

M.5.3.8 Evolutionary Light Water Reactor

Studies of evaluation basis accidents and beyond evaluation basis accidents have been performed for an evolutionary LWR in the *Evolutionary/Advanced Light Water Reactor Data Report*. The studies postulated a set of accident scenarios that were representative of the risks and consequences for workers and the public that can be expected if the facility were constructed and operated. The advanced boiling reactor studies were selected as representative studies for the evolutionary LWRs.

M.5.3.8.1 Accident Scenarios and Source Terms

A wide range of hazardous conditions and potential accidents from operating the facility were identified as candidates to represent the risks to workers and the public. Through a screening process, four evaluation basis accidents and two beyond evaluation basis accidents were selected for further definition and analysis. Supporting information for these accidents has been documented in *Assessment of Radioactive Releases to the Environment Due to the Incorporation of Tritium Targets into an Advanced Light Water Reactor to Produce Tritium*, October 1995.

Evaluation Basis Accidents

Failure of Small Primary Coolant Line Outside of Containment

This accident postulated the rupture of an instrument line outside the drywell but inside the reactor building. It is not possible to isolate the leak. The flow from the instrument line is limited by a 0.64-centimeter (0.25-inch) diameter flow-restricting orifice inside the drywell. The total integrated mass of fluid released into the reactor building is 5,442 kg (12,000 pounds [lb]), with approximately 2,270 kg (5,000 lb) flashed into steam. The accident sequence is terminated by the orderly shutdown and depressurization of the reactor. Table M.5.3.8.1-1 presents the source term released to the environment. The analysis did not estimate the accident annual frequency of occurrence. It is expected that the postulated annual frequency of occurrence would range from 0.01/yr to 1.0×10^{-4} /yr. For the purpose of calculating the point estimate of risk for the postulated accident, the accident annual frequency of occurrence is assumed to be 1.0×10^{-3} /yr.

Steam System Piping Break Outside Containment

This accident postulated a large steam line break outside of containment downstream of the outermost isolation valve. The plant is designed to immediately detect the break and initiate isolation of the broken line. Table M.5.3.8.1-1 presents the source term released to the environment. The analysis did not estimate the accident annual frequency of occurrence. It is expected that the postulated annual frequency of occurrence would range from 1.0×10^{-4} /yr to 1.0×10^{-6} /yr. For the purpose of calculating the point estimate of risk for the postulated accident, the accident annual frequency of occurrence is assumed to be 1.0×10^{-5} /yr.

Cleanup Water Line Break Outside Containment

This accident postulated a large cleanup water line break outside of containment. The analysis assumed that the non-filtered inventory in both the regenerative and non-regenerative heat exchangers is released through the break. The leak is automatically isolated approximately 75 seconds after the break. Table M.5.3.8.1-1 presents the source term released to the environment. The analysis did not estimate the accident annual frequency of occurrence. It is expected that the postulated annual frequency of occurrence would range from 1.0×10^{-4} /yr to 1.0×10^{-6} /yr. For the purpose of calculating the point estimate of risk for the postulated accident, the accident annual frequency of occurrence is assumed to be 1.0×10^{-5} /yr.

Table M.5.3.8.1-1. Advanced Boiling Water Reactor Evaluation Basis Accident Source Terms

Accident Parameter	Accident Scenario			
	Failure of Small Primary Coolant Line Outside Containment	Steam System Piping Break Outside Containment	Cleanup Water Line Break Outside Containment	Fuel Handling
Frequency of occurrence ^a	1.0×10^{-3}	1.0×10^{-5}	1.0×10^{-5}	1.0×10^{-5}
Isotope Released to Environment (Ci)				
I-131	4.2	43	2.4	130
I-132	34	410	5.5	160
I-133	25	260	5.9	120
I-134	49	720	8.3	6.0×10^{-6}
I-135	36	390	6.8	21
Xe-131m	0	2.9×10^{-4}	0	84
Xe-133m	0	5.5×10^{-3}	0	1.1×10^3
Xe-133	0	0.14	0	2.7×10^4
Xe-135m	0	0.47	0	220
Xe-135	0	1.3	0	1.9×10^4
Xe-137	0	2.0	0	2.1×10^{-10}
Xe-138	0	1.5	0	4.3×10^{-10}
Xe-139	0	0.70	0	0
Kr-83m	0	0.040	0	3.8
Kr-85m	0	0.078	0	55
Kr-85	0	1.9×10^{-4}	0	250
Kr-87	0	0.24	0	7.1×10^{-3}
Kr-88	0	0.23	0	14
Kr-89	0	1.6	0	8.1×10^{-11}
Kr-90	0	0.42	0	0

^a Midpoint of the estimated frequency range.

Source: GE nda.

Fuel Handling Accident

This accident postulated a spent fuel assembly dropped into the reactor core. The analysis assumed that some rods in the dropped assembly and in the struck assembly fail. Table M.5.3.8.1-1 presents the source term released to the environment. The analysis did not estimate the accident annual frequency of occurrence. It is expected that the postulated annual frequency of occurrence would range from 1.0×10^{-4} /yr to 1.0×10^{-6} /yr. For the purpose of calculating the point estimate of risk for the postulated accident, the accident annual frequency of occurrence is assumed to be 1.0×10^{-5} /yr.

Beyond Evaluation Basis Accidents

Chapter 19 of the *Advanced Boiling Water Reactor Standard Safety Analysis Report* evaluated beyond design basis accidents that were initiated by either internal events (for example, a sequence of equipment failures) or external events (for example, severe natural phenomena such as beyond design basis earthquakes). The evaluation of external event-initiated accidents did not present accident frequency data, release fractions, or source term data that could be used to analyze the accident consequences and risks for this class of accident in this document.

Numerous internal event-initiated accidents were evaluated in Chapter 19 of the Advanced Boiling Water Reactor (BWR) Standard SAR. The accidents that had a common source term were grouped together and evaluated as a single accident, and a single total annual frequency of occurrence was defined for the group. Release fractions and the annual frequency of occurrence were defined for two accidents. The annual frequency of occurrence for the ten accidents in Chapter 19 of the Advanced BWR Standard SAR ranged from 7.0×10^{-8} /yr to less than 1.0×10^{-10} /yr. Two of the ten accidents had an annual frequency of occurrence greater than 1.0×10^{-8} /yr. These two accidents were selected for evaluation.

Anticipated Transient Without Scram and Loss of Core Cooling

The postulated accident is an anticipated transient without scram with the loss of core cooling. Due to the loss of core cooling, core damage results, the vessel fails in approximately 1 hour, and the containment fails in approximately 19 hours. The source term is presented in Table M.5.3.8.1–2. The annual frequency of occurrence for this accident is 1.3×10^{-7} /yr.

Large Break Loss of Coolant Accident and Loss of Core Cooling

The postulated accident is represented by a source term that is common for a group of accidents. The group of accidents includes the following:

- Loss of all core cooling, vessel failure at high pressure, firewater addition system switched to drywell spray mode, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.
- Loss of all core cooling, vessel failure at high pressure, passive flooders and drywell spray available, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.
- Large break loss of coolant accident, loss of all core cooling, firewater addition system switched to drywell spray mode, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.
- Station blackout with reactor core isolation cooling operating for 8 hours, offsite power restored at 8 hours, firewater addition system switched to drywell spray mode, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.
- Loss of all core cooling, vessel failure at low pressure, passive flooders available, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.
- Loss of all core cooling, vessel failure at low pressure, firewater addition system switched to drywell spray mode, containment overpressure protection system rupture disk ruptures, and release negligible—less than 0.1 percent volatile fission products.

The source term is presented in Table M.5.3.8.1–2. The annual frequency of occurrence for the group of accidents is 2.1×10^{-8} /yr.

Table M.5.3.8.1–2. Advanced Boiling Water Reactor Beyond Evaluation Basis Accident Source Terms

Accident Parameter	Accident Scenario	
	Anticipated Transient Without Scram and Loss of Core Cooling	Large Break Loss of Coolant Accident and Loss of Core Cooling ^a
Frequency of occurrence ^b	1.3×10^{-7}	2.1×10^{-8}
Isotope Released to Environment (Ci)		
Kr-85	2.3×10^6	5.2×10^5
Kr-85m	1.0×10^6	2.3×10^7
Kr-87	1.7×10^6	3.9×10^7
Kr-88	2.3×10^6	5.2×10^7
Rb-86	0.53	0.30
I-131	2.6×10^3	18
I-132	3.8×10^3	25
I-133	4.8×10^3	31
I-134	5.3×10^3	35
I-135	4.7×10^3	31
Xe-133	9.1×10^6	2.1×10^8
Xe-135	6.7×10^6	1.5×10^8
Cs-134	200	110
Cs-136	150	86
Cs-137	210	120

^a Representative accident description for a group of accidents with the same source term.

^b Total frequency for a group of accidents with same source term.

Source: Source term derived from accident release fractions (GE nda) and core inventory (TTI 1995b).

M.5.3.8.2 Accident Impacts

The estimated impacts of the postulated accidents at each site are provided in Tables M.5.3.8.2–1 through M.5.3.8.2–6. The dose and cancer fatality estimates are based on the analysis of the accident source terms in Tables M.5.3.8.1–1 and M.5.3.8.1–2 using the MACCS computer code. [Text deleted.]

Table M.5.3.8.2-1. Evolutionary Light Water Reactor Accident Impacts at Hanford Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km	
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/Prompt Fatalities ^b Accident Frequency (per year)
Failure of small primary coolant line outside containment	5.6×10^{-3}	$2.2 \times 10^{-6}/0$	5.6×10^{-4}	$2.8 \times 10^{-7}/0$	0.10	$5.2 \times 10^{-5}/1.0 \times 10^{-3}$
Scram system piping break outside containment	0.061	$2.5 \times 10^{-5}/0$	6.2×10^{-3}	$3.1 \times 10^{-6}/0$	1.11	$5.5 \times 10^{-4}/1.0 \times 10^{-5}$
Cleanup water line break outside containment	1.7×10^{-3}	$6.7 \times 10^{-7}/0$	1.7×10^{-4}	$8.4 \times 10^{-8}/0$	0.036	$1.8 \times 10^{-5}/1.0 \times 10^{-5}$
Fuel handling	0.071	$2.8 \times 10^{-5}/0$	8.6×10^{-3}	$4.3 \times 10^{-6}/0$	2.0	$1.0 \times 10^{-3}/1.0 \times 10^{-5}$
Anticipated transient with scram and loss of core cooling	40.4	$0.021/0$	5.4	$2.7 \times 10^{-3}/0$	1,650	$0.82/1.3 \times 10^{-7}$
Large break loss of coolant accident and loss of core cooling	422	$0.089/0.40$	85.6	$0.08/9.7 \times 10^{-3}$	11,700	$5.9/2.1 \times 10^{-8}$
[Text deleted.]						

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

Table M.5.3.8.2-2. Evolutionary Light Water Reactor Accident Impacts at Nevada Test Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/Prompt Fatalities ^b	Accident Frequency (per year)
Failure of small primary coolant line outside containment	3.9x10 ⁻³	1.5x10 ⁻⁶ / 0	8.3x10 ⁻⁵	4.1x10 ⁻⁸ / 0	3.2x10 ⁻³	1.6x10 ⁻⁶ / 0	1.0x10 ⁻³
Scram system piping break outside containment	0.043	1.7x10 ⁻⁵ / 0	9.0x10 ⁻⁴	4.5x10 ⁻⁷ / 0	0.033	1.7x10 ⁻⁵ / 0	1.0x10 ⁻⁵
Cleanup water line break outside containment	1.2x10 ⁻³	4.7x10 ⁻⁷ / 0	2.5x10 ⁻⁵	1.2x10 ⁻⁸ / 0	1.1x10 ⁻³	5.6x10 ⁻⁷ / 0	1.0x10 ⁻⁵
Fuel handling	0.048	1.9x10 ⁻⁵ / 0	1.5x10 ⁻³	7.6x10 ⁻⁷ / 0	0.051	2.6x10 ⁻⁵ / 0	1.0x10 ⁻⁵
Anticipated transient with scram and loss of core cooling	27	0.014/ 0	1.0	5.0x10 ⁻⁴ / 0	50.9	0.026/ 0	1.3x10 ⁻⁷
Large break loss of coolant accident and loss of core cooling	279	0.087/ 0.25	17.8	0.15/ 2.4x10 ⁻⁴	118	0.059/ 0	2.1x10 ⁻⁸
[Text deleted.]							

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

Table M.5.3.8.2-3. Evolutionary Light Water Reactor Accident Impacts at Idaho National Engineering Laboratory

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km	
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/ Prompt Fatalities ^b Accident Frequency (per year)
Failure of small primary coolant line outside containment	5.5×10^{-3}	$2.2 \times 10^{-6}/0$	5.0×10^{-5}	$2.5 \times 10^{-8}/0$	0.043	$2.2 \times 10^{-5}/0$ 1.0×10^{-3}
Scram system piping break outside containment	0.061	$2.4 \times 10^{-5}/0$	5.4×10^{-4}	$2.7 \times 10^{-7}/0$	0.45	$2.3 \times 10^{-4}/0$ 1.0×10^{-5}
Cleanup water line break outside containment	1.6×10^{-3}	$6.6 \times 10^{-7}/0$	1.5×10^{-5}	$7.6 \times 10^{-9}/0$	0.015	$7.6 \times 10^{-6}/0$ 1.0×10^{-5}
Fuel handling	0.068	$2.7 \times 10^{-5}/0$	1.0×10^{-3}	$5.1 \times 10^{-7}/0$	0.65	$3.3 \times 10^{-4}/0$ 1.0×10^{-5}
Anticipated transient with scram and loss of core cooling	36.3	$0.020/0$	0.66	$3.3 \times 10^{-4}/0$	689	$0.35/0$ 1.3×10^{-7}
Large break loss of coolant accident and loss of core cooling	385	$0.071/0.36$	12.4	$0.010/0$	1,150	$0.57/0$ 2.1×10^{-8}
[Text deleted.]						-

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

Table M.5.3.8.2-4. Evolutionary Light Water Reactor Accident Impacts at Pantex Plant

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/Prompt Fatalities ^b	Accident Frequency (per year)
Failure of small primary coolant line outside containment	2.2x10 ⁻³	8.8x10 ⁻⁷ / 0	1.6x10 ⁻³	7.9x10 ⁻⁷ / 0	0.063	3.2x10 ⁻⁵ / 0	1.0x10 ⁻³
Scram system piping break outside containment	0.024	9.7x10 ⁻⁶ / 0	0.017	8.7x10 ⁻⁶ / 0	0.68	3.4x10 ⁻⁴ / 0	1.0x10 ⁻⁵
Cleanup water line break outside containment	6.5x10 ⁻⁴	2.6x10 ⁻⁷ / 0	4.7x10 ⁻⁴	2.3x10 ⁻⁷ / 0	0.021	1.1x10 ⁻⁵ / 0	1.0x10 ⁻⁵
Fuel handling	0.027	1.1x10 ⁻⁵ / 0	0.020	9.9x10 ⁻⁶ / 0	0.97	4.9x10 ⁻⁴ / 0	1.0x10 ⁻⁵
Anticipated transient with scram and loss of core cooling	16.4	7.2x10 ⁻³ / 0	12.0	6.5x10 ⁻³ / 0	813	0.41/ 0	1.3x10 ⁻⁷
Large break loss of coolant accident and loss of core cooling	162	0.095/ 0.080	129	0.10/ 0.047	4,660	2.3/ 0	2.1x10 ⁻⁸
[Text deleted.]							

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

Table M.5.3.8.2-5. Evolutionary Light Water Reactor Accident Impacts at Oak Ridge Reservation

Accident Scenario	Worker at 665 m		Maximum Offsite Individual		Population to 80 km	
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/Prompt Fatalities ^b Accident Frequency (per year)
Failure of small primary coolant line outside containment	6.9×10^{-3}	$2.8 \times 10^{-6}/0$	6.9×10^{-3}	$3.5 \times 10^{-6}/0$	0.43	$2.2 \times 10^{-4}/0$ 1.0×10^{-3}
Scram system piping break outside containment	0.076	$3.0 \times 10^{-5}/0$	0.076	$3.8 \times 10^{-5}/0$	4.6	$2.3 \times 10^{-3}/0$ 1.0×10^{-5}
Cleanup water line break outside containment	2.1×10^{-3}	$8.3 \times 10^{-7}/0$	2.1×10^{-3}	$1.0 \times 10^{-6}/0$	0.15	$7.4 \times 10^{-5}/0$ 1.0×10^{-5}
Fuel handling	0.085	$3.4 \times 10^{-5}/0$	0.085	$4.3 \times 10^{-5}/0$	7.8	$3.9 \times 10^{-3}/0$ 1.0×10^{-5}
Anticipated transient with scram and loss of core cooling	50.6	0.028/ 0	50.6	0.035/ 0	6,250	3.1/ 0 1.3×10^{-7}
Large break loss of coolant accident and loss of core cooling	474	0.058/ 0.56	474	0.072/ 0.56	45,100	22.2/ 0 2.1×10^{-8}
[Text deleted.]						

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary [665 m for this facility at ORR], whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

Table M.5.3.8.2-6. Evolutionary Light Water Reactor Accident Impacts at Savannah River Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km	
	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (rem)	Probability of Latent Cancer/ Prompt Fatality ^a	Dose (person-rem)	Number of Latent Cancer/Prompt Fatalities ^b Accident Frequency (per year)
Failure of small primary coolant line outside containment	3.5×10^{-3}	$1.4 \times 10^{-6}/0$	4.2×10^{-5}	$2.1 \times 10^{-8}/0$	0.15	$7.5 \times 10^{-5}/1.0 \times 10^{-3}$
Scram system piping break outside containment	0.039	$1.6 \times 10^{-5}/0$	4.5×10^{-4}	$2.3 \times 10^{-7}/0$	1.6	$7.9 \times 10^{-4}/1.0 \times 10^{-5}$
Cleanup water line break outside containment	1.1×10^{-3}	$4.2 \times 10^{-7}/0$	1.3×10^{-5}	$6.3 \times 10^{-9}/0$	0.053	$2.6 \times 10^{-5}/1.0 \times 10^{-5}$
Fuel handling	0.045	$1.8 \times 10^{-5}/0$	7.7×10^{-4}	$3.9 \times 10^{-7}/0$	2.5	$1.3 \times 10^{-3}/1.0 \times 10^{-5}$
Anticipated transient with scram and loss of core cooling	27.2	$0.013/0$	0.52	$2.6 \times 10^{-4}/0$	2,260	$1.1/1.3 \times 10^{-7}$
Large break loss of coolant accident and loss of core cooling	279	$0.095/0.21$	8.4	$4.9 \times 10^{-3}/0$	8,640	$4.3/2.1 \times 10^{-8}$
[Text deleted.]						

^a Increase likelihood (or probability) of cancer or prompt fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred. Note: All values are mean values. Advanced BWR data was used as surrogate data for the evolutionary LWR.

Source: Calculated using the source terms in Tables M.5.3.8.1-1 and M.5.3.8.1-2 and the MACCS computer code.

M.5.3.9 Plutonium Conversion

Studies of evaluation basis accidents and beyond evaluation basis accidents have been performed for a Pu conversion facility in the *Data Report for Plutonium Conversion Facility*. The studies postulated a set of accident scenarios that were representative of the risks and consequences for workers and the public that can be expected in the facility were constructed and operated. Although not all potential accidents were addressed, those that were postulated have consequences and risks that are expected to envelop the consequences and risks of an operating facility. In this manner, no other credible accidents with an expected frequency of occurrence larger than 1.0×10^{-7} per year are anticipated that will have consequences and risks larger than those described in this section.

M.5.3.9.1 Accident Scenarios and Source Terms

A wide range of hazardous conditions and potential accidents were identified as candidates to represent the risks to workers and the public of operating the facility. Through a screening process, four evaluation basis accidents and four beyond evaluation basis accidents were selected for further definition and analysis. Descriptive information on these accidents is provided in Tables M.5.3.9.1-1 and M.5.3.9.1-2. Accidents source term information is provided in Tables M.5.3.9.1-3 through M.5.3.9.1-5. Descriptions of accident scenarios are provided in Table M.5.3.9.1-6.

Table M.5.3.9.1-1. Evaluation Basis Accident Scenarios for the Plutonium Conversion Facility

Accident Scenario	Accident Frequency (per year)	Source Term at Risk	Source Term Released to Environment
Fire on the loading dock	1.0×10^{-4} to 1.0×10^{-3}	18 g Pu	0.8 g Pu
Fire in a process cell	1.0×10^{-5} to 1.0×10^{-3}	24 g Pu	4.8×10^{-6} g Pu
Deflagration inside a glovebox	1.0×10^{-5} to 1.0×10^{-3}	10 kg Pu	1.0×10^{-3} g Pu
Forklift breach of containment	4.5×10^{-5}	4 kg PuO ₂	1.7×10^{-9} g Pu

Source: LANL 1996c.

Table M.5.3.9.1-2. Beyond Evaluation Basis Accident Scenarios for the Plutonium Conversion Facility

Accident Scenario	Accident Frequency (per year)	Source Term at Risk	Source Term Released to Environment
Nuclear criticality	$<1.0 \times 10^{-7}$	5.0×10^{17} fissions; gaseous by-products released	^a
Beyond design basis fire in a process cell	$<1.0 \times 10^{-7}$	24 g Pu	0.034 g Pu
Oxyacetylene explosion in a process cell	$<1.0 \times 10^{-7}$	10 kg Pu	50 g Pu
Beyond evaluation basis earthquake	$<1.0 \times 10^{-7}$	10 kg Pu	25 g Pu

^a See Table M.5.3.9.1-3.

Source: LANL 1996c.

Table M.5.3.9.1–3. Plutonium Conversion Facility Criticality Source Terms

Nuclide	Produced (Ci)	Released (Ci)
Kr-83m	5.5	2.75
Kr-85m	3.55	1.75
Kr-85	4.05×10^{-4}	2.0×10^{-4}
Kr-87	21.5	11
Kr-88	11.5	6
Kr-89	650	325
Xe-131m	5.0×10^{-3}	2.5×10^{-3}
Xe-133m	0.11	0.05
Xe-133	1.35	0.75
Xe-135m	165	85
Xe-135	20.5	10
Xe-137	2,450	1,225
Xe-138	550	275
I-131	0.55	0.025
I-132	60	3
I-133	8	0.4
I-134	215	11
I-135	22.5	1.0

Source: LANL 1996c.

**Table M.5.3.9.1–4. Plutonium Conversion Facility Evaluation Basis
Source Terms**

Accident Parameter	Accident Scenario			
	Fire on Loading Dock	Fire in Process Cell	Deflagration Inside a Glovebox	Forklift Breach of Containment
Frequency of occurrence (per year)	5.0×10^{-4a}	1.0×10^{-4a}	1.0×10^{-4a}	4.5×10^{-5}
Pu released to environment (g)	0.8	4.8×10^{-6}	1.0×10^{-3}	1.7×10^{-9}
Isotope Released to Environment (Ci)				
Pu-238	2.9×10^{-3}	1.74×10^{-8}	3.62×10^{-6}	6.15×10^{-12}
Pu-239	0.0448	2.69×10^{-7}	5.60×10^{-5}	9.57×10^{-11}
Pu-240	0.0147	8.83×10^{-8}	1.84×10^{-5}	3.13×10^{-11}
Pu-241	0.0606	3.63×10^{-7}	7.57×10^{-5}	1.29×10^{-10}
Pu-242	4.75×10^{-6}	2.85×10^{-11}	5.94×10^{-9}	1.01×10^{-14}
Am-241	3.19×10^{-4}	1.92×10^{-9}	3.99×10^{-7}	6.78×10^{-13}

^a Midpoint of the estimated frequency range.

Source: Derived from Table M.5.1.3.4–3 and M.5.3.9.1–1.

Table M.5.3.9.1-5. Plutonium Conversion Facility Beyond Evaluation Basis Accident Source Terms

Accident Parameter	Accident Scenario			
	Nuclear Criticality	Beyond Evaluation Basis Fire in Process Cell	Oxyacetylene Explosion in Process Cell	Beyond Design Basis Earthquake
Frequency of occurrence (per year)	1.0×10^{-7}	1.0×10^{-7}	1.0×10^{-7}	1.0×10^{-7}
Pu released to environment (g)	NA	0.034	50	25
Fissions	5.0×10^{17}	NA	NA	NA
Isotope Released to Environment (Ci)				
Pu-238	0	1.23×10^{-4}	0.181	0.0905
Pu-239	0	1.90×10^{-3}	2.80	1.40
Pu-240	0	6.26×10^{-4}	0.920	0.460
Pu-241	0	2.57×10^{-3}	3.79	1.89
Pu-242	0	2.02×10^{-7}	2.97×10^{-4}	1.49×10^{-4}
Am-241	0	1.36×10^{-5}	0.02	9.98×10^{-3}
Kr-83m	2.75	0	0	0
Kr-85m	1.75	0	0	0
Kr-85	2.0×10^{-4}	0	0	0
Kr-87	11	0	0	0
Kr-88	6	0	0	0
Kr-89	325	0	0	0
Xe-131m	2.5×10^{-3}	0	0	0
Xe-133m	0.05	0	0	0
Xe-133	0.75	0	0	0
Xe-135m	85	0	0	0
Xe-135	10	0	0	0
Xe-137	1,225	0	0	0
Xe-138	275	0	0	0
I-131	0.025	0	0	0
I-132	3	0	0	0
I-133	0.4	0	0	0
I-134	11	0	0	0
I-135	1.0	0	0	0

Note: NA=not applicable.

Source: Derived from Tables M.5.1.3.4-3, M.5.3.9.1-2, and M.5.3.9.1-3.

Table M.5.3.9.1–6. Accident Scenario Descriptions for the Plutonium Conversion Facility

Accident Scenario	Accident Description
Evaluation Basis Accidents	
Fire on the loading dock	The fire is caused by welding, cleaning solvents, electrical shorts, or other miscellaneous causes. The scenario assumes an open garage door and that a single drum of combustible waste is involved in the fire.
Fire in the process cell	It is assumed that a process cell contains a glovebox used for final processing of Pu oxide powder. The gloves, stowed outside the glovebox, are coated with a layer of Pu dust. A flammable cleaning liquid such as acetone or isopropyl alcohol is brought into the process cell in violation of operating procedures, spills and ignites. The initial extent and intensity of the fire are sufficient to completely incinerate the gloves. The sprinkler system activates and protects the glovebox from further damage. The ventilation system with HEPA filters continues to function throughout the accident.
Deflagration inside a glovebox	The bounding evaluation basis explosion is a deflagration of a flammable gas mixture inside a glovebox. It is assumed that through some unforeseen set of failures, a combustible gas mixture accumulates inside a glovebox and is ignited, possibly by an electrical spark from an operating electrical device. The deflagration blows out the HEPA filter from the glovebox ventilation system exit. Gloves may also be blown out. The room volumes are sufficient to attenuate the pressure wave to levels below that needed to damage the building ventilation system HEPA filters.
Forklift breach of containment	The most catastrophic case of leak or spill or nuclear material would result from a forklift or other large vehicle running over a package or nuclear material, breaching the containment, and causing an airborne release to the room. Three-stage HEPA filtration is available for the facility exhaust to limit the release to the environment.
Beyond Evaluation Basis Accidents	
Nuclear criticality	There will not be sufficient quantities of Pu solutions at the facility to cause a criticality accident. The most likely cause of a criticality event involving Pu oxides would be improper stacking or handling of bulk nuclear material. Multiple operational errors in the material spacing, packing density, manner and type of containment, and maximum quantities of fissile materials permitted in the area would be required for the postulated criticality accident to occur.
Beyond evaluation basis fire in a process cell	A typical fire with coincident failures of two or more major safety systems constitutes a beyond evaluation basis fire. The evaluation postulated the fire in a process cell, discussed above, with the sprinkler system and ventilation system with HEPA filtration inoperative during the accident.
Oxyacetylene explosion in a process cell	The evaluation postulated the explosion of a welding rig oxyacetylene bottle in a process cell. The explosion is sufficient to blow out the HEPA filters and cause significant damage to the ventilation system and nearby equipment.
Beyond evaluation basis earthquake	The following assumptions were used in the evaluation: (1) the earthquake disables the ventilation system; (2) there is significant structural damage to the building but it does not totally collapse; (3) a ceiling slab falls on the glovebox; (4) the process cell with the most material at risk is located on an outside wall; (5) the outside wall cracks; and (6) the wind is blowing and the cracks are located in the lee side of the building.

Source: LANL 1996c.

M.5.3.9.2 *Accident Impacts*

The estimated impacts of the postulated accidents at each site are provided in the Tables M.5.3.9.2–1 through M.5.3.9.2–6. The dose and cancer fatality estimates are based on the analysis of the accident source terms in Tables M.5.3.9.1–4 and M.5.3.9.1–5 using the MACCS computer code. [Text deleted.].

Table M.5.3.9.2-1. Plutonium Conversion Facility Accident Consequences at Hanford Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km	
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b
Fire on the loading dock	0.24	9.7×10^{-5}	7.7×10^{-3}	3.8×10^{-6}	14.0	7.0×10^{-3}
Fire in a process cell	1.4×10^{-6}	5.8×10^{-10}	4.6×10^{-8}	2.3×10^{-11}	8.4×10^{-5}	4.2×10^{-8}
Deflagration inside a glovebox	3.0×10^{-4}	1.2×10^{-7}	9.6×10^{-6}	4.8×10^{-9}	0.018	8.7×10^{-6}
Forklift breach of containment	5.1×10^{-10}	2.0×10^{-13}	1.6×10^{-11}	8.2×10^{-15}	3.0×10^{-8}	1.5×10^{-11}
Nuclear criticality	5.2×10^{-4}	2.1×10^{-7}	1.7×10^{-5}	8.4×10^{-9}	3.4×10^{-3}	1.7×10^{-6}
Beyond evaluation basis fire in a process cell	0.010	4.1×10^{-6}	3.3×10^{-4}	1.6×10^{-7}	0.59	3.0×10^{-4}
Oxyacetylene explosion in a process cell	15.0	6.8×10^{-3}	0.48	2.4×10^{-4}	873	0.44
Beyond evaluation basis earthquake	7.5	3.1×10^{-3}	0.24	1.2×10^{-4}	436	0.22
[Text deleted.]						

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

Table M.5.3.9.2-2. Plutonium Conversion Facility Accident Impacts at Nevada Test Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		Accident Frequency (per year)
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b	
Fire on the loading dock	0.16	6.6×10^{-5}	3.0×10^{-3}	1.5×10^{-6}	0.32	1.6×10^{-4}	5.0×10^{-4}
Fire in a process cell	9.9×10^{-7}	4.0×10^{-10}	1.8×10^{-8}	9.1×10^{-12}	1.9×10^{-6}	9.5×10^{-10}	1.0×10^{-4}
Deflagration inside a glovebox	2.1×10^{-4}	8.2×10^{-8}	3.8×10^{-6}	1.9×10^{-9}	4.0×10^{-4}	2.0×10^{-7}	1.0×10^{-4}
Forklift breach of containment	3.5×10^{-10}	1.4×10^{-13}	6.4×10^{-12}	3.2×10^{-15}	6.7×10^{-10}	3.4×10^{-13}	4.5×10^{-5}
Nuclear criticality	3.9×10^{-4}	1.5×10^{-7}	6.5×10^{-6}	3.2×10^{-9}	6.6×10^{-5}	3.3×10^{-8}	1.0×10^{-7}
Beyond evaluation basis fire in a process cell	7.0×10^{-3}	2.8×10^{-6}	1.3×10^{-4}	6.4×10^{-8}	0.013	6.7×10^{-6}	1.0×10^{-7}
Oxyacetylene explosion in a process cell	10.3	4.5×10^{-3}	0.19	9.4×10^{-5}	19.8	9.9×10^{-3}	1.0×10^{-7}
Beyond evaluation basis earthquake	5.1	2.1×10^{-3}	0.094	4.7×10^{-5}	9.9	4.9×10^{-3}	1.0×10^{-7}
[Text deleted.]							

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

Table M.5.3.9.2-3. Plutonium Conversion Facility Accident Impacts at Idaho National Engineering Laboratory

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b	Accident Frequency (per year)
Fire on the loading dock	0.22	9.0x10 ⁻⁵	1.9x10 ⁻³	9.7x10 ⁻⁷	4.2	2.1x10 ⁻³	5.0x10 ⁻⁴
Fire in a process cell	1.3x10 ⁻⁶	5.4x10 ⁻¹⁰	1.2x10 ⁻⁸	5.8x10 ⁻¹²	2.5x10 ⁻⁵	1.3x10 ⁻⁸	1.0x10 ⁻⁴
Deflagration inside a glovebox	2.8x10 ⁻⁴	1.1x10 ⁻⁷	2.4x10 ⁻⁶	1.2x10 ⁻⁹	5.2x10 ⁻³	2.6x10 ⁻⁶	1.0x10 ⁻⁴
Forklift breach of containment	4.8x10 ⁻¹⁰	1.9x10 ⁻¹³	4.1x10 ⁻¹²	2.1x10 ⁻¹⁵	8.9x10 ⁻⁹	4.5x10 ⁻¹²	4.5x10 ⁻⁵
Nuclear criticality	5.0x10 ⁻⁴	2.0x10 ⁻⁷	3.9x10 ⁻⁶	1.9x10 ⁻⁹	8.5x10 ⁻⁴	4.3x10 ⁻⁷	1.0x10 ⁻⁷
Beyond evaluation basis fire in a process cell	9.5x10 ⁻³	3.8x10 ⁻⁶	8.3x10 ⁻⁵	4.1x10 ⁻⁸	0.18	8.9x10 ⁻⁵	1.0x10 ⁻⁷
Oxyacetylene explosion in a process cell	14.1	6.9x10 ⁻³	0.12	6.1x10 ⁻⁵	262	0.13	1.0x10 ⁻⁷
Beyond evaluation basis earthquake	7.0	2.8x10 ⁻³	0.061	3.0x10 ⁻⁵	131	0.065	1.0x10 ⁻⁷
[Text deleted.]							

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.
Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

Table M.5.3.9.2-4. Plutonium Conversion Facility Accident Impacts at Pantex Plant

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		Accident Frequency (per year)
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b	
Fire on the loading dock	0.097	3.9x10 ⁻⁵	0.031	1.5x10 ⁻⁵	4.8	2.4x10 ⁻³	5.0x10 ⁻⁴
Fire in a process cell	5.8x10 ⁻⁷	2.3x10 ⁻¹⁰	1.9x10 ⁻⁷	9.3x10 ⁻¹¹	2.8x10 ⁻⁵	1.4x10 ⁻⁸	1.0x10 ⁻⁴
Deflagration inside a glovebox	1.2x10 ⁻⁴	4.8x10 ⁻⁸	3.9x10 ⁻⁵	1.9x10 ⁻⁸	5.9x10 ⁻³	3.0x10 ⁻⁶	1.4x10 ⁻⁸
Forklift breach of containment	2.1x10 ⁻¹⁰	8.2x10 ⁻¹⁴	6.6x10 ⁻¹¹	3.3x10 ⁻¹⁴	1.0x10 ⁻⁸	5.1x10 ⁻¹²	4.5x10 ⁻⁵
Nuclear criticality	2.4x10 ⁻⁴	9.7x10 ⁻⁸	9.3x10 ⁻⁵	4.6x10 ⁻⁸	2.3x10 ⁻³	1.1x10 ⁻⁶	1.0x10 ⁻⁷
Beyond evaluation basis fire in a process cell	4.1x10 ⁻³	1.6x10 ⁻⁶	1.3x10 ⁻³	6.6x10 ⁻⁷	0.20	1.0x10 ⁻⁴	1.0x10 ⁻⁷
Oxyacetylene explosion in a process cell	6.1	2.5x10 ⁻³	1.9	9.7x10 ⁻⁴	297	0.15	1.0x10 ⁻⁷
Beyond evaluation basis earthquake	3.0	1.2x10 ⁻³	0.97	4.8x10 ⁻⁴	149	0.074	1.0x10 ⁻⁷
[Text deleted.]							

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

Table M.5.3.9.2-5. Plutonium Conversion Facility Accident Impacts at Oak Ridge Reservation

	Worker at 772 m		Maximum Offsite Individual		Population to 80 km		
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b	Accident Frequency (per year)
Accident Scenario							
Fire on the loading dock	0.28	1.1x10 ⁻⁴	0.28	1.4x10 ⁻⁴	52.3	0.026	5.0x10 ⁻⁴
Fire in a process cell	1.7x10 ⁻⁶	6.8x10 ⁻¹⁰	1.7x10 ⁻⁶	8.4x10 ⁻¹⁰	3.1x10 ⁻⁴	1.6x10 ⁻⁷	1.0x10 ⁻⁴
Deflagration inside a glovebox	3.5x10 ⁻⁴	1.4x10 ⁻⁷	3.5x10 ⁻⁴	1.8x10 ⁻⁷	0.065	3.3x10 ⁻⁵	1.0x10 ⁻⁴
Forklift breach of containment	6.0x10 ⁻¹⁰	2.4x10 ⁻¹³	6.0x10 ⁻¹⁰	3.0x10 ⁻¹³	1.1x10 ⁻⁷	5.6x10 ⁻¹¹	4.5x10 ⁻⁵
Nuclear criticality	5.9x10 ⁻⁴	2.4x10 ⁻⁷	5.9x10 ⁻⁴	3.0x10 ⁻⁷	0.035	1.8x10 ⁻⁵	1.0x10 ⁻⁷
Beyond evaluation basis fire in a process cell	0.012	4.8x10 ⁻⁶	0.012	6.0x10 ⁻⁶	2.2	1.1x10 ⁻³	1.0x10 ⁻⁷
Oxyacetylene explosion in a process cell	17.6	7.9x10 ⁻³	17.6	9.8x10 ⁻³	3,270	1.63	1.0x10 ⁻⁷
Beyond evaluation basis earthquake	8.8	3.5x10 ⁻³	8.8	4.4x10 ⁻³	1,630	0.82	1.0x10 ⁻⁷
[Text deleted.]							

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary (772 m for this facility at ORR), whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

Table M.5.3.9.2-6. Plutonium Conversion Facility Accident Impacts at Savannah River Site

Accident Scenario	Worker at 1,000 m		Maximum Offsite Individual		Population to 80 km		
	Dose (rem)	Probability of Cancer Fatality ^a	Dose (rem)	Probability of Cancer Fatality ^a	Dose (person-rem)	Number of Cancer Fatalities ^b	Accident Frequency (per year)
Fire on the loading dock	0.16	6.3×10^{-5}	3.1×10^{-3}	1.5×10^{-6}	15.0	7.5×10^{-3}	5.0×10^{-4}
Fire in a process cell	9.4×10^{-7}	3.8×10^{-10}	1.9×10^{-8}	9.3×10^{-10}	9.0×10^{-5}	4.5×10^{-8}	1.0×10^{-4}
Deflagration inside a glovebox	2.0×10^{-4}	7.9×10^{-6}	3.9×10^{-6}	1.9×10^{-9}	0.019	9.4×10^{-6}	1.0×10^{-4}
Forklift breach of containment	3.3×10^{-10}	1.3×10^{-13}	6.6×10^{-12}	3.3×10^{-15}	3.2×10^{-8}	1.6×10^{-11}	4.5×10^{-5}
Nuclear criticality	3.5×10^{-4}	1.4×10^{-7}	5.7×10^{-6}	2.8×10^{-9}	4.6×10^{-3}	2.3×10^{-6}	1.0×10^{-7}
Beyond evaluation basis fire in a process cell	6.7×10^{-3}	2.7×10^{-6}	1.3×10^{-4}	6.6×10^{-8}	0.64	3.2×10^{-4}	1.0×10^{-7}
Oxyacetylene explosion in a process cell	9.9	4.4×10^{-3}	0.19	9.7×10^{-5}	936	0.47	1.0×10^{-7}
Beyond evaluation basis earthquake	4.9	2.1×10^{-3}	0.097	4.8×10^{-5}	468	0.23	1.0×10^{-7}
[Text deleted.]							

^a Increased likelihood (or probability) of cancer fatality to a hypothetical individual (a single onsite worker at a distance of 1,000 m or the site boundary, whichever is smaller, or to a hypothetical individual in the offsite population located at the site boundary) if exposed to the indicated dose. The value assumes the accident has occurred.

^b Estimated number of cancer fatalities in the entire offsite population out to a distance of 80 km if exposed to the indicated dose. The value assumes the accident has occurred.

Note: All values are mean values.

Source: Calculated using the source terms in Tables M.5.3.9.1-4 and M.5.3.9.1-5 and the MACCS computer code.

M.5.3.10 Existing Commercial and Partially Completed Light Water Reactors

The use of MOX in place of Uranium Dioxide (UO_2) fuel in existing commercial and partially completed LWRs is an alternative being considered for the disposition of surplus Pu. The risks and consequences of potential accidents for commercial LWRs that use UO_2 fuel have been studied in detail and documented in reports submitted by nuclear plant owners to the NRC. These reports do not address the potential accident impacts associated with the use of MOX fuels.

The risks associated with existing commercial LWRs has been studied by the operating organizations in accordance with NRC guidance. The safety of these reactors has been analyzed and reported by plant operators in such documents as SARs and probabilistic risk assessments. In addition, the NRC has conducted probabilistic risk assessments on five existing reactors and issued the report *Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants* (NUREG-1150). According to this report, the estimated mean core damage frequencies would range from 4.0×10^{-6} to 3.4×10^{-4} caused by internal events (not including natural phenomena). Should such core damage occur, the potential consequences would range from 71 to 1,022 latent cancer fatalities for the offsite population according to this NRC report. The estimated risks to the offsite population from these accidents would range from 9.6×10^{-4} to 2.4×10^{-2} .

Reactor safety issues regarding the use of MOX fuel in existing LWRs are addressed in a recent report by the National Academy of Science (NAS). The report indicates that the potential influences on the safety of the use of MOX fuel in LWRs has been extensively studied in the United States in the 1970s. These influences on safety have also been extensively studied in Europe, Japan, and Russia. Regarding effects of MOX fuel on accident probabilities, the report states, "... no important overall adverse impact of MOX fuel use on the accident probabilities of the LWRs involved will occur; if there are adequate reactivity and thermal margins in the fuel, as licensing review should ensure, the main remaining determinants of accident probabilities that will involve factors not related to fuel composition and hence unaffected by the use of MOX fuel rather than LEU fuel" (NAS 1995a:352). Regarding the effects of MOX fuel on accident consequences, the report states, "... it seems unlikely that the switch from uranium-based fuel could worsen the consequences of a postulated (and very improbable) severe accident in an LWR by more than 10 to 20 percent. The influence on the consequence of less severe accidents, which probably dominate the spectrum value of population exposure per reactor-year of operation would be even smaller, because less severe accidents are unlikely to mobilize any significant quantity of plutonium at all" (NAS 1995a:355).

Analysis described has been performed using the MACCS code to determine the effects of the use of MOX fuel in an existing LWR. The assumed accident conditions include a large population distribution near the existing LWR and meteorology conditions for dispersal leading to large doses, and would not necessarily be reflective of actual site conditions. A sample of severe accident scenarios is illustrated in Table M.5.3.10-1. The data shown are derived from a range of severe accidents that make up the release scenarios. Some accidents have frequencies much less than 1×10^{-8} and large releases. These low frequency/high release accidents were included to reflect severe accident conditions leading to core damage and release of radioactive materials in order to obtain an estimate on the effects of using MOX fuel versus uranium fuel, as indicated by the ratios. To perform a comparison of existing commercial LWR impacts with other disposition alternatives, reactor accidents with frequencies less than $1 \times 10^{-7}/\text{yr}$ would need to be done with site-specific meteorology, receptor, and population data.

Impacts are calculated in units of probability of cancer fatality for the MEI and the worker and the number of cancer fatalities for the offsite population. The fatality data shown does not reflect site conditions and would differ if site-specific meteorology and population were used. The ratios of accident fatalities for MOX and UO_2 fueled LWRs are given in Table M.5.3.10-2 only for the purpose of showing the relative impacts because the ratios would not be affected by meteorological or population data. Each scenario is based on releases taken from an existing commercial LWR probabilistic risk assessment of severe accidents. The releases were modeled using the MACCS code based on a large population distribution near a generic LWR and meteorological

Table M.5.3.10-1. Accident Impacts for Existing Light Water Reactor With Mixed Oxide Fuels

Accident Release Scenario ^a	Worker at 1,000 m						Maximum Offsite Individual						Population Within 80 km					
	Accident Scenario Frequency ^b (per year)	Probability of Latent Cancer Fatality	Risk of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality per 17 yr (per 11 yr)	Probability of Latent Cancer Fatality	Risk of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality (per 17 yr (per 11 yr)	Risk of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality (per 17 yr (per 11 yr)	Number of Latent Cancer Fatalities	Risk of Latent Cancer Fatalities (per year)	Risk of Latent Cancer Fatalities (per 17 yr (per 11 yr)	Number of Latent Cancer Fatalities	Risk of Latent Cancer Fatalities (per year)	Risk of Latent Cancer Fatalities (per 17 yr (per 11 yr)			
Steam generator tube rupture	1.5x10 ⁻⁶	1.0	1.5x10 ⁻⁶	2.6x10 ⁻⁵ (1.7x10 ⁻⁵)	1.0	1.5x10 ⁻⁶	2.6x10 ⁻⁵ (1.7x10 ⁻⁵)	1.0	1.5x10 ⁻⁶	2.6x10 ⁻⁵ (1.7x10 ⁻⁵)	5.9x10 ³	0.0089	5.9x10 ³	0.0089	0.15 (0.098)			
Large late containment failure-high RCS pressure	8.1x10 ⁻⁶	0.79	6.4x10 ⁻⁶	1.1x10 ⁻⁴ (7.2x10 ⁻⁵)	0.86	7.0x10 ⁻⁶	1.2x10 ⁻⁴ (7.8x10 ⁻⁵)	0.86	7.0x10 ⁻⁶	1.2x10 ⁻⁴ (7.8x10 ⁻⁵)	1.3x10 ²	0.0011	1.3x10 ²	0.0011	0.018 (0.012)			
Large early containment failure-medium/low RCS pressure	7.0x10 ⁻⁷	1.0	7.0x10 ⁻⁷	1.2x10 ⁻⁵ (7.8x10 ⁻⁶)	1.0	7.0x10 ⁻⁷	1.2x10 ⁻⁵ (7.8x10 ⁻⁶)	1.0	7.0x10 ⁻⁷	1.2x10 ⁻⁵ (7.8x10 ⁻⁶)	2.3x10 ³	0.0016	2.3x10 ³	0.0016	0.027 (0.018)			
Large early containment failure-high RCS pressure	8.7x10 ⁻⁷	1.0	8.7x10 ⁻⁷	1.5x10 ⁻⁵ (9.8x10 ⁻⁶)	1.0	8.7x10 ⁻⁷	1.5x10 ⁻⁵ (9.8x10 ⁻⁶)	1.0	8.7x10 ⁻⁷	1.5x10 ⁻⁵ (9.8x10 ⁻⁶)	1.6x10 ³	0.0014	1.6x10 ³	0.0014	0.024 (0.016)			

Table M.5.3.10-1. Accident Impacts for Existing Light Water Reactor With Mixed Oxide Fuels—Continued

Accident Release Scenario ^a	Worker at 1,000 m				Maximum Offsite Individual				Population Within 80 km			
	Accident Scenario Frequency ^b (per year)	Probability of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality per 17 yr (per 11 yr)	Risk of Latent Cancer Fatality (per year)	Probability of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality (per year)	Risk of Latent Cancer Fatality (per 17 yr (per 11 yr))	Number of Latent Cancer Fatalities (per year)	Risk of Latent Cancer Fatalities (per year)	Number of Latent Cancer Fatalities (per year)	Risk of Latent Cancer Fatalities (per year)	Risk of Latent Cancer Fatalities (per 17 yr (per 11 yr))
Interfacing system loss of cooling accident	1.3x10 ⁻⁷	1.0	1.3x10 ⁻⁷	2.2x10 ⁻⁶ (1.4x10 ⁻⁶)	1.0	1.3x10 ⁻⁷	2.2x10 ⁻⁶ (4.8x10 ⁻⁶)	7.3x10 ³	0.00095	7.3x10 ³	0.016 (0.010)	
Small early containment failure	2.4x10 ⁻⁶	1.0	2.4x10 ⁻⁶	4.1x10 ⁻⁵ (2.7x10 ⁻⁵)	1.0	2.4x10 ⁻⁶	4.1x10 ⁻⁵ (2.7x10 ⁻⁵)	1.2x10 ³	0.0029	1.2x10 ³	0.049 (0.032)	

^a Each release scenario is based on existing commercial LWR probabilistic risk assessment of severe accidents. The release scenarios were modeled using the MACCS code based on large population distribution near a generic site and meteorological conditions leading to large doses. The meteorological data used to estimate the fatalities are not for reactor sites, and therefore, the fatality data shown are not relevant to nor indicative of fatalities that would be calculated if site-specific meteorological and population data were used in the model.

^b A release scenario typically will contain many accident sequences that have a common outcome (for example steam generator tube rupture). Each accident sequence has a frequency of occurrence that is derived from an event tree analysis and will include sequences with frequencies that are below those used in typical EISs.

^c The population risk of latent cancer fatality, when compared with similar risk from the use of LEU reactor fuel, yields correct latent cancer fatality ratios of MOX-fuel relative to LEU-fuel. The accident conditions include a large population distribution near the existing LWR and meteorology conditions for dispersal leading to large doses and would not necessarily be reflective of actual site conditions. Further site-specific NEPA and safety documentation would be completed if the existing LWR alternative is selected.

Note: RCS=Reactor Coolant System. For the Preferred Alternative, for analysis purposes, approximately 70 percent of the Pu was assumed to be used for MOX fuel. The impacts projected for 50 t for the assumed 17-year existing LWR campaign would be proportionately reduced to those for an 11-year campaign; all values are mean values.

Source: HNUS 1996a.

Table M.5.3.10-2. Ratio of Accident Impacts for Mixed Oxide Fueled and Uranium Fueled Reactors for Typical Severe Accidents (Mixed Oxide Impacts/Uranium Impacts)^a

Accident Release Scenarios ^b	Worker at 1,000 m	Maximum Offsite	Population Within
		Individual	80 km
Steam generator tube rupture	0.94	0.94	0.94
Large late containment failure-high RCS pressure	1.08	1.07	1.08
Large early containment failure-medium/low RCS pressure	0.93	0.93	0.93
Large early containment failure-high RCS pressure	0.97	0.96	0.97
Interfacing system loss of cooling accident	0.93	0.92	0.93
Small early containment failure	0.96	0.95	0.96

^a The ratio of accident fatalities for MOX- and UO₂-fueled LWRs are shown for the purposes of showing relative impacts. For example, 0.94 indicates that the impacts of the accident would be lower for a reactor with MOX fuel.

^b Each release scenario is based on existing commercial LWR probabilistic risk assessment of severe accidents. The release scenarios were modeled using the MACCS code based on estimated population distribution near a generic site and meteorological conditions for dispersal leading to large doses. Therefore, the fatality data shown are not relevant to nor indicative of fatalities that would be calculated if site-specific meteorological and population data were used in the model.

Note: RCS=Reactor Coolant System.

Source: HNUS 1996a.

conditions for dispersal leading to large doses and would not necessarily be reflective of actual site conditions. Further site-specific NEPA and safety reviews would be performed should the Existing LWR Alternative be selected at the ROD.

The MACCS calculations for typical LWR reactors using a MOX core have shown that, for some risk measures, there is a reduction in risk. This must result from lower releases of some fission products, all else being equal. The main reasons for such lower releases are the following:

- The different spectrum of fission products resulting from Pu-239 fissions as compared to those from fissions of U-235.
- The lower flux level in a reactor with an increased loading of Pu-239 in place of U-235, both at the same power level.

The first effect will alter the amounts produced of individual radionuclides. The lower flux level will alter both the level at which saturating fission products will equilibrate and the rates of change of fission products with medium cross-sections.

Additional effects can result from different neutron flux spectrum shapes in MOX-fueled reactors, the effects of Pu-241 fission in MOX cores, and the change in U-238 fast fissions, as well as several other phenomena, but these are all of less importance.

Examination of typical core inventory isotopic ratios for MOX compared to UO₂ cores, reveals that the ratios are less than one for some risk-important radionuclides. In particular, these are the krypton, strontium, and tritium isotopes, and also cesium-134, iodine-134 and iodine-135. While there are others that are reduced, they all are not readily released to the environment (very small "release fraction") in a severe accident so that the change is not significant.

A series of sensitivity calculations has been performed to illustrate the effects of the changes in the isotopic core inventory ratios. These have been carried out using the MACCS code for one particular Pressurized Water Reactor reactor using as a basis the severe accident releases quoted in the Individual Plant Evaluation PRA submittal document to the NRC. Six risk calculations were performed: the base case (UO₂) for the Individual Plan and Evaluation submittal case, a MOX case using the isotopic factors, and four sensitivity cases in which some of the isotopic ratio factors were arbitrarily set to 1.0, while the remaining ratios were as for the MOX case. The sensitivity cases run were the following:

- Cs-134 ratio increased to 1.0 (from 0.65)
- All krypton (Kr) isotopes increased to 1.0 (from 0.57-0.62)
- All strontium (Sr) and yttrium (Y) isotopes increased to 1.0 (from 0.5-0.78)
- Iodine, I-134, and I-135 increased to 1.0 (from 0.96 and 0.92)

The results of these cases are shown in Table M.5.3.10-3. The column headed MOX is the percentage change in the risk factors in going to a MOX core from a UO₂ core. The columns headed Cs, Kr, Sr/Y, I-134/135 are the sensitivity cases listed immediately above, with the changes shown as percentage differences from the MOX case.

Table M.5.3.10-3. Accident Impact Sensitivity Analysis for Light Water Reactors Using Mixed Oxide Fuels

Risk Factor	MOX ^a	Cs-134 ^b	Kr ^b	Sr/Y ^b	I-134/135 ^b
Latent Cancer Fatalities to Regional Population					
Within 10 miles	-8%	11%	0%	0%	0%
Within 50 miles	4%	0%	0%	0%	0%
Within 500 miles	-6%	8%	0%	0%	0%
Population Dose					
Within 10 miles	-6%	9%	0%	0%	0%
Within 50 miles	4%	-1%	0%	0%	0%
Within 500 miles	-5%	8%	0%	0%	0%
Prompt Cancer Fatalities to Regional Population					
Within 10 miles	2%	1%	0%	0%	0%
Within 50 miles	2%	1%	0%	0%	0%
Within 500 miles	2%	1%	0%	0%	0%

^a Values are the percent change in health impacts due to replacing UO₂ core with MOX core.

^b Values are the percent change in health impacts due to changing the isotopes as described in the text.

Source: HNUS 1996a.

The MOX and Cs columns taken together show that the reduction in the latent fatalities and population exposures can be explained by the reduction in the amount of Cs-134 in the MOX core. For example, the MOX core substitution results in a 6-percent reduction (from the UO₂ base) in latent fatalities out to 800 km (500 mi). Arbitrarily increasing the Cs-134 core inventory back up to the UO₂ level results in an 8-percent increase in this risk factor (from the MOX base) back to the magnitude of the UO₂ case.

The other isotopes do not appear to have a significant effect. The strontium and tritium fission products have a very low release fraction in all of the accidents for this reactor. The two iodine isotopes would be expected to have the same effect as the cesium but do not appear to be significant as the relative change in isotopic ratio is small. The negative early fatality effect of the cesium, iodine and krypton isotope decreases appear to be outweighed by all the other fission products whose inventories are larger in the MOX core (relative to the UO₂ core).

It is not immediately obvious why, relative to the UO_2 case, the MOX latent fatalities decrease within both the 16-km (10-mi) and the 800-km (500-mi) radius but increase within the 80-km (50-mi) radius. These do appear to track with the cesium. It is postulated that this effect is due to the varying temporal relationships of the decay, the meteorology, the population distributions, the different paths, and other factors that have differing relative dose importances with distance and time.

These results are quantitatively applicable only to a typical set of accidents and environmental conditions. They should be qualitatively indicative for other reactor situations that are not too dissimilar.

M.5.3.11 Contribution of Americium, Curium, and Plutonium to Reactor Accident Consequences

The analysis of potential accidents and risks for an LWR that uses MOX fuel was performed using the MACCS computer program and the library of isotopes that was included with the program. The isotopes in the library are considered important contributors to accident risk and consequences by the program developers at Sandia National Laboratory. In addition to the analysis of potential reactor accident impacts discussed in this appendix, a study using the MACCS program has also been performed to provide information on the contribution to accident risks and consequences of radioisotopes associated with MOX fuel: (1) Americium (Am-241); (2) Curium (Cm-242 and Cm-244), and (3) Pu (Pu-238, Pu-239, Pu-240, and Pu-241). The study was based on several potential severe accidents for three operating commercial reactors. Using the MACCS program, the ratio of dose due only to Americium, Curium, and Pu to the total dose due to all isotopes in the MACCS library were estimated and are shown in Table M.5.3.11-1. The results indicate that the contribution of Americium, Curium, and Pu to accident risks and consequences in a MOX fueled LWR very low, less than 1 percent to 2 percent of the total. The only exception to this is the "large late containment failure high reactor coolant system" accident for which the contribution of Americium, Curium, and Pu is 10 percent of total.

Table M.5.3.11-1. Ratio of Accident Dose for Americium, Curium, and Plutonium in a Mixed Oxide Fuel Reactor to Total Dose for Uranium Fueled Reactor (Americium+Curium+Plutonium Dose/Total Dose)

	Offsite Population	Maximum Exposed Individual
Accident Release Category		
Steam generator tube rupture	1.7×10^{-4}	2.4×10^{-4}
Large late containment failure	1.0×10^{-1}	9.7×10^{-2}
Large early containment failure—low to medium RCS pressure	1.3×10^{-3}	1.8×10^{-3}
Large early containment failure—high RCS pressure	1.6×10^{-2}	2.1×10^{-2}
Interfacing system loss of cooling accident	2.1×10^{-3}	3.1×10^{-3}
Small early containment failure	1.4×10^{-2}	1.5×10^{-2}

Note: RCS=Reactor Coolant System.

Source: HNUS 1996a.

It is not immediately obvious why, relative to the UO_2 case, the MOX latent fatalities decrease within both the 16-km (10-mi) and the 800-km (500-mi) radius but increase within the 80-km (50-mi) radius. These do appear to track with the cesium. It is postulated that this effect is due to the varying temporal relationships of the decay, the meteorology, the population distributions, the different paths, and other factors that have differing relative dose importances with distance and time.

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Large early containment failure—high RCS pressure	1.6×10^{-2}	2.1×10^{-2}
Interfacing system loss of cooling accident	2.1×10^{-3}	3.1×10^{-3}
Small early containment failure	1.4×10^{-2}	1.5×10^{-2}

Note: RCS=Reactor Coolant System.

Source: HNUS 1996a.

Appendix N

Multipurpose Reactor

A multipurpose reactor is a reactor that can produce tritium, use plutonium (Pu)-based fuel, and/or offset operating costs through revenues generated from the sale of electricity. In the past, Congress and commercial parties, including reactor vendors, have expressed interest in developing a multipurpose reactor that could both meet the nations tritium supply requirements and accommodate the disposition of surplus Pu. In the National Defense Authorization Act for Fiscal Year 1996, Congress directed that the Department of Energy (DOE) include a cost-benefit analysis in the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement* (Storage and Disposition PEIS) of the multipurpose reactor using the Advanced Light Water Reactor (ALWR) and Modular Helium Reactor (MHR) technologies. DOE has also received comments on the Storage and Disposition PEIS concerning certain types of multipurpose reactors including the Fast Flux Test Facility (FFTF) at Hanford Site (Hanford), which would actually be a dual purpose reactor than a multipurpose reactor as characterized above.

The purpose of this appendix is to provide information on the costs and benefits of carrying out two separate projects for the performance of the tritium production and Pu disposition missions, versus the costs and benefits of carrying out one multipurpose project for both missions. Information in the appendix is not a proposal for action by the Department, nor is it an analysis of the multi-purpose reactor technology that would allow it to be selected in the Storage and Disposition PEIS Record of Decision (ROD). This information is presented in the interest of more fully informing the decision-maker and the public regarding discussions about the potential utility of multi-purpose reactors for overlapping or simultaneous Departmental missions. The cost-effectiveness of using FFTF is not known, beyond the common-sense proposition that using an existing facility could be an advantage. Furthermore, neither the multipurpose reactor nor the FFTF in a dual-purpose mode has been proposed or subjected an independent system analysis by the Department.

N.1 BACKGROUND

An evaluation of multipurpose reactors was performed as part of DOE's *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (TSR PEIS) (DOE/EIS-0161, October 1995). This evaluation was a part of the TSR PEIS because the multipurpose reactor could potentially offer the capability of producing tritium at a reduced cost compared to other tritium production options through the sharing of costs with the Pu disposition mission. The TSR PEIS evaluated the potential environmental impacts for multipurpose reactors for ALWR, Modular High Temperature Gas-Cooled Reactor (MHTGR), and existing commercial light water reactor (LWR) designs. Although the TSR PEIS also mentioned a MHR, an emerging design variation of the MHTGR, no detailed analyses of the MHR as a reasonable option for the tritium production mission were included.

All of these reactor types normally utilize uranium as fuel. Uranium fuel could continue to be used if one of these technologies were selected for tritium production; however, an all Pu fuel or a mixed oxide (MOX) fuel of Pu and uranium could also be used for a tritium production reactor. Both the LWR and gas cooled reactor technologies have been used for electrical power production but not for tritium production. While the technology exists in other countries for operating LWRs with MOX fuel, the gas cooled reactor has no MOX fuel operating experience.

The Department's TSR Record of Decision (ROD) was to pursue a dual track for tritium supply based on the two most promising tritium supply alternatives. This dual track consists of (1) initiating the purchase of an existing commercial reactor (operating or partially complete) or irradiation services with an option to purchase the reactor for conversion to a defense facility and (2) designing, building, and testing critical components of an accelerator system for tritium production. Within a 3-year period, DOE expects to select one of the tracks to serve as the primary source of tritium. The TSR ROD concluded that the use of LWRs, especially existing

commercial reactors, has the highest potential for delivering new tritium gas by the required start date of 2011. The MHTGR and MHR were judged to have a lower probability of meeting this date because they have the potential for major technical or regulatory delays. They were also judged to have a lower probability than the other alternatives considered of being able to operate with sufficient reliability, to meet the annual tritium production requirements. Furthermore, total life cycle costs and operation and maintenance costs for gas reactors were high, especially for the MHTGR.

The TSR PEIS also considered tritium production in the FFTF, an existing liquid metal cooled reactor located at Hanford near Richland, Washington. It was dismissed in the TSR ROD as a long-term tritium supply option because its remaining life is substantially less than the long-term mission requirements for tritium production. The FFTF is also limited in the amount of tritium that it could produce, which is only a percentage of the tritium requirement. It was therefore not considered reasonable to rely on operating the facility as a long-term tritium supply option. Nevertheless, the TSR ROD indicated that DOE would conduct further evaluations to determine whether the operation of the FFTF might be able to play any role in meeting future tritium requirements. Although the FFTF produces no electricity and like the light water and gas cooled reactors has never been used for tritium production, it has been used in experimental capacities. Therefore, its utility as a multipurpose reactor is included in the discussion below.

The sizes of the multipurpose reactors considered for tritium production use based upon meeting specific tritium supply requirements and not on the disposition of a prescribed quantity of Pu within a reasonable (25-year) time period. These reactors would have to be capable of producing tritium at a steady state production mode and at an increased production mode should the need arise.

Plutonium disposition using a single multipurpose reactor would take longer than the disposition goal of 25 years from project authorization. This disposition goal could only be achieved by using more reactors (or an additional disposition option such as immobilization). This would be required for tritium production alone. Furthermore, if new reactor(s) were provided, the Pu disposition mission would be completed before the end of their useful design life for the reactors, thereby resulting in unneeded plutonium disposition capacity after approximately 15 years of operation (assuming 50 metric tons [t] (55 short tons) [tons] of Pu). Thus, while plutonium disposition would be possible in a multipurpose reactor, the primary purpose of the reactor would be tritium production.

N.2 NEW MULTIPURPOSE REACTORS

A new ALWR or MHR multipurpose reactor could potentially offer savings to the Government by combining the tritium production and Pu disposition missions into a single reactor program. Although it may be technically feasible for a multipurpose reactor to perform these combined missions, additional development, demonstration, and testing would be required to address a number of technical issues. These technical issues relate primarily to fuel and tritium target development and demonstration, and to related reactor modification and licensing requirements. These issues would be expected to have greater impact on the MHR than on an ALWR because of its extensive developmental requirements and lack of operating experience. Also issues related to the different capacity requirements (number of reactors) for each mission, and different refueling and re-targeting schedules would need to be addressed. The use of a single reactor for tritium production is not compatible with the Pu disposition objective of satisfying the Spent Fuel Standard in 25 years or less from the time of project authorization. Furthermore, a lower reliability would be expected for combined missions versus separate missions in separate reactors, because the problems and delays with one mission could impact the timely implementation of the other. For example, problems with MOX fuel performance (a disposition mission factor) or tritium target performance such as repeated leaks (a tritium production mission factor) could delay both missions. Whether this potentially lower reliability would impact the effective implementation of both these critically important missions is still an open question.

The Nuclear Regulatory Commission (NRC) evaluated MOX-burning LWRs in an environmental impact statement issued in 1976.¹ They included extensive information on the changes and impacts required for an LWR in order to allow it to utilize MOX fuel. This document was reviewed as part of DOE's analysis of the multipurpose ALWR.

N.3 ADVANCED LIGHT WATER REACTOR

The TSR PEIS considered four ALWR options: a large 1300-megawatt electric (MWe) pressurized water reactor (PWR) plant, a large 1,100-MWe boiling water reactor (BWR) plant, a small 600-MWe PWR plant, and a small 600-MWe BWR plant. All ALWR options would use light (regular) water as the reactor coolant and moderator, and a steam cycle to remove heat from the light water coolant to generate electricity.

The ALWR concepts considered for tritium production are based on advanced commercial reactor designs developed by U.S. reactor vendors in conjunction with DOE. These commercial designs have been reviewed or are undergoing review by the NRC with the goal of simplifying their licensing process. They incorporate passive safety features and other advancements that would be expected in any new LWRs that might be built in the United States in the future. Advanced BWRs, similar to some of the designs being developed in the United States, are being built in Japan.

Although no ALWRs have been built in the United States, they are considered to have the lowest risk of any new reactor option evaluated for tritium production or Pu disposition because they are based on the light water technology and extensive operating experience of the 110 commercial reactors operating in this country today. A single multipurpose large ALWR (1,256 MWe) with a typical commercial reactor fuel cycle (18 to 24 months) could meet both the steady state and increased tritium production requirements. The steady state requirement could be achieved without having to displace any of the reactor's fuel rods with tritium target rods. However, the disposition of 50 t (55 tons) of surplus Pu in a single multipurpose reactor would take approximately 44 years from project authorization (12 years of plant design and construction and 32 years of operation). For the increased tritium production requirement, Pu disposition would take even longer since some of the reactor's fuel may have to be displaced by tritium targets to accommodate the higher tritium requirement. In order to produce the required amount of tritium and disposition 50 t (55 tons) of Pu in approximately 25 years from project authorization, two multipurpose ALWRs would be required. If a hybrid approach were chosen for Pu disposition in which reactors and immobilization were used, less than the full 50 t (55 tons) of Pu would be identified for disposition in reactors, and the disposition times and number of reactors would therefore be reduced.

N.4 MODULAR HELIUM REACTOR AND MODULAR HIGH TEMPERATURE GAS-COOLED REACTOR

The TSR PEIS considered the use of three 350-megawatt thermal (MWt) MHTGR modules for the production of tritium. The MHTGR concept uses a steam cycle to remove heat from the helium reactor coolant and to generate electricity. There has been some limited experience (with mixed success) in the United States and abroad with gas reactors using a steam cycle. However, the use of MOX fuel in MHTGR reactors designed to produce tritium would significantly reduce tritium production capability. Combining tritium production and Pu disposition in multipurpose gas reactors would require an increase to six 350-MWt MHTGR reactor modules in order to meet the increased tritium production requirement. However, this number of modules would still be insufficient to meet the 25 year Pu disposition objective. Approximately twenty-four 350-MWt reactor modules would be required to satisfy the Pu mission goal using the MHTGR technology. This number of reactors would be economically unattractive.

¹ *Final Environmental Statement on the Use of Recycled Plutonium Mixed Oxide Fuel in Light Water Cooled Reactors* (GESMO) (NUREG-0002), August 1976.

The MHR concept is economically more attractive than the MHTGR because it has the potential to achieve higher thermal efficiencies and its advanced design allows reactors to be packaged into larger modules (600-MWt) than the 350-MWt MHTGR. Fewer MHR modules would therefore be required to satisfy the same tritium or Pu mission, and the cost of reactor construction and operations would be less. Two MHR reactor modules would be required to meet the increased tritium production requirement alone, without Pu disposition. Eight multipurpose reactor modules using a 2-year reactor fuel cycle proposed by the MHR vendor, would be required to satisfy the increased tritium production requirement and disposition approximately 50 t (55 tons) of surplus Pu. With eight 600-MWt MHR reactor modules, the disposition of 50 t (55 tons) of surplus Pu would take approximately 26 years from project authorization (12 years of plant construction and 14 years of operation).

The MHR can achieve substantial cost savings when compared to the MHTGR because it uses the reactor's helium coolant in a high efficiency direct-cycle gas turbine to generate electricity rather than in a steam cycle like the MHTGR. While the direct cycle approach has cost advantages and higher plant efficiency, it also has a much larger risk associated with bringing it to a level of technical maturity that would allow the Government to proceed with confidence in the timeframe required to meet tritium production and Pu disposition objectives.

Since the direct-cycle turbine power conversion system is new and unproven, it must complete an extensive design, development, testing, and demonstration program. Further, the integration of the power conversion system with the reactor system has not been demonstrated, and will require extensive design and development. In addition to the direct cycle turbine, only very limited experience exists with Pu fuel for gas reactors. Both the fabrication process and operational performance of the fuel must be developed and demonstrated. The Pu fuel fabrication facility for the MHR would be a first-of-a-kind facility and therefore represents one of the highest risk items for maintaining the aggressive schedule that would be required for tritium production and Pu disposition. Direct cycle turbine and fuel development activities required for the MHR would therefore represent a major risk to meeting mission objectives in a timely, reliable, and cost-effective manner. It was for this reason that DOE did not consider the MHR to be a reasonable alternative for either tritium production or Pu disposition, or both missions combined in a multipurpose MHR reactor.

N.5 COST COMPARISONS

N.5.1 ADVANCED LIGHT WATER REACTOR COSTS

For purposes of cost analysis, reactors were assumed to be located at the Savannah River Site (SRS). Costs were calculated for separate tritium production and Pu disposition missions in separate reactors, as well as for combined missions in a multipurpose reactor.

The cost/benefit of the multipurpose ALWR reactor option was analyzed for two cases: Government ownership and private ownership. In the case of Government ownership, the front-end costs which include the reactor, tritium recovery facility, pit disassembly/conversion facility, MOX fuel fabrication facility, and all associated research and development, would all be paid for by the Government. In the case of private ownership, the reactor and MOX fuel fabrication plant would be financed, constructed, and operated by a private entity. All other front-end costs would be paid for by the Government. Cost comparisons, expressed in discounted 1996 dollars, are provided in Table N.5.1-1. Costs shown are for construction and operation of the reactor and common facilities (pit disassembly/conversion, MOX fuel fabrication, tritium target fabrication). An average revenue return of \$.029 per kilowatt-hour is assumed for electricity production over the life of the reactor. This return reflects the potential effect of deregulation of the electric power industry. This value was also used in the *Reactor Alternative Summary Report Vol. 4—Evolutionary LWR Alternative* (ORNL/TM-13275/r4) and the *Technical Summary Report for Surplus Weapons—Usable Plutonium Disposition* (DOE/MD-0003).

The Government ownership cases highlight the potential cost advantages of a multipurpose reactor as compared to building new reactors for each mission separately. The front-end costs to the Government for deploying

Table N.5.1-1. Advanced Light Water Reactor Costs (1996 Dollars)

Mission	Reactor Size	Front-End Costs (Dollars in Billions)	Discounted Life Cycle Costs (Dollars in Billions)	Discounted Total Costs for Both Missions (Dollars in Billions)
Private^a				
Pu disposition only	Two ALWRs 2,512 MWe	0.32	4.1	7.0 ^b
Tritium production only	One ALWR 1,100 MWe	0.34	2.9	
Multipurpose	Two ALWRs 2,512 MWe	0.66	4.4	4.4
Government^c				
Pu disposition only ^d	Two ALWRs 2,512 MWe	6.9	3.7	7.0 ^b
Tritium production only	One ALWR 1,100 MWe	4.3	2.0	
Multipurpose	Two ALWRs 2,512 MWe	7.2	3.7	3.7

^a Privately owned MOX fuel fabrication facilities and reactors. Government owned Pu processing and tritium facilities.

^b Sum of Pu disposition and tritium production.

^c All government owned facilities.

^d Same case as Table 4.2 of October 1996 Technical Summary Report for Surplus Weapons Usable Plutonium Disposition (Rev 1).

separate reactors and associated facilities versus the costs for two multipurpose reactors and associated facilities are \$11.2 billion and \$7.2 billion, respectively. The front-end cost for the multipurpose reactor is therefore \$4.0 billion less than that for separate new reactors. The discounted life-cycle costs are \$2.6 billion less for the two multipurpose reactors compared to the three reactor separate projects case.

The private ownership option assumes a combination of industry-based financing for a substantial part of the undertaking, together with debt financing for the balance. However, the potential feasibility of private financing must be tempered with the recognition that for more than 15 years, the commercial nuclear power industry has not found it economically and politically feasible to build new nuclear power plants in the United States. It is unlikely that passive investors would be willing to "project finance" the construction phase of the project (that is, where the debt and equity investors take the project risk), for the following reasons: the size of the investment; the risks associated with completing the construction of such a facility; and the general anxiety within the investment community over nuclear projects. There is some possibility that passive investors might be willing to finance such a project once it is built and operating; after NRC approvals and associated risks are complete; and after technology issues, construction delays, cost overruns, permitting, and initial startup testing are behind the project. Government support of a privately owned reactor may overcome some of these concerns, as suggested by the interest expressed by some industry groups in both single purpose and multipurpose reactors for tritium production and Pu disposition.

The private ownership cases highlight the potential cost advantages of private ownership. The front-end costs to the Government are significantly reduced for the reactors in the Pu disposition only case (\$6.6 billion reduction), the tritium production only case (\$4.0 billion reduction), and the multipurpose reactor case (\$6.6 billion reduction), when compared to Government ownership because the front-end costs of the reactor and MOX fuel fabrication facility would be financed by a private entity. For the multipurpose reactor, the discounted life-cycle cost is increased, however, by about \$0.7 billion as a result of the higher financing costs for a private owner combined with tax effects and the desire by the private investor for a return on investment. These costs are

ultimately paid for by the Government as part of the irradiation service over the 40-year operating life of the reactor. Potential advantages of private ownership would be lower front-end costs and the fact that Government outlays could be spread over the life of the project.

The Department tasked a consultant (Putnam, Hayes & Bartlett, Inc. [PHB]) to provide an independent cost analysis of DOE's tritium production alternatives, including a preliminary assessment of the multipurpose ALWR option. For the multipurpose reactor option, the PHB report² analyzed the costs of a Government-owned multipurpose reactor and a privately financed and owned option for three cases: the purchase of an existing commercial LWR; the construction and operation of a new small ALWR; and the construction and operation of a new large ALWR.

The PHB analysis of cost impacts of privately financing the multipurpose reactor indicates that only the purchase of an existing reactor would result in a cost benefit to the Government. The PHB report shows that privatization of such a multipurpose reactor could provide savings to the Government of about \$1 billion in discounted life-cycle cost compared to the cost of separate reactors for tritium production and Pu disposition. A privately financed and owned multipurpose reactor could cost the Government an additional \$0.7 billion to \$11.4 billion in discounted cost compared to the Government ownership option as a result of the higher financing cost for a private owner and the desire by the private investor for a return on investment. This result depends heavily on electricity unit revenues and the terms that private participants are willing to offer DOE. The PHB report concluded that private financing may provide benefits to the Government, but should be examined by DOE after a tritium supply option or strategy is chosen.

N.5.2 MODULAR HELIUM REACTOR COSTS

For purposes of MHR cost analysis, reactors were again assumed to be located at Savannah River Site. As in the case of the ALWR, costs were calculated for separate tritium production and Pu disposition missions in separate reactors, as well as for combined missions in a multipurpose MHR. The cost/benefit of the multipurpose MHR option was analyzed for two cases: Government ownership and private ownership. In the case of Government ownership, the front-end costs, which include the reactor, tritium recovery facility, pit disassembly/conversion facility, MOX fuel fabrication facility, and all associated research and development, would all be paid for by the Government. In the case of private ownership, the reactor and MOX fuel fabrication facility would be financed, constructed, and operated by a private entity. All other front-end costs would be paid for by the Government. Cost comparisons, expressed in discounted 1996 dollars, are provided in Table N.5.2-1. Costs shown are for construction and operation of the reactor and common facilities (pit disassembly/conversion, MOX fuel fabrication, tritium target fabrication). An average revenue return of \$.029 per kilowatt-hour is assumed for electricity production over the life of the reactor.

For the Government ownership option, the Government's front-end costs for the multipurpose MHR plant and the sum of the costs for separate reactor plants for tritium production and Pu disposition, were calculated to be about \$6.5 billion and \$8.1 billion, respectively. The potential cost advantage of the multipurpose MHR would be about \$1.6 billion in front-end costs.

With regard to private financing, the MHR would not be feasible until after a period of successful operation of a demonstration facility. Financing for a multipurpose MHR would be difficult in view of the poor operating history of the Fort Saint Vrain facility, a gas-cooled reactor plant in Colorado that experienced a multitude of operational problems. The revolutionary nature of its design, the development and demonstration requirements associated with the reactor fuel and direct cycle turbine, and the lack of NRC review would be further impediments to private financing.

² DOE Tritium Production Options: Putnam, Hayes & Bartlett Final Report On Cost Analysis, September 1, 1995 (Text Revision October 15, 1995).

Table N.5.2-1. *Modular Helium Reactor Costs (1996 Dollars)*

Mission	Reactor Size ^a	Front-End Costs (Dollars in Billions)	Discounted Life Cycle Costs (Dollars in Billions)	Discounted Total Costs for Both Missions (Dollars in Billions)
Private^b				
Pu disposition only	8 modules	0.32	3.5	5.0 ^c
	2,288 MWe			
Tritium production only	2 modules	0.68	1.5	4.1
	572 MWe			
Multipurpose	8 modules	1.0	4.1	4.1
	2,288 MWe			
Government^d				
Pu disposition only	8 modules	5.8	3.1	5.0 ^c
	2,288 MWe			
Tritium production only	2 modules	2.3	1.0	3.7
	572 MWe			
Multipurpose	8 modules	6.5	3.7	3.7
	2,288 MWe			

^a Each reactor module is designed to produce 286 MWe.

^b Privately owned MOX fuel fabrication facilities and reactors. Government owned Pu Processing and tritium facilities.

^c Sum of Pu disposition and tritium production.

^d All government facilities.

For the privately owned multipurpose MHR, the front-end costs could be reduced by about \$5.5 billion relative to the Government-owned multipurpose reactor option because the reactors and the fuel fabrication plant would be financed, constructed, and operated by private entities. The privately owned multipurpose reactor would cost the Government about \$0.4 billion more in discounted life cycle costs compared to the Government-owned option. This increase, as in the case of the ALWR, is the result of higher financing costs for a private owner combined with tax effects and the desire of the private investor for a return on investment. These costs would ultimately be paid for by the Government as part of the irradiation service over the operating life of the reactor. Again, potential advantages of private ownership would be lower front-end costs and the fact that the Government outlays could be spread over the life of the project.

N.6 FAST FLUX TEST FACILITY

As part of the process of selecting Pu disposition technologies for evaluation in the Storage and Disposition PEIS, DOE considered the FFTF, a liquid metal reactor at Hanford, because it was an existing facility that would not require the large commitment of time and money that a new reactor would require for implementation of the Pu disposition mission. The FFTF, however, was eliminated because it was in a standby status awaiting shutdown and because it could not satisfy the Storage and Disposition PEIS criterion of completing the disposition mission within 25 years using the historic FFTF Pu fuel enrichment specifications.

It has been suggested by commentators in this PEIS and others that the use of the FFTF as an integral part of the nation's tritium production infrastructure might help ensure the tritium supply by 2005 and at the same time provide a way to begin the disposition of surplus weapons-usable Pu as well as provide a source of medical isotopes.

As noted in the DOE's December 5, 1995 ROD on Tritium Supply and Recycling, DOE is evaluating the operation of the FFTF to determine if it might have a role in meeting future tritium requirements. If DOE

proposes and subsequently decides to use the FFTF for tritium production, then, in order to accomplish this mission, a portion of the fuel-usable surplus Pu could be used to operate the FFTF.³ Before the FFTF could begin to use this Pu for the production of tritium, 3 to 4 years would be required to develop and test a higher Pu enriched reactor fuel and to establish a MOX fuel fabrication capability. Under these conditions, it would take at least 35 years from a ROD to disposition the surplus weapons-grade Pu that is suitable for use in reactors, or a supplementary disposition approach (such as immobilization) would be needed for the unused balance.

At the time this Storage and Disposition PEIS went to print, DOE had not proposed to use FFTF for tritium production. If DOE proposes to consider the FFTF in detail for this purpose, appropriate *National Environmental Policy Act* review will be performed.

N.7 SUMMARY

A single multipurpose ALWR could perform the tritium mission at a steady state mode but it would not provide the capability to disposition surplus Pu in a timely manner. For a single new large multipurpose ALWR operating on a typical commercial fuel cycle, it would take approximately 12 years of design and construction and 32 years of operation (a total of 44 years) to disposition 50 t (55 tons) of Pu. The same reactor could meet an increased tritium production requirement, but Pu disposition would take longer since some of the reactor's fuel may have to be displaced by tritium targets to accommodate the higher production requirement. Two multipurpose ALWRs would be required to meet the increased tritium production requirement and complete Pu disposition within the goal of 25 years from project authorization.

Two MHR reactor modules would be required to meet the increased tritium production requirement alone, without Pu disposition. Eight MHR modules would be required to meet the same tritium production requirement and complete the Pu disposition mission in 26 years (12 years for construction and 14 years for operation).

The use of the FFTF, or new multipurpose reactors sized for tritium production alone, could provide cost advantages to the Government in front-end costs and overall life cycle costs relative to the use of separate new reactor facilities for tritium production and Pu disposition. However, these cost savings would need to be balanced against the impacts of the slower Pu disposition rate imposed by the limited reactor capacity of these options. The goal of completing the disposition mission within 25 years of project authorization could only be achieved if additional reactors were to be provided or other means of disposition employed, such as immobilization. In the case of multiple new reactors, the disposition mission would be completed before the end of the useful design life of the reactors, which would result in unneeded reactor capacity.

³ The rate of utilization would be about one ton per year maximum. See Use of the Fast Flux Test Facility for Tritium Production (the "JASON Report"), S. Drell and D. Hoummer, Co-chairs, The MITRE Corporation, McLean, Virginia, September 11, 1996, page 22 (draft).

Appendix O

Can-in-Canister Variants

O.1 INTRODUCTION

This appendix presents descriptive information on variants to the vitrification and ceramic immobilization disposition alternatives described as “a can-in-canister approach at Savannah River Site (SRS)” in Table 2.4-1. Based upon comments from the public on the Draft Programmatic Environmental Impact Statement, there is substantial interest in the can-in-canister (CIC) concept for the disposition of surplus plutonium (Pu), and several requests have been made for the Department of Energy (DOE) to consider this concept in its decisionmaking process.

During the initial 12 scoping meetings held across the country from August to October 1994, there was public input on the potential reasonable alternatives and proposed screening process. One of the 37 disposition options under consideration at that time was Option I-2: Borosilicate Glass Immobilization using a Modified Defense Waste Processing Facility (DWPF). This option was eliminated as unreasonable because the DWPF was not designed for criticality control, and therefore would require extensive modifications and refitting of the facility and equipment during its present mission, potentially resulting in increased personnel radiation exposure, along with potential delays and cost escalation for its present mission (DOE 1995m:1-9).

The Department recognized that there could be potential cost savings for the immobilization category of disposition alternatives if the output product from the DWPF (that is, vitrified high-level waste [HLW]) could be used in the disposal of Pu. In response, SRS and the national laboratories developed a CIC concept, which was mentioned in the *Summary Report of the Screening Process* as a variant of Option I-3: Immobilization in Borosilicate Glass (DOE 1995m:4-6). This concept currently consists of two CIC variants that are included in the *Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0003) dated July 17, 1996.

The CIC concept at SRS is described as an example of a technology variant at an existing facility. However, the Record of Decision (ROD) for this PEIS will only select broader technology strategies for disposition. Site specific decisions and variant-specific decisions will be made pursuant to subsequent *National Environmental Policy Act* (NEPA) review tiered from this initial PEIS.

O.2 CAN-IN-CANISTER CONCEPT AT SAVANNAH RIVER SITE

The CIC concept includes variations to the two Pu disposition alternatives for vitrification and ceramic immobilization. CIC could utilize existing facilities at SRS to house the processes for pit disassembly/conversion, Pu conversion, and vitrification or ceramic immobilization. These existing facilities include the 221-F Facility in F-Area where Pu would be immobilized into a ceramic or glass form and loaded in a can and the DWPF in S-Area where the immobilized Pu would be loaded into a canister with vitrified HLW. For vitrification CIC, Pu would be immobilized in a borosilicate glass matrix in small cans and the cans placed in stainless steel canisters, which are then filled with molten borosilicate glass containing HLW to serve as the radiation barrier. For ceramic CIC, Pu would be immobilized in a ceramic matrix in small cans in lieu of the borosilicate glass, and the cans placed in stainless steel canisters, which are then filled with molten borosilicate glass containing HLW to serve as the radiation barrier. In both cases, the stainless steel canisters would be filled at the DWPF and placed in interim onsite storage at SRS until shipment to a HLW repository is possible.

The CIC concept at SRS could offer the following advantages over the base case immobilization category alternatives:

- Maximize use of existing SRS facilities
- Use vitrified HLW already slated for disposal in a HLW repository
- Provide a simple, yet effective, means to control criticality (that is, small cans of Pu)
- Eliminate unnecessary packaging between front-end operations and immobilization operations
- Require fewer additional canisters in a HLW repository
- Potentially reduce cost and worker radiation exposure

O.3 VITRIFICATION CAN-IN-CANISTER VARIANT

The vitrification CIC variant would process Pu forms to oxide, immobilize Pu oxide in borosilicate glass, and fill individual stainless steel cans. The filled cans would be loaded onto a frame and placed inside an empty stainless steel canister. The canister would have a cylindrical shape with a diameter of 0.6 meters (m) (2 feet [ft]) and length of 3 m (10 ft), and be identical to the stainless steel canister currently used in the DWPF to hold vitrified HLW, with the exception that the canister head would not be welded to the body until after the canister is loaded with cans of Pu glass. The loaded canister would be transferred to the DWPF facility, where molten HLW glass would be poured inside the canister and around the small cans and allowed to harden. The filled canisters would then be decontaminated, welded closed, and stored on-site in the Glass Waste Storage Building until a HLW repository is available for final disposal. A process schematic and material flow diagram for the vitrification CIC process are presented in Figures O.3-1 and O.3-2, respectively.

Facility Description. The vitrification CIC variant could use part of the existing 221-F Canyon building including the Pu Storage Facility and the New Special Recovery facilities, and part of the DWPF including the Vitrification and Service Buildings and the Glass Waste Storage Building. Table O.3-1 lists the location of each process area. Pit disassembly/conversion and other front-end processing, pretreatment operations, and first stage vitrification could be performed in the existing 221-F facility in areas specifically modified to vitrify Pu. The current F-Area facilities are designed and built to handle large quantities of Pu and have systems to maintain criticality control and safeguard systems to maintain accountability and security. The F-Area site layout is shown in Figure O.3-3. The floor area required for the front-end Pu processing and the vitrification functions

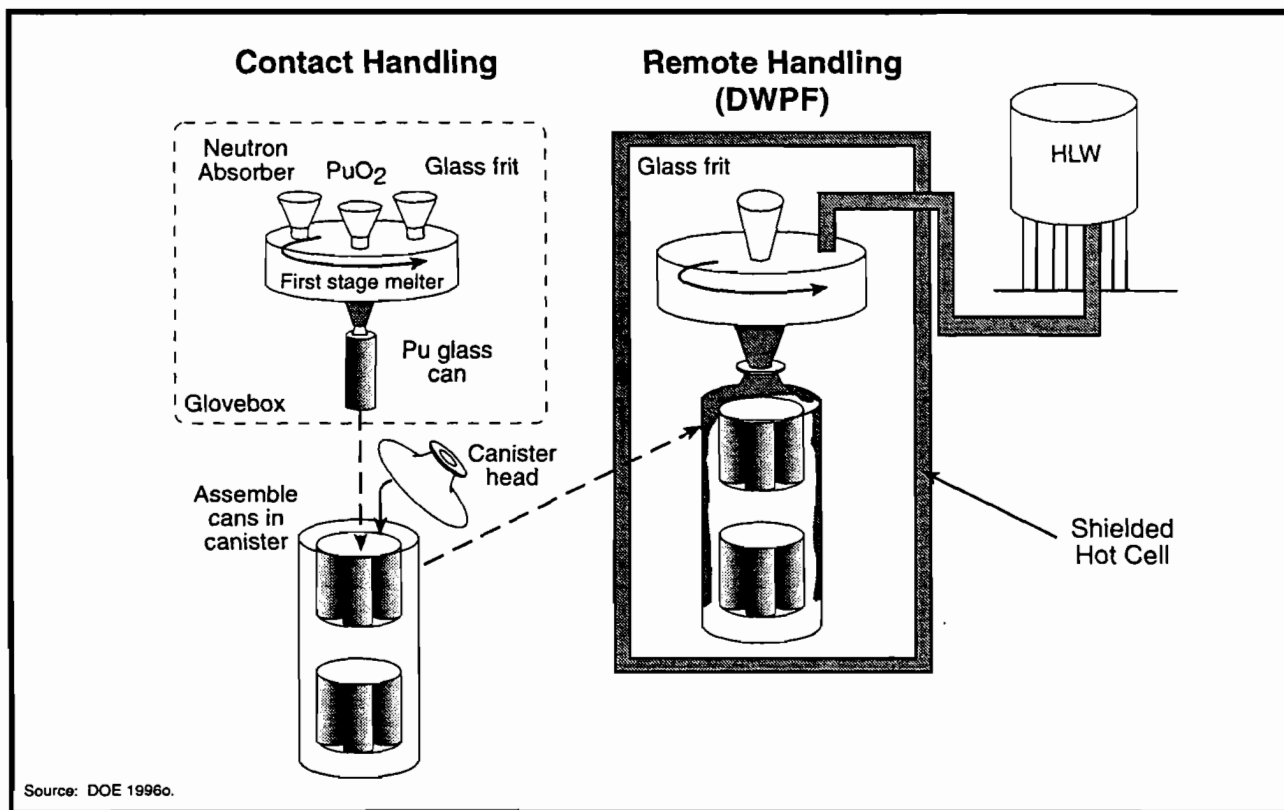
Table O.3-1. Locations for Proposed Vitrification Can-in-Canister Process Equipment

Process	Location
Receiving, shipping, storage, sampling	221-F Pu Storage Facility
Pit disassembly, dehydrate/hydride/oxidation	221-F New Special Recovery Facilities
Oralloy decontamination	221-F New Special Recovery Facilities
Special recovery	221-F Canyon 3rd Level
Fuel decladding, halide material processing	221-F Canyon 3rd Level
Feed preparation (dry variants)	221-F Canyon 3rd Level
Oxide lag storage (dry variants)	221-F Canyon 3rd Level
1st stage melter (dry variants)	221-F Canyon 3rd Level
Off-gas treatment (dry variants)	221-F Canyon 3rd Level
Feed preparation (wet variants)	221-F Canyon 3rd Level
Oxide lag storage (wet variants)	221-F Canyon 3rd Level

Table O.3-1. Locations for Proposed Vitrification Can-in-Canister Process Equipment—Continued

Process	Location
1st stage melter (wet variants)	221-F Canyon 2nd Level
Off-gas treatment (wet variants)	221-F Canyon 2nd Level
Can decon (dry variants)	221-F Canyon 3rd Level
Can decon (wet variants)	221-F Canyon 2nd Level
Can weld and test (dry variants)	221-F Canyon 3rd Level
Can weld and test (wet variants)	221-F Canyon 2nd Level
Interim can storage	221-F Canyon 3rd Level
Place in canister	221-F Canyon 1st Level
Weld and test	221-F Canyon 1st Level
Interim canister storage	221-F Canyon 1st Level/DWPF Service Building Interim Vault
Blend tank	DWPF Vitrification Building Hot Cell
2nd stage melter	DWPF Vitrification Building Hot Cell
Canister decontamination	DWPF Vitrification Building Hot Cell
Weld and test	DWPF Vitrification Building Hot Cell
Off-gas treatment	DWPF Vitrification Building Hot Cell
Interim product storage	DWPF Glass Waste Storage Building

Source: LLNL 1996j.

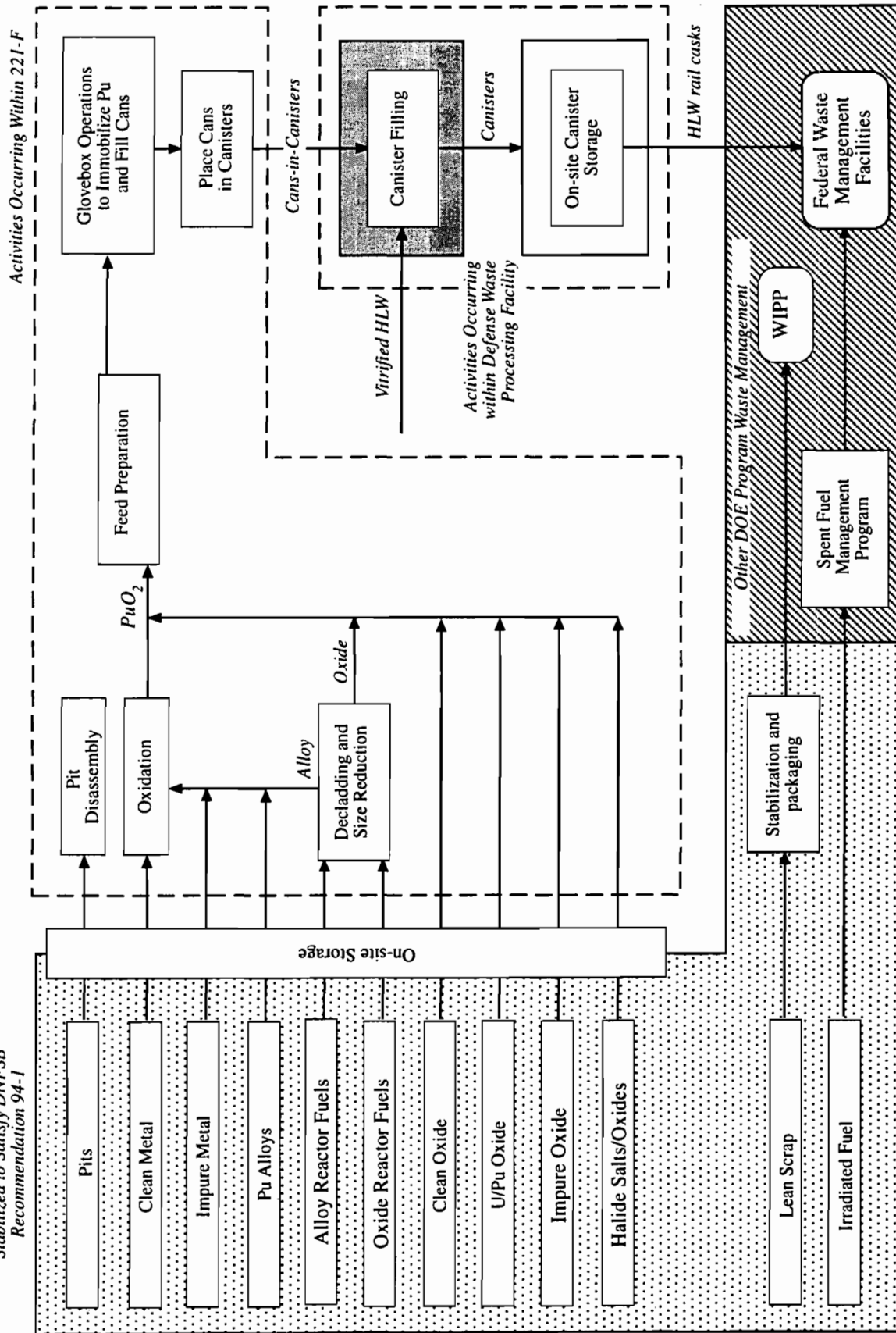


Source: DOE 1996o.

3273/S&D

Figure O.3-1. Vitrification Can-in-Canister Variant Process.

Stabilized to Satisfy DNFSB
Recommendation 94-1



Source: LLNL 1996j.

Figure O.3-2. Can-in-Canister Material Flow Diagram for Operations at Savannah River Site.

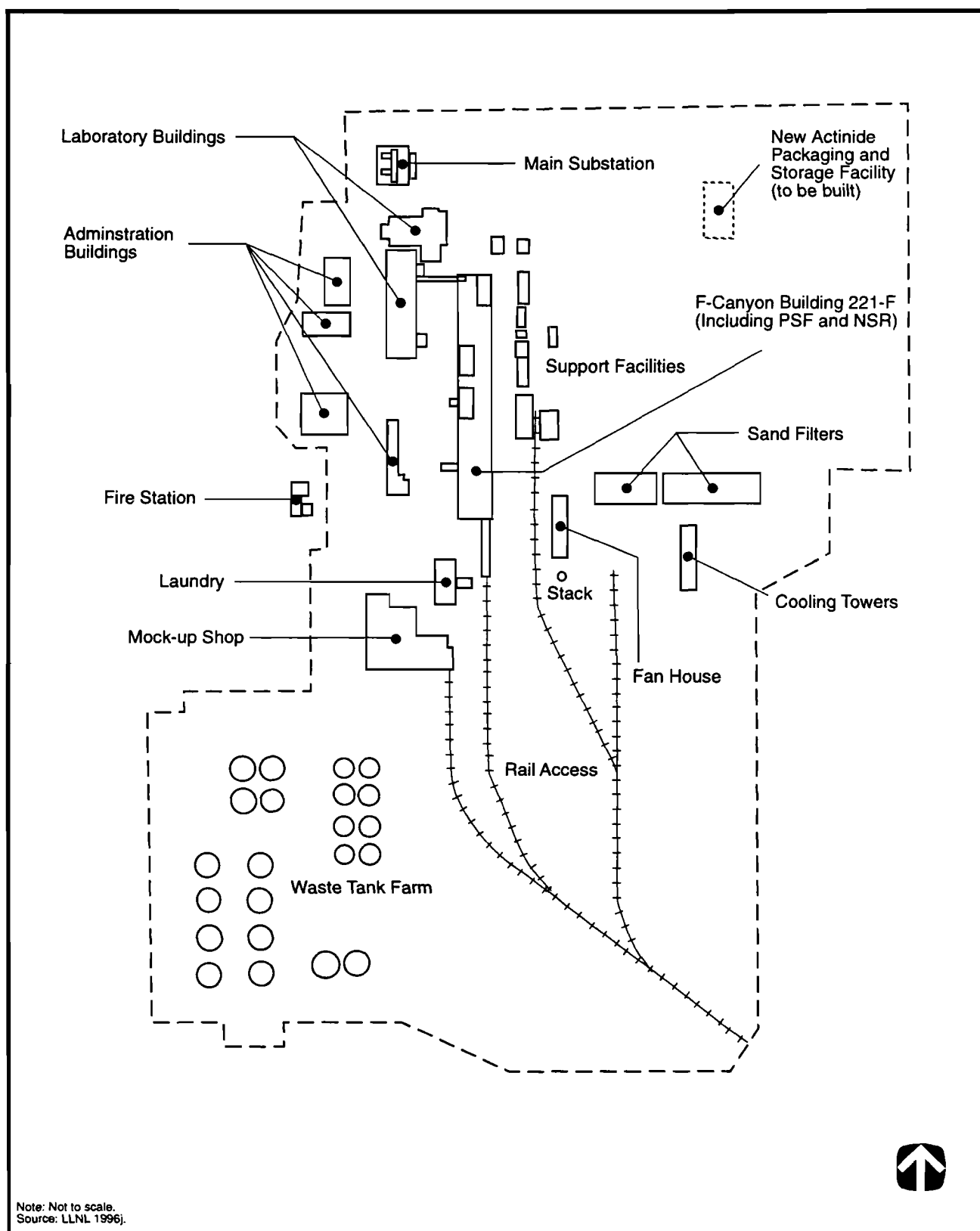


Figure O.3–3. Savannah River Site F-Area Layout Showing Building 221-F.

would be approximately 2,080 square meters (m^2) (22,390 square feet [ft^2]). Total support area (heating, ventilation, and air conditioning, ingress, egress) would be an additional 6,500 m^2 (70,000 ft^2), approximately. The addition of the molten HLW as a radiation barrier in the canister would take place in the DWPF located in the S-Area. The S-Area site layout is shown in Figure O.3-4. The existing DWPF would be upgraded to meet safeguards and security requirements for the handling of stainless steel canisters containing Pu-glass cans during the canister filling operations. Disruptions to current DWPF operations would be minimized since Pu would not be introduced into the DWPF in other than a vitrified, criticality safe manner. Safeguards and security provisions would be upgraded in selected portions of the DWPF buildings.

Facility Operations. In the vitrification CIC variant, the initial step in the immobilization process would be the transportation by safe secure trailer (SST) of Pu feed materials (such as pits, metal, oxides, and unirradiated reactor fuels) from storage site(s) to the receiving facilities in the Pu Storage Facility and New Special Recovery facilities on top of the 221-F Canyon building at SRS. The shipping containers would be unpacked, and accountability measurements conducted. Pu pits would be disassembled and converted to oxide.¹ Other forms would go through the minimum necessary processing to be converted to oxides. The oxide feed materials would then enter into specially modified portions of the 221-F Canyon and undergo first stage immobilization in glove boxes as depicted in Figure O.3-2.

The feeds to this process would consist of glass formers, a neutron absorber, and the Pu oxide which would be combined in a melter to prepare a homogeneous borosilicate glass. This glass would be poured into small stainless steel cans with a Pu concentration of approximately 10 percent by weight. The outside dimensions of the can are a diameter of 13.4 centimeters (cm) (5.3 inches [in]), a length of 47.6 cm (18.7 in), and a shell thickness of 1 cm (0.4 in). After filling, the cans would then be capped, decontaminated, welded, tested, and transferred to lag storage in an onsite secured vault.

When Pu-glass cans are ready for processing, they will be decontaminated and transported to the canister loading area of the F-Canyon. The cans would be placed in a holding rack inside an open DWPF canister (head removed). After loading a canister with approximately 20 Pu-glass cans (5 cans in an array—4 arrays high), the head of the canister would be welded to the body and tested. Each canister would contain approximately 50 kilograms (kg) (110 pounds [lbs]) of Pu. The canisters may be placed in temporary storage in 221-F until they are shipped by rail or truck to the DWPF Service Building. A small storage vault, designed for special nuclear material and sized for about one week supply of canisters, would be provided in or adjacent to the DWPF Service Building to permit interim storage, if necessary, of canisters awaiting processing.

When a canister is ready to be filled, it would be transferred from the DWPF Service Building, via a controlled corridor, to the Melt Cell in the Vitrification Building. Utilizing a melt pour turntable, the HLW-borosilicate glass would be poured into the canister and around the Pu-glass cans. The cans would then become encapsulated in the HLW-glass within the stainless-steel canister. After filling, the canister would be decontaminated and sealed by plug welding and transported to the Glass Waste Storage Facility for interim onsite storage.

The Glass Waste Storage Building, Unit 1, was designed and constructed to hold HLW-glass canisters until a HLW repository is available. Since the capacity of Unit 1 is 2,286 canisters, a Unit 2 building is planned to be constructed as Unit 1 fills with HLW-glass canisters. Since Unit 2 is scheduled to be built in support of the DWPF mission, only upgrades to facility safeguards and security and increased capacity are necessary to accommodate additional canisters resulting from the Pu disposition mission. Alternatively, Unit 1 could be upgraded in the event Unit 2 was determined to be unnecessary. Because the Pu-glass cans displace volume that would normally contain HLW-glass in a separate DWPF operation, additional DWPF canisters would be needed to process all of the HLW in the SRS tank farm and all of the surplus Pu under scope of this PEIS. The number of additional DWPF canisters would be directly proportional to Pu loading in the Pu-glass. The total number of DWPF canisters containing Pu-glass cans would be about 1,000. Assuming 20 cans per canister, the volume of

¹ Based upon the Preferred Alternative, Pu pits would be converted to MOX fuel and would not be immobilized.

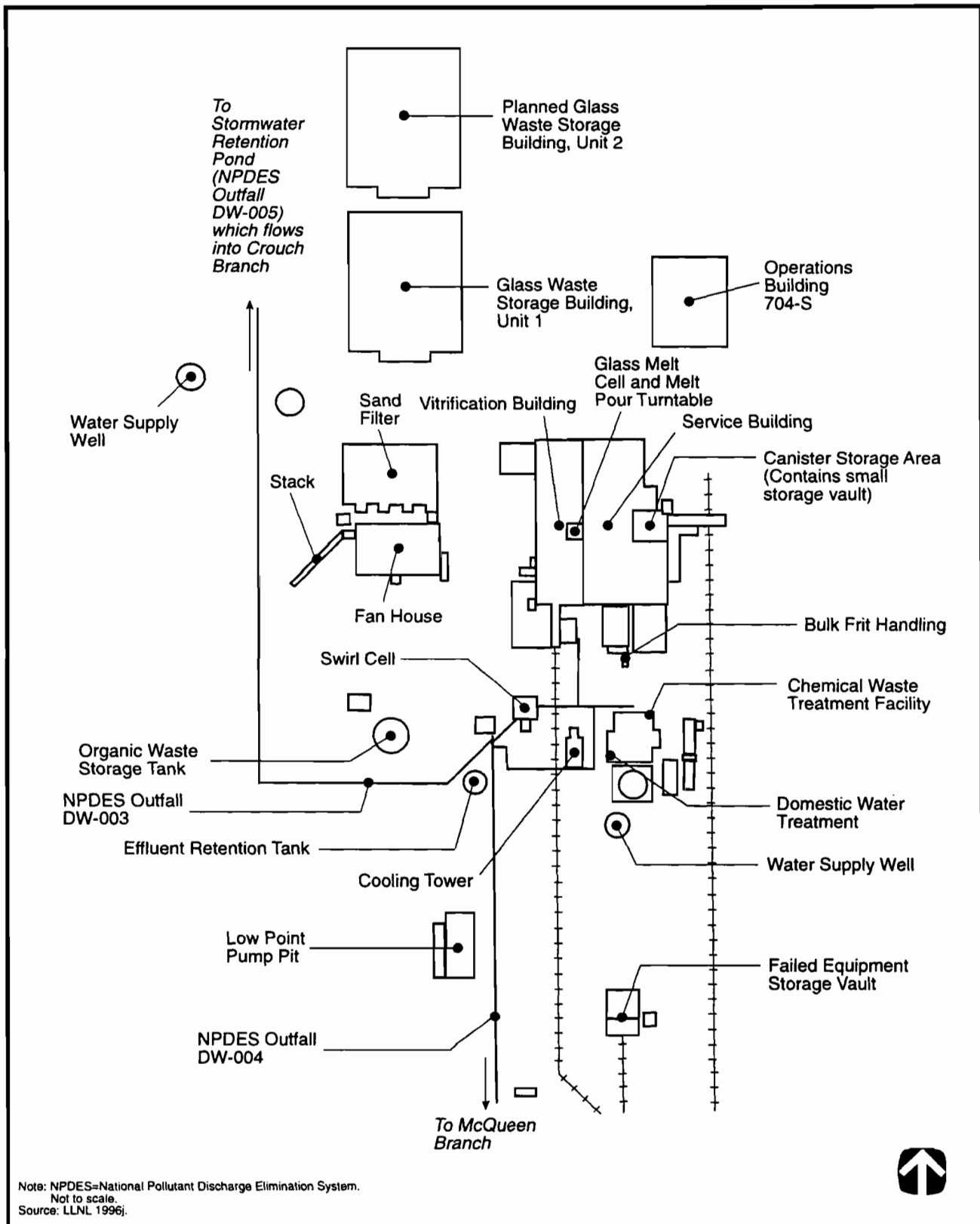


Figure O.3—4. Savannah River Site S-Area Layout Showing Defense Waste Processing Facility.

HLW-glass displaced would be approximately 20 percent, or about 200 additional canisters to those required for the SRS tank farm HLW program.

This variant would process 5,000 kg (11,000 lb) of surplus Pu annually. A normal operating year for the facility would be 200 days with a nominal throughput of 25 kg (55 lb) of Pu per operating day. This operating schedule assumes three shifts per day, 7 days per week. Remote maintenance, accountability, criticality control, and other functions would be performed during the 165 days per year the plant would not be expected to operate.

Construction. The vitrification CIC variant utilizes existing SRS facilities to house the pit disassembly/conversion, Pu conversion, and immobilization operations. For this variant, no major new construction would be required at SRS. However, some of the existing facilities would be modified and upgraded. Facilities in F-Area are designed and built to handle large quantities of Pu and have systems in place to maintain criticality control and safeguards systems to maintain accountability and security. However, the DWPF Vitrification Building, selected portions of the Service Building, and the Glass Waste Storage Building, Unit 1 or 2, would have to be upgraded to meet safeguards and security requirements to support storage and handling of vitrified Pu in accordance with DOE O 470.1 *Safeguards and Security Program*.

Radiological. With the CIC concept, the radiation source used to satisfy the spent fuel standard is the vitrified HLW outside the can. This eliminates the need for introducing radioactive cesium-137 (Cs-137) into the immobilization process, thereby reducing radiation shielding/hot cell requirements and the potential radiation exposures to operating personnel and the public. The dose to workers and the public would be smaller for the CIC variant than the dose to workers and the public for the new facility analyzed in Section 4.3.4.1.9.

Waste Management. Since the Pu conversion and immobilization processes would be similar to those otherwise described for the vitrification alternative, implementation of the vitrification CIC variant would result in similar waste streams. The wastes generated as a result of the operation of this variant would consist of transuranic (TRU), mixed TRU, low-level, mixed low-level, hazardous, nonhazardous (sanitary), and nonhazardous (other) materials. This variant could offer the potential for significant reductions in the quantity of pollutants emitted and wastes generated compared to the construction and operation of the separate disposition facilities as detailed in this PEIS. Significant emphasis would be placed on the minimization of both liquid and solid wastes. Vitrified HLW would be used to surround the cans and fill the canisters; however, no HLW would be generated as a result of the Pu disposition operations. In addition, any criteria pollutants, hazardous air pollutants, and other toxic compounds and gases that may be emitted as a result of the process would be within permit requirements.

Transportation. Fissile material located at various DOE facilities would be transported by SST, in compliance with applicable regulatory requirements, to SRS and placed in onsite temporary storage. Intrasite transport of radiological materials that are not immobilized would be limited to the secure movements within the 221-F Canyon building. Canisters containing the vitrified Pu in cans would be transported from 221-F to the DWPF Service Building via rail or truck. The filled canisters would be stored in the Glass Waste Storage Building until shipment to a HLW repository is possible.

The Department is developing a rail shipping cask for DWPF canisters. This rail shipping cask would hold five DWPF canisters. Based on the use of this transport cask, it is estimated that over the life of the project 40 additional shipments from SRS to a HLW repository would be required.

O.4 CERAMIC CAN-IN-CANISTER VARIANT

The ceramic CIC variant would be similar to the vitrification CIC variant in that both could use existing SRS facilities, produce cans of immobilized Pu, and fill DWPF canisters with Pu and vitrified HLW. The major difference between the two variants is that the Pu inside the stainless steel can would be immobilized in a titanate-based ceramic matrix, rather than a glass matrix. The ceramic product would be formed using a dry

feed, cold press, and sintering (heating) process without including Cs-137 in the ceramic matrix, rather than the wet feed, hot press process with the added Cs-137 radiation barrier as described for the ceramic immobilization alternative in Section 2.4.4.2. The advantages of using the cold press and sintering (heating) process would include increased throughput, simplicity, and proven production experience as used in the MOX fuel industry. Cold pressing would be an option for the ceramic CIC because the volatility of Cs-137 in the sintering process is not an issue with external radiation barrier variants. Using HLW as the radiation barrier, in lieu of the Cs-137 from cesium chloride capsules, would offer the advantages of process simplification and cost reduction, reduction in the potential for worker radiation exposure, and improvements in facility operations and maintenance requirements. If desired, the wet feed and cold press and sintering process could be used in the ceramic CIC variant.

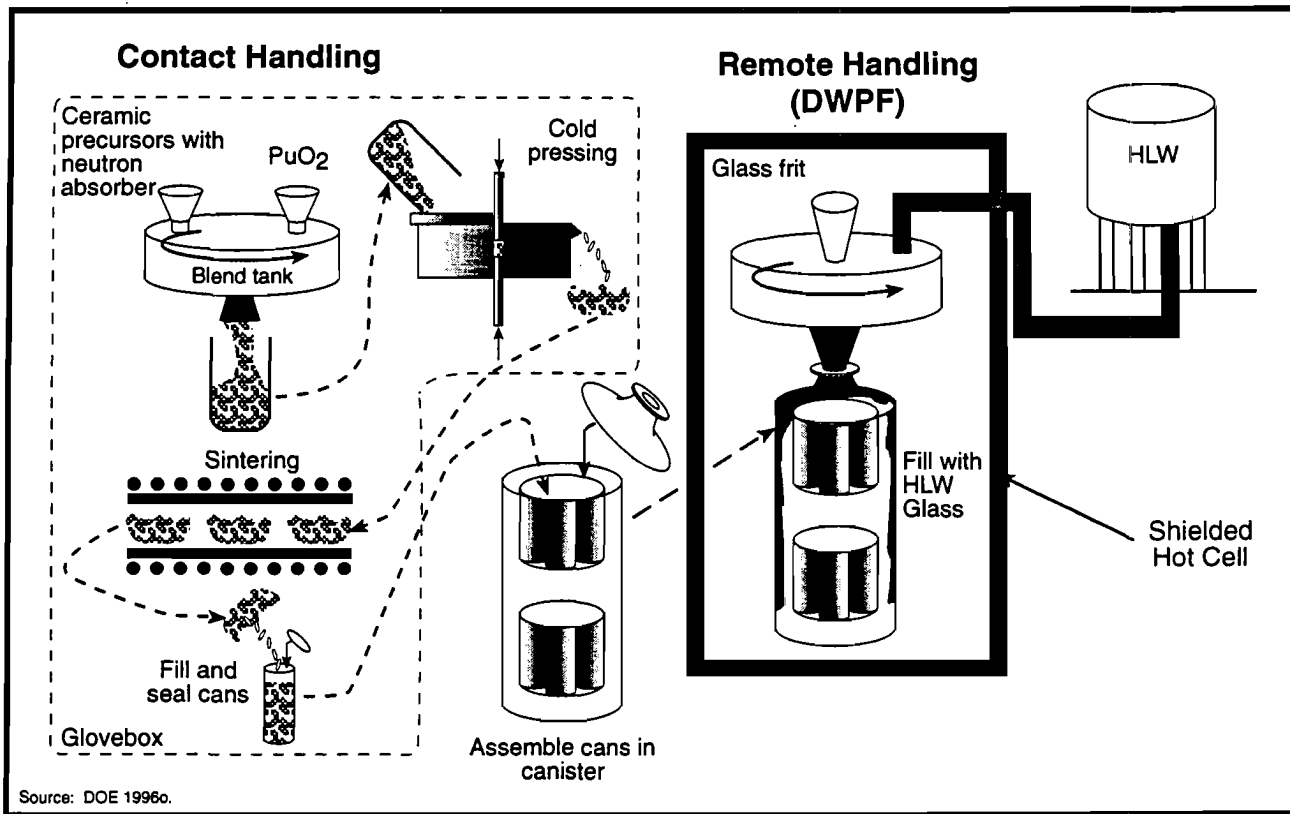
A process schematic for the ceramic CIC process is presented in Figure O.4–1; the material flow diagram for this CIC process is the same as that shown in Figure O.3–2. As in the vitrification CIC variant, many of the feed materials require conversion to oxide form. Such treatment, conversion processing, and oxidation would take place in glove boxes. The resulting Pu oxide product would be fed to the ceramic process where Pu oxide would be blended with ceramic precursors and neutron absorbers. This mixture would be calcined, cold pressed, and sintered to produce densified pellets to be loaded into the small stainless steel cans. The cans of immobilized Pu in ceramic forms would be placed on a frame which would fit inside a DWPF canister and be transferred to the DWPF. These canisters would be filled with vitrified HLW at the DWPF to provide a radiation barrier for the final product.

Facility Description. The ceramic CIC variant could use part of the existing 221-F Canyon building including the Pu Storage Facility and New Special Recovery facilities, and part of the DWPF including the Vitrification and Service Buildings and the Glass Waste Storage Building. Table O.4–1 lists the location of each process area. Pit disassembly/conversion and other front-end processing, treatment operations, and immobilization (feed preparation, calcine and fill, press and package, and can filling) could be performed in the existing 221-F facility in areas specifically modified for Pu ceramic immobilization. The current F-Area facilities are designed and built to handle large quantities of Pu and have systems to maintain criticality control and safeguard systems to maintain accountability and security. The F-Area site layout was previously shown in Figure O.3–3. The floor area required for the front-end Pu processing and immobilization functions would be approximately 2,080 m² (22,390 ft²). Total support area (heating, ventilation, and air conditioning, ingress, egress) would be an additional 6,500 m² (70,000 ft²). The addition of the molten HLW as a radiation barrier in the canister would take place in the DWPF located in the S-Area. The S-Area site layout was previously shown in Figure O.3–4. The existing DWPF would be upgraded to satisfy the safeguards and security requirements for the handling of the stainless steel canisters containing Pu ceramic cans during the canister filling operations. Disruptions to current DWPF operations would be minimized since Pu would not be introduced into the DWPF in other than an immobilized, criticality safe manner. Safeguards and security provisions would be upgraded in selected portions of the DWPF buildings.

Facility Operations. In the ceramic CIC variant, the initial step in the immobilization process would be the transportation by SST, in Department of Transportation shipping containers, of Pu feed materials (such as pits, metal, oxides, and unirradiated reactor fuels) from storage site(s) to receiving facilities in the Pu Storage Facility and New Special Recovery facilities on top of the 221-F Canyon building at SRS. The shipping containers would be unpacked and accountability measurements conducted. Pu pits would be disassembled and converted to oxide.² Other forms would go through the minimum necessary processing to be converted to oxides. The oxide feed materials would then enter into specially modified portions of the 221-F Canyon and undergo ceramic immobilization in glove boxes as depicted in Figure O.3–2.

The feeds to this process would consist of ceramic precursors with a neutron absorber, dried titanate ion exchanger, and size-reduced Pu oxide powders which would be dry blended. Dry blending would be conducted

² Based upon the Preferred Alternative, Pu pits would be converted to MOX fuel and would not be immobilized.



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Figure O.4-1. Ceramic Can-in-Canister Variant Process.

Table O.4-1. Locations for Proposed Ceramic Can-in-Canister Process Equipment

Process	Location
Receiving, shipping, storage, sampling	221-F Pu Storage Facility
Pit disassembly, dehydride/hydride/oxidation	221-F New Special Recovery Facilities
Oralloy decontamination	221-F New Special Recovery Facilities
Special recovery	221-F Canyon 3rd Level
Fuel decladding	221-F Canyon 3rd Level
Feed preparation (dry feed)	221-F New Special Recovery Facilities
Oxide lag storage (dry feed)	221-F Canyon 3rd Level
Ceramic press and sinter (dry feed)	221-F Canyon 3rd Level
Off-gas treatment (dry feed)	221-F Canyon 3rd Level
Feed preparation (wet feed variant)	221-F Canyon 3rd Level
Oxide lag storage (wet feed variant)	221-F Canyon 3rd Level
Ceramic press and sinter (wet feed variant)	221-F Canyon 2nd Level
Off-gas treatment (wet feed variant)	221-F Canyon 2nd Level
Can decon (dry)	221-F Canyon 3rd Level
Can decon (wet feed variant)	221-F Canyon 2nd Level
Can weld and test (dry)	221-F Canyon 3rd Level
Can weld and test (wet feed variant)	221-F Canyon 2nd Level
Interim can storage	221-F Canyon 3rd Level
Place in canister	221-F Canyon 1st Level

Table O.4-1. Locations for Proposed Ceramic Can-in-Canister Process Equipment—Continued

Process	Location
Weld and test	221-F Canyon 1st Level
Interim canister storage	221-F Canyon 1st Level/DWPF Service Building Interim Vault
Blend tank	DWPF Vitrification Building Hot Cell
DWPF melter	DWPF Vitrification Building Hot Cell
Canister decontamination	DWPF Vitrification Building Hot Cell
Weld and test	DWPF Vitrification Building Hot Cell
Off-gas treatment	DWPF Vitrification Building Hot Cell
Interim product storage	DWPF Glass Waste Storage Building

Source: LLNL 1996k.

in a standard blending device such as a V-blender. The drying and calcining would be conducted in a rotary calciner that is a rotating tank inside a high temperature furnace. Following the drying and calcining process, the material would undergo milling and granulation to optimize size and morphology for the pressing and sintering operations. The dried and calcined ceramic precursor material loaded with Pu would then be poured into a feeder hopper which would deliver the oxide material into an automated pressing machine. The size of the pellets would be about 7 cm (2.75 in) in diameter by 2.8 cm (1.1 in) high. Pressed pellets would be transferred by a conveyor belt to the sintering oven and heated to 1,200 degrees Centigrade ($^{\circ}\text{C}$) (2,200 degrees Fahrenheit [$^{\circ}\text{F}$]) for several hours. After sintering, the pellets would be approximately 6.4 cm (2.5 in) in diameter by 2.5 cm (1 in) high. Any cracked or deformed pellets would be recycled. The Pu-ceramic pellets would then be loaded into 7.6 cm (3 in) diameter by 0.6 m (2 ft) high cans. The Pu loading in the ceramic form would not exceed 12 percent by weight. Cans loaded with the Pu-ceramic would be stored in storage racks in a vault on the third level of the 221-F Canyon building until ready to be placed in the DWPF canister.

When Pu-ceramic cans are ready for processing, they will be decontaminated and transported to the canister loading area of the F-Canyon. The cans would be placed in a holding rack inside an open DWPF canister (head removed). After loading a canister with approximately 20 Pu ceramic cans (5 cans in an array—4 arrays high), the head of the canister would be welded to the body and tested. Each canister would contain approximately 50 kg (110 lb) of Pu. The canisters may be placed in temporary storage in 221-F until shipped by rail or truck to the DWPF Service Building. A small storage vault, designed for special nuclear material and sized for about one week supply of canisters, would be provided in or adjacent to the DWPF Service Building to permit interim storage, if necessary, of canisters awaiting processing.

When a canister is ready to be filled, it would be transferred from the DWPF Service Building via a controlled corridor, to the Melt Cell in the Vitrification Building. Utilizing a melt pour turntable, the HLW-borosilicate glass would be poured into the canister and around the Pu-ceramic cans. The cans would then become encapsulated in the HLW-glass within the stainless-steel canister. After filing, the canister would be decontaminated and sealed by plug welding and transported to the Glass Waste Storage Facility for interim onsite storage.

The Glass Waste Storage Building, Unit 1, was designed and constructed to hold HLW-glass canisters until a HLW repository becomes available. Since the capacity of Unit 1 is 2,286 canisters, a Unit 2 building is planned to be constructed as Unit 1 fills with HLW-glass canisters. Since Unit 2 is scheduled to be built in support of the DWPF mission, only upgrades to facility safeguards and security and increased capacity would be necessary to accommodate the additional canisters resulting from the Pu disposition mission. Alternatively, Unit 1 could be upgraded in the event Unit 2 was determined to be unnecessary. Because the Pu-ceramic cans displace volume that would normally contain HLW-glass in a separate DWPF operation, additional DWPF canisters would be needed to process all of the HLW in the SRS tank farm and all of the surplus Pu. The number of additional

DWPF canisters would be directly proportional to Pu loading in the Pu-ceramic. The total number of DWPF canisters containing Pu-ceramic cans would be expected to be about 1,000. Assuming 20 cans per canister, the volume of HLW-glass displaced would be approximately 20 percent, or about 200 additional canisters to those required for the SRS tank farm HLW program.

This variant would process 5,000 kg (11,000 lb) of surplus Pu annually. A normal operating year for the facility would be 200 days with a nominal throughput of 25 kg (55 lb) of Pu per operating day. This operating schedule assumes 3 shifts per day, 7 days per week. Remote maintenance, accountability, criticality control, and other functions would be performed during the 165 days per year the facility would not be expected to operate.

Construction. The ceramic CIC variant utilizes existing SRS facilities to house the pit disassembly/conversion, Pu conversion, and immobilization operations. Under this variant, no major new construction would be required at SRS. However, some of the existing facilities would be modified and upgraded. Facilities in F-Area are designed and built to handle large quantities of Pu and have systems in place to maintain criticality control and safeguard systems to maintain accountability and security. However, the DWPF Vitrification Building, selected portions of the Service Building, and the Glass Waste Storage Building, Unit 1 or 2, would have to be upgraded to meet the safeguards and security requirements to support storage and handling of immobilized Pu, in accordance with DOE O 470.1, *Safeguards and Security Program*.

Radiological. With the CIC concept, the radiation source used to satisfy the spent fuel standard is the vitrified HLW outside the can. This eliminates the need for introducing radioactive Cs-137 into the immobilization process, thereby reducing radiation shielding/hot cell requirements and the potential radiation exposures to operating personnel and the public. The dose to workers and the public would be smaller for the CIC variant than the dose to workers and the public for the new facility analyzed in Section 4.3.4.2.9.

Waste Management. Since the Pu conversion and immobilization processes would be similar to those otherwise described for the ceramic immobilization alternative, implementation of the ceramic CIC variant would result in similar waste streams. The wastes generated as a result of the operation of this variant would consist of TRU, mixed TRU, low-level, mixed low-level, hazardous, nonhazardous (sanitary), and nonhazardous (other) materials. The ceramic CIC variant could offer the potential for significant reductions in the quantity of pollutants emitted and wastes generated when compared to the construction and operation of the other separate disposition facilities as detailed in this PEIS. Significant emphasis would be placed on the minimization of both liquid and solid wastes. Vitrified HLW would be used to surround the cans and fill the canisters; however, no HLW would be generated as a result of the Pu disposition operations. In addition, any criteria pollutants, hazardous air pollutants, and other toxic compounds and gases that may be emitted as a result of immobilization activities would be within permit requirements.

Transportation. Fissile material located at various DOE facilities would be transported by SST, in compliance with applicable regulatory requirements, to SRS and placed in onsite temporary storage. Intrastate transport of radiological materials that are not immobilized would be limited to the secure movements within the 221-F Canyon. Canisters containing the Pu-ceramic cans would be transported from 221-F to the DWPF Service Building via rail or truck. The filled canisters would be stored in the Glass Waste Storage Building, Unit 2, until shipment to a HLW repository is possible.

The Department is developing a rail shipping cask for DWPF canisters. This rail shipping cask would hold five DWPF canisters. Based on the use of this transport cask, it is estimated that, over the life of the project, 40 additional shipments from SRS to a HLW repository would be required.

O.5 REPOSITORY ACCEPTANCE

An analysis has been completed that examines the feasibility of introducing Pu-loaded glass into a HLW repository, using a CIC concept where the DWPF glass is poured into the space between the Pu glass cans and the DWPF canister (DOE 1996d:8-8). The DWPF glass acts as a radiation barrier to theft and diversion; gadolinium is added to the Pu glass cans as a neutron absorber. The analysis presented represents a case where the CIC concept for Pu disposition is a supplement to the disposition of the defense HLW already planned for the repository. The conclusions presented here for the vitrification variant are expected to apply to the ceramic CIC variant.

Regulatory. Any waste form that is accepted for disposal in a geologic repository must comply with the provisions of the *Nuclear Waste Policy Act* (NWPA), as amended. Under Section 2(12)B of the NWPA, the Nuclear Regulatory Commission (NRC) has the authority to certify this waste as eligible for the NWPA geologic repository. Such NRC action or legislative clarification in authorizing legislation will be necessary before this waste form can be considered for disposal in an NWPA repository. The final disposal of this waste form will have to conform to the licensing provisions of the NRC. Further, it is current DOE policy not to accept into the first HLW repository any wastes that include components regulated as hazardous under the *Resource Conservation and Recovery Act* (RCRA) (DOE 1995a:6). The absence of any RCRA-regulated hazardous materials in the final form would have to be demonstrated prior to acceptance into the HLW repository.

Criticality. The effective neutron multiplication factor (k_{eff}) for the intact glass form, assuming credit for the neutron absorbers during the post-closure period, is calculated to be 0.3 which is well below the 0.95 maximum value of k_{eff} allowed (10 CFR 60).

Thermal. The initial heat release from this CIC waste form is mostly from the HLW glass component. Temperatures peak between 30 and 60 years. By 100 years, the radiolytic heat generated by Pu will exceed the thermal output from the HLW. These predicted temperatures are far lower than, and therefore safely away from, the glass transition temperature of 400°C (750°F). The temperature and thermal output from these canisters are unlikely to materially affect the thermal balance of the repository.

Radiation. A comparison of the radiation exposure emanating from a repository waste package containing DWPF HLW glass canisters versus a package containing Pu cans and HLW glass shows that the radiation dose at the waste package surface is 81 roentgen equivalent man (rem)/hour (hr) for the package containing DWPF glass compared to the 30 rem/hr for one with the Pu cans with HLW glass. The radiation level for the package incorporating Pu CIC is below the threshold value for radiolytic corrosion, so no additional thickness of the copper-nickel alloy waste package outer barrier would be required to reduce the radiation to an acceptable level (100 radiation absorbed dose/hr) to protect the waste package from radiolysis-induced corrosion. However, additional shielding would be required to protect workers. Doses at a distance of 2 m (6.6 ft) from the waste package surface show values of 12.5 rem/hr for the DWPF glass and 4.7 rem/hr for the CIC. For emplacement in the repository, only 7 cm (2.75 in) of lead thickness must be added to the CIC waste package underground transporter to reduce the radiation doses to meet the standard allowable dose of 10 millirem/hr at 2 m (6.6 ft) from lateral outer surfaces (49 CFR 173.441) to ensure worker protection versus 10 cm of lead for repository waste package containing DWPF HLW glass canisters.

Releases. The calculated dose contribution to the accessible environment from all the CIC waste packages would be nearly 100 times lower than the calculated peak dose from a repository that contains only commercial spent fuel and HLW. This is to be expected because the repository release would be dominated by the greater quantity of commercial, uranium-based spent nuclear fuel.

O.6 TESTS AND DEMONSTRATIONS

The department has received comments on the Draft PEIS requesting that "pilot plant" studies of the CIC concept be performed. In this regard, DOE has initiated research, development, and testing of various aspects of the CIC concept for both the vitrification and ceramic immobilization alternatives. For example, in January 1996, a cold (without radionuclides) demonstration of the CIC variant was successfully conducted at the DWPF. Small cans containing a high temperature glass with a Pu surrogate were loaded into two full-size DWPF canisters (one canister contained 8 cans and the other 20 cans) which were subsequently filled with surrogate HLW-glass in the DWPF as part of the cold startup qualification tests of that facility. Other tests are being conducted to demonstrate techniques that could enhance the nonproliferation properties of the final product. Ceramic waste forms have been under development for HLW for many years; however, the application of this technology to the immobilization of Pu is currently developmental.

The DOE plans to continue research to determine whether glass or ceramic is the preferred form for Pu disposition and to establish the optimum Pu concentration and chemical composition of a waste form that can be readily processed and satisfy nonproliferation concerns and perform well after the emplacement in a geologic repository. In addition, developmental efforts are underway to design acceptable processing equipment and controls and to demonstrate on a pilot scale the integration of the individual processing steps. As part of this effort, the Pacific Northwest National Laboratory, Argonne National Laboratory, Lawrence Livermore National Laboratory, and SRS are each contributing to a cooperative, integrated program of testing and evaluation of forms and processes.

Should DOE select either the vitrification or ceramic immobilization disposition alternative or the CIC variant, these activities will provide the information needed to demonstrate technical viability and practicality of the Preferred Alternative for disposition as well as provide information useful for DOE's tiered NEPA reviews (and RODs) regarding the selection of a specific technology variant, location, and/or facilities.

Appendix P

Manzano Storage Facility

The *Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (Pantex EIS) analyzed the storage of plutonium (Pu) in a pit form. Under the Pit Storage Relocation Alternative in the Pantex EIS, the pit storage function currently carried out at Pantex Plant (Pantex) would be transferred to another site. The Manzano Weapons Storage Area (WSA) at the Kirtland Air Force Base (KAFB) near Albuquerque, NM, is one of the candidate sites for the storage of pits. The WSA represented a reasonable alternative for this mission because the pits to be potentially relocated from Pantex exist in a sealed and stable metal form and will be packaged in specially designed containers that will ensure a very low probability of breach, metal oxidation, and dispersion of oxidation products. Therefore, the Manzano WSA was considered in the Draft Programmatic Environmental Impact Statement (PEIS) but eliminated as a reasonable alternative primarily because Manzano WSA could not accommodate storage of both pit and non-pit materials.

Since the issuance of the Draft PEIS, the Department of Energy (DOE) has developed a Preferred Alternative for storage that would separate storage of most Pu pits from storage of non-pit Pu material. Specifically, the Preferred Alternative would store Pu pits from Pantex and Rocky Flats Environmental Technology Site (RFETS) at Pantex, and would store non-pit Pu at Savannah River Site, Hanford Site, and Idaho National Engineering Laboratory. Since DOE's Preferred Alternative would separately locate storage of pits and non-pit Pu from RFETS, the option to store pits at Manzano WSA no longer appears unreasonable. Therefore, DOE has added this appendix to the Final PEIS, which discusses potential storage of Pantex and RFETS pits at Manzano WSA.

For a number of reasons, the Preferred Alternative would store the pits from Pantex and RFETS at Pantex, rather than Manzano WSA. Pantex is the proposed site for interim storage of pits under the Preferred Alternative in the Pantex EIS.¹ The majority of the pits that require storage are surplus to U.S. defense needs and are already located at Pantex. The number of pits that would be relocated from RFETS would be small by comparison. Since the majority of pits are already in storage at Pantex, it would be prudent for DOE to consolidate all pits there for storage. Assembly and disassembly operations would continue at Pantex even if pit storage did not occur there. Selecting Manzano WSA would require DOE to create another site where Pu would be located with the risk of contamination and the associated costs for site infrastructure and security. In addition, other missions that could be added to Pantex (for example, pit disassembly/conversion or mixed oxide fuel fabrication) could not be added to Manzano.

Storage at Manzano WSA would involve the transportation risk of moving these materials from Pantex to Manzano WSA. Furthermore, two shipment campaigns would be required for disposition for most of the pits (those already at Pantex) if Manzano WSA were chosen, whereas only one shipment campaign of those same pits would be required if the pits were stored at Pantex. For the Manzano case, pits at Pantex would require relocation to Manzano and then a second shipment campaign to a disposition site. Leaving the pits in storage at Pantex would result in only one shipment campaign from Pantex to the disposition site.² This appendix incorporates applicable information from the Pantex EIS.

¹ The disposition of these surplus pits would begin within the next 10 years and would be completed within the next 25 years. The time period required for the storage of the pits is therefore close to that considered in the Pantex EIS for pit storage and the reasons for not using Manzano WSA are the same.

² Two shipment campaigns of pits would be required for those pits currently stored at RFETS for both Pantex and Manzano.

P.1 MANZANO WEAPONS STORAGE AREA

The KAFB is an Air Force Materiel Command base sharing base facilities and infrastructure with a number of major tenants, including DOE, Sandia National Laboratories (SNL), the Defense Special Weapons Agency, and Phillips Laboratory (Figure P.1-1). The base covers an area of 21,320 hectares (ha) (52,600 acres) on the southeast boundary of Albuquerque, New Mexico. Approximately 8,300 ha (20,500 acres) of this area is withdrawn public lands (USAF 1993a:1-3). Major Air Force units at KAFB include the 377th Air Base Wing, 58th Special Operations Wing (which performs helicopter crew training and pararescue training) and Phillips Laboratory (which performs research and development for space systems, ballistic missiles, geophysics, and directed energy systems). SNL conducts research and development for space systems, testing, stockpile surveillance, and the transportation of nuclear materials (USAF 1993a:3-2).

The Manzano WSA at KAFB consists of four plants inside Manzano Mountain (used primarily for research activities) and 122 magazines, of which 81 are earth covered and 41 are tunneled into the mountainside (KAFB 1993a:13) (Figure P.1-2). Construction began in June 1947, and the facility became operational in April 1950. In June 1992, the Manzano WSA was deactivated, and Phillips Laboratory assumed responsibility for its maintenance. SNL continues to provide minimum security, although the Perimeter Intrusion Detection and Alarm System was deactivated with the termination of the main mission in 1992. The Manzano WSA has enough magazine space to store the pits from Pantex and RFETS. The proposed location for the storage of pits is the set of 41 magazines that are tunneled into the mountainside. As many as 35 magazines have overburden greater than 9 meters (m) (30 feet [ft]) of earth and granite. The existing fence would be reactivated to the extent necessary, and no new fence or security systems would be required. If in the Pantex EIS, DOE chooses to do storage of pits in the Manzano WSA at KAFB, a pit placement, retrieval, and inventory system would have been implemented. The storage areas at the Manzano WSA are well suited for the Stage Right equipment and techniques successfully implemented at Pantex Plant.

P.2 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

The environmental resources discussed below have been assessed for KAFB. Analyses have shown that the impacts to some resources from the potential storage of pits at the Manzano WSA are small enough to warrant only limited discussion. Therefore, the resources are discussed commensurate with their impacts.

P.2.1 LAND RESOURCES

The Manzano WSA is currently being used in part for storage of a variety of items such as furniture and document boxes. These items would easily be removed and space made available for storage of surplus pits. The use of some storage magazines for the storage of pits would not change the array of potential storage materials for which these weapon storage magazines are designed. Additionally, no land disturbance is projected as it pertains to the Manzano WSA. Impacts to land use would not be expected.

P.2.2 SITE INFRASTRUCTURE

The KAFB infrastructure is managed by the 377th Air Base Wing and includes support to all tenants. As the Manzano WSA is not a DOE site, the exact breakdown of infrastructure support activities that would be performed by KAFB and DOE personnel has yet to be worked out in detail. Should this site be selected for pit storage, a Memorandum of Understanding between the Department of the Air Force and DOE would be developed detailing these duties. The infrastructure operations at KAFB that could be affected by or be expected to directly support pit storage operations include security, vehicle and building maintenance, safety and health protection, utilities, administration, and general support (for example, cafeteria, general stores).

The direct impacts from the implementation of pit storage would include a small increase in the site's security force. Electrical usage due to long-term pit storage (estimated to be 4,110 megawatt-hours per year [MWh/yr])

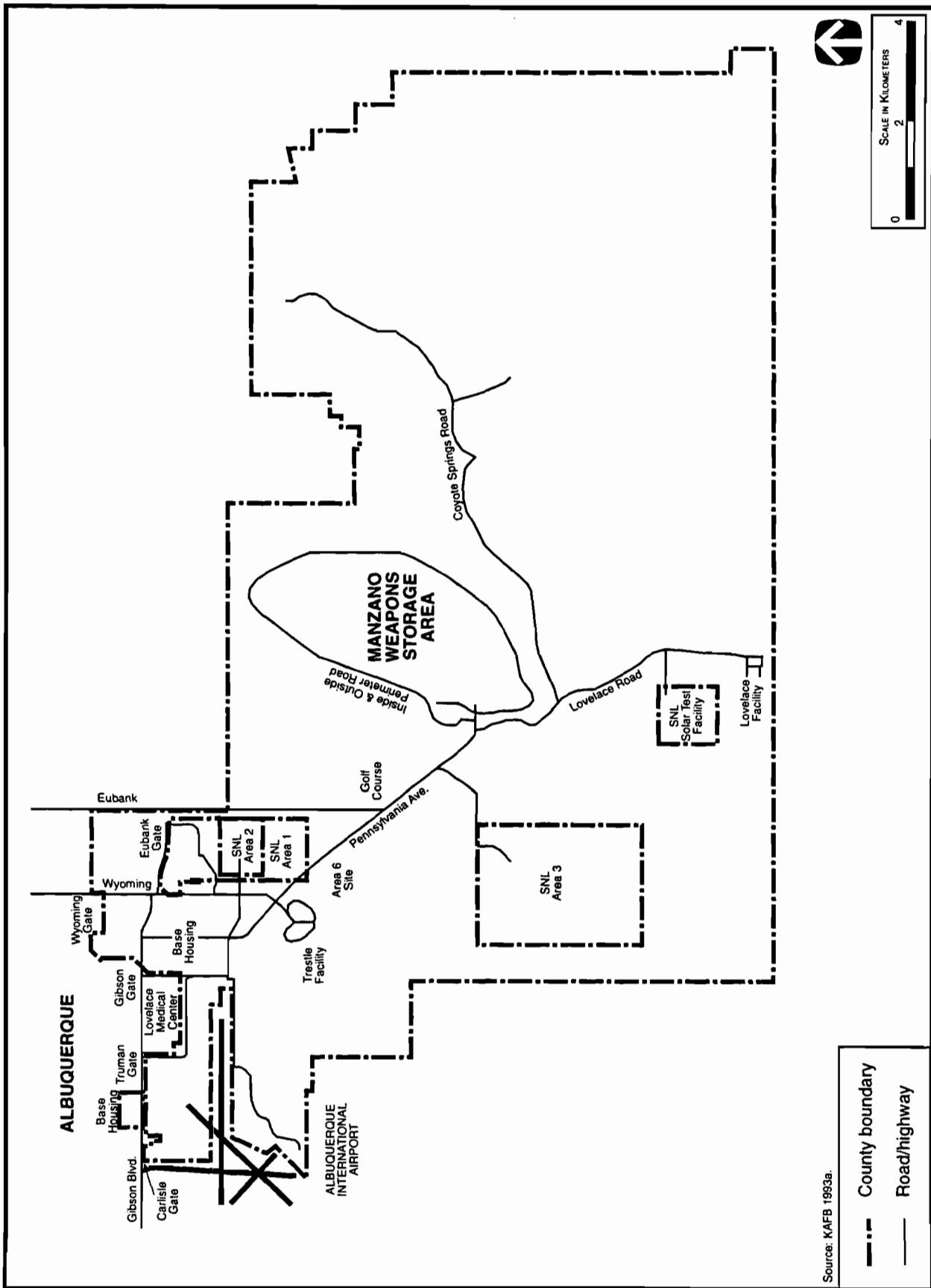


Figure P.1-1. The Manzano Weapons Storage Area at Kirtland Air Force Base, New Mexico.

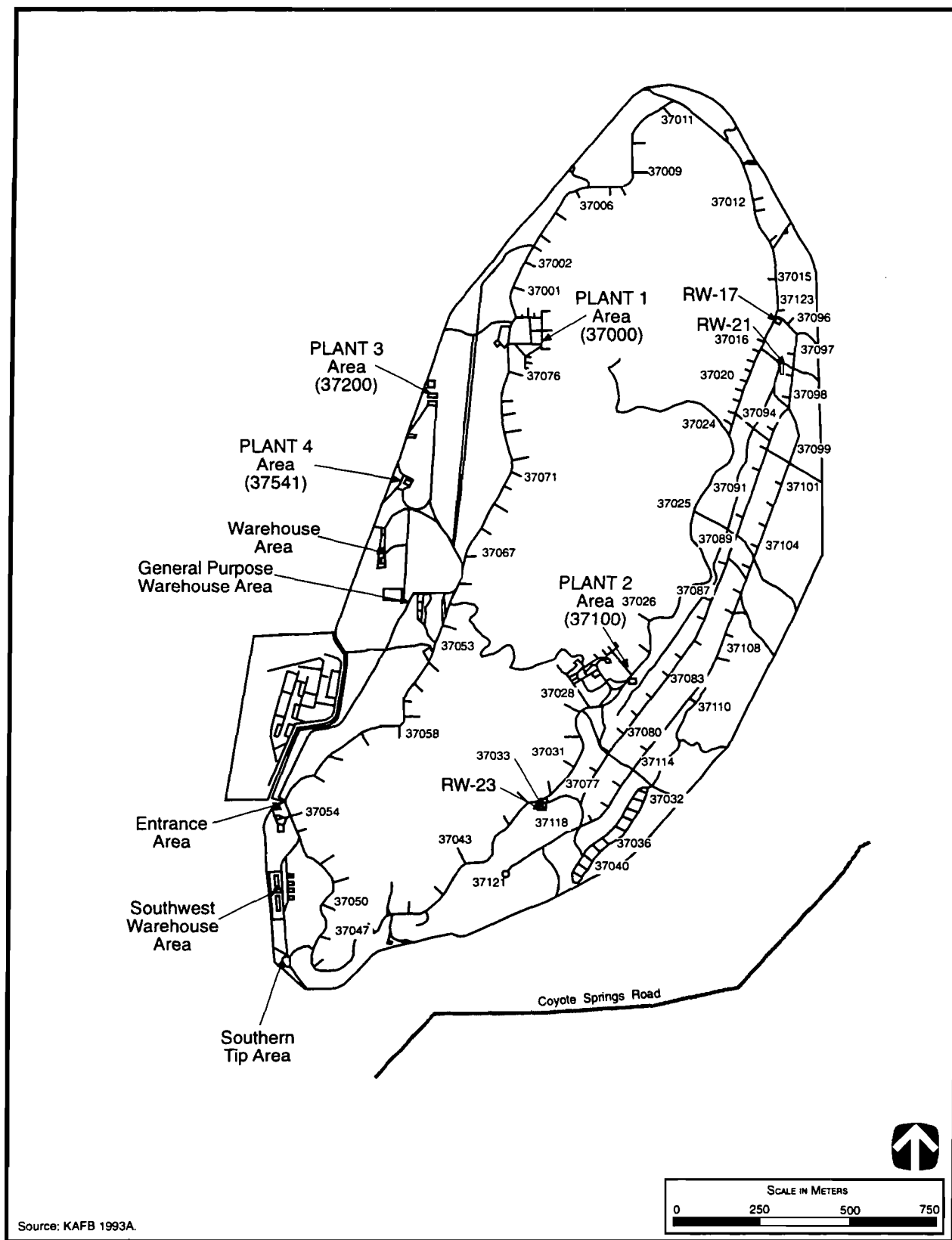


Figure P.1-2. Layout of the Manzano Weapons Storage Area at Kirtland Air Force Base.

represents a 0.8 percent increase over the site's fiscal year 1993 usage of 490,000 MWh/yr and 0.4 percent of the fiscal year 1993 system capacity of 1,095,000 MWh (USAF 1993a:3-17). Maintenance support and indirect impacts resulting from pit storage worker requirements (for example, water, wastewater treatment, and fuel) would increase minimally in comparison to the current and historical onsite infrastructure support levels and system capacities. The Manzano WSA is not currently being utilized at historical or design levels; therefore, the utility systems supporting this facility generally have excess capacity available to support pit storage activity.

P.2.3 AIR QUALITY AND NOISE

Since Manzano WSA is in a moderate nonattainment area for carbon monoxide (CO), air quality analysis is performed at a greater detail for this site. This section provides a more detailed analysis.

P.2.3.1 Air Quality Affected Environment

The Manzano WSA at KAFB is located in Bernalillo County, which is situated in the Albuquerque-Mid Rio Grande Intrastate Air Quality Control Region 152. The Manzano WSA lies outside the City of Albuquerque and is classified as better than national standards for sulfur dioxide, unclassifiable/attainment for ozone (O₃), unclassifiable for particulate matter less than or equal to 10 microns in diameter (PM₁₀), cannot be classified or better than national standards for nitrogen dioxide (NO₂), attainment for CO, and not designated for lead. For CO, Bernalillo County has not had a violation during the past 3 years. As of July 15, 1996, the Environmental Protection Agency (EPA) redesignated Bernalillo County from nonattainment to attainment for CO. The nearest Prevention of Significant Deterioration (PSD) Class I area to the Manzano WSA is the Bandelier Wilderness, approximately 80 kilometers (km) (50 miles [mi]) to the north. The Manzano WSA has no emission sources subject to PSD requirements.

P.2.3.2 Air Quality Environmental Impacts

There are no direct criteria pollutant emissions from the pits during storage. Indirect pollutant emissions would be produced from the exhausts of the vehicles used by employees used to commute to and from work. Also, exhaust emissions from the tractor-trailers used to transport the pits from Pantex to the Manzano WSA would contribute a small amount of pollution to the overall pollutant burden in Bernalillo County, NM.

The calculation of emission rates of exhaust pollutants from employee and pit delivery vehicles was made based on emission factors obtained from the EPA Mobile Source Emission Factor Model (MOBILE 5a). The following assumptions were used in calculating the exhaust pollutant emissions:

- 120 vehicles would be used by security employees (365 days/yr)
- 30 vehicles would be used by operations staff employees (255 days/yr)
- Average roundtrip commute distance: 48 km (30 mi)
- Pit delivery truck roundtrip distance from Pantex in Bernalillo County: 80 km (50 mi)

Table P.2.3.2-1 presents the estimated annual pollutant emissions from employee and pit delivery vehicles. A comparison of these emissions with those in Bernalillo County is also provided in the table. Table P.2.3.2-1 shows that the resulting increase in the CO emission due to storage of pits at the Manzano WSA would be 0.08 percent. Also, these emissions from mobile sources would be distributed over a relatively large area. The increases in the ambient concentrations would, therefore, probably not be detectable and would not cause an increase in the violations of the CO ambient air quality standard (Bernalillo County is currently an attainment area for CO). Nor would these negligible increases cause any violations of the National Ambient Air Quality Standards (NAAQS) for the other criteria pollutants. Also, these small emission increases would not slow

progress in attaining the CO standard. The air quality impacts resulting from the storage of pits at the Manzano WSA would therefore be negligible.

Table P.2.3.2-1. Pollutant Emission Rates Related to Storage of Pits at the Manzano Weapons Storage Area

Source	Pollutant Emission Rate		
	CO (kg)	NO ₂ (kg)	VOC (kg)
Employee Vehicles	19,940	3620	2,080
Pit Delivery Vehicles	40	50	10
Total	19,980	3,670	2,090
Bernalillo County (1993)	26,303	NA	NA
Percent of County Emission	0.08	NA	NA

Note: NA=emission factors not available.

Source: PX DOE 1996b.

P.2.3.3 General Conformity Determination

The EPA published the General Conformity Rule 40 Code of Federal Regulations (CFR) parts 6, 51, and 93 on November 30, 1993, to implement section 176(c) of the *Clean Air Act* (CAA) as amended in 1990. This section requires that Federal action conform to the appropriate State Implementation Plan. Conformity, as defined in the CAA, is conformity to the State Implementation Plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. A formal conformity determination is required for Federal actions occurring in nonattainment areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified annual de minimis (threshold) values. Because O₃ is a secondary pollutant, the conformity determination for O₃ uses the precursor emissions of volatile organic compounds and NO₂ as surrogate pollutants. The threshold values are presented in Table P.2.3.3-1. Since the Manzano WSA is in a maintenance for attainment area for CO, the threshold value for CO is 90.7 metric tons (100 short tons) per year (Table P.2.3.2-1). As shown in Table P.2.3.3-1, the emission rate for CO is well below the threshold value. Therefore, a general conformity analysis is not required for the Manzano WSA.

Table P.2.3.3-1. Threshold Values

Criteria Pollutant	Degree of Nonattainment	Emission Rate (kg)
Ozone (VOCs and NO ₂)	Serious	45,400
	Severe	22,700
	Extreme	9,100
	Other ozone nonattainment areas (outside of ozone transport region)	90,700
VOCs	Marginal/moderate nonattainment (within ozone transport region)	45,400
NO ₂	Marginal/moderate nonattainment (within ozone transport region)	90,700
CO	All	90,700
PM ₁₀	Moderate	90,700
	Serious	63,500
SO ₂ /NO ₂	All	90,700
Pb	All	22,700

Source: PX DOE 1996b.

P.2.3.4 Noise

The major sources of noise within KAFB include blasting and explosives testing, aircraft operations, and equipment and machine operations. The only additional sources of noise associated with pit storage operations would be from transportation vehicles. These impacts would be minimal.

P.2.4 WATER RESOURCES

Because of the nature of the pit storage activities, operations at the Manzano WSA would not affect surface water or groundwater. The pit storage activities would not use surface waters at the Manzano WSA. The Manzano WSA has several springs and seeps. Four springs are located on the mountains that make up the Manzano WSA (USCOE 1995b:22,23,27). Some magazines show evidence of water intrusion (KAFB 1993a:48). These magazines were designated as unsuitable for pit storage and would not be used. The sanitary sewer waste from the Manzano WSA would be discharged to approved septic systems. The wastewater would not have a measurable affect on groundwater quality because of the combined effects of a deep water table (15 to 30 m [50 to 100 ft]), low additional discharge volumes, high evaporation rates, and a composition and concentration consistent with treated and sanitary wastewater. The water demands of pit storage operations are solely due to use by storage personnel. The water demands would be less than historical usage at the Manzano WSA and negligible in comparison to the 6.4 billion liters (1.7 billion gallons) used annually at KAFB (USAF 1994a:3-20). The Manzano WSA is located outside of the 100-year and 500-year floodplains (USAF 1979a).

P.2.5 GEOLOGY AND SOILS

The only aspects of geology and soils resource area that could be affected by or have an effect on the implementation of long-term pit storage at the Manzano WSA are the risks associated with earthquakes. The earthquake risk was assessed and found to be bounded by other accidents, as discussed in Section P.2.9. The Manzano WSA is not anticipated to require upgrades that would involve land disturbance; therefore, impacts to soils are not anticipated.

P.2.6 BIOTIC RESOURCES

No Federally listed threatened or endangered plant and animal species have been reported from the Manzano WSA, although the peregrine falcon and the bald eagle may be occasional KAFB migrants (USAF 1994a:3-8, 3-9). However, three specimens of the grama grass cactus, a species of concern, were noted just west of the perimeter fence near the Manzano WSA administrative complex. The western burrowing owl, another species of concern, has been reported 1.6 km (1 mi) west of the Manzano WSA perimeter fence, but not within that facility's boundary. Additionally, two State endangered plants, the viznagita cactus and Wright's fishhook cactus, were found together on gravelly or rocky slopes at nine sites within the Manzano WSA (NM NHP 1995a:15,C-176,C-177). Further, four springs were identified within the perimeter of the Manzano WSA (USCOE 1995b:ES,15-27). However, the long-term storage of pits does not include any action that would disturb the animal or plant species noted above or any of the four springs. Therefore, no impacts to biotic resources would be expected.

P.2.7 CULTURAL RESOURCES

Twenty-seven historic and prehistoric archaeological sites have been found in the Manzano WSA. Of these sites, 8 have been recommended for inclusion in the National Register of Historic Places (NRHP) and 14 others are considered to be potentially eligible for inclusion (ANL 1995c:1-1,1-2,8-2-8-6). The storage of pits would not include any action that would disturb these resources. No storage facilities identified have been nominated to the NRHP. Therefore, no impacts to cultural and paleontological resources would be expected.

To identify areas of potential concern and locations, DOE has, in the past, sought consultations with Native American groups with traditional ties to the area. Two of these groups, the Sandia and Isleta Pueblos, expressed a general concern about the Manzano WSA. Isleta Pueblo considers the Four Hills area that comprises the Manzano WSA to be within their traditional area of cultural activities. They have requested that KAFB inform them of any archaeological finds at the Manzano WSA, specifically in regards to human remains and ritual objects (ANL 1995c:1-1,1-2). The long-term storage of pits is not expected to affect these concerns.

P.2.8 SOCIOECONOMIC RESOURCES

Approximately 150 additional personnel (including 120 security personnel) would be required to operate the storage magazines at the Manzano WSA if pit storage activities were moved to this facility. This number represents less than a 0.8-percent increase in the total Federal workforce at KAFB. Most of these workers could be hired locally; therefore, the increase to the KAFB workforce or the regional population would not be significant. According to the 1990 Census, 150 workers represent 0.06 percent of the of the workforce employed within the KAFB region of influence (ROI) (Census 1993m:202-205). No socioeconomic impacts would be anticipated.

P.2.9 OCCUPATIONAL AND PUBLIC HEALTH

The basic approach used in assessing human health concerns is to first identify the affected environments and establish a baseline that represents the risk from current operations. Changes in this baseline risk resulting from the long-term storage of pits are then examined for both normal operations and potential accidents.

In the Pantex EIS, the assessment of the human health risk impact from potential accidents that results from storing the pits in the Manzano WSA involved a risk screening process. The first step in this process was to identify a broad spectrum of potential accident scenarios. The second step in the process used screening techniques to identify the specific scenarios that dominate risk. Rigorous consequence evaluations are only performed for the identified risk-dominant scenarios.

Two types of accident consequences are examined:

- Worker and public exposure
- The probability of the accident causing fatal cancer in a worker or the public

If DOE chooses to relocate pits to KAFB, two aspects of this relocation contribute to a potential for environmental impacts. They are the impacts associated with the following:

- Transferring pits from the transporter to their storage location inside the facility
- Storage itself (for example, potential impacts resulting from having the pits reside inside the facility)

Each time pits are transferred from the transporter to their storage location inside the facility, there is a small probability that an accidental release could occur due to a handling accident. In addition, the transfer of pits from the transporter to their storage location would result in radiological exposures to involved workers.

P.2.9.1 Affected Environment

The release of radioactivity and toxic chemicals to the environment from a DOE facility is an important issue for onsite workers and the public. Since the human environment contains many sources of radioactivity and toxic chemicals, it is essential to understand the sources of these substances and how effectively they are controlled.

Table P.2.9.1–1 summarizes the major sources of radiation exposure in the vicinity of the Manzano WSA. The average annual probability of contracting a fatal cancer in the State of New Mexico is 1.4×10^{-3} . Using a nominal

Table P.2.9.1–1. Major Sources of Radiation Exposure in the Vicinity of the Manzano Weapons Storage Area at Kirtland Air Force Base

Source of Exposure	Dose to Average Individual (mrem/yr)	Percentage of Total Exposure
Natural Background Radiation		
Cosmic and external terrestrial	119	84.8
Internal terrestrial	39	
Radon in home	200	
Total natural	358	
Medical Radiation		
Diagnostic x rays	39	12.6
Nuclear medicine	14	
Total medical	53	
Other Sources		
Weapons test fallout	<1	2.6
Consumer and industrial products	10	
Air travel	1	
Nuclear facilities (other than transportation of radioactive materials)	<1	
Manzano/Sandia-environmental radioactivity	4×10^{-8}	
Total other	11	
Total (All Sources)	422	100

Source: NCRP 1987a.

fatal cancer risk factor of 5×10^{-4} cancer fatalities per person rem and the environmental radioactivity data for Manzano/Sandia in Table P.2.9.1–1, it is calculated that fatal cancers attributable to environmental radioactivity released in the vicinity of the Manzano WSA and SNL constitute an extremely small fraction (<0.01 percent) of the average yearly fatal cancer probability in the State of New Mexico (NM DOH 1995a:1).

Figure P.2.9.1–1 depicts the offsite population within an 80-km (50-mi) radius of the Manzano WSA. Windspeeds and directions in the Manzano WSA vicinity are presented in Figure P.2.9.1–2. Winds are predominantly southerly during the summer and northerly during the winter.

P.2.9.2 Environmental Impacts

Human health impacts from pit storage activities could potentially result from normal operations and accident scenarios. Impacts from normal operations would be confined to onsite workers. Normal operational impacts result from the unloading of pits from safe, secure trailers (SSTs) at the Manzano WSA. Unloading operations would result in radiological exposure to cargo handlers. Based on conservative calculations made for handling of pits at Pantex Plant, the worker doses from unloading of 2,000 pits per year are estimated to be 27 person-roentgen equivalent man (rem) per year or 270 person-rem for the unloading of pits. Once removed from the SSTs, pits would be transferred into the Manzano WSA for storage. Pit transfers within the Manzano WSA would result in radiological exposures to onsite workers handling the pits. The transfer of pits would result in worker doses of less than 2 person-rem per year for handling 2,000 pits and 13 person-rem for the placement of pits. The combined worker dose from unloading and storage of pits at the Manzano WSA would be 283 person-rem distributed over the 30 people directly involved in material movement. Over a period of

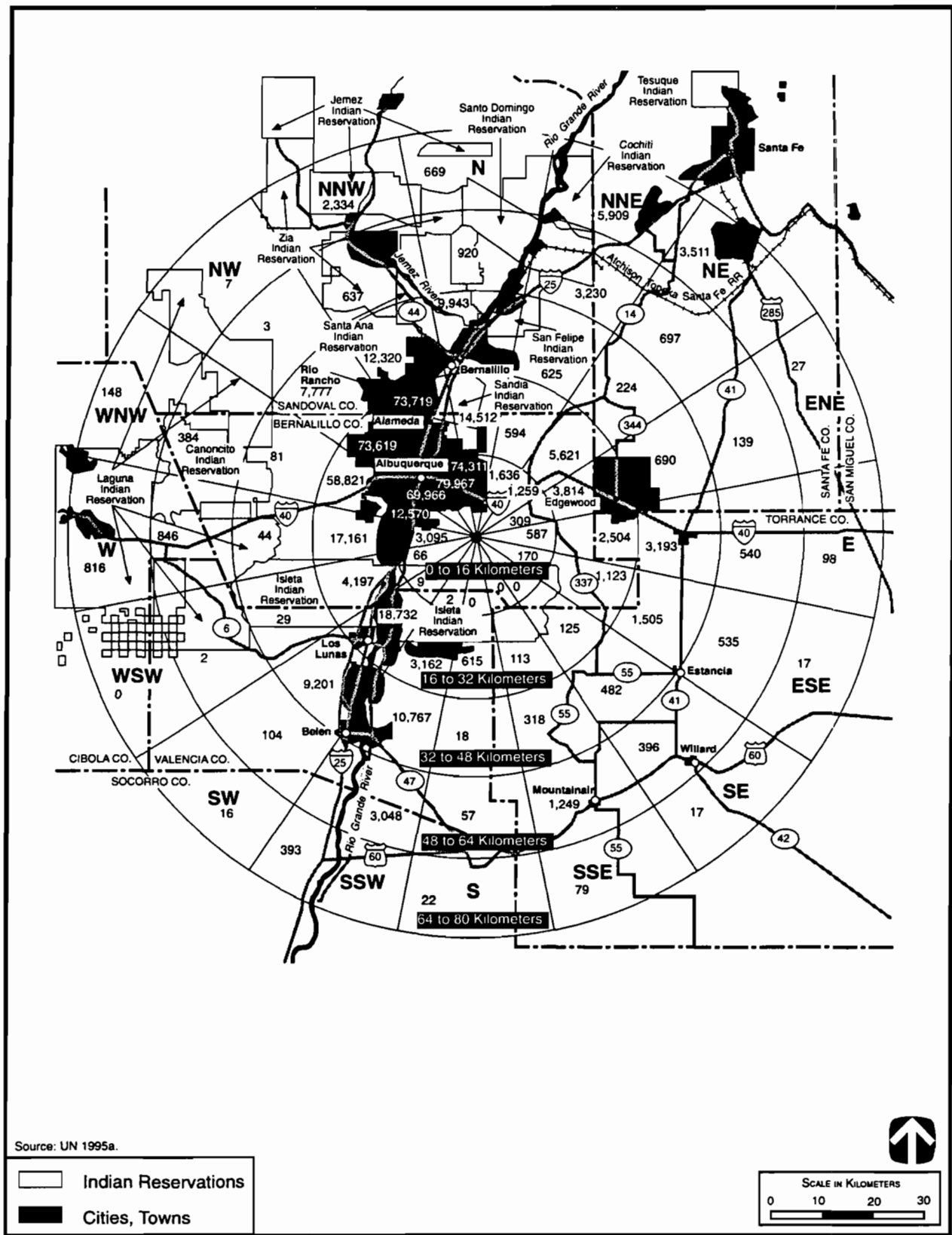


Figure P.2.9.1–1. Offsite Populations in the Vicinity of the Manzano Weapons Storage Area.

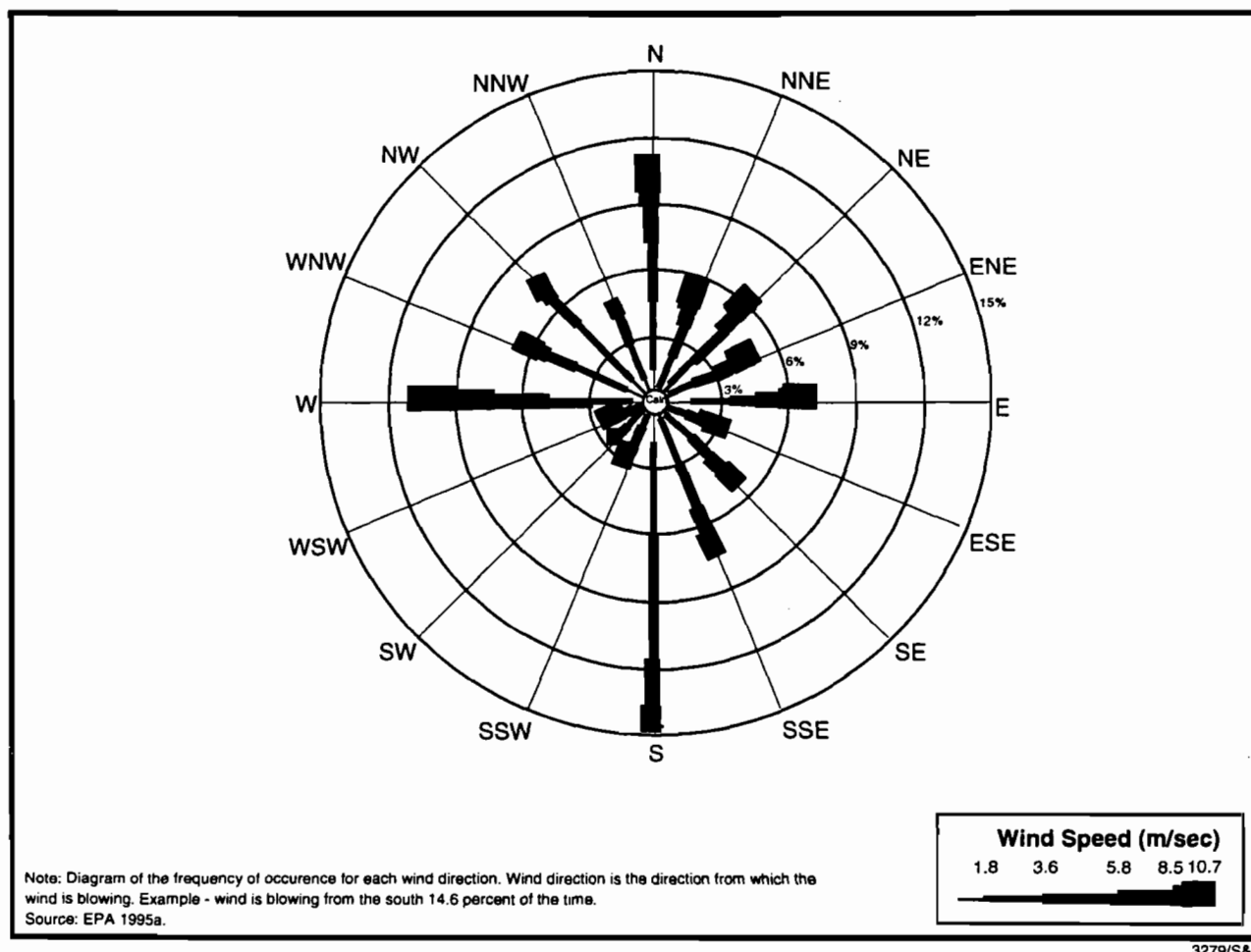


Figure P.2.9.1-2. Wind Direction and Speed at Albuquerque International Airport.

10 years and using a dose-to-risk conversion factor of 4×10^{-4} latent cancer fatality (LCF) per person-rem, there would be an additional 0.11 LCF experienced by this group due to radiological exposure from pit handling. For long-term storage, over a period of 50 years, assuming the handling of 2,000 pits per year and no movement to or from the WSA, there would be an addition 0.04 LCF experienced by the workers.³

Some operational accidents could result in impacts to both onsite workers and the offsite general population. Radiological exposures and the resultant risk of latent cancers have been evaluated. The probability of an onsite worker or an offsite member of the general public contracting a fatal cancer resulting from accidental radiological exposure was calculated using the Melcor Accident Consequence Code System (MACCS) computer code.

The radiological health risk from accidents associated with the storage of pits is dominated by handling accidents that could occur when the pits are being transferred from the transporter. A standard tine forklift is likely to be used to remove pit containers from an SST. The probability of a standard tine forklift causing a puncture during a single handling operation is in the range 10^{-4} to 10^{-6} (that is, extremely unlikely as defined by DOE orders). It is estimated that a forklift puncture of a pit container would release 9.2×10^{-5} curies of Pu.

³ For the Preferred Alternative, surplus Pu material would not be stored for 50 years but until disposition occurs.

This is a conservative estimate of the respirable, airborne release caused by a puncture of one shipping container (PX DOE 1992f:7-39).

Given such a release, an involved worker (the forklift driver) would receive a dose of 6.6 rem, corresponding to an incremental increase in an LCF of 2.6×10^{-3} . In addition, a noninvolved worker 100 m (328 ft) downwind along the center line of the Pu dispersion plume would receive a 5.2×10^{-2} rem exposure, corresponding to an incremental increase in an LCF of 2.1×10^{-5} . The maximally exposed individual of the public would be expected to receive an exposure of 6.7×10^{-3} rem, corresponding to an incremental increase in an LCF of 3.4×10^{-6} .

This event would result in an exposure of 4.0×10^{-2} person-rem to the public within 50 km (80 mi). Considering the likelihood and consequence of this event, on the average, a member of the public will have an increased annual risk of developing a fatal cancer from this potential accident of 2.6×10^{-14} fatal cancers per year. The annual fatal cancer risk to a person in the State of New Mexico from all other causes is 1.4×10^{-3} fatal cancers per year.

Pit container inventories at the Manzano WSA are expected to be performed using either shielded or automated techniques and equipment. Consequently, these normal operations are not expected to result in any significant radiological exposure to workers.

P.2.9.3 Aircraft Accidents

The Manzano WSA is located in the foothills of the Manzano Mountains, approximately 6.5 km (4 mi) southeast of the main (east-west) runway of the Albuquerque International Airport. Figure P.1-1 shows the locations of the Manzano WSA relative to the two runways for the Albuquerque International Airport, one of three airports in the vicinity of the Manzano WSA. The Albuquerque International Airport is the major commercial airfield in the State of New Mexico; it is the only airport with regular commercial jet service. In addition to its role as a commercial airfield, the Albuquerque International Airport is utilized by military aircraft stationed at Kirtland Air Force Base. In 1994, the Albuquerque International Airport had 220,914 aircraft operations (takeoffs and landings) (FAA 1996a:1). Table P.2.9.3-1 summarizes the total number of airfield operations at the Albuquerque International Airport.

In addition to the Albuquerque International Airport, there are two other airports within the Albuquerque area. Coronado Airport is located approximately 19 km (12 mi) to the north-northwest, has two runways, and is used by general aviation aircraft. Similarly, Alameda Airport is located approximately 24 km (15 mi) to the northwest, has two runways, and is also used by general aviation aircraft. Both of these airports are outside the boundary for general aviation aircraft and were therefore not included in the aircraft crash analysis. Only the Albuquerque International Airport and nonairport (in-flight) aircraft were included in the analysis.

Table P.2.9.3-1. Albuquerque International Airport Operations for 1994

Aircraft Type	Number of Operations
Air Carrier	77,978
Air Taxi	41,349
Military	29,929
General Aviation	71,658
Total Airfield Operations	220,914

Source: FAA 1996a:1.

In the history of the Manzano WSA, there have been three aircraft crashes. One crash involved an F-100C; the crash site is located east of the Manzano administration area. Another crash involved a B-29 in the northern portion of the site. This aircraft departed from Kirtland Air Force Base and crashed after approximately

3 minutes in flight, killing the crew. The third crash also occurred in the northern portion of the site and involved an EC-135 (KAFB 1993a:69,73,74). None of these crashes affected the storage facilities.

If DOE chooses to relocate pits to the Manzano WSA, the pits would be stored in Type D magazines. Type D magazines (as shown in Figure P.2.9.3-1) have access tunnels that vary in length from 20 m to over 30 m (65 ft to over 100 ft). The main chambers are approximately 19 m (61 ft) long and have the capacity to store up to 800 pit containers each in a Stage Right configuration using a shielded forklift to stack containers. In addition, the main chambers are protected by two vaultlike steel doors at both ends of the access tunnel.

Type D facilities are tunneled into the mountainside, which provides significant earth overburden protection from penetrating aircraft. As many as 35 magazines have overburden greater than 9 m (30 ft) and are potentially available for pit storage. The frequency of an aircraft impacts at the Manzano WSA is relatively high compared with other potential storage sites. However, the earth overburden of Type D magazine provides complete protection against potential damage from aircraft impacts.

At Manzano, the potential exists for airplanes overflying the area to be carrying conventional bombs. An analysis was performed to determine whether expected bomb loads (one to four 909-kg [2,000-lb] bombs) could damage the Manzano storage magazines in the event of an airplane crash. With the minimum overburden cover of 9 m (30 ft) of granite and earth, the magazines cannot be damaged by any foreseeable aircraft events (Army 1986a: 3-19).

Using the Final DOE Standard for determining the probability of aircraft crashes and 1994 data from the FAA, the frequency of hitting one of the 25 Type D magazines was calculated as 8.8×10^{-5} for all types of aircraft (*DOE Standard, Accident Analysis for Aircraft Crash into Hazardous Facilities, SAFT-0030*). It should be noted that the frequency calculation represents a conservative upper bound. Since this frequency is greater than 1×10^{-7} , the Final DOE Standard stated that further analysis was needed. A structural analysis was done according to the Final DOE Standard for the facility with a 9-m (30-ft) overburden. The analysis was done for the maximum penetrator missile for each of the aircraft categories except for helicopters. None of the aircraft missiles penetrated the facility. Since this frequency is 0, the DOE Standard stated no further analysis was needed.

P.2.10 WASTE MANAGEMENT

For the purpose of this assessment, it is assumed that DOE's SNL would manage the wastes from pit storage at the Manzano WSA. Waste management figures from SNL are used for comparison. SNL manages mixed transuranic waste, transuranic waste, mixed waste, low-level waste, hazardous waste, and nonhazardous wastes in accordance with the requirements of a number of Federal and State regulations, permits obtained under these regulations (for example, New Mexico unilateral FCC order) and DOE Orders. These requirements are primarily under the authority of the EPA, DOE, and the New Mexico Environment Department. SNL generated an estimated 90 cubic meters (m^3) (110 cubic yards [yd^3]) of low-level waste and an estimated 1.7 m^3 (2 yd^3) of mixed waste in 1994. In addition, SNL currently stores approximately 70 m^3 (90 yd^3) of mixed waste onsite (DOE 1995cc:6-4; DOE 1993j:3-71). The new Radioactive Mixed Waste Management Facility for handling these wastes is due to become operational in the near future. SNL generated 751 m^3 (198,450 gal) of liquid and 127 m^3 (166 yd^3) of solid hazardous waste in 1991 (DOE 1993j:3-71). The pit storage operations would generate less than 1 m^3 (1.3 yd^3) of mixed, low-level, and hazardous wastes. Compared to the amounts of waste generated and stored at SNL, the wastes generated by the pit storage activities would be minimal and would not impact the current waste management at SNL.

P.2.11 INTRASITE TRANSPORTATION

Interstate 40 and Interstate 25 provide access to the Albuquerque metropolitan area. Access to KAFB from Interstate 40 is provided from either the Wyoming or Eubank gate entrances (Figure P.1-1). Access to KAFB from Interstate 25 is via Gibson Boulevard.

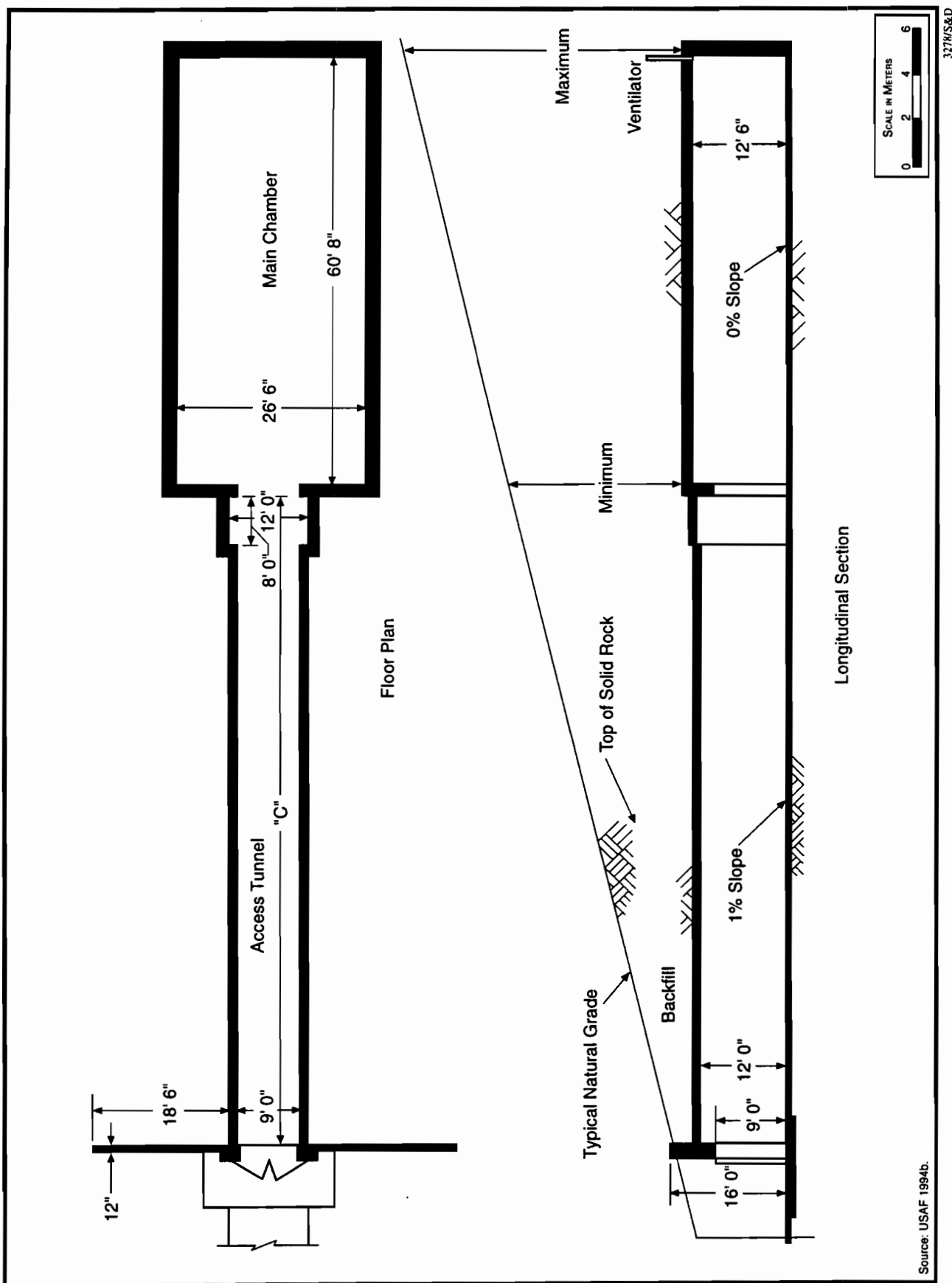


Figure P.2.9.3-1. Type D Storage Facility at the Manzano Weapons Storage Area.

The onsite road system at KAFB consists of paved streets and access roads. The Manzano WSA is located on the east side of KAFB. Access to the Manzano WSA is via Pennsylvania Avenue. The Manzano WSA is surrounded by fencing. Access to facilities within the area is provided via a ring road that encircles the mountain (Figure P.1-2). Traffic within the KAFB boundaries is strictly controlled, and the roads are not open to public traffic. Base personnel traffic would be controlled as SST convoys pass through the base roads. Because a release of Pu from an intersite pit shipment would require a severe accident (for example, an accident with a fuel tanker or a train), the controlled transportation environment at KAFB does not pose a significant threat to pit shipments. Consequently, the contribution to overall intersite transportation accident risk from onsite transport is negligible.

Two high speed transportation corridors (Gibson and Tijeras Arroyo corridors) that would traverse KAFB have been proposed. Of these, the Tijeras Arroyo Corridor would come in closest proximity to the Manzano WSA. Both transportation routes have been discussed for a number of years. However, *National Environmental Policy Act* documentation has not been completed on either project.

P.2.12 ENVIRONMENTAL JUSTICE

P.2.12.1 Affected Environment

The Manzano WSA is located on KAFB, which is adjacent to the southeastern city limits of Albuquerque, in central New Mexico. Besides the Air Force and other Department of Defense facilities, KAFB is also the location of various DOE operations, including SNL. Nearly 20,000 military and civilian personnel work on the base (KAFB 1995a:14). In order to identify the populations covered by Executive Order 12898, an 80-km (50-mi) radius circle centered on the Manzano WSA was overlaid on 1990 Census tract maps. The communities that lie within the 80-km (50-mi) ROI are shown in Figure P.2.12.1-1.

According to the 1990 Census, there were 606,446 persons within the Manzano ROI. White persons comprised 55 percent of the population, Hispanics were the second largest group with 37 percent, and Native Americans accounted for just over 4 percent of the total population. Native American reservations and trust lands belonging to 10 Native American tribes are located within the Manzano ROI, and approximately half of the Native Americans counted in the area in 1990 resided on Native American land. Blacks, Asians, Pacific Islanders and other racial groups totaled less than 4 percent of the total population in 1990 (UN 1995a).

Most of the population in the Manzano ROI resides in various cities, towns, and Census Designated Places. Albuquerque is the most populous community, with 384,736 persons or 63 percent of the total population within the Manzano ROI in 1990. An unincorporated area known as the South Valley, located immediately southwest of Albuquerque and due west of KAFB, is the second largest community in the area, with a 1990 population of 35,701. More than 70 percent of residents in the South Valley were Hispanic. Rio Rancho, northwest of Albuquerque in south-central Sandoval County, is third largest, with 32,505 persons in 1990. North and south of Albuquerque, along the Rio Grande River, are a number of towns and villages, most with primarily Hispanic populations: Belen (5,960 persons in 1990, 67 percent Hispanic), Bernalillo (5,960 persons, 75 percent Hispanic), Bosque Farms (3,791 persons, 25 percent Hispanic), Corrales (5,453 persons, 27 percent Hispanic), Los Chaves (3,872 persons, 49 percent Hispanic), Los Lunas (6,013 persons, 58 percent Hispanic), Tome-Adelino (1,695 persons, 65 percent Hispanic), and Valencia (3,917 persons, 47 percent Hispanic) (Census 1992b:11-21). Most of these communities are also characterized by fairly large low-income populations. For example, Belen had 28 percent of its population below the poverty level, Bernalillo had 24 percent below the poverty level, Los Chaves had 19 percent below the poverty level, Los Lunas had 25 percent below the poverty level, and Valencia had 15 percent below the poverty level (Census 1993m:516-520).

There are also nine primarily Native American communities in the Manzano ROI. A major portion of the northern boundary of the Isleta Indian Reservation borders the southern boundary of KAFB, but the Isleta people (2,699 in 1990) primarily live near the Rio Grande River, several miles from the KAFB boundary. In the

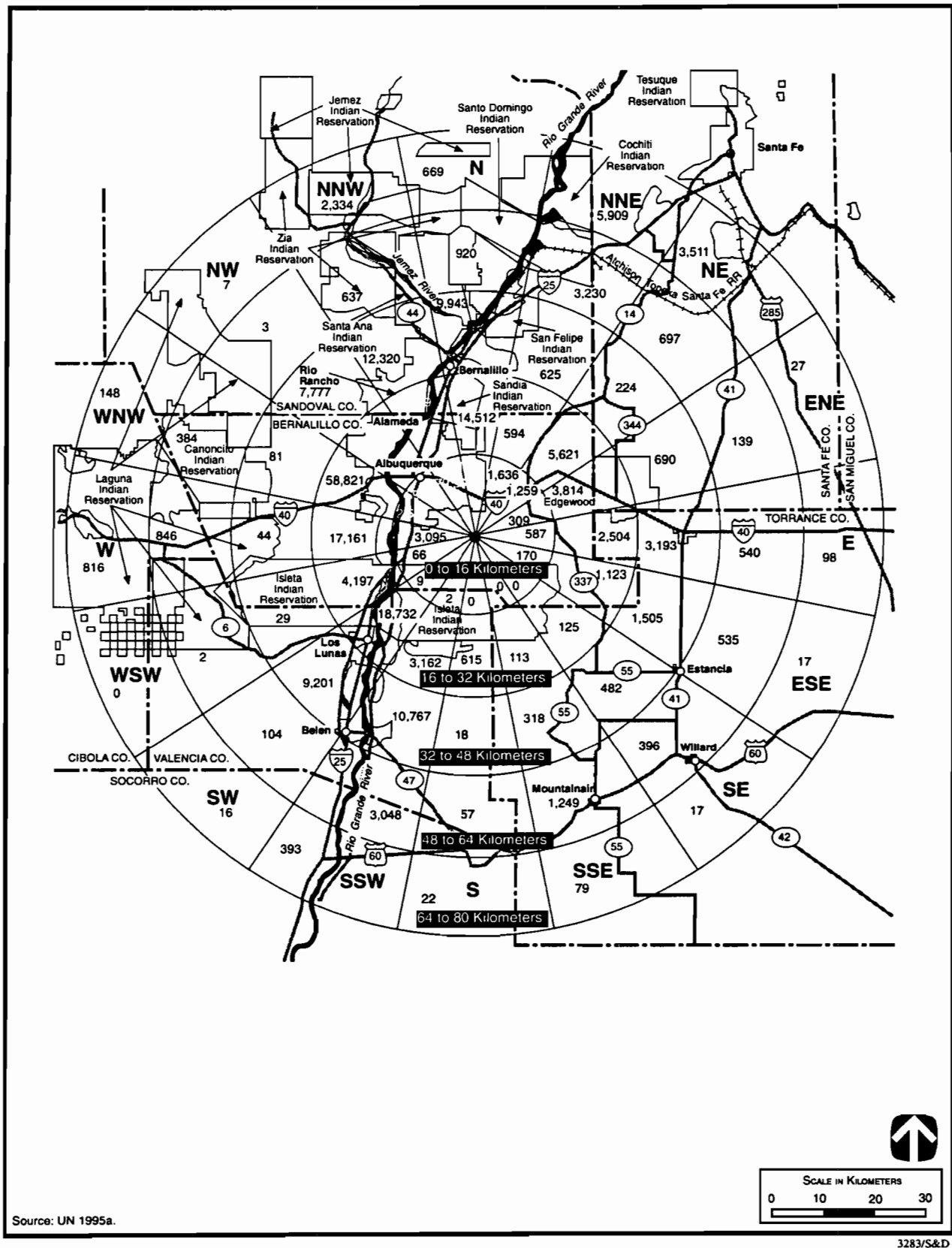


Figure P.2.12.1-1. The Manzano Weapons Storage Area Region of Influence.

Sandoval County portion of the Manzano ROI are seven additional Native American reservations with persons residing in dense settlements known as Pueblos: Sandia Pueblo with 358 Native American residents in 1990; Santa Ana Pueblo with 481 Native American residents; San Felipe Pueblo with 1,859 Native American residents; Santo Domingo Pueblo with 2,947 Native American residents; Cochiti Pueblo with 666 Native American residents; Zia Pueblo with 637 Native American residents; and Jemez Pueblo with 1,738 Native American residents. In the northwest corner of Bernalillo County is the Canoncito Navajo Reservation, a satellite of the main Navajo Reservation, with 1,060 Native American residents counted in 1990 (Census 1991h:60,61). The most notable socioeconomic characteristic of these communities is their large numbers of low-income persons. The percentage of persons below the poverty level based on 1989 incomes found on these reservations were: Isleta, 27 percent; Sandia, 19 percent; Santa Ana, 13 percent; San Felipe, 42 percent; Santo Domingo, 34 percent; Cochiti, 25 percent; Zia, 33 percent; Jemez, 37 percent; and Canoncito, 60 percent (Census 1993m:622-625).

Figure P.2.12.1–2 shows 1990 Census tracts within the Manzano ROI. The tracts are shaded if minority populations comprised 25 percent or more of the populations in 1990 or if 25 percent or more of the persons in a tract were below the poverty level based on their incomes in 1989. The 25 percent threshold levels for minority or low-income persons are based on the working definitions contained in the notice of the EPA's Office of Environmental Justice (59 FR 50757).

Virtually every tract in the Manzano ROI had a population in 1990 in which at least 25 percent of persons were minority or non-Whites. The major exceptions were the southernmost tract in Santa Fe County, 4 tracts in Rio Rancho in southcentral Sandoval County, and 25 tracts located primarily in the northeastern quadrant of Albuquerque, including the Four-Hills Tract located just north of the Manzano WSA.

Low-income persons were not nearly as prevalent in the Manzano ROI in 1990 as were minority persons. High levels of poverty found in Native American communities account for the shaded tracts in rural Sandoval County, eastern Cibola County, and western and southern Bernalillo County. The tracts shaded for low-income persons in rural Socorro, Valencia, Torrance and San Miguel Counties are also areas with largely Hispanic populations. In the Albuquerque area, high poverty levels were found primarily in the southern half of the city, with the greatest concentration of low-income persons situated in the southwest quadrant, in the unincorporated area known as the South Valley, with its 73-percent Hispanic population (Census 1992b:11-21).

P.2.12.2 Environmental Impacts

Because the long-term storage of pits at KAFB would not require any construction activities and because all facility modifications would take place inside existing facilities, impacts to the natural environment would be minimal. Under normal operating conditions, a minor increase in PM_{10} concentrations would be expected from the operation of forklifts that are used to move the pits from the unloading area to the storage area. These impacts are not likely to affect the surrounding population. Radiological releases from normal pit storage operations would have no measurable effect on an individual occupying a position near the KAFB boundary for an entire year. Levels at the site boundary would be indistinguishable from natural background radiation. No health effects would be expected among the general public, including minority and low-income populations, as a result of normal storage operations.

An abnormal event, such as accidental puncture of a storage container by a forklift, has the potential of exposing the general public to radiation. The analysis in Section P.2.9, indicates that the risk to the public from such an accident would be negligible. With no measurable impacts on the general population, the minority and low-income populations would not be disproportionately impacted.

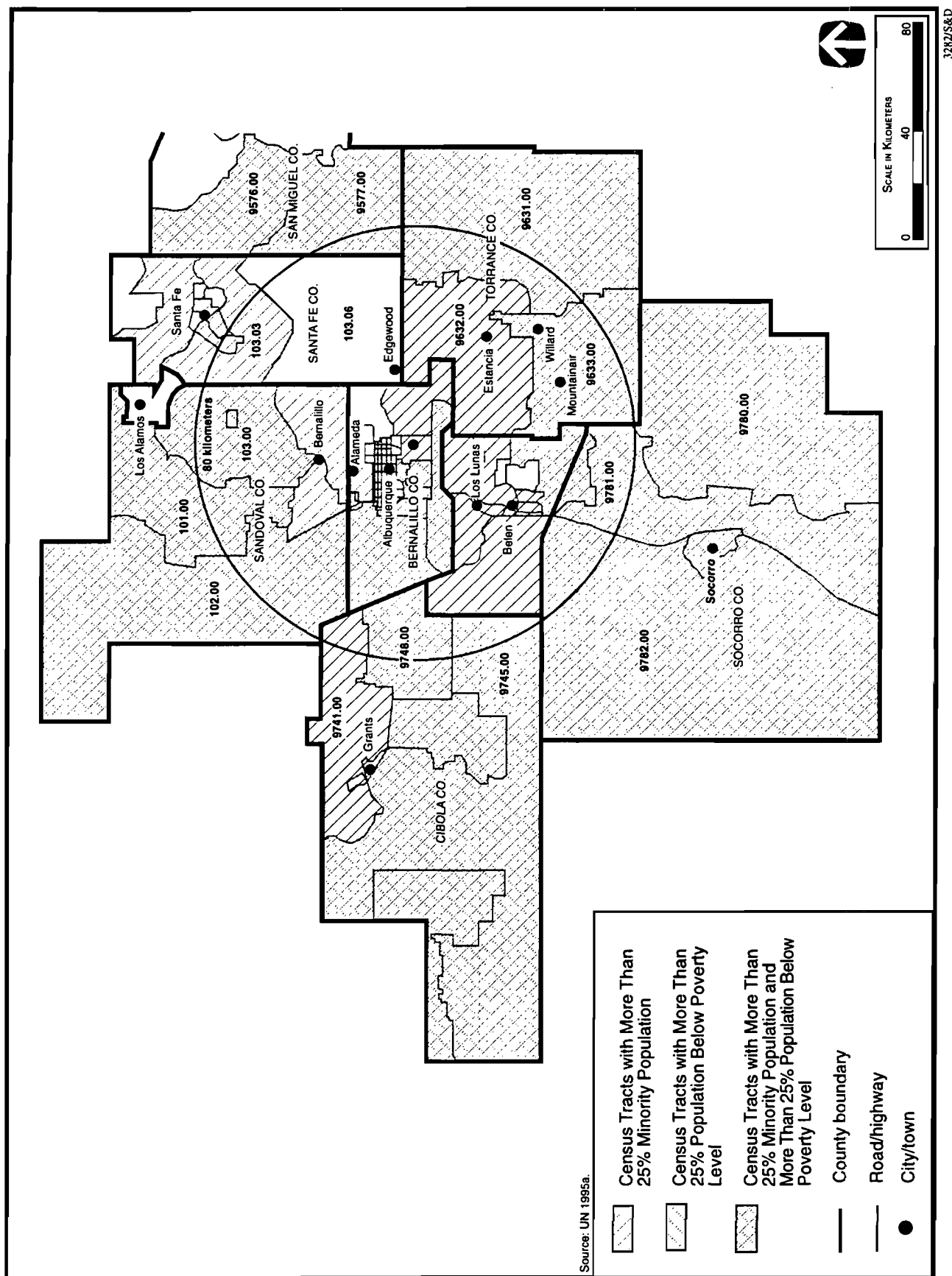


Figure P.2.12.1-2. Minority and Low-Income Populations in the Manzano Weapons Storage Area Region of Influence.

Appendix Q

Storage of Rocky Flats Environmental Technology Site Plutonium Pits at Pantex Plant

Q.1 INTRODUCTION

The Preferred Alternative for storage identified in this Programmatic Environmental Impact Statement (PEIS) calls for the transfer of plutonium (Pu) pits from Rocky Flats Environmental Technology Site (RFETS) (both strategic and surplus) to Pantex Plant (Pantex) with storage of surplus pits continuing until disposition. Pits to be transferred would be packaged in FL (Type B) containers at RFETS before shipment and, upon receipt at Pantex, would be repackaged into AL-R8 containers in Zone 12 South and placed into storage in Zone 4 West pending availability of AT-400A containers and relocation to upgraded storage facilities in Zone 12 South. The transportation of pits between Zone 4 and Zone 12 and the repackaging of the pits from AL-R8 to AT-400A containers is analyzed in the *Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (Pantex EIS). The environmental analysis of intersite transportation for shipment of the RFETS Pu to Pantex is given in Section 4.4 and Appendix G of this PEIS for both workers and the public. Storage of Pantex pits at Zone 4 West is analyzed in the Pantex EIS and incorporated into this appendix as follows.

There are a small number of pits at RFETS that are surplus to national security needs but are still needed for on-going, non-weapons-related research and development projects at Los Alamos National Laboratory (LANL) and Lawrence Livermore National Laboratory. Therefore, these pits will not come within the scope of this PEIS until the research and development projects are completed. It is expected that this work will result in the conversion of the Pu into metal or oxide and the return of the material to RFETS. At that point, the materials will come within the scope of this PEIS and be stored and dispositioned in accordance with the decisions reached on the storage and disposition of surplus Pu in metal or oxide form.

The majority of the surplus pits at RFETS are already in a shippable form. However, there are a small number of pits that are not currently in a shippable condition. If a decision is reached to store surplus pits to Pantex, actions will be taken at RFETS, in accordance with existing procedures and in accordance with decisions based on existing environmental analyses, to place them in a shippable condition prior to shipment to Pantex. All of these pits are types which are currently stored at Pantex or have been stored there in the past.

Q.2 PIT TRANSFER AND STORAGE

Currently at Pantex, pits removed from weapons are swipe-tested to ensure that there is no surface radioactive contamination. Pits are then placed in AL-R8 containers and sealed with a tamper-indicating device. A pit within a container presents an external radiological hazard that is weapons-system-specific. A typical dose rate is 3 millirem per hour at 1 meter (m) (3.3 feet [ft]) from the AL-R8 container.

All pits at Pantex are expected to be stored in Zone 4 West using Stage Right techniques and equipment by December 1996. Stage Right techniques and equipment would enable the stacking of pit containers in a safe configuration, simplify pit transfers, reduce the need for entrance into magazines by personnel, and limit their exposure to radiation. Pits being transferred to Zone 4 West for staging are placed at the disassembly point within a Stage Right pallet (either 4 or 6 containers per pallet) and, using an electric forklift, loaded into a pallet trailer or a hardened trailer, which can carry 24 pit containers. The pallet trailer is driven to Zone 4 West, and the pit pallets are then unloaded by the shielded Stage Right forklift into the storage magazine. Pits are retrieved from a storage magazine in a similar manner.

Q.3 ZONE 4 WEST STAGING OPERATIONS

The bulk of the storage activity associated with the Zone 4 West staging magazines involves material movements to and from the production areas in Zone 12, as discussed in Section 4.12.1.1 of the Pantex EIS.

The Department requires safeguards and security programs at facilities handling special nuclear material. At Pantex, this program requires the periodic inventory of the magazines containing nuclear explosives and nuclear explosive components. The frequency of inventory for pit-staging magazines is dictated by the staging class of the magazine. Pit-staging magazines are divided into two classes: normal and exempt magazines. Normal staging magazines contain reserve components for existing weapon systems. For these magazines, the maximum time between inventories would be 12 months and 1 week. Exempt magazines contain components that are not expected to be reused. For these magazines, the maximum time between inventories would be 21 months and 1 week.

When pit containers are placed in Stage Right configuration, inventories in the magazines are performed with automatic bar code readers and video cameras attached to an inventory pallet. No movement of the pit containers is required for the inventory.

Q.4 RADIOLOGICAL EXPOSURE FROM ZONE 4 STORAGE

Pits from both dismantlement and stockpile management activities are transported and handled within the Pantex boundary as part of the Pantex operations. The transfer of pits between Zone 4 and Zone 12 would require repackaging of pits from original containers (for example, the FL [Type B] containers for pits from the RFETS) into AL-R8 containers for storage in Zone 4. After the AT-400A containers are available, the pits would be repackaged into AT-400A containers for either long-term storage or transportation to a disposition site. Pantex's current schedule indicates a repackaging rate of approximately 2,000 pits /year(yr) starting in 1997. No public exposure to radiation would occur from onsite, incident-free transport of pits.

Under the Proposed Action described in the Pantex EIS, as many as 20,000 pits could be stored in Zone 4. From the repackaging of 2,000 pits per year, it is estimated that an additional worker exposure of less than 30 person-rem will be incurred. Similarly, an additional worker exposure of less than 300 person-rem for the repackaging of 20,000 pits will be incurred. Using a normal operations dose-to-risk conversion factor of 4×10^{-4} cancer fatalities per rem, less than 0.12 cancer fatalities would be incurred in the workforce from repackaging 20,000 pits. Repackaging all of the RFETS pits would yield less than an additional 10^{-2} cancer fatalities.

Table Q.4-1 presents the estimated exposures to the 50 people (based on current operation levels) who are directly involved with transportation and staging operations at Pantex. Workers who are not directly involved are not allowed in the vicinity of material transfer operations. These exposures were estimated using historical dosimetry information on site. No public exposure to radiation occurs from nonincident onsite material transfers. Assuming a 2,000 weapons operations maximum activity level, and assuming that the same 50 people remain involved in material handling for the 10 years under evaluation of the Pantex EIS, there should be 0.024 additional latent cancer fatalities in this group due to this exposure.

Assuming that a maximum exposed worker receives less than 0.3 rem/yr over the timeframe evaluated in the Pantex EIS, the incremental increase in lifetime fatal cancer probability from the projected exposure period of 10 yr is approximately 1.2×10^{-3} .

Although the worker exposure will vary depending on the weapons-system-specific pit, the dose to workers from the movement of a single pit container between Zone 4 and Zone 12 or Zone 12 and Zone 4 is 6.5×10^{-4} person-rem, as analyzed in the Pantex EIS. Transferring all of the RFETS pit containers from storage in Zone 4 to Zone 12 for repackaging and returning them to Zone 4 for storage would yield less than 10^{-3} cancer fatalities.

Table Q.4-1. Estimated Transportation and Staging Worker Exposures for the Proposed Action

Number of Additional Weapons Operations	10-Year Worker Exposure ^a (person-rem)	Yearly Average Exposure ^a (person-rem)	Latent Cancer Risk For 10-Year Exposure ^a
2,000	61	6	0.024
1,000	48	5	0.019
500	41	4	0.016

^a Includes a baseline of 2,000 Pantex pit repackaging operations per year.

Source: PX DOE 1996b.

Therefore, the total exposure to workers from both the transfer of pit containers and the repackaging of pits from FL (Type B) to AL-R8 containers would be less than 10^{-2} additional latent cancer fatalities to workers due to this exposure. No additional exposure to the public from these activities for normal operations would occur.

Potential consequences to the Ogallala Aquifer from an accidental plutonium release were investigated in conjunction with a Safety Analysis Report and an Environmental Assessment by LANL (LANL 1992e:1,2,10). The hypothetical accident leading to dispersal of Pu to the environment around Pantex was assumed to be a high-temperature fire caused by a jet plane impact into a Zone 4 storage magazine containing Pu pits, and subsequent ignition of jet fuel. LANL envisioned that the hypothetical jet fuel fire could disperse fine particulate plutonium downwind of Pantex for a maximum distance of 80 kilometers (50 miles). Prompt decontamination efforts could reduce radiation levels to 0.2 microcuries per square meter ($\mu\text{Ci}/\text{m}^2$), but surface runoff and wind transport could concentrate contamination at playa lakes, where surface soil radiation levels could be as high as $2.0 \mu\text{Ci}/\text{m}^2$. Surface water infiltrating through this contaminated soil could carry plutonium and decay products down toward the Ogallala Aquifer. The model assumed an average recharge rate of 3 centimeters (1 inch)/yr (10 times the High Plains average), and that recharge water would reach the Ogallala Aquifer at a depth of 20 to 100 m (65 to 330 ft).

The analyses conclude that the hypothetical plutonium dispersal accident does not pose a significant threat to the Ogallala Aquifer. The assumptions of the analyses were conservative because the "worst-case" scenarios were based on a depth to the water table of 20 m (50 ft) whereas, at Pantex, the typical depth to the top of perched groundwater is approximately 82 m (270 ft), and the depth to the main Ogallala Aquifer ranges from 104 to 140 m (340 to 460 ft). For water table depths of 60 and 100 m (200 and 330 ft), LANL calculated plutonium travel times of 305,000 and 610,000 years, respectively. Interactions with both surficial materials and the unsaturated portion of the Ogallala Formation would be expected to retard the movement of Pu relative to the infiltrating water (that is Pu would move at a rate slower than the infiltrating water). During the transport time, radioactive decay would be expected to further reduce Pu concentrations (LANL 1992e:10,12). Where the perched aquifer is present, the downward movement of plutonium would be further reduced, because the low-permeability fine-grained zone would impede downward flow and potential contamination would be more likely to move horizontally and follow the course of buried channel sands and gravels.

The likelihood of an aircraft crashing into a critical area at Pantex is extremely unlikely. The likelihood of an aircraft crashing into a critical area at Pantex and affecting (by fire or direct hit) an intransit pit shipment is considered not reasonably foreseeable (frequency of occurrence is less than $10^{-6}/\text{yr}$) and at least several orders of magnitude less likely than an aircraft impact to a Pantex facility (because of the limited target area of the trailer compared with facilities and the limited time that weapons are contained in a trailer). In terms of risk the potential environmental impacts from an airplane crash into a Zone 4 weapons magazine are much more significant than those associated with a crash into a trailer.

Other potential onsite transportation accidents are much more likely to occur but have less potential for environmental impacts. A characteristic high-probability/low-consequence accident involving radioactive

material is a forklift puncture causing a release of plutonium from a pit container in the onsite transportation environment.

An individual worker would be expected to receive no more than a 7-rem exposure from Scenario 6 (PX DOE 1994e:ES-9). This corresponds to an upper bound incremental increase in fatal cancer probability of 2.8×10^{-3} , given that the release occurs. The maximally exposed non-involved worker would be expected to receive an exposure of 4×10^{-3} rem. This corresponds to an incremental increase in fatal cancer probability of 1.6×10^{-6} .

Q.5 OTHER IMPACTS FROM ZONE 4 STORAGE

The storage of RFETS pits planned under the Preferred Alternative would use existing storage space in Zone 4. Therefore, no land resources, including floodplains and wetlands, would be affected. Currently, all existing Modified Richmond and Steel Arch Construction magazines have the necessary utility support and material access control, and are supported by existing plant facilities and infrastructure. Steel Arch Construction magazines are used to stage nuclear weapons and pits, and require similar levels of infrastructure support as the Modified Richmond magazines. No new construction of storage magazines is required as a result of increasing storage for the RFETS pits. Therefore, current levels of infrastructure and utility support are expected to continue.

Only indirect pollutant emissions would result from pit storage activities. Pollutant exhaust emissions from moving pits between Zone 4 and Zone 12 would be the principal source. Onsite pit transfers are accomplished with electric forklifts which do not emit any pollutants. Pollutant emissions from these indirect sources are a small fraction of the total emissions from Pantex. Therefore, air quality impacts resulting from pit storage activities would be negligible. The principal noise source from pit storage activities would be from the vehicles moving pits between Zone 4 and Zone 12. The number of vehicles would be a very small fraction of the total traffic generated by Pantex. Overall noise level increases resulting from pit storage activities would not be detectable by the human ear. Therefore, noise impacts from pit storage activities would be negligible.

Under the Preferred Alternative, the RFETS number of pits would be stored at Pantex. The increased number of pits would be within the capacity of Zone 4. Storage activities do not pose additional impacts to water quality or availability currently for the operations occurring. Impacts to pit storage activities due to potential erosion, subsidence, and seismic hazards are the same or less than those for other operations at Pantex. Storage activities do not pose additional impacts to soil and sediment quality under normal conditions because the pits would not come in contact with the soil or sediment. Accident release scenarios are discussed in Section Q.4.

The storage of RFETS pits would utilize existing facilities and would not pose impacts to biotic or cultural resources. Only 30 employees are directly involved in current pit storage activity at Pantex. The addition of RFETS pits would use only a portion of these employees. Since they are part of the total employment of 3,800 workers at Pantex, the socioeconomic effects would be minimal.

Pit storage activities generate low-level waste, mixed low-level waste, hazardous waste, and nonhazardous waste. The amount of waste generated (less than 1 cubic meter [1.3 cubic yards] /yr) for each waste category is small compared to the volume of waste routinely handled at the plant, and would not affect waste management activities. The activities generating waste include radiation safety operations (for example, labels, security seals, and personnel protective equipment) and minor maintenance.

Appendix R

Aircraft Crash Accident at Pantex Plant

Aircraft accidents are a concern at Pantex Plant (Pantex) because of the large volume of local air traffic, the proximity of Pantex to flight paths to and from the Amarillo International Airport, and overflights. Pantex is a unique Department of Energy (DOE) facility because the location of nuclear weapons and weapon components, Zone 4 West, is situated on a direct line off the centerline of Runway 04/22. The airport is used by commercial air carriers and air taxis, large and small military aircraft flying touch and go training exercises, and general aviation aircraft. Even though the likelihood of an aircraft crash at Pantex is small, a crash could have the potential of causing radioactive releases from Pantex facilities.

In the past, the aircraft crash analysis was done using the Solomon model, which is over 20 years old. However, this method has been determined to be obsolete because it does not consider aircraft altitude in the model, does not incorporate recent data for crashes that occur near airports in the United States, and does not account for recent changes for aircraft that do not fly on designated airways. DOE has created a new set of models that replace the Solomon model. This DOE standard, *Accident Analysis for Aircraft Crash Into Hazardous Facilities*, was used to estimate the aircraft impacts in the *Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components* (Pantex EIS).

The Pantex EIS analyzed the probability of hitting those nuclear facilities where plutonium (Pu), highly enriched uranium (HEU), and tritium are located. This analysis separated the 60 storage magazines in Zone 4 West from the nuclear facilities in Zone 12 South, where nuclear operations occur. The probability of an aircraft hitting a facility in Zone 4 or Zone 12 is 1.3×10^{-5} and 1.8×10^{-5} , respectively, for a total probability of 3.1×10^{-5} . The likelihood of an aircraft hitting a Zone 12 South nuclear facility is slightly greater than that of an aircraft hitting a Zone 4 West magazine, primarily because the total Zone 12 South target footprint is slightly larger than that of Zone 4 West.

After determining the probability of an aircraft crashing into a facility, the potential for sufficient building damage to cause a release was then determined. For an aircraft impact, building damage is defined as perforation (when a missile [flying object] generated by an aircraft penetrates into a facility) or scabbing (when an impact of an aircraft missile on a facility generates a secondary missile inside the facility). For magazines or building containing pits not in weapons, the only release mechanism possible is a perforation followed by a fire from spilled aircraft fuel. The Pantex EIS assumed that a perforation would lead to a release. This assumption is conservative for several reasons: 1) a fire may not occur, 2) the magazine contents may not be involved in the fire if the fuel material does not get into the facility, and 3) pits are currently stored in AL-R8 containers, which provide thermal and impact resistance. For Zone 4 and Zone 12 where Pu, HEU, and tritium are stored, the probability of facility perforation leading to a fire is 5.3×10^{-7} and 4.7×10^{-7} , respectively, for a total of 9.9×10^{-7} .

If any of the three storage alternatives (upgrade, consolidate, or collocate) of the *Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Impact Statement* (Storage and Disposition PEIS) were implemented, there would be a change in the aircraft crash probability. These alternatives would transport Pu material from other existing Pu storage sites, including Rocky Flats Environmental Technology Site (RFETS). Since the result of any of these alternatives would be the removal of all Pu pits not in weapons from Zone 4, aircraft crash and release probabilities would be reduced. If either the Preferred Alternative (Upgrade With RFETS Pu Pits Subalternative) or the Upgrade With All or Some RFETS Pu and Los Alamos National Laboratory Pu Subalternative is selected, all Pu would be moved to existing buildings in 12-66 and 12-82. This would reduce the aircraft crash and release probabilities almost proportionally to the number of Zone 4 West magazines no longer used. The aircraft crash and release probabilities in Zone 4 would only be for those magazines where nuclear weapons are staged. The impact of additional Pu in Zone 12 South buildings would

be minimal because Buildings 12-66 and 12-82 are existing and adjacent to where Pu is currently stored. Therefore, the aircraft crash probability would be approximately the same.

The Consolidation Alternative to the Storage and Disposition PEIS has two options at Pantex: 1) build a new facility and modify existing facilities in Zone 12 South or 2) build a new facility in Zone 12 South. Under the first option, there would be a reduction in the aircraft crash and release probabilities due to a reduction in target footprint in Zone 4 and a minimal increase in Zone 12 South as discussed for the Upgrade Alternative. The new facility in Zone 12 South would have a smaller target footprint compared to the Zone 4 West pit storage magazines no longer used. There would be an increase in the aircraft crash and release probabilities because of the addition of a new facility in Zone 12 South and a decrease because of the closing of some magazines in Zone 4 West. Because the overall Pantex footprint would decrease, the overall aircraft accident probabilities for all of Pantex would be reduced. The impacts from the second consolidation option, building a new facility, or the Collocation Alternative, would be similar to the first consolidation option since material would be moved from Zone 4 West to Zone 12 South.

Pantex is a potential site for locating two disposition facilities - pit disassembly/conversion and mixed oxide (MOX) fuel fabrication. Should new facilities be built at Pantex, there would be an increase in the aircraft crash and release probabilities depending on locations. If existing buildings where Pu operations are currently occurring were used, there would be no increase in the aircraft crash and release probabilities. The aircraft crash and release probabilities are highly dependent on the size of the building (target footprint) and the location of the building (whether or not it is shielded by other buildings). Based on the current size and location of the buildings, for the Preferred Alternative, if either the pit disassembly/conversion facility or MOX fuel fabrication facility were built at Pantex, either building would increase by no more than 10 percent of the current Zone 12 crash probability, 1.8×10^{-5} , or release probability, 4.7×10^{-7} . The crash and release probabilities for either building would be assessed in subsequent, tiered *National Environmental Policy Act* review.



**Office of
Fissile Materials Disposition**

United States Department of Energy

**Storage and Disposition of
Weapons-Usable Fissile Materials
Final Programmatic Environmental
Impact Statement**

Comment Response Document

Volume IV - Part A

December 1996

**For Further Information Contact:
U.S. Department of Energy
Office of Fissile Materials Disposition, 1000 Independence Ave., SW, Washington, DC 20585**

COVER SHEET

RESPONSIBLE AGENCY: U.S. Department of Energy (DOE)

TITLE: *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement (DOE/EIS-0229)*

CONTACTS:

For further information on this programmatic environmental impact statement (PEIS), call (202) 586-4513 or fax (202) 586-4078 or contact:

Mr. J. David Nulton

Director

Office of NEPA Compliance and Outreach

Office of Fissile Materials Disposition

U.S. Department of Energy

1000 Independence Ave., SW

Washington, DC 20585

(202) 586-4513

For further information on the U.S. Department of Energy/*National Environmental Policy Act* (NEPA) process, call (800) 472-2756

or contact:

Ms. Carol Borgstrom

Director

Office of NEPA Policy and Assistance (EH-42)

Office of Environment, Safety and Health

U.S. Department of Energy

1000 Independence Ave., SW

Washington, DC 20585

(202) 586-4600

ABSTRACT: This document analyzes the potential environmental consequences of alternatives for the long-term storage (up to 50 years), including storage until disposition, and disposition of weapons-usable fissile materials from U.S. nuclear weapon dismantlements under the responsibility of the DOE. Long-term storage of nonsurplus inventories of weapons-usable plutonium (Pu) and highly enriched uranium (HEU) are required for national defense purposes, while the disposition of surplus weapons-usable Pu is necessary in order to implement our national nonproliferation policy. In addition to the No Action Alternative, this PEIS assesses three storage alternatives (that is, upgrade at multiple sites, consolidation of Pu, and collocation of Pu and HEU) at six DOE candidate sites located across the country. These sites are Hanford Site, Nevada Test Site, Idaho National Engineering Laboratory, Pantex Plant, Oak Ridge Reservation, and Savannah River Site. Although they are not candidate sites for storage, Rocky Flats Environmental Technology Site (RFETS) and Los Alamos National Laboratory are assessed for the No Action Alternative. For the disposition of surplus Pu, three alternative categories (that is, deep borehole, immobilization, and reactor) with nine primary alternatives are assessed at several DOE and representative sites for analysis purposes. Evaluations of impacts on site infrastructure, water resources, air quality and noise, socioeconomics, waste management, public and occupational health and safety, and environmental justice are included in the assessment. The intersite transportation of nuclear and hazardous materials is also assessed. DOE's Preferred Alternative is identified in this Final PEIS. The Preferred Alternative for storage is a combination of No Action and Upgrade Alternatives for the various DOE sites, and phaseout of Pu storage at RFETS. The Preferred Alternative for disposition of surplus Pu is to pursue a disposition strategy involving a combination of immobilization and reactor alternatives, including vitrification, ceramic immobilization, and existing reactors.

PUBLIC INVOLVEMENT: The DOE issued a Draft PEIS on March 8, 1996, and held a formal public comment period on the Draft through June 7, 1996. In preparing the Final PEIS, DOE considered comments received via mail, fax, electronic bulletin board (Internet), and transcripts of messages recorded by telephone. In addition, comments and concerns were recorded by notetakers during interactive public meetings held during March and April 1996 in Denver, CO, Las Vegas, NV, Oak Ridge, TN, Richland, WA, Idaho Falls, ID, Washington, DC, Amarillo, TX, and North Augusta, SC. Comments received and DOE's responses to those comments are found in Volume IV of the Final PEIS.

FOREWORD

This is the *Storage and Disposition of Weapons-Usable Fissile Materials Final Programmatic Environmental Impact Statement* (PEIS), prepared by the U.S. Department of Energy, Office of Fissile Materials Disposition. The document is composed of four volumes and a separate Summary. Changes made since the Draft PEIS are shown by change bar notation (vertical lines adjacent to the changes) in this Final PEIS for both text and tables. Deletion of one or more sentences is indicated by the phrase "Text deleted." in brackets. This Final PEIS includes the Preferred Alternative, which is a combination of alternatives. The Preferred Alternative is described in Section 1.6 and Chapter 2 of Volume I, and analyzed in Chapter 4 of Volume II. For all the alternatives, including the Preferred Alternative, a comparison of alternatives is presented in Section 2.5 of Volume I and a summary of impacts is presented in Section 4.6 of Volume II (Part B). Information from these sections is also presented in the Summary.

Volume I contains Chapters 1 through 3 of the PEIS. Chapter 1 includes a description of the history and background of the fissile materials disposition program, the purpose of and need for the proposed action, a summary of changes made to the Draft PEIS, and the Preferred Alternative. Chapter 2 gives a description of the proposed long-term storage and disposition alternatives, a description of how the alternatives were selected and why others were eliminated from further consideration, and a comparison of the alternatives in terms of their potential environmental impacts. Chapter 3 describes the affected environment at candidate long-term storage locations, and at sites and environmental settings for the disposition alternatives.

Volume II (Parts A and B) contains Chapters 4 through 10 of the PEIS. Chapter 4 describes the potential environmental impacts resulting from construction and operation of the proposed long-term storage and disposition alternatives, including the Preferred Alternative. Also contained in this chapter are intersite transportation impacts, a discussion of environmental justice issues, cumulative impacts due to the implementation of the proposed alternatives in addition to other actions at a site, avoided environmental impacts, and a summary of impacts. Chapter 5 provides a list of references used in the preparation of this document. Chapter 6 provides an index to the main text of the PEIS. Chapter 7 is a glossary of key terms used in the document. Chapter 8 is a list of preparers. Chapter 9 lists government agencies and organizations contacted during the preparation of this PEIS. Chapter 10 provides a distribution list for the document.

Volume III contains the appendices to this PEIS. Appendix A contains the fact sheet on the President's *Nonproliferation and Export Control Policy*, and the Joint Statement Between the United States and Russia on Nonproliferation. Appendix B provides specifications for key buildings within each facility complex analyzed in this PEIS. Appendix C describes requirements for construction and operation of the various facilities required to accomplish the storage and disposition activities essential to the alternatives described in this PEIS. Appendix D provides information on overall water usage for the storage and disposition facilities discussed in this PEIS. Appendix E gives a general overview of the Department of Energy (DOE) environmental restoration and waste management program, baseline waste management at DOE sites, and project-specific waste management activities associated with the proposed long-term storage and disposition alternatives. Appendix F provides detailed data supporting the air quality and noise analyses. Appendix G describes the methodology used for intersite transportation risk analysis and provides a summary of hazardous materials shipped to and from DOE sites, plus information on shipping containers. Appendix H evaluates various plutonium waste forms for potential disposal in a high-level waste repository. Appendix I describes operations of a Canadian Deuterium Uranium Reactor. Appendix J identifies the compliance requirements associated with the Proposed Action, as specified by the major Federal and State environmental, safety, and health statutes, regulations, and orders. Appendix K lists the scientific names of common nonthreatened and nonendangered animal and plant species identified in Chapters 3 and 4. Appendix L includes the supporting data used for assessing the No Action

Alternative in the socioeconomics sections of this PEIS. Appendix M presents detailed information on the potential health risks associated with releases of radioactivity and hazardous chemicals from the proposed storage and disposition alternatives during normal operations and from postulated accidents. Appendix N describes different concepts for, and provides cost and benefit information on, the multipurpose reactor. Appendix O provides a description of facilities and operations for a can-in-canister approach to plutonium immobilization at the Savannah River Site in South Carolina. Appendix P describes the potential environmental impacts of using the Manzano Weapons Storage Area in New Mexico for the long-term storage of plutonium pits. Appendix Q identifies the potential health impacts from the storage of Rocky Flats Environmental Technology Site plutonium pits at the Pantex Plant in Texas. Appendix R discusses the aircraft crash and radioactive release probabilities for proposed storage and disposition facilities at Pantex Plant in Texas. A separate Classified Appendix was also prepared, which provides detailed analysis results for intersite transportation risks based on classified inventories of materials stored at DOE sites.

Volume IV (Parts A and B) is the Comment Response Document. It contains an overview of the public comment process, the comments received on the Draft PEIS during the public review period, and the DOE responses to those comments, including identifying changes made to the Draft PEIS in response to public comments.

The Summary provides a brief overview of the PEIS. It includes the purpose of and need for the Proposed Action, a description of the storage and disposition alternatives including the Preferred Alternative, and the potential environmental impacts resulting from these alternatives.

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LIST OF ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
ACEC	Area of Critical Environmental Concern
ACGIH	American Conference of Governmental Industrial Hygienists
AEA	<i>Atomic Energy Act</i>
AEC	Atomic Energy Commission
AGV	automated guided vehicle
ALARA	as low as reasonably achievable
ALE	Arid Lands Ecology Reserve
ANL-W	Argonne National Laboratory-West
APSF	Actinide Packaging and Storage Facility
AQCR	Air Quality Control Region
ARA	Auxiliary Reactor Area
ARIES	Advanced Recovery and Integrated Extraction System
BEA	Bureau of Economic Analysis
BEIR	biological effects of ionizing radiation
BLM	Bureau of Land Management
BOP	balance-of-plant
BPA	Bonneville Power Administration
BWR	boiling water reactor
CAA	<i>Clean Air Act</i>
CANDU	Canadian deuterium uranium
CAS	Chemical Abstracts Service
CCDF	complimentary cumulative distribution function
CEQ	Council on Environmental Quality
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act</i>
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CGTO	Consolidated Group of Tribes and Organizations
CI	confidence interval
CIC	can-in-canister
CLUP	Comprehensive Land-Use Plan
CMR	Chemistry and Metallurgy Research

COE	Corps of Engineers
Complex	Nuclear Weapons Complex
CRD	Comment Response Document
CRT	Cargo Restraint Transporters
CWA	<i>Clean Water Act</i>
D&D	decontamination and decommissioning
DAF	Device Assembly Facility
DCG	derived concentration guide
DHLW	defense high-level waste
DNB	departure of nucleate boiling
DNFSB	Defense Nuclear Facilities Safety Board
DNL	day and night average sound levels
DNWR	Desert National Wildlife Range
DoD	Department of Defense
DOE	Department of Energy
DOT	Department of Transportation
DP	Office of Defense Programs
DRCOG	Denver Regional Council of Governments
DWPF	Defense Waste Processing Facility
EA	environmental assessment
EBR	Experimental Breeder Reactor
EDNA	Environmental Design for Noise Abatement
EIA	Energy Information Administration
EIS	environmental impact statement
EM	Office of Environmental Management
EPA	Environmental Protection Agency
ERR	excess relative risk
ES&H	Office of Environment, Safety, and Health
ESA	<i>Endangered Species Act</i>
ETF	effluent treatment facility
FAIR	Forest, Agriculture, Industry, and Research
FCF	Fuel Cycle Facility
FEMA	Federal Emergency Management Agency
FFCA	Federal Facility Compliance Agreement
FFTF	Fast Flux Test Facility

FLPMA	<i>Federal Land Planning Management Act</i>
FMEF	Fuels and Materials Examination Facility
FMF	Fuel Manufacturing Facility
FONSI	Finding of No Significant Impact
FR	Federal Register
FSAR	Final Safety Analysis Report
GBZ	Glass-bonded zeolite
GESMO	Generic Environmental Statement on Mixed Oxide
GIS	Geographical Information System
GMA	<i>Growth Management Act</i>
GMODS	Glass Material Oxidation Dissolution System
HAD	hazard analysis document
Hanford	Hanford Site
HE	high explosives
HEAST	Health Effects Summary Table
HEPA	high-efficiency particulate air
HEU	highly enriched uranium
HEU EIS	<i>Disposition of Surplus Highly Enriched Uranium Environmental Impact Statement</i>
HFEF	Hot Fuel Examination Facility
HI	Hazard Index
HLW	high-level waste
HQ	Hazard Quotient
HRA EIS	<i>Hanford Remedial Action Environmental Impact Statement and Comprehensive Land Use Plan</i>
HVAC	Heating Ventilation and Air Conditioning
HWR	Heavy Water Reactor
IAEA	International Atomic Energy Agency
ICPP	Idaho Chemical Processing Plant
ICRP	International Commission of Radiological Protection
INEL	Idaho National Engineering Laboratory
IRIS	Integrated Risk Information System
ISCST2	Industrial Source Complex Short-Term Model Version 2
ISO	International Standards Organization
IWG	Interagency Working Group
K-25	K-25 Site

L/ER	Energy Research Program Office
LA	Limited Area
LAA	Limited Access Area
LANL	Los Alamos National Laboratory
LANSCE	Los Alamos Neutron Scattering Center
LCF	latent cancer fatalities
LDR	Land Disposal Restriction
LEU	low-enriched uranium
LIGO	Laser Interferometer Gravitational-Wave Observatory
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOB	Laboratory Office Building
LWR	Light Water Reactor
MAA	Material Access Area
MACCS	Melcor Accident Consequence Code System
MC&A	Material Control and Accountability
MD	Office of Fissile Materials Disposition
MEI	maximally exposed individual
MHR	Modular Helium Reactor
MMI	Modified Mercalli Index
MOX	mixed oxide
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	<i>Native American Graves Protection and Repatriation Act</i>
NAS	National Academy of Sciences
NCDC	National Climatic Data Center
NCRP	National Commission of Radiological Protection
NEIC	National Earthquake Information Center
NEPA	<i>National Environmental Policy Act</i>
NERP	National Environmental Research Park
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFS	Nuclear Fuel Services Fuel Fabrication Plant
NHPA	<i>National Historic Preservation Act</i>
NIOSH	National Institute of Occupational Safety and Health
NMSF	Nuclear Material Storage Facility

NMSM	Nuclear Materials and Stockpile Management
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRC	Nuclear Regulatory Commission
NRF	Naval Reactors Facility
NRHP	National Register of Historic Places
NTS	Nevada Test Site
NTS EIS	<i>Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada</i>
NWI	National Wetlands Inventory
NWPA	<i>Nuclear Waste Policy Act</i>
NWS	National Weather Service
OCRWM	Office of Civilian Radioactive Waste Management
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
ORR	Oak Ridge Reservation
OSHA	Occupational Safety and Health Administration
PA	Protected Area
Pantex	Pantex Plant
Pantex EIS	<i>Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components</i>
PBF	Power Burst Facility
PCV	Primary Containment Vessel
PEIS	programmatic environmental impact statement
PEL	Permissible Exposure Level
PFP	Plutonium Finishing Plant
PFP EIS	<i>Plutonium Finishing Plant Stabilization Environmental Impact Statement</i>
PIDAS	Perimeter Intrusion Detection and Alarm System
PNNL	Pacific Northwest National Laboratory
PPA	Property Protection Area
PRA	probabilistic risk assessment
PSAR	Preliminary Safety Analysis Report
PSD	Prevention of Significant Deterioration

PUREX	Plutonium-Uranium Extraction Plant
PWR	pressurized water reactor
R&D	Research and Development
RCRA	<i>Resource Conservation and Recovery Act</i>
REA	regional economic area
RIA	reactivity insertion accident
RFETS	Rocky Flats Environmental Technology Site
RIMS II	Regional Input-Output Modeling System
RL	Richland Operations Office
ROD	Record of Decision
ROI	region of influence
RSWF	Radioactive Scrap and Waste Facility
RWMC	Radioactive Waste Management Complex
RWMS	Radioactive Waste Management Site
SAR	Safety Analysis Report
SARA	<i>Superfund Amendments and Reauthorization Act</i>
sd	standard deviation
SDWA	<i>Safe Drinking Water Act</i>
SEB	Security Equipment Building
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SISMP	Site Integrated Stabilization and Management Plan
SMR	Standardized Mortality Ratio
SNF	spent nuclear fuel
SNL	Sandia National Laboratories
SRR	standardize rate ratio
SRS	Savannah River Site
Stockpile Stewardship and Management PEIS	<i>Programmatic Environmental Impact Statement for Stockpile Stewardship and Management</i>
Storage and Disposition PEIS	<i>Storage and Disposition of Weapons-Usable Fissile Materials Programmatic Environmental Impact Statement</i>
SST	safe secure trailer
START	Strategic Arms Reduction Talks

TA	Technical Area
TAN	Test Area North
TCPLP	toxicity characteristic leaching procedure
TDEC	Tennessee Department of Environmental Conservation
TDS	total dissolved solids
TI	transport index
TLV	Threshold Limit Values
TNRCC	Texas Natural Resources Conservation Commission
TRA	Test Reactor Area
TRU	transuranic
TSCA	<i>Toxic Substance Control Act</i>
TSD	Transportation Safeguards Division
TSP	total suspended particulates
TSR PEIS	<i>Tritium Supply and Recycling Programmatic Environmental Impact Statement</i>
TVA	Tennessee Valley Authority
USFWS	United States Fish and Wildlife Services
USGS	United States Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WAC	Waste Acceptance Criteria
Waste Management PEIS	<i>Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste</i>
WIPP	Waste Isolation Pilot Plant
WMIS	Waste Management Information System
WNP	Washington Nuclear Power
WPPSS	Washington Public Power Supply System
WSA	Weapons Storage Area
WSCC	Western Systems Coordinating Council
WSCF	Waste Sampling and Characterization Facility
Y-12	Y-12 Plant
Y-12 EA	<i>Environmental Assessment for the Proposed Interim Storage of Enriched Uranium Above the Maximum Historical Level at the Y-12 Plant, Oak Ridge, Tennessee</i>
YMSCO	Yucca Mountain Site Characterization Office
ZPPR	Zero Power Physics Reactor

CHEMICALS AND UNITS OF MEASURE

°C	degrees Celsius
Ci	curie
cm	centimeter
CO	carbon monoxide
CO ₂	carbon dioxide
Co-60	cobalt-60
Cs	cesium
Cs-137	cesium-137
CsCl	cesium chloride
Cu	copper
dB	decibel
dBA	decibel A-weighted
°F	degrees Fahrenheit
ft	feet
ft ²	square feet
ft ³	cubic feet
g	gram
G	gravitational acceleration
gal	gallon
Gd	gadolinium
GWd	gigawatt-days
ha	hectare
H ₂	hydrogen
HF	hydrogen fluoride
HNO ₃	nitric acid
hr	hour
I-129	iodine-129
in	inch
k _{eff}	effective neutron multiplication factor
kg	kilogram
km	kilometer
km ²	square kilometer

Kr	krypton
kV	kilovolt
l	liter
lb	pound
m	meter
m ²	square meter
m ³	cubic meter
mCi	millicurie
mg	milligram
mi	mile
mi ²	square miles
min	minute
mph	miles per hour
mrem	millirem (one thousandth of a rem)
MW	megawatt
MWe	megawatt electric
N ₂	nitrogen
nCi	nanocurie (one-billionth of a Curie)
Ni	nickel
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
O ₃	ozone
oz	ounce
Pb	lead
PCB	polychlorinated biphenyl
pCi	picocurie (one-trillionth of a Curie)
PM ₁₀	particulate matter less than or equal to 10 microns
ppm	parts per million
Pu	plutonium
PuCl	plutonium chloride
PuO ₂	plutonium dioxide
rad	radiation absorbed dose
rem	roentgen equivalent man
RfC	Reference Concentration
RfD	Reference Dose

s	second
SO ₂	sulfur dioxide
Sr-90	strontium-90
t	metric ton
Tc-99	technetium-99
ton	short ton
U	uranium
U-233	uranium-233
U-234	uranium-234
U-235	uranium-235
U-236	uranium-236
U-238	uranium-238
UF ₆	uranium hexafluoride
UNH	uranyl nitrate hexahydrate
UO ₂	uranium dioxide
U ₃ O ₈	triuranium octaoxide
VOC	volatile organic compound
yd	yard
yr	year
µg	microgram (one-millionth of a gram)

METRIC CONVERSION CHART

To Convert Into Metric			To Convert Out of Metric		
If You Know	Multiply By	To Get	If You Know	Multiply By	To Get
Length					
inches	2.54	centimeters	centimeters	0.3937	inches
feet	30.48	centimeters	centimeters	0.0328	feet
feet	0.3048	meters	meters	3.281	feet
yards	0.9144	meters	meters	1.0936	yards
miles	1.60934	kilometers	kilometers	0.6214	miles
Area					
sq. inches	6.4516	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.092903	sq. meters	sq. meters	10.7639	sq. feet
sq. yards	0.8361	sq. meters	sq. meters	1.196	sq. yards
acres	0.40469	hectares	hectares	2.471	acres
sq. miles	2.58999	sq. kilometers	sq. kilometers	0.3861	sq. miles
Volume					
fluid ounces	29.574	milliliters	milliliters	0.0338	fluid ounces
gallons	3.7854	liters	liters	0.26417	gallons
cubic feet	0.028317	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.76455	cubic meters	cubic meters	1.308	cubic yards
Weight					
ounces	28.3495	grams	grams	0.03527	ounces
pounds	0.45360	kilograms	kilograms	2.2046	pounds
short tons	0.90718	metric tons	metric tons	1.1023	short tons
Temperature					
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit

METRIC PREFIXES

Prefix	Symbol	Multiplication Factor
exa-	E	1 000 000 000 000 000 000 = 10^{18}
peta-	P	1 000 000 000 000 000 = 10^{15}
tera-	T	1 000 000 000 000 = 10^{12}
giga-	G	1 000 000 000 = 10^9
mega-	M	1 000 000 = 10^6
kilo-	k	1 000 = 10^3
hecto-	h	100 = 10^2
deka-	da	10 = 10^1
deci-	d	0.1 = 10^{-1}
centi-	c	0.01 = 10^{-2}
milli-	m	0.001 = 10^{-3}
micro-	μ	0.000 001 = 10^{-6}
nano-	n	0.000 000 001 = 10^{-9}
pico-	p	0.000 000 000 001 = 10^{-12}
femto-	f	0.000 000 000 000 001 = 10^{-15}
atto-	a	0.000 000 000 000 000 001 = 10^{-18}

Chapter 1

Issue Categories

1.1 INTRODUCTION

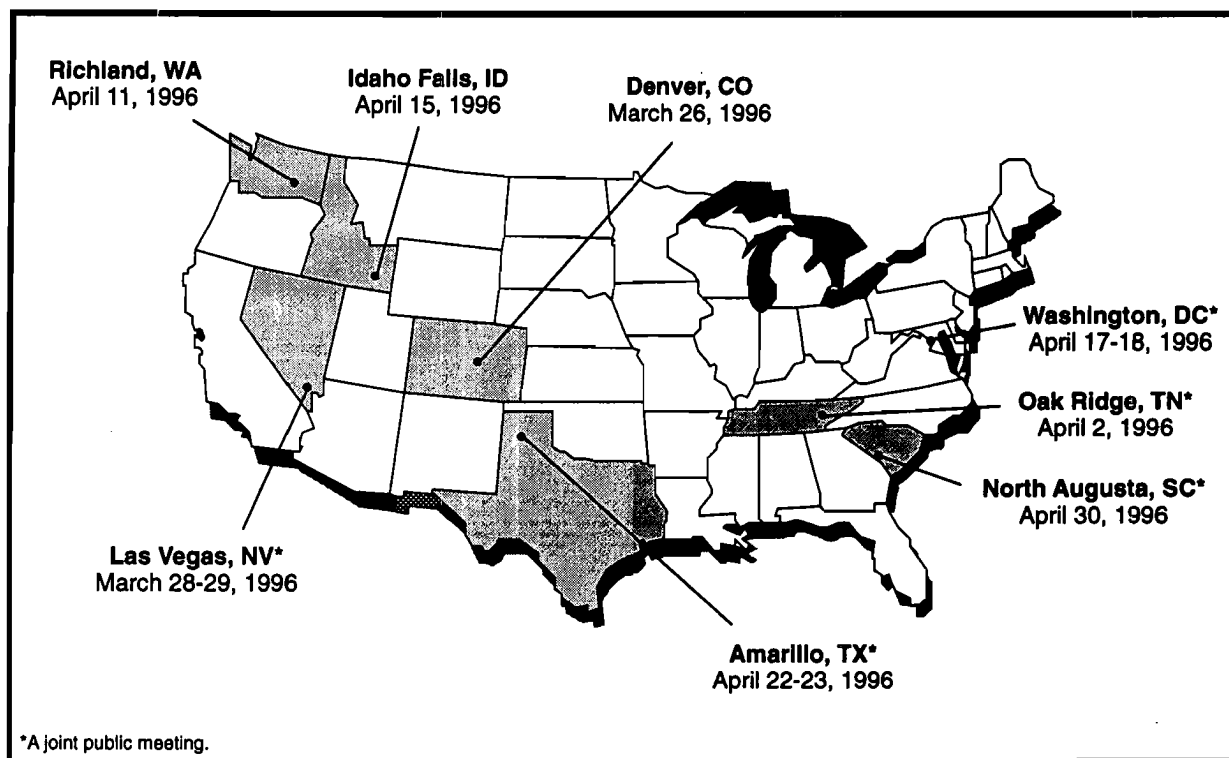
In February 1996, the Department of Energy (DOE) published the *Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement* (Storage and Disposition Draft PEIS). This PEIS analyzes the direct, indirect, and cumulative environmental effects of reasonable alternatives for the long-term storage and disposition of weapons-usable fissile materials. Following the guidelines set forth in the *National Environmental Policy Act* (NEPA), DOE established a comment period to allow the public to review and comment on the Storage and Disposition Draft PEIS. The public comment period was originally from March 8 through May 7, 1996 (61 FR 9443); however, in response to public request, DOE extended the comment period through June 7, 1996 (61 FR 22038). Comments were accepted as late as June 24, 1996.

During the comment period, public meetings were held at eight locations. Figure 1.1–1 shows the dates and locations of these meetings. Five of the public meetings were joint meetings to obtain comments on both the Storage and Disposition Draft PEIS and the *Draft Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (Stockpile Stewardship and Management PEIS). Two of the joint meetings (Amarillo, Texas, and North Augusta, South Carolina) also included the *Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapons Components* (Pantex EIS). The public meetings were directed by a neutral facilitator, and comments and concerns were recorded by notetakers.¹ In addition to public meetings, the public was encouraged to provide comments via mail, fax, telephone (toll-free number), and electronic bulletin board (Internet).

Attendance at each meeting and the number of comments recorded and documents received via other methods during the public comment period are presented in Tables 1.1–1 and 1.1–2, respectively. Attendance numbers for the public meetings were based on the number of participants who completed and returned registration forms. A number of comment documents submitted during the public meetings were recorded as part of the minutes. In some instances, the same comment documents were also submitted as hand-ins at the end of the meeting. In these cases, these documents were analyzed once, as part of the minutes or as stand-alone comment documents. A list appears at the beginning of each public meeting response document showing all the hand-ins that were included as part of the minutes and the page numbers on which they can be found in the *Comment Response Document* (CRD).

Each comment document received by mail, fax, telephone, or electronic bulletin board was marked with the date of receipt and assigned a sequential document number according to its origin (for example, F-001 was assigned to a faxed submission, this tracking code appears in the lower right-hand corner of the scan). The document then was processed through the comment analysis and response system for inclusion in the CRD. A total of 6,543 comment documents were submitted by various organizations and individuals. Several comment documents addressed the Stockpile Stewardship and Management PEIS and Pantex EIS. Copies of these documents were forwarded to those programs for inclusion in the corresponding CRDs. These comments were not addressed in the Storage and Disposition CRD.

¹ In order to ensure that all comments were accurately recorded by the notetakers, transcripts of the proceedings of each meeting were taken. These transcripts are not included in the Storage and Disposition CRD, but have been archived in the Administrative Record for the PEIS.



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Figure 1.1-1. Dates and Locations of Public Meetings.

Table 1.1-1. Meeting Attendance and Comments

Public Meetings	Attendance	Comments
Denver, CO	39	33
Las Vegas, NV	71	40
Oak Ridge, TN	84	12
Richland, WA	107	24
Idaho Falls, ID	75	34
Washington, DC	132	35
Amarillo, TX	102	17
North Augusta, SC	124	55
Total	734	250

Table 1.1-2. Document and Comment Submission Overview

Method of Submission	Documents Received	Comments
Hand-ins at Public Meetings	61	182
Mail-in	159	922
Campaign Documents (letters, postcards, hand-ins)	6,203	6,829
Fax	58	410
Telephone	54	75
Electronic Bulletin Board	8	24
Total	6,543	8,442

1.2 ORGANIZATION

The CRD has been organized into the following sections:

- Chapter 1 describes the comment analysis and response process.
- Chapter 2 presents the changes made to the Storage and Disposition Draft PEIS.
- Chapter 3 presents the scanned images of original documents received during the public comment period. These images are marked with sidebars denoting the identified comments, and the responses that correspond to those comments.

Tables are provided at the end of this chapter to assist readers in locating comments regarding the Storage and Disposition Draft PEIS. Comments were identified and categorized by issue (for example, Policy/Purpose and Need/Scope) and assigned a six-digit issue bin number. An issue bin is the term used for a general topic under which to identify like comments for proper response. Table 1.2–1 lists the issue categories and corresponding issue bin numbers. Issue bins are divided into three separate categories defined as Level 1, Level 2, and Level 3. Level 1 issue bins include the various Fissile Materials Disposition Program topics included in the Storage and Disposition Draft PEIS. Level 2 issue bins represent a subdivision of the Level 1 topics and provide for further definition of the specific topic. Level 2 issue bins include the various storage and disposition alternatives and environmental resource/issue areas evaluated in the Storage and Disposition Draft PEIS. Level 3 issue bins designate the specific site at which the specific topic and/or alternative may occur. The majority of identified comments were responded to on a one-to-one basis. Comments that are similar in content were given the same response.

Table 1.2–2 identifies public meeting attendees and the location of comments and responses from each meeting. Table 1.2–3 lists the individuals, agencies, companies, organizations, and special interest groups that submitted comment documents. Commentors are listed alphabetically by last name or organization name, along with the corresponding page number on which the actual comment document appears. Also listed in this table are the issue bin numbers assigned to the comments found within each document.

For convenience, the information in Table 1.2–3 was then broken out into three separate tables. Table 1.2–4 lists the agencies, companies, organizations, and special interest groups that submitted comments, corresponding page numbers on which the actual comments appear, and assigned issue bin numbers. Table 1.2–5 provides an alphabetical list of individuals who submitted comments, corresponding page numbers on which the actual comments appear, and assigned issue bin numbers. Table 1.2–6 lists those documents considered to be multiple signatory² documents, page numbers on which the actual comments appear, and assigned issue bin numbers.

As discussed in Section 1.1, documents were received by mail, fax, telephone, or electronic bulletin board. In some instances, multiple documents were received from a single commentor. To ensure that all comments submitted by an individual or organization were included in the CRD, multiple documents were treated simultaneously. If, during the review, variations in the documents were identified, the documents were treated separately. If the documents were identical (presenting verbatim comments), only one of the documents was reviewed and scanned for inclusion in the CRD. Commentors wishing to view comments similar in content should refer to Table 1.2–7, which lists the issue bins in which comments were grouped and the page numbers where the comments are located. Multiple page numbers indicate several comments on the same issue. In addition, Tables 1.2–8 through 1.2–14 list commentors who submitted documents that were classified as postcard or letter campaigns. The postcards and letters were part of campaigns conducted by various organizations and special interest groups to express either support of or opposition to the Fissile Materials Disposition Program. Although many postcards and letters were received for these campaigns, only one scanned image is shown in Chapter 3 for each campaign.

² A multiple signatory document is a document that has been signed by more than two individuals.

Chapter 2

Changes Made to the Draft Programmatic Environmental Impact Statement as a Result of Public Comments

2.1 INTRODUCTION

During the 92-day public comment period, DOE received a total of 8,692 comments (Tables 1.1–1 and 1.1–2) on the Storage and Disposition Draft PEIS. DOE considered and responded to all comments received during the comment period. Several issues emerged from public comments. Some of these issues necessitated changes in the Storage and Disposition Draft PEIS. These changes were incorporated into the Storage and Disposition Final PEIS. A summary of the major comments received and changes made to the Draft PEIS appears below.

2.2 COMMENTS RECEIVED

Approximately 80 percent of the comments received consisted of mail-in letter and postcard campaigns which expressed either support of or opposition to the use of various sites or alternatives. Most commentors were in favor of transforming surplus plutonium (Pu) into non-weapons-usable forms. Some favored the Reactor Alternatives which would convert the surplus Pu to mixed oxide (MOX) fuel, burn the MOX fuel in reactors, and gain a resultant energy and economic benefit. Other commentors favored the Immobilization Alternatives, specifically the Vitrification Alternative, the conversion of the surplus Pu into a non-weapons-usable form without the use of reactors. A few commentors were in favor of the Borehole Alternatives. However, most commentors opposed the Borehole Alternatives on the basis of environmental, safety, safeguards, and security concerns. A number of commentors expressed the opinion that the surplus Pu should remain in present locations for future energy or weapons use, or until new technologies are available for disposition.

Since MOX technology is not a readily available technology in the United States, several commentors were concerned with security and involvement by foreign nations in the U.S. disposition program. Commentors wanted assurance that the MOX fuel would not be part of the commercial market and would remain under DOE's ownership.

A number of commentors were concerned about the Canadian Deuterium Uranium (CANDU) Reactor Alternative and the manner in which the operation would be conducted with the Canadian Government. Commentors expressed concerns with U.S. and Canadian agreements that would be developed if the CANDU Reactor Alternative were selected as the Preferred Alternative, as well as Canadian compliance with their own environmental laws and regulations. Further concern was raised over the safety, security, and environmental issues associated with the transportation of the materials to Canada.

Some commentors stated that the U.S. Nonproliferation Policy does not encourage the civil use of Pu or Pu processing for either nuclear power or nuclear explosive purposes. The commentors requested that the PEIS address the possibility that the MOX option would have an adverse effect on U.S. Nonproliferation Policy by encouraging its use in civil nuclear power programs and by encouraging Pu reprocessing and recycling. However, other commentors were concerned that DOE should not make statements that would expressly prohibit future reprocessing. DOE acknowledges the public concern for nonproliferation. As discussed in the PEIS, the reactor option would utilize a once-through fuel cycle. Spent fuel from disposition would be disposed of with other commercial reactor spent fuel. This is consistent with U.S. policy since no Pu in the spent fuel would be recycled.

Some commentors indicated that the isotopic composition of the residual Pu in the final waste forms is an inappropriate criterion by which to assess proliferation risks because it perpetuates a myth that reactor-grade Pu cannot be used to make workable weapons. In the opinion of these commentors, isotopic degradation does not constitute a compelling argument in favor of the MOX option. DOE acknowledges that, although it may be possible to make a nuclear weapon from spent commercial reactor fuel, this can only be done with extreme difficulty by individuals with a great deal of experience in handling and processing nuclear materials. DOE believes that the disposition of weapons Pu through the use of MOX fuel in reactors would meet the Spent Fuel Standard in creating a radiological barrier that makes the Pu as difficult to retrieve and reuse in weapons as Pu in spent commercial fuel. The use of this technology would allow for the Pu to be disposed in a geologic repository, the same as for spent commercial fuel.

Commentors encouraged DOE and the United States to become the world leader in the safe, secure, and timely disposition of Pu. Commentors favored U.S. promotion of worldwide nonproliferation of surplus Pu.

A large number of comments were received about the duration of the original 60-day comment period. The concern was that the Draft PEIS was complex and the original comment period too short to allow for a detailed and thorough review. The comment period was subsequently extended to a total of 92 days.

Commentors indicated either support of or opposition to the use of existing facilities. Existing facilities were considered in the Draft PEIS to the extent practicable. For example, for storage of surplus Pu, the Upgrade Alternative would use existing facilities at various sites. For disposition, existing reactors in the United States and Canada are included as alternatives.

Some commentors requested that DOE have a formal economic analysis to evaluate the cost of each alternative. Several commentors requested that such a comparative cost analysis be available for public review.

Some commentors proposed that DOE evaluate additional alternatives for the management of Pu and highly enriched uranium (HEU).

2.3 CHANGES MADE TO THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

In response to comments received on the Storage and Disposition Draft PEIS, as well as other improvements in data and analyses, the Storage and Disposition Final PEIS has been modified in the following respects:

- Revisions were made throughout the Summary and Sections 4.6 and 4.7 to modify the discussion of cumulative impacts and ranking of sites. As a result of comments received during the comment period, all comparative language was removed from the description of the analyses of the alternatives. This was done to provide unbiased analyses to the decisionmaker.
- Some commentors requested that DOE consider additional disposition alternatives, including the use of the Fast Flux Test Facility (FFTF), deep burn reactors, and mononitride reactors. The use of advanced reactors such as deep burn reactors and mononitride reactors was considered but eliminated due to the technical immaturity, attendant costs, and lengthy development and demonstration efforts required to bring the technologies to a viable, practical status and enable disposition options to be initiated with certainty. The FFTF would be considered for Pu disposition if first selected for tritium production. The FFTF is not a reasonable, stand alone alternative because it is in a standby status awaiting shutdown and because it could not satisfy the criterion of completing the disposition mission within 25 years. A discussion of FFTF for this purpose is included in Appendix N. In all, 37 different alternative options were considered by DOE for disposition of Pu. DOE has made revisions to the Summary and Chapter 2 of the Final PEIS to clarify how the screening process was used for selection of reasonable alternatives.

- Section 4.7.3 was modified to address the cumulative impacts for the disposition alternatives.
- Section 4.9, which includes Impacts on Uranium Mining and Nuclear Fuel Cycle Industries, Avoided Environmental Impacts of Using MOX Fuel Instead of Traditional Low-Enriched Uranium Fuel in Nuclear Power Plants, and Avoided Environmental Impacts of Using Nuclear Power Plants Instead of Fossil Fuel Power Plants, was expanded and clarified. Avoided impacts to air quality and waste generated were added to the Final PEIS.
- Los Alamos National Laboratory (LANL) was analyzed for No Action and Storage Phaseout and is included in the Final PEIS. Of the 2.7-metric ton (t) (2.97-short ton [ton]) inventory of Pu at LANL, approximately 1.5 t (1.65 tons) fall within the scope of this PEIS and have been analyzed for storage and disposition.
- Public and occupational health and safety sections were rewritten to clarify methodologies used for the calculation of accidents.
- Section 4.2.6.9 (Public and Occupational Health and Safety) was reanalyzed due to revised badged worker numbers at the Savannah River Site (SRS). New data were provided for the No Action Alternative and the Upgrade Alternative.
- Some commentors requested more information on the can-in-canister technology concept which is a variant of the Vitrification and Ceramic Immobilization Disposition Alternatives. Appendix O, describing the two can-in-canister technology concepts at SRS, was added to the Final PEIS.
- The accident analysis for the Existing Light Water Reactor (LWR) Pu Disposition Alternative was enhanced to further address the comparative impacts and risks of operating an existing commercial uranium-fueled LWR with MOX core. The analysis of a representative Advanced Boiling Water Reactor (BWR) for the Evolutionary LWR Alternative was modified to quantitatively address the “absolute” risks associated with MOX-fueled reactor operations. A more detailed explanation was added to various accident analysis methodology sections to clarify issues related to the technical approach and the basis for modeling assumptions used in the PEIS. The analyses are in accordance with DOE’s Office of NEPA Policy and Assistance guidelines for the preparation of EISs. The results, which have a quantitative basis, are presented in applicable sections of the Final PEIS.
- Changes to various technical issues raised by commentors, including data discrepancies or inconsistencies, were incorporated into the Final PEIS for a number of environmental resources.
- Some facility locations for the storage alternatives were clarified in the Final PEIS. In the Draft PEIS, the Consolidation Alternative at the Pantex Plant (Pantex) had two different locations, either north of Zone 11 or in Zone 12 South. The Final PEIS designates only Zone 12 South for consolidation activities. For the SRS Upgrade Alternative, the description has been changed to clarify that the proposed new storage facility is the Actinide Packaging and Storage Facility (APSF), and vault space would be expanded to meet the long-term storage needs. The APSF will be operational before the year 2005, which is the baseline year for No Action in the PEIS.
- The socioeconomic sections were revised due to updated population projections for all Bureau of Economic Analysis (BEA) regions and changes to the employment requirements for Pu conversion, pit disassembly, and MOX fuel fabrication facilities. Employment changes were also made to the Storage Upgrade Alternative at the Hanford Site (Hanford), Pantex, and the Idaho National Engineering Laboratory (INEL). In addition, the affected environment for site employment has been

updated for the Nevada Test Site (NTS), Hanford, SRS, INEL, and the Oak Ridge Reservation (ORR).

- Lawrence Livermore National Laboratory (LLNL) was eliminated from the transportation analysis in Section 4.4.
- The epidemiology sections have been updated in Section M.4.
- Commentors noted that transportation of fissile materials is one of their major concerns with the Fissile Materials Disposition Program. The ground transportation between sites, in the event a consolidation alternative was selected, could increase the potential for traffic accidents. International transportation and specific border crossings for shipment of MOX fuel to Canada for the CANDU Reactor Alternative was also identified as a concern. DOE acknowledges the public's concern, and in response, the transportation analyses in Section 4.4 and Appendix G of the Draft PEIS were expanded. The revisions address security measures for land and sea transport, emergency preparedness, and clarify the results of analyses performed.
- The Preferred Alternative, based on a combination of storage and disposition alternatives, has been identified and analyzed.
- Appendix N, which in the Draft PEIS summarized the operational aspects of the multipurpose reactor, has been revised for this Final PEIS to provide information on the costs and benefits of conducting separate tritium production and Pu disposition missions versus the costs and benefits of carrying out one multipurpose mission. Included in Appendix N is a cost comparison of using new Advanced LWRs or Modular Helium Reactors and a discussion of issues regarding the use of the FFTF (a liquid metal reactor at Hanford) for tritium production and Pu disposition.
- Appendix P has been added to the Final PEIS to provide a description of using the Manzano Weapons Storage Area (WSA) near Albuquerque, NM, to store Pu pits. This appendix also describes the resulting environmental impacts, based on information provided in the Pantex EIS. This appendix was added because DOE's PEIS Preferred Alternative separates the long-term storage of pits from non-pit materials, in which case, Manzano WSA no longer appears unreasonable under the Preferred Alternative for pit storage. However, since DOE's preferred site for interim storage of pits is Pantex (as described in the Pantex EIS) and the majority of pits are already located in storage at Pantex, it did not seem reasonable for DOE to consider a site other than Pantex for the long-term storage of Pu pits, because weapons assembly/disassembly would continue at Pantex in any case. Construction of a new storage facility at Manzano would create needless expense and transportation risk.
- Appendix Q has been added to the Final PEIS to describe the operations and human (radiological) health impacts associated with Pu pits being transferred from the Rocky Flats Environmental Technology Site (RFETS) to Pantex, repackaged in Zone 12 South, and placed in storage in Zone 4 West at Pantex, as part of the Preferred Alternative for storage. The information presented in this appendix is based on the Pantex EIS analysis of storing the Pu pits already at Pantex.
- Appendix R has been added to the Final PEIS to discuss aircraft crash and radioactive release probabilities for proposed storage and disposition facilities at Pantex.

Chapter 3 contains the scanned images of original documents received during the public comment period. These images are marked with sidebars denoting the identified comments and the responses corresponding to these comments.

Chapter 3

Comment Documents and Responses

This chapter presents documents submitted to DOE on the Storage and Disposition Draft PEIS, comments recorded in public meetings and identified from documents, and DOE's response to each comment. The responses to comments identical or similar in nature were repeated throughout the document. Comments that were assigned the same issue bins indicate that they pertained to the same general topic (see Table 1.2-1) but may not necessarily have the same response.

In most instances, the response is found on the same page as the corresponding comment. However, in cases where many comments were identified on a single page, the responses to those comments may appear on following pages.

A number of responses to comments refer to documents providing analysis for the technical, cost, schedule, and nonproliferation policy of the storage and disposition alternatives separate from the PEIS. These documents are as follows:

- *Technical Summary Report for Surplus Weapons-Usable Plutonium Disposition* (DOE/MD-0003)
- *Technical Summary Report for Long-Term Storage of Weapons-Usable Fissile Material* (DOE/MD-0004)
- *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*

The two Technical Summary Reports were initially made available to the public for comment in July 1996. The Nonproliferation Assessment was first made available to the public for comment in October 1996, and a series of public meetings were held in October and November 1996 to receive public comment. The comments that were received on each of these documents were considered by DOE, and appropriate changes, clarification, and additional information are provided in updates to the documents which were again made available to the public beginning in November 1996.

The results of these analyses as well as the environmental analysis and public comments will be included in the decisionmaking process.

AHOUSE, LORETTA, SEATTLE, WA
PAGE 1 OF 2

Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic
Environmental Impact Statement (PEIS) Public Comment Form

Name (optional): Loretta Ahouse
Address (optional): 10521 1st Ave. Suite 100
Seattle, WA 98148

Please write down your comments and drop this form in the marked boxes before you leave tonight. These forms will be submitted to the Department of Energy as part of the formal comment on this PEIS. If you are unable to complete this form tonight, written comments can be mailed to:

Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

or, you can call this toll-free number to leave comments by phone: 1-800-820-5156. Comments must be submitted by May 17, 1994.

The Department of Energy has identified three types of technologies as options for disposing of weapons-usable fissile materials. The Department has also considered a "no action alternative" which would result in long-term storage of these materials. Please write down your comments on the following three types of options for disposal and the storage option.

1. Materials Immobilization/Vitrification - Immobilize fissile materials by mixing them with glass, banded zeolites, or ceramics.

I suggest immediately if plutonium (and fast fission nuclear waste) that has not gone through the process of removing proliferation potential, the Department to pursue the various immobilization options.

1/08.03.01

2. Deep borehole disposal - Materials would be disposed in boreholes at least 2.5 miles deep, in geologically stable formations. Materials could be disposed directly into the deep borehole, or materials could be immobilized first, and then deposited into the deep borehole.

The untreated disposal is a deep borehole option is abundant and should not be considered at all.

2/08.03.01

3. Reactor Options - Surplus plutonium/highly enriched uranium would be made into MOX fuel for use in nuclear reactors, destroying by fission a major portion of the weapons grade materials.

This option would only encourage future development of nuclear power, which if passed, it is not a viable option. plutonium is not a waste, it is a valuable resource. It makes no sense to put it in a reactor and then burn it. It is still a problem.

3/08.03.01

4. Storage Options - USDOE would continue existing storage practices for weapons-usable fissile materials at current locations and/or consolidate that storage at one or more of the designated sites.

M-222

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Vitrification Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy recognizes the commentor's concern with the Borehole Alternatives. Decisions on the disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, alternatives involving reactors must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 02 00	Comment Number 4
	Comment noted. However, the Seattle meeting was not sponsored by DOE. DOE was an invited guest.
01 00 00	Comment Number 5
	Comment noted.
4/08.02.00	Please use this space to write down any additional comments on the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement. My first comment is on the public comment process. The meeting in Seattle would have benefited from allowing more time for citizens to speak instead of listening to the experts. The discussion groups were very helpful and should have had more time. Any decisions that are made about the program has to bear in mind the Pu will be around longer than our govt. We must use a technology that best protects future generations, as well as our own.
5/01.00.00	
M-222	

M-125

SSM PEIS and S&D PEIS
SOCIOECONOMIC QUESTIONS

- Please explain why LLNL and LANL Stockpile Management budgets show projected increases from 1998 to 2004 since the US has terminated the development of new nuclear weapons ?
Ref. SSM PEIS Preferred Alternatives Report, pp 26,30.
- Are these projected increases in Stockpile Management at the two labs based on transferring missions to them which have previously been done at the production plants ?
- Please elaborate on a statement made on page 34 of the SSM PEIS Preferred Alternatives Report that " personnel from the laboratories could perform assembly / disassembly for some weapon surveillance operations to improve the programmatic tie between Stockpile Stewardship and Stockpile Management " .
 - Would laboratory personnel replace Pantex personnel for this work ? If not, explain.
 - Would this add to the projected layoffs at Pantex ? If not, explain.
 - Would the laboratory personnel be trained and certified to perform this work ?
 - What organization(s) would be responsible for safety, safeguards, and conduct of operations associated with this work ?
 - Explain how this would improve Stockpile Stewardship and Management ?
- Under Phaseout (page S-21) of the S&D PEIS the statement is made " All of the regional economic areas surrounding the DOE sites would experience a loss in employment with

1/09.08.08

M-125

09 08 08 Comment Number 1

With the exception of RFETS, the phaseout of existing storage facilities at DOE sites would involve, at most, the loss of 200 direct jobs (Hanford and SRS). At Pantex, the phaseout would only affect five jobs, and no jobs would be lost at INEL. The impacts of these employment losses on the affected regional economies would be minimal. As stated in the PEIS, the regional economies in which the DOE sites are located are too large to be adversely affected by such a small decrease in employment at one site. Although the phaseout of storage facilities at RFETS would involve a greater number of workers, the impact on the regional economy would still be small because of the plant's location near a large metropolitan area. The PEIS analyses (including analyses of socioeconomic impacts), along with technical and cost studies, nonproliferation considerations, and public comments will be considered by DOE in the Record of Decision (ROD).

phaseout. However, compared to total employment in these areas, the loss of jobs would have no or negligible impacts at all the DOE sites." - For which sites would the impact be negligible ? - For which sites would the impact be significant ? - What is the basis for determining the significance of the impacts ? - How does the DOE plan to use this significance in their selection process ?	1/09.08.08 cont.
* The socioeconomic analyses of the three EIS's are not consistent. The SWEIS (p. S-17) assumes 1.65 indirect jobs in the region for every job at Pantex. The SSM PEIS (p. S-32) assumes 1.16 and the S&D PEIS (p. 4-205) assumes 3.51. - Please explain these differences ? - Why didn't the DOE use the analysis of the Amarillo Economic Development Commission (AEDC) which is based on local knowledge of the area ? Their analysis gives a ratio of 2.87 to 1 (REF. Chamber Quarterly, 2nd Quarter, 1996, Amarillo Chamber of Commerce).	2/09.08.04
* Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and President Clinton's February 11, 1994 Memorandum for the Heads of all Departments and Agencies requires an analysis of environmental effects on low-income and minority populations to include human health, social, and economic effects. - Why do the draft SWEIS, SSM PEIS, and S&D PEIS analyze only human health effects of the proposed actions and not the social and economic effects as required ?	3/09.12.08
M-125	

09 08 04 Comment Number 2

The number of indirect jobs generated by the Proposed Alternatives was based on the Regional Input-Output Modeling System (RIMS II) model developed by BEA. The multipliers used in the model are available for every economic region in the Nation (each of the DOE sites). This allowed a consistent method to be applied to all sites. Site-specific numbers should be used in site-specific EISs. Section 4.1.8 of the PEIS has been modified to clarify the utilization of the RIMS II model.

Projections of the number of indirect jobs generated depends on a number of factors, including the activity performed, the type of data used, and the methodology employed. The Storage and Disposition PEIS evaluates the socioeconomic impacts for the storage and disposition of fissile materials at Pantex, while the Stockpile Stewardship and Management PEIS evaluated the impacts of weapon assembly and disassembly operations. The activities of the two programs are quite different and each requires very different inputs for production. The availability of inputs within the region determines the size of the multiplier.

09 12 08 Comment Number 3

Socioeconomic impacts are analyzed in detail in all of the environmental statements noted by the commentor. The Storage and Disposition PEIS analyzes potential socioeconomic impacts for all of the Proposed Alternatives. For those alternatives that would add a new mission to a particular DOE site, there would be no adverse socioeconomic impacts. In fact, the analyses indicate that the impacts of these alternatives would be small but beneficial to the affected regional economies. There would be no environmental justice issues associated with these alternatives. For those alternatives involving phaseout of storage facilities, the job loss would be very small in all cases except RFETS. Even in the case of RFETS storage facility phaseout, the employment loss would have a minimal impact on the local communities and on the regional economy. Hence, there would be no environmental justice impacts from these alternatives.

ALLEY, CLYDE, AMARILLO, TX
PAGE 4 OF 5

- * In the draft SWEIS (p. S-17) it is stated that at the 500 weapon activity level Pantex " would support 2,400 direct jobs and 3,949 secondary jobs" and that " personal income additions to the economy would be reduced to \$365 million annually ?
-Please explain why this degree of economic loss would not only be an adverse but a Significant Adverse Impact to the community.
- At the 500 weapon activity employment level what would be the impact to the revenues for the governing bodies within the Pantex ROI compared with the current revenues presented in Table 4.11.1.8-1 (p.4-165) ?
- * In the draft SSM PEIS (1-4-450) please explain the statement
* The downsizing A/D and HE fabrication alternative would result in the addition of 280 workers at Pantex "
- If the statement is incorrect what would be the result ?

M-125

WATER USAGE : PANTEX PLANT

- Plant used 230 million gallons in 1985.
 - Texas Tech Farms used 66 million gallons (29%) of the total plant water usage.
 - Nuclear weapons operations used 163 million gallons (71%).
- Amarillo Water District consumed 16 billion gallons in FY 1985.
- Pantex Plant including Texas Tech Farms used 1.4% as much water as Amarillo District.
- Nuclear weapons operations used 1% of the water used by Amarillo.
- Considering the water also used for irrigation, the Plant withdrew 0.6% of the regional withdrawal from the Ogallala aquifer.* Nuclear weapons operations consumed 0.43% of the regional withdrawal.
- Draft Environmental Impact Statement for the Continued Operation of the Pantex Plant and Associated Storage of Nuclear Weapon Components, March 1986, page S-15.

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.



April 24, 1996

Secretary Hazel O'Leary
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585

Re: Comments on Stockpile Stewardship and Management (SSM) PEIS
and Fissile Materials Storage and Disposition (MD) PEIS

Dear Secretary O'Leary:

Under separate cover we are forwarding to your office two boxes of cards addressed to the U.S. Department of Energy, Office of Reconfiguration and the U.S. Department of Energy, Office of Fissile Materials, addressing the Stockpile Stewardship and Management (SSM) PEIS and Fissile Materials Storage and Disposition (MD) PEIS. These cards have been signed by over 6000 Amarillo residents, further emphasizing our continuing support for DOE functions in Amarillo.

Enclosed is a copy of the card indicating support for weapons assembly and disassembly, and continuation of the high explosives function at Pantex. We shall continue to look forward to opportunities for additional stewardship functions at Pantex.

We believe Amarillo to be a strong candidate for continuing storage and future material disposition operations. We believe the community is in perfect harmony with the Department, both believing that all functions in the future should be safe and environmentally sound.

We are grateful for the Department's consideration.

Yours very truly,


Tom Patterson
President & CEO

1/08.03.01

1/08.03.01
cont.

M-204

AMARILLO ECONOMIC DEVELOPMENT CORPORATION,
AMARILLO, TX, BOB JUBA
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April 8, 1998

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23708
Washington, DC 20026-3708

By facsimile to: 1-800-820-5158

RE: Comments and questions regarding the Storage and Disposition of Surplus Fissile Materials (SD) Programmatic Environmental Impact Statement (PEIS)

Dear Sir or Madam:

Thank you for the chance to comment on this document that is of great importance to the Pantex Plant, and consequently to the economic vitality of the Texas panhandle.

I also appreciate DOE's commitment to operating in an environmentally sound fashion. The continuation of environmentally sound operating and management principles at Pantex supercedes and is paramount to all further comments about continuing or new missions at Pantex.

Pantex is ideally situated to continue the storage of surplus fissile materials. It makes sense logistically and financially to store surplus fissile materials removed from weapons at the DOE's only assembly/disassembly site, Pantex. Further, Pantex has safely stored plutonium weapons components on-site on an interim basis since the facility began nuclear weapons operations in the early 1950s. Because it makes sense to store surplus fissile materials at Pantex, then the DOE should also consider Pantex as the preferred site for environmentally sound disposition options.

After having studied the Draft SDPEIS documents, I offer the following comments and questions to the DOE for inclusion in the comment summary document.

- In the Summary (p.8-46), it is stated that, "When the other DOE programs previously identified in this section are considered, the rank order of DOE sites in terms of their descending potential for cumulative impacts changes to SRS, INEL, Pantex, MTS, Hanford and ORR." A similar statement appears on p. S-47.
 - o What does this statement mean? It is obscure and demands an explanation that is concise, clear, to the point, and supported by evidence.
- In the Summary, under the environmental impacts for the No Action and Long-Term Storage alternatives "adverse impacts" on Pantex water resources are

Send Comments to: Bob Juba, 1000 S. Broadway, Amarillo, Texas 79101
Voice: (806) 334-0001 or (806) 334-0001 x1001 Fax: (806) 334-0001 x1001

F-012

08 03 01 Comment Number 1

The Department of Energy acknowledges the comment in support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

09 00 08 Comment Number 2

The Department of Energy did not intend to give the perception that the sites were ranked. The language in the cumulative impacts section of the Summary has been revised to better reflect the impact analysis in the Final PEIS. In addition, reference to "adverse" impacts has been deleted. Revisions made to the Final PEIS are reflected in the Summary.

09 00 04 Comment Number 3

Based on comments received, Section 4.2.4.4, *Water Resources*, was revised, as well as the Summary. There was no intention to "bury" impacts or to portray Pantex, the Pantex region, or the Texas Panhandle region in a negative fashion. Each DOE site was analyzed and studied in the same manner and presented in the PEIS accurately per these analyses and studies. Revisions made to the PEIS text are included in the Summary of the Final PEIS.

Office of Fleets Materials Page 2	shown for all alternatives except the Phaseout alternative (pp. 8-18 through 8-21). In Section "4.2.4.4 Water Resources," however, the following statement is made, "In regard to all of the above alternatives and related actions, the alternatives are not expected to have an adverse impact on water resources at Pantex." (p. 4-162)	3/09.00.04 cont.
o If no adverse impacts are expected on the water resources in regard to "all alternatives and related actions," why do statements regarding "adverse impacts" to water resources at Pantex appear in the important Summary document?	o Why is the "no adverse impacts on water resources" statement "buried" in the second of three volumes instead of showing up in the Summary document under environmental impacts?	4/09.11.08
• In the Summary it is stated (p. 8-21) that "Potential adverse impacts to waste management would occur at Pantex, ORR (all three options), and ERS, because the construction of sanitary, utility, and process wastewater treatment systems to treat nonhazardous liquid wastes may be required."	o How can the construction of facilities and systems to treat waste have the potential to adversely impact the management of waste? Is this a significant environmental impact as intended by §1502.1 of the NEPA regulations?	5/07.02.00
• The Summary discusses three plutonium disposition categories (deep borehole, immobilization and reactor) consisting of nine alternatives, and ultimate high-level waste disposition.	o If the immobilization alternatives and reactor alternatives (except CANDU) result in the same ultimate disposition, viz., a high-level waste (HLW) repository, what is the cobenefit of the reactor alternatives?	6/12.00.00
o Doesn't "HLW repository" mean the DOE's High-Level Nuclear Waste Repository at Yucca Mt., Nevada?	o What would constitute ultimate disposition in the case of the CANDU reactor alternative? Would the Canadians be allowed to send the resultant high-level nuclear waste back to the U.S.?	7/12.00.00
• Volume I, Summary, Attachment A, Summary table indicates that for every alternative the impact at Pantex would be the same or less than the impact at other sites under consideration.	F-012	8/08.00.00

09 11 08 Comment Number 4

The conceptual design for the consolidated and collocated storage facilities and the disposition facilities have, as part of their design, waste management facilities that would treat and package all waste generated in accordance with the *Resource Conservation and Recovery Act* (RCRA), and other applicable Federal and State statutes and DOE Orders. The impacts of having to construct the waste management facilities are captured in other resource areas such as land use and air quality. The text referring to "potential adverse impacts" to waste management has been deleted. The commentor is correct that the construction of waste management facilities will not adversely impact the management of waste.

07 02 00 Comment Number 5

A cost analysis for the alternatives was performed concerning those activities before final disposition in a geologic repository; this cost data, along with technical and schedule data, was provided in the Technical Summary Report for disposition in July and October 1996.

12 00 00 Comment Number 6

Not necessarily. "HLW repository" refers to a high-level waste geologic repository as envisioned under the *Nuclear Waste Policy Act* (NWPA). Although work is being done to characterize the Yucca Mountain site, no final decision regarding the suitability of Yucca Mountain has been made.

12 00 00 Comment Number 7

For the CANDU Reactor Alternative, no spent fuel would be returned to the United States. The material would become part of the Canadian spent fuel program.

08 00 00 Comment Number 8

At the time the Draft PEIS was published, DOE had not identified a Preferred Alternative. There were no preferred sites for any of the storage or disposition

Office of Fissile Materials
Page 3

o What is the basis for news reports indicating that other sites are leading in the consideration for this mission?

8/08.00.00
cont.

Under Phaseout (p.3-21) of the S&D PEIS, the following statement is made: "All of the regional economic areas surrounding the DOE sites would experience a loss in employment with phaseout. However, compared to total employment in these areas, the loss of jobs would have no or negligible impacts at all the DOE sites."

o For which sites would the impact be negligible?

o For which sites would the impact be significant?

o What is the basis for determining the significance of the impacts?

o How does the DOE plan to use this significance in their selection process?

9/09.08.08

In the draft S&D PEIS, under Long-Term Storage Alternatives (p.3-48), it is stated that:

Among the DOE sites under consideration, Pantex has the greatest potential to experience adverse cumulative impacts, particularly because of its relatively small, compact area. Water resources and biological resources would be vulnerable, and land resources, air quality, cultural resources, socioeconomic, public and occupational health and safety, waste management, interstate transportation, and environmental justice could be susceptible to adverse cumulative impacts." (A parallel statement follows on the same page as regards the Disposition Alternatives. There is no analysis presented to support this statement.) (Emphasis added.)

The draft SWEIS, however, presents conclusions on the cumulative impacts of the Proposed Action and the draft S&D PEIS collocation alternative - the bounding alternative used for the analysis. In some cases conclusions include draft W&PEIS impacts. Quotations are from Section 4.3.5.1 of the draft SWEIS. Conclusions are:

Plant Facilities and Infrastructure

"...additional oil...would be required. ...would increase electrical consumption from 80,200 megawatt-hours per year to a maximum of 179,814 megawatt-hours per year. ...additional electrical lines would be needed." Draft W&PEIS impacts are included. (p.4-20)

F-012

missions. A Preferred Alternative has been identified in the Final PEIS. The ROD will be based not only on environmental analyses, but also on technical, cost, national policy considerations, and public input.

09 08 08 Comment Number 9

With the exception of RFETS, the phaseout of existing storage facilities at DOE sites would involve, at most, the loss of 200 direct jobs (at Hanford and SRS). At Pantex, the phaseout would only affect five jobs, and at INEL no jobs would be lost. The impacts of these employment losses on the affected regional economies would be minimal. As stated in the PEIS, the regional economies in which the DOE sites are located are too large to be adversely affected by such a small decrease in employment at one site. Although the phaseout of storage facilities at RFETS would involve a greater number of workers, the impact on the regional economy would still be small since the plant is located near a large metropolitan area. The PEIS analyses (including analyses of socioeconomic impacts), as well as technical and cost studies, Nonproliferation Policy considerations, and public input will be considered by the decisionmaker in reaching the ROD.

AMARILLO ECONOMIC DEVELOPMENT CORPORATION,
AMARILLO, TX, BOB JUBA
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Page 4

Land Resources

"...direct effects of land use would be negligible." (p.4-25)

Geology and Soils

"No ...effects on the geologic resources are anticipated. Soil impacts during operation are expected to be minimal." (p.4-54)

Water Resources

Water for "construction and operation would require 285 million gallons per year and 301 [million(?) gallons per year, respectively. ...increase in wastewater generation ...would be 174,000 million gallons per year. ...no exceedance of...discharge limit. During operations, wastewater would be recycled, causing no impacts." Draft WMLPEIS impacts are included. (p.4-85)

Air Quality

During construction, ambient "concentrations of all pollutants...would remain within...standards. During operation, concentrations...are predicted to be in compliance..." (p.4-117)

Acoustics

"Due to the size of the site, noise emissions from construction equipment would not be expected to cause annoyance to the public." (p.4-13)

Biotic Resources

"...would disturb 232 acres of habitat. Construction would adversely affect some animal populations." (p.4-145) [Note: "Cumulative impacts to terrestrial resources or threatened and endangered species would be minimal." (S&DPEIS p.4-880)]

Cultural Resources

"Impacts to prehistoric or historic resources are not anticipated." (p.4-153)

Socioeconomic Resources

"Construction and operation of new storage facilities would require 1,524 and 676 workers, respectively." (p.4-171)

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AMARILLO ECONOMIC DEVELOPMENT CORPORATION,
AMARILLO, TX, BOB JUBA
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Page 6

Intrastate Transportation - not addressed in the SLDPEIS

Waste Management

"...impact on...waste management activities by increasing the generation of TRU, LLW, LLMW, HM, and NMM." (p.4-203) [Note: "...the worst alternative in the WMPPEIS may increase the need for additional treatment facilities. The consolidation of Pu storage with HEU storage...would increase the need for treatment and disposal facilities." (SLDPEIS p. 4-261)]

Human Health

"Normal operation of the new collocated storage facility...would result in impacts that are within applicable regulatory limits. The risks of adverse health effects to the public would be small." (p.4-236)

Aircraft Accidents

Any alternative "would reduce aircraft accident probability." (p.4-242)

Intrastate Transportation of Nuclear and Hazardous Materials

"...the potential fatalities would be .461" from transportation of Pu and HEU from storage sites to Pantex. (p.4-274) [Note: Total potential fatalities range from .293 to 1.080 at six candidate sites; only ORR has a smaller impact than Pantex. A footnote states that the results are from radiological and nonradio-logical risk for the life of the project. (SLDPEIS p.4-778)]

Environmental Justice

"...if there were any health impacts...these impacts would not appear to disproportionately affect minority or low-income populations." (p.4-265)

The statements make it appear that it is DOE's intention to eliminate Pantex from consideration as a long-term storage site.

Please enumerate which cumulative impacts are potentially adverse and explain why you believe each is greatest at Pantex. In each case, please discuss the basis for the conclusion and whether you think the potential adverse cumulative impact is significant as a discriminator among sites.

The socioeconomic analyses of the three EISs are not consistent. The SWEIS (p.5-17) assumes 1.65 indirect jobs in the region for every job at Pantex. The

10/09.00.04

11/09.08.04

F-012

09 00 04 Comment Number 10

The Department of Energy did not intend to give the perception that the sites were ranked. The cumulative impact analysis in Section 4.7 of the PEIS does not attempt to rank the potential for cumulative impacts at the sites. The language in the Summary has been revised to better reflect the impact analysis in Section 4.7.

09 08 04 Comment Number 11

Projections of the number of indirect jobs generated depend on a number of factors, including the activity performed, the type of data used, and the methodology employed. The Storage and Disposition PEIS evaluates the socioeconomic impacts for the storage and disposition of fissile materials at Pantex, while the Stockpile Stewardship and Management PEIS evaluated the impacts of weapon assembly and disassembly operations. The activities of the two programs are quite different and each requires very different inputs. The availability of inputs within the region determines the size of the multiplier.

Office of Public Materials
Page 6

SSA/PEIS (p.5-32) assumes 1.16 and the S&DPEIS (p.4-205) assumes 3.51.

o Please explain these differences.

• The Amarillo Economic Development Commission (AEDC) analysis, based on local knowledge of the area and a regional impact study performed by Dr. Ray Perryman of Southern Methodist University, gives a ratio of 2.87 additional jobs in the region to every one Parlatz job (for a total job multiplier of 3.87).

o Why didn't the DOE consult with the AEDC and/or the City of Amarillo and use the expert analysis that local taxpayers had already paid for?

• Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and President Clinton's February 11, 1994, Memorandum for the Heads of all Departments and Agencies requires an analysis of environmental effects on low-income and minority populations to include human health, social, and economic effects.

o Why do the draft SWES, SSA/PEIS, and S&DPEIS analyze only human health effects of the proposed actions and not the social and economic effects, as required?

Thank you for your attention to these comments and questions.

Sincerely,



Bob Juba
Parlatz Relocation and Expansion Coordinator

cc: Hon. Mac Thornberry
Hon. Kai Seliger

11/09.08.04
cont.

12/09.08.04

13/09.12.08

09 08 04 Comment Number 12

The number of indirect jobs generated by the Proposed Alternatives was based on the RIMS II model developed by BEA. The multipliers used in the model are available for every economic region in the Nation (each of the DOE sites). This allowed a consistent method to be applied to all sites. Site-specific numbers should be used in site-specific EISs. Section 4.1.8 of the PEIS has been modified to clarify the utilization of the RIMS II model.

09 12 08 Comment Number 13

Socioeconomic impacts are analyzed in detail in all of the environmental statements noted by the commentor. The PEIS analyzes potential socioeconomic impacts for all of the alternatives. For those alternatives that would add a new mission to a particular DOE site, there would be no adverse socioeconomic impacts. In fact, the analyses indicate that the impacts of these alternatives would be small but beneficial to the affected regional economies. There would be no environmental justice issues associated with these alternatives.

AMARILLO ECONOMIC DEVELOPMENT CORPORATION,
AMARILLO, TX, VANCE REED
PAGE 1 OF 2

Mr. Vance Reed
President, Amarillo Economic Development Corporation

Comments on the Stippled Stewardship & Management PEIS,
the Storage & Disposition of Fissile Materials PEIS, and
the Pantex Site-Wide EIS

Thank you for this opportunity to provide input to the Department of Energy regarding the operation of the Pantex plant. I would like to address two primary issues tonight regarding Pantex's future: 1) the environment, and 2) jobs.

Starting with the environment, I would like to reiterate this community's adamant position that all work performed at Pantex continue to be done in a fashion that protects the environment. While the public has heard a great deal about "contamination" at Pantex, there has been little media attention given to the nature of pollution problems at Pantex. Most contaminants at Pantex are related to solvents and hydrocarbons that are very similar to those that would be found at practically any large manufacturing facility. This community is very reassured by the fact that Pantex has not had contamination problems from radioactive materials, such as occurred at Rocky Flats and Hanford.

The Amarillo Economic Development Corporation views Pantex in much the same manner as we view other large manufacturers in terms of presenting risks to the environment. For instance, if we were recruiting a computer chip manufacturer, we would realize that these plants have hazardous waste streams including arsenic and other heavy metals. The A.E.D.C. would only recruit a company that is committed to full compliance with E.P.A. and state environmental regulations. High tech businesses have created whole new industries and thousands of jobs, while working with very hazardous substances. This shows that protection of the environment and job creation can go hand-in-hand.

Likewise, we believe that Pantex can be a site where good, high-paying jobs are created in a work environment that includes potentially dangerous materials. When

TX-038

**AMARILLO ECONOMIC DEVELOPMENT CORPORATION,
AMARILLO, TX, VANCE REED
PAGE 2 OF 2**

09 08 04 **Comment Number 1**

The number of indirect jobs generated by the Proposed Alternatives was derived using the RIMS II model developed by BEA. The multipliers used in the model are available for every economic region in the Nation (each of the DOE sites). This allowed a consistent method to be applied to all sites. Site-specific numbers should be used in site-specific EISs. Section 4.1.8 of the PEIS has been modified to clarify the utilization of the RIMS II model.

08 03 01 **Comment Number 2**

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

15 00 00 **Comment Number 3**

Comment noted. The Amarillo National Research Center for Plutonium currently provides support to DOE for the Materials Disposition Program.

measured in terms of total payroll, Pantex is by far the area's largest employer. With 3,500 employees at the plant, a job multiplier of 3.67 shows that Pantex is responsible for a total of over 13,500 jobs in this region. This multiplier was established by Dr. Ray Perryman at Southern Methodist University. The multiplier reflects the fact that the money that Pantex brings into the local economy supports many retail, medical, educational, finance, insurance and real estate jobs. All told, employment related to Pantex represents over 12% of all jobs in the Amarillo metropolitan area. I urge the D.O.E. to correct the socio-economic impact portions of all three EIS documents to accurately reflect the impact of Pantex on our local economy.

1/09.08.04

Because of the importance of Pantex to our local economy, the A.E.D.C. is very pleased that Pantex has been chosen as the preferred site for continued assembly and disassembly functions. We also believe this decision is in the best economic interests of the nation, as it saves more than 1.5 Billion dollars to American taxpayers. I also urge the D.O.E. to continue the high explosive fabrication mission that is currently performed at Pantex. Again, this not only protects jobs in our region, it saves American taxpayers 50 Million dollars compared with the cost of moving these operations to New Mexico.

2/08.03.01

For Pantex's future, the D.O.E. should locate storage and disposition missions at Pantex, as long as they can be done in an environmentally safe fashion. I urge the Department to make use of the expertise of the Amarillo National Resource Center for Plutonium. This resource center, which is operated by the University of Texas System, the Texas A&M University System, and the Texas Tech University System, can provide world-class evaluation of disposition options. I believe the Amarillo area will prove to be an outstanding operating environment for those storage and disposition functions that have been fully scientifically evaluated and safely implemented.

3/15.00.00

Once again, thank you for the opportunity to address you in this workshop tonight.

TX-038

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GARY MOLBERG
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09 00 04 Comment Number 1

Potential environmental consequences of each Pantex alternative were analyzed in the PEIS. Results of these environmental analyses will be given full weight, along with other factors such as cost, technical risk, schedule, and national security requirements, in the process of selecting the storage strategy and site and disposition strategy and technology for the Fissile Materials Disposition Program. Pantex will continue to operate in compliance with all Federal, State, and local regulations.



Amarillo National Bank

GARY MOLBERG
VICE PRESIDENT
AND
TREASURER

April 3, 1995

U.S. Department of Energy
Office of Fissile Materials
PO Box 23786
Washington, DC 20026

RE: Comment on stockpile Stewardship and Management (SSM) and Storage and Disposition (SD) of Weapons-Usable Fissile materials Draft Programmatic Environmental Impact Statement (PEIS).

Thank you for the opportunity to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statement (PEIS) on Stockpile Stewardship and Management (SSM) and Storage and Disposition (SD) of Weapons-Usable Fissile Materials. Please also consider this my comment on the Pantex Site-Wide Draft Environmental Impact Statement, since most of the issues addressed in these documents are identical.

I strongly believe that any current and future functions at Pantex will be conducted in a safe and environmentally sound manner. Our first priority is to ensure any expansion at Pantex be implemented in a way that does not impact the health or safety of area residents or have an adverse effect on the environment. These goals serve as a prerequisite to any current or future activities at Pantex, including expansion.

I. Generally, I am pleased that the DOE selected Pantex as the preferred alternative for assembly and disassembly and has canceled all plans to transfer this to the Nevada Test Site (NTS). Pantex is the best site for maintaining the integrity of the U.S. Nuclear stockpile and attaining maximum efficiencies and cost savings.

II. Stockpile Stewardship and Management & Programmatic Environmental Impact Statements

1. Pantex is the best place to also new construction/stockpile activities. Pantex is the most cost-effective for any new construction of SSM facilities. First, the labor costs, utility rates, and water and land availability at Pantex as well as political and public

1/09.00.04

M-012

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GARY MOLBERG
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08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

support, are more amenable than those at any other Complex site. The location of additional defense-related activities at Pantex would ensure that core technical capabilities are preserved at a location that can secure them at the most efficient cost to the American people. In its deliberations, DOE should insist that budgetary comparisons between Pantex and the other sites are accurate, and include capital, transportation, training, remediation, and other costs.

2. Pantex is the best site to continue High Explosives fabrication. Consistent with the strengths listed above for increased stewardship and management duties, the high explosives (HE) functions should also remain at Pantex. It is only logical that if assembly/disassembly functions remain at Pantex then the HE fabrications should also be present at the corresponding site. Pantex must retain HE capabilities in order to process the inventories already on site for dismantling. The transferring of HE functions from Pantex will cost tax payers from \$40 to \$50 Million. It is also important to have HE facilities at weapons production/assembly site if there should ever be a need for new weapons production.

III. Fissile Materials (Plutonium) Storage and Disposition PEIS. Pantex has handled assembly and disassembly of nuclear weapons for more than 40 years and has done so in a safe and efficient manner. A challenge faced after dismantling a significant portion of nuclear stockpile is processing or disposal of the materials that remain. Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by the DOE. This could all be done at minimal cost and difficulty.

IV. Conclusion. Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions. Thank you for the opportunity to comment on these documents.

Respectfully yours,


Gary Molberg

2/08.03.01

M-012

AMARILLO NATIONAL RESOURCE CENTER FOR PLUTONIUM,
AMARILLO, TX, DALE E. KLEIN
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Amarillo National Resource Center for Plutonium
A Higher Education Consortium of The State Adult Learning System, Texas Tech University, and The University of Texas System

June 6, 1996

Department of Energy
Office of Fissile Materials Disposition
PO Box 23786
Washington, DC 20026-3786

The Amarillo National Resource Center for Plutonium's Senior Technical Review Group has reviewed portions of the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement. After careful and deliberate discussion, the Group agreed upon the enclosed comments, and we hereby formally submit them as part of the formal public comment period for the draft PEIS, which ends June 7, 1996.

We very much appreciate the opportunity for our Review Group to comment, and look forward to the Department's response.

Sincerely,

Dale E. Klein
Governing Board Chairman

Enclosure

600 South Tyler • Suite 800 • Mail Box 12098 • Amarillo, TX 79101 • 806-376-5533 • Fax 806-376-5561

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AMARILLO, TX, DALE E. KLEIN
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Comments and Recommendations
Based on the PEIS Briefings
and
Reactor-Based Plutonium Disposition Options

Submitted By

Senior Technical Review Group
Amarillo National Resource Center for Plutonium

March 1996

600 South Tyler • Suite 800 • Mail Box 1709R • Amarillo, TX 79101 • WOL 376-5573 • Ext. 804, 376-5561

F-049

A Report of the
Senior Technical Review Group
March 1996

The Senior Technical Review group met on March 11 and 12, 1996, to review the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement, and to review the reactor-based plutonium disposition options.

The Group once again emphasized the urgency of both the U.S. and Russia moving forward with selecting and implementing plutonium disposition options.

Comments and recommendations based on the PEIS briefing:

The DOE representatives gave a reasonably detailed presentation on the draft PEIS on "Storage and Disposition of Weapons-Usable Fissile Materials." Based on this presentation and an examination of several parts of the Summary document, the Review Group has several concerns, indicated in the following comments.

The absence of significant discussion on safeguards and security in the presentation was striking. We understand this is a result of limitations on what is to be included in a PEIS. We further understand that the PEIS is only one of three "pathways" to the decision on storage and disposition of weapons materials, the other two being costs and proliferation issues. (This is clearly described on page S-1.) However we believe any public discussion of the PEIS should explicitly describe these three factors because the fundamental concerns relate to the safeguards and security aspects.

We are skeptical about the feasibility of the deep borehole concept, which has been included as a "reasonable" disposition option. Obtaining approval for a site will be difficult. Licensing the site for an approach never examined by EPA or NRC will be extremely time consuming. We realize that the deep borehole concept has some potential advantages, but we remain skeptical about being able to achieve these on a competitive timetable. Proceeding with this option is inconsistent with our previous recommendations to proceed with plutonium disposition on an urgent basis. In our judgement, this option should not be described as "reasonable" but, rather, as "not necessarily unreasonable."

We were surprised to find that electrometallurgical treatment continues as a "reasonable" option for immobilization. Previous presentations to the Review Group had indicated this approach was being dropped. We believe it should have been.

Some of the Review group believe that elimination from the PEIS of the European MOX fabrication/irradiation option is inappropriate and decidedly premature. Under NEPA, exclusion of this option from the PEIS will preclude further consideration. However, environmental impacts of this option are almost exclusively overseas and are therefore excluded from NEPA coverage. Thus, there is no environmental impact basis for excluding the option. The reason cited for elimination of this option is that European fabricators have expressed an unwillingness to fabricate U.S. plutonium for irradiation in European reactors primarily because of the fabricators' concern that this would have an adverse impact upon the market for reprocessing services, which they also offer. This objection, however, would not necessarily apply to a limited program of irradiating a few assemblies or even a few reloads. Moreover, commercial objections might be subject to reversal for policy reasons and because of future changes in the market. Indeed reactor grade MOX fabrication and irradiation already are licensed and commercially proven activities in Europe. NRC licensing of MOX might be achieved quickly, but there is no guarantee of this. This existing capability provides the potential for acceleration of the disposition process if the political and commercial problems, as well as transportation issues, can be resolved. Therefore some members

01 06 00

Comment Number 1

The purpose of the Proposed Action is, in part, to establish the technical and program infrastructure that will enable the United States to take unilateral action or negotiate reciprocal actions with other nations for the disposition of surplus weapons-usable Pu. This PEIS addresses the environmental impacts of the reasonable alternatives for DOE's Proposed Action. Analyses of the cost, schedule, technical, and Nonproliferation Policy impacts are described in separate documents to support DOE's ROD. The technical, cost, and schedule documents were made available for public review beginning in July 1996. The nonproliferation analysis was made available to public beginning in October 1996. DOE also conducted a series of public meetings, prior to the issuance of the Final PEIS, to discuss the analysis of the Nonproliferation Policy as it relates to the PEIS alternatives.

04 04 00

Comment Number 2

Comment noted.

01 04 00

Comment Number 3

The *National Environmental Policy Act* requires consideration of all reasonable alternatives. Although the Electrometallurgical Treatment Alternative for disposition of weapons-usable Pu is not as technically mature as other alternatives considered in the PEIS, it was considered to have sufficient maturity to be retained as an alternative in the Final PEIS. Further, the National Academy of Sciences (NAS) recognized this alternative, dependant upon successful demonstration. Section 2.4.4.3 of the Final PEIS has been modified to note recent conclusions from the National Research Council.

06 01 08

Comment Number 4

Comment noted. The basis for exclusion of the European MOX Fabrication/Irradiation Option is included in the Screening Report. Section 2.1.4 of the PEIS provides further explanation on the exclusion of this alternative, due to a lack of capacity to complete the disposition mission, the institutional complexities such as transportation, security, and other geopolitical factors.

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of the Review Group believe that the European pathway to early implementation, particularly through initial demonstrations of the disposition process, should not be foreclosed at this time.	4/06.01.08 cont.
The Summary (page S-15) indicates the possibility of using LWRs both for the disposition of plutonium and for the production of tritium. We consider that, both from a policy and public perspective, these two requirements should be kept separate, and should not be accomplished in the same reactor or reactors. The Office of Future Material Disposition should be involved only in the various aspects of storage and disposition of plutonium and HEU, and not in the production of new weapons material.	5/11.00.08
Finally, the Review Group strongly objects to misleading presentations in the Summary, for example, of what are properly calculations of least cancer fatalities in the public and the work force for various disposition options. While we have not reviewed the entire draft PEIS, the following comments, based upon review of the Summary, indicate our concerns:	6/16.00.00
(1) We were informed that it was assumed that new nuclear plants would not displace any existing operating units of any kind. This is an inappropriate assumption.	7/06.04.08
(2) Figures S-14 through S-18, S-23, S-25, S-27 through S-31, and S-39 through S-44 are unclear in their comparison among existing LWRs, partially completed LWRs, and evolutionary LWRs. A reader could easily conclude that evolutionary LWRs will cause more least cancer fatalities, emit more radiation and produce more radioactive waste than existing LWRs. Yet they have been designed to reduce both radioactive emissions and radioactive waste. We were informed that these descriptions were based on two requirements: (a) actual data were used for existing plants, but maximum allowable limits were used for unfinished or evolutionary phases; (b) no error bars or uncertainty limits were allowed to be used, leading the reader to conclude the graphs are accurate. Both requirements lead to highly misleading presentations, which are accentuated by not having an explanation to appendices A and B to put the calculations into perspective. We understand that the DOE Office of General Counsel ordered that no error bars be shown. The General Counsel should be asked to reconsider this order since it affects the determination of technical issues.	8/01.00.00
(3) The figures used to describe the impact of the proposed operations are misleading as they lack the perspective of existing baseline values and, in some instances, a time-frame. Also the scales on which the data are displayed exaggerate very small effects. For example: a) Figures S-17 and S-18 are for the life of operation. They indicate that during the period the operation's radiological impact on cancer fatalities would be less than 3.3 or less than 6 additional cancer deaths among the resident and worker populations, respectively. However, they do not reflect the several million "person-years" (dose-radiation related) cancer deaths that would be expected to occur among these populations during the same period. Nor do they indicate the bounds of the uncertainties around these estimates, thus the reader could conclude that the estimates are precise. However, both HEIR and NCRP have indicated that, at very low doses, zero effect is within the range of likelihood. Specifically the National Committee for Radiation Protection, in Report #121, "Principles and Application of Collective Dose in Radiation Protection", recommends "When the collective dose is smaller than the reciprocal of the relevant risk coefficient, the risk assessment should note that the most likely number of excess cancer deaths is zero. This recommendation applies in this case, which the reader can only discover by reading the Appendices carefully."	

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However the option is retained for the utilization of European MOX fabrication to fulfill short term MOX fuel needs as explained in Section 2.4.5.1 of the PEIS.

11 00 08 Comment Number 5

Comment noted.

16 00 00 Comment Number 6

Based on comments received, the Summary for the Draft PEIS was revised. Revisions made in the Final PEIS are reflected in the Summary.

06 04 08 Comment Number 7

If a new reactor was built, it would operate to provide electricity to a competitive marketplace. No displacement of existing capacity per se is envisioned but the market would be the arbiter of any displacement.

01 00 00 Comment Number 8

Based on public comments, the Summary of the Draft PEIS was revised. The Comparison of Alternatives charts (figures) were removed, and the text was expanded and revised. Chapter 4 of the PEIS has been revised to include an explanation of low doses. Chapter 4 has also been revised to reflect "total" impacts and wastes from operating existing LWRs using MOX fuel, as well as the "net" incremental impacts (that is, the difference in spent fuel between uranium-fueled and MOX-fueled operations).

b) Figure S-22 is another example of deceptive graphics in which the graphics developed to describe risks misrepresent the impacts of the proposed operations in that they do not include baseline values (levels). The reader will not realize that the chart shows additional low level waste generated by the alternatives. The several thousand times greater volume generated by evolutionary LWRs compared to existing LWRs is because the large volume generated by the existing LWRs is not included in the chart. Also, Figures S-4 through S-13 give no indication whether they represent total or additions to existing quantities or, for that matter, whether the numbers shown for different options have been calculated on the same basis.	8/01.00.00 cont.
We recommend that the figures be revised where applicable to reflect existing operations and the cancer death rate among the general, non-exposed population. (4) In several parts of the text, it is stated that "the dose to the population living within 80 km (50 mi) of the site would be within 100 person-rem per year". However, the reader is not told whether this is acceptable or how it compares with other population doses, including those received from natural sources. In summary, the Review Group is skeptical about some of the retained alternatives, disturbed about the misleading character of the Summary, and concerned about the lack of discussion of the major reason for the program, i.e., the safeguards and security (or proliferation) issue.	9/09.09.08
Comments on Reactor Disposition Options The DOE Team presented the plans of the efforts to evaluate the disposition option that would utilize LWRs or CANDUs. The STRG's comments on the review are as follows:	10/08.03.01
LWR OPTIONS The team reported that the major technical focus in utilizing LWRs has been on full core loading of mixed U-Pu oxide (full MOX core), revealing some developmental issues primarily associated with relatively new applications of burnable absorbers. To avoid potential delays in resolving these technical issues and in licensing a newer technology, DOE has shifted its emphasis to evaluating partial (1/3) core loading of MOX fuel.	11/07.00.00
While disappointed that the DOE did not begin by focusing on the 1/3rd core option, the STRG endorses this shift and a strategy that would apply the partial MOX core in the initial stages of a disposition campaign, followed by full MOX core applications when the developmental problems are resolved. The STRG recommends that this strategy, including development work, be defined in detail, along with an implementation plan that reflects the urgency of starting a disposition option. The strategy and implementation plan should include the following characteristics:	12/06.02.08
(1) Proven technology for the initial applications: -MOX fuel and reactor designs should be patterned on existing commercial MOX experience; European design and operational experience should be utilized fully. DOE should consider obtaining all such pertinent experience from the Europeans and makes it available to U.S. utilities that have shown strong interest in the MOX disposition option. -Changes in the number of control rods or the configuration of the reactor vessel head or internals should be barred from consideration for partial core loading.	F-049

-Pu metal conversion processes should be selected that will provide oxide with essentially the same characteristics as present commercially used MOX, (excepting the Pu isotopic distribution and possibly some gallium residue in the MOX fuel). -Existing facilities should be used wherever practical at each stage (conversion, fuel fabrication, and reactor operation). There is potential through this approach to reduce the time to start the disposition and the costs of the disposition process as well as to minimize the introduction of new facilities which will later have to be decommissioned. DOE should also take into account potential difficulties in documenting design basis and equipment qualifications for existing facilities. The STRG concurs with the DOE position to consider initially only those reactors that will not require license renewal or extension during the length of the disposition program.	13/03.02.08
(2) Program Acceleration Planning	
-The STRG is concerned that there is an insufficient sense of urgency in pursuing the disposition options. The new formulation of strategy and planning should place first priority on timeliness, given that the security and health & safety requirements are met. Cost is an important factor but should not be subjugated to timeliness. -Emphasis should be given to narrowing down the reactor burning options to permit greater focus. Seventeen sub options in this category were identified as still under evaluation. -In-depth review of licensing issues should be sought with NRC on the several vendor partial MOX core designs, including the impact of the weapons Pu isotopic distribution. -The STRG considers it important to demonstrate as soon as possible the adequacy of full scale MOX fuel assemblies derived from weapons grade Pu. Specifically:	14/01.02.00
(a) Since MOX fabrication appears to be on the critical path, strategies should be defined to accelerate the fabrication of each demonstration lead assemblies. Existing commercial facilities should be considered as well as experimental-level facilities in the U.S. National Laboratories. (b) Early demonstration of lead MOX fuel assembly irradiation in commercial reactors should be sought, including European reactors that are already licensed for MOX operation. Elimination of the Euratom MOX fabrication reactor burning option should be reconsidered if elimination would preclude such early demonstrations. -The DOE team cited many political and commercial difficulties in utilizing western European capability for the reactor disposition option. Since there is high technical potential to start the process much sooner by that route, the political and commercial issues should continue to be addressed aggressively.	15/07.01.00
(3) Necessary R&D	
-An effective R&D program should be mounted to evolve as rapidly as possible to the utilization of full MOX core so as to minimize the number of reactor sites and their auxiliary facilities and associated transportation and security requirements. -The R&D program will need to include in the development of MOX fuel fabrication facilities the impact of using new burnable absorbers as well as reactor design and fuel reliability issues related to new burnable absorber design features.	16/06.01.08
	17/06.01.08
	18/06.01.08
	19/06.01.08

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03 02 08 Comment Number 13

If a Reactor Alternative is chosen as part of the ROD for Pu disposition, the MOX fuel fabrication process would meet all the appropriate reactor fuel specifications. The feed material needed to fabricate MOX fuel, produced using pit and non-pit processing technologies, would meet the specifications of the MOX process.

01 02 00 Comment Number 14

Comment noted.

07 01 00 Comment Number 15

The Department of Energy recognizes the "sense of urgency" for timely disposition of surplus Pu. Accordingly, in the ROD for this PEIS, DOE will select a technology strategy for disposition with the goal to complete disposition within 25 years thereafter. Schedule data were provided in the Technical Summary Report in late July and October 1996; this information will be considered in the ROD. Furthermore, DOE will immediately begin preparation of tiered NEPA reviews to analyze specific locations and technology variants for disposition activities, and will begin disposition immediately following the tiered, location-specific decisions.

06 01 08 Comment Number 16

Fabrication and use of MOX fuel using reactor-grade Pu is a mature, industrial scale technology in Europe with at least three vendors actively fabricating MOX fuel. There are some differences introduced by the use of weapons-grade Pu, which DOE is addressing as part of an ongoing weapons-grade MOX fuel research and testing program.

06 01 08 Comment Number 17

The Department of Energy is moving forward with activities to test the fabrication of MOX fuel from weapons-usable Pu and its performance in LWRs and heavy water reactors.

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(4) Scope -All criteria governing the disposition process should be included in the strategy and planning. Security and proliferation performance should be treated explicitly, criteria that were not strongly treated during the DOE team presentation. -Arbitrary budget constraints, as distinct from defining a focused, cost effective plan, should not be imposed on the planning process. The appropriate full scope of the needed program should be defined, permitting a later, more intelligent application of budget restraints if necessary. CANDU OPTIONS The DOE team reported that no technical difficulties had arisen in the full scale MOX application, that the much shorter fuel pins could be more easily handled in the existing MOX fabrication facility (FABER) at Hanford, and that political acceptance at this time in Canada was good although the new administration was reviewing the issue. The small size of the CANDU assemblies raises questions as to the sufficiency of the radiation barrier to comply with the spent fuel standard. The proposed solution was to raise their proliferation resistance to the LWR spent fuel level by joining many assemblies together to increase the radiation level and make them more bulky. Effort is also underway to raise the Pu level in the design to try to achieve a fuel cost reduction of about a factor of two. The STRG comments on the LWR option also apply to the CANDU option where applicable. Further, the fact that CANDU reactant use on line refueling could result in some increase in proliferation risks. JOINT U.S./RUSSIAN STUDIES The LWR disposition option is included in an overall study with the Russians of a broad array of disposition options. This effort is particularly important since it provides the potential for a "middle way" for Russian cooperation (spend two qu) in the disposition process between their present preference for the unitary and costly fast reactor disposition option and their complete rejection of weapons Pu direct disposal and immobilization options. This prospect is justification in itself for vigorous pursuit by the U.S. of the LWR disposition option. SPENT FUEL STANDARD In defining the components of the spent fuel standard, isotopic denaturing should be included. Although the practical level of isotopic denaturing does not eliminate potential diversion for terrorist nuclear explosive use, it is a significant additional barrier to fast neutron re-use or reprocess nuclear military use. UTILITY COOPERATION IN THE MOX FUEL DISPOSITION PROCESS The effort to explore the interest of the utilities in siting in the commercial LWR disposition option are important to achieving timely implementation of the option. There is concern, however, that the incorporation of a utility production mission with the excess weapons Pu disposition mission will introduce complexity, delay, and increased public apprehension into the disposition mission. The STRG also expressed concern on reversing the long-standing U.S. policy of separating nuclear weapons production from nuclear electricity production. As indicated in the STRG comments on the draft PEIS, the Office of Fissile Material Disposition should be involved only in the various aspects of storage and disposition of weapons grade Pu and highly enriched U.	14/01.02.00 cont.
	20/07.00.00
	21/06.05.08
	22/06.05.08
	23/01.03.00
	24/01.02.00
	25/11.01.08
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06 01 08	Comment Number 18	The Department of Energy is considering the possible use of full MOX cores for the reactor disposition of surplus Pu. Uncertainties with the use of full MOX cores are being evaluated as part of the fuel qualification program.
06 01 08	Comment Number 19	Comment noted.
07 00 00	Comment Number 20	Comment noted.
06 05 08	Comment Number 21	The Canadian proposal is to fasten 24 fuel bundles into a module to increase the size, weight, and radiation level and achieve the same resistance to theft and diversion as LWR spent fuel. The online refueling will require additional efforts to safeguard the CANDU reactor, but is achievable (see <i>Draft Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Materials Storage and Plutonium Disposition Alternatives</i> , October 1996).
06 05 08	Comment Number 22	Although CANDU reactors require more intensive actions to safeguard than LWRs, International Atomic Energy Agency (IAEA) safeguards are already in place for CANDU reactors in Canada, irrespective of the Pu disposition mission.
01 03 00	Comment Number 23	Comment noted.
01 02 00	Comment Number 24	Isotopic denaturing is not considered a proven technology for Pu disposition and would take time for it to be proven. This would not meet the schedule and cost criteria for consideration as a reasonable alternative for implementation.

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AMARILLO, TX, DALE E. KLEIN
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Comment Number 25

11 01 08

Comment noted.

6 May 1996 The Honorable Hazel O'Leary United States Department of Energy 1000 Independence Avenue SW Washington, DC 20085 Dear Secretary O'Leary: In February of 1996, the Department of Energy (DOE) released the Draft Programmatic Environmental Impact Statement (PEIS) on the Storage and Disposition of Weapons-Usable Fissile Materials. We are gravely concerned that the document itself, as well as several aspects of DOE's approach to disposing of weapons-usable fissile materials, is substantially flawed. We have outlined our primary concerns below, and request that DOE provide another opportunity for public comment after these concerns are addressed in a revised Draft PEIS. Disposing of surplus plutonium and highly-enriched uranium is one of the most urgent and significant international security matters of our time. The National Environmental Policy Act (NEPA) dictates that DOE present a credible and accurate discussion of reasonable alternatives in its review of this issue. Further, the potential consequences of an inappropriate decision compel DOE to demonstrate better than its normal quality of NEPA performance - ensuring particularly that the nonproliferation and cumulative impacts of its decision are soundly addressed. The current Draft PEIS meets neither of these standards. The most glaring lapse is the continuing confusion between the objectives of fissile materials disposition and nuclear industry subsidization. For environmental, nonproliferation, economic, and other policy reasons, the proposed use of mixed oxide (MOX) fuel as a means of plutonium disposition should be flatly rejected as unreasonable. In the presence of other means to safely dispose of excess plutonium, there is no sound reason whatsoever for giving as much credence to a MOX alternative(s) as DOE does in the Draft PEIS. The only apparent reason for continuing to emphasize the use of MOX fuel is pressure from people who stand to gain economically and/or politically from its selection. The Draft PEIS is woefully inadequate in its consideration of the nonproliferation and cumulative impacts of this alternative. A more thorough analysis of MOX use would raise significant concerns about, for example, its link to future reprocessing and long-term US policy regarding reliance on a plutonium fuel cycle. Any analysis of MOX fuel for plutonium disposition which does not thoroughly and explicitly evaluate such related matters is insufficient and should not be the basis for decisions. In addition to these far reaching policy concerns, the Draft PEIS fails to adequately discuss safety issues associated with the use of MOX fuel. The Draft PEIS, for instance, does not adequately consider the high thermal power of MOX spent fuel and the related implications for the cost and safety of a high-level waste repository. This issue was raised by the National Academy of Sciences in its 1995 reactor options study for	1/08.03.01
	2/01.00.00
	3/01.02.00
	4/08.03.01
	5/06.01.08
	6/09.08.08
	M-242

08 03 01

Comment Number 1

As noted in presentations at the public meetings, DOE welcomes public input throughout the decisionmaking process, which includes the formal NEPA comment periods, scoping, and reviewing the Draft PEIS, as well as during the period of time after issuance of the Final PEIS leading up to the ROD. DOE believes that the Draft PEIS was adequate for the purposes of soliciting public comments, and does not intend to issue another draft.

01 00 00

Comment Number 2

The Final PEIS has been revised to reflect comments received, including revisions to cumulative impacts in Section 4.7. Analyses of nonproliferation impacts are presented in a separate document, *Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*, and will be considered in DOE's ROD. This document was available for public review in October 1996 and public meetings were held in October and November 1996 on this nonproliferation study.

01 02 00

Comment Number 3

The Department of Energy is complying with NEPA by analyzing a range of reasonable alternatives for implementation of the Proposed Action. Accomplishing nonproliferation and meeting the intent of the Spent Fuel Standard is not a subsidization of the nuclear industry. This can be achieved through any of three disposition categories; Reactors, Immobilization, or Deep Borehole.

08 03 01

Comment Number 4

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input. The NAS considered the use of the Reactor Alternatives using MOX fuel as a disposition option. This was further considered and confirmed in the Screening Report. Therefore, the Reactor Alternatives using MOX fuel are reasonable alternatives under NEPA, and accordingly the PEIS provided a complete analysis of the reactor alternatives.

plutonium disposition. The Draft PEIS also inadequately addresses the potentially greater consequences of an accident in a reactor loaded with MOX fuel.	6/09.09.08 cont.
The consideration of MOX fuel is not the only deficiency in the Draft PEIS. The document fails to consider alternatives for the long-term storage of weapons-usable fissile materials, particularly plutonium pits. The Pantex Site-Wide Environmental Impact Statement acknowledges that long-term storage of pits at Department of Defense (DOD) facilities, specifically at Kirtland Air Force Base's Manzanero Weapons Storage Area, is a reasonable alternative. Accordingly, the DOD is a cooperating agency in that Pantex EIS. The Draft PEIS repeats this alternative for long-term storage without adequate explanation. Among the potential advantages of using an existing facility which should be better evaluated in the PEIS are cost savings from avoiding new construction and faster implementation.	7/01.05.00
Further, the Draft PEIS fails to consider alternatives for plutonium storage containers. Only one container is analyzed despite the fact that this container is not yet certified and is admittedly not appropriate for storage of plutonium in all the variety of forms in which it currently resides throughout the complex. A range of adequate containers and storage conditions should be examined in order to ensure that plutonium stabilization and storage can be done safely.	8/02.00.08
The Draft PEIS should also more fully consider activities associated with the processing and interim storage of plutonium and highly enriched uranium that will be required to transition this material from its current status at various sites around the complex to the preferred form(s) for long-term storage. The Draft PEIS seems to presume that such processing and repackaging involves comprehensive NEPA coverage in some other document(s). That is not the case. Instead, existing NEPA documents considering interim stabilization and storage are incomplete. All related issues have not been addressed separately and certainly not comprehensively. Moreover, there are numerous outstanding safety concerns (e.g., seismic safety at the Savannah River Site reprocessing canyons) which raise questions about the adequacy of those NEPA documents which have been completed.	9/11.01.08
Finally, the Draft PEIS contains no cost estimates and no detailed design information on buildings and facilities. Such information is necessary to identify reasonable alternatives and evaluate their environmental impacts. But that information will not be available to the public until some time after the comment period. Such information is essential to the public discussion and should be made available for public review and comment.	10/08.00.00
These concerns make clear that the Department has much work to do before it can produce an adequate Draft PEIS on the storage and disposition of weapons-usable fissile materials. The public should expect no less than a fully sufficient NEPA analysis for this very important issue.	11/15.00.00
In conclusion, we want to emphasize that completing an adequate Draft PEIS should not be an excuse for failure to take appropriate action in several areas of disposition policy. Continuation of a plutonium verification plant to demonstrate the safe substitution of plutonium in reactors, for example, would not foreclose any options considered in the PEIS. Moving forward with a plutonium verification plant will instead signal the Department's resolve to safeguard plutonium rather than to stockpile it, as well as to address some existing environmental, health, and safety issues. Moving forward will also provide additional information about the details of immobilization of plutonium in glass - information that would be useful in preparing an adequate PEIS.	M-242

06 01 08 Comment Number 5

Comment noted. The President's Nonproliferation Policy says that the United States will not recycle Pu. Burning weapons Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel. This would not be a subsidization of the nuclear industry. As noted in response to Comment Number 2, DOE has prepared both cost and nonproliferation analyses for public review; in the ROD, DOE will consider the cost and nonproliferation information along with environmental analyses, schedule and technical analyses, and public comments.

09 09 08 Comment Number 6

The human health and safety impacts from normal operations and facility accidents for all three Reactor Alternatives, existing LWRs, partially completed LWRs, and evolutionary LWRs using MOX fuel are evaluated and documented in the Final PEIS. Appendix H, *High-Level Waste Forms Comparative Analysis*, provides an analysis of the thermal and radiation conditions of the waste form's performance in the repository.

01 05 00 Comment Number 7

Combined storage of pits and non-pit Pu at the Manzano WSA was originally eliminated as a reasonable alternative in the Draft PEIS. After considering separate storage of pits from non-pit Pu, the option to store these pits at the Manzano WSA no longer appears unreasonable. The Manzano WSA was evaluated in the Pantex EIS and Section 2.1.3 of the Final PEIS. The Final PEIS was revised to clarify the consideration of the Manzano WSA for combined storage, and a description of the WSA was included in Appendix P.

02 00 08 Comment Number 8

The PEIS assumes that all surplus Pu at Hanford, INEL, Pantex, SRS, RFETS, and LANL has been transformed to a stable form that meets the DOE *Standard Criteria for Safe Storage of Pu Metals, and Oxides* (DOE-STD-

AMERICAN FRIENDS SERVICE COMMITTEE, DENVER, CO,
RALPH HUTCHISON
PAGE 3 OF 4

If you have questions or would like to further discuss our concerns, please contact either
Ralph Hutchison at (423) 483-8202 or Brian Costner at (803) 256-7298. We appreciate
your attention to our concerns and look forward to hearing from you soon.

Sincerely,

Ralph Hutchison
Ralph Hutchison, on behalf of:

American Friends Service Committee, Denver, CO
Citizen Alert, Las Vegas, NV
Concerned Citizens for Nuclear Safety, Santa Fe, NM
Economists Allied for Arms Reduction, New York, NY
Energy Research Foundation, Columbia, SC
Environmental Defense Institute, Troy, ID
Institute for Energy and Environmental Research, Takoma Park, MD
Nashville Peace Action, Nashville, TN
Native Americans for a Clean Environment, Tahlequah, OK
Oak Ridge Environmental Peace Alliance, Oak Ridge, TN
Panhandle Area Neighbors and Landowners, Pankhandle, TX
Peace Farm, Amarillo, TX
Physicians for Social Responsibility, Washington, DC
Rocky Mountain Peace Center, Boulder, CO
Services Texas Against Nuclear Dumping, Amarillo, TX
Snake River Alliance, Pocatello, ID
Southwest Research and Information Center, Albuquerque, NM
Tri-Valley CAREs, Livermore, CA
Western States Legal Foundation, Oakland, CA

M-242

3013-94) for materials greater than 50-percent Pu or the *Criteria for Interim Safe Storage of Pu-Bearing Solid Materials* (draft in preparation by DOE) for material with less than 50-percent Pu. Stabilization of the material and the impacts are not within the scope of this PEIS, but have or will be analyzed in other NEPA documents, as appropriate. The material would be stored in containers consistent with the transportation of the materials on or to the site. Containers analyzed for storage of pits include the FL container (currently certified) and the AT-400A (currently under review for certification). Material would not be moved and stored in the AT-400A container without proper certification. Other containers were analyzed for the transportation of other Pu materials (for example, the BUSS R-1 cask for cesium (Cs) and the MO-1 for MOX fuel). Appendix G, "Intersite Transportation," provides the analysis of the containers used for transportation and storage for Pu and HEU.

11 01 08 Comment Number 9

The Department of Energy has an ongoing materials stabilization program under the Office of Environmental Management (EM), to stabilize, process, and package various materials including weapons-usable fissile materials. The NEPA coverage for stabilization of the weapons-usable fissile materials is beyond the scope of this PEIS. Appropriate NEPA documents have or will be prepared, as necessary, for the stabilization of various materials, including weapons-usable fissile materials, under DOE's Materials Stabilization Program. This PEIS analysis begins at the point that the surplus weapons-usable fissile materials are in a form suitable for storage or disposition.

08 00 00 Comment Number 10

In the interest of openness and more informed decisionmaking, DOE released Technical Summary Reports to the public as soon as they became available. Cost data, along with technical and schedule data, were provided in Technical Summary Reports of both storage and disposition in late July 1996. Final Summary Reports reflecting public input were made available to the public in October and November 1996. Results of the nonproliferation analysis were made available in October 1996. Each of these analyses, along with the environmental analysis and public input, will be integrated into the DOE's decisionmaking process.

AMERICAN FRIENDS SERVICE COMMITTEE, DENVER, CO,
RALPH HUTCHISON
PAGE 4 OF 4

15 00 00

Comment Number 11

Comment noted. DOE will include pilot and demonstration projects, as appropriate, in moving toward implementation of the disposition technologies.

AMERICAN NUCLEAR SOCIETY,
JAMES DEWES
PAGE 1 OF 1

AMERICAN NUCLEAR SOCIETY - SAVANNAH RIVER SECTION STATEMENT
REGARDING STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE
MATERIALS DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

My name is John Dewes and I am Vice Chairman of the Savannah River Section of the American Nuclear Society. Our local section consists of some 800 scientists and engineers in the Central Savannah River Area. On behalf of the Section, I would like to make a statement concerning the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement.

We believe that all of the long term storage options are acceptable from the standpoint of environmental, safety and health. We also believe that any of the Long Term Storage sites proposed have sufficient infrastructure to handle the engineering & design of such a facility.

We strongly support the recommendations contained in the American Nuclear Society Special Panel Report on the Protection and Management of Plutonium¹, a Panel chaired by Glen T. Seaborg, who discovered Plutonium almost 60 years ago. This report recommended implementation of the reactor irradiation option for disposal of surplus weapons-usable plutonium.

The stated goal of the PEIS is to make surplus plutonium inaccessible and unattractive for use as nuclear weapons. We believe that the reactor irradiation option has several advantages over the other options in meeting this goal. It is the only option that converts weapons grade plutonium to reactor grade plutonium. This is a crucial point, because our weapons testing history indicates that, although possible, it is extremely difficult to build a successful nuclear weapon from reactor grade plutonium, and that the infrastructure required to either build a successful weapon or to purify the plutonium to weapons grade presents a tremendous barrier to diversion. The reactor irradiation option is also the quickest way to reach the goal of the Spent Fuel Standard for protection from misuse.

Bill Lytle, Deputy Assistant Secretary, in her prepared comments for the Chinese Advisory Board Plutonium Forum, indicated that she wanted a "sustainable decision", one which considers the issue in light of other decisions under review and one that garners long term public support. The decision should therefore reflect the long term need to protect the public from diversion of the materials in question. The French have recognized this issue, and are currently taking advantage of the long term protection associated with the use of mixed oxide fuel for their civilian stockpiles of plutonium.

We believe that if the mission of the DOE is to ensure a stable energy supply for our country's needs, then the energy value of the plutonium, estimated at 32 billion dollars, should be considered when selecting the preferred alternative. Plutonium is not a waste - it is the closest thing to a peace dividend our country will ever see. We also believe that the DOE needs to pay attention to scientific facts related to plutonium rather than irresponsible and irrational statements made concerning its toxicity and potential impact on the population.

We strongly urge you to select the reactor irradiation option as the most beneficial and effective method for dispositioning of weapons-usable fissile material. Thank you for the opportunity to provide comment on this important issue.

¹ Protection and Management of Plutonium, American Nuclear Society Special Panel Report, Glen T. Seaborg, August 1995.

1/08.03.01

2/08.03.01

3/08.03.00

4/01.00.00

2/08.03.01
cont.

SR-005

Comment Number 1

08 03 01

The Department of Energy acknowledges the commentor's support for long-term storage of fissile materials. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 2

08 03 01

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 3

08 03 00

Comment noted.

Comment Number 4

01 00 00

Comment noted.

AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
PAGE 1 OF 7

01 02 00 Comment Number 1

The Department of Energy noted the comment requesting a statement in the Summary making it clear that future reprocessing decisions are beyond the scope of this PEIS. A clarifying statement was included in the Summary of the Final PEIS.

A LETTER TO THE SECRETARY OF ENERGY
WITH COMMENTS ON THE DRAFT PEIS ON
STORAGE AND DISPOSITION OF WEAPONS-USABLE MATERIALS
FROM THE ANS PAST-PRESIDENTS COUNCIL

April 23, 1996

Hon. Hazel O'Leary, Secretary
U. S. Dept. of Energy
1000 Independence Ave. SW
Washington, DC 20585

Attention: Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, DC 20026-0786

By Fax: 800-820-5156

Dear Secretary O'Leary,

On August 10, 1995, the ANS Past Presidents Council submitted a letter regarding the Plutonium Disposition PEIS which analyzes alternatives for DOE future action. Among other things, our letter warned that, by implication, the PEIS could be used to claim that an open process had been used to eliminate reprocessing from all future nuclear fuel cycle decisions.

According to DOE, the IP says that this is not the case, and that the PEIS does not apply to commercial nuclear fuel cycles. However, we believe that some persons will choose to try to use this EIS to try to establish such prohibitions. Since irradiated MOX fuel is no different from any commercial reactor spent fuel (and some of us have participated in the irradiation of MOX fuel assemblies in licensed commercial reactors in the U. S.) any decision on future reprocessing of spent fuel, regardless of whether plutonium atoms in it came from excess weapons material or not, has no place in this EIS. And therefore any decisions about processes to be used for disposition of excess weapons material cannot have any bearing on future decisions by the United States about reprocessing of any commercial spent fuel.

Our letter asked that this be made clear. DOE's response (Letter from Greg Rudy, Acting director, Office of Fissile Materials Disposition to John Graham, President ANS, Sept. 8, 1995 - copy attached) says:
"... any subsequent reprocessing and extraction of plutonium from that spent fuel is beyond the scope of the PEIS and the fundamental nonproliferation purpose of this report."

1/01.02.00

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AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
PAGE 2 OF 7

We fully agree. We expected to find this statement explicitly made in the PEIS. We have not found it. It belongs in the "SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT" section on Page S-4 of the SUMMARY of the EIS draft dated February 1996.

We have not found this statement in the PEIS, although we must admit that, in light of the volume of the report, we might have missed it. In any event, it belongs in a very visible place in the SUMMARY. We believe that failure to include this statement in a visible place in the SUMMARY may result in misreading and abuse of the document. This was one of the key points of our earlier comments.

We see no reason why this statement, a statement made very explicitly in Mr. Rudy's letter, should not be clearly made. We are counting on you to see that this is done.

It may sound like an item of limited interest at this time. We do not believe this to be the case. In any event, we do not feel that the Department has any reason for anything less than a full and complete response to our request.

Should the Department fail differently, we urge you to contact us at once.

If the Final EIS is published without clarifying this issue, in a manner as clear as we have suggested above, a clear basis will exist for a court challenge to the EIS, which a court might find would require a reprinting and redistributing of the entire EIS. This would be a waste of Federal funds which we would be disappointed to see.

We thank you for your attention to this matter.

Sincerely,



The American Nuclear Society Past-Presidents Council

(Signatures appear on the last page of the enclosed letter dated August 10, 1995.)

1/01.02.00
cont.

M-077



Department of Energy
Washington, DC 20585
September 8, 1993

Mr. John Graham
President
American Nuclear Society
555 North Kensington Avenue
La Grange Park, IL 60136

Dear Mr. Graham:

Thank you for your letter to Secretary O'Leary dated August 10, 1995, and its enclosed letter from just the president of the American Nuclear Society (ANS) regarding the Implementation Plan for the Department's Programmable Environmental Impact Statement (PEIS) on nuclear plutonium disposition. I have been asked to respond to your letter because, as the Acting Director of the Office of Plutonium Materials Disposition, I am responsible for the PEIS.

In their letter, the past ANS presidents raise the concern that "the implementation plan systematically eliminates from debate every option that hinders any future possibility of reprocessing of spent nuclear fuel." The letter requests that the pros and cons of options not reprocessing be discussed in the FEIS.

[illegible]

While the PERS will decrease the generation of spent fuel as an indirect result of potential disposition decisions, any subsequent reprocessing and extraction of plutonium from that spent fuel is beyond the scope of the PERS and the fundamental reexamination phases of the disposition effort. The fact that the PERS will crystallize disposition of existing weapons plutonium through use is a mixed oxide fuel, but will not further enhance reprocessing of the spent fuel, will not facilitate policy or technology options, and will not facilitate future decisions regarding the management or disposition of the spent fuel.

I hope this response has helped to better explain the Department's perspective and our intended path forward for the PDS on the consideration of minor versus substantial violations.

Summary:

Gary Rudy
Acting Director
Office of Pesticide Materials Division

 Please visit our website at www.mcgraw-hill.com

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AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
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AMERICAN NUCLEAR SOCIETY

353 North Kensington Avenue
La Grange Park, Illinois
60526 USA
Tel: 708/353-6411
E-Mail: ANS@ANS.org
Fax: 708/353-6499

August 10, 1995

The Honorable Hazel O'Leary
Secretary
US Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Re: Plutonium Disposition PEIS
Implementation Plan

Dear Secretary O'Leary,

In March 1995, the Department of Energy issued an Implementation Plan for work to develop the Programmatic Environmental Impact Statement for the Storage and Disposition of Excess Weapons Material. Copies of this Implementation Plan reached some American Nuclear Society (ANS) members in late May.

At the 1995 Annual Meeting of the ANS in June in Philadelphia, Pennsylvania, this Implementation Plan was discussed by members who expressed concern with the way in which the screening process was used to exclude valid options which include the reprocessing of spent fuel.

A number of Past Presidents of the Society were concerned enough to draft the attached letter to you on this subject.

I am pleased to submit the enclosed letter, signed by 19 of the ANS Past Presidents, to you. Although no formal action was taken, we do want to express the views of the entire membership of this Society. It is our hope that the concerns expressed by our Past Presidents are shared by current ANS Officers and the overwhelming majority of members.

Since most of the names of the Past Presidents are familiar to DOE, their affiliations are not indicated. However, a biographical information on any or all of them is desired, do not hesitate to contact ANS Executive Director James G. Toomey at ANS Headquarters.

Sincerely,

John Graham

Enclosure: Statement of ANS Past Presidents

- cc Mr. Greg Rudy, DOE
Senator Frank Lautenberg
Honorable Warren Christopher, Secretary of State
Honorable William Perry, Secretary of Defense
ANS Officers
ANS Past Presidents
Mr. Patrick Murphy, ANS Washington Representative

Letter to the Administrator, Implementation and regulation of nuclear safety and technology in light of history
ANS, Inc.
ANS 1, Tenthredin Point, Suite 100
Englewood, CO 80111 USA
Tel: 303/494-0700
E-Mail: Tenthredin@ans.org
Fax: 303/494-0610

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AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
PAGE 5 OF 7



AMERICAN NUCLEAR SOCIETY

555 North Kensington Avenue
La Grange Park, Illinois
60526 USA
Tel: 708/353-6801
E-Mail: ANS@AUNS.org
Fax: 708/353-4999

August 10, 1995

The Honorable Hazel O'Leary
Secretary
US Department of Energy
Washington, DC 20585

Re: Plutonium Disposition PDS
Implementation Plan

Dear Secretary O'Leary:

We have reviewed the Plutonium Disposition PDS Implementation Plan (IP) dated March 1995. We realize that this effort has been in progress for almost two years and that work on the PDS has already proceeded based on the IP. We would like to express our appreciation for the work that has been done. The IP is a good starting point for the development of a Programmatic Environmental Impact Statement on the Long-Term Storage and Disposition of Weapons-Usable Fissile Materials (PDS). This Implementation Plan does not do so. We will explain why below.

This IP systematically eliminates from debate every option that involves any future possibility of reprocessing of spent nuclear fuel. In so doing, it eliminates the opportunity for the public even to hear about options that may be shown to be highly desirable from a technical, economic, and environmental perspective. The IP also eliminates the possibility of a reasoned and open debate on the merits of different options. The reason offered could, at best, be applied blindly in the future decision-making on nuclear power fuel cycles. This risk, we believe, would be both serious and improper.

We recognize that there are people who believe the opposite, but the analyses that have been presented to support their views have not been convincing. In any case, there is no valid reason to prevent those arguments, pro and con, from being fairly and openly aired in this PDS. In fact, based on the history of the Environmental Policy Act, analysis of real options would be required.

Although decisions are offered to say that the PDS relies only to assess weapons-related DOE has chosen to not include analysis of reprocessing of spent nuclear fuel. By systematically eliminating reprocessing from the PDS, DOE has chosen to not include analysis of reprocessing from all future nuclear fuel cycle decisions. The IP says that this is not the case, and that the PDS does not apply to commercial fuel cycles. But the reasons for these systematic exclusions are in themselves weak. Not considering these options in the PDS could well give the public a seriously incomplete picture.

The options that would allow reprocessing have been eliminated from discussion by the use of "scoping criteria." Many persons, including some of us, provided input during the comment period on the PDS. We would like to see the DOE's response to our comments and the DOE's response to the other comments. Despite our comments, DOE has decided to preclude a full and fair consideration of alternatives.

Letter to the Department, Secretaries and Assistant Secretaries of the Department of Energy

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AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
PAGE 6 OF 7

August 10, 1995

Page 2

We are all very familiar with the EIS process. We all recall decisions that went as high as the Supreme Court with regard to what had to be included in an EIS in order to make it a valid part of the process. With this in mind, we offer the following for your consideration:

1. One cannot legally screen out a particular process on the grounds of "lack of technical maturity" when it is or has been in actual operation, and in some cases is in full commercial operation.
2. One cannot legally screen out a particular process on the basis of "technodiversion" when processes (actually based on technology developed in the US) are in commercial operation in two countries with fully adequate and demonstrated resistance to theft and diversion.
3. One cannot legally screen out an option on the basis of a so-called "policy" of prohibiting reprocessing when such Presidential policy has not been subjected to public debate, when it is repealed for five years, then rescinded for 12 years, and then stated again in late 1993 as a policy rather than a national policy. Such a so-called policy itself cries out for open public discussion.

Considering DOE's policy of openness that you have declared, the lack of disallowing technologically viable options by screening them out of a programmatic environmental assessment in advance, without a sound and compelling basis, should be repugnant to you.

Each of us has agreed to be available to you and your staff to discuss this matter. However, we urge you to act promptly to withdraw this IP. In its present form, we find it hard to imagine that either it, or more importantly a PEIS based on it, would survive a court test, in light of the extensive legal history that has been developed over the past 25 years.

Sincerely,

Past Presidents of the American Nuclear Society
(signatures appear on the following page)

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AMERICAN NUCLEAR SOCIETY PAST-PRESIDENTS COUNCIL,
A. DAVID ROSSIN
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SIGNED BY THESE MEMBERS OF THE ANS PAST-PRESIDENTS COUNCIL:

Manson Benedict
Mr. Vincent S. Boyer
Dr. Karl P. Cohen

Ed Fuller
Joseph W. Hendrix
Dr. Joseph M. Hendrie
Dr. William R. Kinnel

Harry Lawinski
Milton Levinson
Dr. Harry Lawinski
Dr. Miles C. Leverett

James R. Schaefer
Walter B. Lowenstein
Dr. James R. Lichtenhal
Dr. Robert L. Long

W. S. D. David Rossin
Dr. A. David Rossin
Dr. M. Jack Oshman
Dr. Chauncey Starr

Alan Walter
Alvin M. Weisberg
Dr. Alan Walter
Dr. Alvin M. Weisberg

Bertram Wolfe
Dr. Bertram Wolfe

M-077

AMERICAN NUCLEAR SOCIETY, IDAHO FALLS, ID,
JOHN COMMANDER
PAGE 1 OF 1

08 03 01 **Comment Number 1**
The Department of Energy acknowledges the commentor's support for the Collocation Alternative. Decisions on storage alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 **Comment Number 2**
The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

14 00 00 **Comment Number 3**
During the screening of alternatives for inclusion in the PEIS, a Reactor-Burning concept was evaluated involving a variation of the Integral Fast Reactor concept. However, this concept, which would use a reactor fuel cycle design still requiring development, would be more costly and require a longer timeframe than other mature reactor options. The development program was terminated by the Administration and Congressional action. Since Pu disposition can be accomplished using existing technologies, this advanced technology for Pu disposition is less reasonable than other Reactor Alternatives for Pu disposition.

INMS Statement Re: Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement
My name is John Commander. I am Vice-Chair of the Idaho Section of the American Nuclear Society, and represent some 900 members located predominantly in Southeast Idaho. On behalf of the section, I would like to make a statement concerning the Storage and Disposition of Weapons Usable Fissile Materials Draft Programmatic Environmental Impact Statement.
We believe that all of the long term storage options are acceptable from the standpoint of safety and environmental impact; however, the option for the Collocation of the Plutonium and Highly Enriched Uranium receives our support as the most favorable alternative. We also believe that any of the long term storage sites proposed could be designed to be acceptable.
We believe that the Plutonium Disposition Alternatives which involve disposal with out utilization as fuel for use in reactors are unacceptable. We support the recommendations contained in the ARES report on the Reactor-Burning concept, dated August 1993, and the recommendations contained in the ARES report on the Integral Fast Reactor, dated August 1993. This report recommended implementation of the reactor irradiation option for disposal of surplus weapons-usable plutonium.
The Special Panel Report also recommended continuation of development work on the Reactor-Burning concept. We support this recommendation. We also support the proliferation-resistant fuel cycle. We strongly support this recommendation also.

John Commander
John Commander

170 Fieldstream Lane
Idaho Falls, ID. 83404

ID-004

AMERICAN NUCLEAR SOCIETY Position Paper Abstract - Disposition of Plutonium	
Short-Term: Surplus Weapons Plutonium	
1. We strongly support conversion of all plutonium released from weapons stocks to a form in which it is protected from theft or seizure by intense radiactivity (the "spent fuel standard"). Place immediate emphasis on protecting stocks as securely as when they were active weapons. We urge that higher priority and attention be devoted to assuring that this standard is being met.	1/01.02.00
2. We recommend prompt implementation of the reactor irradiation option for disposition of surplus U.S. and Russian weapons plutonium, employing available reactors in the United States and Russia, or in third countries.	2/06.00.09
3. The time schedule for both initiation and completion of conversion should be shortened.	3/07.01.00
4. All released plutonium in the United States and Russia should be placed under international safeguards as early as possible.	
Longer-Term: Civil Plutonium	
5. Energy demand, especially for electric power, is increasing steadily in the developing countries. We cannot and should not wish these countries to forgo the benefits of abundant energy that the industrial world has enjoyed for so long.	4/01.03.00
6. The use of nuclear energy will take place primarily in industrialized countries, making fossil fuel resources more accessible and affordable for use in the developing world.	
7. Current proven reserves of reasonably priced uranium are insufficient to support a long-term, major contribution of nuclear energy to meeting world energy demand. Breeder reactors can overcome this limitation.	5/14.00.00
8. The issue of the proper level and structure of development on the breeder and other advanced reactor systems calls for further assessment. We urge that this be undertaken.	6/12.01.00
9. The recent U.S. decision to stop all development work on reprocessing and the breeder should be reversed.	4/01.03.00 cont.
10. The development of permanent waste repositories is essential, since these will be needed for either spent fuel or fission product waste disposal.	7/13.00.00
11. We see no need for international uniformity in selection of fuel cycle options.	4/01.03.00 cont.
12. The IAEA should place increased emphasis on containment and surveillance and other nonaccountancy safeguards measures.	
13. The IAEA should be called on to review the adequacy of national measures for protection of nuclear materials against subnational threats.	
14. It is essential that the IAEA be assured of the financial, technical and manpower resources and the political support necessary to carry out its increasingly vital tasks.	
	WA-021

01 02 00	Comment noted.	Comment Number 1
06 00 09	Comment noted. However, disposition of foreign weapons-usable materials is beyond the scope of this PEIS.	Comment Number 2
07 01 00	Comment noted.	Comment Number 3
01 03 00	Comment noted.	Comment Number 4
14 00 00	Liquid metal breeder reactors were not considered reasonable alternatives for Pu disposition in the PEIS since more time and greater cost would be incurred to complete construction than with LWRs. While the PEIS discusses the generation of spent fuel as an indirect result of potential disposition actions, there would not be any subsequent reprocessing and extraction of Pu from that spent fuel. The U.S. policy concerning reprocessing is beyond the scope of the PEIS and the fundamental nonproliferation purpose of the disposition effort. The President's Nonproliferation Policy says the United States will not recycle Pu. Burning weapons Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.	Comment Number 5
12 01 00	Comment noted. Site characterization is currently being performed for a geologic repository in accordance with the NWPA, and further environmental analyses will be performed as necessary.	Comment Number 6

13 00 00

Comment Number 7

Comment noted. The emphasis that IAEA places on various safeguards measures is not a part of this environmental analysis. IAEA inspectability is considered in the technical and nonproliferation analysis and will be integrated into DOE's decisionmaking process.

J. David Moulton, Director
NEPA Compliance & Outreach
U.S. Department of Energy
Office of Fissile Materials Disposition, MD-4
Forrestal Building
1000 Independence Ave., S.W.
Washington, D.C. 20385

Dear Mr. Moulton,

The following comments are in response to the draft Programmatic
Environmental Impact Statement on the Storage and Disposition of Weapons-Usable
Fissile Material.

At the present time, the No Action Alternative appears to be the logical and
reasonable choice. As is pointed out in the FEIS, the No Action Alternative
would have no or negligible adverse impacts to land resources, site
infrastructure, air quality, and geology and soils at all of the DOE sites under
consideration.

Other alternatives, especially in this time of existing federal budgetary
problems, involve large expenditures of money and energy resources for the
construction of new facilities (e.g., a vitrification facility, or a ceramic
immobilization facility, or a MOX fuel fabrication facility) or the deep
borehole concept. Also, all of the other alternatives involve excessive
intersite transportation of nuclear materials between the source and the
processing facilities and the final destination.

Although permission has apparently not been granted by the Canadian
government, transportation of the MOX fuel to the Ontario Hydro Nuclear Bruce-A
Generating Station in Ontario appears to be a poor idea. As is pointed out in
the draft FEIS: "Potential adverse intersite transportation impacts related to
the transportation of MOX fuel could occur because of the increased risk of
traffic accident fatalities."

Obviously, there is no perfect answer to the horrendous problem of dealing
with this nuclear fissile material. We have created this problem without ever
having given serious consideration to that day in the future when we would need
to make some effort to face the reality of disposing of this weapons-usable
fissile material with the minimal adverse affect on the people and the
environment.

Sincerely,

Amy Louise Anderson
Amy Louise Anderson

M-252

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for the
No Action Alternative for long-term storage and disposition of fissile
materials. Decisions on storage and disposition of weapons-usable fissile
materials will be based upon environmental analyses, technical and economic
studies, national policy considerations, and public input.

08 03 01

Comment Number 2

The Department of Energy acknowledges the commentor's opposition to the
use of the CANDU Reactor Alternative for the disposition of Pu. Decisions
on disposition of weapons-usable fissile materials will be based upon
environmental analyses, technical and economic studies, national policy
considerations, and public input. This will include an appropriate level of
analysis concerning the CANDU Reactor Alternative. In addition, according
to the Canadian Government, implementation of the CANDU Reactor
Alternative would be subject to Canadian Federal and Provincial policies and
regulations and require health, safety, and environmental assessments before
issuance of a Canadian license. (See the letter from the Canadian Embassy in
Washington, DC, dated June 6, 1996, reproduced in this CRD.)

1/08.03.01

2/08.03.01

ANDERSON, MRS. GABE, JR., AMARILLO, TX
PAGE 1 OF 1

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Mr. Gabe Anderson Jr.
1000 1st St. N.
Amarillo, Texas 79118

April 26, 1996

Dear Sir -
Our family strongly
oppose to any Government plan
to turn Pantex into a permanent
waste facility.

We fear for our people & our
farmland. We are a hill country
area & we are afraid of pollution -
We don't want to have Pantex being
polluted another facility with
an Rocky Flats.

Many of our people feel the same
way in this. Please be aware of
our concerns. Mrs. Gabe Anderson
Amarillo, TX.

1/08.03.01

M-203

J. David Hulton, Director
NEPA Compliance & Outreach
U.S. Department of Energy
Office of Fissile Materials Disposition, MD-4
Forrestal Building
1000 Independence Ave., S.W.
Washington, D.C. 20585

3819 Devonshire Avenue
Kalamazoo MI 49006-2703
Friday, 31 May 1996

Dear Mr. Hulton,

The following comments are in response to the draft Programmatic
Environmental Impact Statement on the Storage and Disposition of Weapons-Usable
Fissile Materials:

At the present time, the Mo Action Alternative appears to be the logical and
reasonable choice. As is pointed out in the FEIS, the Mo Action Alternative
would have no or negligible adverse impacts to land resources, site
infrastructure, air quality, and geology and soils at all of the DOE sites under
consideration.

Other alternatives, especially in this time of existing federal budgetary
problems, involve large expenditures of money and energy resources for the
construction of new facilities (e.g. a vitrification facility, or a ceramic
immobilization facility, or a MOX fuel fabrication facility) or the deep
burial concept. Also, all of the other alternatives involve excessive
interstate transportation of nuclear materials between the source and the
processing facilities and the final destination.

Although permission has apparently not been granted by the Canadian
government, transportation of the MOX fuel to the Ontario Hydro Nuclear Bruce-A
Generating Station in Ontario appears to be a poor idea. As is pointed out in
the draft FEIS: "Potential adverse interstate transportation impacts related to
the transportation of MOX fuel could occur because of the increased risk of
traffic accident fatalities."

Obviously, there is no perfect answer to the horrendous problem of dealing
with this nuclear fissile material. We have created this problem without ever
having given serious consideration to that day in the future when we would need
to make some effort to face the reality of disposing of this weapons-usable
fissile material with the minimal adverse effect on the people and the
environment.

Sincerely,

Robert C. Anderson

Robert C. Anderson

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for the
No Action Alternative for long-term storage and disposition of weapons-
usable fissile materials. Decisions on storage and disposition of weapons-
usable fissile materials will be based upon environmental analyses, technical
and economic studies, national policy considerations, and public input.

08 03 01

Comment Number 2

The Department of Energy acknowledges the commentor's opposition to the
use of the CANDU Reactor Alternative for the disposition of Pu. Decisions
on disposition of weapons-usable fissile materials will be based upon
environmental analyses, technical and economic studies, national policy
considerations, and public input. This will include an appropriate level of
analysis concerning the CANDU Reactor Alternative. In addition, according
to the Canadian Government, implementation of the CANDU Reactor
Alternative would be subject to Canadian Federal and Provincial policies and
regulations and require health, safety, and environmental assessments before
issuance of a Canadian license. (See the letter from the Canadian Embassy in
Washington, DC, dated June 6, 1996, reproduced in this CRD.)

1/08.03.01

2/08.03.01

M-253

APPALACHIAN PROPERTIES,
NATHAN COGGINS
PAGE 1 OF 1

15 00 00 Comment Number 1
Blending is not within the scope of the PEIS.

APPALACHIAN PROPERTIES
(615) 783-8800
(615) 783-8870 fax

ATTENTION: DOZ
FROM: Nathan Coggins

DATE: 3/11/96

of pages: 1

Please call if total transmission was not received

Dear Doe:
You may wish to consider a work shop on a field office
near the blending sites. We live near Erwin and would like to attend
and have input as to the safety of our community.
Thank you

1/15.00.00

F-002

ARNOLD, ED, DECATUR, GA
PAGE 1 OF 2

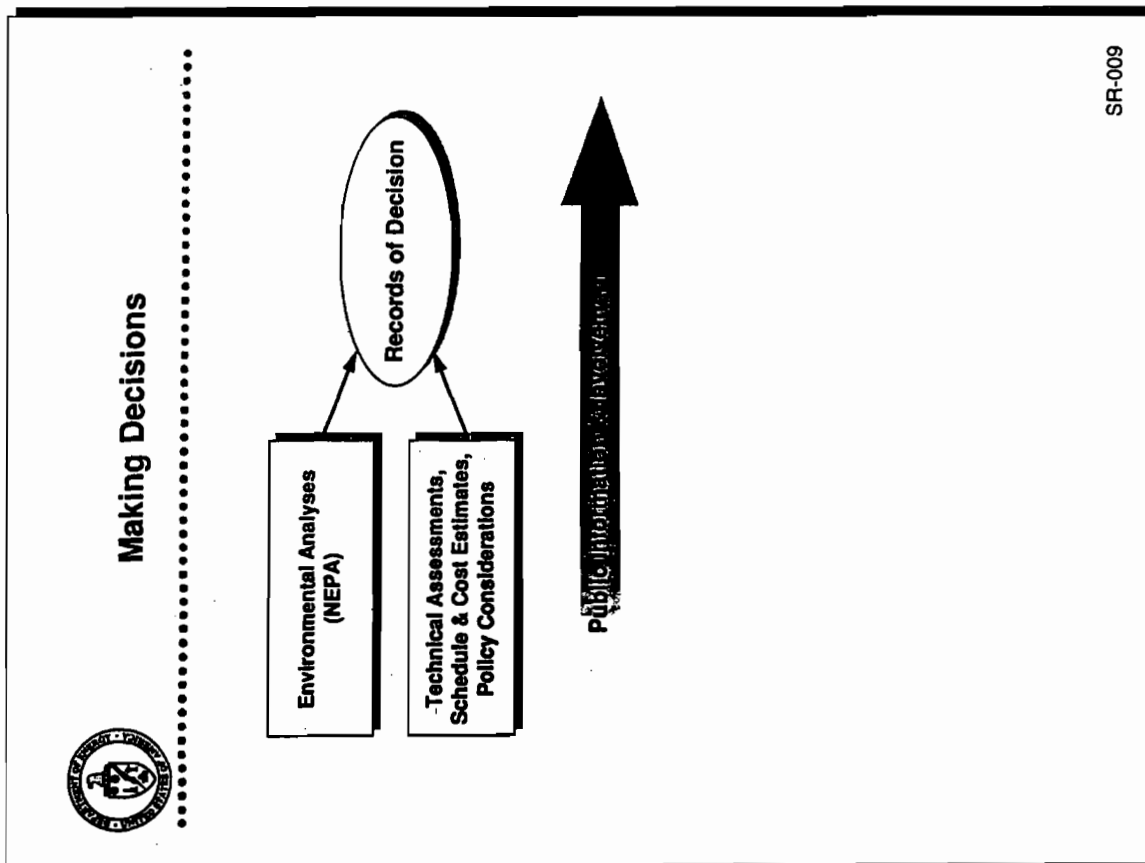
08 03 00 Comment Number 1

Public information and involvement intersect with the ROD since all public comments on the Draft PEIS are available to the decisionmaker at the time the decision is made.

 Comment Form This comment applies to the Draft Environmental Impact Statement (EIS) for the proposed construction and operation of a new nuclear power plant at the site of the existing plant, located in the County of DeKalb, Georgia. United States Department of Energy	NAME: (Optional) <u>Ed Arnold</u> ADDRESS: <u>2352 Forest Creek Rd. Decatur, GA 30034</u> TELEPHONE: () - -
	<u>See Attached graphic representing</u> <u>"Making Decision"</u> <u>"Public Information & Involvement"</u> <u>overlaid with "Knowledge of Decision"</u> <u>What really happens?</u>

1/08.03.00

SR-009



ARNOLD, MARVIN, AMARILLO, TX
PAGE 1 OF 1

U.S. Department of Energy
Office of Reconfiguration
P O Box 3417
Alexandria, VA 22302

U.S. Department of Energy
Office of Fissile Materials
P O Box 23786
Washington, DC 20026

Comments on Stockpile Stewardship and Management (SSM) PEIS: I support the selection of Pantex for weapons assembly and disassembly functions. I strongly support the continuation of high explosives functions at Pantex and oppose any plan to move these functions to the national labs. Since Pantex is the most cost-effective DOE facility and enjoys the strongest local support, I also support the addition of other environmentally sound stewardship and management functions at Pantex.

Do Not
I also believe that the plutonium should be moved to a more secure location. I believe that Pantex should be chosen as the location for fissile materials storage and disposition functions. Pantex already stores surplus plutonium, and has the needed safety and security capabilities to cost-effectively accommodate an expanded role. Fair budgetary comparisons, strong local support, and national security concerns, should lead DOE to choose Pantex for new fissile material storage and disposition functions that are conducted in a safe and environmentally sound fashion.

Name: Marvin Arnold Address: Amarillo TX

1/08.03.01

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

PC-003

B. R. BARFIELD CO. INC., AMARILLO, TX,
B. R. BARFIELD
PAGE 1 OF 1

THE B. R. BARFIELD CO.
1400 BARFIELD ST.
P.O. Box 9110 Amarillo, Texas 79101 (806) 376-5588
April 10, 1996

U. S. Department of Energy
Office of Reconfiguration
P. O. Box 3417
Alexandria, Virginia 22302
U. S. Department of Energy
Office of Fissile Materials
P. O. Box 23786
Washington, DC 20026

Over one hundred years ago, my great-grandparents came to Amarillo. My grandfather was the first president of the Amarillo Board of Trade (predecessor of the Amarillo Chamber of Commerce) in 1906, my father was on the board of the Chamber in the 1930s, and I served as president of the organization in 1961. With deep roots and a large investment in Amarillo, involvement and a strong interest in community affairs has always been a commitment.

I respectfully urge DOE to designate Pantex as the preferred alternative for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions.

Sincerely yours,

B. R. Barfield

1/08.03.01

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Continuing a Tradition of Service Since 1889

M-038

BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 1 OF 11



BNFL Inc.
1776 1st Street NW, Suite 750
Washington D.C. 20006-3700
Tel: (202) 785-2635
Fax: (202) 785-4037

May 6, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Re: Draft FEIS in Storage and Disposition of Excess Weapons-Usable Fissile Materials

Dear Sirs:

On behalf of BNFL, I am pleased to submit the attached comments and documents in reference to the Department's Draft Programmatic Environmental Impact Statement on Storage and Disposition of Excess Weapons-Usable Fissile Materials.

In addition to the enclosed information, BNFL would be willing to provide additional material in support of the final FEIS if the Department requests such information, and if the information is already in the public domain. BNFL has over 30 years experience in the fabrication, storage, handling, and transport of plutonium products, and in the manufacture of mixed oxide fuel. That experience, and the environmental impacts of those activities, are well documented and would be relevant to the Department's present undertaking.

I thank you for the opportunity to provide input to this very important process.

Yours truly,

A handwritten signature in cursive script that reads "Marilyn F. Meigs".

Marilyn F. Meigs
Vice President

M-218

BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 2 OF 11

Attachments:

1. BNFL Statement for the Record
2. Basis for Economics and Waste Data
3. "Disposition of Weapons Plutonium: Reuse or Vitrify?", M. Meigs, USCEA Fuel Cycle Conference, Boston, March, 1994.
4. "Licensing of the Sellafield MOX Plant", A.J. Tilstone and R.J. Page, BNFL plc.
5. "Environmental Statement for the Proposed Sellafield MOX Plant", BNFL plc, October, 1993.
6. "Effective Nuclear Materials Control and Accountability for Commercial Mixed Oxide Fuel Fabrications Plants in the United Kingdom", B.A. Burrows and D. S. Macphie, BNFL plc, and G. P. Snape, AEA Technology, IAEA-SM-333/12.
7. "MOX Technology - An Effective Way to Reduce Plutonium Stockpiles", D.S. Macphie, B.C. Hexter, and M.P. Young, March, 1996.

M-218

BNFL Statement for the Record on draft PEIS, Storage and Disposition of US Excess Weapons Plutonium	
- As a world leader in the handling, treating, processing, storing, and transporting of commercial-grade plutonium products, including Mixed Oxide (MOX) fuel, BNFL is pleased to provide input into the DOE draft PEIS on Storage and Disposition of Excess Weapons-Grade Pu. - With respect to either storage or final disposition of excess weapons plutonium, it is in the US best interests to utilize existing, proven technologies, where available, instead of embarking on long, uncertain, and oftentimes wasteful pursuits of alternatives that might look good in theory, but may never prove out in practice. - Thus, with respect to storage of plutonium, whether consolidated or not, DOE could avoid costly delays by utilizing designs that are already in use in Western Europe and approved by the appropriate regulatory bodies and by the International Atomic Energy Agency. In view of the urgency of providing safe packaging and storage of these plutonium materials, as identified by the Defense Nuclear Facility Safety Board's recommendations in 94-1, the US cannot afford to waste time and money "reinventing the wheel", and is better off pursuing a cookie-cutter approach in this instance. - With respect to disposition of plutonium, BNFL has engineering, manufacturing, safety, licensing, and environmental experience in MOX fuel fabrication and handling that is directly applicable to the draft PEIS. For the record, some of this documentation is offered to DOE at this time, including design and safety cases for the BNFL Sellafield MOX plant, licensing experience, and BNFL's nuclear materials control and accountability approach. BNFL is willing to make available any other non-proprietary data that would be useful to the finalization of the PEIS document and other DOE documents that will provide the basis for a Record of Decision on Pu disposition. - While US experience in the manufacture and use of MOX fuel was prematurely terminated in the 70s, experience in Western Europe has continued to mature over the last 30 years to the point where, today, it is a fully developed and deployed industry that the US can look to with confidence for information and assistance in the deployment of a similar MOX program in the US for once-through burning of excess weapons plutonium. - In contrast, very little is known about the immobilization of plutonium in glass or ceramic, let alone the impact of the deep borehole burial option, and therefore one has to assume great uncertainties, requiring extensive research and development, with little assurance of success.	
	1/01.01.00
	2/01.02.00
	3/06.01.01
	4/08.03.01

M-218

01 01 00 Comment Number 1

Comment noted.

01 02 00 Comment Number 2

Comment noted. DOE appreciates the useful information provided.

06 01 01 Comment Number 3

Comment noted.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's opposition to the disposition alternatives. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 4 OF 11

Even if immobilization technologies were fully understood and the environmental and cost impacts were similar to that of MOX use, one cannot complete the comparison of options without including the huge energy and environmental "offset" values of the MOX option, which I will summarize here (see attached background information on these calculations): Energy Value. Assuming that all 38 MT of excess weapons-grade Pu were manufactured into MOX fuel, this would give rise to new fuel worth 1.6 - 2.1 Billion dollars, and would produce approximately 45 GW years of electricity worth approximately \$12 billion in revenues! Waste generated. Since MOX fuel displaces uranium fuel that would otherwise have to be obtained by mining, milling, and enriching uranium, one has to consider the wastes that the vitrification option would generate because of the need for new uranium fuel. Thus, vitrifying 38 MT of Pu would not only generate additional repository waste volumes in the form of approximately 320 cu. meters of extra HLW glass, the vitrification of this Pu would result in 5.3 million additional cu. meters of mill tailings and 3900 cu. meters of enrichment tails caused by the mining of uranium to displace the plutonium as new reactor fuel!	5/09.00.08	09 00 08 Comment Number 5 The scope of this PEIS is not intended to provide an analysis of the benefits and impacts of generating energy as a consequence of burning MOX in a reactor. Its intent is solely to analyze the environmental and socioeconomic impacts of the disposition of weapons-usable fissile materials through reactor burning. The PEIS compares the amount of waste generated from burning MOX in a reactor to the amount of waste generated from mining, milling, and enriching uranium for a similar amount of reactor fuel.
BNFL's experience in transporting plutonium products, including MOX fuel, should give the US ample data base to conclude that transportation of MOX can be done safely. Thus, even the option of European manufacture of MOX fuel, requiring trans-Atlantic shipments of materials, can be viewed as environmentally sound and more than adequately safe for serious consideration under this PEIS.	6/08.03.01	08 03 01 Comment Number 6 The Department of Energy acknowledges the commentor's support for the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.
Special weight should be given to options that enable rapid implementation and encourage similar actions within the Former Soviet Union. After all, the real threat of this material is not the inventory stored here in the US, but the inventory that exists in Russia. The sooner we get on with a disposition path here that is compatible with Russian methods of disposal, the more likely Russia will proceed with its own disposition. It is no secret to everyone in this room that the Former Soviet Union views its excess weapons plutonium as an asset that should be utilized as MOX fuel! A similar program in the US would provide impetus to both countries.	7/01.03.00	01 03 00 Comment Number 7 Comment noted.
Special weight should be given to the ability to rapidly deploy the option under question. The only option that could be implemented in any reasonable timeframe, without the need for endless R&D, is the MOX option. BNFL, for one, is prepared and capable of implementing a US MOX program from the day the ROD is announced! BNFL would be prepared to commit its existing manufacturing facilities to the early production of Lead Test Assemblies, followed by the manufacture of initial core loads utilizing any available excess capacity at its plants in Sellafield. BNFL has also stated, in its Expression of Interest to DOE in February of this year, that it would be prepared to construct a new facility as a privatized venture on US soil, for continued manufacture of MOX fuel to serve the US Pu Disposition program until its completion.	8/06.01.08	06 01 08 Comment Number 8 Comment noted.

M-218

**BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 5 OF 11**

- To summarize, the Western European's extensive experience in MOX fuel provides overwhelming evidence that the MOX options under consideration in the draft FEIS are superior to the other options, not only in terms of environmental, health, and safety aspects, but also in terms of cost/benefit, ability for rapid deployment, and compatibility with the Former Soviet Union's objectives.

6/08.03.01
conf.

M-218

BASIS FOR ECONOMIC AND WASTE DATA

ECONOMICS

1) Value of MOX fuel:

Based on ave. U fuel cost of \$1.5M/T HM

$$38T \text{ Pu} \times 1T \text{ fuel} \times \$1.5M = \$1.62B$$

0.035TPu THM

(higher value if U costs go up)

2) Recoveries:

$$38TPu \times 1T \text{ fuel} = 1086 T \text{ fuel}$$

0.035TPu

$$1086T \text{ fuel} \times 440Wd \times 35\% \text{ efficiency} \times 3T = 450Wym.$$

365d

$$45 \text{ GW yrs} \times \$0.07 = \$32B$$

kWh

WASTE GENERATION

1) GLASS LOGS: (assumes 5% incorporation into glass)

$$38T \text{ Pu} \times 1T \text{ glass} \times 120cu.in. = 322cu.in. glass$$

0.05TPu 0.4T

2) MILL TAILINGS

$$38T \text{ Pu} \times 1T \text{ fuel} = 1086 T \text{ fuel}$$

0.035TPu

For an equivalent U fuel, 3.7% enrichment at 0.25% tails, feed factor is 7.5
Therefore, 1T fuel needs 7.5 TU = 8.84T as U308 ore

Assuming density of 1.8g and an ore grade of 0.1%,
cu3

$$1086 T \text{ fuel} \times 8.84T \text{ ore} \times cu3 = 5.3Mcu. miller mill tailings$$

T fuel 1.8g

3) ENRICHMENT TAILS

Feed factor of 7.5 gives 1T prod and 6.5 T tails

Therefore, 1086T fuel gives (1086 x 6.5) = 7059T enrichment tails

$$7059T \times 1cu3 = 3900 cu. miller enrichment tails$$

1.8g

**BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 7 OF 11**

**DISPOSITION OF WEAPONS PLUTONIUM:
REUSE OR VITRIFY?**

M. Meigs, BNFL Inc.

**USCEA FUEL CYCLE CONFERENCE
BOSTON, MARCH 1994**

M-218

BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 8 OF 11

Licensing of the Sellafield MOX Plant

A.J. Tilstone
R.J. Page

British Nuclear Fuels plc
Risley, Warrington, WA3 6AS

M-218

**BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 9 OF 11**

ENVIRONMENTAL STATEMENT

**for the proposed
Sellafield MOX Plant**

British Nuclear Fuels plc

M-218

BNFL, INC., WASHINGTON, DC,
MARILYN F. MEIGS
PAGE 10 OF 11

**EFFECTIVE NUCLEAR MATERIALS CONTROL
AND ACCOUNTANCY FOR COMMERCIAL
MIXED OXIDE FUEL FABRICATION PLANTS
IN THE UNITED KINGDOM**

B.A. BURROWS, D.S. MACPHER
British Nuclear Fuels plc,
Risley, Warrington, Cheshire

G.P. SNAPE
AEA Technology,
Windesale, Seascale, Cumbria
United Kingdom

Abstract

**EFFECTIVE NUCLEAR MATERIALS CONTROL AND ACCOUNTANCY FOR
COMMERCIAL MIXED OXIDE FUEL FABRICATION PLANTS IN THE UNITED
KINGDOM.**

A mixed oxide (MOX) fuel demonstration facility (MDF), constructed under a joint project between British Nuclear Fuels plc (BNFL) and AEA Technology, is now operating satisfactorily; qualification programmes are complete and production is under way. BNFL now intends to build a full size production plant called the Sellafield MOX Plant (SMP). Achieving effective and efficient nuclear materials control and accountancy (NMCA) has been an important consideration during the formulation of these projects and throughout the detailed design work. The goal is to achieve the highest NMCA and safeguards credentials in a flexible and highly commercial manufacturing environment.

1. INTRODUCTION

The production of mixed oxide (MOX) fuel is not a new process; many tonnes of MOX have been safely and successfully loaded into reactors around the world. The construction of MOX plants at Sellafield to handle recycled plutonium, coupled with the capability of BNFL's Oxide Fuel Complex (OFC) to process recycled uranium, effectively closes the fuel cycle. Such facilities are important elements of a responsible fuel management strategy and serve the needs of customers who express a wish to utilize their valuable fissile materials recovered from reprocessing.

M-218

MOX TECHNOLOGY - AN EFFECTIVE WAY TO REDUCE PLUTONIUM STOCKPILES

Douglas S. Marple
General Manager Projects
BNFL Engineering Ltd
Salford Quays
MANCHESTER M5 2SP
United Kingdom
(+44) 161-952 6000

Brian C. Hester
General Manager Engineering Business
BNFL Engineering Ltd
Salford Quays
MANCHESTER M5 2SP
United Kingdom
(+44) 161-952 6811

Malcolm P. Young
Technical Manager, SMP
BNFL Engineering Ltd
Salford Quays
MANCHESTER M5 2SP
United Kingdom
(+44) 161-952 6000

ABSTRACT

BNFL is one of only two organisations in the world to offer a full range of services in support of the nuclear fuel cycle, including fuel manufacture and spent fuel reprocessing. As a major reprocessor of spent nuclear fuel, BNFL is committed to the effective utilisation of its customers' reprocessing products. The provision of a MOX fuel fabrication facility is an essential part of this strategy.

BNFL has accumulated considerable R&D experience of MOX fuel, including flow-sheet development studies, the manufacture of fuels of different form and type, and property measurements on both irradiated and unirradiated MOX fuel. A key component of this R&D programme has been the development of a high energy milling process, known as the Short Binderless Route (SBR), which achieves extremely homogeneous MOX powder and offers a number of advantages for processing feed powders derived from weapons-grade plutonium.

BNFL Engineering Ltd. is currently installing plant and equipment in a new, commercial-scale MOX fuel fabrication facility it has designed and constructed for its parent company at the Sellafield site. The plant design incorporates 'state-of-the-art' international safeguards and material accountability provisions designed to meet IAEA and Euratom standards.

In concentrating on the design and construction of the new Sellafield MOX Plant (SMP), this paper aims to show that the utilisation of such technology can reduce plutonium stockpiles by degrading weapons-grade plutonium through fabrication of MOX fuel, with subsequent generation of electricity in thermal nuclear reactors. This paper also discusses BNFL's experience in the MOX technology arena and provides an insight into the capabilities of BNFL Engineering and its approach to major projects. In particular, it addresses the safeguards provisions appropriate to accommodate feed materials arising from nuclear weapons decommissioning programmes.

1. INTRODUCTION

Since plutonium was first separated more than 50 years ago, the element has been at the forefront of public debate. Whilst it is viewed as a dangerous and toxic material by the public at large, there is little doubt that it has the potential to provide a major source of energy to the world population providing it is carefully and effectively managed.

In order to release the potential energy from plutonium, it can be mixed with uranium to make Mixed Oxide Fuel (MOX) for use in thermal nuclear reactors in place of standard uranium fuel. The technology base for MOX utilisation spans more than 30 years. The first thermal MOX fuel was manufactured in the early 1960s and loaded into a European PWR in 1963. In 1965 MOX fuel was loaded into the Sellafield reactor in USA and in 1978 the Bessans reactor in Switzerland was loaded with its first MOX assemblies.

Over the past 17 years the use of MOX fuel in thermal reactors across Europe has grown significantly with utilities in Belgium, Switzerland, Germany and France adopting the policy to recycle the plutonium dioxide product from reprocessing. In the US, however, the use of MOX fuel stopped in the early 1980s when a national policy not to reprocess spent fuel was adopted and the Yucca Mountain storage project was formulated.



Figure 1 - The Sellafield MOX Plant under construction

BAMBERRY, ED, BLACKFOOT, ID
PAGE 1 OF 1

Comment ID: P0028
Date Received: April 18, 1996
Name: Ed Bamberry
Address: 1181 Packer Drive
Blackfoot, ID
Phone: 208-785-1623

Transcription:

I would like to comment that I am in favor of the Department of Energy processing plutonium, preferably in the reactors, and also the second I guess would be to contain the waste, any waste, in a glassified or a container for storage. Thank you for this time to let me explain my views on this. Bye.

1/08.03.01

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-028

BELISLE, MAVIS, PANHANDLE, TX
PAGE 1 OF 2

- It is my intent this evening to speak briefly
to each of the Programmatic Environmental Impact
Statements, and reserve comments on the latter
site until the Jan. public meeting.

These documents are being addressed in this
community as an economic and jobs issue. While
the local economy is undeniably important, both
of these PEIS deals deal with issues that have
national and international implications, ~~and~~ those
~~issues to be considered in that light.~~ Those
implications involve national and international
security; the involve decisions about nuclear waste
that we have been unable to make decisions
about for more than 50 years; and they involve
introducing new technologies with a wide range
of health, ~~and~~ safety and environmental risks.
They deserve to be considered in that light, read
thoughtfully and carefully, and addressed with more
than 999 rallies about jobs.

The Stoddard Stewardship and Management PEIS,
does not ~~adequately~~ make a case for
development of of more than \$2.6 billion in
new capital cost and \$2 billion in development
of a new super computer. The reliability of US nuclear
weapons has been tested over and over again.
The French just recently completed a series of tests
designed to allow them to continue nuclear weapons
development by simulated tests and computer

TX-065

BELISLE, MAVIS, PANHANDLE, TX
PAGE 2 OF 2

The proposed new facilities and we believe
they have any purpose other than continued
weapons development.
The storage and disposition options
provide us no good choices; reasonably so,
because there are none. The emphasis
on the spent fuel standard may leave us
with a false sense of security - virtually
every country which has developed nuclear
weapons has done so from spent nuclear
fuel. It may ~~prevent~~ provide some level of
security from theft by terrorists, but the nuclear
militaries of the world themselves hold
hostage each other and the non-nuclear nations.
We have for more than 50 years been
unable to resolve the issue of what is to be
done with spent nuclear fuel - producing power
or it, or other materials equally as toxic,
is more problem, not solution -

Mavis Belisle
Hill 2 Box 25
Panhandle, TX 79068
535-1715

1/01.06.00

01 06 00 Comment Number 1

Comment noted. Most weapons produced in other countries used Pu from specialized reactors, not commercial reactors. The Spent Fuel Standard provides the most rapid path for converting Pu to a much more proliferation-resistant form. While the residual Pu could be recovered through the reprocessing of this form, it would be as difficult to retrieve as the Pu from the much larger inventory of spent fuel produced over many decades of commercial reactor operation.

TX-065

BENTON COUNTY COMMISSIONER, BENTON COUNTY, WA,
SANDI STRAWN
PAGE 1 OF 2

TESTIMONY OF COMMISSIONER SANDI STRAWN BENTON COUNTY, WASHINGTON at the U.S. DEPARTMENT OF ENERGY HEARING APRIL 11, 1996 RICHLAND, WA Re: Storage and Disposition of Weapons-Usable Plutonium Materials Draft Programmatic Environmental Impact Statement Good evening. My name is Sandi Strawn and I am a Benton County Commissioner. I represent the county in which most of the Hanford Reservation is located. I am providing testimony tonight on behalf of the entire Board of Benton County Commissioners. The outbreak of peace has presented us with a decidedly better future and a significant challenge. Plutonium warheads - those very items we once felt were so necessary - now are surplus to our needs. Peace is at hand, but this country's work is not yet done. I want to offer several pieces of input to your Draft Programmatic EIS.		1/08.03.01
1. Keep moving forward. We are pleased to see the Department of Energy is taking steps to address this challenging set of issues. The Department has evaluated a host of potential approaches, and has made significant progress by developing the set of alternatives outlined in the Draft EIS. We applaud your effort to date, and encourage you to keep pressing ahead on this internationally important issue. The complexities of the problem should not be used as a reason for avoiding any action. The "No-Action" and "Long-term Storage" alternatives are neither acceptable nor effective.		2/08.03.01
2. Follow the recommendation of independent experts. The National Academy of Sciences has suggested fabrication of plutonium into reactor fuel is one of the few promising alternatives in management and disposition of fissile materials.		3/08.03.01

WA-018

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to continuing or long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's support for new missions at Hanford. Decisions on storage and disposition of weapon-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

BENTON COUNTY COMMISSIONER, BENTON COUNTY, WA,
SANDI STRAWN
PAGE 2 OF 2

4. The mixed oxide fuel approach is the least costly and quickest path.
As a representative of taxpayers, we urge you to use proven technologies whenever possible. When this is done, the costly steps of investigation and experimentation are avoided. The mixed oxide fuel approach has been proven viable in this country and others. No new technologies are needed, and parties have offered you their technologies and facilities to pursue this alternative. The mixed oxide fuel approach will allow us as a nation to take the biggest possible bite out of this problem with the least resources, and in the shortest period of time.
We urge you to move quickly to reduce the quantity of material which could find its way into irresponsible hands, and to quickly help the former Soviet states to reduce their stockpiles of nuclear material. The mixed oxide approach will provide the quickest demonstration of our seriousness, it will embrace a pathway that the Russians may emulate, and it will reduce stockpiles of materials.
These are the things we are FOR. Now let me mention one we are against.
5. Consolidation of plutonium at Hanford is not necessary.
The Draft EIS poses as an option the consolidation of all surplus plutonium materials at the Hanford Site. We strongly object to this approach. Benton County residents have been and will continue to willingly fulfill our part of the solution. We recognize our responsibilities to safety, manage, stabilize, and dispose of the substantial amount of plutonium already existing at Hanford. But, we will not become the nation's dumping ground for all plutonium scrap and mixed waste. There are already enough items on our Hanford cleanup "to-do" list. Movement of plutonium materials should only occur right before treatment.

Thank you for conducting a hearing in Richland to hear from those who are most directly affected by DOE actions. We urge you to continue forward with timely development of technically sound and fiscally responsible solutions to these very important issues.

Sandi Strawn
4/11/96

WA-018

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 5

The Department of Energy acknowledges the commentor's opposition to the Consolidation Alternative at Hanford. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

BILL WOLFE CUSTOM HOMES, AMARILLO, TX,
BILL K. WOLFE
PAGE 1 OF 2



Bill K. Wolfe
President

(806) 353-6441

4425 Tarrant Drive
Amarillo, Texas 79109

April 5, 1996

U.S. Department of Energy
Office of Reconfiguration
P O Box 3417
Alexandria, Virginia 22302

U. S. Department of Energy
Office of Fissile Materials
P O Box 23786
Washington, DC 20026

Re: Comment on Stockpile Stewardship and Management (SSM)
and Storage and Disposition (SAD) of Weapons-Usable Fissile
Materials Draft Programmatic Environmental Impact Statements
(PEISs).

Thank you for the opportunity to comment on the U. S.
Department of Energy's (DOE) Programmatic Environmental
Impact Statements (PEISs) on Stockpile Stewardship and
Management (SSM) and Storage and Disposition (SAD) of
Weapons-Usable Fissile Materials. Please also consider this
my comment on the Pantex Site-Wide Draft Environmental
Impact Statement, since most of the issues addressed in
these documents are identical.

First and foremost, I maintain that any current and future
functions at Pantex must be conducted in a safe and
environmentally sound manner. Any expansion at Pantex must
be implemented in a way that does not impair the health or
safety of area residents or have an adverse affect on the
environment.

Second, I maintain that the history of Pantex and the Texas
Panhandle communities have been one of lower cost than other
facilities, a safer and more environmentally sound operation
and of overall strong community support for the operation.

1/09.00.04

M-030

09 00 04 Comment Number 1

Potential environmental consequences of each Pantex alternative were analyzed in the PEIS. Results of these environmental analyses will be given full weight, along with other factors such as cost, technical risk, schedule, and national security requirements, in the process of selecting the storage strategy and site and disposition strategy and technology for the Fissile Materials Disposition Program. Pantex will continue to operate in compliance with all Federal, State, and local regulations.

BILL WOLFE CUSTOM HOMES, AMARILLO, TX,
BILL K. WOLFE
PAGE 2 OF 2

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Third, I further maintain that the movement of any existing functions from Pantex to other locations are not cost effective uses of our (yours and mine) tax dollars. The high cost of new facilities would far outweigh any other theorized savings that come from a facility with historically higher costs.

Finally, I maintain that if any movements of operations are to be considered, the operations that have provided safe, cost effective and productive performance over the years should receive additional work rather than having any work removed. Therefore, Pantex should be the natural location for expanded functions. Because of its performance record and its available facilities, Pantex should be the preferred location for any weapons work.

Sincerely,


Bill K. Wolfe

2/08.03.01

M-030

Comment ID: Date Received: Name: Address: Transcription:	P0037 May 1, 1996 Darrel Birkenfeld HCR 2, Box 19 Nazareth, TX I am a concerned citizen calling to voice my strong and unconditional opposition to any storage or disposition of radioactive nuclear waste or plutonium or anything regarding that, that is outlined in the FEIS program or proposition of the Department of Energy. I'm totally against this storage because of the unforeseen and yet totally unwork-out difficulties with storing this plutonium over the equifer. I also want to voice my opposition to this idea of making any area in our country a national sacrifice place which is what would happen if plutonium is stored in our region. We're undergoing our own economic problems that we need to find solutions to, but this is not one of them, and I again voice my opposition to any storage or disposition of plutonium or radioactive nuclear waste in the Panhandle of Texas. Thank you.	1/08.03.01 2/08.03.01

P-037

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's concerns with the long-term storage and disposition of weapons-usable fissile materials. Decisions on storage and disposition of fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

BLAKE, BARBARA, SAN JOSE, CA
PAGE 1 OF 2

May 6, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
J. David Nulton
P.O. Box 25786
Washington, DC 20096-3786

I am sending the following comments with regard to your February 1996 Draft Programmatic Environment Impact Statement for the Disposition of Weapons-Usable Fissile Materials.

I am deeply concerned that the DOE is not taking more timely and positive action in establishing a disposition program which will, with the Russians, convert the plutonium stockpiles in both countries into spent fuel.

The reactor option makes sense, and can with a high degree of confidence, use the plutonium instead of uranium fuel to produce electricity, and in the process, change the plutonium to other forms and make it radioactive. The reactor process also consumes some of the plutonium. Many reactor owners have told the DOE they are willing to work with them and use their reactors to convert the plutonium so that it would not be useful for weapons. Give the job to the utility companies and let them get on with making the world a safer place.

The Russian economy is in turmoil and I have read about attempts to smuggle bomb making materials. How much longer can we study the topic and have the luxury of two year FEIS studies without doing something real with the material.

DOE seems to be catering to special interests or trying to make everyone happy. Enough with Washington politics and special or regional interest catering! I read where some politicians from the Savannah River area were trying to get DOE to build a new nuclear reactor (from a Swedish company no less) at Savannah River to make tritium and burn plutonium. If existing reactors are available why wouldn't you use them instead. It is obvious that their proposal for a new reactor is their attempt to create jobs for their area. I also think the idea of having Canadian reactors burn the plutonium is unacceptable. Are we throwing the problem over our fence and letting the Canadians put in under their rug because we can't decide whose rug to bury it under here in this country? I also think we shouldn't be paying the Canadians or making fuel for their reactors when a U.S. utility is willing to do it and maybe in the process, lower my taxes. Isn't it enough the DOE has wasted more than two years on an environmental impact study that must have cost tens of millions of dollars and we are two years further down the road without anything being done or even having an agreement with the Russians. This seems like DOE catering to Al Gore and his rich environmentalist cronies.

08 03 00 Comment Number 1

The Department of Energy is working to make decisions on these very important issues in a timely manner using all available information such that wise, sustainable decisions can be implemented in a deliberate, properly scheduled manner.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the use of the CANDU Reactor Alternative for the disposition of Pu. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. This will include an appropriate level of analysis by Canada before any decision on burning Pu in a CANDU reactor is implemented.

1/08.03.00

2/08.03.01

2/08.03.01
cont.

3/08.03.01

1/08.03.00
cont.

F-033

BLAKE, BARBARA, SAN JOSE, CA
PAGE 2 OF 2

I read where Greenpeace was objecting to using reactors for the job. Enough of those nutcases. They don't represent mainstream America. They are paid professionals and ignorant elitist, wealthy volunteers, more interested in saving whales while humans starve in Appalachia or the Northwest because Greenpeace forced a coal mine or lumber mill to shut down. They don't have solutions and they propose Utopian nonsense. They are obstructionist who, in this situation would have both the U.S. and Russia do nothing. While if we wait long enough, eventually the material will go back into bombs--if not in Russia than maybe possibly IRAN or IRAQ? or even worse, into a terrorist bomb in the center of Washington DC or in my city?

The other options being evaluated by DOE appear pie-in-the-sky, make-work R&D programs. Funding plutonium in glass and burying it seems dangerous. The scientist really don't know what will happen to the glass 50, 100, or 1000 years from now. I expect they could also spend years and years and millions and millions of more dollars on R&D and still not be ready to put the plutonium into a safe form of glass. The Greenpeace people say that's better than reactors but they also don't want the glass (or anything else for that matter) buried at Yucca Mountain. They are hypocrites. I also understand that it would be an easy matter for the U.S. or Russia to remove the plutonium from the glass if either wanted to. Therefore, that doesn't make sense either.

I want to show my support for the common sense approach offered by the utilities and their reactors. The National Academy of Sciences recommended OVER TWO YEARS AGO, that the plutonium should be put into reactors and turned into spent fuel. The DOE has since spent those two years studying every other hatched idea and the reactor process is no further along. I want to protest DOE's lack of action and urge the DOE to get the process going before it is too late.

Yours Truly,

Barbara Blake

Ms. Barbara Blake
6343 Farm Hill Way
San Jose, CA 95130

2/08.03.01
cont.

1/08.03.00
cont.

F-033

BOARD OF COUNTY COMMISSIONERS, LAS VEGAS, NV,
LORRAINE HUNT
PAGE 1 OF 2

LORRAINE HUNT
Commissioner



Board of County Commissioners

CLARK COUNTY COMMISSIONER OFFICE
400 S. CAHILL CENTER, 1ST FLOOR
PO BOX 2000
LAS VEGAS, NV 89102-0001
(702) 733-2000 FAX (702) 733-2000

May 7, 1996

U.S. Department of Energy
1000 Independence Ave. S.W.
Washington, D.C. 20585
Attention: Ms. Hazel O'Leary, Secretary

SUBJECT: STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE
MATERIALS DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT
STATEMENT

Dear Secretary, O'Leary:

I am a Commissioner of Clark County, Nevada, a community with over 60 percent of Nevada's population, in addition to being one of the more rapidly growing metropolitan areas in the United States. I am writing to express some concerns about the manner in which the Department of Energy (DOE) is proposing to resolve a severe national problem with the final resolution of the nation's radioactive and mixed radioactive waste issues.

While my immediate concerns are in reference to a proposal, recently described at a workshop in Las Vegas, to consider the storage of weapons-usable Fissile Materials (more commonly known as Plutonium "pits") at the Nevada Test Site (NTS), my concerns address a host of issues associated with the NTS.

As you are probably aware, the NTS is being considered as a storage, treatment and disposal site for a considerable amount of the waste that has been generated in the nation's weapons development program. This is, of course, in addition to the hundreds of nuclear weapons tests that have been detonated over the years and the proposal to place all the nation's commercial spent nuclear fuel and defense high-level waste at the NTS. Now this proposal. Where will it end?

Nevada, because of its relatively small population and national political strength seems to be always automatically considered as a final solution when proposals such as these are generated.

DOE needs to be more creative in crafting final solutions. Nevada has obviously performed ably in doing its part in ending the "cold war." It is willing to continue to do its part in the final resolution of the onerous waste problems confronting the nation. Other parts of the nation, however, also need to do their part as well.

01 00 00 Comment Number 1

Comment noted. DOE is also considering sites in other states for the various storage and disposition alternatives analyzed in this PEIS. To obtain public comments, DOE held meetings near each of the potentially affected sites and a national meeting in Washington, DC. DOE also participated in meetings, open to the public, sponsored by different organizations at which the sponsors collected public comments which were forwarded to DOE. Technical, schedule, cost, and nonproliferation analyses along with environmental analyses will be used by the decisionmaker in determining the ROD. These documents were made available for public review beginning in late July 1996.

1/01.00.00

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BOARD OF COUNTY COMMISSIONERS, LAS VEGAS, NV,
LORRAINE HUNT
PAGE 2 OF 2

Secretary O'Leary
May 7, 1996
Page Two

The final solution of this problem needs to include states and communities, other than Nevada. DOE and the nation needs to inject more equity into the final cleanup process and not take the line of least resistance and automatically foist all the waste and nuclear materials on one locale. This will be work for DOE, but is the only way to ensure that just as many communities and states benefited (as well as contributed to the defense efforts) from the jobs and wages that accrued from this program, that they will also share in the waste and material disposal side.

It should be noted that there are communities that have recognized this inequity and have worked to redress it. The NTS Community Advisory Board and the Fernald Ohio group, for example, have interacted to develop a more equitable solution to these issues.

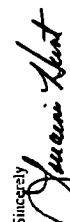
As a result of their discussions what was originally an alternative to transport a high proportion of the waste to Nevada has been modified to one where a considerable amount of the waste will remain safely stored in Ohio, some to a private incinerator in Utah, and yes, some for final disposal in Nevada. This is an equitable solution that could be emulated throughout the nation. It also offers the added benefit of reducing the amount of material (and consequence to added cost) that must be transported on U.S. highways, and thereby, reduce another source of potential accident and exposure to the public.

We are certain that you will support these valuable, positive efforts to solve, I reiterate, in an equitable manner, these serious problems.

Nevada, because of geography and history have limited transportation options. Much of the material consequently may end up being transported through one of the more vibrant communities in the United States. In a tourist-based economy we, understandably, have great concerns.

I look forward to the initiation of a constructive dialogue on these issues.

Sincerely,


Lorraine Hunt
Commissioner

cc: Thomas Grumbly, Under Secretary
Clark County Board of Commissioners
Donald L. Shalmy
James Ley
Richard B. Holmes

OTR:rry:dk

01 04 00

Comment Number 2

The disposition alternatives evaluated in the PEIS will produce various types and quantities of waste. Some of this waste will be disposed of onsite, while other quantities will be shipped offsite for disposal. As part of the implementation process and depending on the type of waste, DOE will consider alternatives for onsite versus offsite disposal in order to define an approach that will reduce cost, transportation requirements, and potential exposure of the public to radiological releases and contaminants, and will be consistent with decisions associated with other NEPA reviews, such as the *Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (Waste Management PEIS).

1/01.00.00
cont.

2/01.04.00

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BOARDMAN, CHARLES, SARATOGA, CA
PAGE 1 OF 5

May 5, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786
(FAX) 1-800-820-5156

Please accept my comments on the "Draft Programmatic Environmental
Impact Statement for the Disposition of Weapons-Usable Fissile Materials."
Feb. 1996.

Regards,



Charles Boardman
19444 Via Madronas Ct.
Saratoga, CA 95070

F-034

The PES should include a cost-benefit risk assessment which accounts for both the timeliness and risks of each option, each should be pre-rated against a potential order of magnitude cost estimate and environmental impact costs to the nation if the weapons useable material were to be stolen or diverted.	1/07.02.00	Comment Number 1	Parallel with the preparation of the PEIS, DOE conducted cost, schedule, technical, and nonproliferation assessments of each alternative. The results of these parallel studies were provided in a Technical Summary Report issued in July 1996 and a Nonproliferation Assessment Report issued in late 1996. The results of these evaluations will be factored into the ROD for storage and disposition of weapons-usable fissile materials.
The existing reactor option has the most technical maturity and is truly industrially proven. The track record of industrially based projects has much higher credibility than those within Government programs. The PES record of decision process therefore should include a cost-risk analysis of the R&D and industrial development and shutdown costs of other options which, given the DOE /Government driven development of those other programs, should certainly merit high-risk grades which would cover to high cost grades. DOE is also reminded that the National Academy strongly suggested that cost not be a major factor in addressing the risk of weapons usable plutonium. The speed, reliability, and low risk of the reactor option should therefore be overriding even if there is a cost differential due to licensing, fuel testing requirements, and DOE's political /policy decision that it needs a U.S. MOX fabrication facility. Facility construction for that MOX facility is much more definitive than a facility for the still developmental technologies associated with the other options.	2/08.03.01	Comment Number 2	The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.
Continued consideration of the CANDU option is difficult to justify, given the willingness of U.S. utilities to undertake the mission. It is an affront to the American taxpayer to subsidize Canadian companies which are competing with U.S. electric producers with O&M or irradiation fee payments or with free fuel when those could be provided to U.S. utility companies.	3/01.03.00	Comment Number 3	The <i>National Environmental Policy Act</i> requires the analysis of a range of reasonable alternatives for a Proposed Action. There are no indications that the CANDU Reactor Alternative is not reasonable from the environmental perspective.
DOE also seems overly concerned with the use of reactors contributing to the proliferation problem. Electric production reactors are not involved in proliferation activities and are committed to thorough safeguards practices in accordance with IAEA requirements. It is simplistic to think the other nations of the world who lead the U.S. in MOX technology anyway will be impacted in their continued use of it. If the U.S. chooses to forgo a specialized use of that technology for Pu disposition. It is clear the U.S. program would involve only a limited number of reactors dedicated to a non-proliferation mission because that offers the fastest, most reliable solution for the disposition mission. We would be cutting off our noses to	4/01.06.00	Comment Number 4	Comment noted.

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BOARDMAN, CHARLES, SARATOGA, CA
PAGE 3 OF 5

spite our faces were we to forgo the LWR option on "principal". Our principal statement would have negligible impact on the risk and in fact would add to the risk by adopting other alternatives that are less rigorous in their capability to perform the mission. We must not miss our window of opportunity with willing US reactor owners and with the Russian plutonium security situation.

In subsequent discussions, it was noted that facilities and production processes for MOX fuel that would be used in a U.S. disposition program could be designed so it would be highly impractical to consider the use of those same facilities for the highly irradiated recycled Pu that would be considered if a commercial MOX program were intended. Furthermore, the facility could be designed for convenient decontamination from low exposure weapons grade Pu and built-in decommission considerations could be designed in so that could be readily achieved upon termination of the disposition program. It is also relevant to explain to the political opponents of LWR disposition that the U.S. disposition program is going to be limited program with only a few plants participating in order to achieve rapid and reliable disposition of weapons for a strategic non-proliferation goal and it is in no way oriented to promote the commercial use of MOX. There are "professional" protest lobbies (Greenpeace for one) that would decay any and all DOE disposition options and especially the LWR option; while others recognize the facility of the LWR option and decay the environmental risks of geological disposal of vitrification products. Yet they offer no alternate solution to the environmental threat of doing nothing and the role they play in further delaying meaningful disposition.

Involved Locales and Common Sense Public Good

Some professional environmental protesters would have the DOE abandon consideration of all near term options and spend additional decades in R&D on "still unidentified, ultimate disposition methods" which, of course, must have no potential for environmental impact. Pursuing a longer term solution for the much less threatening proliferation risk from reactor grade plutonium, instead of focusing on the near term security issues stemming from weapons grade plutonium, could result in the proverbial "locking of the barn door after the horses are stolen".

Few activities, if any, undertaken in modern industrial society have no risk. Society chooses to drive automobiles despite 50,000 traffic fatalities yearly. The risks of no action and action too long delayed are much greater than those highly improbable risks that some would demand we avoid in

4/01.06.00
cont.

F-034

BOARDMAN, CHARLES, SARATOGA, CA
PAGE 4 OF 5

arriving at a record of decision and getting on with the program as expeditiously as practical.

When the general public and their political representatives are given these facts through public meetings and other information initiatives which the Department of Energy should be undertaking, and when they are made aware that the use of MOX fuel in reactors to convert weapons usable materials to spent fuel is a quick, reasonable and practical solution to the threat of diversion and otherwise relatively easy refuse that might be achieved with other options, the LWR option should win broad public and political acceptance.

Public responses at PHS public scoping meetings in 1995 and this year's draft PHS comment meeting have clearly demonstrated broad community support in those locales that are candidates for Pu disposition activities. There have been significant expressions of state and local level political and public support. The candidate communities are knowledgeable of the real nature of the plutonium hazard, (not the hyped hysterics that some party) have favorable experience with plutonium activities, are comfortable with the real issues of plutonium handling and processing activities which will be common to all disposition options, and are confident in the ability of well-managed organizations to conduct the program safely and in an environmentally sound way. Particular locations which have had poor experiences with DOE facilities, or those with a well-established culture of opposition by special interests to DOE and nuclear-related operations are clearly not being considered as sites for program activities and should therefore not be a factor. A key, therefore, to achieving an accurate and meaningful public consensus lies in appropriately identifying and obtaining a consensus of those local and regional stakeholders who are truly affected.

Because U.S. national security is potentially affected by a lack of action as much as by specific actions taken in addressing this excess weapons material threat, special interests and/or bias and ideological critics who would seek to block the program with protests in the name of having "a higher vision" than the rest of us, or even by legal challenges, despite it otherwise being a broad-based acceptable solution, are doing a gross disservice to our country. The overwhelming public interest clearly lies in implementing an effective and timely solution. A solution which has broad public and political consensus, which is being hampered by a limited special interest challenge, has a strong argument for passing over those objections, especially when they are clearly politically motivated, largely procedural, filled with slanted and inflammatory "scare tactic

F-034

BOARDMAN, CHARLES, SARATOGA, CA
PAGE 5 OF 5

rhetoric" or otherwise without substantive merit, considering the all the risks and options.

DOE disposition actions must remain focused on the nature and potential of the immediate threat of divergence of weapons useable materials and the timeliness and reliability of the response and solution to the threat offered by the proposed options, and not on "micro" issues of cost, support or non-support of nuclear power, value or use of the Pu material, and local or regional economic or political interests.

The LWR option would seem to be the only credible option for the U.S. to offer the Russians to enter into a bilateral program. Anything that does less, does nothing to reduce the threat of diversion of Russian material which will remain at risk until converted into a form not readily useable in weapons.

5/08.03.01

08 03 01

Comment Number 5

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

F-034

**BOATMEN'S FIRST NATIONAL BANK OF AMARILLO,
AMARILLO, TX, JOE M. STANGE
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**BOATMEN'S
FIRST NATIONAL BANK
OF AMARILLO**

DOWNTOWN CENTER
1001 10th Street
P.O. Box 23786
Amarillo, TX 79106
806 379-1422

JOE M. STANGE
Vice President
806 379-1427

April 19, 1996

U.S. Department of Energy
Office of Fissile Materials
P.O. Box 23786
Washington, DC 20026

I appreciate the chance to comment on the U.S. Department of Energy's (DOE) Programmatic Environmental Impact Statements (PEIS's), Stockpile Stewardship and Management (SSM) and Storage and Disposition (SDA) of Weapons - Usable Fissile Materials. These three areas affect Pantex, Amarillo, and the Panhandle area in a significant manner.

One of my concerns is the continuing expansion and operation of Pantex that would be conducive to the environment and health matters. This continued operation and expansion of Pantex must be conducted in a safe and environmentally sound manner with proper evaluation and research being completed.

The decision by the DOE to select Pantex as the preferred alternative for assembly and disassembly is certainly appreciated and I think this reflects the confidence in Pantex. Also, the cost related to moving this facility would be prohibitive. However, by failing to recognize Pantex as the preferred site for new stockpile management facilities the DOE has overlooked the best site to attain maximum efficiencies and cost savings.

I am sure Pantex is the most cost effective facility for any new construction of SSM facilities such as labor costs, utility rates and water and land availability at Pantex. It would be a natural to consider Pantex for an alternative site to complement the activities at the Los Alamos National Laboratory. DOE makes no mention of a strategic plutonium reserve that is necessary to meet future national security needs, even though the PEIS mentions that strategic storage should be co-located with disassembly. Pantex should be a preferred site for such a project in coordination with the management functions. When the basic technical capabilities are already located at a site such as Pantex with its excellent

09 00 04 Comment Number 1

The Department of Energy is committed to maintaining existing facilities to ensure safe operation for the life of the facilities. For all storage and disposition alternatives being evaluated at Pantex, compliance with all Federal, State, and local regulations and DOE Orders is an integral and important part of each storage or disposition facility design.

1/09.00.04

M-045

BOATMEN'S FIRST NATIONAL BANK OF AMARILLO,
AMARILLO, TX, JOE M. STANGE
PAGE 2 OF 2

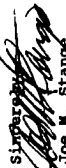
record it would be most cost effective to use that location. In their discussion process, DOE should use budgetary comparisons, and capital requirements, available transportation, skilled people, and other costs.

For basically the same reason mentioned above the High Explosives (HE) fabrication should remain at Pantex. The SSM draft admits that Pantex must retain HE capabilities to process the inventories already on site from the dismantling process which certainly would be the least expensive alternative. When everything is considered transferring the HE function from Pantex would cost taxpayers over \$40M. Also, if it becomes necessary for new weapon production, it would be very important to have the HE facilities at the weapons production and assembly site.

With Pantex being the only authorized facility for assembly and disassembly of nuclear weapons, they have maintained an excellent record of safety and efficiency for over 40 years. DOE is considering several options regarding Plutonium Storage and Disposition (PEIS) which is a result of the dismantling. Pantex could continue to store plutonium which is already at the site and upgrade the facility for an and all storage being considered by the DOE with minimized cost. It makes no sense at all to recreate storage facilities at another location and then unnecessarily transport large amounts of plutonium across the country from Pantex.

Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship foundations as well as consolidation of all plutonium storage and disposition and related functions.

Thanks for allowing individuals to express their thoughts.

Sincerely,

Joe M. Stange
Vice President

2/08.03.01

08 03 01

Comment Number 2

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

M-045

		NAME: (Optional) Cecil "Mick" Bohlander ADDRESS: 1600 Turtle Creek, Pampa, TX 79065 TELEPHONE: 806, 665, 3400 I attended the Meeting at Radisson Hotel at Pampa April 23-26. I have acquired much of which was discussed in the committee for the waterbury report and full persons of the way it is being handled as it is a better way of holding clean up of water in the future. Still said the cleanup is very good. I have some thought of ten leaving questions with labors the storage and handling of nuclear weapons parts and plutonium in the containers stored at the temporary other sites in the USA. I believe Plutonium should be permanently stored at Pantex. I believe it is being handled in the safe and sound way in all concerned. The security of the plant area is sufficient however as we now have placed within our country as has been in the past years. I feel we need to provide the storage area with some permanent handling. Maybe by a small contingent of military personnel. This plant and storage. I am thinking of maybe at least ten thousand men with twenty four hour. Thermal blankets and over support necessary to find them any invasion of this area. I have all before from the different organized groups as they possibly said the storage and I hold the whole country at bay and I reason the people of their freedom. I stand with the movement made at the hearing. Pantex has people living on the edge of its borders with all weapons that can not be taken to the end. I believe the responsibility and management of the storage of Plutonium should take note. (on card)	1/08.03.01 2/13.00.00

M-075

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

13 00 00

Comment Number 2

Comment noted. Prior to implementation of the Proposed Action, a well-thought-out security plan that meets international standards would be in place. Facilities would be inspected by IAEA, as appropriate.

BOHLANDER, CECIL, PAMPA, TX
PAGE 2 OF 2

I am 71 yrs old, Retired
had my own Companies for many yrs
Contributing building gas & oil related plants
setting heavy equipment throughout the
central U.S.

M-075

BOLEN, JAMES E., AIKEN, SC
PAGE 1 OF 1

		NAME (Optional) <u>JAMES E. BOLEN</u> ADDRESS: <u>P.O. BOX A, AIKEN, SC 29801</u> TELEPHONE: <u>803-723-1970</u> THE POSITION THE UNITED STATES HAS BEEN TAKING REGARDING THE REPROCESSING OF SPECIAL NUCLEAR MATERIALS IS BEING OUTDATED. THE WORLD HAS DEMONSTRATED HERE TO BE AN AWCY, HOSTILE PLACE, HOWEVER IT IS ALSO A PLACE WHERE TECHNOLOGICAL IDEAS ARE GIVEN OPPORTUNITIES TO DEVELOP. OTHER NATIONS ~~AND~~ ^{WILL} CONTINUE TO DEVELOP & PRODUCE NUCLEAR MATERIALS AND PRODUCTION CAPABILITIES OF MANY KINDS, REGARDLESS OF ANY STANDING U.S. POLICIES ON THESE ISSUES. EUROPE AND ASIA HAVE ^{successfully} DEMONSTRATED THEIR ABILITY TO REPROCESS RECYCLE NUCLEAR MATERIALS. THE UNITED STATES WILL CONTINUE TO FALL BEHIND IN THE AREA OF NUCLEAR POWER/PROCESSING AS LONG AS IT ERRANTLY BELIEVES THE PRETENSE THAT THE REMAINDER OF THE WORLD WILL SUBSCRIBE TO OUR QUESTIONABLE PHOSOPHY AND POLICY OF NON-REPROCESSING/RECYCLING OF OUR ~~SPENT~~ URANIUM/PLUTONIUM. THE UNITED STATES WILL BE THE ONLY LOSER SHOULD IT CONTINUE TO ADHORE POLICIES ~~WHICH~~ WHICH DISPLACE NUCLEAR FUEL REPROCESSING/ RECYCLING. THE TIME FOR DISCONTINUING THIS 1970's ERA ~~IS NOW~~ ^{IS NOW} IS NOW		1/15.00.00
		2/01.00.00		

SR-006

15 00 00 Comment Number 1

Comment noted.

01 00 00 Comment Number 2

While the PEIS discusses the generation of spent fuel as an indirect result of potential disposition actions, any subsequent reprocessing and extraction of Pu from that spent fuel is beyond the scope of the PEIS and the fundamental nonproliferation purpose of the disposition effort. Although the PEIS evaluates disposition of surplus weapons Pu through use in MOX fuel it does not further evaluate reprocessing of the spent fuel. This does not foreclose policy or technology options nor does it prejudice future decisions regarding the management or disposition of the spent fuel.

BONNER, PATRICK, SOUTH GATE, CA
PAGE 1 OF 2

9616 Deeble St Apt A
South Gate CA 90280
May 5, 1996

To the United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington DC 20026-3786

I am seriously concerned about the Programmatic
Environmental Impact Statement prepared for the Department of
Energy regarding Storage and Disposition of Weapons-Usable
Fissile Materials.

Although I recognize the need to assure safe, secure,
long-term storage and disposition of the significant quantities
of surplus fissile materials, I believe this document fails
to address very important issues. Additional alternative sites
must be considered.

In reviewing the alternative for the possible future of
the Pantex site in the Texas Panhandle, it becomes evident that
all of the nation's weapons-usable plutonium not in active
warheads would be stored at Pantex.

Before 1989, plutonium pits were never stored at Pantex.
But with the closing of Rocky Flats, Pantex has become the
interim storage site for at least 12,000 pits. Now this document
proposes storing not only plutonium pits, but other more
undesirable forms of plutonium.

Pantex is being considered for a plutonium pit
disassembly/conversion facility to cut the pits and process
them into metal or oxide, a plutonium conversion facility to
process other types of Plutonium, a facility to mix plutonium
with uranium, nuclear power reactors, and storage of spent fuel
from the reactors, and storage of all mixed waste generated
from these processes.

The document fails to address the impact on agricultural
products produced in the Texas Panhandle. And it fails to
address the location of Pantex above the Ogallala aquifer, which
provides groundwater for the plains of Texas and seven other
Midwestern food producing states. Pantex has already
contaminated the fine-grained layer of water-bearing sands above
the Ogallala aquifer with high explosives, chemicals, solvents,
and radionuclides. With the downward migration of the recharging
waters, how long will it be before the Ogallala is contaminated?

Food is our nation's most important product and must be
protected.

1/01.04.00

2/09.09.04

3/09.04.04

M-163

01 04 00 Comment Number 1

Comment noted.

09 09 04 Comment Number 2

The PEIS considers and analyzes the impacts to prime farmlands potentially
caused by air emissions and radiation releases to determine any effects on
agricultural products. Statements can be made that part of a region's economy
(for example, agriculture) would be adversely impacted by a release of
nuclear material.

09 04 04 Comment Number 3

Current and future operations at Pantex are not expected to affect the water
quality of the Ogallala Aquifer. However, since this aquifer is being depleted
(that is, the current withdrawal is exceeding the current recharge), Pantex
operations contribute to the depletion of the Ogallala Aquifer and are
analyzed in the PEIS.

BONNER, PATRICK, SOUTH GATE, CA
PAGE 2 OF 2

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

The Texas Panhandle is too valuable an agricultural area to be jeopardized by using it for plutonium storage, processing and waste.

4/08.03.01

Sincerely


Patrick Bonner

M-163

BRECHIN, VERNON J., MOUNTAIN VIEW, CA
PAGE 1 OF 6

June 7, 1996

Vernon J. Brechin
255 S. Rengstorff Ave. #49
Mountain View, CA
(415) 961-5123

DOE-Office of Fissile Materials Disposition
c/o SAIC-PEIS
P.O. Box 23786
Washington, DC 20026-3786

Dear Sir:

What follows are my:

Public Comments on the
"Storage and Disposition of Weapons-Usable Fissile Materials
Draft Programmatic Environmental Impact Statement" - February 1996
(DOE/EIS-0229-D).

Henceforth, the document, upon which I am commenting upon, will be referred to as "S&D PEIS." This document was a product of the U.S. Department of Energy's Office of Fissile Materials Disposition.

General comments:

This S&D PEIS document did a better job of presenting and analyzing the numerous alternatives than did some of the other EISs that I have reviewed. I counted 16 alternatives in this draft document and found that to be excessive. If one adds in the site options, the number of overlapping and interacting alternatives climbs to over a hundred. This does not help the public or other agencies to analyze the options. I was glad to see that the Department had dropped the accelerator based transmutation scheme as being too uncertain.

I hope the final S&D PEIS drops all the alternatives that do not lead directly to very near-term stabilization and storage. The chosen storage form should be ready for disposal in a high level Nuclear Waste Repository or be ready for conversion to such a form. All the alternatives, that lead to the production of MOX fuel for use in a wide variety of reactors, should be dropped. These schemes are clearly designed to prop-up nuclear power advocates despite the clear economic uncertainty of future nuclear power development. The department's biggest environmental headaches resulted from the feeding of fissile materials into reactors. Until, the department is actually engaged in the final disposition of reactor produced wastes, they should not be suggesting the deliberate production of more reactor produced wastes.

I favor the long-term storage alternative that involves the "collocation of plutonium and highly enriched uranium at a single site." I suggest that you reconsider a site which you apparently

01 04 00 Comment Number 1

Comment noted. While the PEIS evaluates a significant number of technical alternatives and sites, DOE feels this is not an excessive number since two proposed actions are being evaluated: long-term storage and disposition of weapons-usable fissile materials. Furthermore, the same six DOE sites are evaluated for both storage and disposition.

01 04 00 Comment Number 2

Comment noted.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Collocation Alternative. Decisions on storage alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

01 04 00 Comment Number 5

Combined storage of pits and non-pit Pu at the Manzano WSA was originally eliminated as a reasonable alternative in the Draft PEIS. After considering separate storage of pits from non-pit Pu, the option to store these pits at the Manzano WSA no longer appears unreasonable. The Manzano WSA was evaluated in the Pantex EIS and Section 2.1.3 of the Final PEIS. The Final PEIS was revised to clarify the consideration of the Manzano WSA for combined storage, and a description of the WSA was included in Appendix P.

M-266

dropped with little explanation. This site is at Kirtland Air Force Base's Manzano Weapons Storage Area. This site could quickly accommodate pit storage, and the construction of new storage facilities could be performed quickly and economically due to the existing infrastructure that surrounds the base.	5/01.04.00 cont.	6/08.03.01 7/08.03.01 8/08.03.01 9/08.03.01	In the "disposition" options, I favor the "vitrification" alternative in the "immobilization" category. My second choice is for "Ceramic Immobilization" either in the "Immobilization Category" or in the "Deep Borehole Category." The processing site should be located at the single site where the surplus fissile materials are stored.
Upon close examination, of the four thick volumes that constitute the SDP DFEIS, it became clear to me that many of the proposals were highly conceptual in nature. It seems that little thought has gone into the cost and the interrelatedness of most of the numerous proposals. This makes it difficult for the public and other agencies to evaluate the merits of the various proposals. The DOE should reduce the alternatives down to five or less, provide an end depth analysis, and then reissue another draft SDP DFEIS document.	1/01.04.00 cont.		
I will now comment on specific problems I have found in this 14 pound stack of documents. All 18 Figures which show the outline or the boundaries of the Nevada Test Site need to be corrected. The portion of the test site, withdrawn under Public Land Order 1662 is not shown on your maps. This portion of the test site extends to the east and lies next to the northeast corner of Area 15. A depiction of this area can be found on page 4-10 in Part A of Volume 1 in the "Draft Environmental Impact Statement for the Nevada Test Site and Off-site Locations in the State of Nevada" - January 1996 (DOE/EIS 0243). All the other maps in this document are also in error. This is due to a deliberate attempt to hide the existence of this area which was once known as Area 51. For 38 years this deception has been propagated throughout all levels of DOE HQ including the Inspector General's office. The deception has made its way into documents that are presented to Presidential and Congressional oversight committees. DOE has issued hundreds of tons of documents, containing these deceptive maps, which are now found in government repository libraries all across this country. The Cold War has ended and its about time this deception was ended. Please correct the map drawings in the following figures.	10/09.01.02		
SDP DFEIS Volume I p. 2-18 Figure 2.2.2-1. 2935-NTS/SDP p. 2-19 Figure 2.2.2-2. 2936-NTS/SDP p. 2-35 Figure 2.2-2. 2938-NTS/SDP p. 2-62 Figure 2.3.2.2-3. 3175/SDP p. 2-63 Figure 2.3.2.2-4. 3176/SDP p. 2-71 Figure 2.3.3.2-3. 3139/SDP p. 2-72 Figure 2.3.3.2-4. 3138/SDP p. 2-78 Figure 2.4-2. 2940-NTS/SDP p. 3-68 Figure 3.3.1-1. 2468-NTS/SDP p. 3-69 Figure 3.3.1-2. 2574-NTS/SDP			

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BRECHIN, VERNON J., MOUNTAIN VIEW, CA
PAGE 3 OF 6

P.3-76 Figure 3.3.4-1. P.3-77 Figure 3.3.4-2. P.3-81 Figure 3.3.5-1. P.3-83 Figure 3.3.6-1. P.3-86 Figure 3.3.6-2. Volume II P.4-792 Figure 4.5.1-3 P.4-793 Figure 4.5.1-4 Volume III P.M-32 Figure M.2.5-1	2404-NTS/S&D 2405-NTS/S&D 2406-NTS/S&D 5125-NTS/S&D 2408-NTS/S&D 2994-NTS/S&D 2995-NTS/S&D 2957-NTS/S&D	10/09.01.02 cont.	08 02 00 Comment Number 11	Based on the comment, the half-life of Pu-239 has been included in the text of the PEIS (Chapter 7, <i>Glossary</i>).
Summary Volume	After the "METRIC CONVERSION CHART" a fact sheet should be provided that briefly describes the characteristics of Pu-239 including its half-life and why it needs to be isolated from the human environment for over a quarter million years. I suggest that you obtain the fact sheet from the Institute for Energy and Environmental Research in Takoma Park, Maryland.	11/08.02.00	01 00 00 Comment Number 13	These materials are not considered weapons-usable and, therefore, are not included in the scope of this PEIS.
Page S-1, Box that describes what constitutes "Weapons-Usable Fissile Materials". It states "All isotopes of Pu..." As such, the Summary Volume and Volume I should state clearly on the "COVER SHEET" and in the "TABLE OF CONTENTS" that a classified appendix has been prepared which involves the separation of plutonium-242, at Savannah River Site's P-Canyon reprocessing facility, for use in the DOE weapons program. The reasons for this classified appendix needs to be explained and all aspects of this project, that have environmental consequences, need to be declassified.	Page S-4, "SCOPE OF THE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT". Third paragraph.	12/10.03.00	06 01 09 Comment Number 14	Comment noted. DOE is evaluating various sites in the United States for MOX fuel fabrication using surplus weapons-usable Pu. DOE is also considering some initial MOX fuel fabrication in Europe (for example, Lead Test Assemblies and core loads). Initial fabrication in Europe could accelerate the start date by a few years.
This should mention the many metric tons of Pu-239 that lie below the 11 underground nuclear explosion testing sites in the U.S. Page S-6, "Development of Disposition Alternatives". "(7)Buranom mixed oxide (MOX) fuel fabrication/reactor burning." It appears that the various MOX options could only be justified if, in the short-term, we paid a premium for Euratom to process our fuel. This alone, should have disqualified all the MOX options. This MOX option, including the need to utilize European facilities, is also mentioned on page S-15 and on the last few lines under "Reactor Category" on pages-23. Since the Europeans cannot support our long-term program we would have to build our own MOX fuel fabrication plant. In the second to the last paragraph on page S-32 it is suggested that a MOX fabrication plant would have virtually no environmental impact on DOE sites. If this is so, then why does such a plant have to go through a gauntlet of licensing procedures that could prevent the plant from ever going into operation?	Page S-7, Middle of second paragraph. It should be made clear that while all the MOX fuel will be consumed, most of the Pu-239 will remain in the wastes that is discharged from the reactors.	14/06.01.09	09 11 08 Comment Number 15	The Summary of the Draft PEIS was revised to state that MOX fuel is not actually consumed through irradiation, but Pu-239 is fissioned. The MOX fuel would be used in the reactor until it meets the Spent Fuel Standard or is no longer usable for generation of electric power. Upon removal, the spent MOX fuel assemblies would still have some Pu-239 similar to spent conventional uranium fuel assemblies.
M-266	15/09.11.08	08 02 00 Comment Number 11	Based on the comment, the half-life of Pu-239 has been included in the text of the PEIS (Chapter 7, <i>Glossary</i>).	

16/08.03.01	Page S-34. "Partially Completed Light Water Reactor Alternative" first line of the third paragraph. "Use of a partially completed LWR where construction of the reactor, turbine and auxiliary buildings, and cooling towers and ponds has been halted would involve the completion of these facilities with the implementation of this alternative." The use of the U.S. DOE to prop up a severely failed private project is not an appropriate use of tax dollars.
	Volume I
17/10.00.00	Page 2-110, "Transportation." The second line indicates that High Level Waste (HLW) would be transported "... (via pipeline)." There was no further description or analysis of this option. It was also not clear how the cesium-137 capsules would be transported and I did not see any analysis of this issue.
18/09.01.02	Page 3-67, first line. Change 350,000 ha to 322,195 ha and change 864,000 acres to 796,160 acres. The later values are the legal values.
19/09.00.06	Page 3-227, Second paragraph, sixth line. "However, some stored nuclear materials will require additional processing or conversion into forms suitable for continued safe storage, use or transportation to other DOE sites." If this statement is in reference to the plutonium-242 at Savannah River Site's F-Canyon reprocessing facility, then the PEIS should make this clear. If the reference is to some classified activity then this fact should be clearly stated in the PEIS.
	Volume II
20/09.02.08	Page 4-443, First paragraph, first line. "During the post-closure period, the borehole array area of 25 ha (60 acres will be declared a limited access area indefinitely...." The S&D PEIS should explain, in detail, what is meant by the term "indefinitely." At the end of the paragraph, the term "perpetuity" is used. Again, the reader deserves to know what is meant by the use of this term. The last line then states that "Such restrictions could be institutionalized by constructing drilling barriers and installing a variety of permanent markers." Just how permanent would these markers need to be? Should we expect the institutionalized DOE bureaucrats to maintain these barriers long after our federal government has collapsed? Could this provide job security for the next quarter million years?
21/16.00.00	I suggest that the terms Indefinitely, Institutionalized, Perpetually and Perpetuity be added to the Glossary.
22/10.00.00	And a final note: In Volume III, on page G-23 there is "Figure G-4-4. AT-400A Packaging for the Transport of Plutonium Pits." The plutonium-239 pit is the heart of a nuclear weapon and I do realize why the pit sphere in the center is not drawn to scale. In any case, there has been a mix-up in the labeling of the shipping container parts
M-266	

08 03 01

Comment Number 16

The Department of Energy acknowledges the commentor's concern about the disposition of Pu using the partially completed LWR (commercial). Decisions on the disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

10 00 00

Comment Number 17

Further information concerning this statement regarding the Vitrification Alternative can be found in Section 4.4 and Appendix G of the PEIS. Data summaries regarding the transport of high-level waste (HLW) as well as Cs pellets are located in Table 4.4.2.2-1.

09 01 02

Comment Number 18

The NTS land area as presented in the PEIS is identical to that in the Nevada Test Site Development Plan and the Final Environmental Impact Statement for NTS and Offsite Locations in the State of Nevada, Volume I, Chapters 1-9, Part A, January 1996. Section 4.2.2.1 of the Final PEIS was revised to reference these documents.

09 00 06

Comment Number 19

The information presented in Chapter 3 of the PEIS depicts the "Affected Environment" for the various storage and disposition sites analyzed in the document. The affected environment descriptions provide the context for understanding the environmental changes that may be brought about by implementation of the Proposed Action and alternatives.

Consequently, Section 3.7 describes environmental conditions as they currently exist at SRS. This includes some material which was identified in the *Plutonium Working Group Report on Environmental, Safety and Health (ES&H) Vulnerabilities Associated with DOE's Plutonium Storage* as requiring corrective actions to ensure compliance with high-priority ES&H requirements. These corrective actions are assumed to have been completed as part of the No Action

BRECHIN, VERNON J., MOUNTAIN VIEW, CA
PAGE 5 OF 6

diagram. The labels "Stainless Steel/Foam Insert Cover (Lower)" and "Containment Vessel Lower Shell" have been interchanged. I suggest that this be corrected.

-END-OF COMMENTS

22/10.00.00
cont.

Sincerely,

Vernon J. Brechin

Vernon J. Brechin

cc. Kathleen A. McGinty - Council on Environmental Quality
William D. Dickerson - EPA
Christopher Paine - Natural Resources Defense Council (NRDC)
Arjun Mukhiyani - Institute for Energy and Environmental Research (IERE)
Joan Glickman - Public Accountability (HQ DOE)
Dan W. Reicher - PDAS for Policy (HQ DOE)
Robert Alvarez - DAS for Natl Sec & Env Rest Pol (HQ DOE)
Senator John Glenn - (Ohio)
Senator Harry Reid - (Nevada)
Senator Richard B. Bryan - (Nevada)
Stephen I. Schwartz - Nuclear Weapons Cost Study Group
The Brookings Institution, Wash., DC

Alternative, and, prior to transportation to any storage or disposition site, analyzed in the PEIS. A brief description of the corrective actions planned under the No Action Alternative for SRS are presented in Section 2.2.6 of the PEIS.

09 02 08 Comment Number 20

Words such as "indefinitely" and "in perpetuity" are used in this case because the fissile materials emplaced at the Deep Borehole Disposal Facility would be required to remain safe, secure, and monitored by national means of detection for a very long time. Since the half-lives of Pu-239 (24,500 years) and its fissile decay product, U-235 (7.1×10^8 years) are so long, the intended use of these two words is essentially the same.

An important criteria every reasonable disposition alternative must meet is "to provide resistance to retrieval, extractions, and reuse by the host nation." To satisfy this criteria, the borehole complex will be made as visible as possible to domestic and international means of detection. One way this can be done is to make the borehole array a limited access area (LAA) and restrict surface activities around the array "indefinitely." Installing highly visible permanent markers makes the deep borehole array easier, for means of detection, to locate and observe during the post-closure period. Thus, this action will allow any monitoring agency to determine if the area is being entered on a regular basis. By installing barriers to drilling, any attempt by the host or other nation, to extract the material from the deep borehole array would take more time than if the barriers were not there. The additional retrieval time will ensure that any interested, monitoring agency would be able to detect and react to the excavation attempt long before the material could actually be extracted.

The Department of Energy expects that if a Deep Borehole Alternative is selected, these or similar actions would be put in place and used until such time that meeting this criteria was no longer important to our national interests.

M-266

16 00 00 Comment Number 21

These terms are used in a manner consistent with common usage, and therefore, not included in the Glossary.

10 00 00 Comment Number 22

The commentor is correct, and the change was made to Figure G.4-4.

BREEDING, PAULA
PAGE 1 OF 2

I don't live by Pantex, but I do own land across from Pantex. I am
some people try to blame as being the hugger,
considered an environmentalist ~~though~~ I have never hugged a tree

in my life. I am very concerned about the water in our area. It
looks like our City Fathers would be, since they are pumping our
water from underneath Pantex, and it can hurt them as much as
any one. However they bragged about drinking water at Rocky
Flats, so I guess we can't expect much from them.

I don't want PU stored here. However we are doing it now, and I
expect Pantex to be the dumping ground for PU. I am not a NMBE
person. I don't want it here but I don't think someone else should
have the problem. It is also too dangerous to transport.

We are asking for disaster if PU processing comes to Pantex. We
will be another Rocky Flats, and probably worse.

There was an editorial in the paper today by a Pantex employee. He
said in part "In the event that Pantex is chosen to do new types of
work and a different mission, the work force will decide whether to
proceed or not. All the approval from the DOE, the labs, Congress
and the President himself will not persuade Pantexans to do

1/08.03.01

TX-058

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new
missions at Pantex. Decisions on storage and disposition of weapons-usable
fissile materials will be based upon environmental analyses, technical and
economic studies, national policy considerations, and public input.

Waste/hazardous material treatment/handling operations are regulated to
minimize the potential for releases of hazardous substances to the soil or
surface water which could then migrate to the groundwater.

BREEDING, PAULA
PAGE 2 OF 2

something we think should not be done". I guess that is one of the most naive statements I have ever heard. This might happen on private business but I don't think an employee could tell DOE what to do. By the time he finds out how things are and how dangerous they are, it will be much too late. He will also find out he can't make as money as he does at Pantex.

I hope we can find some way to dispose of PU that is not hazardous to our land, water, and air. If we do, then I guess miracles do happen.

TX-058

BRESEE, BRIAN, LAS VEGAS, NV
PAGE 1 OF 2

To DOE;

I am native to Las Vegas and the idea of sending everyone else's garbage in my backyard rings a chord of deep anger.

I sense a spirit of great arrogance those in power have in dealing with our nuclear waste problem. They don't know the Beauty of the desert the way I know it so they take our whole state as a waste land. It's easy for a New Yorker or Floridan to care less when our water is ~~the~~ tainted with nuclear pollutant, or an accident ruins the image of our city as a place of destitution. I don't trust our government to be honest about these matters. They weren't honest to my family living in Southern Utah.

M-040

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at NTS. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

The state economy's (Cheap Power) that benefit from Nuclear power should be the same states that live with the risk of that benefit.

I am Strongly against Nuclear waste being stored in my backyard. I ask that all this bullying come to an end and that idea of States right's be brought to mind. This State doesn't want your garbage.

1/08.03.01

Brian Breese

M-040

BRIGHT, HORACE T., SPARTANBURG, SC
PAGE 1 OF 1

 Comment Form These comments apply to the following documents: Storage and Disposition Draft PEIS Site-Specific Stewardship and Management Draft PEIS Pantex Site-Wide Draft EIS		
NAME: (Optional) <u>HORACE T. BRIGHT</u> ADDRESS: <u>484 Carolyn Dr. Spartanburg, S.C.</u> TELEPHONE: <u>864-585-5552</u>		1/11.01.04
<u>The DOE should NOT consider</u> <u>THE SAVANNAH RIVER SITE FOR CONTINUED</u> <u>operation OF THE PANTEX STORAGE OR</u> <u>component work.</u> <u>The contractor for SAV-RIVER</u> <u>has NO concern OR VALUE FOR</u> <u>ENVIRONMENTAL, ITS PERSONNEL &</u> <u>THE PUBLIC.</u> <u>THIS LAST MONTH A SHIPMENT</u> <u>TO Oak Ridge TENN. SHOWS</u> <u>HOW CONCERNED THEY ARE.</u> <u>THE STATE OF TENN WILL</u> <u>NOT LET SAV-RIVER SHIP TO</u> <u>Oak Ridge.</u>		2/08.03.01
<u>The Pantex storage & disposition</u> <u>OF WEAPONS-USABLE FISSILE MAT-</u> <u>SHOULD STAY IN CARSON COUNTY</u> <u>TEXAS - CONVERSION TO (MOX)</u> <u>FUEL FOR REACTORS. THIS</u> <u>SOLD TO THE 109 COMMERCIAL</u> <u>LIGHT WATER REACTORS</u>		3/08.03.01
<u>Horace T. Bright</u> <u>5-3-96</u>		

M-157

Comment Number 1

11 01 04

The interim storage of Pantex pits and equipment at SRS was addressed in the Pantex EIS.

Comment Number 2

08 03 01

The Department of Energy acknowledges the comment in support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 3

08 03 01

The Department of Energy acknowledges the commentor's support for the Reactor Alternative using MOX fuel. Decisions will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (PEIS) Public Comment Form

Name (optional): Rosemary E. Brodie
Address (optional): Seattle, WA 98115

Please write down your comments and drop this form in the marked boxes before you leave tonight. These forms will be submitted to the Department of Energy as part of the formal comment on this PEIS. If you are unable to complete this form tonight, written comments can be mailed to:

Department of Energy
Office of Fissile Materials Disposition
P.O. Box 33786
Washington, D.C. 20026-3786

or, you can call this toll-free number to leave comments by phone: 1-800-420-5156. Comments must be submitted by May 7, 1996.

The Department of Energy has identified three types of technologies as options for disposing of weapons-usable fissile materials. The Department has also considered a "no action alternative" which would result in long-term storage of these materials. Please write down your comments on the following three types of options for disposal and the storage option.

1. Materials Immobilization/Vitrification - Immobilize fissile materials by mixing them with glass, glass bonded resins, or ceramics

This must be done for all the radioactive waste

| 1/08.03.01

2. Deep borehole disposal - Materials would be disposed in boreholes at least 2.5 miles deep, in geologically stable formations. Materials could be disposed directly into the deep borehole, or materials could be immobilized first, and then deposited into the deep borehole.

No good

| 2/08.03.01

3. Reactor Options - Surplus plutonium/highly enriched uranium would be made into MOX fuel for use in nuclear reactors, destroying by fission a major portion of the weapons grade materials.

No good

| 3/08.03.01

4. Storage Options - USDOE would continue existing storage practices for weapons-usable fissile materials at current locations and/or consolidate that storage at one or more of the designated sites.

No good

| 4/08.03.01

M-248

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for new missions at Hanford. Decisions on storage and disposition of weapon-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy recognizes the commentor's concern with the Borehole Alternatives. Decisions on the disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, reactor burning must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's opposition to long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

BRUNNENKANT, C., SEATTLE, WA
PAGE 1 OF 2

Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic
Environmental Impact Statement (PEIS) Public Comment Form

Name (optional): C. BRUNNENKANT
Address (optional): 1250-12 Ave S
Seattle, WA 98172

Please write down your comments and drop this form in the marked boxes before you leave tonight. These forms will be submitted to the Department of Energy as part of the formal comment on this PEIS. If you are unable to complete this form tonight, written comments can be mailed to:

Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

or, you can call this toll-free number to leave comments by phone: 1-800-820-5156. Comments must be submitted by May 7, 1996.

The Department of Energy has identified three types of technologies as options for disposing of weapons-usable fissile materials. The Department has also considered a "no action alternative" which would result in long-term storage of these materials. Please write down your comments on the following three types of options for disposal and the storage option.

1. Materials Immobilization/Verification - Immobilize fissile materials by mixing them with glass, glass bonded zeolites, or ceramics.

2. Deep borehole disposal - Materials would be disposed in boreholes at least 2.5 miles deep, in geologically stable formations. Materials could be disposed directly into the deep borehole, or materials could be immobilized first, and then deposited into the deep borehole.

3. Reactor Options - Surplus plutonium/highly enriched uranium would be made into MOX fuel for use in nuclear reactors, destroying by fission a major portion of the weapons grade materials.

4. Storage Options - USDOE would continue existing storage practices for weapons-usable fissile materials at current locations and/or consolidate that storage at one or more of the designated sites.

M-228

BRUNENKANT, C., SEATTLE, WA
PAGE 2 OF 2

Comment Number 1

01 03 00

Comment noted.

Please use this space to write down any additional comments on the Storage and Disposition of Weaponizable Public Materials Draft Programmatic Environmental Impact Statement.

My primary concern is to dispose of plutonium in a way that it is hard to retrieve it as bomb material

I am interested in moving ahead with in encouraging the Russians to dispose of their PV material, even if it takes some of my tax \$\$. Maybe a first step would be to help the Russians refigure their weapons grade material

Cost should be considered as well.

1/01.03.00

M-228

BURDITT, ROBERT B., OAK RIDGE, TN
PAGE 1 OF 4

April 23, 1996 124 Hampshire Court Oak Ridge, TN 37830	U. S. Department of Energy Office of Fissile Materials Disposition P.O. Box 23786 Washington, D.C. 20026-3786	Sir:	I am attaching some specific comments on the Draft Programmatic Impact Statement on the Storage and Disposition of Weapons-Usable Fissile Materials. I have only had a limited amount of time for this review and so I have confined my comments to the summary document, although I have made a cursory review of the other documents. I am particularly concerned about three issues: (1) why Los Alamos, which is scheduled to be a plutonium production facility was not considered as a site, while Oak Ridge, which has no other planned plutonium activities was considered as a plutonium site; (2) why, since Oak Ridge already has storage capability and is anticipated to be an ongoing site with appropriate safety and security provisions, other alternatives for storage are given consideration; and (3) why high risk, expensive disposition alternatives such as borehole disposition are being considered when mixed oxide use in reactors would provide an effective and profitable disposition or disposition in CANDU reactors would be acceptable with appropriate IAEA oversight and inspection.	1/01.05.00
			2/01.05.00	
			3/01.05.00	
			4/08.03.01	
I regret that there was not more involvement in the disposition hearings in Oak Ridge. This was an inevitable consequence of the combining of this hearing with the Stockpile Stewardship and Management Program and the assumption that the results of this hearing were inevitable and acceptable and that there were significant uncertainties about the SSMP hearing results. I believe that even though there was not much participation in the hearings, you would find that a decision to site a plutonium processing facility in Oak Ridge would lead to a major upsurge, as would a decision to move uranium storage out of Oak Ridge.	Robert B. Burditt	Sincerely, Robert B. Burditt	Retired Program Manager for Weapons Manufacturing Development, Y-12	Attachment

M-057

01 05 00 **Comment Number 1**
The selection process for candidate storage sites, including the criteria for selection and reasons for elimination, is described in Chapter 2 of the PEIS.

01 05 00 **Comment Number 2**
Under NEPA, DOE is required to look at a range of reasonable alternatives where HEU storage could be accomplished, and to compare the environmental impacts of storage at this range of sites. The storage decision will be based on technical, cost, schedule, and nonproliferation considerations as well as the analyses in the PEIS.

01 05 00 **Comment Number 3**
This PEIS analyzes the environmental impacts of a range of reasonable alternatives that are within acceptable environmental limits. Analyses of the cost, schedule, technical, and Nonproliferation Policy impacts of these alternatives are presented in separate documents to support DOE's ROD. The documents related to technical, cost, and schedule analyses were made available for public review beginning in late July 1996. The nonproliferation analysis was made available to the public beginning in October 1996.

08 03 01 **Comment Number 4**
The Department of Energy acknowledges the commentor's opposition to new missions at ORR. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

DISPOSITION QUESTIONS	
Page S-2: Why is 50 years considered long term? What happens after that? Has any thought been given to truly long range impacts, 100 years or more?	5/02.00.08
Page S-6: Why is Los Alamos not considered as a potential site, since this is the one place where Pu production activities are scheduled? How can Los Alamos do Pu production without a storage capability?	1/01.05.00 cont.
Page S-13: What validation do we have for the borehole concept?	6/01.05.00
Page S-13: How can we evaluate alternatives without knowing that we have an acceptable site?	7/01.04.00
Page S-14: Do we really believe the radiation field would deter a committed terrorist?	8/13.00.00
Page S-14: Why the push for EMT and vitrification over established oxide technology?	9/01.04.00
Page S-14: Why is the absence of an MOX (mixed oxide) facility considered a problem, but the absence of an EMT (electrometallurgical treatment) or vitrification facility is not considered a problem?	10/01.04.00
Page S-16: Would handling of weapons materials by Canada require a change in Canadian law rather than just government approval.	11/06.05.09
Page S-31: Why is it that only at Pantex is the Pu facility considered to be in conflict with the land use plan?	12/09.01.04
Page S-33: Why are we so confident that there will be no spills or exposures with Pu, yet we projected significant releases when discussing beryllium at Oak Ridge?	13/09.09.08
What, if any, non-proliferation safeguards/inspection provisions have been considered in this study?	14/01.06.00
Is there not an inherent contradiction between this study, which considers Oak Ridge as a site for plutonium operations, and the Stockpile Stewardship and Management Study, which says that locating plutonium will not be considered an option for any facility which is not already involved in plutonium operations?	15/11.01.05
M-057	

02 00 08 Comment Number 5

Fifty years was used as the timeframe for long-term storage for the environmental analysis. To increase this to 100 years or more would lead to a highly speculative environmental analysis, which would be contrary to the intent of NEPA. Fifty years also covers reasonable facility life cycles.

01 05 00 Comment Number 6

The Borehole concept was recommended for consideration in the PEIS by the NAS in their 1994 study, *Management and Disposition of Excess Weapons-Usable Plutonium*. Substantial experience on boreholes has been developed by Russia and other countries. The technology for drilling holes of this depth, diameter, and straightness needed for this kind of Pu disposition exists in the United States today. Technical and licensing issues related to the Borehole concept have been considered by DOE in their technical evaluations of storage and disposition alternatives. The technology appears quite feasible, although more work would have to be done on this concept before it could be implemented.

01 04 00 Comment Number 7

All the sites analyzed for the Pu disposition alternatives are acceptable sites. DOE cannot select sites for these alternatives at this time since some alternatives need further actions. For example, to select a site for the Existing LWR Alternative, DOE needs to issue a Solicitation of Interest to the commercial sector and then determine, from responses to the Solicitation, which site would be most suitable for implementing the Proposed Action.

13 00 00 Comment Number 8

The intent is to make the surplus Pu as unattractive and inaccessible as spent nuclear fuels. A committed terrorist would have to have the technical specialists and equipment to transport these radioactive materials and conduct extensive remote chemical processing in order to extract the Pu for weapons use.

01 04 00 **Comment Number 9**

The PEIS attempted to analyze all alternatives consistently. No preference was expressed within the Draft PEIS for immobilization over other alternatives. A Preferred Alternative is identified in the Final PEIS. In addition to the environmental analyses reflected in the PEIS, DOE has conducted technical, schedule, cost, and policy evaluations of each alternative. All of these factors will be considered in reaching the ROD.

01 04 00 **Comment Number 10**

As described in this PEIS, for Pu disposition, various sites were used for analysis purposes to provide an estimate of their environmental impacts. For each alternative, existing facilities, if possible, were used to provide reference data. If there were no existing facilities, such as the case of MOX fuel fabrication, the conceptual design of a new facility was used for the environmental analysis.

06 05 09 **Comment Number 11**

Several agreements would require negotiations with the Canadians to implement the CANDU Reactor Alternative. No modifications to Canadian law have been identified.

09 01 04 **Comment Number 12**

As discussed in Section 4.3.4.1.1, page 4-526 of the Draft PEIS, Zone 4 is the proposed location for the vitrification facility at Pantex. The master plan of the *Pantex Plant Site Development Plan* designates Zone 4 for weapons and weapons components staging. Therefore, the potential action would be inconsistent with the current site development plan. However, Pantex could revise the site development plan in accordance with the proposal. The Proposed Action would be in compliance if this change is approved, resulting in no impact to land resources. Section 4.3.4.1.1 of the Final PEIS was revised to include this condition.

09 09 08 Comment Number 13

The human health risk of exposure from normal and accidental releases of Pu is considered for all of the alternatives and presented in this PEIS. Chapter 4 and Sections M.2 and M.5 quantify the impacts of normal operational and accidental releases of Pu. Beryllium operations that are conducted at ORR are not within the scope of the alternatives under consideration in the PEIS.

01 06 00 Comment Number 14

All long-term storage and disposition alternatives considered in the Storage and Disposition PEIS would be subject to IAEA safeguards and inspections if implemented. These provisions would apply until the materials achieved a proliferation-resistant condition. Independent of the PEIS, DOE has conducted a nonproliferation assessment of each technology alternative. The results of these assessments will be factored into the ROD on the Storage and Disposition PEIS.

11 01 05 Comment Number 15

The ORR storage site at the Y-12 Plant (Y-12) is a candidate storage site being analyzed in the Storage and Disposition PEIS since it currently stores weapons-usable HEU. Six DOE sites, including ORR and other generic and specific sites, are analyzed to provide perspectives for the extent of environmental impacts from the various reasonable alternatives.

BURNS, CASEY, IDAHO FALLS, ID
PAGE 1 OF 2

Casey Burns
1438 Ashmont Apartment 1
Idaho Falls, ID 83404
April 15, 1996

Have you ever turned on the television, light bulb, or microwaved a hot dog? How would you like it if this were not possible not only for you, but for your children and grandchildren as well? Part of the electricity used to cook that hot dog, power the T.V., and light the light bulb comes from nuclear power. Isn't it interesting one nuclear reactor provides more power per day than all the hydroelectric dams on the Snake River combined, without damaging the habitat of the fish?

Idaho doesn't have to become a waste repository. What Idaho needs to become is a leader concerning the future of spent nuclear fuel. With your knowledge about the subject, surely you can see that the only feasible solution is to reprocess this spent fuel at the Idaho Chemical Processing Plant. There is one catch however, in order to process this spent fuel, there needs to be a waste repository site. There are sites already waiting to be opened at WIPP and Yucca Mountain. As Idaho was one of the leaders in the forefront of shutting these projects down, Idaho needs to be a leader in the reopening of these waste repositories. Then we can deal with Idaho's main concern: spent nuclear fuel being stored at the INEL.

The spent fuel will not go away, however the implementation of WIPP and Yucca Mountain, along with the restart of the Idaho Chemical Processing Plant, will provide a solution for the nuclear waste issue. What the Department of Energy needs to do is to implement a complete nuclear fuel cycle and, at the same time, show the American public the benefits of nuclear energy. If these two sites were operational, the Idaho Chemical Processing Plant could start up again and reclaim the fuel. Uranium is a natural resource that is NOT renewable and needs to be recycled.

There are people who would like the general public to believe that the nuclear industry is not safe. This is just not true! With the stringent guidelines implemented by both the United States Nuclear Regulatory Commission and the Department of Energy, we are safer today than we have ever been. There is

1/08.03.01

2/15.00.00

ID-003

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for new missions at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input. However, the President's Nonproliferation Policy says the United States will not recycle Pu. The operation of the Idaho Chemical Processing Plant (ICPP) is beyond the scope of this PEIS.

15 00 00 Comment Number 2

Idaho National Engineering Laboratory is one of six candidate storage sites considered in the PEIS. DOE will base its final decisions on the results of environmental analyses, information from technical and economic studies, national policy objectives, and public input. Decisions regarding potential repositories for transuranic (TRU) waste, HLW, and spent fuel will be made by DOE pursuant to separate NEPA reviews. DOE is committed to removing spent nuclear fuel from INEL by 2035, although such spent fuel is beyond the scope of this PEIS. Similarly, the operation of the ICPP, and associated socioeconomic benefits, is beyond the scope of this PEIS.

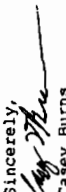
BURNS, CASEY, IDAHO FALLS, ID
PAGE 2 OF 2

greater probability for accidents involving automobiles than in the nuclear industry. I'll bet you don't see people protesting against automobiles! There are also people who would like the public to believe the nuclear industry releases tons of pollutants into the atmosphere. This also is a complete fabrication. Whenever radiation is released accidentally, it is true that the measurement is in curies. However, when radiation is released on purpose, the measurement used is microcuries.

Go up Taylor Mountain in Idaho Falls early one morning and take a good look around, the haze you see is us, slowly killing the environment as well as ourselves. Each year over two hundred million tons of pollutants are introduced into the atmosphere by coal fired power plants! Of this two hundred million tons, there are significant quantities of radiation being released into the environment, including Radium-226! Are we supposed to bury our heads in the sand and do nothing about this? My answer is ABSOLUTELY NOT!! If we don't press forward with safe, clean, high efficient power plants, whether they be nuclear or not, I see nothing but a bleak future for generations to come.

Are you aware of the economic benefits spent nuclear Navy fuel has upon our state? By allowing spent nuclear Navy fuel shipments into Idaho along with the start up of the Idaho Chemical Processing Plant, we would be able to offset some of the layoffs that employees of the INEL have been suffering. This would contribute greatly to the economy of Eastern Idaho as well as the rest of the state. As Idaho's third largest employer, the INEL provides thirteen percent of the tax base. Where is that thirteen percent going to be cut from the budget? Who is going to take responsibility, and provide for the families of the workers who have lost their jobs?

The public is not educated well enough about the nuclear age to feel safe about it. In lieu of this, I encourage you to visit one of the Radiation Safety Programs at the Eastern Idaho Technical College in Idaho Falls, or at Idaho State University in Pocatello. I would be very interested in hearing your feelings and policies concerning the nuclear industry and specifically, the Idaho National Engineering Laboratory.

Sincerely,

Casey Burns
Radiation Safety Student
Eastern Idaho Technical College

2/15.00.00
cont.

ID-003

CAMPAIGN 1
PAGE 1 OF 1

U.S. Department of Energy Office of Reconfiguration P O Box 3417 Alexandria, VA 22302	U.S. Department of Energy Office of Fissile Materials P O Box 23786 Washington, DC 20026	Comments on Stockpile Stewardship and Management (SSM) PEIS: I support the selection of Pantex for weapons assembly and disassembly functions. I strongly favor the continuation of high explosives functions at Pantex, and oppose any plan to move these functions to the national labs. Since Pantex is the most cost-effective DOE facility and enjoys the strongest local support, I also support the addition of other environmentally sound stewardship and management functions at Pantex.	Comments on Fissile Materials Storage and Disposition (MD) PEIS: I believe that Pantex should be chosen as the location for fissile materials storage and disposition functions. Pantex already stores surplus plutonium, and has the needed safety and security capabilities to cost-effectively accommodate an expanded role. Fair budgetary comparisons, strong local support, and national security concerns, should lead DOE to choose Pantex for new fissile material storage and disposition functions that are conducted in a safe and environmentally sound fashion.	1/08.03.01
Name: <u>John McKinney</u> Address: <u>21 Box 5074</u>				

TX-001

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

**Committee on
Environmental Regulation**

White Ocean

Washington D.C. 20036

2. *Predict* is the best site to combine high Explosives/low herbicides. Consistent with the strategies identified above for increased invasibility and management delays, the high explosives (HE) sites are the best to combine high Explosives/low herbicides. The low herbicides sites remain at the same site. The HE sites should also remain at the same site. Because the production accurately/seasonally consistent remains at the same site, the HE herbicides sites should be present at the corresponding site. After all, the USDA Data indicates that *Predict* can still retain HE capabilities to process the herbicides already on site from dissolving. Therefore, the best expensive alternative is to maintain HE facilities at *Predict*. I already discuss with

Deirdre Seal, Committee Clerk
Office: Texas Capital Examination, Room E2154 • 512-463-8778
Mail P.O. Box 2910 • Austin, Texas • 78768-2910 • FAX 512-463-5096

1/09.00.04

M-006

08 03 01

Comment Number 2

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

2/08.03.01

From Letter page 1 of 1

the statement in the draft PEIS that there are no advantages to siting high explosives at Pantex as opposed to the national labs. The capital outlay alone necessary for transfer is cost prohibitive. In addition, should future need arise for new weapons production, it will be critical to have the R&D facilities at the weapons production/assembly site.

III. *Fissile Materials (Plutonium) Storage and Disposition PEIS:* As the sole DOE-authorized facility for assembly and disassembly of nuclear weapons, Pantex has historically handled these functions in a safe and efficient manner for more than forty years. One of the challenges faced after dismantling a significant portion of the nuclear stockpile is processing or disposal with the materials that remain. The DOE is considering several options. Once again, acknowledging cost savings considerations, Pantex could continue to store plutonium which is already at the site and upgrade facilities for any and all storage options being considered by the DOE with minimal cost and difficulty. Pantex currently addresses more than 5,000 surplus pit and plans are being made to ship additional pits from Rocky Flats to Pantex. It makes little sense to re-create storage facilities at another site and then unnecessarily transport large amounts of plutonium across the country from Pantex. The budgetary and political cost for such a decision would be enormous. Because of these costs, Pantex also should be designated the preferred site for any disposition options and related functions. It makes budgetary and policy sense to site disposition where storage already exists. Furthermore, it makes no sense from any perspective, budget or otherwise, to site strategic storage at one site and surplus at another. Pantex should be selected for both storage functions. Pantex has the necessary safety, security, and surveillance capabilities to accommodate an expanded role with minimal costs and it is the production site chosen by Los Alamos, the planned pit fabrication site.

IV. *Conclusions:* Based upon these reasons, I respectfully urge DOE to designate Pantex as the preferred alternative site for all existing and new stockpile management and stewardship functions as well as consolidation of all plutonium storage and disposition and any related functions. Again, thank you for the opportunity to comment on these documents.

Sincerely,

Dan Chaim
Warren Chaim

WChg

M-006

CAMPAIGN 3
PAGE 1 OF 1

Comment Number 1

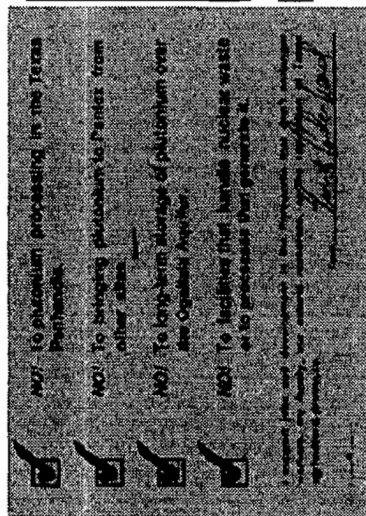
08 03 01

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 2

08 03 01

Comment noted.



1/08.03.01

2/08.03.01

PC-004

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

	NAME (Optional) <u>TERENCE A KUTE</u> ADDRESS: <u>Rt 4 Box 9636 Richmond VA 23135</u> TELEPHONE: <u>627-1452</u> <u>Dear Sir, I am writing this to inform you that I want to be counted as the favor of Option #1. that is for the plutonium storage concept.</u> <u>Thank you very much,</u> <u>TERENCE A KUTE</u>

1/08.03.01

WA-012

April 24, 1996

The United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

I am seriously concerned that the Programmatic Environmental Impact Statement prepared for the Department of Energy regarding storage and disposition of weapons-usable fissile materials suggests Pantex in Carson County, Texas as a likely place for plutonium pit disassembly and conversion. This document fails to address the negative effects plutonium missions could have on the people, agriculture, and water of the Texas Panhandle.

Processing plutonium generates an incredible amount of radioactive waste as well as other undesirable contaminants. These types of operations have contaminated other parts of the country and the cost has been high - in lives, land use, and billions of dollars in cleanup.

The Texas Panhandle is prime agricultural farmland. Nothing should ever be done at Pantex that would risk this valuable part of the country. The food produced here is shipped all over the world. The quality of these food products would be questionable if Pantex is used for plutonium storage or processing.

It is estimated that one quarter of all jobs in the Panhandle are agriculture related. The loss of these jobs would devastate this area. Contamination of farmland or water resources in such a productive part of the country would affect the entire world. After all, food is a commodity all need. It must be protected.

The Ogallala aquifer is the source of groundwater for drinking and irrigation in Texas and seven other food producing states. Pantex is located over this aquifer and operations there have already contaminated the water bearing sands above the aquifer. We must not allow any water resource so important to become unsafe or unusable for any reason. The processing of plutonium would surely do this.

Therefore, plutonium should not be stored or processed at the Pantex plant. Shipping plutonium or highly enriched uranium to Pantex from already contaminated sites is not in the best interest of Texas or the rest of the country. The suggestion that the DOE use Pantex as the site for plutonium storage, processing, or waste management is shortsighted and ill conceived. Following such a suggestion puts us all at risk.

Sincerely,

Constance Q. Bhasker

1/09.00.04

2/08.03.01

M-051

09 00 04 Comment Number 1

Radiological and chemical releases resulting from the Proposed Actions for normal operations are analyzed in the PEIS and would be within Federal and State regulatory limits. Therefore, the quality of agriculture in the Panhandle would not be affected, and agriculture-related employment in the Panhandle region would remain unaffected.

Also, current and future operations at Pantex are not expected to affect the water quality of the Ogallala Aquifer. However, the PEIS acknowledges that this aquifer is being depleted (that is, the current withdrawal is exceeding the current recharge); the PEIS analyzes whether and the extent to which potential Pantex operations under the various alternatives could contribute to the depletion of the Ogallala Aquifer.

Current and future operations at Pantex are not expected to impact the soil used for agriculture and farming in the Pantex region. All activities will be limited to Pantex and any impacts to the surrounding areas are within Federal, State, and local regulatory limits.

The PEIS includes analyses on the radiological and chemical impacts to workers and the public from both normal operations and accidents. These analyses also address the effects to local plant and animal resources as well as the effects on prime farmland.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentator's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

April 22, 1996

To the United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 37196
Washington, D.C. 20508-3716

In a document the views of all people should be listed and not considered in decision-making when policies are greatly affected by the views of a few. Being concerned with the preservation of rural America, I am seriously and by the Department of Energy regarding Storage and Disposition of Weapons-Usable Fissile Materials.

1/09.00.04

Although I recognize the need to store, secure, long-term storage and disposition of the significant quantities of surplus fissile materials, which include plutonium (Pu) and highly enriched uranium (HEU), I believe this document fails to address very critical issues.

In reviewing the alternative for the possible future of Pantex, it becomes very evident that all of the nation's weapons-usable plutonium and its active waste would be stored at Pantex - 20,000 jobs, plus much of the plutonium now at Rocky Flats Plant, Colorado; Hanford, Washington; Los Alamos, New Mexico; Savannah River, South Carolina; and the Idaho National Engineering Laboratory.

Before 1989, plutonium jobs were never stored at Pantex. However, with the closing of Rocky Flats, Pantex is the nation's storage site for at least 12,000 jobs. Now this document proposes not only storing plutonium jobs, but other more undesirable forms of plutonium.

Once stored at Pantex, this site is being considered for a plutonium pit dismantling/conversion facility to cut the jobs and process them into metal or oxide; a plutonium conversion facility to process other types of Pu; a facility to mix plutonium with uranium to make mixed oxide fuel (MOX); nuclear power reactors to use the MOX fuel; plus storage of the spent fuel from the reactors, as well as storage of all the mixed waste generated from all these processes. It is processing of plutonium which has contributed to the national environmental degradation which makes our nation with a \$300 billion dollar cleanup problem.

This document states there would be few negative effects from doing any and all of these activities at Pantex. When the document fails to address the impact on the good reputation of our agricultural products. Agriculture is the one industry which has consistently maintained the Puhanville for decades.

The food chain begins here in the prime agricultural farmland of the Texas Puhanville. The most products and several grains produced here are shipped throughout the world; 35% of the Nation's beef is produced and processed here. The quality and wholesomeness of these products would be placed in jeopardy with the siting of these processes at Pantex. Without production agriculture this part of Texas would cease to exist. When one of every four people is employed in an agriculture related job, the loss to this High Plains trade area of these jobs would create untold problems.

A second issue the document fails to address is the location of Pantex above the Ogallala aquifer, the source of groundwater for as many as 10 million people in the High Plains. With high explosives, chemicals, solvents, and other hazardous materials, Pantex has contaminated the fine grained layer of water bearing sands above the Ogallala aquifer. With the decreased migration of the recharging waters, how long will it be before the Ogallala itself will be contaminated?

Water and agriculture are the real wealth of the Texas Puhanville. Without them there would be no "Texas Puhanville." We cannot stand by and allow these resources to be compromised in any way. Food is the most important commodity we have - it must be protected.

Not all alternatives for siting these processes at other sites were analyzed in this document. Before choosing a preferred alternative, other options need to be considered. The siting of these activities at Pantex must be weighed and determined. The environmental impact in conjunction with these processes has the potential to devastate this food producing region.

The Puhanville is too valuable to be used as a plutonium storage, processing and waste facility.

Sincerely,

Myrtle A. Long
Richard A. Long

M-062

09 00 04 Comment Number 1

Radiological and chemical releases resulting from the Proposed Actions for normal operations would be within Federal and State regulatory limits. Therefore, the quality of agriculture in the Panhandle would not be affected, and agriculture-related employment in the Panhandle region would remain unaffected.

Also, current and future operations at Pantex are not expected to affect the water quality of the Ogallala Aquifer. However, since this aquifer is being depleted (that is, the current withdrawal is exceeding the current recharge), and since Pantex operations contribute to the depletion of the Ogallala Aquifer, impacts to the aquifer were analyzed in the PEIS.

Current and future operations at Pantex are not expected to impact the soil used for agriculture and farming in the Pantex region. All activities will be limited to Pantex and any impacts to the surrounding areas are within Federal, State, and local regulatory limits.

The PEIS includes analyses on the radiological and chemical impacts to workers and the public from both normal operations and accidents. These analyses also address the effects to local plant and animal resources as well as the effects on prime farmland.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

1/09.00.04
cont.

2/08.03.01

08 03 01 Comment Number 1

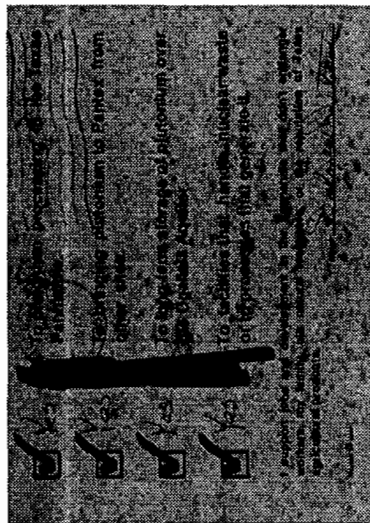
The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

If Pantex is chosen for long-term storage mission, storage facility design and operations would assure safety, health, and integrity of the Ogallala Aquifer.

08 03 01 Comment Number 3

Any generation and handling of nuclear waste resulting from fissile materials storage and disposition activities will include measures that ensure public and worker health and safety.



1/08.03.01

2/08.03.01

3/08.03.01

1/08.03.01
cont.

PC-069

CAMPBELL, DAWN, WASHINGTON, NJ
PAGE 1 OF 1

3-114

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, reactor burning must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

June 10 1996
145 Brook St.
Wash. N.J. 07832

4.2 DOE
Office of Fissile Material Disposition
P.O. Box 23796
Wash. D.C. 20026-3786

Storage and Disposition of Weapons-Usable Fissile
Materials: MOX

We are disturbed about proposals to
use Plutonium in Nuclear Power Plants.
Do we need any more opportunities
for terrorists to acquire fissionable
materials.

Plus new plans to process MOX are
swirling in the billion dollar class;
used nuclear waste products
worsened.

We urge you to stop this
outrageous proposal.
Sincerely yours,
Dawn Campbell

1/08 03 01

M-291

01 03 00 Comment Number 1

The Department of Energy appreciates the interest of the Canadian Government in this important international activity. DOE has worked closely with Canada to determine if such an alternative would work, and if so, how to best implement it.



Canadian Embassy

Ambassade du Canada

501 Pennsylvania Ave., N.W.
Washington, D.C. 20001

June 6 1996

DOE-Office of Fissile Materials Disposition
c/o SAIC-FRIS
P.O. Box 23786
Washington, D.C. 20026-3786

Attn: Mr. J. David Multon
Director
NEPA Compliance and Outreach

Dear Mr. Multon:

We are writing to comment on the *Statement and Disposition of Nonseparable Fissile Materials Draft Environmental Impact Statement* (DOE/EIS-018-B) (the EIS). We refer specifically to the CANDU reactor alternative, which is one of the nine primary alternatives assessed in the EIS for the disposition of surplus weapons plutonium. The following is provided to give you a Canadian Government perspective on this issue.

At the April 20, 1996 Summit on Nuclear Safety and Security, leaders agreed that international cooperation is needed for the safe management and use of plutonium no longer required for defense purposes. In support of this objective the Canadian Prime Minister, the Right Honourable Jean Chrétien, announced that Canada had agreed, in principle, to the concept of using this plutonium in a "once-through" mixed-oxide (MOX) fuel for Canadian-based CANDU reactors. Rendering the surplus plutonium effectively inaccessible for weapons purposes is seen as a significant benefit to non-proliferation objectives.

Canada is also exploring with the Government of Russia the use of MOX fuel from Russian nuclear weapons in Ontario Hydro CANDU reactors. There may well be some synergies if the United States and Russian "Swords into ploughshares" programs proceed in parallel. To this end, further studies and assessments of the CANDU option are being conducted by Atomic Energy of Canada Limited (AECL) and Ontario Hydro in collaboration with U.S. and Russian experts. When taking decisions on continued support for this initiative, the Government of Canada will take careful note of the results of these further assessments and the evolving views of the Government of the United States.

1/01 03.00

F-051

CANADIAN EMBASSY, WASHINGTON, DC,
BRIAN MORRISEY
PAGE 2 OF 2

Canada has been a Party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) since it entered into force in 1976. Through the NPT, Canada made an international commitment not to develop or acquire nuclear weapons. Canada has a long history of initiating and supporting measures to strengthen the international non-proliferation regime. The CANUO option for reducing the accessibility of surplus weapons material -- whether of U.S. or Russian origin -- is entirely consistent with Canada's weapons non-proliferation policy. The full scope of Canada's weapons non-proliferation program is covered by international Atomic Energy Agency (IAEA) safeguards. The IAEA has confirmed its ability to reliably safeguard CANUO reactors.

Canadian government policy does not exclude the use of plutonium as a reactor fuel, but the cost of producing plutonium makes it an uneconomic alternative to natural uranium for the CANUO reactor. Using MOX fuel from existing plutonium in a productive endeavour, such as the generation of electricity, is an economic sense for Canada. The CANUO MOX initiative is confined to the possible use of existing plutonium no longer required for defense purposes and is not related to a commercial plutonium fuel cycle.

MOX fuel fabrication using reactor grade plutonium is now a well known technology employed in Germany, France, Belgium, and Britain, and the use of weapons grade plutonium would be expected to provide an added advantage because of its lower radioactivity. Techniques for transporting and handling MOX fuel for the generation of electricity have been refined over the last 10 to 15 years. The composition of the spent fuel produced by the MOX fuel would be quite similar to that which is currently being produced using natural uranium. The storage of spent MOX fuel would be managed as an integral component of the Canadian spent fuel program. However, the amount of spent MOX fuel produced will be about 15% less than that from the use of natural uranium fuel to generate the same amount of electricity.

If the DOE selects Ontario Hydro CANUO reactors for the plutonium disposition program, implementation would be subject to Canadian federal and provincial policies and regulations. These would include detailed, multi-faceted assessments of health, safety and environmental aspects before issuance of an Atomic Energy Control Board (AECB) operating license to Ontario Hydro for the use of MOX fuel. We expect that the public reviews included in the AECB assessment process would focus on issues such as the safe and secure transportation of MOX fuel from the international boundary as well as matters specific to the reactor site.

Yours sincerely,


Brian Morrisey
Minister-Counsellor
Economic and Trade Policy

1/01.03.00
cont.

F-051



CANADIAN ENVIRONMENTAL LAW ASSOCIATION
 L'ASSOCIATION CANADIENNE DU DROIT DE L'ENVIRONNEMENT

June 17, 1996

United States Department of Energy
 Office of Public Involvement
 P.O. Box 23786
 Washington, D.C.
 20026-5786
 U.S.A.

VIA FAX 202-586-5710

**RE: STORAGE AND INCINERATION OF WEAPONS-usable FISSILE MATERIALS
 DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT**

Dear Sir/Madame,

The Canadian Environmental Law Association (CELA) is a public interest legal clinic within the Ontario Legal Aid Clinic system, and has a mandate to represent citizens' and environmental groups and low income individuals, and promote law reform and public education about environmental issues. CELA has been involved in nuclear issues since the organization was founded in 1970. Please accept our apologies for the lateness of this submission. We hope you will still be able to consider it.

We wish to express our opposition to the incineration of plutonium fuel for use in the Bruce "A" Nuclear Generating Station. We have followed this matter closely in recent months - since public information has finally become available - and we have endorsed the submission of Nuclear Awareness Project - colleagues of ours in Canada. We strongly support the Nuclear Awareness Project Submission to the U.S. Department of Energy on the matter of mixed-oxide (MOX) fuel use in CANDU reactors.

It appears that your department should be very concerned about the quality of the report from Atomic Energy of Canada Limited. The report contains overly optimistic and even erroneous assumptions about reactor stabilization and performance expectations. Such flaws call into question the validity of the entire report.

50 COLLEGE STREET • SUITE 401 • TORONTO • ONTARIO • M4G 4A2
 TELEPHONE: 467-960-5284 • FAX: 467-960-5292 • E-MAIL: celaw@celaw.net

F-069

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the use of the CANDU Reactor Alternative for the disposition of Pu. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. This will include an appropriate level of analysis concerning the CANDU Reactor Alternative. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

1/08.03.01

The excessive cost of this proposal appear to have been misapprehended. The cost alone of building three "A" subcritical reactors and upgrading security on the site could approach \$1 Billion. These costs would be added to the already excessive costs of running these reactors. Ontario Hydro has been subsidizing its nuclear program for years as a bargain to Ontario electricity ratepayers. Apparently, this latest proposal is being similarly misapprehended. Ontario's electricity ratepayers are not interested in paying for yet another wasteful misapprehension. In the current climate of rate freezes and increased competition, this proposal would seem to be on very shaky economic ground. Another obvious assumption contained in this proposal concerns the management of the spent fuel. The ongoing Federal Environmental Assessment Panel addressing Canada's high level nuclear waste is considering a proposal from Atomic Energy of Canada Limited that has been found to be technically deficient by many reviewers including the Atomic Energy Control Board, Environment Canada and the Review Panel's own Scientific Review Group. Nor does this proposal, which took fifteen years to prepare, include consideration of spent MOX fuel. Hence, the assumption that this spent fuel can be relied into that Environmental Assessment process is unwarranted and premature.	1/08.03.01 cont.	15 00 00 Comment Number 2	Comment noted. Prior to implementation, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required, as well as business negotiations with reactor owners. These negotiations will include further environmental analyses, as appropriate. Appropriate security will be maintained during the MOX fuel fabrication, transportation, and reactor cycle for the material.
We wish to echo the concerns expressed by Canadian environmental organizations that the use of MOX fuel would violate the spirit of Canada's non-proliferation stance by removing the separation between Canadian nuclear programs and the military nuclear programs of foreign powers. Many Canadians are opposed to the prospect of this country becoming a dumping ground for foreign military radioactive waste. Canadians are similarly concerned that the use of MOX fuel would create serious security problems to avoid the theft or diversion of plutonium.	2/15.00.00	09 09 08 Comment Number 3	The Department of Energy is working with Canadian Government and industry to conduct environmental and health risk analyses for activities in Canada to meet relevant regulatory requirements in both Canada and the United States. These analyses would include impacts from emissions, age of facilities and potential severe accidents, as well as environmental and public health risks.
Finally, the public health and environmental risks of this proposal are unacceptable. Ontario Hydro's nuclear program already contributes to radioactive contamination, especially tritium pollution which is found at elevated levels near all CANDU reactors. The risk of severe accidents increases as Ontario Hydro's reactors age. And, the AECB report regarding the MOX fuel proposal is deficient in a key area of public health and environmental safety. Plutonium is one of the most carcinogenic substances known and this proposal poses unacceptable risks of criticality accidents. Further, it leaves a proper assessment of criticality risks to the licensing stage. Not only is it unacceptable to downplay and avoid evaluation of such serious environmental and public health risks at this early stage, there is no guarantee that a full environmental assessment will occur at the licensing stage.	3/09.09.08	08 02 00 Comment Number 4	Proposed activities and environmental analyses in the United States have been reviewed with the public through a series of public meetings and a comment period. If CANDU Reactor Alternative is chosen, it is DOE's understanding that in Canada there will be appropriate environmental and related analyses, and that the public will be involved in this process. DOE acknowledges the commentor's support for the Immobilization Category of Pu disposition alternative.
This proposal has been accompanied by an extremely level of secrecy, manipulation of information and misleading public consultation. The administration of this initiative in the international arena as a "warrior to plutonium" success story early, if ever, provided Canadians with the full story. We strongly object to this proposal and urge the U.S. Department of Energy to rule out the option of using CANDU reactors located in Canada for plutonium disposition purposes. We support our colleagues in the environmental movement in calling on your department to choose the alternative of immobilizing plutonium within the United States.	4/08.02.00	F-069	

CANADIAN ENVIRONMENTAL LAW ASSOCIATION, TORONTO, ON,
KATHLEEN COOPER
PAGE 3 OF 3

We would appreciate a reply to this letter and would like to be added to any of your mailing lists for informing the public about your decisions on this matter. By way of a final question, could you also clarify for us your policy on subsidizing demands or lawsuits within using MOX fuel made from DOE plutonium?

Thank you. Once again, our apologies for the lateness of this submission.

Yours truly,

CANADIAN ENVIRONMENTAL LAW ASSOCIATION


Kathleen Cooper
Executive Director

F-069

CENTER FOR RADIOACTIVE WASTE MANAGEMENT,
ALBUQUERQUE, NM, WERNER LUTZE
PAGE 1 OF 6



The University of New Mexico
Professor Werner Lutz, Director
200 Fourth St. SW
Albuquerque, NM 87131-1341
Telephone: (505) 277-7664
FAX: (505) 277-5433
e-mail: BRBL@unm.edu

CeRaM

CENTER FOR RADIOACTIVE WASTE MANAGEMENT

Albuquerque, May 1, 1996

Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, D.C. 20026-3786

Dear Sir/Madam,

Enclosed please find our comment (5 pages including title page and references) on document DOE/EIS-0229-D
Storage and Disposition of Weapons-Usable Fissile Materials
Draft Programmatic Environmental Impact Statement
issued in February 1996.

Yours truly,

Werner Lutz
Werner Lutz,
Professor and Director

M-213

CENTER FOR RADIOACTIVE WASTE MANAGEMENT,
ALBUQUERQUE, NM, WERNER LUTZE
PAGE 2 OF 6

**The Zircron Option
for Storage and Disposal of Surplus Plutonium**
A 4-Billion-Year Track Record Points to a Simple Solution

Center for Radioactive Waste Management (CeRaM)
The University of New Mexico
151 Farris Engineering Building, Albuquerque, NM 87131-1341
Phone: 505-277-7964; Fax: 505-277-9676; E-mail: BRBL@unm.edu
Dr. Werner Lutze, Director
April 1996

M-213

The Case for the Zircron Option

We propose that the U.S. convert its surplus weapons plutonium (WPu) into a ceramic waste form by chemically bonding it with one of earth's most durable minerals: zircon ($ZrSiO_4$). Because zircon is so durable and because WPu bonds so strongly with it, this waste form will,

- guarantee safe storage;
- provide unparalleled integrity for deep borehole disposal, or
- with the addition of Cesium-137, easily meet standards for disposal in a civilian repository.

This paper summarizes the merits of the zircon option. We are submitting it as a formal comment on the U.S. Department of Energy's February 1986 draft PEIS on disposition of WPu and are circulating it widely within the policy and scientific communities. We welcome requests for more information.

Our proposal draws on both scientific disciplines and the broad, interdisciplinary approach that characterizes the University of New Mexico's Center for Radioactive Waste Management. We believe scientific, technical, management, and institutional factors together converge to support the zircon option, which capitalizes on physical assets unique to zircon and on key assets zircon shares with the vitrification and MOX fuel options, while avoiding their severe liabilities.

The bottom line. The zircon option delivers a high level of technical and managerial confidence coupled with a low level of institutional risk, and can support either borehole or repository disposal.

An unpermeated database. Zircon is a ubiquitous mineral, and it is ubiquitous because it is durable—so durable that it serves as the standard for age-dating geologic materials. The vast literature on zircon (well over 6,000 publications) provides exceptional understanding of its characteristics. We know with a high degree of certainty how it behaves under a broad range of physical and chemical conditions and over time periods of up to 4 billion years.

Unparalleled performance. In a repository environment, the zircon waste form will outperform both glass and the spent fuel resulting from the MOX fuel option. For a deep borehole, neither glass nor spent MOX fuel are disposal options, whereas the zircon waste form can easily meet borehole disposal standards.

Repository disposal. Zircon can both immobilize and stabilize WPu; its natural affinity with Pu creates a strong chemical bond. Moreover, the durability of that bond can be confirmed through long-term performance assessments drawn from zircon's vast database. The database for predicting how glass will perform is much more limited in scope and geologic time.

Because glass corrodes in groundwater much faster than zircon, it is at greater risk of plutonium release and criticality. The zircon waste form, far more durable, thus offers more flexibility in repository design. And while optimum waste loading will be determined by several factors including safeguard and criticality considerations, zircon can accept up to 10% Pu by weight, with an upper limit still to be established; borosilicate glass can accept only a much smaller percentage. Accordingly, RAD is needed to create glasses that are both more durable and capable of accepting a larger percentage of Pu.

Because zircon is twice as dense as glass it will yield lower volumes of waste and, depending on fabrication processes, may yield them faster, accelerating the schedule for WPu disposition.

Deep borehole disposal. Not only will the zircon waste form itself be exceptionally stable; surrounding it with a barrier of WPu-free zircon in a granitic site that itself contains natural zircon will further constrain WPu-bearing zircon from corroding. The zircon waste form will mimic neighboring and resident zircon; that is, it will most likely do what zircon almost always does, even under high temperatures and high pressures, under

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. During the screening of alternatives for inclusion in the PEIS, various immobilization forms were considered. The PEIS analyzes immobilization in ceramic and glass forms. The specific ceramic form is not identified. Research and development is both on-going and planned to support a disposition alternative(s), which would include pilot facilities for processes and materials (and could include zircon), as necessary. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

1/08.03.01

M-213

CENTER FOR RADIOACTIVE WASTE MANAGEMENT,
ALBUQUERQUE, NM, WERNER LUTZE
PAGE 4 OF 6

conditions of radiation damage, and in the presence of groundwater: it will tend to stay where it is and change very little.

An existing fabrication technology. To immobilize WPs in zirconia it may be most expeditious to simply adapt the existing MOX fuel fabrication process, sintering zirconium oxide and silicon dioxide for uranium oxide. The ceramic pellets that constitute the final waste form can be manufactured for storage and transport. To minimize transportation, a fabrication facility could be sited at Paducah, where most WPs are stored, but any site suitable for the MOX fuel or vitrification options will be suitable for zirconia, too.

A reliable schedule. The longer it takes to implement an option, the longer WPs remain exposed to the risk of theft or diversion. Consequently, a reliable schedule is itself a safeguard. On this crucial point, zirconia has clear advantages over both the MOX fuel and vitrification options.

MOX fuel. This option is technically proven, but if it is implemented domestically it is likely to encounter protected resistance that will retard its schedule. Not only must a MOX fabrication facility be licensed; reactions must obtain license amendments to burn MOX fuel. Critics who oppose nuclear power, critics who fear that the MOX option will increase risks of proliferation domestically, and critics who fear that the MOX option will send an unwanted signal to other nations—all may intervene in all licensing proceedings. They may also oppose shipments of MOX fuel to nuclear power plants. The MOX fuel option is thus exposed to the risk of delay on numerous fronts.

Vitrification. Plutonium has only been vitrified in isolated laboratory experiments. Scaling these experiments up to a production process is without precedent and will pose significant technical uncertainties that must be accurately defined and expeditiously resolved. But any schedule for doing this is likely to be grossly overestimated by the Savannah River vitrification facility for defense waste. Despite the fact that it has completed a long history of delay and cost overruns, the vitrification facility is being used as a model for what could be done. A schedule for vitrifying WPs is essentially a schedule for delay, because it would be another prolonged and costly R&D program. It must therefore be viewed as highly speculative.

Zirconia. While technical questions must be resolved for zirconia, too, because this option can adopt a proven technology—MOX fuel fabrication—questions can be more easily defined and answered than for glass, and forecasts of schedule and cost will be more reliable, coming from market-driven private sector competitors. And unlike the MOX fuel option, the zirconia option should not attract interveners who can retard its schedule.

Reliable—and efficient—quality control (QC). The integrity of the waste form depends on reliable QC. Zirconia can use the QC process successfully used in MOX fuel fabrication, but QC for vitrifying WPs has yet to be developed. Zirconia enjoys other QC advantages, too. Because each zirconia ceramic pellet will be homogeneous, each pellet sampled will accurately represent the whole; but glass may not always be homogeneous. And because zirconia pellets are so much smaller than glass logs, if QC identifies defects, fabrication can be promptly halted with minimal disruption and loss of "product."

Safeguards and criticality controls. An adaptation of an existing fabrication process that already meets stringent and security standards may more readily meet those standards than a large-scale vitrification process for WPs that has no precedent. For criticality control, the zirconia option has clear advantages over the MOX fuel and vitrification options. Zirconia R&D. And as noted above, after disposal zirconia is at far less risk of criticality than glass, which, being less stable, could release WPs more quickly.

A precedent for licensing. DOE's commitment to external regulation ensures that WPs disposition will be subject to oversight in a public forum; indeed, that forum may be defined by Congress. Whenever the regulations, they will find no precedent for licensing vitrification, whereas the MOX fuel fabrication process offers ample precedent abroad. And whatever the licensing process, performance assessment criteria will have to be satisfied; zirconia's 4-billion-year track record will be an enormous asset in meeting them.

M-213

Comment Number 2

08 03 01

The Department of Energy acknowledges the commentator's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 3

08 03 01

The Department of Energy acknowledges the commentator's opposition to the Vitrification Alternative. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

2/08.03.01

3/08.03.01

CENTER FOR RADIOACTIVE WASTE MANAGEMENT,
ALBUQUERQUE, NM, WERNER LUTZE
PAGE 5 OF 6

Comment Number 4

01 06 00

Comment noted.

An unmistakable signal of non-proliferation. The potential for proliferation of nuclear materials, particularly within the former Soviet Union, is generating grave international concern. At best, the MOX fuel option appears to be a solution in search of a problem; but within this context, it is a problem: by keeping plutonium in use it will perpetuate security concerns. Moreover, it will do so for benefits that are trivial and even dubious. The electricity yielded by the MOX option would equal a mere few months of the world's total supply of nuclear-generated electricity, and because MOX fuel will cost more than the fuel utilities now burn, they will want subsidies to buy it.

2/08.03.01
cont.

We strongly believe that any benefit derived from the MOX option is far eclipsed by the strategic benefits of a clear commitment to non-proliferation. U.S. selection of irreversible strategic disposal against that commitment, and can help lead other nations in the direction of greater global security.

4/01.06.00

Definitive closure. The MOX option, like verification, offers not just "disposition" of a policy issue, but literal physical disposal of WMs. By contrast, after MOX fuel is burned in reactors, up to 30 percent plutonium will remain, requiring further "disposition." Because US policy does not permit reprocessing, the MOX fuel option defers this problem to a future policy scenario yet to be defined.

Widespread public acceptance. Finally, DOE must sell the option it selects—to Congress; to the scientific, technical, and policy communities; to the international community; to the American public. The simpler the option, the more readily it can be understood and the more easily it will win acceptance.

Zircaloy's literally elemental nature, the durability attested to by its 4-billion-year performance record, the availability of a proven technology for fabricating the waste form, and the appeal of a definitive policy signal sent by irreversible disposal can together help win wide popular support for a policy that says, in simple terms,

Using one of earth's oldest, most durable materials, we will convert surplus weapons plutonium into an innocuous stable waste form that guarantees safe storage above ground and safe disposal deep in the earth.

Fast-tracking the zircaloy option. Moving aggressively to marshal domestic and international resources, and engaging nuclear states in the former Soviet Union in collaboration, DOE can pursue work in parallel on several fronts.

Fabrication: Solicit from MOX fuel fabricators cost and schedule estimates for adapting that process.

Regulation: Petition the Nuclear Regulatory Commission to examine how other nations regulate MOX fuel fabrication and have the US can adopt these procedures.

R&D and engineering analyses: 1) Verify chemical durability/long-term performance of the zircaloy waste form under deep borehole and repository conditions. 2) Determine adaptation of the MOX fuel fabrication process. 3) Determine optimum method for adding Cesium-137 to meet spent fuel standard. 4) Determine optimum percent waste loading. 5) Resolve criticality issues.

6) Optimize parameters for safe, secure waste handling, size of the waste form, number of waste-form units. 7) Conform zircaloy waste form to waste-acceptance specifications developed for disposal.

The United States policy and scientific communities have the talent and resources to operationalize the zircaloy option quickly, establishing it as the exemplary model that will make the world a safer place. We urge its prompt adoption.

M-213

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CHAMBLISS AND BANNER PLLC, CHATTANOOGA, TN,
CHARLES N. JOLLY
PAGE 1 OF 3

CHARLIS S. BANNER, PJC

ATTORNEY AT LAW

ONE EIGHT EIGHT

ONE EIGHT EIGHT

CHATTANOOGA, TENNESSEE 37402-2500

TELEPHONE: 423/739-1000

FACSIMILE: 423/739-1000

CHARLES N. JOLLY

April 5, 1996

DATE: 02/27/96

The Honorable Hazel O'Leary
Secretary of Energy
Fortress Building
1000 Independence Avenue S.W.
Washington, D.C. 20585

Dear Mr. O'Leary,

I am the Democratic candidate for Congress from the 1st District of Tennessee. On April 1st of this year I attended the DOE public hearing on the programmatic environmental impact statement for Storage, Stewardship and Management as both a concerned citizen and a candidate for Congress. After participating in that public hearing I wish to advise you personally of my deep concern that this administrative proceeding is seriously flawed.

At the risk of stating the obvious, this entire proceeding is about downsizing of DOE's mission in an entirely new geopolitical context. It is obvious that there are several sites, notably including both Los Alamos and Oak Ridge, competing for the stockpiling and stewardship functions which will remain once downsizing is completed.

It is also apparent that a downsizing which simply involved a reduction of existing stockpiling and stewardship activities at existing sites would require no new environmental impact statement. That a PEIS has been prepared at all speaks eloquently to the fact that the DOE plan for the future has been to perform stockpile and stewardship activities either at new locations and/or to a much greater extent than previously.

The documents ostensibly comprising the underlying administrative record in the PEIS amount to more than five inches of reading material of a highly complex and technical nature. Participants at the public hearing, and especially public

M-251

CHAMBLISS AND BANNER PLIC, CHATTANOOGA, TN,
CHARLES N. JOLLY
PAGE 2 OF 3

08 02 00	Comment Number 1
The combining of meetings was done at the specific request of the public near several DOE sites and not to have any negative impact on the public review process. This request was based upon a need to hear how these documents were related to one another and to avoid requiring public attendance at several meetings spanning several days. The Draft PEIS and reference documents were made available in advance of the public meetings.	1/08.02.00
08 02 00	Comment Number 2
The Department of Energy does not view the NEPA process as a competition among sites. It is viewed as a process for determining the environmental impacts for a series of alternatives and specific sites. This information then can be presented, along with other information to the decisionmaker so that good sustainable decisions can be made.	1/08.02.00 cont.
It is my feeling that the administrative record of this proceeding so abundantly demonstrates a lack of even-handedness that a defensible conclusion to this proceeding is impossible. I urge you to put an immediate end to the travelling road show presenting the Stockpile and Stewardship PEIS and the Storage and Disposition of Weapons PEIS and instead develop a process whereby each of the competing locations can be objectively evaluated in a fair and objective process. Based on my own participation and first hand observation, I would find it impossible to defend DOE's decision making process in this proceeding as it has unfolded.	2/08.02.00

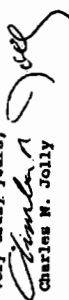
M-251

CHAMBLISS AND BANNER PLIC, CHATTANOOGA, TN,
CHARLES N. JOLLY
PAGE 3 OF 3

The Honorable Hazel O'Leary
April 5, 1996
Page 3

I would appreciate your personal response to this letter at your earliest opportunity and would further request that a copy of these remarks be placed in the administrative record of both the Stockpile and Stewardship PEIS and the Storage and Disposition of Weapons-Usable Fissile Materials Draft PEIS.

Very truly yours,


Charles M. Jolly

cc: U.S. Department of Energy
Office of Reconfiguration
PO Box 3417
Alexandria, Virginia 22302

M-251

April 22, 1996 My name is Addis Charles, Jr. I own, live on, and operate a ranch ten miles north of the Pantex facility. Although I am somewhat comfortable with the current mission at Pantex, I have marked reservations about an expanded role at Pantex that would include permanent storage of plutonium pits, other plutonium scrap, uranium, etc., as well as processing/reprocessing of same, and the possibility that a nuclear reactor of whatever type might be built there to accommodate any burning of mixed oxide fuel (MOX), or to produce tritium.	1/08.03.01	2/09.04.04	3/09.09.04
To expand Pantex's role to accommodate any or all of the above is to me grossly irresponsible in view of the fact that the plant lies above the largest fresh water aquifer in the U. S., and that said aquifer is the lifeblood of this area's agriculture industry. Why the Ogallala aquifer has not been classified as a Class 1 water source is a puzzlement to me. None of the draft PEIS's have adequately addressed what would happen to this area's farm and ranch economy if a significant accident releasing substantial quantities of radionuclides were to occur regardless of how well it were to be cleaned up. I think the public's perception of the contamination would be such that it would make our products unmarketable not just for the immediately affected area, but for the entire Panhandle's products.			

TX-043

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at Pantex. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

09 04 04 Comment Number 2

Currently, waste/hazardous material treatment/handling operations are regulated to minimize the potential for releases of hazardous substances to the soil or surface water which could then migrate to the groundwater.

The Ogallala Aquifer has not been classified as a Class 1 (that is, sole source) aquifer since other sources of drinking water are available in areas above this aquifer.

09 09 04 Comment Number 3

Perceived risks are not exactly quantified. The impacts of such perceived risks to a region's economy are more difficult to evaluate. Moreover, NEPA documents do not, as a practice, include market analyses for housing, tourism, or agricultural products. Statements can be made that part of a region's economy (for example, agriculture) would be adversely impacted by a release of nuclear material. However, the degree of that impact cannot be quantified.

CHARLES, ADDIS, JR.
PAGE 2 OF 2

It is a further contention by Pantex boosters that no substantial water pollution has occurred except for the perched water above the Ogallala aquifer. On June 27, 1995, a water sample was taken from one of my windmill wells and submitted for analysis. The results yielded the following information:

For 16 high explosives tested for, results were BQI.
For gross alpha, gross beta, Pu 239/240, Ra 226/228, Sr-90, tritium,
U 234/238--detected, but below Safe Drinking Water Act maximums.

How much will these levels rise if Pantex's role is expanded? Is it something we are willing to risk? Is it truly necessary for the viability of Amarillo's or the Panhandle's economy? Is short term economic prosperity worth eternal contamination?

2/09.04.04
cont.

TX-043

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Section 4.4 and Appendix G provide the results of the transportation analyses indicating that the transportation impacts are minimal.

Comment ID: P0009
Date Received: April 18, 1996
Name: Marlene Christianson
Address: 1045 Concord
Pocatello, ID

Transcription:

I would definitely like to tell you no, do not bring anymore of this type of thing to Idaho. We're sitting over an aquifer. I have children and grandchildren growing up in the area. It takes 20-30 years before we know what affect this would have on them. There are lists, endless lists, of train wrecks and derailments over the last this last 3-4 months. It's not safe. It's not necessary. Stop this killing of people in order to learn how to kill more people.

1/08.03.01

P-009

CHUBB, WALSTON, MURRYSVILLE, PA
PAGE 1 OF 2

U.S. Dept. of Energy
Office of Fissile Materials
P.O. Box 23766
Washington, DC 20026 - 3766
April 11, 1996
Re: Draft Programmatic EIS for Storage and Disposition of Weapons Usable Fissile Materials (DOE/EIS - 02223).

Dear Sirs,

The authors of this draft PEIS have accepted conventional wisdom without due caution or consideration. It is wishful thinking to imagine that fissile materials can be disposed of as if they were worthless annoyances. This error is expressed in the comment (page 4-923) that "Pu (disposed of) is lost forever". Fissile isotopes have a natural property which gives them a unique value. That property cannot be destroyed by wishful thinking. It is wasteful and futile to bury fissile isotopes in unguarded, unmonitored graves. An EIS on the storage and disposition of fissile materials must consider the efforts that most people are willing to make to acquire extremely valuable materials. Only worthless trash has a chance of remaining undisturbed after burial.

Those who stand in awe of the fissionable isotopes don't seem to appreciate the fact that the separation of one isotope from its sister isotopes is a difficult operation, a "value-added" operation. The current market price of natural uranium is \$13.25 per pound or approximately \$330 per pound of separated U-235. That is more than half the current price of refined gold. Separation of isotopes usually increases value by 100 to 10,000 times depending upon the "difficulty" and degree of separation. 95% pure U-235 is probably worth over \$3 million per pound, about 500 times the value of pure gold. The fissionable isotope, Pu-239, can be assumed to have a value similar to that of U-235.

The draft PEIS is proposing to store or dispose of 38.2 metric tons of surplus Pu-239 worth about \$250,000,000,000. One suggestion involves digging 23 boreholes (graves) about 4 m deep. Each grave is to contain about 180 critical masses of Pu in a 500 foot length of each grave. That suggestion constitutes expensive, hazardous, insecure storage, not disposal. For 5000 years, enterprising grave robbers have outwitted the best efforts of people to take their wealth with them in death. Fissionable isotopes are already appearing on the clandestine markets of a world with maturing plutonium economies.

The suggestion that surplus Pu be adulterated with glass, zeolites and/or Cs-137 is perverse. Dilution is an additional operation requiring expense and resulting in a volume increase. A volume increase will make storage and recovery more expensive. Cs-137 has a half-life of 30 years. It will have to be replenished at least every 300 years. Future supplies of Cs-137 will have to be purchased from countries which have developed economically successful plutonium economies.

1/01.02.00

1/01.02.00
cont.

2/05.00.08

M-037

01 02 00 Comment Number 1

Comment noted. Use of the Borehole Alternative for disposition would provide barriers to recovery and reuse that do not exist with current storage practices. These include both radiological and physical barriers. Further, if the Borehole Alternative were chosen, it would not be left unguarded. Appropriate monitoring, safeguards, and security measures would be provided. With regard to burning Pu in reactors, some individuals argue that this alternative is more unacceptable than the Borehole Alternative because it results in residual Pu that could, under some conditions, be recovered and used in a weapon. All of the alternatives considered in the PEIS result in Pu being placed in a condition where diversion and reuse is extremely unlikely due to a combination of physical and radiological barriers, administrative controls, and international inspections. NEPA requires that DOE consider a range of reasonable alternatives for Pu disposition, and accordingly, both the Borehole and Reactor Burning Alternatives were included. The preference for continued secure storage noted in this comment is also addressed in the PEIS under the No Action Alternative.

05 00 08 Comment Number 2

Diluting Pu makes it unattractive for reuse in weapons and, hence, enhances nonproliferation goals. A need to reestablish a radiation barrier after 300 years using cesium-137 (Cs-137) would be precluded by geologic disposal of these material forms. As discussed in the PEIS (Appendix H), all surplus Pu disposition alternatives ultimately require geologic disposal.

CHUBB, WALSTON, MURRAYSVILLE, PA
PAGE 2 OF 2

07 01 00 Comment Number 3
Cost data, along with technical and schedule data, were provided in Technical Summary Reports for disposition beginning in late July 1996. Recovery of Pu from the "much larger and growing quantity of Pu that exists in spent nuclear fuel" is outside the scope of the PEIS.

-2-

The lack of due consideration in this PEIS is clearly demonstrated by the suggestion which requires that the U.S. purchase Ca-137 from a more advanced country. Apparently, there has been no consideration of the environmental-economic impact of spending about \$10 billion to build an industrial complex to (1) downgrade the waste of our surplus Pu or (2) to recover valuable Pu from the "much larger and growing quantity of Pu that exists in spent nuclear fuel". Only fools would attempt to make a weapon from reactor-grade plutonium. Economically successful companies make products by adding value to their raw materials. Wasteful policies have quintupled the federal debt since 1980.

The separated fissionable isotopes of uranium and plutonium demand the custodial care due to extremely valuable and potentially dangerous materials. They should be stored in a repository at least as secure as Fort Knox. They must be stored in containers representing a small fraction of a critical mass. The containers must be separated by neutron absorbing barriers or walls. The storage rooms must be able to drain rapidly by gravity if the rooms should start to fill with water for any reason. The economic and environmental damage that might be caused by uninformed or haphazard disposition of fissionable materials could be enormous.

Our government's alleged concern about the imaginary hazards of weapons proliferation from consuming weapons-grade plutonium to produce nuclear electricity is contradictory, as noted above. The government's real concern has to do with the ability of nuclear energy to compete with fossil energy. Secure storage of our surplus fissionable materials should be sufficient to satisfy this mean and unpatriotic concern. Continuing growth of the federal debt should force us back onto the road to peace and prosperity within a few years.

Sincerely,

Melton Chubb

Walston Chubb
3450 MacArthur Drive
Murrysville, PA 15668
412-327-8592

2/05.00.08
cont.

3/07.01.00

1/01.02.00
cont.

M-037

CINQUEMANI, D. K. & F. L., MONTCLAIR, NJ
PAGE 1 OF 1

535 Upper Mountain Avenue
Montclair, NJ 07043-1506
June 5, 1996

U. S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Storage and Disposition of Weapons Usable Fissile Materials: MOX Proposal:

We are unilaterally opposed to the Department of Energy plan to allow commercial nuclear reactors to use MOX, mixed oxide, which as we all know is largely a blend of plutonium and uranium.

1. The initial cost of one or more new plants which would cost at least \$1 billion.
2. The use of MOX would greatly increase both the volume and radioactivity of the commercial nuclear power plant waste.
3. There are extremely dangerous proliferation problems posed by commercial power plant use of MOX
 - a. It is relatively easy to separate the plutonium from the other components of MOX.
 - b. The transportation of the unused fuel would require military escorts. There would be long trips throughout the U. S. A. and Canada. We assume fuel storage would also require military protection.
 - c. Terrorism, national and international, is increasing. With so many private "militia" and others, there would be a ready market for MOX.
4. There are at least two options already identified for plutonium: continued storage and vitrification. We favor the latter.

Please do not make what is likely to become a catastrophic mistake. The world is lucky to have had but one Chernobyl so far, but there have been so many near disasters. Don't facilitate another unnecessary holocaust.

Sincerely yours,

D. K. & F. L. Cinquemani
Dr. D. K. & F. L. Cinquemani

1/08 03.01

2/08 03.01

M-261

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

CITIZENS FOR ENVIRONMENTAL JUSTICE,
DEBRA K. ABDALLAH
PAGE 1 OF 4

Rev. Vonnell Cune
Chairman



Dr. Michael McClain
Executive Director

May 7, 1996

Mr. J. David Nelson,
Director
Office of NEPA Compliance and Outreach
Office of Plutonium Materials Disposition
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Nelson:

On the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement, the following comments have been drafted for consideration before the Record of Decision is announced. May I begin with the following observation of the Department of Energy's plan for SES?

Please note that the Department's "Reasonably Foreseeable Future Program at SES," includes the following proposed activities:

- 1) Storage and Disposition of Plutonium and Highly Enriched Uranium
- 2) Foreign Research Reactor Spent Nuclear Fuel
- 3) Highly Enriched Uranium Disposition
- 4) Isotopic Management of Nuclear Materials
- 5) Stockpile Stewardship and Management
- 6) Tritium Supply and Recycling
- 7) Waste Management

F-041

The cumulative impact of the seven proposed activities would have a devastating effect on the populations and environmental status of the states of South Carolina and Georgia. For example, there would be a 6% increase in water usage over the no-action alternative. Collocation would account for approximately 11% of the total annual waste water discharge, along with increased impacts to wetlands and aquatic resources from discharges from proposed facilities. In addition, "minority" and low income communities would be adversely and disproportionately affected in the event of a radiological accident/incident/terrorism-related release. Consider that neither of the options of choice in the PEIS for the Storage and Disposition of Weapons-Usable Fissile Materials can eliminate the environmental, safety and health risks, nor the dangers of proliferation. These available options can only reduce the risks, therefore, this paper cites vitrification as the disposition alternative of choice. However, this disposition alternative does not come without severe challenges, particularly in the area of environmental justice. Data on geographic distribution of low income and minority populations and prevailing wind conditions are used to assess whether toxic/hazardous pollutants and radiological releases from the proposed actions would be emitted disproportionately in the direction of these populations. If SRS is the site of choice for the storage and disposition of Pu there "could be potential environmental justice impacts due to the large low income and minority population residing in two counties adjacent to the SRS" (PEIS). These counties have minority populations of greater than 50 percent and several other counties surrounding the site have populations of greater than 25 percent. Hence, low income and minority populations would be disproportionately affected by an accidental release. Because of this very significant factor, even though vitrification is the method of disposition cited here, please be advised that SRS is not the site of choice. It is further recommended that: pilot plants be constructed to test various vitrification technologies that are specific to the different forms of Pu recommended for vitrification; vitrification must also be proven to be technologically safe; apart from criticality accidents, other types of accidents, such as spills of radioactive materials might occur during the vitrification process;	1/09.00.06
	2/09.12.06
	2/09.12.06 cont.
	3/08.03.01
	4/15.00.00
	5/09.09.06

F-041

09 00 06 Comment Number 1

Section 4.7 of the PEIS analyzes the cumulative impacts for all of the Proposed Alternatives. Future site-specific NEPA analyses would provide a more detailed analysis, including further study of wetlands and aquatic resources.

09 12 06 Comment Number 2

The PEIS assessed potential health impacts from the accidental release of radiation for all of the Proposed Alternatives. The Environmental Justice section further evaluated whether such impacts would be disproportionately borne by low-income and minority communities. As discussed in Section 4.5 of the Draft PEIS, data on the distribution of the low income and minority populations and historical information on the prevailing wind conditions indicate that these minority and low-income populations would not likely be disproportionately affected in the event of an accidental release. The PEIS, however, does note that under certain conditions, low-income and minority populations could be disproportionately affected by such an accidental release.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to new missions at SRS. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

15 00 00 Comment Number 4

Comment noted. DOE is currently testing the can-in-canister technology for vitrification. Should DOE choose new vitrification technologies for implementation, a pilot plant would be needed for the demonstration, and NEPA documentation would be prepared, as appropriate.

Pu vitrification options should be studied as an EIS under NEPA so that a sound decision regarding the choices of technology can be made;	4/15.00.00 cont.
Disadvantage of adding Pu vitrification to DWPF at SRS is the delay in the vitrification of the 34 millions gallons of High Level Waste that are already scheduled for the facility. Far greater potential for environmental contamination exists from the storage this nonvitrified waste. The consequences of such accidents with liquid wastes would also be far more severe than those of accidents that might occur from storage of vitrified high level radioactive wastes.	6/11.00.06
It is hereby recommended that Pu is treated as a waste product rather than as a resource. The disposition of Pu as a waste product would be fairly low in cost (if it is integrated with the current vitrification program at SRS) and it would be rendered highly proliferation-resistant. However, if SRS is the site of choice for this procedure, then extensive environmental awareness and education must be offered to the surrounding communities, especially those that would be exposed in the event of an accident. These communities must also be made aware of any and all emergency procedures and evacuation routes. Considering the extent that such an accident could have on a population, relocation of these residents is an even more viable option to insure their health and safety.	7/01.04.00
The FEIS also states that radiation exposure is more likely to produce somatic effects than genetic effects as exposure risks to these same individuals who live in the 50 mile radius of the site. They are therefore, at risks from exposure from past and present releases and from any accidental release should Pu be stored and disposed of at SRS.	8/09.09.06
It is further recommended that the following be given full consideration: Putting Pu in non weapons-usable form as soon as possible, compatible with protection of environment, workers and community health; Options must in compliance with all environmental,	F-041

09 09 06 Comment Number 5

To protect public and workers' health and safety, Pu disposition facilities will be designed to comply with current Federal, State, and local laws; DOE Orders; and industrial codes and standards. This will provide a plant that is highly resistant to the effects of natural phenomena and internal events such as fire and explosion. Furthermore, the PEIS analyzed the probabilities and human health consequences of the potential accidents for proposed Pu disposition alternatives including the Vitrification Alternative.

11 00 06 Comment Number 6

Comment noted. Should DOE decide to conduct Pu vitrification at SRS, any schedule conflict would be resolved prior to implementation.

01 04 00 Comment Number 7

The determination of whether or not Pu should be considered a waste, is beyond the scope of the PEIS. Furthermore, whether or not Pu is a waste, will not change the range of disposition alternatives addressed in the PEIS. NEPA requires that the environmental impacts for all reasonable alternatives be considered for the Proposed Action. While immobilization is clearly a reasonable alternative, so are reactor burning and boreholes. The non-proliferation risks of each alternative will be carefully considered and factored into the ROD for disposition. Cost, schedule, and technical analyses have been conducted by DOE and will also be factored into the ROD.

09 09 06 Comment Number 8

To respond to potential accidents, DOE Orders specify the requirements for emergency preparedness at DOE facilities. Each DOE site has established an Emergency Management Program that incorporates activities associated with emergency planning, preparedness, and response. The emergency plans at each site would be revised to incorporate future DOE requirements and expanded to incorporate the addition of new facilities.

CITIZENS FOR ENVIRONMENTAL JUSTICE,
DEBRA K. ABDALLAH
PAGE 4 OF 4

09 00 08 Comment Number 9
Comment noted. Analyses in the PEIS consider the potential environmental impacts of the handling, processing, and transportation of the surplus weapons-usable materials.

15 00 00 Comment Number 10
Comment noted.

9/09.00.08

health, and safety laws and regulations. It must be taken into account the reality that increased handling, processing, and transporting of Pu entails additional environmental risks; and, that some of these new risks may offset existing risks from present methods of storage.

Technology for re-extracting Pu from glass is known; thus, there is no need to continue operating reprocessing plants to produce more Pu that is uneconomical today and will remain so for decades.

Volumes of wastes are increased greatly in reprocessing and in the most dangerous portion of waste in the short-term medium-term which consists of highly radioactive fission products and is in a liquid form which must be stored in tanks.

Environmental costs and health risks of reprocessing excess streams of radioactive materials like:

the atmospheric release of C-14 in the form of C-14 dioxide and krypton-85; and,

large volumes of liquid wastes contaminated with radionuclides that are released into the environment.

In conclusion, let us strengthen US and international fissile materials control efforts and do it with the least costly methods that also subject us to the fewest health, and environmental health and safety risks.

Respectfully submitted,

A Citizen for Environmental Justice,

Debra K. Abdallah
Debra K. Abdallah

F-041

**CITIZENS FOR ENVIRONMENTAL JUSTICE, SAVANNAH, GA,
MUSTAFA MOHAMMED
PAGE 1 OF 1**

Comment ID: P0035
Date Received: May 1, 1996
Name: Mustafa Mohammed
Organization: Citizens for Environmental Justice
Address: 818 West Carter Street
Savannah, GA

Transcription:

I am in disfavor of the storage of weapons-usable fissile materials at the Savannah River Site. I am also totally against any reform plan such as your consolidated alternative. I am against any of your storage plans. I mean your plan that have for storing this plutonium. I am also in disfavor of the consolidation of plutonium alternatives unless it's at another site. I am also in disfavor of your upgrading of any one of your multiple sites. I am also in disfavor of your no action alternative. I am in favor of actually getting the Savannah River Site out of Savannah period. Thank you.

1/08.03.01

I am a member of Citizens for Environmental Justice. I am totally against the existence of any barehole being created on the Savannah River Site, of the storage of any plutonium. I am also I think all of your programs, your alternative programs ad subalternative programs, are very primitive. I also are in disfavor of your consolidation alternatives, your upgrading facilities, and also am also not in favor for any of your anything that's dealing with the storage of plutonium at the Savannah River Site, except your consolidation of the plutonium which would hopefully be moved to one of your other five sites, of the other six sites besides the Savannah River Site. Thank you.

2/08.03.01

P-035

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to new missions at SRS. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

CITY OF AMARILLO, OFFICE OF CITY COMMISSIONER,
AMARILLO, TX, HONORABLE DIANNE BOSCH
PAGE 1 OF 4

HON. DIANNE BOSCH
CITY COMMISSIONER
CITY OF AMARILLO, TEXAS

COMMENTS ON THE STOCKPILE STEWARDSHIP AND MANAGEMENT
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT,
STORAGE AND DISPOSITION OF FISSILE MATERIALS PROGRAMMATIC
ENVIRONMENTAL IMPACT STATEMENT AND
PANTEX SITE-WIDE ENVIRONMENTAL IMPACT STATEMENT

THANK YOU FOR THE CHANCE TO ADDRESS THE DEPARTMENT OF
ENERGY IN THIS INTERACTIVE WORKSHOP FORMAT. AS AN
AMARILLO CITY COMMISSIONER SINCE 1989, I HAVE WITNESSED
COUNTLESS D.O.E. HEARINGS ON PANTEX. THE GIVE-AND -TAKE
BETWEEN THE AUDIENCE AND THE D.O.E. OFFICIALS IS VERY
INFORMATIVE TO EVERYONE IN ATTENDANCE. THE D.O.E. IS TO BE
APPLAUDED FOR THE USE OF AN INTERACTIVE FORMAT, AND SHOULD
CONTINUE TO USE IT IN FUTURE HEARINGS.

THE D.O.E. IS ALSO TO BE APPLAUDED FOR THE OPEN MANNER WITH
WHICH IT HAS, AND CONTINUES TO, ADDRESS LOCAL
ENVIRONMENTAL CONCERNS. WE ARE ALSO THANKFUL THAT GOOD
MANAGEMENT AT PANTEX BY THE D.O.E.'S CONTRACTORS, MASON &
HANGER AND BATELLE, HAS PREVENTED PANTEX FROM HAVING
ENVIRONMENTAL PROBLEMS OF THE TYPE AND MAGNITUDE FOUND
AT OTHER D.O.E. SITES. AS IS EVIDENT BY THE LARGE TURNOUT
TONIGHT, THIS COMMUNITY STRONGLY SUPPORTS PANTEX, AND THIS

TX-039

CITY OF AMARILLO, OFFICE OF CITY COMMISSIONER,
AMARILLO, TX, HONORABLE DIANE BOSCH
PAGE 2 OF 4

SUPPORT COMES IN LARGE MEASURE FROM THE D.O.E.'S
COMMITMENT TO OUR LOCAL ENVIRONMENT. THAT CONTINUED
COMMITMENT TO THE ENVIRONMENT IS CRITICAL FOR COMMUNITY
SUPPORT OF ALL CONTINUED OR NEW MISSIONS AT PANTEX.

REGARDING THE STOCKPILE STEWARD SHIP AND MANAGEMENT FEES,
I STRONGLY SUPPORT THE CHOICE OF PANTEX AS THE PREFERRED
ALTERNATIVE FOR THE ASSEMBLY AND DISASSEMBLY MISSION. THIS
COMMUNITY IS EXTREMELY PROUD THAT PANTEX PLAYED AN
IMPORTANT PART IN WINNING THE COLD WAR, AND WILL CONTINUE
TO PLAY A CRITICAL ROLE IN REDUCING THE SIZE OF THE NATION'S
NUCLEAR ARSENAL IN THE POST-COLD WAR PERIOD. KEEPING THIS
MISSION AT PANTEX IS NOT ONLY THE RIGHT CHOICE FOR AMARILLO,
IT ALSO MAKE SENSE FROM A NATIONAL PERSPECTIVE BECAUSE IT
MAINTAINS A CONTINGENT PRODUCTION CAPABILITY, AND IT SAVES
MORE THAN 1.5 BILLION DOLLARS WHEN COMPARED TO THE COST OF
TRANSFERRING THE WORK TO THE NEVADA TEST SITE.

AS LONG AS WE ARE ON THE SUBJECT OF COST SAVINGS AND
RETENTION OF PRODUCTION CAPABILITY, THE D.O.E. MUST NOT LET
THE HIGH EXPLOSIVE (H.E.) FABRICATION MISSION BE MOVED FROM
PANTEX. PANTEX EMPLOYEES HAVE SUCCESSFULLY PERFORMED
THIS MISSION FOR MORE THAN FORTY YEARS, AND THERE IS

TX-039

CITY OF AMARILLO, OFFICE OF CITY COMMISSIONER,
AMARILLO, TX, HONORABLE DIANNE BOSCH
PAGE 3 OF 4

ABSOLUTELY NO REASON FOR THIS WORK TO BE MOVED. WHEN THE
WEAPONS COMPLEX WAS ORGANIZED, IT MADE LOGICAL SENSE TO
LOCATE HIGH EXPLOSIVE WORK WITH ASSEMBLY AND DISASSEMBLY.
IT STILL MAKES SENSE. FURTHERMORE, THE D.O.E.'S OWN ANALYSIS
INDICATES THAT THE COST OF TRANSFERRING H.E. WORK TO NEW
MEXICO LABS WOULD BE FIFTY MILLION DOLLARS. IT IS
INCONCEIVABLE THAT THE D.O.E. MIGHT SEEK TO JUSTIFY SPENDING
FIFTY MILLION DOLLARS ONLY TO END UP WITH LESS PRODUCTION
CAPABILITY IN A LOCATION THAT HAS NEVER PERFORMED THIS
MISSION.

IN TERMS OF STORAGE AND DISPOSITION ACTIVITIES, I WOULD FIRST
LIKE TO NOTE MY PREVIOUS COMMENTS ABOUT THE NEED TO
PROTECT THE ENVIRONMENT. I AM ENCOURAGED BY THE PREVIOUS
COMMENTS ABOUT THE NEED TO PROTECT THE ENVIRONMENT. I AM
ENCOURAGED BY THE OUTSTANDING ENVIRONMENTAL RECORD THAT
PANTEX HAS REGARDING STORAGE OF PLUTONIUM OVER MANY
YEARS. I HOPE THAT THE D.O.E. WILL MAKE THE RIGHT CHOICE AND
CONTINUE THE SAFE STORAGE OF SURPLUS PLUTONIUM AT PANTEX. I
ALSO HOPE THAT THE D.O.E. WILL KEEP IN MIND THAT PLUTONIUM
FROM DISMANTLED WEAPONS REPRESENTS A TREMENDOUS
INVESTMENT AND MAY PROVE TO BE A VALUABLE ASSET IN CIVILIAN

1/08.03.01

TX-039

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support of Pantex. Decisions related to future missions at Pantex will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

CITY OF AMARILLO, OFFICE OF CITY COMMISSIONER,
AMARILLO, TX, HONORABLE DIANNE BOSCH
PAGE 4 OF 4

USE. I URGE THE D.O.E. TO CHOOSE PANTEX AS THE SITE FOR
ENVIRONMENTALLY SOUND DISPOSITION ACTIVITIES.

1/08.03.01
cont.

ONCE AGAIN, THANK YOU FOR THE OPPORTUNITY TO COMMENT ON
THE D.O.E.'S PLAN FOR THE FUTURE OF PANTEX. PANTEX HAS BEEN
AN IMPORTANT PART OF OUR REGIONAL ECONOMY FOR MANY YEARS,
AND WE SUPPORT THE CONTINUATION OF ENVIRONMENTALLY SOUND
OPERATIONS AT THE PLANT. I WOULD ALSO LIKE TO THANK ALL THE
CONCERNED CITIZENS OF OUR COMMUNITY WHO HAVE MADE THE
EFFORT TO ATTEND THIS MEETING TONIGHT.

TX-039

CITY OF RICHLAND, OFFICE OF THE MAYOR, RICHLAND, WA,
MAYOR LARRY HALER
PAGE 1 OF 3



**Comments of Richland Mayor Larry Haler
April 11, 1996 Public Meeting on Storage and
Disposition of Weapons-Usable Fissile Materials
Draft Programmatic Environmental Impact Statement**

Good evening. I am Larry Haler, Mayor of Richland. I also serve as Chairman of the "Hanford Communities," an intergovernmental organization that represents the interests of cities and counties most directly affected by Hanford. As you are concluding a long day of meetings, let me extend a somewhat belated welcome to the Tri-Cities!

I have a prepared statement I would like to read and leave with you. We will be submitting written comments within the month.

The Programmatic Environmental Impact Statement, or PEIS, on Storage and Disposition of Weapons-Usable Fissile Materials is of great interest to the City of Richland and the other local governments in this area. Hanford, directly to our north, is identified as one of six DOE candidate sites for long-term storage of weapons-usable plutonium. Two of the disposition alternatives noted in the PEIS are particularly well suited to Hanford.

We would be proud to have Hanford help reduce the global nuclear weapons threat. However, we do have some misgivings. Nearly half of all Hanford workers live in Richland. I am concerned about their health and safety, as well as their economic well-being. Public safety associated with transport of radioactive materials through our communities is a factor we must consider. We must also safeguard the quality of our natural environment.

Beyond these tangible issues, we are anxious that our community not be perceived by others in the Pacific Northwest as a dumping ground for radioactive wastes. As DOE is reducing employment opportunities at Hanford, we must recruit new enterprises into this area to remain viable. Positive community image is critically important to our economic diversification efforts.

Our formal written responses to this PEIS will be carefully developed. We have appointed a technical advisory committee to explore the health and safety, transportation, and socioeconomic impacts of a new plutonium mission for Hanford. The committee began its analysis this week, and we hope to have our elected governing boards review their work and recommendations by the end of the month.

1/10.00.00

2/09.08.01

WA-016

10 00 00 Comment Number 1

Transportation safety is assured since Federal regulations require the use of packagings that cannot release dangerous quantities of radioactive material under the most severe accident conditions. During more than 40 years of DOE shipment activity, there has never been an accidental release of radioactive material that has caused injury or death. The maximum potential health risk from transporting materials associated with the Proposed Alternatives are evaluated and presented in Section 4.4 and Appendix G of the PEIS.

09 08 01 Comment Number 2

The socioeconomic analysis estimates impacts to employment, income, housing, and community services. These impacts are estimated using standard methodology and can be quantified and compared across sites. The disposal of radioactive wastes from other DOE sites is not within the scope of this PEIS. This PEIS analyzes the expected waste disposal for Proposed Actions at Hanford, and compared the amount to the existing environment.

Comments of Richland
Mayor Larry Haler

Page 2

Fabricating plutonium into mixed-oxide, or MOX, fuel and burning it in reactors is one of the disposal options noted in the PEIS. The Washington Public Power Supply System has made a proposal to the Department of Energy to burn a bundle of MOX fuel as a demonstration. Our City Council fully supports the Supply System in this endeavor. We also encourage DOE consider the Supply System's unfinished nuclear power plant on the Hanford Site as a second MOX fuel facility. The Fast Flux Test Facility, or FFTF, provides yet another opportunity for burning of MOX fuel. The FFTF offers additional value in the potential for production of tritium and vital medical isotopes. We also have at Hanford the "Fuel and Materials Examination Facility," or FMEF, the only facility in the country that has been designed and is available to cost-effectively manufacture MOX fuel.

As you can see, Hanford offers a complete, safe, and secure industrial complex capable of storing plutonium, manufacturing and burning MOX fuels, vitrifying waste products, and handling spent fuel. The Supply System and private companies have indicated interest in participating in this important endeavor. We have a talented and experienced work force and the industrial infrastructure necessary to perform a plutonium storage and disposal mission. Assuming we achieve necessary public understanding and support and address legitimate concerns through effective mitigative measures, I believe Hanford will prove to be well suited to play a plutonium storage and disposal mission.

In closing, I should mention that the short timeline for commenting on the PEIS has made our review particularly difficult. One problem is that there are very few copies of the PEIS currently available. We have requested additional copies for our committee and hope to receive them soon. I hope you will consider extending the comment period to give the public better opportunity to participate.

Thank you again for the opportunity to provide comments this evening. We will be carefully evaluating this opportunity for Hanford to be of service to the nation. You can expect a thoughtful written response to the PEIS from us.

3/08.03.01

4/08.02.00

WA-016

08 03 01 Comment Number 3

Liquid metal reactors were not included as alternatives for Pu disposition in the PEIS due to longer time and greater cost required to complete their construction. The FFTF, on the other hand, is an existing reactor and could be used for Pu burning. However, the limited capacity of the FFTF would limit the rate at which Pu could be dispositioned and would require a much longer timeframe for disposition than that which could be achieved with the reactor options addressed in the PEIS.

The Department of Energy is in fact considering the FFTF, pursuant to the ROD for the *Final Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (TSR PEIS). The ROD (December 1995, 60 FR 63878) for the TSR PEIS addressed the FFTF for tritium production as follows:

A private group has recently suggested that it purchase the FFTF from DOE and that DOE then contract with the private group to make tritium at that facility. In the [Tritium Supply and Recycling Final] PEIS, the use of the FFTF was considered and dismissed as a long-term tritium supply option because the amount of tritium that it could produce would only meet a percentage of the steady state tritium requirements, and it was not reasonable to rely on operating the facility far beyond the end of its design life. However, DOE will evaluate the presentation made by the private group to determine whether the operation of the FFTF might be able to play any role in meeting future tritium requirements. If any changes are warranted to this ROD following that review, or further NEPA documentation is required, DOE will take appropriate action.

The Secretary of Energy has requested a review by the JASON Panel (eminent academic scholars and scientists) as part of the evaluation of tritium production with the FFTF. Should the outcome of this evaluation lead to a DOE proposal to restart the FFTF for tritium production, additional environmental analyses would be performed, as appropriate. If the FFTF were to be restarted, a substantial portion of the surplus Pu that would be used for MOX fuel could be used to fabricate FFTF driver fuel, thereby achieving the Spent Fuel Standard for Pu disposition through irradiation in the FFTF. Further description of the FFTF has been added to Appendix N of the PEIS.

CITY OF RICHLAND, OFFICE OF THE MAYOR, RICHLAND, WA,
MAYOR LARRY HALER
PAGE 3 OF 3

The Fuels and Materials Examination Facility (FMEF) is considered for use as a long-term storage facility for Pu, and the impacts are included in Section 4.2.1 of the PEIS. For the production of MOX fuel, a generic facility was considered for all six DOE sites. At Hanford, the MOX fuel fabrication facility would be located in the 200-Area adjacent to 200 East. The utilization of the FMEF would be a variant for MOX fuel fabrication at Hanford, which is bounded by the environmental analysis for the MOX fuel fabrication facility located in the 200-Area. Table 2.4-1 of the PEIS provides a brief description for variants which includes "Modification/Completion of existing facilities for MOX fabrication." The storage options for Hanford also include constructing a new facility. Utilization of FMEF for the Upgrade Alternative would not preclude its use to also support Pu disposition activities for either Reactor or Immobilization Alternatives.

08 02 00

Comment Number 4

Additional copies of the PEIS were mailed within 2 days of receipt of the request. The public comment period was extended to a total of 92 days.

CITY OF WEST RICHLAND, WEST RICHLAND, WA,
COUNCILMAN KEN DOBBIN
PAGE 1 OF 3

Kirkland Evening 10/3
4-11-96

Comments of West Richland Commission, Ken Dobbin
April 11, 1996 Public Meeting on Storage and
Disposition of Weapons-Grade Fissile Materials
Eight Programmatic Environmental Impact Statement

The Fast Flux Test Facility (FFTF) will need 800kg
to one million ten per year of weapons return plutonium
to fuel the multi-missions it will be asked to perform.
The FFTF will use a once-through fuel system that
converts the plutonium to a spent fuel standard. It
will not be recycled.

These FFTF missions include testing for material
security, medical isotopes for well-directed cancer
therapy and treatment of other major diseases, and
commercial isotopes for agriculture and industry.

Advanced Nuclear and Medical Systems, called ANMS,
is a consortium of companies negotiating with the
Department of Energy to operate the FFTF to privately
provide above missions for our Nation. ANMS has
developed Congressional and professional support
for the privatization of the FFTF.

WA-019

4-11-96 2 of 3

Comments of West Richland Councilman, Ken Dobbin

ARMSS has proposed an alliance with the Washington Public Power Supply System to jointly burn plutonium in the FFTF and WNP-2. That proposal provides synergism between the two facilities and will use the already contracted Fuel and Materials Examination Facility, called the FMEF, for plutonium fuel management.

There further is the advantage of the reduced security issues of all those located on the Hanford site. The FFTF and FMEF already have state-of-the-art plutonium security systems. Eleven metric tons of the plutonium is already located on the Hanford site.

The FFTF creates a teaming opportunity with Russia. The United States wants Russia to use a once-through fuel system and not recycle. Russia wants to burn the plutonium in their fast reactor. The FFTF would demonstrate how to convert the plutonium to a spent fuel standard without recycle. They could be persuaded to do likewise.

WA-019

Comments of West Richland Councilman, Ken Dobbin

Converting weapons-usable plutonium to a spent fuel standard cooperatively with the Russians while providing needed isotopes is a win-win for both the Hanford area and the Nation.

I urge the Department of Energy to include the FFTF as a viable plutonium disposition option in the Programmatic Environmental Impact Statement on the Disposition of Weapons-Usable Fissile Materials.

Thank you,

Ken Dobbin

*Councilman, City of West Richland, Washington
Member, American Nuclear Society Eastern Washington
Section, Public Information Committee*

1/01.02.00

WA-019

01 02 00 Comment Number 1

Liquid metal reactors were not included as alternatives for Pu disposition in the PEIS due to longer time and greater cost required to complete their construction. The FFTF, on the other hand, is an existing reactor and could be used for Pu burning. However, the limited capacity of the FFTF would limit the rate at which Pu could be dispositioned and require a much longer timeframe for disposition than that which could be achieved with the reactor options addressed in the PEIS.

The Department of Energy is in fact considering the FFTF for the TSR PEIS. The ROD (December 1995, 60 FR 63878) for the TSR PEIS addressed the FFTF for tritium production as follows:

A private group has recently suggested that it purchase the FFTF from DOE and that DOE then contract with the private group to make tritium at that facility. In the [Tritium and Recycling Final] PEIS, the use of the FFTF was considered and dismissed as a long-term tritium supply option because the amount of tritium that it could produce would only meet a percentage of the steady state tritium requirements, and it was not reasonable to rely on operating the facility far beyond the end of its design life. However, DOE will evaluate the presentation made by the private group to determine whether the operation of the FFTF might be able to play any role in meeting future tritium requirements. If any changes are warranted to this ROD following that review, or further NEPA documentation is required, DOE will take appropriate action.

The Secretary of Energy has requested a review by the JASONs Panel (eminent academic scholars and scientists) as part of the evaluation of the tritium production with the FFTF. Should the outcome of this evaluation lead to a DOE proposal to restart the FFTF for tritium production, additional environmental analyses would be performed, as appropriate. If the FFTF were to be restarted, a substantial portion of the surplus Pu that would be used for MOX fuel could be used to fabricate FFTF driver fuel, thereby achieving the Spent Fuel Standard for Pu disposition through irradiation in the FFTF. Further description of the FFTF has been added to Appendix N of the PEIS.

CITY OF WEST RICHLAND, WEST RICHLAND, WA,
COUNCILMAN KENNETH D. DOBBIN
PAGE 1 OF 2

Kenneth D. Dobbin
1843 Blue Heron
West Richland, WA. 99353
May 4, 1996

U. S. Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, D. C. 20026-3786

COMMENTS ON THE STORAGE AND DISPOSITION OF WEAPONS-USABLE
FISSILE MATERIALS DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT
STATEMENT

Dear Sir:

I respectfully request that you include the Fast Flux Test Facility (FFTF) as a option to disposition either weapons-grade fissile material or reactor grade plutonium. It is an error to omit the FFTF from the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement. The Department of Energy (DOE) is reconsidering the use of the FFTF for defense and medical missions and this fuel material will be needed for its operation. The FFTF can be back on line in less than three years and could play a significant role to reduce what the National Academy of Sciences calls a "clear and present danger" associated with the stockpile of these materials.

The FFTF will need between 800 kg and one metric ton (MT) per year of fissile plutonium or uranium to fuel the multiple missions it will be asked to perform. It will use a once-through fuel system that converts the plutonium to a spent fuel standard. The FFTF can disposition a significant quantity of the 38 MT of surplus weapons-grade plutonium or use a portion of the 175 MT of surplus highly enriched uranium over the 30 years of life left in this reactor.

Missions being considered for the FFTF include tritium for national security, medical isotopes for cell-directed cancer therapy and treatment of other major diseases, and commercial isotopes for agriculture and industry. Advanced Nuclear and Medical Systems (ANMS) is a consortium of companies that is negotiating with the DOE to operate the FFTF and privately provide these products for our Nation. ANMS has widespread Congressional and professional support for the privatization of the FFTF.

ANMS has proposed an alliance with the Washington Public Power Supply System to jointly burn plutonium in the FFTF and WNP-2. That proposal provides synergism between the two facilities, a higher disposition rate of weapons usable material, and significant cost savings. The proposal would utilize the already constructed Fuels and Materials Examination Facility (FMEF) for plutonium fuel management.

1/01.02.00

1/01.02.00
cont.

M-168

01 02 00 Comment Number 1

Liquid metal reactors were not included as alternatives for Pu disposition in the PEIS due to longer time and greater cost required to complete their construction. The FFTF, on the other hand, is an existing reactor and could be used for Pu burning. However, the limited capacity of the FFTF would limit the rate at which Pu could be dispositioned and would require a much longer timeframe for disposition than that which could be achieved with the reactor options addressed in the PEIS.

The Department of Energy is in fact considering the FFTF, pursuant to the ROD for the TSR PEIS. The ROD (December 1995, 60 FR 63878) for the TSR PEIS addressed the FFTF for tritium production as follows:

A private group has recently suggested that it purchase the FFTF from DOE and that DOE then contract with the private group to make tritium at that facility. In the [Tritium Supply and Recycling Final] PEIS, the use of the FFTF was considered and dismissed as a long-term tritium supply option because the amount of tritium that it could produce would only meet a percentage of the steady state tritium requirements, and it was not reasonable to rely on operating the facility far beyond the end of its design life. However, DOE will evaluate the presentation made by the private group to determine whether the operation of the FFTF might be able to play any role in meeting future tritium requirements. If any changes are warranted to this ROD following that review, or further NEPA documentation is required, DOE will take appropriate action.

The Secretary of Energy has requested a review by the JASONS Panel (eminent academic scholars and scientists) as part of the evaluation of tritium production with the FFTF. Should the outcome of this evaluation lead to a DOE proposal to restart the FFTF for tritium production, additional environmental analyses would be performed, as appropriate. If the FFTF were to be restarted, a substantial portion of the surplus Pu that would be used for MOX fuel could be used to fabricate FFTF driver fuel, thereby achieving the Spent Fuel Standard for Pu disposition through irradiation in the FFTF. Further description of the FFTF has been added to Appendix N of the PEIS.

CITY OF WEST RICHLAND, WEST RICHLAND, WA,
COUNCILMAN KENNETH D. DOBBIN
PAGE 2 OF 2

The FMEF was a candidate storage facility under the Upgrade Alternative for storage of weapons-usable fissile materials.

The FFTF, WNP-2, and FMEF can take advantage of reduced security issues associated with all these facilities being located in close proximity on the Hanford Reservation in Washington State. Also, the FFTF and FMEF already have state-of-the-art plutonium security systems. Because Hanford is host to some of this material, it should be considered as one of the disposition locations.

The FFTF also creates a teaming opportunity with Russia. The United States wants Russia to use a once-through fuel system and not recycle. However, Russia wants to use its fast reactors which now are a part of a fuel system that includes recycle. The FFTF could demonstrate how to set up a fast reactor system to burn rather than breed plutonium and convert significant quantities of weapons-usable plutonium to a spent fuel standard without recycle. The US could provide Russia with the technology to extend the life of its BN600 reactor and convert it to a system similar to the FFTF to simultaneously burn the material in both countries.

Converting significant quantities weapons-usable fissile material to a spent fuel standard, providing the US with needed isotopes, and teaming with Russia to persuade them to accept the US stance on a once-through fuel cycle is a win-win for our Nation as well as the world. I strongly urge the DOE to include the FFTF as a viable option in the Programmatic Environmental Impact Statement on the Disposition of Weapons-Usable Fissile Materials.

Sincerely,

Kenneth D. Dobbin

Kenneth D. Dobbin

Councilman, City of West Richland, Washington
Member, American Nuclear Society Eastern Washington Section, Public Information Committee

cc: Senator Slade Gorton
Senator Patty Murray
Congressman Doc Hastings

M-168

CLARTON, WAYNE, RIGBY, ID
PAGE 1 OF 1

Comment ID: P0027

Date Received: April 18, 1996

Name: Wayne Clarton

Address: 444 North State Street
Rigby, ID 83432

Transcription:

I'm calling in favor of the plutonium work in Idaho at the INEL, and I'd like to state that I'm in favor of it. We have the ability to store it safely, to take care of it. It creates more jobs in the Southeastern Idaho area. We're in favor of it, and like to see it come here. Thanks.

1/08.03.01

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for additional missions at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-027

COALITION 21, IDAHO FALLS, ID,
GEORGE A. FREUND
PAGE 1 OF 6

Subject:
WEAPONS-USABLE MAT'L DPEIS

COMMENTS ON STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS
DRAFT DPEIS- 21/96-04GF

This comment document (#21/96-04GF) is the companion document referred to in Comment 13 of the Coalition 21 comment document (#21/96-03RK). The comments herein are based on a limited review; they should be considered symptomatic of more pervasive shortcomings.

GENERAL COMMENTS:

A. The Summary does not represent a thoughtful summary of the entire PEIS. It is overburden with marginally useful details about environmental impact at the expense of better description of the alternatives and of the assumptions related to the various candidate sites (cf specific comments S-4, S-12a&b, S-18b, S-22).

B. The environmental information in the Summary is not only too detailed; it is unnecessarily repetitive leading to internal inconsistencies (comments S-17, S-18a, S-19, S-20a, S-21, S-23b, S-37b, S-46, S-59, S-122).

1/09.00.08

C. Meaningful comparisons that would allow decisions to be made on environmental factors are often lacking; some comparisons that are included are meaningless. The only comparisons that are really clear are the obvious ones, i. e. alternatives using existing facilities (ANL-W, Electrometallurgical or Existing LWR) have less impact than comparable alternatives involving new facilities (comments S-26b, S-28; S-47a, b&d; S-48a, b&c; S-49b, S-53).

SPECIFIC COMMENTS:

These comments are keyed to the page number of the Summary. Multiple comments on a page are identified by a, b etc. Location on the page is keyed to the paragraph; a partial paragraph at the top of the page is considered the 1st paragraph.

S-3: By its shading, Figure S-1 calls attention only to the one material category not - more -
| 2/16.00.00

F-027

Comment Number 1

09 00 08

Based on comments received, the Summary of the Draft PEIS was revised. All revisions made appear in the Summary of the Final PEIS.

Comment Number 2

16 00 00

The shading in Figure S-1 is designed for clarity and readability. The figure itself is designed only to show the relationship between the various types of fissile material categories. The figure has been modified for the Final PEIS and Summary.

COALITION 21, IDAHO FALLS, ID,
GEORGE A. FREUND
PAGE 2 OF 6

covered by either PEIS. It should be used as the basis for text explaining what is meant by each block on the figure. S-4, 1st para.: Here would be the place to explain that the environmental analysis is based on 50t of Pu and to justify selection of that value. S-5, last para.: Figure S-2 appears five pages after its first mention; too far back. S-7(a): 1st para.: The concept of grouping the alternatives into categories is good but is not carried through consistently (see S-37a). S-7b: The text after the three boxes does not relate to the last previous subheading on page S-6. S-12a: Better coordination between Figure S-2 and Tables S-1, S-2 and S-3 is necessary. Table S-1 does provide appropriate additional detail on Upgrade. Tables S-2 and S-3 should show where at each site the new facilities would be built. Accompanying text should justify these selections. S-12b: The significance of the subalternative for Consolidation and Collocation Alternatives is not clear, since this subalternative is not further identified in subsequent bar graphs (Figures S-4 etc.) or accompanying text. S-17: The difference in emphasis (if any) between the section starting on this page and going to page S-36 and the section starting on page S-47 is not clear. The latter section, particularly since it explains the various figures, is much better. The former section seems to give unnecessary and duplicative detail, that would be better captured in a couple of carefully thought-out charts. S-18a, 7th para: Air quality discussion not adequately related to corresponding text on page S-72. Also should make it clear that the identified sites are the only ones to which this alternative applies. S-18b, 7th para: Comment on cultural/paleontological resources would not apply if the location at INEL were inside an existing fenced area which has been previously disturbed. From a cost and future environmental cleanup standpoint, such a location would surely be selected. This comment applies repeatedly throughout this section. S-19, 3rd para: Page S-81 shows the impact on local road to be at Pantex not at INEL. S-20a, 2nd para: Text on page S-88 indicates an endangered-species impact at Hanford as well. S-20b, 2nd para: Would there be this adverse impact on waste management at INEL if the facility were built inside an existing fenced area with an established infrastructure. S-21: Attachment A does not address Phaseout. S-22, 5th para: Explain earlier which forms of Pu do not lend themselves to MOX fuel fabrication. Relate to 50/50 split on page S-50 (combination of alternatives) and justify selection of that split. S-23a: Provide distinctive shadings for INEL and NTS paragraphs. Leaving it blank (as	2/16.00.00 cont. 3/01.00.00 4/16.00.00 1/09.00.08 cont. 5/09.03.08 6/09.07.03 7/09.08.08 8/09.06.01 9/09.11.03 4/16.00.00 cont. 10/06.01.08 1/09.00.08 cont.

F-027

01 00 00 Comment Number 3

Comment noted. In preparing the PEIS, DOE assumed the disposition of approximately 50 t (55 tons) of Pu. Currently, DOE's inventory of Pu for disposition consists of 38.2 t (42.1 tons) of material declared surplus by the President and identified in the Secretary of Energy's Openness Initiative in early 1996, and an additional 14.5 t (15.95 tons) of reactor-grade and fuel-grade Pu that is excess to U.S. defense needs, but which has not yet been declared surplus by the President. The PEIS identifies annual impacts based on throughput requirements identified for each technology. Therefore, if amounts greater than 50 t (55 tons) are eventually declared surplus, annual impacts would be the same but would occur over a longer period of time.

16 00 00 Comment Number 4

Comment noted. Based on comments received, the Summary has been revised for the Final PEIS.

09 03 08 Comment Number 5

In response to the comment, text was added to the Upgrade Alternative section of the Summary to clarify that the alternative does not apply to NTS, RFETS, or LANL. Text was also added to the air quality discussion of the Upgrade Alternative section in the Summary to clarify that all sites are expected to comply with the ambient air quality standards and guidelines.

09 07 03 Comment Number 6

The commentor is correct that construction on previously disturbed land would probably not affect resources that are potentially eligible for placement on the National Register of Historic Places (NRHP). However, other cultural resources could be affected by new ground disturbance. The Summary of the Final PEIS has been revised (Sections S.5 and S.8) to provide a better description of the approach to the environmental impact analysis and the comparison of alternatives.

COALITION 21, IDAHO FALLS, ID,
GEORGE A. FREUND
PAGE 3 OF 6

for NTS) suggests less impact than others; filling it in solid (as for INEL) suggest more impact.	1/09.00.08 cont.
S-23b, Figure S-5: Explain why RFETS material causes a much greater employment impact at Pantex than at other facilities; and why employment impact at ORR is more without RFETS material than with it. How many other such discrepancies exist that I have not identified?	11/09.08.08
S-26a: Change Upgrade paragraphs from solid color to shading.	1/09.00.08 cont.
S-26b: Liquid transuranic waste is listed as a key long-term impact on page S-22. Less than one 55 gal. drum per year (and the same for all sites) does not seem to warrant a separate Figure S-11 in the Summary. INEL is dealing with about 130,000 cu meters of TRU waste.	12/09.11.08
S-28: Decline of local road service is not mentioned in corresponding text on page S-140. The whole subject of service decline seems to be overblown for the INEL. A site that (a) has lost 2600 jobs over the last few years, (b) has recently opened an overpass/merge at its main entrance junction, (c) whose main access road was once at 70mph and has just been raised to 65mph and (d) most of whose employees ride buses, is not likely to have a new local traffic problem.	13/09.08.08
S-37a: The top three paragraph legends on Figures S-14 to S-31 should have the word "Category" instead of "Alternative" associated with them. For the fourth legend Facility should be plural.	4/16.00.00 cont.
S-37b: The LWR Category values in both Figures S-14 and S-15 are different from the corresponding Figures in Section 2.5.2, Ia. -1 and -2.	14/06.00.08
S-46, 5th para: The rank order of cumulative impacts differs from the last in the previous two paragraphs. Doesn't any discussion of cumulative impacts have to include the effects of programs listed in para. 2? If so, what is the distinction between the findings in para. 5 and the statement in para. 4 that INEL is among the least vulnerable?	15/09.00.08
S-47a, 2nd para: What is the distinction between "would be vulnerable", "could be vulnerable" (used in other paragraphs), and "could be susceptible"? S-47b, 4th para: What are the "key discriminators"? A number of environmental impacts more important than visual resources are not represented graphically. S-47c, 7th para: The text for the Comparison of Alternatives section that starts on this page appears to be verbatim from Section 2.5 of Volume 1. With the exception of Figures S-21 to S-25, the figures are the same, but in this summary the references to the individual figures have been removed and put far further front, away from the explanatory text. Figure S-4 should be referenced at the end of this paragraph and other figures should be referenced in subsequent paragraphs. S-47d, 8th para: Figure S-5 should be referenced here, in line 5. For a true comparison of alternatives, the bar graphs (and accompanying text) for Upgrade with RFETS	1/09.00.08 cont.
	16/02.04.08

F-027

09 08 08 Comment Number 7

The Summary table in the Draft PEIS was incorrect. Construction of the consolidated facility could cause a decrease in level of service at both Pantex and INEL. The Final PEIS reflects the correction.

09 06 01 Comment Number 8

Endangered species at Hanford may be impacted by implementation of this alternative. The text was revised to reflect potential impacts.

09 11 03 Comment Number 9

Language regarding adverse impacts has been modified in the PEIS based on comments received. The Final PEIS provides the necessary information to describe the impacts for the resources analyzed. The Summary of the Final PEIS has been revised (Sections S.5 and S.8) to provide a better description of the approach to the environmental impact analysis and the comparison of alternatives.

06 01 08 Comment Number 10

Some of the Pu material for disposition is relatively pure (such as metal in weapons pits) and requires little purification to be usable in MOX fuel. However, some Pu material is mixed with contaminants (such as Pu in halide salts) and requires a considerable amount of purification before it can be used in MOX fuel. For the purpose of analysis, approximately 70 percent of the Pu material does not require extensive purification, and, thus, lends itself for use as MOX fuel. The Final PEIS discusses the 70-percent split of materials in Sections 1.6 and 4.6.

09 08 08 Comment Number 11

The number of workers required to operate the Pantex facility with RFETS material would be the same as without the RFETS material (a total of 90 workers would be used in both cases). The numbers used in the Draft PEIS have been updated, and the new numbers and analyses were incorporated into Section 4.2.4.8 of the Final PEIS.

COALITION 21, IDAHO FALLS, ID,
GEORGE A. FREUND
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material should show the total employment impact on all six sites (the one that accepts the RFETS material plus the other five that do not). In other words, is the total employment impact greater if Pantex accepts the RFETS material than if ORR does?	16/02.04.08 cont.
S-48a, 4th para: Fatality values reported to the third significant figure are not defensible. Suggest using approximations that say they are (a) likely to be essentially zero for the 0.077 calculated value and (b) zero to one or two for the higher values. This approach worked best in the INEL EIS.	17/09.09.08
S-48b: What purpose does this comparison for the Upgrade alternative serve the decision maker? Does he have the option to upgrade some of the facilities and not others? If so, that option should be described. The reader and the decision maker will also have difficulty verifying the "least affected" claims because the corresponding figures (S-9 to S-13) show only the highest impact of each option. In other words the figures do not show the NTS P-tunnel option under Collocation. Finally, does this generalized comparison lamp apples and oranges (i. e. positive and negative impacts, and equating land use in some fashion with waste generated)?	18/02.00.08
S-48c, para 7a8 and S-48a, para 2.4.5 etc: The most important comparisons to be shown are between the Existing LWR and the other Disposition Categories because this is the choice most likely to confront the decision maker. Many of the comparisons that show the Evolutionary LWR to have the highest impact of any alternative are only marginally useful and detract from a clear and succinct comparison of likely alternatives.	19/01.00.00
S-49a, 5th para: This paragraph should be expanded to include the parameters in Figures S-21 to S-25 and should reference all Figures from S-18 to S-31.	1/09.00.08 cont.
S-49b, 6th para: Comment S-48a applies here as well.	17/09.09.08 cont.
S-53: Consistent with the previous comment, Figure S-35 is a meaningless comparison. The note shown on the figure should appear in the text and the Figure S-59 and S-122: Attachments A and B should be eliminated; they appear in Section 2.5 and are much too detailed, repetitive, and often conflicting to be in a Summary.	1/09.00.08 cont.
S-66: Dividing 220 person-rem by 30 millirem suggests that 7300 site workers would be affected by No Action on a long-term INEL storage facility that for most workers would be at least several miles away if the facility were upgraded (page S-77). The average dose would increase significantly but only 64 workers would be affected. Is this reasonable?	20/09.09.08
S-82: First entry under ORR: "does" not "does"	21/16.00.00
S-141: First two columns, 2nd entry: "than" not "then"	22/09.11.08
S-152 & S-153: Most of the numerical values under Waste Management are annual rates and should be so indicated.	

F-027

The storage options for ORR involve the storage of HEU not Pu. Hence, storage of RFETS material is not among the Proposed Alternatives for ORR.

09 11 08 Comment Number 12

Based on comments received, the Summary was revised. All revisions made are in the Summary of the Final PEIS. Specific comments on the amounts of waste being generated were addressed accordingly.

09 08 08 Comment Number 13

The level of service on some of the local roads at INEL would likely be reduced during construction and/or operation of several of the storage and disposition alternatives. Similar impacts would be expected at other DOE sites. For the PEIS, the local transportation impacts for each of the sites were modeled using the latest available traffic estimates and the number of additional workers expected to use roads into each site. The revisions made in the Final PEIS are also reflected in the Summary.

06 00 08 Comment Number 14

Based on comments received, the Summary of the Final PEIS has been revised and Figures S-14 through S-31 have been deleted because of the confusion they caused; incorrect values were mistakenly presented for some of the LWR alternatives shown in the comparison bar charts for operational land use and maximum direct employment. Sections S.5 and S.8 provide a narrative description of the approach to the environmental impact analysis and the comparison of alternatives.

09 00 08 Comment Number 15

The Department of Energy did not intend to give the perception that the sites were ranked. Specifics on how other DOE programs could affect the cumulative impacts associated with the proposed storage and disposition alternatives is addressed in Section 4.7 of the Final PEIS. The cumulative impact discussion presented in the Summary has been revised to better reflect the analysis in the Final PEIS.

Other: ROI for INEL is five counties in this PEIS, six counties in INEL WM EIS, and seven counties in WM PEIS. Numerical differences are small, but what a waste of effort not to have a single consistent ROI for INEL!

George A. Freund
George A. Freund 2025 Balboa Drive, Idaho Falls ID 83404, ph:(208)522-5647

23/09.08.03

02 04 08 Comment Number 16

Typically, EISs only assess employment impacts at the local and regional levels for a given action. The Draft PEIS and Summary presented projected changes in employment that could occur at each DOE site from storage upgrade and other storage alternatives. This information provides the decisionmaker with the ability to compare a range of alternative storage actions at each of the individual DOE sites. Based on comments received, the Draft PEIS Summary was revised. Revisions made in the Final PEIS are also reflected in the Summary.

09 09 08 Comment Number 17

In order to provide information to the public and decisionmakers, the human health risks and latent fatal cancers were presented in the Draft PEIS even though they are very small numbers. To aid public understanding of the risk numbers, an explanation of how to interpret these risk numbers is also included in Section M.5. Due to the inherent uncertainties associated with risk assessment, the parameters related to human health risk assessment should be kept to two significant digits. Risk numbers more than two significant digits were modified in Chapter 4 of the Final PEIS. Presenting more significant digits does not affect the decisionmaking process, but may prevent the artificial grouping of numbers that may disguise significant discriminators.

02 00 08 Comment Number 18

The Preferred Alternative included in the Final PEIS is a combination of storage alternatives. These are covered by the environmental analyses included in the Final PEIS. The impacts shown in the Summary do not lump "apples and oranges" or positive and negative effects on land use with waste.

F-027

01 00 00 Comment Number 19

The Department of Energy did not intend to give the perception that the sites were ranked. The Final PEIS provides the necessary information to describe the impacts for the resources analyzed. The comparison of alternatives bar charts were removed, and the comparisons are now addressed in the text. It is up to the decisionmaker to determine which impacts are discriminators among sites.

09 09 08 Comment Number 20

The radiation dose for workers for the No Action Alternative was estimated for the total workforce on site. For the proposed storage alternatives other than No Action, the dose for the workers was analyzed for workers involved only in the proposed new actions. The radiation dose from No Action is the baseline for the dose of the other Proposed Actions. The calculated dose for each Proposed Alternative is presented as the incremental dose over the No Action Alternative.

16 00 00 Comment Number 21

The commentor is correct, and appropriate changes were made to the text.

09 11 08 Comment Number 22

Impacts reported in Sections 4.2 and 4.3 tables of the PEIS are clearly marked for annual values, or total lifetime of each campaign, for each of the storage and disposition alternatives. Impacts reported in Sections 2.5, 4.6, and the Summary of the PEIS are also clearly marked for annual values or for the life of each alternative.

09 08 03 Comment Number 23

The PEIS defines the region of influence (ROI) as those counties where approximately 90 percent of current DOE and/or contractor employees reside. This definition was applied consistently across all of the sites evaluated in the PEIS. The other documents used slightly different criteria, which accounts for the differences in ROI counties identified in respective documents.

Subject:

Coalition 21 DPES Comments

COMMENTS ON STORAGE AND DISPOSITION OF WEAPONS-USABLE FISSILE MATERIALS
DRAFT PEIS - 21/06-03RK

Coalition 21 is a recently organized stakeholders group focusing on the future of technology in Idaho for the 21st century. These comments on the subject draft PEIS are submitted on behalf of our growing number of members. Our ID number for this comment document is 21/06-03RK.

1. The environmental impacts on the INEL from the various alternatives, particularly the ones likely to be implemented there, are acceptable and not likely to exceed significantly the impacts of existing/ongoing activities. This conclusion is based on the experience of our membership rather than on the PEIS Summary document, which we find seriously flawed as a clear explanation of the various alternatives and their environmental consequences (see comment 13 below).	1/08.03.01
2. Whenever environmental consequences are not a deciding factor, other factors must be considered in reaching rational decisions. Coalition 21 advocates safe, technically sound and proliferation-resistant choices that are fiscally responsible and consistent with Idaho's 1995 Nuclear Waste Agreement. Only then do we advocate their location at the INEL.	2/08.03.00
3. HEU storage should be consolidated at Oak Ridge, where HEU has been produced for many years and where about two-thirds of the current inventory is stored.	3/01.04.00
4. Some of the discussion and much of the media coverage of the April 15 public hearing in Idaho Falls focused on whether plutonium is a waste or not. Coalition 21 believes that plutonium becomes a waste only if DOE does not put it to beneficial use prior to final disposition. Accordingly we support the general concept of consolidated long-term storage at PANTEX where about two-thirds of the current inventory exists. However, we prefer the No Action alternative for INEL plutonium, if current or reasonably likely future programs at ANL-W can put it to beneficial use. If those programs do not materialize, the plutonium must be removed by the year 2018, consistent with the transuranic waste provisions of the 1995 Nuclear Waste	4/09.11.08 5/08.03.01 6/08.03.01 7/08.03.00

- more -

F-028

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for additional missions at INEL. Based on comments received, the Summary of the PEIS was revised and now includes the Preferred Alternative. The bar charts (figures) providing the comparison of impacts for both storage and disposition were deleted from the Summary. The related text was revised to clearly describe the alternatives and clarify the comparison of impacts.

08 03 00 Comment Number 2

The Department of Energy acknowledges the commentor's support of new missions at INEL if they are fiscally responsible and consistent with the 1995 Nuclear Waste Agreement (October 17 Settlement Agreement/Consent Order).

01 04 00 Comment Number 3

Comment noted. The *Disposition of Surplus Highly Enriched Uranium Final Environmental Impact Statement* (HEU EIS) assumed that all HEU would be transferred to ORR for storage pending a decision on long-term storage. Continued storage at ORR for the "long-term" is one of the alternatives analyzed in the PEIS. Facilities at other sites are included in the PEIS analyses since they are also "reasonable" storage alternatives and, therefore, must be considered according to NEPA. The Preferred Alternative for storage is identified in Chapter 1 of the Final PEIS.

09 11 08 Comment Number 4

The Department of Energy acknowledges that, in accordance with 40 CFR 261.4, "Source, special nuclear or by-product material as defined by the *Atomic Energy Act* (AEA), as amended, 42 U.S.C. 2011 et. seq." is not a "solid waste" under RCRA. Section 1.1.1 outlines the materials that fall within the scope of this PEIS.

COALITION 21, IDAHO FALLS, ID,
RICHARD KENNEY
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Agreement.	7/08.03.00 cont.	5. The National Academy of Sciences study established the "Spent Fuel Standard" as a criterion by which to judge disposition alternatives. One assured way of meeting that standard is to incorporate the plutonium in LWR fuel and then use that fuel to high burnup. Disposal of plutonium through such burnup use in commercial power reactors provides a real "peace dividend" for weapons usable materials. Coalition 21 therefore supports the Reactor category of disposal alternatives.
6. Commercial reactors already produce considerable plutonium, concurrent with burning it up via the fission process. A number of commercial nuclear plants including WPPSS-2 have expressed an interest in using weapons plutonium in their plant. In this instance Coalition 21 recognizes that the environmental consequences (and financial costs) of the Existing LWR alternative are less than those of other Reactor alternatives.	8/08.03.01	7. The Evolutionary LWR alternative would allow the US to build here one or more of the advanced US designs already being built and tested overseas. It would prevent this technology and industrial base from completely escaping to our overseas competitor nations and would help to ensure a future role for nuclear power in a growing economy that is less dependent on foreign oil. We support this Reactor alternative. The INEL would be an acceptable site, but we do not advocate location at INEL because a new large commercial reactor (even half-size) should be built near load centers, and in conjunction with a utility that already operates nuclear power plants.
8. However, INEL would benefit indirectly from the selection of any Reactor alternative through INEL's continuing technical (and possibly safety testing) support to the Nuclear Regulatory Commission. DOE should provide sufficient financial support to ensure that the underlying technology and core competencies are maintained at INEL, the primary reactor testing facility and designated engineering laboratory for DOE. This INEL mission should be clearly delineated in the Strategic Laboratory Missions Plan now being prepared by DOE. Coalition 21 is commenting separately on the draft plan.	9/08.03.01	
9. Coalition 21 supports the location of the MOX fuel fabrication facility at the INEL, but we recognize that other DOE sites, such as Hanford where a commercial fuel fabrication facility already exists nearby, are likely to be stronger candidates.	11/08.03.01	
10. According to the EIS, some forms of plutonium will not lend themselves to MOX - more -	12/08.03.01	

F-028

08 03 01 Comment Number 5

The Department of Energy acknowledges the commentor's support of consolidated long-term storage at Pantex. Decisions related to storage will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 6

The Department of Energy acknowledges the commentor's support for the continued storage of surplus Pu (No Action Alternative) at INEL. Decisions on disposition of weapons-usable fissile materials at INEL, Argonne National Laboratory-West (ANL-W), or other facilities will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 00 Comment Number 7

Decisions on storage and disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input. Part of the decision process takes into consideration existing agreements such as the 1995 Settlement Agreement among the State of Idaho, DOE, and the U.S. Navy. DOE is committed to compliance with the October 17, 1995, Settlement Agreement/Consent Order.

08 03 01 Comment Number 8

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 9

The Department of Energy acknowledges the commentor's support for additional missions at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses,

COALITION 21, IDAHO FALLS, ID,
RICHARD KENNEY
PAGE 3 OF 4

fabrication. For these forms the INEL, with its vast chemical processing experience, should play a major treatment role, preferably through the ANL-W Electrometallurgical Process (provided that process is successfully demonstrated) or via one of the other immobilization alternatives. If the treated material is shipped in and out of Idaho in a timely manner, such treatment would meet the terms of the 1995 Nuclear Waste Agreement. 11. If DOE selects the immobilization category of alternatives for disposition of all its plutonium, Coalition 21 believes that the ANL-W EM alternative (once successfully demonstrated) is the environmentally best alternative in this category and we support it for that reason.	12/08.03.01 cont.	15 00 00 Comment Number 10 Comment noted.	13/08.03.01 14/09.01.03	08 03 01 Comment Number 11 The Department of Energy acknowledges the commentor's support for construction of the MOX fabrication facility at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, existing agreements, and public input. 08 03 01 Comment Number 12 The Department of Energy acknowledges the commentor's support for the Electrometallurgical Treatment Alternative and other disposition alternatives at INEL. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, existing agreements, and public input. In a different context, a limited demonstration of electrometallurgical treatment of EDR-II spent nuclear fuel is underway at ANL-W and is scheduled for completion within the next 3 years, pursuant to the <i>Environmental Assessment of the Electrometallurgical Treatment Research and Demonstration Project in the Fuel Conditioning Facilities at Argonne National Laboratory-West</i> (DOE/EA-1148, May 1996). 08 03 01 Comment Number 13 The Department of Energy acknowledges the commentor's support for the construction of the Pu conversion facility at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

F-028

09 01 03

Comment Number 14

Concerning the land area required during operation for the Upgrade Alternatives, the Draft PEIS was revised to identify "disturbed area" as land currently not in use and previously an undisturbed natural habitat. Previously disturbed areas, such as graveled area or any land previously graded and cleared of vegetation, were considered "already disturbed areas." All areas within the existing Protected Area (PA) are classified as "already disturbed areas." The criteria for determining disturbed and undisturbed land area during construction would be the same as for operation.

At INEL, only the Upgrade Alternative would be situated entirely on previously disturbed land ANL-W. A potential location for the Consolidation and Collocation Alternatives at INEL would be undisturbed land east of the ICPP. Section 4.2.3.1 of the Final PEIS reflects the revision.

09 00 08

Comment Number 15

Based on comments received, the Summary was revised. The bar charts providing the comparison of impacts for both storage and disposition were deleted from the Summary. The related text was revised to clarify the comparison of impacts.

COLORADO COALITION FOR THE PREVENTION OF NUCLEAR WAR,
FRANKTOWN, CO, V. E. PERKINS
PAGE 1 OF 1

THE COLORADO COALITION
11151 E. Grant Rd.
Franktown, CO 80116-9221
May 2, 1996

DEPT. OF ENERGY
Office of Fissile Materials Disposition
P. O. Box 23786
Washington D.C. 20026-3786

Re: PFIS on Plutonium Storage and Disposition

Dear DOE:

The Board of the Colorado Coalition has authorized me to comment on the PFIS on Plutonium Storage and Disposition. First, we strongly oppose converting our excess PU for use as a reactor fuel. Such use will, in our view, encourage proliferation and it will increase the nuclear waste stream.

The principle to keep in mind is that the U.S. must dispose of excess PU in a way that will stop the spread of nuclear materials. In our view, that immediately removes the options of using it as a reactor fuel or putting it into deep bore holes. We think the option of vitrification is the most likely way to immobilize PU and to render it unusable for weapons purposes. We therefore believe that money should be spent on developing this technology and that the PU in question should be stored as safely as possible until this technology can be used to immobilize PU.

Sincerely,

V. E. Perkins

V. E. Perkins, Ph.D., Vice-President
THE COLORADO COALITION FOR THE PREVENTION OF NUCLEAR WAR

1/08.03.01

2/08.03.01

3/08.03.01

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, reactor burning must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, nonproliferation analysis, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to the disposition alternatives. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, nonproliferation analysis, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's support for the Vitrification Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, nonproliferation analysis, and public input.

M-134

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL,
WILLIAM F. NAUGHTON
PAGE 1 OF 9

Commonwealth Edison Company
4401 Upper Plaza
Downers Grove, IL 60515-2701

ComEd

May 4, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 33786
Washington, D.C. 20026-3786

Attention: Draft Programmatic Environmental Impact Statement Comments on
Storage and Disposition of Weapons-Usable Fissile Materials

Dear Madam/Sir:

Commonwealth Edison Company (ComEd) is pleased to have the opportunity to
provide comments to DOE's Draft Programmatic Environmental Impact Statement
(PEIS). ComEd believes that incorporation of the comments contained herein will
improve the overall clarity, consistency, strength of the draft PEIS.

In the Enclosure, ComEd has categorized its comments for DOE's convenience and ease
of reference. ComEd believes that the Summary PEIS document should include and
highlight all significant findings that distinguish the various alternatives. To that end,
ComEd will identify those areas requiring special emphasis in the enclosed comments.

Very truly yours,

William F. Naughton
William F. Naughton
Project Manager Fissile
Nuclear Strategic Services

enclosure

F-015

ENCLOSURE ComEd Comments on Draft DOE FEIS for Storage and Disposition of Weapons-Usable fissile Materials	<u>GENERAL</u>	• MOX LWR History. Since 1963 the Europeans have manufactured, safely loaded, and burned over 400 tons of LWR MOX fuel. The manufacturing and use of MOX fuel is a fully developed and deployed industry that the U.S. can look to with confidence for information and assistance in the deployment of a similar MOX program in the U.S. for the disposition of excess weapons plutonium.	1/08.03.01
	• Immobilization Uncertainty. In contrast, while much is known about immobilization of trace amounts of actinides in glass or ceramic, very little is known about the immobilization of plutonium in glass or ceramic, let alone the impact of the deep borehole burial option, and therefore large uncertainties have to be assumed requiring extensive research and development, with little assurance of success. These uncertainties need to be more clearly delineated both in the complete and Summary documents.	2/04.02.00	
	• Rapid Deployment. Special weight should be given to options that enable rapid implementation and encourage similar actions within the former Soviet Union. After all, the real threat of this material is not the inventory stored in the U.S., but the inventory that exists in Russia. The sooner a disposition path is chosen that is compatible with Russian methods of disposal, the more likely Russia will proceed with its own disposition. The former Soviet Union views its excess weapons plutonium as an asset that should be utilized as MOX fuel. Thus, a similar rapidly deployed program in the U.S. would provide impetus to both countries.	3/01.03.00	
	• Design LWR Impact. The advantage to the LWR alternative is clearly the none to minimal impact to land use, visual resources, air quality, local geology, biological (which includes impacts to endangered species, etc.), historic resources, paleontological, resources, etc. as delineated in Draft FEIS pages 4-680 through 4-686. This is in comparison to constructing new facilities or substantially expanding the facilities at the up to 7 DOD sites for the various alternatives evaluated, which may have substantial impact to some if not all the aforementioned environmental concerns.	4/08.03.01	
	F-015		

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

04 02 00 Comment Number 2

Further information on the technical viability of alternatives was provided in the Technical Summary Report and related alternative summary reports published beginning in July 1996. These documents are referenced in the Final PEIS and were made available to the public.

01 03 00 Comment Number 3

Comment noted.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

CANDU Must Be Evaluated. Evaluation of environmental impacts must not be limited to inside the U.S. borders unless some normalizing factor can be applied to U.S. options to account for the differences. In particular, the inclusion of the CANDU Reactor alternative with virtually no environmental assessment implies that there are no environmental impacts associated with that alternative. At the Washington, D.C. public meeting DOE indicated that such an impact will be required of the Canadian government. If so, that should be unequivocally stated both in the Summary and detailed FEIS Documents. Additionally, prior to issuance of a final FEIS, the U.S. public should also have an opportunity to comment on the Canadian EIS for the CANDU alternative.	5/06.05.09
	6/08.02.00
Timely Action Impact. The draft FEIS should evaluate the need for timely action and the potential environmental consequences for delays in terms of the increased proliferation risk. Also, appropriate benefits should accrue to those options that can be implemented immediately. Thus, the implementation immediacy of the various disposition alternatives should be evaluated and compared for their overall environmental impacts.	7/01.00.00
	8/08.03.00
The No Action and Storage options fail to even acknowledge the increased possibility for clandestine diversion and usage of the highly viable nuclear weapons materials by terrorist groups or hostile governments especially since these options most likely will be chosen based on Russian actions. In fact, these essentially are the status quo options from which the "clear and present danger" concerns stemmed. This aspect clearly needs to be addressed in the Final PEIS.	9/13.00.00
Decommissioning Environmental Impacts. Environmental impacts of decommissioning of all facilities have not been included in the PEIS. Only the LWR option is currently planning/allowing for this aspect. The LWR and CANDU are only alternatives that are not impacted in the PEIS as they will be decommissioned whether or not weapons material is disposition in their facilities. All other alternatives require further review to account for the environmental impacts of decommissioning. These impacts need to be addressed in the Final PEIS.	10/01.02.00
Finally, Western European's extensive experience in LWR MOX fuel provides overwhelming evidence that the LWR MOX options under consideration in the draft PEIS are superior to the other options, not only in terms of environmental, health, and safety aspects, but also in terms of cost/benefit, ability for rapid deployment, and compatibility with the former Soviet Union's objectives.	F-015

06 05 09 Comment Number 5

The PEIS states that the environmental impacts in Canada for the CANDU Reactor Alternative are not included, but that such impacts would be addressed in Canada in accordance with Federal law.

08 02 00 Comment Number 6

The Canadian Government has informed the United States that they will not start their environmental analysis until the United States has completed its actions and has stated that the CANDU Reactor is the Preferred or one of the Preferred Alternatives. The means by which U.S. citizens can comment on a Canadian environmental analysis process is beyond the scope of this PEIS.

01 00 00 Comment Number 7

Analyses of the cost, schedule, and proliferation impacts are discussed in separate documents to support DOE's ROD. The documents related to technical, cost, and schedule analysis were available for public review beginning in July 1996. The nonproliferation analysis was made available to the public beginning in October 1996. A series of public meetings to discuss the proliferation analysis were conducted by DOE prior to issuance of the Final PEIS.

08 03 00 Comment Number 8

Schedule information, including the time required to start and complete all of the alternatives, will be provided to the decisionmaker as part of the overall process of making decisions on implementation of alternatives. However, the environmental impacts are not dependant upon the schedule or time required for implementation.

13 00 00 Comment Number 9

Analysis of the No Action Alternative is required by NEPA to serve as a baseline. As stated in Chapter 1 of the PEIS, the purpose of the Proposed Action is to provide safe, secure, and cost-effective storage for the uninsurable weapons-usable fissile materials and for the surplus Pu pending disposition, since the disposition process would take time. The intent is to conduct the disposition, maintaining appropriate levels of security until all

MOX FABRICATION FACILITIES

- May Not Be Needed. The Draft FEIS states on pages S-15, S-22, and S-32 that a dedicated facility would have to be built at a U.S. site to implement the LWR alternative. COMED agrees that a facility or facility expansion will be required for the CANDU alternative, but disagrees with DOE that it must be built for the LWR alternative. A MOX fabrication facility may have to be built, but for the FEIS it should not be required. Since existing European facilities would be used to meet the interim fuel needs of the existing LWR alternative, DOE should also explore the environmental impacts/benefits of using existing excess European capacity or elasticity in plant capability to meet the LWR weapons disposition alternative. Both alternatives should be analyzed and evaluated in the Final FEIS. However, the use of excess European capacity and elasticity should be explored first. Let the ultimate decision be based on an integrated examination and comparison of all the issues associated with a foreign versus domestic MOX fabrication supply. Note that by providing a dual fabrication facility option that:
 1. For the LWR alternative, the Environmental impact is significantly reduced without a required MOX fabrication facility, not to mentioned the reduced cost of the option;
 2. There is no change for the CANDU alternative as a MOX fabrication facility will be needed for either case; and
 3. A U.S. MOX fabrication facility on a DOE site may negatively impact the Russians from a trust and integrity perspective, as a strong case can be made that such a facility would not be economically justified in the commercial sector. Hence, a Russian perspective could include a hidden agenda, siphoning off weapons plutonium, etc.
- Adjuncts to LWR Alternative. Requiring the construction of a MOX fabrication facility may add substantially to the perceived risk of the LWR alternative as the environmental impacts of constructing and operating the MOX facility are currently included in the LWR alternative. Thus, alternative or comparative analyses that include both utilization of existing capacity as well as a new facility need to be included in the FEIS to ensure accurate and unbiased comparisons.

11/06.01.09

12/06.02.08

F-015

surplus Pu materials are taken care of. Security and proliferation are further discussed in the nonproliferation analysis (*Nonproliferation and Arms Control Assessment of Weapons-Usable Fissile Material Storage and Plutonium Disposition Alternatives*), which was issued for public comment in October 1996 and will be considered in the ROD.

01 02 00 Comment Number 10

Environmental impacts of decommissioning the disposition facilities will be addressed in the next tier NEPA documents, as appropriate, once the sites for these facilities have been determined.

06 01 09 Comment Number 11

Europe is moving toward a balance between the capacity to fabricate MOX fuel and the capacity to utilize MOX fuel in reactors. Additionally, Europe has excess separated Pu stores that they intend to use as MOX fuel as the fuel fabrication infrastructure and reactor infrastructure permits. Therefore, use of European reactors for consumption of U.S. Pu-source MOX fuel would merely displace the use of separated European Pu and result in no net reduction in world inventories of separated Pu. Hence, the statement that Europe has no excess MOX capacity. Additionally, facility utilization projections indicate that, while some excess MOX fuel fabrication capacity may exist in Europe for the next few years, current capacity is soon expected to be fully utilized for commercial MOX fabrication. Therefore, the United States may not be able to rely on the use of existing European MOX fabrication capacity for the entire disposition campaign. However, as a part of efforts to develop weapons-grade Pu MOX fuel, DOE is consulting with European Fuel Fabricators to benefit from their experience in MOX fuel fabrication and may have some MOX Lead Test Assemblies and/or initial core loads fabricated in Europe. Also, participation in the construction and operation of a MOX Fuel Fabrication Facility in the United States will be open to European fuel vendors.

06 02 08 Comment Number 12

It is envisioned that excess MOX fuel fabrication in Europe will be insufficient to satisfy DOE's Office of Fissile Materials Disposition need for

NON-LIGHT WATER REACTOR ALTERNATIVES CANDU - MOX fabrication facility will be required for this option. - Virtually no environmental impacts were assessed incrementally which is a must to ensure a balanced evaluation. - Comparison of current uranium based CANDU should be assessed with MOX based impact in all aspects. - Extension of designated CANDU plant life should be included as shutdown of the units proposed for the disposition has been considered if the CANDU MOX alternative is not chosen. The plants are already beginning a three-year license renewal (April 11, 1996 Nucleonics Week). Therefore, in the Final PEIS DOE should evaluate this situation as being equivalent environmentally with the building of a "new" plant (same as Evolutionary LWR) with respect to MOX usage. - The CANDU alternative would require fabrication of a much larger quantity of MOX fuel to dispose of the same quantity of plutonium than the LWR alternative.	13/06.05.08
BOREHOLE - Unproven Technology. This technology is not proven. The risks calculated are estimated based on modeling of an undetermined site, hence there are large uncertainties in the analysis. A more balanced comparison should be made to the risks at existing facilities which are much better defined, being based primarily on extrapolations of existing conditions, which have much less uncertainty. - Major Uncertainty. Since for this alternative: - No site has been specified; - No previous EIS, and - No previous licensing experience, the siting/licensing of the facility would be time consuming resulting in extended interim storage. Based on the previous DOE experience in a similar arena, specifically the fact that the U.S. has been unable to finalize siting of this HLW facility and the LLW facilities by the various state compacts, the degree of uncertainty of this alternative even being viable within the timeframe of the "clear and present danger" envelope is a major point that needs to be addressed. - The mixing facility will require eventual decommissioning, adding to the burden at both the HLW and compact LLW sites.	14/06.05.08
13/06.05.08 cont.	15/04.00.00
16/04.03.00	F-015

MOX fuel fabrication; thus, a domestic MOX fuel facility would likely be required. Pending operation of the domestic facility, DOE is considering using foreign fuel facilities to make MOX fuel for the initial stage of the Pu disposition campaign.

06 05 08 Comment Number 13

Comment noted.

06 05 08 Comment Number 14

Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. This will include an appropriate level of analysis concerning the CANDU Reactor Alternative. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

04 00 00 Comment Number 15

Since no sites have been selected for a deep borehole and because there are no existing deep boreholes utilized for waste disposal, DOE chose to analyze a generic borehole site for environmental impacts. Some of the other disposition technologies require facilities which are similar to existing facilities in the United States. Therefore, DOE chose to pick representative sites for some of the other disposition alternatives.

04 03 00 Comment Number 16

Further information on the technical viability of alternative sites was provided in the Technical Summary Report and related alternative summary reports made available for public review beginning in July 1996.

COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL,
WILLIAM F. NAUGHTON
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• VITRIFICATION

1. This technology is not proven with a high content of plutonium and should require extensive and lengthy research, development, and testing in a prototype facility before it could be viewed as an alternative for the LWR alternative from an industrial perspective. DOE needs to address this aspect fully in the final FEIS.
2. This technology, contrary to the LWR alternative, does not reduce the plutonium inventory and does not degrade the plutonium isotopic composition from military grade to reactor grade level. Thus, it is not comparable to the LWR alternative from a non-proliferation perspective.
3. This technology is not contemplated by the Russians and would therefore, not bring any advantage in terms of compatibility with the former Soviet Union's objectives.

17/05.01.08

18/08.03.01

05 01 08

Comment Number 17

Further information on the technical viability of alternatives was provided in the Technical Summary Report and related alternative summary reports made available for public review beginning in July 1996.

08 03 01

Comment Number 18

The Department of Energy acknowledges the commentor's opposition to the Vitrification Alternatives. Decisions on disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

06 02 09

Comment Number 19

To get the MOX fuel to the Spent Fuel Standard as soon as possible and then remove it from the reactor, we would necessarily shorten the refueling cycles and cause more spent fuel to be removed from the reactor over the program life. Since the amount of spent fuel, radioactive waste, security, and radiation

F-015

LIGHT WATER REACTOR ALTERNATIVE

- **LWR Work Force Unchanged.** The proposed increase of 40-105 workers per single unit at the LWR facilities (Figure on S-141) is totally unrealistic. Other than minor increases in the security force, there would be no incremental change to the site labor force required for MOX utilization. This aspect needs complete revision including the modifications to all the other environmental impacts impacted, e.g. worker carcinogenic risks, etc.
- **Unrealistic LWR Fuel Cycles.** The PEIS (page 4-692) assumes yearly fuel cycles with single cycle MOX fuel assembly usage. This scenario is unrealistic for the commercial LWR alternative, especially for the the necessity of operating and producing a stable and reliable product for its customers. The assumption that LWRs would always be unloading once burned MOX fuel and replacing with fresh MOX does not consider the implications on the remaining fuel in the reactor and the necessary complications and substantial additional wasted resources from the uranium portion of the fuel cycle that would be necessary to effect such a scheme. Some observations about the once through scheme:
 1. Spent fuel pools would fill up faster with the once through scheme. The disposition issue then becomes a high level waste issue which currently shows no indication of being resolved in the intermediate future.
 2. Once burned MOX assemblies will retain higher residual reactivities when discharged and will impose new safety and licensing issues on existing Spent Fuel Pool licensing bases, especially in light of the quantities of assemblies being discharged each cycle.
 3. Once burned MOX assemblies with their higher residual reactivities and heat load will impact HLW transportation and disposal within the repository as current requirements on reactivity and heat loads assumes nearly depleted spent fuel.
 4. The environmental impacts are significantly increased for the once through scheme versus the current LWR two to three eighteen month fuel cycles.
 5. Impact on MOX Fabrication. The requirements for the once through scenario will certainly tax whatever fabrication facility or capacity that is to be used. Additionally, it is questionable that DOE can convert the weapons material rapidly enough into LWR compatible fabrication material to meet such capacity requirements. DOE needs to evaluate their proposed schemes in concert with reasonable fabrication capability. The environmental impacts are directly proportional. A balance needs to be analyzed.
- **For current LWR operations:**
 1. There will be NO increase in spent fuel storage needs; and
 2. All waste forms (HLW, LLW, and Intermediate Waste) will be the same for MOX or uranium fuel cycles.

19/06.02.09

20/06.02.09

21/01.00.00

22/06.02.09

F-015

protection personnel requirement would increase, there would be a need for additional personnel. Also, the addition of a new fuel handling building would require additional personnel for security. A ratio, derived from a 14-percent increase in the amount of spent fuel generated, would probably impact personnel by approximately 10 percent of that amount, or about 1.4 percent. A four unit BWR normally necessitates about 2,819 people, and 1.4 percent of 2,819 is 39 people. These are conservative considerations used for the environmental analysis. Optimization of the fuel cycle would reduce the personnel requirements.

06 02 09 Comment Number 20

The PEIS fuel cycle was an idealized case selected for analyses. Any real fuel cycle would be designed to closely match reactor operating cycles, typically 18 to 24 months.

01 00 00 Comment Number 21

Comment noted.

06 02 09 Comment Number 22

A real fuel cycle would require a transition from low-enriched uranium (LEU) fuel to MOX fuel in a staged manner where the LEU would be replaced as it is burned out. The PEIS case is an idealized fuel cycle prepared for analyses of environmental impacts.

09 09 08 Comment Number 23

Comment noted. Section 4.9 of the PEIS has been modified to further describe avoided impacts.

10 02 00 Comment Number 24

Standard transportation accidents and resulting fatal injuries statistics, per number of vehicles, were used because they are conservative and documented. The number of fatalities is based on several factors including the radiation environment of the package, type of package used, type of vehicle, number of miles to be traveled, and type of roads to be traveled. The standard approach is applied to all alternatives and sites. This is appropriate at the programmatic level.

• The LWR alternative: 1. Destroys plutonium to below weapons grade; 2. Is consistent with the plans of the Russians and other nuclear weapons countries; 3. Is an irreversible process and therefore favored by non-nuclear states; 4. Is based on existing, proven technology; and 5. Has a portion of the cost offset by revenues from energy production.	4/08.03.01 cont.
• Environmental Benefits. The FEIS does not contemplate the environmental benefits associated with lower mining and milling levels for uranium, less energy consumption for conversion and enrichment, and materials and energy necessary for fabrication through the avoidance of purchasing uranium based fuel. Assuming the replacement of 4.5w/o fuel for 40 Mt of Pu, avoids the need for 5 million SWUs and 21.6 million lbs U3O8. The energy required per SWU is 2,150-2400 KWH/le per SWU from coal fired reactors for USEC gaseous diffusion production. This would result in a substantial decrease in tail production, and, in fact, would result in current tails be used as the blend material to make the MOX. Additionally, the avoided risks associated with not producing traditional uranium fuel assemblies, i.e. mining and milling accidents, transportation of fuel assemblies and materials, worker impacts in all phases including fabrication, etc. need to be credited to the LWR alternative. • LWR Offsets. Additionally, the LWR alternative should be credited with the huge energy and environmental "offset" values as compared to the other alternatives: Energy Value - assuming that all 40 Mt of excess weapons grade plutonium were manufactured into MOX fuel, a new fuel worth of \$1.6-2.1 billion would result with approximately 45 GW years of electricity worth approximately \$32 billion in revenues; and Waste Generated - Since MOX fuel displaces uranium fuel that would otherwise have to be obtained by mining, milling, converting, enriching, and fabricating uranium, the wastes that the verification option would generate would have to be considered because of the need for new uranium fuel. Thus, verifying -40 MT of PU would not only generate repository waste volumes in the form of approximately 360 cubic meters of extra HLW glass, the verification of this Pu would result in 5.6 million additional cubic meters of mill tailings and 1800 cubic meters of enrichment tails caused by the mining of uranium to displace the plutonium as new reactor fuel.	23/09.09.08
• Offset of Uranium Fuel Transport. The FEIS indicates an incremental increase in the number of transportation facilities associated with MOX fuel transport, primarily due to increased number of vehicles used to provide safe transport. Utilization of standard transportation accidents and resulting fatal injuries statistics per number of vehicles may not be accurate when one considers the intent of the increased vehicles, i.e. to ensure safe and secure transport. Presumably, the transport teams would have a significantly lower overall potential accident rate and thus, fatality rate than just the	24/10.02.00

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COMMONWEALTH EDISON COMPANY, DOWNERS GROVE, IL,
WILLIAM F. NAUGHTON
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associated with number of vehicles on the road. In this field as well, the extensive
experience of MOX transport in Europe without incident may be viewed as an asset.

24/10.02.00
cont.

F-015

08 01 00 **Comment Number 1**
At the request of several organizations and i
period was extended to a total of 92 days.



P.O. Box 638
PEBOLETON, OREGON 97801
Area code 541 Phone 278-0105 FAX 278-0106
Pub. Dir: Carl Altmeyer May 23, Portland, OR

David Nelson
Director, NEPA Compliance and Oversight
Office of Plastic Materials Disposition
U.S. Department of Energy
MD-4 Regional Building
1000 Independence Avenue SW
Washington, D.C. 20385

Dear Mr. Nelson:

1/08.01.00

Thank you very much for your consideration of this request. CTRN/ASAP staff would like to receive written confirmation of your action. If there are any further questions, please do not hesitate to contact either me, or Tom Ahrens, ASAP Research Coordinator, at 541-376-0165 (phone) or 541-378-3300 (fax).

Camille Wilson

James R. Wilkinson
Program Manager
Special Sciences and Research Program
THE UNIVERSITY of MICHIGAN

TREATY JUNE 9, 1868 - CAYUSE, UMATILLA AND WALLA WALLA TRIBES

M-202

COOPS, MELVIN S., SANTA ROSA, CA
PAGE 1 OF 2

MELVIN S. COOPS
4 Valley Center Road
Santa Rosa, CA 95408-4228
Telephone 707-536-1440

June 6, 1986

David Nulton, MD-4
U.S. Department of Energy
Foresdal Building
1000 Independence Ave SW
Washington, DC 20585

Dear Mr. Nulton,

At this time I would like to provide additional comments relating to the PEIS on the "Storage and Disposition of Weapons-Usable Fissile Materials".

I have previously expressed strong recommendations to store, and make available to the U.S. Naval Nuclear Propulsion Program, all weapons-surplus highly-enriched uranium-235 (93%) for eventual utilization as naval reactor fuel; and to create a special reserve supply of lesser enriched uranium fuels (average 50 % enrichment) for use in development of modern sodium-cooled fast reactor systems that certainly will be needed in the U.S. for electrical power generation in the near future, as was recommended by the National Academy of Sciences as their top priority item in their recent evaluation of U.S. national energy development requirements. (Please see my letter to Greg Rudy, MD-1, dated December 22, 1985).

The current international situation relating to weapons development activities by many foreign countries, demands that the U.S. maintain its nuclear options in an intelligent and judicious manner. In particular, the apparent reversal of political trends in Russia, and the continuing economic and military buildup in China, Pakistan, Iran, and other potential world trouble-spots, requires that the U.S. not unilaterally discard its nuclear options and capabilities. I believe that we should proceed with dismantlement of our surplus old weapon systems, but that we must retain in readily available form, the critical nuclear material recovered from the dismantlement program for possible use for an indefinite period. The cost to accomplish this is practically nothing, since storage of plutonium in metal form for long periods of time is well understood, simple, and quite inexpensive (all facilities and equipment exists), compared to other options being proposed. Attempting to convert plutonium to a permanently-useless form, (short of destruction by fission) is naive, unimelligent, and downright dangerous to future generations. Storing this material for future use, hopefully as fast-reactor fuel, is a wise and prudent investment both for the U.S. economy, and as insurance against undesirable military eventualities.

F-054

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for long-term storage of fissile materials. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

I strongly urge the USDOE and Congress, that the DOE should recover all existing military plutonium in the form of metal castings, sealed under vacuum in welded stainless-steel containers, for long-term storage. This option is absolutely practical for at least 50 years, and probably suitable for hundreds of years more. This option will permit a long-term evaluation of the status of world politics over the next decade and permit a truly realistic evaluation by our own next generation. The Russian state will pursue this approach whether we do or not, and it is in our best national interest to do the same. Any other option at this time, would be gambling with the future of this country and possibly the future of many of the democracies of our current world.

1/08.03.01

Sincerely yours,

M.S. Coops
Melvin S. Coops, ScD
Retired Nuclear Chemist

F-054

COUNTY OF ST. CLAIR, OFFICE OF EMERGENCY MANAGEMENT,
PORT HURON, MI, JEFFREY A. FRIEDLAND
PAGE 1 OF 1



OFFICE OF EMERGENCY MANAGEMENT

County of St. Clair, Michigan

204 BARD STREET, PORT HURON, MICHIGAN 48060

Phone (810) 987-1710
FAX (810) 985-5102

JUDITH KEEGAN, Chairperson, St. Clair County Board of Commissioners
JEFFREY A. FRIEDLAND, Coordinator

June 4, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington D.C. 20026-3786

REF: Storage and Disposition of Weapons Usable Fissile Materials Draft Programmatic
Environmental Impact Statement.

I am writing with concern regarding the options presented in the reactor category of
disposition alternatives in the above Programmatic Environmental Impact Statement.

It is apparent that the Canadian Deuterium Uranium (CANDU) reactors located near
Kincardine, Ontario is a facility that would utilize the plutonium based mixed oxide fuel that could
result from the proposed refinement facility in the Washington state. This would create a lengthy
transportation route through densely populated areas.

St. Clair County would be included in this transportation route as both Interstates 69 and
94 merge near the Blue Water International Bridge to Ontario. As the emergency management
coordinator for the county, I have serious concerns regarding the volumes of traffic on these
interstates and the ability of local emergency response units to handle an emergency situation
involving the proposed product movement. The current volume of hazardous materials has
overwhelmed these units without even considering the proposed hazard.

If the CANDU option is one that is seriously being considered, I would strongly urge your
Department to consider a transportation route through Canada from a point further west of
Michigan as the route through St. Clair County is unacceptable in my opinion.

I thank you for the opportunity to comment on this important issue.

Sincerely

Jeffrey A. Friedland

Government of Service



M-257

10 00 00 Comment Number 1

Under NEPA, DOE is required to evaluate a range of alternatives for Pu disposition. In that regard, the disposition of Pu in CANDU reactors is one of nine different disposition alternatives analyzed in the PEIS. Six specific sites and a generic site are evaluated for fabricating MOX fuels for Pu disposition. As a result, the transportation analyses performed in the PEIS consider multiple routes from potential MOX fuel fabrication sites to potential reactor sites. Although the Port Huron/Sarnia border crossing is mentioned in the PEIS as a convenient point for the CANDU fuel shipments to pass from the United States to Canada, our analysis also reflects other possible routes.

The Draft PEIS did not identify a Preferred Alternative for Pu disposition. A Preferred Alternative is identified in the Final PEIS and a disposition decision is expected to be made by the end of the year. The decision will take into account environment, safety (including transportation), and health factors, as well as technical, cost, schedule, and nonproliferation considerations. After the ROD (which will include technology approaches), which is expected in late 1996, follow-up analyses, negotiations, and specific agreements over several years will be required before implementation.

1/10.00.00

CRAMER, JERRY
PAGE 1 OF 1

My name is Jerry Cramer and I reside at 3650 West 42nd Avenue. I'm here to speak in favor of Plutonium Disposition Project. I can't think any better way to reduce our stockpile of plutonium than making fuel out of it to produce electric power for the Pacific Northwest. Burning plutonium is also very compatible with DOE's Hanford cleanup mission.	1/08.03.01
I feel the Supply System deserves this project because they have worked very hard to reduce the cost of power and operating the power plant more reliably. I don't think anyone can argue that they succeeded on both counts. Burning plutonium will reduce the cost of power for the Supply System, and ratepayer even more.	2/08.03.01
Plutonium disposition is a win - win situation for the Tri-City economy. This will make the Supply System a long term asset to our area instead of a big questions mark. If this venture has a positive result it could also pave the way for completion of #1 for the same purpose.	3/08.03.01
Another asset is the FMEF facility that is already built that will be used process the fuel, and create many additional jobs. The Plutonium Disposition project would be a great start in showing the rest of the world, especially Russia, that the United States is serious about reducing their plutonium stock pile to make our world a safer place and hopefully someday no one will need to fear destruction or complete annihilation from an awful bomb made from plutonium.	WA-015

08 03 01 **Comment Number 1**

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 **Comment Number 2**

Comment noted.

08 03 01 **Comment Number 3**

The Department of Energy acknowledges the commentor's support for new missions at Hanford. Decisions on storage and disposition of weapon-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

DANIEL, LOUISE, AMARILLO, TX
PAGE 1 OF 1

305 Overlook Dr.
Amarillo, TX 79109
May 28, 1995

United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 20086
Washington, D.C. 20520-3086

To: Hon. D. Roy Owens

After receiving the Draft Programmatic Environmental Impact Statement regarding the Storage and Disposition of Weapons Usable Fissile Materials, I continue to have the same concerns which have troubled me since this decision-making process began.

Though I am interested in the disposition and disposal options for the entire nuclear complex, my particular interest is in the future of the Pantex Plant.

The Ogallala aquifer is the life-blood of this region and any potential threat to its quality or quantity is unacceptable. Past operations at Pantex have contaminated groundwater under the plant in the panhandle aquifer and what is now being referred to as the "Super Ogallala". That contamination has moved off-site and it is only a matter of time before its migration reaches the Ogallala itself. There is still much to be learned about how the aquifer is recharged and about the geology of the plumes and floodplain regions. Though the plant is making a valiant effort to clean the groundwater and pull back the contaminated plume, pump-and-treat operations are widely believed to be of limited effectiveness.

While I have become fully comfortable with interim storage of a limited number of plutonium pits, I am opposed to the designation of Pantex as a permanent repository and to storing plutonium in any form other than PWS. I believe that permanent storage will inevitably involve the permanent safety responsibilities of plutonium. Historically, such operations have led to environmental disasters at the plants which have housed them. Therefore, any further processing of plutonium should be restricted to sites that are already contaminated beyond hope of clean-up.

The DOE should reevaluate the existing nuclear weapons storage business at Kirtland Air Force Base or build a storage facility in a place that is not a prime agricultural area.

With regard to disposition alternatives, I understand that the current decision will be confined to the technology and will not include siting. However, I believe the two to be so interdependent that it is difficult to separate them. In any case, no facility which will use large amounts of water should be located at Pantex. Water is a finite resource in this semi-arid region. No matter of course; development or gain can offset its depletion.

Thank you for this opportunity to comment and for your attention.

Sincerely yours,

Louise Daniel

M-245

09 04 04 Comment Number 1

The Department of Energy acknowledges the commentors concern about the Ogallala Aquifer. The PEIS assesses the impacts to the Ogallala Aquifer from the various alternatives, should such activities be located at Pantex.

Waste/hazardous material treatment/handling operations are regulated to minimize the potential for releases of hazardous substances to the soil or surface water that could then migrate to the groundwater.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to long-term storage of Pu pits and other forms of Pu at Pantex. Decisions related to future missions at Pantex will be based upon environmental analysis, technical and economic studies, national policy considerations, and public input.

01 05 00 Comment Number 3

Combined storage of pits and non-pit Pu at the Manzano WSA was originally eliminated as a reasonable alternative in the Draft PEIS. After considering separate storage of pits from non-pit Pu, the option to store these pits at the Manzano WSA no longer appears unreasonable. The Manzano WSA was evaluated in the Pantex EIS and Section 2.1.3 of the Final PEIS. The Final PEIS was revised to clarify consideration of the Manzano WSA for combined storage, and a description of the WSA was included in Appendix P.

1/09.04.04

2/08.03.01

3/01.05.00

1/09.04.04
cont.

DARNELL, G. ROSS, IDAHO FALLS, ID
PAGE 1 OF 2

01 00 00 **Comment Number 1**
Converting surplus Pu into MOX fuel for use in reactors is a reasonable disposition alternative that would generate electricity. Fissile materials present in spent nuclear fuel are not considered weapons-usable since separation of the relevant isotopes from these highly radioactive materials requires significant remote chemical processing.

01 04 00 **Comment Number 2**
The Integral Fast Reactor concept was considered in the Screening Report and was disqualified based on technical maturity and other factors.

May 1, 1996
U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

Dear PRIS Committee Members:

There are two ways to cause true nonproliferation, both of which require destruction of all excess materials that can be used by terrorists and rogue nations to manufacture nuclear weapons. One way is to blow up all of the world's excess weapons-usable materials, and that is unthinkable. The other method, a beneficial method, is to destroy the weapons-usable material while creating electricity. Incidentally, all sources of weapons-usable material, including spent nuclear fuel, must be considered in your deliberations, otherwise we are wearing blinders.

Technological facts must prevail in our decisions. Political decisions can be disastrous.

We citizens have been told repeatedly that solutions like the Integral Fast Reactor cannot be considered because accomplishment cannot be achieved in 10 years. That, of course, is illogical and unrealistic because you routinely talk of placing "waste" in Yucca Mountain, which is scheduled to open in 2010, and may never open. When we are talking environmental impacts, we must be realistic. When we are dealing with dangerous materials that can last for tens of thousands of years, even millions of years, it is illogical to limit our evaluation of solutions to 10 years. This is particularly true when terrorists and rogue nations are involved.

Your efforts are governed by environmental impact logic. Environmental impact does not end in 10 years, it goes on far beyond our ability to predict. Therefore, the following factors must be included in your decision making process:

1. Fossil fuels will be essentially depleted in the 21st Century and their cost will increase dramatically with time.
2. Fossil-fuel fired power plants are spewing huge quantities of radioactive and hazardous contaminants into our atmosphere.
3. The world's supply of uranium will be consumed in today's nuclear reactors in about three decades.

M-127

DARNELL, G. ROSS, IDAHO FALLS, ID
PAGE 2 OF 2

4. America and the world want and need an ultimately safe, clean, abundant, inexpensive, and inexhaustible electrical energy source. But so far, the combination of specifics disqualifies coal, crude oil, natural gas, solar, hydro-power, geothermal, wind, wood, and dung.
5. Spent nuclear fuel still contains some 99% of its original energy, and it also contains plutonium that could be used by terrorists. It is not waste.
6. The Integral Fast Reactor cannot melt down, even if left unattended, even with safety equipment failure, even with sabotage. It is configured so it cannot create plutonium, yet it can consume large quantities of plutonium and actinides in each fuel loading. It can extract the 99% of remaining energy in spent nuclear fuel. Its waste is much smaller than that of current nuclear reactors and the waste is thousands of times safer than spent nuclear fuel. The Integral Fast Reactors will be so incredibly efficient that they can provide all of the world's electricity for nearly 10,000 years with existing fuel. Logically, the Integral Fast Reactor will be ultimately safe and inexpensive when compared to the known alternatives for the future.

We can't plan for the future in the future, we must plan for the future now. Considering the foregoing facts and the need for true nonproliferation, there is one logical solution for the PEIS, the Integral Fast Reactor.

NOTE: Because the Integral Fast Reactor can extract the 99% of remaining energy in spent nuclear fuel, we must ensure that spent fuel remains in a form that can be recovered and sent directly to Integral Fast Reactors for consumption at some future date.

In summary, when we can consume these weapons-usable materials in the Integral Fast Reactors of the future while generating electricity, saving precious fossil fuels, improving the environment, and saving tax payers money, we must seriously consider that course of action.

Thank you for accepting my response to this most important issue.

Sincerely,

G. Ross Darnell

G. Ross Darnell
Retired (Lockheed Idaho Technologies Corporation)

14 00 00 Comment Number 3

During the screening of alternatives for inclusion in the PEIS, a Reactor-Burning concept was evaluated involving a variation of the Integral Fast Reactor concept. However, this concept, which would use a reactor fuel cycle design still requiring development, would be more costly and require a longer timeframe than other mature reactor options. The development program was terminated by the Administration and Congressional action. Since Pu disposition can be accomplished using existing technologies, there is no justification for developing this advanced technology for Pu disposition.

3/14.00.00

M-127

DAVENPORT, LESLIE C., RICHLAND, WA
PAGE 1 OF 3

Leslie C. Davenport
Senior Engineer, Nuclear Safety (Retired)
1922 Main Avenue
Richland, WA 98552

May 7, 1998

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20028-3786

Gentlemen:

Please include the following in the record of public comments for the "Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement." It summarizes what I feel should be done to partially solve this problem. If there are questions, please phone/fax me at (509) 846-4409.

STORAGE OBJECTIVE

The objective should be to minimize cost and risk (by upgrading multiple sites and/or constructing new facilities, by converting to stable forms, by promptly disposing of unusable scrap and waste, and by providing acceptable safeguards & security and environmental health & safety). Consolidate all Safeguards Categories I, II and some III quantities of plutonium and highly enriched uranium (whether to be disposed as surplus, or kept as needed for specific national programs) at a minimum number of sites. Construction of new storage facilities versus upgrading current facilities should be decided on the most effective cost and timeliness basis to achieve the goals of safeguards & security, and environmental health & safety. The cost to package Pu for 50-year safe storage should be minimized by consolidating this work in one location (where the plutonium oxide is to be stored long term) as long as Pu can be safely transported to this site for such ultimate repackaging. For national security, the primary long-term storage site (two for unirradiated Pu, and one for unirradiated HEU) should not be collocated. The handling and storage of Safeguards Categories I and II surplus materials should be to the "Stored Weapons Standard." Only Hanford, Pantex, and Y-12 at Oak Ridge should be considered as candidate sites for the long-term storage of all Safeguards Category I and II weapons-usable plutonium and high enriched uranium.

Interim Storage of Surplus Plutonium (Pu)

About 55% of the currently surplus Pu is at Pantex as metal (primarily as pits), and should be kept there in interim storage in upgraded facilities (until it can be finally disposed). However, interim storage should not be extended longer than necessary because of the negative political signals for nonproliferation and arms reduction. Pu metal at the other sites should be prepared in acceptable form for shipment to, and interim storage at, Pantex (or possibly Hanford if not in pit form). The Pu metal at Rocky Flats and small amounts at Idaho, LLNL, LANL, and "Other Sites" should receive priority for shipment to Pantex or possibly Hanford before the Pu metal at Savannah River is shipped. In any event, all Pu metal should be prepared for interim safe storage promptly.

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Collocation Alternative. Decisions on storage alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for the Consolidation Alternative. Decisions on the storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's concern with the Collocation Alternative. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for long-term storage of fissile materials. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

15 00 00 Comment Number 5

Comment noted.

1/08.03.01

2/08.03.01

3/08.03.01

4/08.03.01

5/15.00.00

M-170

Oxides, unirradiated fuel, and other forms of plutonium should be put into stable forms as quickly as possible for interim safe storage at and shipment between sites, with usable resulting oxides shipped to Hanford, metal shipped to Pantex or Hanford, and unirradiated fuel kept at or shipped to an upgraded site(s). Unusable scrap and waste should be stabilized and disposed of promptly, probably by vitrification (or safe storage until vitrification), because a vitrification facility is to be constructed at Hanford (e.g., a facility that is already planned for construction and to which a parallel line designed for criticality control could be added, rather than developing new technology and building a new facility at another site). The Waste Isolation Pilot Plant (WIPP) could provide disposal for these smaller quantities of vitrified waste containing Pu.	6/01.04.00
Pu in irradiated fuel should eventually be stored above ground in dry storage casks; possibly being consolidated at Hanford where this is already planned.	6/01.04.00 cont.
Interim Storage of Surplus High Enriched Uranium (HEU)	7/08.03.01
About 40% of the currently surplus HEU is at Oak Ridge, primarily at the Y-12 plant. I agree with the proposals in "PEIS Data Report: Upgrading the Y-12 Plant for Long-Term HEU Storage." YES-043R2, February 1996; and feel that Y-12 should be the US repository for storage of both unirradiated HEU needed for specific national programs, and that awaiting disposal as surplus HEU. Beyond upgrades currently in progress to increase storage capacity, improve infrastructure, and convert HEU to stable forms, the primary remaining capital project is to improve the resistance of some Y-12 storage facilities to design basis seismic events and tornadoes (Natural Phenomena Hazard Upgrades).	8/08.03.01
All unirradiated HEU at other sites should be put into stable forms as quickly as possible for safe storage at and shipment between sites, with the resulting materials shipped to Y-12 as quickly as is reasonable. An excavation could be short-term storage of HEU from newly dismantled Pits at Pantex. As stated above, unusable scrap and waste should be stabilized and disposed of promptly, probably by vitrification (or safe storage until it can be vitrified) because a vitrification facility is already running at Savannah River and another is to be constructed at Hanford.	6/01.04.00 cont.
As stated above, HEU in irradiated fuel should eventually be stored above ground in dry storage casks, possibly being consolidated at Hanford where this is already being planned.	7/08.03.01
DISPOSITION OBJECTIVE	8/08.03.01
The options for long-term disposition of usable surplus plutonium should seek to meet the "Spent Fuel Standard," and for usable surplus HEU should seek to blend the HEU down to low enriched uranium (LEU) usable in civilian power reactors." For the usable Pu, I prefer Pit disassembly and/or Pu conversion followed by MOX fuel fabrication and use in an existing reactor or partially completed LWR. For the unusable Pu and HEU that can not be used in civilian power reactors, I would like to see the material vitrified and disposed of as promptly as possible. Vitrification at Hanford would allow adding cesium-137 and/or high-level waste to provide a radiation barrier for nonproliferation purposes.	7/08.03.01 cont.
Disposition of Surplus Pu	M-170
I support the spent fuel option that would use the surplus Pu in fabricating mixed oxide (MOX) fuel for once-through use in commercial nuclear power reactors. This could be done by disassembling Pits at Pantex, shipping in approved Pit containers to Hanford, converting Pits and other source material to usable oxides at Hanford, fabricating into MOX fuel at Hanford, and using as fuel in reactors. The resultant spent fuel would then be disposed of in a high-level waste repository.	

01 04 00 Comment Number 6

The analyses of cost, schedule, technical, and Nonproliferation Policy impacts of the various reasonable alternatives for the Proposed Action are presented in separate documents to support DOE's ROD. These documents were available for public review beginning in late July 1996.

08 03 01 Comment Number 7

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 8

The Department of Energy acknowledges the commentor's support for new missions at Hanford. Decisions on storage and disposition of weapons-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

DAVENPORT, LESLIE C., RICHLAND, WA
PAGE 3 OF 3

The Fuels & Materials Examination Facility (FMEF) at Hanford is a DOE owned facility that was constructed for safe storage of Safeguards Category 1 or 2 quantities of Pu and HEU, and has a remote fabrication line usable for producing MOX fuel. Although this facility has never been used for fuel fabrication work, this was its original purpose and the facility exists with very little need for changes to meet current safeguards & security and environmental health & safety requirements. I would like to see Washington Public Power Supply System's WNP-2 reactor at Hanford, and possibly the three Palo Verde reactors in Arizona, used to burn up this MOX fuel. I believe all four reactors were designed so that they can burn MOX fuel and would have less fueling effort through the NRC to permit this. If additional reactors are deemed necessary, I support completion of construction of WNP-2 at Hanford. The two WNP reactors, the FMEF facility, and appropriate storage vaults are physically all on the Hanford reservation, which would reduce risk and security problems during transport. I do not support the evolutionary LWR alternative due to the long time delay in starting actual disposition. However, acceptable methods include the CANDU reactor alternative, selling the Pu to Japan, France, or the United Kingdom; or in the short-term fabricating MOX fuel assemblies in an existing European MOX fuel fabrication facility.

Disposition of Surplus HEU

Approximately 60% of the surplus HEU (103 of 174 metric tons) is in forms that may allow it to be usable for down blending to LEU. Additional surplus HEU that can be converted to usable LEU on a cost effective basis should also be included. This blending to LEU should be started as soon as possible, but at no slower rate than can be sold at a reasonable return price for commercial use.

Sincerely,

Leslie C. Davenport, Jr.
Leslie C. Davenport,
Senior Engineer, Nuclear Safety (Retired)

7/08.03.01
cont.
8/08.03.01
cont.
9/08.03.01
10/08.03.01

M-170

08 03 01 Comment Number 9
The Department of Energy acknowledges the commentor's opposition to the Evolutionary LWR Reactor Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 10
Comment noted.

DAVIS, ISABEL, CANYON, TX
PAGE 1 OF 1

3-184

Raima Isabel Davis
Rt. 1 Box 213-ZZ
Canyon, TX 79015
(806) 499-3509

United States Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

I am concerned about the disposal and storage of nuclear wastes at a site within 30 miles of my home and directly over my water supply. We live in a area which is not served by a water supply provided by a municipality. We have our own well which is tapped directly into the Ogallala Aquifer. It is frightening to think that in a few years I may be drinking contaminated water without even knowing it.

Even if the possibility of contamination did not exist, the accelerated draining of the aquifer necessitated by the processing of nuclear wastes is a threat not only to agriculture, but to the quality of life in the Texas Panhandle. The aquifer is being drained at an alarming rate by irrigation of crops. We must find a way to use less water, not more.

Surely there is a site available which is not over an aquifer that supplies water to 8 food producing states. The Chamber of Commerce of Amarillo and the Department of Energy are using faulty logic to protect current jobs at the expense of our very survival in the future.

Please do not store surplus plutonium at Pantex. Please do not process plutonium at Pantex, and please do not store hazardous wastes at Pantex.

Sincerely,


Isabel Davis
A Citizen of Randall County, Texas

1/09.04.04

1/09.04.04
cont.

M-193

09 04 04

Comment Number 1

The Department of Energy acknowledges the commentator's concern about the Ogallala Aquifer. The PEIS assesses the impacts to the Ogallala Aquifer from the various alternatives, should such activities be located at Pantex. Waste/hazardous material treatment/handling operations are regulated to minimize the potential for releases of hazardous substances to the soil or surface water that could then migrate to the groundwater.

DETTEN, DANNY
PAGE 1 OF 1

09 04 04 Comment Number 1

The Department of Energy acknowledges the commentor's concern about the Ogallala Aquifer. The PEIS assesses the impacts to the Ogallala Aquifer from the various alternatives, should such activities be located at Pantex.

Waste/hazardous material treatment/handling operations are regulated to minimize the potential for releases of hazardous substances to the soil or surface water that could then migrate to the groundwater.

My Name is Danny Detten and I'm a resident of Pantex having lived all 53 years of my life there. My wife Anne and I have four children and 9 grandchildren. Three of our children move to live, farm and ranch around the north and south sides of Pantex. We are all very opposed to the processing & storage of plutonium.

Plutonium is more important than oil or gold to the Texas Panhandle. Agriculture & the cattle industry are far more important than Pantex. So why are we even considering storage & processing plutonium? We are told if we reject it, this will protect some jobs & keep Pantex from being phased out completely. As the real world of a product is not really it, honestly isn't produced.

Our water supply needs to be protected and by storing & processing plutonium over the Ogallala aquifer is not sound. We just suggested that out of plutonium and to some extent the final assembly of nuclear warheads because of plutonium, but people plutonium works both ways. Amills & DOE, you better wake up and start offering us.

Our family has been here approximately 50 years at this location & we know you it was not Pantex that made this area what it is today but it sure may destroy it in the future.

Thank you
Danny Detten

1/09.04.04

TX-057

DEVORAK, JUDITH
PAGE 1 OF 1

3-186

Comment ID:	P0017
Date Received:	April 18, 1996
Name:	Judith Devorak
Address:	
Transcription:	
I'm calling to say keep that stuff out of Idaho. The Governor was wrong to let you start bringing any of it in. It should have stayed in court longer. Keep it out of Idaho.	
1/08.03.01	

P-017

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to new missions at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

DORWART, ROBERT J., SEATTLE, WA
PAGE 1 OF 1

Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic
Environmental Impact Statement (PEIS) Public Comment Form

Name (optional): Robert J Dorwart
Address (optional): 4422 NE 65th St
Seattle, WA 98115

Please write down your comments and drop this form in the marked boxes before you leave tonight. These forms will be submitted to the Department of Energy as part of the formal comment on this PEIS. If you are unable to complete this form tonight, written comments can be mailed to:

Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

or, you can call this toll-free number to leave comments by phone: 1-800-820-5156. Comments must be submitted by May 7, 1996.

The Department of Energy has identified three types of technologies as options for disposing of weapons-usable fissile materials. The Department has also considered a "no action alternative" which would result in long-term storage of the materials. Please write down your comments on the following three types of options for disposal and the storage option.

1. Materials Immobilization/Vitrification - Immobilize fissile materials by mixing them with glass, glass bonded zeolites, or ceramics.

We need to immobilize solids material in the form of material
disposing uranium. There is no way to prevent mining uranium ore, so
it isn't affected. Growing (many) deep dry land mine
will be no other way to energy source except solar.

1/08.03.01

2. Deep borehole disposal - Materials would be disposed in boreholes at least 2.5 miles deep, in geologically stable formations. Materials could be disposed directly into the deep borehole, or materials could be immobilized first, and then deposited into the deep borehole.

At least plan for this technology, we should explore like
generating of what may be the only energy source recovery by
making them totally unavailable.

2/08.03.01

3. Reactor Options - Surplus plutonium/highly enriched uranium would be made into MOX fuel for use in nuclear reactors, destroying by fission a major portion of the weapons grade materials.

I believe we should also use of this device. We are
rapidly consuming electrical fuel, which will not be made at
expanding nuclear power. (Operation of Plutonium). Increasing the
production of nuclear power will put off an energy emergency even
when it is almost upon us.

3/08.03.01

4. Storage Options - USDOE would continue existing storage practices for weapons-usable fissile materials at current locations and/or consolidate that storage at one or more of the designated sites.

M-224

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the Immobilization Alternatives. Decisions on disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy recognizes the commentor's concern with the Borehole Alternatives. Decisions on the disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

DRYER, TED, PORTLAND, OR
PAGE 1 OF 1

Comment ID: F0004
Date Received: April 16, 1996
Name: Ted Dryer
Address: 7037 SW 54th
Portland, OR

Transcription:

I'd like to suggest that the Department strongly consider putting the nuclear waste into glass.
None of the other options seems safe enough to me. Thank you very much.

1/08.03.01

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-004



DUKE POWER

Department of Energy
Office of Fissile Materials Disposition
c/o SAIC- PEIS
P.O. Box 23786
Washington DC 20026-3786

By Fax (1-800-820-5156) and by Mail

May 6, 1996

Subject: Comments on DOE document "Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (DOE/EIS-0229-D)"

This letter is provided to the Department of Energy to give comments on the subject document. Duke Power appreciates the opportunity to participate in the process and looks forward to the timely resolution of all outstanding issues so that the task of disposing of the excess plutonium may begin. The use of plutonium as LWR MOX fuel is a proven technology which is readily adaptable to the US light water reactors and will ensure a timely and cost effective disposition program. The following comments are offered for consideration by DOE as it prepares the Final Environmental Impact Statement and progresses to a Record of Decision.

- The use of MOX fuel as the primary disposition mechanism is the only option which meets the non-proliferation goals of the program and, at the same time, extracts the great energy potential associated with the material.

- The Final Environmental Impact Statement should fully account for all benefits associated with burning the plutonium as MOX fuel including the avoided mining and enrichment (power intensive) requirements which would be required if MOX fuel were replaced by UO2 based fuel.

- Timely and predictable disposition plans should be laid out and followed. Any scenario delaying the disposition should be penalized due to the potential adverse environmental consequences associated with storage.

- All potential environmental impacts should be considered in evaluating the alternatives, not just those within the US borders.

- Use of existing MOX fabrication capacity in Europe should be seriously considered by DOE. Building from the existing European experience and capacity ensures the most rapid and most reliable start to the program.

1/08.03.01

2/09.00.08

3/07.00.00

4/08.00.00

5/06.01.08

M-181

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

09 00 08 Comment Number 2

Based on comments received, several sections of the Final PEIS include additional analyses. These sections (in Section 4.9) include Impacts on Uranium Mining and Nuclear Fuel Cycle Industries, Avoided Environmental Impacts of Using MOX Fuel Instead of Traditional Low-Enriched Uranium Fuel in Nuclear Power Plants, and Avoided Environmental Impacts of Using Nuclear Power Plants Instead of Fossil Fuel Power Plants. The Avoided Environmental Impacts of Using MOX Fuel Instead of Traditional Low-Enriched Uranium Fuel in Nuclear Power Plants section in the Draft PEIS includes the health impacts avoided to the public and workers for the mining and milling industries. Other avoided impacts to air quality and waste generated were added to the Final PEIS.

07 00 00 Comment Number 3

Generally, the goal is to complete disposition within 25 years after the ROD. The storage decision will be for long-term storage, up to 50 years. Schedule data, along with technical and cost data, were provided in Technical Summary Reports of both storage and disposition in late July 1996.

08 00 00 Comment Number 4

In accordance with Executive Order 12114, DOE guidelines implementing that Order, the Department of State's Unified Procedures (10 CFR 1021.102), the PEIS considers impacts to the global commons from potential European fuel fabrication and the CANDU Reactor Alternative. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and

DUKE POWER, CHARLOTTE, NC,
ROBERT VAN NAMEN
PAGE 2 OF 2

Duke would also like to take this opportunity to request that DOE involve all potential licensees (the utilities) in discussions, plans and projects leading to the licensing of MOX fuel with the Nuclear Regulatory Commission. Capitalizing on the abilities of the commercial sector in implementing the MOX option will result in the most stable, reliable and timely progress on this important program.

6/06.06.08

Robert Van Namen

Robert Van Namen, Manager
Fuel Management, Nuclear Engineering

regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

06 01 08 Comment Number 5

Comment noted.

06 06 08 Comment Number 6

Comment noted.

M-181

6125 Country Club Parkway
San Jose, CA. 95138

May 6, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786
(FAX) 1-800-820-5156

Subject: Storage and Disposition of Weapons-Usable Fissile Materials Draft
Programmatic Environmental Impact Statement (February 1996)

Dear Director Nuhfer:

Each time my wife or I read a magazine or newspaper article which discusses the vast amounts of weapons grade materials currently being stored in the former Soviet Union, we cringe at the thoughts of how easily these materials could be diverted to enemies of the United States (Libya, Iran, Iraq, N. Korea, etc.). Within months of reading of the black-market smuggling of plutonium from one of the new Russian republics, the U.S. government would be faced with the devastating threats of a Saddam Hussein or other militant madman bent on humiliating the American public. This is a totally possible but unacceptable scenario.

In reviewing the draft FEIS, there is only one (1) option that can be implemented in a timely manner in both the United States and Russia. This is also the only option based on proven technologies, thus minimizing technical risks. It is also the only option that could logically be accepted by both involved governments - the existing light water reactor option. Fabrication of mixed oxide fuel is known technology. Operation of commercial nuclear reactors is known technology. The conversion of weapons grade plutonium to spent nuclear fuel is the only true "disposition" option discussed in the FEIS. Involvement of a third country, Canada, should not be considered in solving this American/Russian problem.

The "do nothing" option (current Clinton administration position on most critical issues) is totally UNACCEPTABLE. Likewise, options involving long term storage/burials or conversion/immobilization into forms which could be reversed or leave the materials potentially recoverable (e.g., vitrification) should NOT be on the negotiations table.

1/08.03.01

2/08.03.01

3/08.03.01

F-023

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to continuing or long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

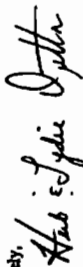
08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Immobilization Alternatives. Decisions on disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

DUTTON, HERB AND LYDIE, SAN JOSE, CA
PAGE 2 OF 2

The DOE is urged to proceed immediately with the existing LWR option. The time for R&D programs has long past. Stop wasting taxpayer money in funding "voodoo" technologies and responding to "Anti-Everything" organizations. The threat and impact of the loss or theft of Russian (or American) weapons materials is far too great!

Sincerely,



Mr. & Mrs. H. A. Dutton

1/08.03.01
cont.

F-023

March 14, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P. O. Box 23786
Washington, D.C. 20026-3786

Gentlemen:

It is my opinion that the possible shipment to, and storage of, weapons-usable fissile material at the INEL site in Idaho is and would jeopardize the public health and safety. The transporting of such material to Idaho as recently shown by the catastrophic train accident is not as safe as one would originally think.

1. In simple terms, the INEL is situated upon a high seismic activity geographical area. The attempts of the Department of Energy to show that that is not the case are not well founded. The scientific and geological wisdom is that it is a highly seismic area.
 2. The INEL site sits directly over the Snake River Aquifer which supplies water to the Snake River, the rural areas of Idaho, and subsequently to the Columbia River drainage which affects most of Idaho and the States of Oregon and Washington.
 3. To store or dispose of radioactive matter at the INEL which is directly above the Snake River Aquifer is clearly not the best alternative to be chosen by the Department of Energy.
- I strongly urge the Department of Energy to open a permanent storage repository as had previously been planned and that the storage and disposition of Weapons-Usable Fissile Materials would be more appropriately stored at that site.
- In the interim, transporting such material causes unnecessary dangers to the public safety and welfare, which far outbalances any delay which may be incurred in opening a permanent repository.
- Simply put, storing or handling radioactive material above the Snake River Aquifer is not a viable alternative from the safety standpoint. The present contamination at the site, the high runoff of surface waters, the continued polluting of the aquifer are a reality. To compound that by brining more materials to the site simply is not acceptable.

1/10.00.00

2/09.05.03

3/08.03.01

4/12.00.00

1/10.00.00
cont.

3/08.03.01
cont.

M-003

10 00 00 Comment Number 1

The human health risks of material transportations associated with the proposed Pu storage and disposition alternatives are evaluated and presented in Section 4.4 of this PEIS. The more detailed description of the methodology and supporting data for the analysis is presented in the Appendix G. Transportation of radioactive materials between sites includes health risks for both normal operations and accident conditions to the public and workers.

09 05 03 Comment Number 2

Idaho National Engineering Laboratory is situated on the Eastern Snake River Plain, an area of low seismicity. The plain is bordered by the seismically active Centennial Tectonic Belt to the north and the Intermountain Seismic Belt to the east and southeast. Historical and recent seismic data cataloged by the National Oceanic and Atmospheric Administration (NOAA), the National Earthquake Information Center (NEIC), the University of Utah, and the INEL Seismic Network, indicate that earthquakes in the region occur primarily in the Intermountain Seismic Belt and Centennial Tectonic Belt (including the mountains and valleys of the Basin and Range province which bound the plain on the north and south). The seismic characteristics of the plain and the adjacent Basin and Range province are different; earthquakes and active faulting are associated with the Basin and Range tectonic activity, whereas the plain has historically experienced few and small earthquakes. Based on the seismic history and the geologic conditions, earthquakes greater than magnitude 5.5 (and associated strong ground shaking and surface fault rupture) are not likely to occur on the plain.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentator's opposition to new missions at INEL. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

12 00 00 Comment Number 4

Comment noted.

EIDEN, MAX A.
PAGE 2 OF 2

U.S. Department of Energy
Office of Fissile Materials Disposition
March 14, 1996
Page 2

I appreciate your consideration of these comments. For more scientific data, please refer to prior Environmental Impact Statements involving the INEL, and scientific materials submitted thereon.

Very truly yours,

Max A. Eiden

MAE:jp

M-003

ELLIS, JENNIFER L.
PAGE 1 OF 1

CALL-IN COMMENTS ON DOE'S FEIS

MS. ELLIS: Jennifer L. Ellis, 222 Cherokee Trail, 37043.

Neither.

A mailing that I have from 2/20 Vision.

I am calling to comment about the Programmatic Environmental Impact Statement. As a medical doctor specializing in preventive medicine, I believe strongly that community and worker safety should be paramount. In order to minimize the dangers related to plutonium and its byproducts, the Department of Energy should look forward to adopting a plan for production of the least amount of new radioactive waste.

I therefore disagree with the three options outlined by the Department of Energy for the disposal of weapons-usable materials. I believe that all three options are dangerous and obsolete.

I encourage the Department of Energy instead to invest in vitrification which, unlike the outlined options, would immobilize plutonium and its dangerous byproducts, and thus also reduce proliferation by removing it from circulation.

Thank you.

1/08.03.01

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for the Vitrification (Immobilization) Alternative. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-047

[illegible]

June 7, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington D.C. 20076-3786 U.S.A.

BY FAX: 202-586-2710 (Original following by mail)

Re: Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement (PEIS)

To whom it may concern,

Attached please find a submission from Energy Probe on the topic of the proposed use of mixed-oxide (MOX) fuel, containing plutonium from dismantled U.S. nuclear warheads, at the Bruce "A" Nuclear Generating Station. The MOX-CANDU reactor proposal is from the Department of Energy (DoE) document *Storage and Disposition of Weapons-Usuable Fissile Materials Draft Programmatic Environmental Impact Statement (PEIS)* as one of the options under consideration by the DoE for plutonium disposition.

Energy Probe is a project of Energy Probe Research Foundation, a non-profit environmental organization founded in 1980, dedicated to raising public awareness about energy and environmental issues. Energy Probe Research Foundation has approximately 50,000 supporters, roughly half of them in the province of Ontario.

We have reviewed the relevant sections of the DoE PES. We have also reviewed the submission sent to you by Nuclear Awareness Project (Box 104, Uxbridge, Ontario L9P 1M6), and we generally endorse its arguments and conclusions, with some relatively minor exceptions and some additions noted below.

In brief, Energy Probe urges the DoE to rule out the option of using CANDU reactors located in Canada for plutonium disposition purposes unless and until the following conditions are met:

- The undertaking must not impose uncompensated costs — financial, environmental, or social — on people in Ontario or elsewhere in Canada;
- The undertaking must not retard Ontario's progress in achieving an open, competitive, and diversified electricity system, characterized by open access for electricity suppliers, and free choice for electricity consumers;
- The undertaking must not proceed without the full, public approval of Ontario's

Energy Probe Research Foundation

228 BRIMSACK AVENUE, TORONTO, ONTARIO M6S 2M8 Phone (416) 984-8223 ext. 228 Fax (416) 984-8239

08 03 01

The Department of Energy acknowledges the commentator's opposition to the use of the CANDU Reactor Alternative for the disposition of Pu. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. This will include an appropriate level of analysis concerning the CANDU Reactor Alternative. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

1/08.03.01

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ENERGY PROBE RESEARCH FOUNDATION, TORONTO, ON,
NORMAN RUBIN
PAGE 2 OF 7

Environmental Assessment Act, or an equivalent testing of its environmental acceptability;

- The undertaking must not proceed without a clear indication that it has the informed consent of the people of Ontario, especially those who will be most directly affected by it.
- If the U.S. government chooses to dispose of its nuclear-weapons plutonium in Canada, rather than within the United States, it must be clearly demonstrated that its decision is in no way motivated by Canada's relative lack of citizen safeguards and rights — both legislated and common-law — that might make implementation easier in Canada than within the U.S.

For reasons outlined below and in the submission of Nuclear Awareness Project, we believe that these conditions are unlikely to be met. We therefore urge the U.S. government to focus its attention on plutonium-disposition options that can be carried out within the United States.

Sincerely yours,



Norman Rubin
Director, Nuclear Research
and Senior Policy Analyst

attachment

1/08.03.01
CONT.

M-285

Energy Probe's Notes Regarding the
Storage and Disposition of Weapons-Usable Fissile Materials
Draft Programmatic Environmental Impact Statement

by
Norman Rubin
Director, Nuclear Research
and Senior Policy Analyst

June 6, 1996

Canadian Impacts "do not apply"

In the *Draft Programmatic Environmental Impact Statement* (henceforth, "the PEIS"), the "environmental impacts" of the Canadian CANDU option are almost universally described with a single phrase: "Does not apply". The specific areas in which impacts "do not apply" include the following: Land Resources, Site Infrastructure, Air Quality and Noise, Water Resources, Geology and Soils, Biological Resources, Cultural and Paleontological Resources, Socioeconomics, Public and Occupational Health and Safety — itself subdivided into Normal Radiological Impacts, Hazardous Chemical Impacts, and Facility Accidents — and Waste Management.¹

In the two areas where impacts are acknowledged to apply — Interstate Transportation of Fissile Materials and Environmental Justice — those impacts end at the Canadian border.

Of course, most Canadians would consider the impacts, in Canada, of the Canadian CANDU option for the disposition of U.S. nuclear-weapons plutonium to be just as real, significant, and "applicable" as the impacts of the other options in the U.S. And informed Canadians — including Energy Probe — would be concerned that the Canadian and Ontario governments may not give much more attention to these real impacts than this U.S. PEIS does. For example, Canadian federal government officials, up to the Prime Minister himself, seem to have publicly concluded — without any recourse to public process, public opinion, or environmental assessment — that the MOX-CANDU proposal is the best option for disposition of both U.S. and Russian nuclear-weapons plutonium.²

In short, we are concerned that the Canadian public (especially Ontario residents) may be treated like citizens of a "banana republic", with neither our own officials nor those of the United States respecting our rights to participate in this important decision. We urge the U.S. government not to take advantage of the weakness of Canada's, and Ontario's, political and legal safeguards in making this decision.

Indeed, we believe that it is consistent with the spirit, and perhaps even the letter, of the U.S. National Environmental Protection Act, that adverse impacts outside the United States be considered before an option is chosen.

2/01.03.00

2/01.03.00
cont.

M-285

Comment Number 2

01 03 00

After considering public comments, the PEIS has been revised with respect to the CANDU Reactor Alternative. The PEIS includes an appropriate level of analysis, consistent with Executive Order 12114, DOE guidelines, the State Department's Unified Procedures, and DOE regulations at 10 CFR 1021.102 concerning NEPA.

In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. Should the CANDU Reactor Alternative be chosen for Pu disposition, further negotiations between the U.S. and Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners. Should the CANDU Reactor Alternative be selected, agreement with the Canadian Government would be reached on the Pu disposition process.

Energy Probe's Notes, page 2

Regardless of the legal issue, we do not see how you can hope to choose an option that minimizes adverse impacts, without comparing all the impacts of all the options.

Energy Probe's comments on the submission by Nuclear Awareness Project:

It is even clearer than NAP indicates that Ontario Hydro does not plan to retube the 4 reactors of Bruce-A station.

Nuclear Awareness Project writes (Submission, p.1):
Capacity Factors and Reliability of CANDU Reactors

The Atomic Energy of Canada Limited (AECL) proposal assumes that the four Bruce "A" Nuclear Generating Station reactors will be retubed regardless of whether or not the mixed-oxide (MOX) fuel scheme is implemented, and that these reactors will operate at an average capacity factor of 80% for a further 25 year period. These assumptions are inappropriate, given current debates about the future of the electricity sector in Ontario, and given operating experience at CANDU reactors.

The AECL Final Report Plutonium Consumption Program - CANDU Reactor Project notes:

"It is assumed for the purposes of this study that the Bruce MGS A units will be retubed because there is a demand for electricity."

Retubing is the rebuilding of a CANDU reactor core where all fuel channels are replaced at a cost now estimated by Ontario Hydro at about \$350 million per reactor. The DoG should note that the Bruce reactor 2 was shut down in 1995 to avoid this cost and other major repairs, primarily to steam generators. The other 3 reactors are scheduled for retubing starting in 2000, but could instead be shut down at that time. The Bruce "A" Station began operations between 1977 and 1979. It is unlikely that Ontario Hydro will be able to justify the expense of retubing its aging reactors when faced with increasing competition in the electricity sector. (emphasis added; endnotes omitted.)

In fact, according to Ontario Hydro documents and sworn testimony, the other 3 reactors of the Bruce-A station are not scheduled for retubing starting in 2000, or at any other time. Rather, they are

09 00 08 Comment Number 3

A comparison of impacts of all alternatives and options associated with each alternative is contained in Section 4.6 of the PEIS. A cumulative impact analysis has been conducted in Section 4.7, as well, for both storage and disposition. For the CANDU Reactor Alternative, the spent fuel resulting from using MOX fuel in these reactors would be the responsibility of Ontario Hydro, and would be stored and disposed of in accordance with procedures established by the Canadian Atomic Energy Control Board. Interactions with the Canadian public regarding the receipt and use of MOX fuel in Canada will be conducted by the Canadian Government and Ontario Hydro.

3/09.00.08

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ENERGY PROBE RESEARCH FOUNDATION, TORONTO, ON,
NORMAN RUBIN
PAGE 5 OF 7

Energy Probe's Notes, page 3

scheduled to be shut down when they reach the end of pressure-tube life, starting in 2000. Ontario Hydro, of course, retains the option of changing its mind and retubing one or more of these reactors. But AECL's assessment of the likelihood of that outcome must be viewed in the context of AECL's historical record of forecasting future events, which can best be described as "laughable". Indeed, it is just as hard in Ontario as in the U.S. to find competent, informed experts who expect to see major capital refits to aging nuclear stations, especially as our electricity system becomes more market-oriented and competitive. Ontario Hydro⁴

In the early 1990s, Ontario Hydro spent a considerable sum — \$203 million in Canadian dollars — on its plans to retube two of the reactors of the Bruce-A station — units 1 and 2, in reverse numerical order. In 1993, Ontario Hydro officially "wrote off" that investment, on the grounds that it was not expected to accrue to the benefit of electricity customers.⁵

Furthermore, on March 21, 1994, Ontario Hydro submitted its "Strategic Plan for Future Operation of Bruce A Nuclear Generating Station" in writing to the Atomic Energy Control Board.⁶

That document is quite clear in assuring the Atomic Energy Control Board that all four units of Bruce-A will actually reach a premature end of life. Consider, for example, the following specific passages:

- In paragraph 1.0 — "Strategic Plan Overview" — of Attachment 1 of the package and the corresponding chart — "Bruce 'A' Operating Strategy" — Ontario Hydro told the Atomic Energy Control Board that Bruce Unit 1 would "SHUT DOWN JANUARY," in the year 2000, and gave the explanation: "P/T [i.e., pressure tube] LIFE LIMIT". For Bruce Unit 3, the notice "SHUT DOWN APRIL" appears in the year 2008, accompanied by "P/T LIFE LIMIT". For Bruce Unit 4, the notice "SHUT DOWN APRIL" appears in the year 2006, accompanied by "P/T LIFE LIMIT", but it is followed by the following Note: "ADDITIONAL SLAR IN THE 1990S WILL ENABLE UNIT TO EXTEND PRESSURE TUBE LIFE LIMIT TO APRIL 2011."

- Attachment 4, Section 1, first paragraph, says "...the elements required to ensure safe operation of Units 1 and 2 to their planned end of life (which have now been firmed up) have been incorporated into their operating strategies." Same section, page 2, first complete paragraph says "For Unit 1, an end of life in 2000 is now planned, based on fuel channel creep induced elongation."

These passages make absolutely clear how firm and unambiguous Ontario Hydro has been in assuring the Atomic Energy Control Board that it actually plans to shut down Bruce A Units 1, 3, and 4 in January 2000, April 2008, and April 2011, respectively. Any assurances to the contrary — especially from AECL — should be given little credence.

The fear of examination from environmental assessment in Ontario is even more well-founded than NAP indicates. Nuclear Awareness Project writes (*Submission*, p. 4):

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Energy Probe's Notes, page 4

There is no guarantee that the plutonium fuel scheme will undergo an environmental assessment at either the provincial or federal level. An exemption was granted to the Bruce "A" Station in 1976 under the Ontario Environmental Assessment Act, and the use of MOX fuel may come under this exemption.

Indeed, Energy Probe has direct and painful experience in this matter: A legal attempt by Energy Probe to force an Ontario EA of another serious change at an exempted nuclear station — specifically the decision to build an Ontario-wide Tritium Removal [and storage] facility at the Darlington station — was rejected by the Ontario courts. The courts found that the proposal to build the nuclear station, which was exempted from the Ontario Environmental Assessment Act, was extremely vague and general. Therefore, the exemption from Environmental Assessment even covered the later decision to construct an Ontario-wide waste-extraction and -storage facility — on a part of the property that was shown as an open space on the maps drawn when the exemption was granted!

Moreover, the Federal Environmental Assessment Panel on High-Level Waste Disposal (see p. 3 of NAP's submission) has already repeatedly indicated its unwillingness to enter into discussions of the potential implications of this proposal on the quantity or nature of high-level nuclear waste in Canada, because it views the proposal as still hypothetical.

As one indication of the treatment of this issue before the Federal Environmental Assessment Panel, following is an intervention on the second day of the hearing by Dr. P. Brown of Natural Resources Canada, explaining why there is no need for that panel to review this proposal:

THE CHAIRMAN: Microphone number 3?

DR. P. BROWN: Thank you, Mr. Chairman. Your indulgence, please. This is more of a comment rather than a question.

The CANDU option -- I just want to clarify one point, and that is that the CANDU option for burning MOX fuel is only a proposal for consideration; it is not a confirmed project. And any project that was there would not start until the year 2000, and, in any event, it would have to meet all applicable Canadian environmental and regulatory requirements before a decision to proceed with the option was indeed given.

So it is not a fait accompli at this point. Thank you.

THE CHAIRMAN: Thank you, Dr. Brown.*

These recent developments give further credence to NAP's concerns in regard to any federal Environmental Assessment of this undertaking.

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ENERGY PROBE RESEARCH FOUNDATION, TORONTO, ON,
NORMAN RUBIN
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Energy Probe's Notes, page 5

End-Notes

1. See, for example, PEIS, Summary volume, Attachment B: "Summary Comparison of Environmental Impacts for Plutonium Disposition Alternatives", pp. S-122—S-155.
2. See, for example, Mark Nichols, "Debating the CANDU option: Should Canada process plutonium?" in *Maclean's*, May 6, 1996, pp. 46-47; "Plutonium plan to go before G7" in *The Financial Post*, April 17, 1996, p. 2.
3. Nuclear Awareness Project, *Submission to the U.S. Department of Energy Regarding the Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement*, June 6, 1996.
4. This morning's release of *A Framework for Competition. The Report of the Advisory Committee on Competition in Ontario's Electricity System to the Ontario Minister of Environment and Energy*, can only be seen as reinforcing and accelerating this widespread trend.
5. Testimony at the Ontario Energy Board, HR22 hearing, esp. Transcript volume 16, pp. 3174-3178.
6. The document bears Ontario Hydro file number BGA 00531 (P). It was distributed by AECB staff to its Board and to the present author as Board Member Document BMD 94-65A, dated 1994-03-30. This document was also filed (by Energy Probe) as Exhibit 4.2.17 at the Ontario Energy Board on June 8, 1994. As far as we know, this document remains in force and has not been superseded by any subsequent documents.
7. Specific citations on request. First the Ontario lower court dismissed our action⁴⁴; the Court of Appeals declined our Application for Leave to Appeal, without giving any reasons.
8. ENVIRONMENTAL ASSESSMENT REVIEW AGENCY, *NUCLEAR FUEL WASTE MANAGEMENT AND DISPOSAL CONCEPT*, PUBLIC HEARINGS, MARCH 12, 1996, VOLUME 2, p. 114.

M-285

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, reactor burning must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

April 30, 1986

Linda Ewald
c/o Ponder Road
Knoxville, TN 37913

U.S. DOE, Office of Reconfiguration
P.O. Box 3417
Alexandria, VA 22302

I am writing to comment on the Programmatic Environmental Impact Statement that lays out options for disposing of excess Plutonium and Highly Enriched Uranium from dismantled nuclear weapons.

I am opposed to option #1, the conversion of plutonium ^{and/or} for use as nuclear reactor fuel. Nuclear reactors produce more dangerous waste - to dispose of it encourages the use of weapons usable materials as fuels, thus increasing the chances of proliferation world-wide and building and maintaining reactors will cost billions of dollars.

1/08.03.01

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EWALD, LINDA, KNOXVILLE, TN
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3-204

Options #2 and #3 are also not viable because these wastes are so unstable and long lasting traditional methods for disposal are not applicable.	2/08.03.01
DOE needs a "nuclear waste standard" to adopt a plan to produce the least amount of new radioactive waste.	3/15.00.00
Disposition of nuclear materials should limit the amount of processing and transportation. I encourage investment in worker and community safety and innovative disposition ideas ~~such~~ such as vitrification. Please listen to academics and independent scientists who have community interests in mind. Thank-you very much. Sincerely, Linda Ewald	4/08.03.01

M-205

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to the disposition alternatives. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

15 00 00 Comment Number 3

Comment noted. Waste minimization is an ongoing goal of DOE and will be considered to the extent practicable in the selection and implementation of the alternative(s).

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.



F.A.C.T.S.
(For A Clean Tomorrow Site)

"PUTTING THE PIECES TOGETHER"



Box 566
Kenmore, NY 14217-0566

Phone: (716) 876-9552
Fax: (716) 876-9552

Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

May 27, 1996

Subject: Comments on Storage and Disposition of Weapons-Usable
Fissile Materials Draft Programmatic Environmental Impact
Statement

1) Fissile materials, plutonium and highly enriched uranium (HEU), can be easily assembled into nuclear weapons. Fissile materials are also very long-lived radioactive materials which are toxic, especially plutonium, to living things. Therefore, it should be apparent that fissile materials pose both grave security and environmental/public health threats, respectively. Because the costs of maintaining both security and environmental isolation of these materials are extremely high, they also represent an enormous economic liability. More than ten years ago, the U.S. government recognized these liabilities and stopped production of plutonium for weapons and commercial use of plutonium.

However, five countries, Britain, France India, Japan and Russia, continue to reprocess spent commercial nuclear power plant fuel, in anticipation of a day when uranium fuel may become scarce or relatively expensive. In the next decade, the amount of commercially separated plutonium in these and additional countries may exceed the amount of plutonium from dismantled weapons.

If the Clinton Administration is serious about the fissile material threats identified above, it must also address, without delay, the growing global commercial production of plutonium, which is bound up with the increased use of nuclear power in economies outside the U.S. The U.S. government can best address this problem by: 1) declaring fissile materials a liability, 2) by exerting influence on the reprocessing countries to phase out both reprocessing and the use of nuclear power, through a frank portrayal of the downside of nuclear energy -- the uneconomic cost of sound, long-term waste management and plant safety issues -- in addition to the weapons proliferation threats and, 3) by encouraging the maximization of energy efficiency and conservation measures in conjunction with the large scale development and production of safe, alternative, renewable power supplies (solar, biomass and wind power). The subsidized transfer of these technologies to the

1/01.03.00

M-255

01 03 00 Comment Number 1

Comment noted. The President's Nonproliferation Policy states the United States will not recycle Pu. Burning weapons-usable Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.

Although it may be possible to make a nuclear weapon from spent commercial reactor fuel, it can only be done with a great deal of difficulty by individuals with extensive experience in handling and processing nuclear materials. The disposition of weapons-usable Pu through the use of MOX fuel in LWRs creates a radiological barrier that makes the Pu as difficult to retrieve and reuse in weapons as Pu in spent commercial reactor fuel. The use of this technology approach would allow for the Pu to be disposed of in a geologic repository the same as commercial reactor fuel. Implementation of the disposition alternatives will serve as an example and encourage other countries to disposition surplus Pu, without reprocessing.

F.A.C.T.S., KENMORE, NY,
JAMES RAUCH
PAGE 2 OF 3

developing countries will reduce the attraction of nuclear enterprises in most cases.

2) We are vigorously opposed to any mixed oxide fuel (MOX) option because: 1) the cost of the MOX fabrication venture is over \$2.2 billion, and 2) it will encourage the development of a plutonium fueled reactor economy, an outcome at odds with current U.S. policy.

The draft EIS presents a sketchy description of a MOX fuel option using the Canadian CANDU reactors at Bruce A. The EIS states that "spent fuel [from this project]... would be accommodated within the Canadian spent fuel program." In effect we would be dumping responsibility for long-term waste management on the Canadians. This would be very unfair. But it would be typical of the irresponsible and slipshod approach to managing nuclear wastes, both commercial and military, taken by past DOE administrations up to and including the current Clinton Administration DOE.

The Canadians are currently reviewing the issue of spent fuel disposal. This review does not include management of spent MOX fuel. In fact, Atomic Energy Canada Limited (the originator of the CANDU MOX proposal) has boasted that a provincial Environmental Assessment can be avoided under an environmental assessment exemption granted to Bruce A in 1976. So, if this option were to be selected, it would probably not be subject to any public review process by Canadian citizens. This would be exceedingly irresponsible, being even less than the routinely political, instead of scientific, shams environmental review processes conducted by DOE in the U.S.

3) At this time, we believe the vitrification of the fissile materials to be the only acceptable option. It would probably cost no more, and perhaps less than the MOX options, without having the fatal flaw of the MOX option, encouragement of a plutonium reactor economy. The cost of expensive shielding could be avoided by vitrifying the fissile material with depleted uranium instead of highly radioactive spent fuel. The glass logs could then be stored in metal canisters made with a gamma-emitter such as cesium-137 to deter theft.

Sincerely,
James Rauch
James Rauch

1/01.03.00
cont.

2/08.03.01

3/08.03.01

4/08.03.01

M-255

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Cost considerations were included in the Technical Summary Report for disposition, which was made available to the public in July and November 1996.

The President's Nonproliferation Policy states the United States will not recycle Pu. Burning weapons-usable Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.

Decisions on disposition of weapons-usable fissile materials will be made based on environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the use of the CANDU Reactor Alternative for the disposition of Pu. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. After considering public comments the PEIS has been revised concerning the CANDU Reactor Alternative. The PEIS includes an appropriate level of analysis concerning the CANDU Reactor Alternative, consistent with Executive Order 12114, DOE guidelines, the State Department's Uniform Procedures, and DOE's regulations at CFR 1021.102 implementing NEPA. In addition, according to the Canadian Government, implementation of the CANDU Reactor Alternative would be subject to Canadian Federal and Provincial policies and regulations and would require health, safety, and environmental assessments before issuance of a Canadian license. (See the letter from the Canadian Embassy in Washington, DC, dated June 6, 1996, reproduced in this CRD.) Should the CANDU Reactor Alternative be chosen for the Pu disposition, further negotiations (which would include the disposition of the MOX spent fuel)

Canadian Federal and Provincial Governments will be required before implementation, as well as business negotiations with reactor owners.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input. The PEIS analyzes vitrification of Pu along with high-level waste or Cs to provide a radiation barrier. The radiation barrier is necessary to provide proliferation resistance and vitrification with depleted uranium would not provide such proliferation resistance; use of HLW or Cs would require shielded facilities.

United States Department of Energy	
	NAME (Optional) <u>CAL FAGER</u> ADDRESS <u>6285 W 68th AVE, ARVADA, CO 80003</u> TELEPHONE <u>(303) 431-8088 (H)</u> <u>514-5700 (W)</u> <u>After extreme review of the attraction of</u> <u>the low-level monitoring disposition alternative</u> <u>it is the most satisfactory option for the following</u> <u>reasons:</u> 1. <u>Meeting treaty requirements - This would be</u> <u>simplest and securest and demonstrable to other</u> <u>countries.</u> 2. <u>Technically feasible - Current technology in</u> <u>existence is acceptable with minor</u> <u>cost parameters and with high levels of safety.</u> 3. <u>Environmental impact - The amount of</u> <u>site after separation & sealing can be limited</u> <u>by technology application process -</u> <u>by efficient operation, monitoring & security</u> <u>they can be set within 100 ft. in any low-</u> <u>level interim type of facility - This is because</u> <u>of the amount of fissile material that is used,</u> <u>the amount of time in process</u> 4. <u>Minimal environmental impact - The low level</u> <u>or relatively small - nuclear waste can</u> <u>disposition - maximum environmental security</u> <u>of the process (this can actually be achieved by</u> <u>complete transfer, storage, & processing</u> <u>of a portion of the material to the system in question,</u> <u>be it again with a significant geological and,</u> <u>or within a year.</u>
	04 02 00 Comment noted.
	Comment Number 1
	1/04.02.00

CO-002

15 00 00

Established in 1917 for Mutual Service and for the Promotion of the Proper Use, Enjoyance and Protection of America's Scenic Wilderness and Outdoor Recreation Resources.



Dear Ms. O'Leary:

On April 15, in Idaho Falls, Idaho, I participated in a hearing on this subject. I have some general comments on the DOE for your eyes, and some specific technical comments on behalf of the Federation of Western Outdoor Clubs that I would like to be part of the hearing record on this matter.

In its Annual Meetings, the Federation of Western Outdoor Clubs has been holding deliberations, and making judgments regarding natural resource issues for over fifty years. I'm aware that you, and many others in the Clinton administration, have the same strong concerns for environmental matters as do the Federation's members. Whether the members be the diverse group of outdoor recreation clubs, sportsmen's associations, and environmental groups affiliated with the F.W.O.C. (as listed in the Appendix), or the Federation's individual members.

For several years, the Federation's Board of Directors has been reviewing the issue of global warming, as it was one of THE major environmental issues that humankind must resolve early on if we want the world to continue as we now enjoy it. At our latest Annual Meeting, we distilled our concerns into an official resolution, a copy of which was sent to you in our letter to you of February 12. To date, we have not received a response, as was requested in our letter.

Please note that the Federation's Resolution strongly supports a variety of initiatives to curb carbon dioxide emissions and outlines a methodology to follow when more electrical power generating capacity is called for. It also conveys a logical rationale or guarded support of nuclear power as the most environmentally-benign, large-scale, safe source of electrical energy, and suggests that environmental groups re-evaluate their viewpoints regarding nuclear power, fuel-reprocessing etc. in view of what appears to be an incontestable trend in global warming.

1/15.00.00

M-256

FEDERATION OF WESTERN OUTDOOR CLUBS, IDAHO FALLS, ID,
MARTIN F. HUEBNER
PAGE 2 OF 4

GENERAL COMMENTS

First, some general comments. I am one of many Americans who have seen the bright promise of post WWII nuclear technology become mired in over-regulation, the un-constructive efforts of journalists, the misplaced concerns of some environmental groups, (and I consider myself a hard-core environmentalist), and the deliberate sabotaging of nuclear technology by alleged "watch-dog groups" who can't or won't (like most journalists) distinguish between military nuclear weapons and commercial nuclear power.

A significant detractor from being able to capitalize on the beneficial use of nuclear technology for our country's benefit, is from what I will refer to hereinafter as the Proliferation Paranooids (PPs). Though probably well-intentioned, these misguided people have infested our government and have done more than any other group to hamstringing our country's once-leadership in nuclear technology. If PPs had been involved in analogous acts to hamper our national defense rather than hamper civilian nuclear power, some have said they would consider such PPs as traitors to our country. If you have any PPs in your shop, I request you find them employment elsewhere!

Although no attribution was given as to the origin of the various proposals/alternatives discussed at the Idaho Falls hearing, I suspect the PPs had a hand in the proposals for immobilization (by e.g. by verification) and Deep Borehole Disposition. I will first discuss how ludicrous these proposals are, from a financial, ethical/moral, and a technical perspective.

TECHNICAL COMMENTS

1) The DOE representatives at the hearing could not/would not respond to my direct question on how much American taxpayer money had been spent to provide these "surplus" materials, (stated to be 175 MT HEU and 38 MT plutonium), or what weapons-grade plutonium or HEU cost per gram to produce. I made the same request for this information from the local DOE office, and from information officers at DOE Headquarters, to no avail. So, based on what I remember about the cost of the weapons-production facilities from past mining on the Colorado plateau the Feed Materials Production Centers like Fernald, through the diffusion plants and production reactors etc., through weapons fabrication, I estimate that to protect our country through the Cold War, the American taxpayer willfully forked over about \$ 1000/gram to support HEU and Pu production.

So, the HEU that's being considered for disposition is estimated to be worth:

$$\text{\$ } 1000/\text{gram} \times 1000 \text{ grams/Kg} \times 1000 \text{ Kg/MT} \times 175 \text{ MT} = \text{\$ } 175,000,000,000$$

If the Plutonium costs a like amount

$$\text{\$ } 1000/\text{gram} \times 1000 \text{ grams/Kg} \times 1000 \text{ Kg/MT} \times 38 \text{ MT} = \text{\$ } 38,000,000,000$$

2/07.00.00

M-256

07 00 00 Comment Number 2

The historical (approximately 50 years) acquisition costs for the HEU and Pu are sunk costs for which no single separate financial accounting system was utilized.

Thus, if either the borehole or the immobilization alternative were (heaven forbid) be chosen, this would result in an unproductive, irrevocable loss to the American taxpayer of a fifth of a trillion dollars. The Immobilization Alternative This calls for the American taxpayer to pay a great deal MORE money (a large but unspecified amount) to change these materials so they aren't attractive to the Bad Guys who would like to do very bad things to our beloved country. The ONLY feasible application of the Immobilization strategy is on plutonium isotopes that can't (for reasons not clear to me) be converted into potential reactor fuel. The rest of such immobilization proposals are a lot of hyper-expensive bunk conjured up by PFRs, or their in-house equivalents. Stated at the Idaho Falls hearing was that the on-going Electro-Metallurgical Project at Argonne National Laboratory-West could be a facility for dealing with non-reactor fissile plutonium. If so, I would recommend that this technical Argonne innovation be vigorously pursued. Deep Borehole Disposition Environmentalists are deeply opposed to inoculating the skin of Mother Earth with any foreign substance, no matter if it is industrial, agricultural, or municipal in origin, or comes from nuclear R & D. The idea of the taxpayers having had to fork-out over \$ 200 billion to manufacture these weapons-grade materials, and then spending huge more amounts to bury it in the ground somewhere at mere taxpayer expense is downright immoral. It would further squander the financial resource of American citizens, who already have a tough time making ends meet. The Borehole concept borders on the ludicrous and would be downright funny if it weren't apparently a sober suggestion, and is even made more ludicrous by the additionally expensive suggestion to "immobilize" the Plutonium first. The absolutely most ridiculous statement made at the hearing was the Russians, too, are considering "Deep Borehole" disposition. It's surprising that a remark like this wasn't treated to out-loud boos of derision. One does not have to be a member of the State Department to know that Russia is in deep financial difficulty, and would no-way bury this supremely expensive materials in the ground. Only in profligate America could something as bizarre as Deep Hole disposal be advanced. Such moneys should be spent in CLEAN-UP of weapons manufacturing facilities! The Federation suggests that persons responsible for such providing such "Alternatives" as Immobilization and Deep Borehole disposal be frequently checked for controlled substances. It makes us wonder if they are truly adhering to whatever oath they took when taking office to benefit, guard and protect our country and its citizens. 2) It is apparent that unless weapons-usable HEU and plutonium are to be used for useful (electricity production) purposes, they are properly safeguarded where they now are stored, and it should be	3/08.03.01
Stated at the Idaho Falls hearing was that the on-going Electro-Metallurgical Project at Argonne National Laboratory-West could be a facility for dealing with non-reactor fissile plutonium. If so, I would recommend that this technical Argonne innovation be vigorously pursued.	4/08.03.01
The absolutely most ridiculous statement made at the hearing was the Russians, too, are considering "Deep Borehole" disposition. It's surprising that a remark like this wasn't treated to out-loud boos of derision. One does not have to be a member of the State Department to know that Russia is in deep financial difficulty, and would no-way bury this supremely expensive materials in the ground. Only in profligate America could something as bizarre as Deep Hole disposal be advanced. Such moneys should be spent in CLEAN-UP of weapons manufacturing facilities!	5/08.03.01
2) It is apparent that unless weapons-usable HEU and plutonium are to be used for useful (electricity production) purposes, they are properly safeguarded where they now are stored, and it should be	6/01.06.00

M-256

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Borehole and Immobilization Alternatives. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Electrometallurgical Treatment Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, existing agreements, and public input.

08 03 01 Comment Number 5

The Department of Energy recognizes the commentor's concern with the Borehole Alternatives. Decisions on the disposition alternatives will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

01 06 00 Comment Number 6

Comment noted. DOE is considering, and the PEIS analyzes, both Reactor Alternatives (which would convert surplus Pu to MOX fuel to generate electricity), and the No Action Alternative (which would leave the surplus Pu in safe, secure storage), as the commentor suggests. For surplus HEU, DOE has already decided to blend-down up to 20 percent of the HEU to commercial fuel as decided in the HEU ROD.

FEDERATION OF WESTERN OUTDOOR CLUBS, IDAHO FALLS, ID,
MARTIN F. HUEBNER
PAGE 4 OF 4

feasible for such materials to remain where most of the related materials now are, such as HEU at Oak Ridge. In contradiction to the EPA, in-country shipments of such special materials have been proven not to be a legitimate proliferation concern.

3) The ONLY legitimate role for the surplus HEU/plutonium is to put it to use for the benefit of U.S. citizens who have already paid dearly to manufacture this material. Several reactor proposals were discussed in the hearing. The Federation is not equipped to make a selection among:

Using the weapons-usable materials as fuel in existing U.S. light water cooled reactors,

Using it in partially completed U.S. light water reactors, or

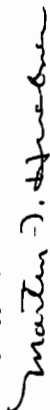
Using it in evolutionary U.S. light water reactor(s) to be designed/built, or

Using it in Canadian CANDU reactors.

It would appear most beneficial for the long-term interests of the country to design/build some commercial power plant reactor of advanced design, and let the U.S. citizens get a "peace benefit" when these materials are in-reactor burned to provide useful power.

The Federation notes that some U.S. electrical utilities have already expressed interest in using these materials in their reactor. This factor is another good reason ignoring the Immobilization and Deep Borehole proposals. We would rather GIVE these materials to the Canadians or the British than see it designated for such stupid and useless purposes.

Very truly yours,



Martin F. Huebner
President
Federation of Western Outdoor Clubs
1995 McKenzie Drive
Idaho Falls, Idaho 83404

Copies to:

- o Idaho State Congressional Delegation
- o Idaho State Legislators and State Officials
- o DOE-Office of Fissile Materials Disposition
- % SAIC-PEIS, PO Box 23786, Washington DC

08 03 01

Comment Number 7

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

6/01.06.00
cont.

7/08.03.01

M-256

FENMORE, CAROL, POCATELLO, ID
PAGE 1 OF 1

Comment ID: Date Received: Name: Address:	P0008 April 18, 1996 Carol Fenmore 365 Skyline Drive Pocatello, ID	1/08.03.01
Transcription: I'm 100% against bring over 1000 tons of plutonium, the most dangerous element known to man, and possibly storing it over the Snake River Aquifer. It is absolutely insanity and should not even be considered at any cost, jobs or otherwise. It makes me livid. Thank you. My number is (208) 203-0788 and thank you.		
		P-008

08 03 01

Comment Number 1

The Department of Energy acknowledges the commentor's opposition to the transportation of Pu for storage at INEL. Decisions on the storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

FTZGERALD, KARA
PAGE 1 OF 1

Comment ID: P0018
Date Received: April 18, 1996
Name: Kara Fitzgerald
Address: none given
Phone: 208-785-0215

Transcription:

I think it'd be a good thing to have the plutonium come to Idaho. Thank you. | 1/08.03.01

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for additional missions involving Pu at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-018

FITZGERALD, PETE, BLACKFOOT, ID
PAGE 1 OF 1

Comment ID: P0007

Date Received: April 18, 1996

Name: Pete Fitzgerald

Address: Blackfoot [ID]

Transcription:

I think we should get that plutonium. It'd bring more jobs for the INEL. We need more jobs in this area. Thank you very much, bye.

| 1/08.03.01

08 03 01 **Comment Number 1**

The Department of Energy acknowledges the commentor's support for additional missions involving Pu at INEL. Decisions on storage and disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-007

FLANGAS, WILLIAM A., LAS VEGAS, NV
PAGE 1 OF 1

United States Department of Energy		Comment Number 1
NAME: (Optional)	William A. Flangas	08 02 00
ADDRESS:	4305 El Cedral Las Vegas, NV 89102	Comment noted.
TELEPHONE:	(702) 871-1730	01 06 00
1. I have attended a great many of these public meetings in recent years & it is painfully obvious that - o meetings are attended by a large by the same people grinding out their own agendas - obviously not interested in facts o Too many participants suggesting they're representing the public - often their agenda to a public of 1 or 2 o Meetings provide a forum for many negative anti-establishment & emotional verbal attacks on any good fact efforts		1/08.02.00
2. In my opinion DOE officials need to do a better job explaining the fact that the nuclear deterrent is necessary & a fact of life that cannot be discarded. We cannot unilaterally disarm & rely on the generosity of others w/ our national security. We must always be in the position to enforce peace, not beg for it. 3. We must do a better job of pointing out that our country is making a good faith effort to disarmament decreasing, storage, disposal of material, etc. We have nothing to apologize for. A Pheasant, it's time to question the continuation of these meetings. Is the cost & effort really worth it?		2/01.06.00
		1/08.02.00 cont.

NV-002

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's preference for the Immobilization/Vitrification Alternative. Decisions on storage and disposition of weapon-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for the Borehole and Immobilization Alternatives. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 3

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternatives. However, NEPA requires that DOE look at all reasonable alternatives and, therefore, reactor burning must be considered. Decisions on the disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's opposition to long-term storage. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Storage and Disposition of Weapons-Usable Fissile Materials Draft Programmatic
Environmental Impact Statement (PEIS) Public Comment Form

Name (optional): MARK FLOMENHOFT
Address (optional): 3415 1st AVE NE
SEATTLE, WA 98105

Please write down your comments and drop this form in the marked boxes before you leave tonight. These forms will be submitted to the Department of Energy as part of the formal comment on this PEIS. If you are unable to complete this form tonight, written comments can be mailed to:

Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, D.C. 20026-3786

or, you can call this toll-free number to leave comments by phone: 1-800-820-5156. Comments must be submitted by May 7, 1996.

The Department of Energy has identified three types of technologies as options for disposing of weapons-usable fissile materials. The technologies are: 1) "deep borehole" disposal, 2) "reactor" disposal, and 3) "vitrification" disposal. Please write down your comments on the following three types of options for disposal and the storage option.

1. Materials Immobilization/Vitrification - Immobilize fissile materials by mixing them with glass, glass-bonded zeolites, or ceramics.
Immobilize fissile materials in the environment & prevent access.
are positive. Don't bury them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.

1/08.03.01

2. Deep borehole disposal - Materials would be disposed in boreholes at least 2.5 miles deep, in geologically stable rock. Materials would be disposed directly into the deep borehole, or materials could be immobilized first, and then deposited into the deep borehole.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.

2/08.03.01

3. Reactor Options - Surplus plutonium/enriched uranium would be made into MOX fuel for use in nuclear reactors, destroying by fission a major portion of the weapon grade materials.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.

3/08.03.01

4. Storage Options - USDOE would continue existing storage practices for weapons-usable fissile materials at current locations and/or consolidate that storage at one or more of the designated sites.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.
Don't dispose of them in the ground. Let them decay.

4/08.03.01

M-129

FLOMENHOFT, MARK, SEATTLE, WA
PAGE 2 OF 2

Please use this space to write down any additional comments on the Storage and Disposition
of Weapons-Usable Fissile Materials Draft Programmatic Environmental Impact Statement.

There are 3 priorities:

1. Permanent isolation from the public
 2. Permanent isolation from terrorists &
military application
 3. Avoidance of nuclear waste generation.
- Only immediate action with long disposal costs
all the objectives.

Mark Flomenhoff

2/08.03.01
cont.

M-129

FOREMAN, BOB D., RICHLAND, WA
PAGE 1 OF 1

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentor's support for new missions at Hanford. Decisions on storage and disposition of weapon-usable fissile materials will be based on environmental analyses, technical and economic studies, national policy considerations, and public input.

 Comment Form These comments apply to the following documents: 1. Environmental Impact Statement for the 2. Proposed Site-Wide Environmental Management Plan 3. Proposed Site-Wide Environmental Management Plan 4. Proposed Site-Wide Environmental Management Plan	
NAME: (Optional) <u>Bob D. Foreman</u> ADDRESS: <u>1221 6th Ave, RICHLAND WA. 99352</u> TELEPHONE: <u>1202 943-0393</u>	
<u>I FEEL THIS PROPOSAL WOULD GREATLY BENEFIT</u> <u>THE CITIZENS OF THIS TOWN. THIS STATE, THIS COMMUNITY,</u> <u>AND THIS PROJECT (SITE). AND I FULLY SUPPORT</u> <u>THIS WORKING WITH THE FULL & COMPLETE BACKING</u> <u>OF MY FAMILY AND FRIENDS.</u> <u>See All</u>	

1/08.03.01

WA-002

GE STOCKHOLDERS' ALLIANCE,
PATRICIA BIRNIE
PAGE 1 OF 1

Date Received: 06/12/96
Comment ID: P0048
Name: Patricia Burney
Address: GEE Stockholder's Alliance

Transcription:

Hello, this is Patricia Burney with the G.E. Stockholder's Alliance. And I first want to thank you for having this phone line available for our comments. I am sending a written statement as well which will have my address and phone number so I won't bother you with it now. But I do want to encourage you to oppose the use of MOX, the mixed oxide, as a fuel for commercial nuclear reactors. There are many reasons why that I am stipulating in my letter, but I wanted to just call in with my opposition to it being used. It makes it so much more possible to make the material available for proliferation; it increases the volume and radioactivity of waste that would be generated; it would require military escort when the -- to take care of the unused fuel. There's just so many reasons that it's not wise to follow that option, and we would strongly encourage you instead to use the vitrification process as the choice -- the option that you would choose for this mixed oxide plutonium and uranium. Thank you and I'll send my letter in tomorrow's mail. Thank you very much. Bye.

1/08.03.01

2/08.03.01

Comment Number 1

08 03 01

The Department of Energy acknowledges the commentor's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment Number 2

08 03 01

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

P-048

The Department of Energy acknowledges the commentator's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Comment noted.

The safeguards and security of storage of the weapons-usable fissile materials will continue to follow existing applicable regulations and requirements. Furthermore, the facilities would be inspectable by IAEA, as appropriate. Transportation impacts are discussed in Section 4.4 and Appendix G of the PEIS. Armed nuclear materials couriers carefully selected and highly trained to operate tractor-trailers and communication systems would be used. These couriers would also be authorized by the AEA to carry firearms and make arrests in the performance of their duties. No military personnel would be used in DOE's management of weapons-usable fissile materials.

The President's Nonproliferation Policy says the United States will not recycle Pu. Burning weapons Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.

The MOX Fuel Option is a means of converting weapons Pu to a form that is difficult to retrieve and reuse in weapons. The MOX Fuel Options does not increase the volumes and radioactivity of waste from existing reactors. It replaces the spent fuel that would have been fabricated from other materials

M-273

1349 W. Sun X Street
Tucson, AZ 85712-0002
Phone: (520) 546-2000
Fax: (520) 546-2073

June 7, 1996

Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

**Re: OPPOSITION TO USE OF MIXED OXIDE FUEL FOR
COMMERCIAL REACTORS**

Dear Sirs:

We strongly oppose the use of mixed oxide fuel (MOX) as a fuel for commercial reactors.

For many years the U.S. has staunchly maintained a policy of separation of civilian use and military use of radioactive materials. This policy should be retained and strengthened.

While it may be tempting to use the plutonium waste from dismantled nuclear weapons as a source of fuel for commercial reactors, we believe the negative factors outweigh the positive.

1. Use of MOX would greatly increase the availability of plutonium for proliferation use since the plutonium would be easily separated from its other components.

2. Use of MOX would greatly increase the volume and radioactivity of waste generated. We don't know what to do with the radioactive waste already generated. Use of MOX would exacerbate an already severe problem.

3. Because of its proliferation potential, used MOX fuel would require military escorts in transportation to waste sites, and military surveillance during storage of the fuel--"forever".

We believe it would be more responsible of the DOE to vitrify the plutonium waste from dismantled weapons, instead in the long run would cost the taxpayer much less.

PLEASE DO NOT CONSIDER USING BOX FOR COMMERCIAL REACTOR LIST:

Sincerely,
Patricia T. Burnie
Patricia T. Burnie, Chair

Patricia T. Birnie, Chair

3-221

GE STOCKHOLDERS' ALLIANCE, TUCSON, AZ,
PATRICIA T. BIRNIE
PAGE 2 OF 2

and displaces the spent fuel that would have otherwise been created by other sources of fuel supply. The spent MOX fuel is essentially the same as existing commercial reactor spent fuel. Therefore, it meets the same criteria as other commercial reactor spent fuel in terms of being accepted for placement in a repository. The PEIS acknowledges the fact that constructing and operating a MOX fuel fabrication facility would increase the wastes generated at any sites selected for analyses. The wastes generated for the MOX fuel fabrication facility are presented in Section E.3.2.3. The impacts associated with operating the MOX fuel fabrication facility are presented in Section 4.3.5.1.10.

08 03 01 Comment Number 5

The Department of Energy acknowledges the commentor's support for the Immobilization Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

05-01-96 05:29PM FROM MD-1 #2	P01	To FAX 1-800-820-5156 US DOE Office of Plutonium Materials Disposition 6-7-96	I am opposed to the MOX option for fuel for commercial nuclear reactors. DOE may consider this option as a "waste reduction program". I see it as a new way to increase volume and radioactivity of the waste from reactors. We are already strapped for dealing with the nuclear utilities' waste. Would storage of MOX fuel require military presence? Would transport of the fuel require military escorts? I believe the U.S. does not need any more transportation problems related to radioactive materials. It is my understanding that MOX poses severe proliferation issues. As a resident of the state of Oklahoma I don't take discussions of bomb material lightly. I urge DOE to reject the misguided MOX option.	1/08.03.01 2/01.04.00 3/13.00.00 4/01.06.00 1/08.03.01 cont.
B. Geary				
2343 S. Birmingham Place Tulsa, OK 74114				

F-063

08 03 01 Comment Number 1

The Department of Energy acknowledges the commentator's opposition to the Reactor Alternative using MOX fuel. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

01 04 00 Comment Number 2

The MOX Fuel Option is not a "waste reduction program." It is a means of converting weapons Pu to a form that is difficult to retrieve and reuse in weapons. The MOX Fuel Option does not increase the volumes and radioactivity of waste from existing reactors. It replaces fuel that would have been fabricated from other materials and displaces the spent fuel that would have otherwise been created by other sources of fuel supply. The spent MOX fuel is essentially the same as existing commercial reactor spent fuel. Therefore, it meets the same criteria as other commercial reactor spent fuel in terms of being accepted for placement in a repository.

13 00 00 Comment Number 3

The safeguards and security of storage of the weapons-usable fissile materials will continue to follow existing applicable regulations and requirements. Furthermore, the facilities would be inspectable by IAEA, as appropriate. Transportation impacts are discussed in Section 4.4 and Appendix G of the PEIS. Armed nuclear materials couriers carefully selected and highly trained to operate tractor-trailers and communication systems would be used. These couriers would also be authorized by AEA to carry firearms and make arrests in the performance of their duties. No military personnel would be used in DOE's management of weapons-usable fissile materials.

01 06 00 Comment Number 4

The President's Nonproliferation Policy says the United States will not recycle Pu. Burning weapons Pu in reactors does not utilize the recycling process because the Pu in the spent fuel from this process will not be extracted

**GEARY, B., TULSA, OK
PAGE 2 OF 2**

for reuse in new fuel. This is consistent with U.S. policy since no Pu is being recycled. After a once-through fuel cycle, the Pu would be converted to a nonproliferation form as spent reactor fuel.

GENERAL ATOMICS, SAN DIEGO, CA,
A. J. NEYLAN
PAGE 1 OF 39



GA/DOE-027-96
Project 9866
April 30, 1996

Mr. Gregory P. Rudy, Acting Director
Office of Fissile Materials Disposition
U.S. Department of Energy
P.O. Box 23786
Washington, DC 20026-3786

SUBJECT: Comments on Draft Programmatic Environmental Impact Statement (EIS) on
Storage and Disposition of Weapons-Useable Fissile Materials

References: (1) R.M. Forsell letter to Howard R. Canter, "Scope for Environmental Impact
Statement for Long-Term Storage and Disposition of Weapons-Useable Fissile
Material: Plutonium Consumption Modular Helium Reactor," GA/DOE-035-95,
February 10, 1995

(2) A.J. Neylan letter to Howard R. Canter, "Programmatic EIS Screening
Results," GA/DOE-068-95, June 6, 1995

Dear Mr. Rudy,

This letter provides the comments of General Atomics (GA) on the subject Draft Programmatic
EIS. GA has previously provided to DOE via References (1) and (2) its comments on the results
of the Screening Process, by which DOE selected the alternatives to be considered in this
Programmatic EIS, and on the scope of the Programmatic EIS. Copies of these references are
attached to this letter (Attachments 1 and 2). GA requests that the comments in Attachments 1
and 2 be included in the public record as part of its comments on the Draft Programmatic EIS
itself. The comments primarily addressed 1) DOE's decision and rationale for not including the
Gas Turbine Modular Helium Reactor (GT-MHR) as a reasonable alternative to be considered
in this Programmatic EIS and 2) DOE's interpretation of the spent fuel standard as an objective
that is not to be exceeded (by eliminating from consideration in this Programmatic EIS all
alternatives capable of exceeding the spent fuel standard), without having provided the public
with a full comparison of the environmental impacts associated with that decision.

Additional comments are provided with this letter in Attachment 3. These comments address
1) the manner in which DOE has provided only superficial consideration (in a three page
appendix to the Programmatic EIS) of multipurpose reactor options for plutonium disposition and
tritium supply; 2) the imposed schedule for demonstration of disposition technologies and for
completion of disposition and the environmental impacts that result from that schedule; 3) the
suitability of final waste forms for permanent disposal in terms of long term safeguards
requirements and long term radionuclide containment; 4) issues associated with borosilicate glass
as a vitrification option; 5) the viability of using electrometallurgical treatment (pyroprocessing)
as an immobilization option; 6) use of a coated particle waste form for plutonium

2650 GENERAL ATOMICS COURT, SAN DIEGO, CA 92121-1184 PO BOX 194008 SAN DIEGO, CA 92186-8784 619-456-3000

M-132

GENERAL ATOMICS, SAN DIEGO, CA,
A. J. NEYLAN
PAGE 2 OF 39

14 00 00 **Comment Number 1**

The Advanced Deep Burn Reactors Option, including Modular Helium Reactors (MHR), was considered in the screening process. Notwithstanding the many potential benefits of their use, the technical immaturity would call for costly and lengthy development and demonstration efforts to bring them to a viable status. The Screening Committee decided that the increased Pu burn-up offered by this option would not counterbalance its cost, schedule, or technical risks, and therefore eliminated this option from further consideration. Clarification has been provided in Appendix N of the Final PEIS for the various multipurpose reactor concepts.

01 05 00 **Comment Number 2**

The Department of Energy, in considering the Spent Fuel Standard, did evaluate the adequacy of the Standard versus the greater degree of destruction achievable with other options such as the Deep Burn Reactor and the Accelerator Options in the Screening Report. It was judged that the Spent Fuel Standard is adequate since it would convert the weapons Pu to a form that would make it as difficult to retrieve and reuse in a weapon as the Pu contained in the much larger existing volume of spent fuel from commercial nuclear reactors.

The Department of Energy concluded that the shorter disposition time achievable with more mature technologies was more desirable than the greater Pu destruction that could only be achieved over a much longer time period through the use of Deep Burn Reactors and Accelerators. The NAS also adopted the Spent Fuel Standard as the most acceptable form for conversion of weapons Pu.

Mr. Gregory P. Rudy -2- GA/DOE-027-96
immobilization; and 7) the treatment of certain environmental impacts associated with the CANDU reactor option for plutonium disposition.

GA continues to believe that the GT-MHR (identified as the Plutonium Consumption Modular Helium Reactor [PC-MHR] when applied to the plutonium disposition mission) must be evaluated in the Programmatic EIS because it is a reasonable alternative for plutonium disposition. GA also believes that the manner in which DOE has applied the spent fuel standard is a significant issue that must also be evaluated in the Programmatic EIS, especially in view of the availability of reasonable alternatives such as the GT-MHR, which is capable of exceeding the spent fuel standard and leaving a factor of five less plutonium-239 remaining than reactor alternatives that merely meet the standard.

1/14.00.00
2/01.05.00

The National Environmental Policy Act (NEPA) requires that all reasonable alternatives and significant issues be evaluated in the PEIS process. By addressing all reasonable alternatives and significant issues as required, DOE will provide a strong foundation for the Record of Decision, will avoid the potential for substantial delays in the plutonium disposition effort that might result from legal action as a result of the manner in which DOE has discharged its obligations under NEPA, and will enhance the credibility of DOE's efforts in the eyes of all stakeholders who have an interest in the resolution of the plutonium disposition problem.

GA again respectfully requests that DOE reconsider its decision to exclude the GT-MHR and the interpretation of the spent fuel standard from consideration in the Programmatic EIS. If you have any questions regarding General Atomics' comments or would like further information, please contact Dave Alberstein at (619) 455-2088.

Sincerely,

A.J. Neylan
A.J. Neylan
Vice President, Power Reactor Group

AJN/DA:da

Attachments:

- 1) GA/DOE-035-95, February 10, 1995
- 2) GA/DOE-068-95, June 6, 1995
- 3) Additional General Atomics Comments on the Draft Programmatic Environmental Impact Statement for Storage and Disposition of Weapons-Usable Fissile Materials

cc:

J.D. Nutton, DOE-HQ

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A. J. NEYLAN
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ATTACHMENT 1 TO GA/DOE-027-96

GA/DOE-035-95
February 10, 1995

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GA/DOE-035-95
Project 6301
WBS: 5109.91
February 10, 1995

Mr. Howard R. Casner, Technical Director
Office of Fissile Materials Disposition
U.S. Department of Energy
Washington, DC 20585

SUBJECT: Scope for Programmatic Environmental Impact Statement for Long-Term Storage and Disposition of Weapons-Usable Fissile Material: Plutonium Consumption Modular Helium Reactor

Dear Mr. Casner:

Thank you for the opportunity to meet with you on February 1, 1995, to discuss the status of the Plutonium Consumption Modular Helium Reactor (PC-MHR) in the scoping process for the Programmatic Environmental Impact Statement (PEIS) for Long-Term Storage and Disposition of Weapons-Usable Fissile Materials. During that meeting you did not indicate that the PC-MHR had been eliminated in the screening process for the PEIS. However, we note from the draft report to Congress on the multipurpose reactor, which is dated January 31, 1995, and which GA received from your office for review and comment on February 3, 1995, that the PC-MHR has been eliminated from consideration.

GA will provide its comments on the draft multipurpose report, per your request, via a separate letter. The purpose of this letter is to explain why GA believes that it would be improper to exclude the PC-MHR as an alternative in the PEIS for fissile materials disposition and to request that DOE reconsider its decision to exclude the PC-MHR from evaluation in the PEIS. GA is sufficiently concerned about this matter that it has sought the advice of consultants with expertise in the legal requirements of the National Environmental Policy Act (NEPA). We are advised that our concerns are substantive and have merit relative to the requirements of NEPA.

GA believes that under both the letter and the spirit of NEPA the PC-MHR must be included and evaluated in the PEIS. NEPA regulations require that the PEIS evaluate all reasonable alternatives (40CFR1502.14) and provide in depth analysis of all significant issues (40CFR1501.7 and 40CFR1508.27). While NEPA itself does not provide a benchmark for what constitutes "reasonable" alternatives, certain principles are clearly discernable from the applicable regulations and court decisions. While the scope of reasonable alternatives issues, of course, be bounded by some sense of feasibility or practicality, it is not permissible to exclude any viable alternatives merely on, for example, policy or political grounds.

The PC-MHR is a reasonable alternative for plutonium disposition relative to DOE's time published screening criteria. Among the alternatives that involve construction of a new reactor dedicated to the plutonium disposition mission, it has superior safety and environmental impact characteristics, very low life cycle cost under government ownership (even when remaining engineering development costs are taken into account), a fast cycle with superior diversion and proliferation resistance characteristics, and a spent fuel form that is best suited for long term disposal in a geologic repository. The strong interest

08 00 00 Comment Number 3

The MHRs were considered as Reactor Alternatives in the screening process. The MHRs were not excluded on political grounds. The Screening Committee decided that the increased Pu burn up offered by this option would not counterbalance its cost, schedule, or technical risks, and therefore eliminated this option from further consideration. Clarification has been provided in Appendix N of the Final PEIS for the various multipurpose reactor concepts.

14 00 00 Comment Number 4

To meet the Nation's goals in support of its nonproliferation policies, DOE determined that the "clear and present danger" demands that the disposition of Pu be initiated within approximately a decade. To achieve this objective, an alternative must be nearly ready for development or be an extension of an existing technology. Clarification has been provided in Appendix N of the Final PEIS for the various multipurpose reactor concepts.

3/08.00.00

4/14.00.00

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Mr. Howard R. Custer GA/DOE-035-95 - 2 - expressed by the Russians in using the MHR for plutonium disposition is clear evidence of its ability to influence disposition of international weapons-usable materials inventories and to foster cooperation with Russia. With regard to DOE's timeliness criterion, under the requirements of NEPA DOE cannot exclude reasonable alternatives on the basis of administrative deadlines or artificial time schedules. It should be noted that regardless of the alternative chosen for plutonium disposition, construction and use of facilities for long term storage of surplus weapons grade plutonium will be necessary. Although the projected schedule for initial deployment of the PC-MHR in the United States is about five years longer than that claimed during Phase I of the DOE Plutonium Disposition Study (PDS) by proponents of other reactor alternatives, the critical factor is that the PC-MHR is capable of completing the plutonium disposition mission within the 25 year overall mission duration that has served as the planning basis for the PDS. The draft report to Congress on the multipurpose reactor basically states that the PC-MHR is being eliminated on the basis of "technical immaturity". This statement is inconsistent with the fact that the MHR has been developed based upon extensive experience with more than 50 gas-cooled reactors built and operated over the last 35 years, including five high temperature gas-cooled reactors that have confirmed the major design features of the MHR. This statement is also incongruous with previous positions taken by DOE. Only three years ago the MHR was one of the final alternatives under consideration for selection as the New Production Reactor. It was, by most accounts, the most likely alternative to have been selected had that Record of Decision not been postponed only one month prior to its scheduled release date. The MHR had been selected as one of the final alternatives following extensive review by the Secretary's Energy Research Advisory Board. In light of this history, it is unjustifiable that DOE would not evaluate in the PEIS for fissile materials disposition a technology option that so recently was under favorable consideration for a mission that is vital to national security. These facts alone demonstrate that the PC-MHR must be included as a reasonable alternative in the PEIS. The PC-MHR differs from the new production reactor design in only two ways: use of plutonium oxide fuel and use of the direct cycle gas turbine to improve plant efficiency and economics. As indicated by the enclosed white paper on fuel development status, which summarizes information that DOE has had in its possession for almost two years under the Plutonium Disposition Study, coated particle plutonium fuel that meets the performance requirements of the PC-MHR has been successfully demonstrated in six separate irradiation tests in a high temperature gas-cooled reactor environment. These tests confirmed the ability of weapons grade plutonium coated particle fuel to achieve high levels of plutonium destruction while maintaining coating integrity and retention of radionuclides in the fuel particles. As indicated by the enclosed white paper on the power conversion system, there exists an extensive technology base for the power conversion system major components. Basic research and development are not needed to complete engineering and demonstration of the system. As shown in GA's Phase II Plutonium Disposition Study report, the power conversion system is not on the critical path for deployment of the PC-MHR. The power conversion system of the MHR has been assessed by two organizations recognized throughout the world as experts in gas turbine and Brayton cycle technology - General Electric and AlliedSignal. Both have endorsed the power conversion system and have concluded that it can be demonstrated in a timely manner.	4/14.00.00 cont.	5/07.00.00	6/01.05.00	7/14.00.00	M-132

07 00 00 Comment Number 5

During the PEIS scoping process and related public meetings, DOE asked for input on the screening criteria. Some respondents reacted to the timeliness statement that "The technology concept should be demonstrated within approximately 20 years and disposition should be completed within approximately 50 years." These respondents ranked our stated definition of timeliness low indicating that 20 and 50 years was too long and it was important for DOE to start and finish earlier. Clarification has been provided in Appendix N of the Final PEIS for the various multipurpose reactor concepts.

01 05 00 Comment Number 6

The Department of Energy recognizes the potential benefits (unrelated to Pu disposition) that can be offered by the Plutonium Consumption Modular Helium Reactor (PC-MHR) Option. Nevertheless, as explained in Appendix N of the Final PEIS, because this technology needs further development and the benefits do not counterbalance the cost, schedule, or technical risks associated with this option, there is no justification to develop this technology solely for the purpose of Pu disposition. Pu disposition can be accomplished using existing technologies to achieve the Spent Fuel Standard. It is unnecessary to exceed the Spent Fuel Standard since the amount of Pu that could be declared surplus from weapons is much less than the inventory of Pu in commercial spent fuel.

14 00 00 Comment Number 7

The Advanced Deep Burn Reactors Option, including MHRs, was considered in the screening process. Notwithstanding the many potential benefits of their use, the technical immaturity would call for costly and lengthy development and demonstration efforts to bring them to a viable status. The Screening Committee decided that the increased Pu burn-up offered by this option would counterbalance its cost, schedule, or technical risks; therefore, this option was eliminated from further consideration. Appendix N of the Final PEIS provides further explanation related to the various multipurpose reactors.

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Mr. Howard R. Caster

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GA/DOE-035-95

8/01.00.00

Based upon these considerations, GA believes that there is no rational argument, relative to DOE's nine published criteria for the screening of disposition alternatives or to DOE's stated purpose and need for taking action, upon which the PC-MHR can be eliminated from consideration and evaluation in the PEIS. GA is aware that DOE has eliminated some plutonium disposition alternatives based on the assessment that their deployment would be in violation of certain international treaties or other legal considerations. GA is aware, however, of no such institutional considerations that justify elimination of the PC-MHR from evaluation in the PEIS.

2/01.05.00
cont.

In addition to GA's concerns regarding the improper exclusion of the PC-MHR from evaluation in the PEIS, there is an additional significant issue which must be addressed in the PEIS. GA believes that the PEIS must consider the adequacy and acceptability of the spent fuel standard. In addition to its many advantages cited above, the PC-MHR is capable of exceeding the spent fuel standard in a single pass of the fuel through the reactor without recycle. The final product resulting from the disposition of weapons grade plutonium in the PC-MHR contains a factor of five less plutonium-239 than that which results from disposition in other reactor options that merely meet the spent fuel standard. If the PC-MHR and other reasonable "deep burn" alternatives are eliminated from evaluation at this time, such elimination will constitute a de facto adoption of the spent fuel standard without the full evaluation required under NEPA. As noted in the National Academy of Sciences (NAS) report on plutonium disposition, "over the long term, however, steps beyond the spent fuel standard will be necessary." The PC-MHR has the capability to take those steps today and provide a one-step, permanent solution to the problem of disposition of surplus weapons grade plutonium with lower total environmental impact than that resulting from the choice of alternatives that merely meet the spent fuel standard and leave the matter of ultimate disposition, and its associated environmental impacts, for future generations.

During the public scoping meetings for the PEIS held in the summer and fall of 1994, the adequacy and acceptability of the spent fuel standard was a subject of much discussion and disagreement. These discussions are partially documented in DOE's PEIS Scoping Meeting Comments Summary Report of November 30, 1994. However, during its presentations in the public meetings on plutonium disposition on December 13-14, 1994, DOE appeared to dismiss this significant issue on the basis that there did not "appear to be strong sentiment for exceeding the spent fuel standard." Members of Congress have also indicated that a consensus has not been reached in Congress on the adequacy of the standard. Questions have been raised regarding whether the alternatives that merely meet the spent fuel standard will adequately meet one of the major national security objectives of the plutonium disposition effort identified in the NAS report and adopted by DOE in its June 21, 1994, Notice of Intent to prepare the PEIS: to minimize the risk that weapons or fissile materials could be reintroduced into the arsenal from which they came.

DOE appears to be adopting the spent fuel standard without providing to the public the results of an objective assessment of the diversion and proliferation resistance and total environmental impacts of alternatives that meet the standard vs reasonable alternatives for plutonium disposition that can exceed the spent fuel standard. The NAS report recommended that efforts to exceed the spent fuel standard not be addressed at this time based upon certain assumptions about deployment time, cost, and technical uncertainty of alternatives that can exceed the standard. These assumptions were not supported by NAS with any specific analyses. The DOE Plutonium Disposition Study later provided such analyses, and the results indicate that some of these assumptions are ill founded.

6/01.05.00
cont.

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01 00 00 Comment Number 8
Comment noted. Appendix N has been revised to provide further explanation concerning the PC-MHR and other multipurpose reactors as alternatives for Pu disposition.

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Mr. Howard R. Carter	- 4 -	GA/DOE-035-95	
The adequacy of the spent fuel standard is, accordingly, a significant issue which must be evaluated in detail in the PEIS. However, regardless of whether the spent fuel standard is considered in the PEIS and ultimately deemed to be an acceptable interim standard, the PC-MHR is a reasonable alternative for plutonium disposition based on its superior safety and environmental characteristics, cost characteristics, diversion and proliferation resistance, spent fuel form, and level of technical maturity as evidenced by its earlier consideration under the New Production Reactor Program. The ability of the PC-MHR to exceed the spent fuel standard is a readily achievable additional benefit.			2/01.05.00 cont.
In summary, GA believes that the PC-MHR must be evaluated in the PEIS because it is a reasonable alternative for plutonium disposition. GA also believes that the adequacy and acceptability of the spent fuel standard is a significant open issue that must also be evaluated in the PEIS, especially in view of the availability of reasonable alternatives such as the PC-MHR, which is capable of exceeding the spent fuel standard and having a factor of five less plutonium-239 remaining than reactor alternatives that merely meet the standard.			1/14.00.00 cont.
NEPA requires that all reasonable alternatives and significant issues be evaluated in the PEIS process. By addressing all reasonable alternatives and significant issues as required, DOE will provide a strong foundation for the Record of Decision, will avoid the potential for substantial delays in the plutonium disposition effort that might result from questions regarding the manner in which DOE has discharged its obligations under NEPA, and will enhance the credibility of DOE's efforts in the eyes of all stakeholders who have an interest in the resolution of the plutonium disposition problem.			2/01.05.00 cont.
GA respectfully requests that DOE reconsider its decision to exclude the PC-MHR and the spent fuel standard from consideration in the Programmatic EIS.			1/14.00.00 cont.

Sincerely,

R. M. Forsell
R. M. Forsell
Senior Vice President
Power Reactor Group

Enclosures:

- 1) Fuel Development Status of the Plutonium Consumption Modular Helium Reactor (PC-MHR)
- 2) GT-MHR Power Conversion System - State of the Art Technology

cc:
C.B. Curtis
R.W. DeGruise
J.D. Nulken
A.J. Cygelm
J.M. Turner, DOE-OAK
S. El Sawmy, DOE-OAK

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FUEL DEVELOPMENT STATUS OF THE PLUTONIUM CONSUMPTION MODULAR HELIUM REACTOR (PC-MHR)

STATUS

Fuel that meets PC-MHR operating requirements has been demonstrated. Additional tests are planned to expand the data base and confirm performance under accident conditions.

BACKGROUND

The PC-MHR can achieve very high levels of weapons grade plutonium destruction without recycle. Destruction of more than 90% of the initially charged plutonium-239 and more than 65% of the initially charged total plutonium is obtained in a single pass through the reactor. This level of destruction makes the discharged plutonium in the spent fuel particularly unattractive for weapons applications relative to the plutonium contained in the spent fuel from other reactor types.

The PC-MHR can achieve this high level of plutonium destruction due, in large part, to the high burnup capability of its plutonium oxide, refractory coated particle fuel. The high burnup capability of this fuel, and its excellent retention of fission product radionuclides, have been demonstrated in irradiation tests of TRISO-coated plutonium fuel conducted in the late 1960s and early 1970s.

The PC-MHR design includes a high pressure, low leakage containment. By taking credit for the enhanced radionuclide retention provided by this containment, the allowable coated particle fuel failure during design basis accident conditions is about a factor of ten larger for the PC-MHR than for the commercial GT-MHR, which has a vented, low pressure containment.

The fuel quality and performance requirements of the PC-MHR during normal operation are similar to performance levels experienced at the Fort St. Vrain reactor, for which more than 30 metric tonnes of TRISO-coated uranium particle fuel were fabricated. This fuel met the required re-manufactured quality levels and, as evidenced by primary coolant radionuclide activity levels that were a factor of 30 less than the design basis, performed much better than required. The core average design basis performance requirement for PC-MHR fuel is a coating failure fraction of less than 4×10^{-4} at an average burnup of about 590,000 MWd/MT (765,000 MWd/MT peak).

Six irradiation tests have been conducted using near weapons grade, highly enriched (85% Pu-239) TRISO-coated plutonium fuel. Five of these tests were performed as part of the Dragon high temperature gas-cooled reactor project (United Kingdom) in the late 60s, and the sixth was performed by General Atomics in the Peach Bottom HTGR in the early 1970s. The fuel for the Dragon tests, which consisted of loose particles in graphite holders, was fabricated by Belgometre in Europe. For the Peach Bottom test, Oak Ridge National Laboratory fabricated the coated particles and standard fuel rod compacts.

These six irradiation tests encompassed a range of irradiation temperatures up to 1450°C and peak fast neutron fluxes of up to 2.3×10^{17} n/cm². Burnups of up to 747,000 MWd/MT were achieved, which resulted in destruction of more than 90% of the initially charged plutonium-239. These irradiation conditions are, with the exception of fast neutron fluxes, nearly the same or in excess of those required for the fuel in the PC-MHR. The plutonium fuel like that planned for use in the PC-MHR performed well in these tests, showing release of fission products at a rate that was about a factor of ten less than that required for fuel in the PC-MHR. Based on the results of simulated core burnup tests of other TRISO-coated particle fuels with a range of compositions and irradiation conditions, minimal additional failure of the plutonium fuel particles is expected under accident conditions in which the peak fuel temperature is expected to approach 1600°C.

The plutonium coated particle fuel irradiation test results are consistent with results obtained for other high burnup TRISO-coated fuels. High burnup, highly enriched fuel particles have been under development at General Atomics for more than twenty five years.

The reference fissile fuel particle for the large HTGR designs of the 1973-1982 period was 93.15% enriched uranium carbide featuring essentially the same TRISO coating planned for use in the PC-MHR. In 1978 General Atomics prepared

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a safety analysis report on the use of this highly enriched uranium carbide fuel in Fort St. Vrain reloaded fuel elements. NRC approval for use of this fuel was provided in 1979, based on a review of the safety analysis report and of the irradiation data base for this high burnup fuel.

The irradiation test experience for this fuel at that time included 316,000 particles successfully tested at nominal temperatures from 885°C to 1240°C and fast neutron fluences of 3.5 to 12.0×10^{18} n/m². A total of 250,000 of these particles were irradiated to burnups of at least 662,000 MWd/MT, and approximately 9,000 particles were irradiated to nominal burnups of 704,000 MWd/MT, which corresponds to destruction of more than 90% of the initially charged uranium-235. Higher burnup levels were achieved in later tests.

NRC approval of use of this fuel in Fort St. Vrain reloads indicates that there is a substantial database that confirms the ability of TRISO-coated particle fuel to achieve high burnup and high levels of destruction of the initially charged fissile material. When these high burnup uranium fuel data are considered in combination with the plutonium fuel irradiation tests in the Dragon and Peach Bottom reactors, it is clear that TRISO-coated plutonium fuel particles can be manufactured to meet operational and safety requirements and to achieve the high levels of plutonium destruction of which the PC-MHR is capable. Table 1 shows a comparison of PC-MHR design conditions with the irradiation experience for high burnup plutonium and uranium TRISO-coated particle fuel.

It should be noted that recent (1990-92) unsuccessful irradiation experience with an experimental, modified fuel design (TRISO-P) for the DOE New Production Reactor and Commercial GT-MHR programs is not relevant to the status of plutonium fuel development. The TRISO-P coating was developed in an attempt to improve as-manufactured quality and inservice performance by about an order of magnitude over the requirements that would apply to PC-MHR fuel. Although the as-manufactured quality was improved, irradiation test results showed that the coating design and fabrication process changes actually resulted in worse inservice performance under irradiation than Fort St. Vrain fuel and previous fuel tests. This modified fuel design has been discarded, and existing prior technology is being utilized. TRISO-coated plutonium fuel for the PC-MHR will be based upon the successful experience obtained on high burnup, highly enriched fissile fuel during the last twenty five years.

Although the results of plutonium fuel irradiation tests obtained to date are positive and performance comparable to PC-MHR requirements was achieved at FSV, more plutonium fuel development work is planned to increase the level of confidence associated with these results and to strengthen the statistical significance of the data. Tests will be conducted on irradiated plutonium coated fuel particles to confirm their behavior under simulated core heatup accident conditions. In addition, the equipment and remote processes used to fabricate plutonium coated particle fuel will be adapted from those used to fabricate uranium fuel and will be qualified for use in a full scale production operation. Plans for these activities have been documented in a plutonium fuel development plan for the PC-MHR.

TABLE 1
COMPARISON OF PC-MHR FUEL OPERATING CONDITIONS
WITH HIGH BURNUP TRISO-COATED FUEL IRRADIATION EXPERIENCE

Parameter	PC-MHR Design Goals	Plutonium TRISO Irradiation Experience	Uranium TRISO Irradiation Experience
Peak Fuel Temperature, °C	1250 (1) 1600 (2)	1275 - 1450	900 - 1550 ~ 2000 (3)
Peak Fast Neutron Fluence, 10^{18} n/m ² ($E > 0.18$ Mev)	4.2	2.3	12.0
Peak Burnup, MWd/MT	785,000 (590,000 Avg)	747,000	~750,000

- (1) Normal Operating Conditions
(2) Design Basis Accident Conditions
(3) Post Irradiation Heatup Tests

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GT-MHR Power Conversion System - State of the Art Technology

1. Summary

Extensive technology data bases exist for the major GT-MHR power conversion system (PCS) components, including the turbocompressor, bearings, generator, recuperator, and pre-cooler/intercooler. Closed Brayton cycle gas turbine technology is well understood. Some 20 fossil-fired closed cycle gas turbine plants have operated for over one million hours with high reliability and availability.

Based on a highly recuperated and intercooled cycle, an efficiency of about 47% is realizable at a very modest level of turbine inlet temperature (- 850°C) compared with contemporary open cycle gas turbines.

Experience gained in Germany with the operation of two large helium gas turbine systems (Oberhausen II 50MWa Helium Gas Turbine Plant, and the HHV Test facility) substantiates the claim that helium gas turbine power conversion systems are regarded as state-of-the-art. Within the U.S. there is strong industrial capability to facilitate the transfer of the necessary gas turbine enabling technology to make the GT-MHR a reality within the next ten years.

2. Design Methodology for GT-MHR Power Conversion System

The properties of helium reduce the size and geometrical complexity of the various power conversion components. Dynamic, thermal and structural design procedures, computer codes, and industry standards used are identical to conventional air-breathing gas turbine practices. The existing HTGR materials data base, established over a 3 decade period, involve materials testing in a helium environment by industry and the national laboratories, and is being fully utilized. Fabrication of the power conversion system components can be accomplished with existing techniques, machine tools and processes, and the size of the components is bounded by existing power generation equipment.

3. Turbocompressor

The largest industrial combustion gas turbine operating today is rated at 226 MWa, and units with outputs of over 300MWa are projected to be in utility service before the year 2000. The size of the 285MWa GT-MHR turbocompressor is physically smaller than the aforementioned combustion gas turbine, as a result of the use of helium (at high pressure) as the working fluid. The number of compressor and turbine stages is comparable with existing industrial gas turbines. Compressor and turbine designs are based on a combination of the following: 1) low Mach number, 2) high Reynolds number, 3) clean oxide-free blading surfaces in the closed helium circuit, and 4) close blade-tip clearance for the base-loaded plant (i.e. not subjected to rapid transients) resulting in high efficiency. The turbocompressor is being designed using the same methods, tools, and standards used for aerospace and industrial gas turbines. The performance of helium turbomachinery has been demonstrated in the Oberhausen plant and the HHV test facility.

The turbine inlet temperature of 850°C is about 400°C below that in the aforementioned large industrial gas turbines. This simplifies the turbine design in that un-cooled blades of conventional nickel-base alloys can be used. For the Integrated PCS, circumferential static seals are necessary between the turbocompressor and other components and structures. The size of these seals and their operating environment (i.e. temperature and pressure differential) are bounded by existing power conversion systems.

4. Active Magnetic Bearings

The utilization of magnetic bearings has three major advantages: it 1) eliminates the possibility of lubricant ingress to the reactor circuit, 2) provides an on-line diagnostic system for monitoring the health of the rotating assembly, and 3) facilitates adjusting bearing performance on-line. Large vertical rotor systems (centrifuges) have operated successfully with magnetic bearings. While the rotor weight of the GT-MHR is heavier than in applications to date, the thrust bearing unit loadings and peripheral velocities are bounded by current operating experience.

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A formidable magnetic bearing technology base exists: over 5500 units with over 8 million hours in operation, including over 160 large turbomachines (e.g. compressors, turboexpanders) with over 1.5 million hours of operation.

5. Generator

Vertical electrical machines are used in boiler feedwater pumps and hydroelectric plants, and only minor modifications to existing generators are necessary for the vertical orientation of the generator in the GT-MHR plant. While the dielectric strength of helium is different from that of air or hydrogen used in the cooling of conventional generators, only minor modifications to the electrical insulation are necessary. For the AVR and THTR plants the circulators, embodying electric motor drives submerged in helium, performed trouble-free.

6. Recuperator

The use of a compact plate fin recuperator facilitates the installation of a high performance unit (i.e. 95% effectiveness, 2% pressure loss) within the confines of the PCS steel vessel. Existing recuperator technology established by AlliedSignal Aerospace is directly applicable to the GT-MHR. Over 60 recuperated industrial gas turbines using this type of heat exchanger have accumulated over 3 million hours of service. Units with 95% effectiveness have been demonstrated in service. The operating environment for these units, in terms of transients and thermal shock, is more severe than would be experienced in the GT-MHR.

Plate-fin heat exchangers are used extensively in the aerospace industry and Allied Signal has produced several million for aircraft systems. The GT-MHR recuperator will benefit from two air-breathing applications, 1) heavy duty industrial recuperators in terms of materials, fabrication, and high temperature service, and 2) aircraft/aerospace heat exchangers in terms of very compact high performance surface geometries.

7. Precooler/intercooler

The precooler and intercooler are helium-to-water heat exchangers that operate in a very benign environment, with metal temperatures less than 250°F. The technology for the units is essentially commercially available. These units should not be compared with steam generators since the water side is pressurized only to suppress boiling, and stable operation is assured with single phase fluids on both sides of the unit. Since the helium pressure is greater than the water pressure, the issue of water ingress into the reactor circuit, as a result of a tube failure for example, is obviated. A faulted tube can be plugged at the tubesheet, which is external to the vessel and is accessible.

8. PCS Development and Testing

Based on the utilization of gas turbine and aerospace industry technology bases the PCS can be realized without the need for further basic R&D. Early in the program, data from subcomponent tests (e.g. bearings, seals) will be available for inclusion in the PCS final design.

A hallmark of the program will be the testing of the PCS in an integrated test facility. The turbomachine will be operated at full temperature and full speed. The comprehensive nature of the PCS testing program removes a major risk element, and will give designers a high degree of confidence that all of the PCS requirements will be met when the system is operated with a nuclear heat source.

9. Maintenance

While designed to last the 60 year plant life, the major PCS components have been engineered to facilitate ease of removal and replacement. The turbocompressor will be removed at 7 year intervals (for refurbishment), with a spare unit kept at the plant site. Experience gained from the AGR plants in the U.K. in terms of removal, replacement, and handling of large components (in shielded cask) is particularly germane.

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ATTACHMENT 2 TO GA/DOE-027-96

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June 6, 1995

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GAJDOE-068-95
Project 6301
WBS: 5109.51
June 6, 1995

Mr. Howard R. Canter, Technical Director
Office of Fissile Materials Disposition
U.S. Department of Energy
Washington, DC 20585

SUBJECT: Programmatic EIS Screening Results

Dear Mr. Canter:

General Atomics has received your letter of April 14, 1995, which presented DOE's rationale for excluding the Plutonium Consumption Modular Helium Reactor (PC-MHR) from consideration as a reasonable alternative for plutonium disposition in the Programmatic Environmental Impact Statement (PEIS) for Long Term Storage and Disposition of Surplus Fissile Material. GA has also reviewed the PEIS Implementation Plan and the Summary Report of the Screening Process. This letter provides GA's response to your letter and its comments on these documents.

GA has reviewed these documents in an effort to understand the factors that led DOE to reject the PC-MHR as unreasonable and lacking in technical maturity. This was DOE's conclusion even though the technology was, as recently as 1992, the leading candidate for new tritium production capacity and is still under consideration by DOE for the important mission of tritium production.

The summary screening report characterizes the various alternatives against the eleven screening criteria developed by DOE. GA believes that the criteria used were, in general, appropriate. However, DOE's assessment of the PC-MHR against the criteria is, in some cases, very difficult to understand. GA is concerned, based upon its review and upon information it has received from others, that the exclusion of the PC-MHR from consideration is more closely related to an apparent intention not to support the development of advanced reactors, including the gas-cooled reactor, than it is to any objective consideration of the capabilities of the PC-MHR relative to the screening criteria.

Attachment 1 provides GA's detailed comments on DOE's evaluation of the PC-MHR and proposed exclusion of the PC-MHR from consideration in the PEIS. The attachment addresses the assessment of the PC-MHR against the screening criteria, adoption of the spent fuel standard, and DOE's approach to multipurpose options for plutonium disposition and tritium production.

DOE has rated the PC-MHR low relative to the criterion of Technical Viability in spite of the fact that this reactor technology was, only three years ago, the leading candidate for selection as the New Production Reactor. It has also given the PC-MHR a lower rating than other alternatives that have been demonstrated to a lesser degree or about which there are fundamental questions concerning their capability. Nevertheless, the major reason cited by DOE for excluding the PC-MHR from consideration is its lack of 'technical maturity'. DOE's view may reflect its opinion on the gas

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3550 GENERAL ATOMICS COURT, SAN DIEGO, CA 92121-1184 PO BOX 88008, SAN DIEGO, CA 92188-3714 (858) 655-2000

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turbine design of the MHR recommended by GA versus the earlier steam cycle version of the design. In fact, the reactor technology for both the steam cycle and gas turbine plants is the same. Regarding the gas turbine power conversion system, world leading U.S. and international vendors consider it to be essentially a repackaging of existing industrial and aeronautical technology. Substantial engineering is needed, but there are no feasibility issues. Given adequate funding, a fully tested turbomachine could be delivered to a site in less than seven years (see Attachment 2).

DOE has rated the PC-MHR the same as all other fission options relative to the criterion of Environment, Safety, and Health. This conclusion ignores the facts that the MHR is widely considered to be the safest reactor option available and that its 47% overall plant efficiency, vs 31-33% for these reactor options deemed to be "reasonable" by DOE, results in substantial reductions in environmental impacts. DOE's own Draft PEIS for Tritium Supply and Recycle makes the safety advantages of the MHR relative to other reactors very clear.

The PC-MHR is rated the same as other reactor technologies that entail construction of a new reactor dedicated to plutonium disposition relative to the screening criterion of Cost Effectiveness. However, DOE provides no quantitative data to support this cost rating or the relative ranking of any of the alternatives in terms of cost effectiveness. The effects of using the gas turbine on life cycle costs of the gas-cooled reactor have yet to be made available to the public because DOE has not made available its report on Phase II of its Plutonium Disposition Study. However, based upon cost analyses using Phase I costing methodology and groundrules, the PC-MHR has a substantial cost advantage over other reactor alternatives (see Attachment 3). Hence, DOE's rating of the PC-MHR as the same as other reactor alternatives against the criterion of Cost Effectiveness is incorrect and adds to the distorted overall ranking of the PC-MHR.

The PC-MHR is given a low rating relative to other reactor alternatives with regard to the Timeliness criterion. The 12.5 year initial deployment schedule of the PC-MHR is a conservative estimate based on the schedule for deployment of the New Production Reactor that was developed by DOE and its contractors on the NPR program and was twice independently reviewed and confirmed. In the screening report, DOE ignores its own schedule and judges the level of certainty in the schedule to be less than that of the alternatives deemed by DOE to be "reasonable", the deployment schedules for which have never been subjected to the level of scrutiny that was applied to the MHR schedule. (In fact, under more aggressive schedule assumptions, in which first core fuel is produced on the fuel development pilot line, the PC-MHR initial deployment schedule can be reduced to 10 years.) DOE also ignores the fact that the PC-MHR has been shown in DOE's own Plutonium Disposition Study to be capable of completing the plutonium disposition mission within the length of time deemed necessary by DOE. DOE has excluded the PC-MHR from consideration in the PEIS on the basis of an artificial schedule requirement that does not reflect that a small delay in beginning the disposition operation is not significant in the overall timeframe for completing the disposition mission. Use of artificial schedules or administrative guidelines as a basis for declaring an alternative to be unreasonable is clearly in conflict with precedents established by NEPA case law.

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The PC-MHR is rated lower than the "reasonable" reactor technologies with regard to the criterion for Forging Progress and Cooperation with Russia and Others. This assessment is not credible because it ignores the fact that the Russians have repeatedly indicated to DOE and to the Goren-Chernomyrdin Commission their desire to destroy surplus weapons grade plutonium in PC-MHRs to be built at Tomsk-7. It also ignores the fact that the Russians have proposed to DOE a cooperative, cost shared MHR design and development program and have initiated the effort with \$1.0 million of their own funding. The Russians have taken no such actions in support of the alternatives deemed "reasonable" by DOE.

The summary screening report rates the PC-MHR as relatively low with regard to the Public and Institutional Acceptance criterion. No explanation is provided for this assessment. The PC-MHR offers distinct advantages relative to this criterion based upon its ability to substantially destroy the plutonium, its superior resistance to diversion and reuse of the residual plutonium in a weapons application, its multipurpose capability, and its unequalled safety characteristics. One can only conclude that DOE has chosen to rate the PC-MHR relatively low against this criterion to be consistent with its apparent intention not to develop advanced reactors in the U.S.. To exclude the PC-MHR at the time of the Record of Decision on the basis of policy matters would be legally permissible; to exclude it from consideration in the PEIS as a reasonable alternative on the basis of policy matters is contrary to precedents established under NEPA case law and is not allowed under Council on Environmental Quality NEPA implementing guidance.

It should also be noted that certain of the alternatives deemed "reasonable" by DOE for consideration in the PEIS and rated higher than the PC-MHR against the Public and Institutional Acceptance criterion will present major, unique public acceptance and policy issues. It is difficult to believe that major policy and public acceptance issues would not be involved in making available large quantities of weapons grade plutonium for disposition either in European nations or in Canada. Not only would major safeguards and security issues be raised, but it would also appear inappropriate to give away to other nations the energy value of the plutonium (which was created at the expense of billions of U.S. taxpayer dollars), to export potential U.S. jobs, and to forego U.S. technology development and deployment in favor of support for foreign technology.

The screening report states that the spent fuel standard was generally accepted, except by "proponents of developmental technologies that could go beyond the spent fuel standard". This statement ignores the letter of December 13, 1994, from Senators Thurmond and Hollings and Representatives Spratt and Spence to Secretary O'Leary that questioned the adequacy of the spent fuel standard. It also continues to ignore the numerous comments in the public scoping meetings which indicated that measures beyond the spent fuel standard would be required to provide ultimate disposition of the plutonium, to ensure that the national security objectives of the plutonium disposition effort would be met, and to extract the maximum possible energy value from the plutonium. The DOE letter of April 14 states that, "all fission options which go beyond the spent fuel standard were deemed unreasonable." By precluding all options that can exceed the spent fuel standard prior to detailed, full evaluation in the PEIS, DOE has withheld important information from

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the public regarding the diversion and proliferation resistance of alternatives that exceed the standard relative to those that merely meet it and has perpetuated the myth that these options cannot be deployed in a timely, cost effective manner.

Congress has consistently directed DOE to give full consideration to multipurpose reactors. However, it appears that DOE has not accepted this direction. The Implementation Plan for the PEIS for Fissile Materials indicates that it will not consider any multipurpose option unless a reactor is chosen for tritium supply, and then that it will consider only whether that reactor option might be suited for multipurpose use. No attempt has been made by DOE as part of the NEPA process to compare the costs, benefits, and environmental impacts of a multipurpose reactor against the combined costs, benefits, and impacts of separate projects for the tritium supply and plutonium disposition missions. This approach to the multipurpose reactor appears contrived, will not result in full and fair consideration of multipurpose reactors, and undermines the underlying philosophy of the NEPA process. In a time of growing concern about limits in government resources and about deficit reduction, the manner in which DOE is trying to avoid full and fair consideration of the multipurpose reactor is difficult to understand.

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GA is disappointed in the manner in which DOE is approaching these important matters. Under DOE's implementing regulations for NEPA (10CFR1021) there is still an opportunity for DOE to amend the PEIS Implementation Plan to include the PC-MHR and the multipurpose reactor options. We urge DOE to do so.

If you would like to discuss any of these issues in detail, please feel free to call me at any time at (619) 455-2580 or Dave Alberstein at (619) 455-2088.

Sincerely,



A.J. Neylan, Vice President
Power Reactor Group

AJN/DA:ds
Attachments

cc:
C.B. Curtis
G. Rudy
J.D. Nulton
P.T. Rhoads
J.M. Turner, DOE-OAK

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ATTACHMENT 1 TO GA/DOE-968-95
GENERAL ATOMICS COMMENTS ON DOE'S EVALUATION OF THE PC-MHR
AND PROPOSED EXCLUSION OF THE PC-MHR
FROM CONSIDERATION AS A REASONABLE ALTERNATIVE IN THE
PROGRAMMATIC EIS FOR FISSILE MATERIALS DISPOSITION

This attachment provides General Atomics' comments on DOE's treatment of the following matters relative to the PC-MHR and its decision to exclude the PC-MHR from consideration in the PEIS for fissile materials (plutonium) disposition: the assessment of the PC-MHR against the screening criteria, treatment of the spent fuel standard, and DOE's approach to multipurpose options for plutonium disposition and tritium production.

Assessment of the PC-MHR Against the Screening Criteria

Technical Viability:

With regard to the Technical Viability criterion, DOE rates the PC-MHR as low relative to other disposition options. The technical viability of the PC-MHR is rated lower than other technologies that have been demonstrated to a lesser degree or about which there are fundamental questions concerning their capability. For example, the technical viability of the PC-MHR is rated lower than that of the ALMR with pyroprocessing, even though the screening report states that this concept "is still under development in a manner different from its intended purpose." The PC-MHR is allocated lower technical viability than glass immobilization in DWPF, even though the screening report states that this option would require a specially designed melter to be installed and much of the supporting equipment in DWPF to be re-fitted for this application because DWPF was not designed for criticality control.

The ostensible primary reason given for exclusion of the PC-MHR from consideration in the PEIS is its lack of technical maturity. This reason is, however, inconsistent with previous positions taken by DOE. Only three years ago the MHR was one of the final alternatives under consideration for selection as the New Production Reactor. It was, by most accounts, the leading candidate to be selected had that Record of Decision not been postponed only one month prior to its scheduled release date. The MHR had been selected as one of the final alternatives for this vital national security mission following extensive review by the Secretary's Energy Research Advisory Board. In light of this history, it is difficult to justify the DOE decision not to evaluate the MHR in the PEIS for fissile materials disposition.

The screening report offers two statements to support the contention that the PC-MHR lacks sufficient technical maturity to be considered in the PEIS as a reasonable alternative for disposition of surplus weapons grade plutonium.

The first statement is the claim that plutonium coated particle fuel is "tested, but not fully demonstrated or proven." In fact, there have been, as DOE is well aware, six successful demonstrations of the capability of weapons grade plutonium coated particle fuel to achieve high levels of plutonium destruction. In contrast, for each of the reactor alternatives that were accepted through the screening process, there is little, if any, irradiation experience whatever with fuels made from plutonium of weapons grade composition. While further demonstration and qualification testing is required for plutonium coated particle fuel (as it will be for weapons grade MOX fuel used in the reactor alternatives deemed "reasonable" by DOE), there have been no feasibility issues identified that would call into question the capability of PC-MHR fuel to perform as required.

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Tritium production is a long-term mission of DOE to support national security. Pu disposition is a shorter term mission that DOE must accomplish to meet the Nation's goals in support of its non-proliferation policies. DOE has determined that the "clear and present danger" demands that disposition of Pu be initiated within approximately a decade. Pu disposition can be accomplished in that timeframe using existing technologies to achieve the Spent Fuel Standard.

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The second statement concerns the use of the direct cycle power conversion system, a new application of previously developed components. As noted several times by GA in reports to DOE and in other correspondence with DOE, development of the power conversion system is not on the critical path for deployment of the PC-MHR. The system has been evaluated by two major turbine-generator vendors that are recognized authorities in direct cycle applications. Both have judged that the power conversion system is essentially a repackaging of existing industrial and aeronautical technology. Substantial engineering is needed, but there are no feasibility issues. Given adequate funding, a fully tested turbomachine could be delivered to a site in less than seven years, a schedule that would support deployment on the time scale needed for plutonium disposition (see Attachment 2).

In addition, DOE has had in its possession since May 1993 information on the capability of the gas-cooled reactor to destroy weapons grade plutonium using a more conventional and previously demonstrated steam cycle power conversion system. However, DOE has chosen to ignore this information in developing its rationale for eliminating the MHR from consideration.

Environment, Safety, and Health:

The summary screening report rates the PC-MHR the same as all other fusion options relative to the criterion of Environment, Safety, and Health. This conclusion ignores the facts that 1) the MHR is widely considered to be the safest reactor option available, 2) its 47% overall plant efficiency, vs 31-33% for those reactor options deemed to be "reasonable" by DOE, results in substantial reductions in environmental impact relative to these other reactor alternatives, and 3) gas-cooled reactors have a proven track record of substantially lower radiation exposure to plant workers than any other power reactor type.

The inherent passive safety characteristics of the PC-MHR offer distinct safety advantages over the reactor types that DOE has deemed "reasonable" for consideration in the PEIS. The safety design objectives of the PC-MHR are met through a combination of inherent safety features and design selections that enable passive heat transfer under accident conditions (even loss of coolant or loss of forced coolant circulation) while maintaining fuel temperatures below damage limits. The reactor core is made of all refractory materials that can not melt at high temperatures. The core is slow to heat up under accident conditions, with thermal transients occurring over periods of hours and days rather than seconds or minutes as for other reactor types. Almost all fission products are retained in the refractory central fuel particles during normal operation and accident conditions, and radioactive release is small. Radiative exposure at the site boundary is less than the Environmental Protection Agency's Protective Action Guidelines, so no off-site actions such as sheltering or evacuation of the public are required, and the risk to public health and safety is minimized. DOE's own Draft PEIS for Tritium Supply and Recycle makes the safety advantages of the MHR relative to other reactors very clear.

Cost Effectiveness:

The PC-MHR is rated the same as other reactor technologies that entail construction of a new reactor dedicated to plutonium disposition relative to the screening criterion of Cost Effectiveness. However, DOE provides no quantitative data to support this ranking or the relative ranking of any of the alternatives in terms of cost effectiveness. The only data that DOE has published regarding plutonium disposition costs are those in its report to Congress that was published following Phase I of the Plutonium Disposition Study. The Phase I report provided relative life cycle cost for various reactor options for plutonium disposition as a function of installed capacity. Costs were developed based on an economic model developed by Oak Ridge National Laboratory personnel under contract to DOE. Information on the gas-cooled reactor in Phase I of the study was developed for the earlier steam cycle version of the plant.

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In Phase II of the Plutonium Disposition Study, GA changed its design to incorporate the direct Brayton cycle gas turbine power conversion system. The primary motivation for this change was the improved plant economics, which result from power conversion equipment simplification and an increase in net plant efficiency from 38% to 47%. The increased efficiency results in increased revenue from sale of electricity to offset the costs of engineering development, design, construction, and operation of the PC-MHR.

Although the report to Congress on Phase II of the Plutonium Disposition was due to be delivered to Congress during the Fall of 1994, DOE has yet to release the report. It is GA's understanding that the report has been completed since the end of 1994. Hence, the effects of changing to the gas turbine on life cycle costs of the gas-cooled reactor have yet to be made available to the public. Using the Phase I economic model, which was provided at DOE's request to GA by the staff at Oak Ridge, GA has calculated the life cycle costs of the PC-MHR and compared them against those of the other reactor technologies evaluated during Phase I of the study. The results show that the life cycle costs of the PC-MHR are substantially lower than those of all other reactor alternatives (see Attachment 3). Informal confirmation of these results has been obtained.

DOE has assumed that alternatives that exceed the spent fuel standard will cost substantially more to develop and deploy than those which merely meet the standard, and it has used this assumption as part of its rationale for eliminating as uneconomical options that exceed the standard. These PC-MHR cost analysis results indicate that this assumption is not well founded.

It is GA's understanding that one of the reasons for the delay in releasing the Phase II Plutonium Disposition Study report was that Oak Ridge was asked by DOE to make changes in the cost analyses in the report. GA is unaware of whether the economic model used in Phase II of the Plutonium Disposition Study is substantially different from that used in Phase I. Hence, GA is also unaware of whether the distinct cost advantage of the PC-MHR will be confirmed by the Phase II report. Nevertheless, based upon available information it appears that the PC-MHR has a substantial cost advantage over other reactor alternatives and that DOE's rating of the PC-MHR as the same as other reactor alternatives against the criterion of Cost Effectiveness is incorrect and adds to the distorted overall ranking of the PC-MHR.

Timeliness:

The PC-MHR is given a lower rating relative to other reactor alternatives with regard to the Timeliness criterion. The 12.5 initial deployment schedule for the PC-MHR is a conservative estimate based on the schedule for deployment of the New Production Reactor that was developed by DOE and its contractors on the NPP program and was twice independently reviewed and confirmed. In the screening report, DOE ignores its own schedule and judges the level of certainty in the schedule to be less than that of the alternatives deemed by DOE to be "reasonable". The deployment schedules for which have never been subjected to the level of scrutiny that was applied to the MHR schedule. (In fact, under more aggressive schedule assumptions, in which first core fuel is produced on the fuel development pilot line, the PC-MHR initial deployment schedule can be reduced to 10 years.)

Because the initial deployment schedule for the PC-MHR is a mere 30 months longer than DOE's arbitrary criterion of a ten year initial deployment schedule, and even though the PC-MHR has been shown in DOE's own Plutonium Disposition Study to be capable of completing the plutonium disposition mission within the length of time deemed necessary by DOE, DOE claims that the PC-MHR does not meet its requirement for timely deployment. DOE ignores the fact that the total duration of the plutonium disposition mission (several decades) will dwarf the 30 month difference in initial deployment schedule of the PC-MHR, and that during the entire disposition mission duration plutonium pits and other forms of weapons usable plutonium will be maintained, initially in "interim storage", and will be subject to current vulnerabilities unless safer, more secure modes of

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storage are implemented. The emphasis on early, timely deployment should be more properly placed on "long term storage" options rather than disposition options.

DOE has excluded the PC-MHR from consideration in the PEIS on the basis of an artificial schedule requirement that does not reflect that a small delay in beginning the disposition operation is not significant in the overall timeframe for completing the disposition mission. Use of artificial schedules or administrative guidelines as a basis for declaring an alternative to be unreasonable is clearly in conflict with precedents established by NEPA case law.

Fostering Progress and Cooperation with Russia and Others:

The PC-MHR is rated lower than the "reasonable" reactor technologies with regard to the criterion for Fostering Progress and Cooperation with Russia and Others. This assessment is not credible because it ignores the fact that the Russians have repeatedly indicated to DOE and to the Gore-Chernomyrdin Commission their desire to destroy surplus weapons grade plutonium inventory in PC-MHRs at Tomsk-7. It also ignores the fact that the Russians have proposed to DOE a cooperative, cost shared MHR design and development program and have initiated the effort with \$1.0 million of their own funding, matched with an equal amount of funding by General Atomics. The Russians have taken no such actions in support of the alternatives deemed "reasonable" by DOE.

In the April 14, 1995, letter to GA, DOE implies that the 12.5 year initial deployment schedule for the PC-MHR in the U.S. disqualifies it for consideration for deployment in Russia and results in its low rating relative to this criterion. This position ignores the fact that deployment in Russia could be accomplished more quickly and less expensively than in the U.S.. Furthermore, it arbitrarily assumes that Russia would agree to the same screening criteria and weighting factors that DOE has deemed appropriate for selection of options in the U.S.. This is clearly not appropriate, as evidenced by the public statements of Russia on plutonium disposition. If DOE wants to foster progress and cooperation with Russia in plutonium disposition, it must deal with the Russians in a manner that addresses the criteria that are important to Russia. The Russians have judged that the PC-MHR provides an approach to plutonium disposition that addresses these criteria. DOE's apparent lack of willingness to support development of the gas-cooled reactor in the United States is not an appropriate basis for down-rating its ability to foster progress and cooperation with Russia.

Public and Institutional Acceptance:

The summary screening report rates the PC-MHR as relatively low with regard to the Public and Institutional Acceptance criterion. No explanation is provided for this assessment. However, the screening report indicates that there were three elements that contributed to this criterion:

- Ability to create a sustainable consensus
- Socioeconomic impacts
- Policy/statute compatibility

There are no indications that the PC-MHR would not create a sustainable consensus or would have net socioeconomic impacts that are particularly adverse relative to other alternatives for plutonium disposition. In fact, as discussed below, the PC-MHR has significant advantages with regard to public acceptance relative to the reactor alternatives deemed by DOE to be "reasonable". Furthermore, there are no indications that selection of the PC-MHR would require significant legislative or regulatory changes.

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Hence, one can only conclude that DOE has purposefully rated the PC-MHR relatively low against this criterion to comply with an apparent intention not to develop advanced reactors in the U.S.. To exclude the PC-MHR at the time of the Record of Decision on the basis of policy matters would be legally permissible; to exclude it from consideration in the PEIS as a reasonable alternative on the basis of policy matters is contrary to precedents established under NEPA case law (Natural Resources Defense Council v. Morton) and is not allowed under Council on Environmental Quality NEPA implementing guidance (Memorandum, Questions and Answers About the NEPA Regulations, 46 Federal Register, 18026, 1981).

The PC-MHR offers distinct advantages over other reactor options with regard to public acceptance. Reactor disposition of surplus weapons grade plutonium is unlikely to be well received by the general public unless the specific reactor technology chosen offers a clear departure from and clear improvement over the nuclear reactor technologies that are in common use today and that have enjoyed less than enthusiastic public acceptance. The PC-MHR represents such a departure. The following points, which were presented by GA in its Phase II Plutonium Disposition Study report to DOE, should have been considered by DOE with regard to public acceptance of the PC-MHR for plutonium disposition.

Use of the PC-MHR for consumption of weapons-grade plutonium offers numerous advantages relative to other plutonium disposition options. These advantages are derived from its high burnup capability, versatility, and inherent, passive safety characteristics, all of which will further contribute to public acceptance.

To obtain public acceptance of the chosen plutonium disposition option, the approach taken must result in a discharge product with minimal attractiveness for weapons applications, and hence no incentive for theft, diversion, or reprocessing. The high burnup capability of the PC-MHR coated particle fuel gives it the demonstrated capability to destroy 90% or more of the initially charged plutonium-239 (and 65% or more of the initially charged total plutonium) so that the weapons-grade material is truly consumed. This level of plutonium destruction is achieved in a single pass through the reactor. The PC-MHR is the only plutonium disposition reactor option that can achieve such high plutonium destruction levels without reprocessing.

Achievement of high burnup is important for obtaining public acceptance of reactor disposition of excess weapons grade plutonium. As discussed in the National Academy of Sciences report on plutonium disposition, the large and growing inventory of plutonium in discharged commercial reactor fuel is of concern with regard to potential proliferation. Use of a reactor technology that achieves higher burnup than that represented by the "spent fuel standard" will enhance the likelihood of public acceptance because it will not be perceived as adding to the existing problem to the extent of other candidate reactor technologies.

Achievement of high burnup without reprocessing is important to both public and political acceptance of reactor disposition of surplus weapons grade plutonium. Reprocessing of spent nuclear fuel in the U.S. has not been allowed under government policy for several years due to concerns regarding nuclear proliferation from the commercial fuel cycle. Much of the opposition to reactor-based plutonium disposition is based on the concern that it would be used as an opportunity to revive a plutonium-based nuclear energy economy. All of the reactor technologies for plutonium disposition that DOE has chosen to include in the PEIS use fuel types that generate new plutonium during operation. The PC-MHR contains no fertile fuel material; all fissions in the core are plutonium fissions, and no new plutonium is created. The PC-MHR is not commonly associated with development of a plutonium based economy, and its deep burn capability could not result in a signal to other nations that rely on plutonium recycling that the U.S. endorses use of plutonium in fuel cycles that create additional plutonium suitable for use in reactors or in weapons applications.

The discharged fuel elements from the PC-MHR are suitable for direct disposal, without further processing (and

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associated opportunity for diversion), in a permanent repository. The discharged fuel is highly undesirable for use as a nuclear weapons material either by terrorists or governments because it is difficult to divert, its plutonium content is difficult to separate, and even if separated the discharged plutonium is difficult to use in a weapons application.

Diversions of the discharged fuel elements is difficult for all the reasons that apply to any reactor spent fuel (high radioactivity, large mass, extensive safeguards and security, etc.), but also for one reason that is unique to the PC-MHR: low plutonium content per fuel element. While the plutonium content in a single spent fuel assembly from a weapons grade MOX-fueled light water reactor (one of the alternatives deemed "reasonable" by the DOE) is of sufficient quantity to use in a weapons application, one would have to divert up to 102 PC-MHR spent fuel elements (each weighing about 250 pounds) to obtain a similar quantity of discharged plutonium. This would require the diversion of about seventeen truckloads of spent fuel shipping casks or three railcars of multipurpose containers containing PC-MHR spent fuel vs one truckload of spent fuel from a weapons grade MOX-fueled light water reactor. Even if such a large quantity of spent fuel were diverted, the technology for separating plutonium from gas-cooled reactor spent fuel has not been developed, in contrast to the light water reactor, for which plutonium separation technology is well established, being practiced, and is known throughout the world. Finally, although any mixture of plutonium isotopes can, in principle, be used to make a nuclear device, the plutonium discharged from the PC-MHR is, due to the high burnup obtained, particularly high in plutonium-240, 241, and 242 content, which makes it substantially more difficult to use in weapons applications than the discharge from reactors that do not achieve as high a burnup level. GA notes that these advantages were recognized also by DOE in the screening summary report, in which the PC-MHR was rated relatively high against other options for the criterion of Resistance to Retrieval, Extraction, and Reuse. However, these characteristics suggest a substantially larger advantage for the PC-MHR than the minimal difference suggested in the DOE analysis.

These matters are straight forward, easily explained, and understandable for a non-technical audience. Thus, public acceptance of use of the PC-MHR for plutonium disposition is likely to be more readily obtained than for the alternatives deemed "reasonable" by the DOE for consideration in the PEIS.

In addition to its suitability for plutonium consumption, the PC-MHR offers other advantages that would enhance public acceptance. One of the most important of these is its versatility. The PC-MHR offers effective use of government money through its ability to perform multiple missions while simultaneously providing electrical generation and advancing power generation science and technology.

Tritium production capability can be provided as needed. The tritium production capability of the gas-cooled reactor was well established on the DOE New Production Reactor Program. The amount of tritium produced by the PC-MHR can be varied by altering one fuel loading or the loading of tritium-producing targets. It can be produced while consuming surplus weapons grade highly enriched uranium in one or more reactor modules dedicated to tritium production, or it can be produced in a coproduction mode while simultaneously consuming surplus weapons grade plutonium. While some have offered the opinion that plutonium disposition and tritium production missions should not be combined and that selection of plutonium disposition technology should not be influenced by the tritium production capability of the candidate technologies, this view does not recognize the importance of using flexible technology for these missions and of making efficient use of government money in a time when federal budgets are tight and deficit reduction is a high priority. A multipurpose plant that combines the plutonium disposition and tritium production missions would not only be economically efficient, but it would also minimize overall environmental impacts by conducting both missions on one site. All of these factors are important considerations in achieving public acceptance of use of reactors for plutonium disposition, and the PC-MHR is particularly well suited in this regard.

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The inherent passive safety characteristics of the PC-MHR, as described in the discussion of the Environment, Safety, and Health criterion, offer distinct safety advantages over the reactor types that DOE has deemed "reasonable" for consideration in the PEIS, and this will also enhance public acceptance. The simple approach to safety design used for the PC-MHR is straight forward, easily explained, and understandable for a non-technical audience. Because the design of the PC-MHR is so different from that of other reactor alternatives, it is less likely to be seen by the public as an offering of more of the same reactor technology that has had highly publicized safety problems and has met to date with only limited public acceptance. It is noteworthy that throughout the initial licensing proceedings and subsequent operating lifetime of the Fort St. Vrain gas-cooled reactor in Colorado, no major intervenor opposition in the plant based upon safety concerns occurred. The safety characteristics of the MHR have been significantly enhanced over those of Fort St. Vrain.

While public acceptance of any approach to plutonium disposition will present challenges, the PC-MHR offers distinct advantages in this regard based upon its ability to substantially destroy the plutonium while not developing a plutonium fuel cycle, its superior resistance to diversion and reuse of the residual plutonium in a weapons application, its multipurpose capability, and its unequalled safety characteristics.

Finally, it should be noted that certain of the alternatives deemed "reasonable" by DOE for consideration in the PEIS are rated higher than the PC-MHR against the public and institutional acceptance criterion will present major, unique public acceptance and policy issues. It is difficult to believe that major policy and public acceptance issues would not be involved in making available large quantities of weapons grade plutonium for disposition either in European nations or in Canada. Not only would major safeguards and security issues be raised, but it would also appear inappropriate to give away to other nations the energy value of the plutonium (which was created at the expense of billions of U.S. taxpayer dollars), to export potential U.S. jobs to other countries, and to forego U.S. technology development and deployment in favor of support for foreign technology. Public acceptance and policy issues would also be raised for the alternative of using existing commercial reactors for plutonium disposition, making a sustainable consensus difficult to achieve.

The Spent Fuel Standard

The screening report states that the spent fuel standard was generally accepted, except by "proponents of developmental technologies that could go beyond the spent fuel standard", and your letter of April 14 states that, "all fusion options which go beyond the spent fuel standard were deemed unreasonable." These statements ignore the letter of December 13, 1994, from Senators Thurmond and Hollings and Representatives Spratt and Spence to Secretary O'Leary that questioned the adequacy of the spent fuel standard. They also continue to ignore the numerous comments in the public scoping meetings, such as those at Savannah River, Idaho Falls, Los Alamos, and Livermore, which indicated that measures beyond the spent fuel standard would be required to ensure that the national security objectives of the plutonium disposition effort would be met and that maximum possible energy value would be extracted from the plutonium. Rather than providing a representative sampling of the comments made in support of exceeding the spent fuel standard, DOE merely provides in the implementation plan and the screening summary report a limited, unrepresentative selection of these comments and then dismisses them by claiming that the appropriateness of the spent fuel standard was reaffirmed by the scoping process.

The implementation plan states that detailed evaluations of the diversion and proliferation aspects of the various alternatives to be evaluated in the PEIS will be performed as part of the Record of Decision process. This evaluation should have been conducted and the results should have been made available to the public as part of the screening process so that the public could be fully informed about the implications of merely meeting the spent fuel standard rather than exceeding it. An open evaluation of these matters would have given the public an opportunity

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to judge for itself the acceptability of the spent fuel standard and/or the merits of substantially exceeding the spent fuel standard. By precluding all options that can exceed the spent fuel standard prior to detailed, full evaluation in the PEIS, DOE has withheld this important information from the public and has perpetuated the myth that these options cannot be deployed in a timely, cost effective manner.

Regardless of the question of the acceptability of the spent fuel standard, the PC-MHR is a reasonable alternative for plutonium disposition based on its superior safety and environmental characteristics, cost characteristics, diversion and proliferation resistance, spent fuel form, and level of technical maturity as evidenced by its consideration under the New Production Reactor Program. The ability of the PC-MHR to exceed the spent fuel standard is a readily achievable additional benefit, and the fact that it has the ability to exceed the standard is not an acceptable basis for its exclusion from consideration in the PEIS.

Multipurpose Reactor Options

When work on the New Production Reactor was terminated, Congress authorized and appropriated funds in FY-93 and directed the DOE to undertake assessments of both light water reactor and gas-cooled reactor systems for the multipurpose functions of plutonium consumption, tritium production, and electricity production. The 1995 Energy and Water Appropriations conference report directed the DOE to submit to Congress, within 180 days, a report on the technological feasibility of a multipurpose reactor for the disposition of plutonium and the production of tritium. In a letter to the Secretary of Energy dated December 13, 1994, Senators Thurmond and Hollings and Representatives Spence and Spratt expressed their support for inclusion of a deep burn multipurpose reactor option in the PEIS being prepared by DOE for both tritium production and plutonium disposition.

As indicated, Congress has consistently directed DOE to give full consideration to multipurpose reactors. However, it appears that DOE has not accepted this direction. The Draft PEIS for Tritium Supply and Recycle provides only a comparison of the environmental impacts of tritium production technologies with the impacts of their multipurpose counterparts. The Implementation Plan for the PEIS for Fissile Materials indicates that it will not consider any multipurpose option unless a reactor is chosen for tritium supply, and then that it will consider only whether that reactor option might be suited for multipurpose use. Therefore, if DOE chooses an accelerator for tritium production, multipurpose reactors will not be considered at all for plutonium disposition.

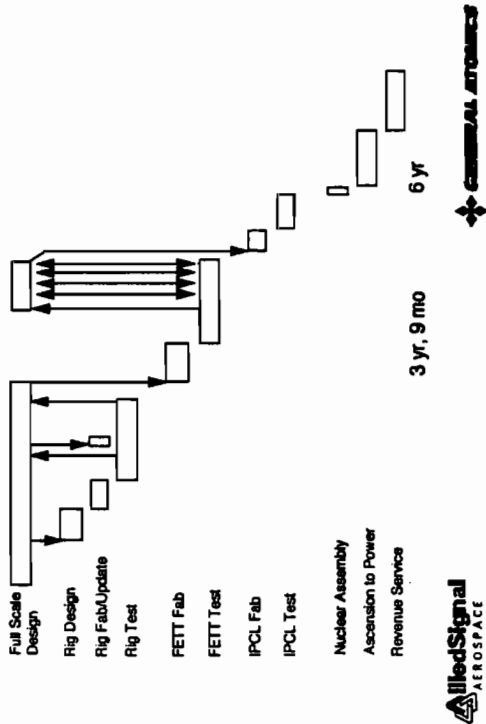
This approach in the multipurpose reactor appears contrived and will not result in full and fair consideration of multipurpose reactors for tritium production and plutonium disposition. It also compromises the underlying philosophy of the NEPA process by effectively precluding alternatives that should result in less total environmental impact than would result from separate projects for each mission. As these evaluations are currently organized by DOE, no effort is being made to compare the costs, benefits, and environmental impacts of multipurpose reactors against the combined costs, benefits, and environmental impacts of the two individual mission technologies. It may well be that DOE could choose the accelerator for tritium production and a non-reactor alternative for plutonium disposition and never provide to the public an assessment of whether a multipurpose reactor could conduct both missions at less cost to the taxpayer and with less total environmental impact. In a time of growing concern about limits in government resources and about deficit reduction, the manner in which DOE is trying to avoid full and fair consideration of the multipurpose reactor is difficult to understand.

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DEVELOPMENT SCHEDULE

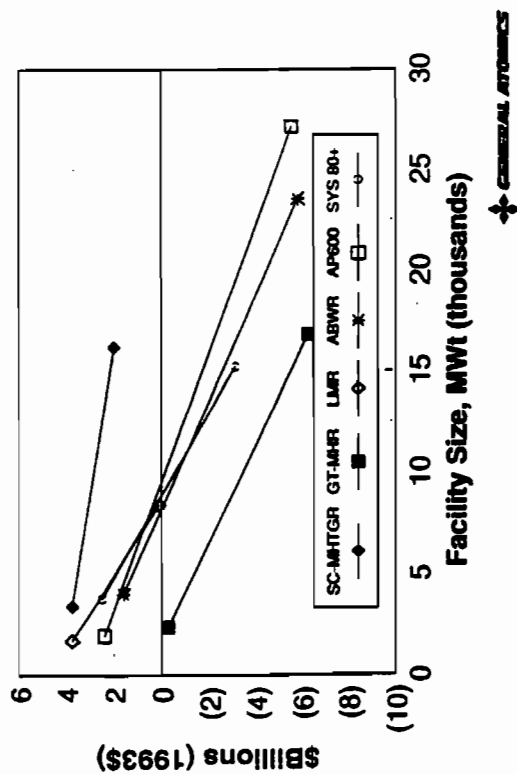
*Turbomachine Development Schedule Shows First Engine to Test
in Less Than 4 Years*



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Pu Disposition Study Net Cost/Revenue vs MWt



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ATTACHMENT 3 TO GA/DOE-027-96
ADDITIONAL GENERAL ATOMICS COMMENTS
ON THE DRAFT PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT
FOR STORAGE AND DISPOSITION OF WEAPONS-USEABLE FISSILE MATERIALS

The following comments on the draft Programmatic EIS are in addition to those in References 1 and 2, copies of which are provided as Attachments 1 and 2, respectively.

Multipurpose Reactors

In References 1 and 2, GA expressed its concerns regarding DOE's approach to consideration of multipurpose reactors in the Programmatic EIS. Subsequently, statutory and Conference Report language from the FY-1996 Defense Authorization Bill (S.1124) has directed that funds authorized to be appropriated to the DOE for Fissile Materials Disposition shall be available for "completing the evaluation of, and commencing implementation of, the interim- and long-term storage and disposition (including storage and disposition through the use of advanced light water reactors and gas turbine gas-cooled reactors) of fissile materials..." The Bill also states that, "sufficient funds shall be made available for the complete consideration of multipurpose reactors for the disposition of fissile materials in the programmatic environmental impact statement of the Department."

These technical assessments, cost/benefit comparisons, and related evaluations would, in the case of the "gas turbine gas-cooled reactor", be a follow-on to the plutonium disposition evaluations performed by General Atomics (GA) for the Gas Turbine Modular Helium Reactor (GT-MHR) during fiscal years 1993 - 1995 under the direction of the DOE in accordance with the provisions of the FY-93 DOE Appropriations Bill.

These studies concluded that the GT-MHR can offer substantial capabilities for the simultaneous disposition of surplus weapons grade plutonium and production of tritium. Evaluations to date indicate that a single 2400 MWt standard plant, comprised of four reactor modules, can process more than 80 metric tonnes of surplus weapons grade plutonium over its 40 year design operating lifetime while concurrently producing tritium at 3/8 of the original New Production Reactor Goal Quantity and generating electricity for sale to offset project costs. The 4x600 MWt modular design provides standardization of construction, enhanced availability, flexibility in mission, and meltdown proof reactor safety. The plant achieves ~47% net plant efficiency, generates 1144 MWe, and significantly reduces environmental impact compared to alternative reactor concepts. The resulting spent fuel is suitable for permanent geologic disposal without further treatment. Design and development costs are ~\$750M. The first reactor module could be operational in about 10 years (Ref. 3).

In Reference 4, GA submitted to DOE a recommended program plan for evaluation of the multipurpose capabilities of the GT-MHR which, if accepted and implemented by DOE, would provide the information needed by DOE to comply with the FY-96 Authorization Bill. DOE's responses to the recommended program plan (Ref. 5) indicated that DOE believes that previously

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conducted studies sufficiently addressed the gas-cooled reactor both for tritium production and for multipurpose use. The response did not, however, indicate how DOE intends to respond to the requirements of the FY-96 Defense Authorization Bill.

The Draft Programmatic EIS for Fissile Materials makes only minimal reference (a three page Appendix N) to multipurpose reactors as an option for fissile materials disposition. It does so in a manner that is not consistent with the spirit or the intent of the National Environmental Policy Act (NEPA) and does not comply with the provisions of the FY-96 Authorization Bill. The discussion is limited to the possibility that an existing LWR could be used simultaneously for plutonium disposition, tritium production, and generation of revenue through production and sale of electricity. The first sentence of Appendix N of the draft Programmatic EIS provides an incorrect definition of multipurpose reactors as reactors that use plutonium in the form of mixed oxide (MOX) fuel. This definition precludes the use of the gas cooled reactor, which uses only fissile plutonium fuel instead of MOX, in a multipurpose application. Reference is then made to the Record of Decision and the Programmatic EIS for Tritium Supply and Recycling, in which the multipurpose reactor was "preserved as an option for future consideration". Contrary to the requirements of the FY-96 Authorization Bill, no discussion is provided of multipurpose advanced light water reactors or of multipurpose gas turbine modular helium reactors.

As noted by GA in its comments to DOE on the Programmatic EIS for Tritium Supply (Ref. 6), the treatment of the multipurpose options in that document is superficial, inadequate, and inconsistent with the requirements of the National Environmental Policy Act. The evaluation is neither full nor fair. The environmental impacts of the multipurpose options are compared only with those of the tritium production options. A full and fair assessment would compare the impacts of the multipurpose options with those of separate plutonium disposition and tritium production options combined. Such a comparison was not provided in the Programmatic EIS for Tritium Supply and Recycling, and if it is not provided in the Final Programmatic EIS for Storage and Disposition of Weapons-Usable Fissile Materials, DOE will not have complied either with NEPA or with the FY-96 Authorization Bill.

Disposition Schedule

Before the Draft Programmatic EIS was prepared, all potential options for plutonium disposition were screened using criteria given in Reference 7. The criteria are similar to those used by the National Academy of Sciences (NAS) in its 1994 report (Ref. 8). One of the criteria, timeliness, was initially defined by DOE as follows:

"The technology concept should be demonstrated within ~20 years and disposition should be completed within ~50 years."

As stated, this criterion would have allowed for development of advanced, deep-burn reactor technologies for plutonium disposition, including the GT-MHR. Of equal significance, this criterion would have allowed for a single, approximately 1GW(e) plant (GT-MHR or LWR) to

11 01 08 Comment Number 10

It was DOE's decision, during the planning for environmental documents in compliance with NEPA, that the TSR PEIS include the analysis of the Multipurpose Reactor Option. Because tritium supply is a long-term mission of DOE compared to the shorter term mission of Pu disposition, the Storage and Disposition PEIS would incorporate, by reference, information developed in the TSR PEIS. This approach is in compliance with the intent of NEPA. Clarification was added to Appendix N in response to the FY-96 Authorization Bill.

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complete the disposition mission (50 metric tonnes of surplus weapons grade plutonium) over the expected operating lifetime of the plant. In other words, the potential environmental impacts would have been limited to those for a single plant.

In Reference 7, the DOE somewhat arbitrarily changed the timeliness criterion to "require that the disposition be able to start within about a decade and be able to be completed within about three decades." The reason stated by DOE in Reference 7 for adopting this shorter schedule was input from the public and stakeholders "relating to the urgency of taking action stemming from the 'clear and present danger' associated with these materials." However, this reasoning is not supported by the DOE's questionnaire data reported in Appendix A of Reference 7 (see Figures 1 and 2, taken from Reference 7). From Figure 1, five of the nine criteria received higher rankings of "very important" than given to timeliness. From Figure 2, the ranking of timeliness relative to the other criteria indicates clearly that the questionnaire respondents viewed timeliness as being of secondary importance.

Other factors also do not justify forcing the plutonium disposition mission to a shorter schedule. According to the draft Programmatic EIS, the DOE also proposes to provide a long-term, 50-year storage system for plutonium and highly enriched uranium declared to be non-surplus. The non-surplus material is categorized into naval nuclear fuel, strategic reserves, material for weapons research and development, and programmatic materials. The DOE acknowledges that some of the non-surplus material could be classified as surplus material in the future. During the disposition mission, it is quite possible that surplus and non-surplus material would be stored and secured at common locations. For plutonium being stored and secured at a given location, it would be absurd to determine that material classified as surplus poses a "clear and present danger," while material classified as non-surplus does not pose a similar risk, particularly when the classification boundary could change over time. The "clear and present danger" argument does not justify adoption of the more urgent disposition schedule, since fissile material of potentially unknown classification (surplus or non-surplus) will be in storage for time periods exceeding the more urgent disposition schedule.

The DOE acknowledges that the risks for theft and diversion of fissile material are greater in Russia than in the U.S., because of the less stable political climate in Russia. Perhaps the justification for the more urgent schedule is to encourage the Russians to adopt a similarly urgent schedule, thereby reducing the risks of theft and diversion. While plausible, this strategy is not consistent with desires expressed by the Russians. The Russians have actively encouraged development of the GT-MHR for plutonium disposition. As part of a private, cost-sharing initiative with General Atomics and Framatome, Russian engineers and scientists are presently working on the GT-MHR design. At the recent Third International Policy Forum: Management and Disposition of Nuclear Weapons Materials (Lansdowne, VA, March 19-22, 1996) high level Russian representatives confirmed their strong support for continuing development of the GT-MHR for plutonium disposition. Despite growing international support, the DOE has not been receptive to this private initiative and has implied that the GT-MHR could not be deployed in Russia in a sufficiently timely manner relative to DOE's schedule requirements. From Figure 2, it is interesting to note that the criterion "Influence on Russia and Other Countries" was rated

01 02 00

Comment Number 11

The Department of Energy did not arbitrarily change the timeliness criteria. The DOE asked for public input on the proposed screening criteria through a questionnaire which used the approximately 20- to 50-year timeframe for the disposition timeliness criteria. There were some responders to the questionnaire who felt that this timeframe was appropriate. However, the majority of responders expressed opinions that the timeliness criteria was moderate to very important and that the timeframe (20 to 50 years) was too long. Further, the NAS Report states that disposition using Pu as fuel in reactors could begin within 10 years and be completed within 20 to 40 years.

01 06 00

Comment Number 12

The "clear and present danger" is of more concern with Russian materials than with U.S. materials. The "clear and present danger" applies to all materials that are weapons-usable, whether or not they are surplus. The sooner the United States and Russia can disposition surplus materials, the sooner the total volume of material can be reduced. Thus, the "clear and present danger" can be reduced.

The "clear and present danger" cannot be eliminated unless all material is declared surplus and dispositioned. Since this is not likely to occur in the foreseeable future, a safe, secure, and inspectable storage capability, such as that evaluated in the PEIS, must be implemented to assure that non-proliferation objectives in both countries are met.

01 03 00

Comment Number 13

Comment noted. DOE is encouraging the Russians to pursue timely Pu disposition by offering technical assistance, conducting joint assessments of the various disposition technologies, and planning joint demonstrations of some of the technologies to remove uncertainties in their viability.

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as being of somewhat greater importance than timeliness.

Finally, in its 1995 report on reactor-related options for plutonium disposition (Ref. 9), the NAS viewed the shorter schedule as a "very severe constraint" that did not provide a useful basis for comparative evaluations. For comparing the various reactor options, the NAS assumed that 50 metric tonnes of plutonium would be processed over the nominal lifetimes of the reactors.

The impacts of adopting the unnecessarily shorter plutonium disposition schedule are:

The shorter schedule eliminates advanced, deep-burn reactor technologies, such as the GT-MHR, from further consideration.

The required number of approximately 1 GW(e) plants is increased from one to two, and the associated environmental impacts are doubled.

The potential for a strong international cooperative program on plutonium disposition and proliferation-resistant fuel cycles that is of great interest to Russia is hampered.

The Programmatic EIS should be expanded to include a flexible schedule that can accommodate disposition of plutonium over the expected reactor lifetime, and advanced, deep-burn reactor options should be evaluated as part of the EIS process. The "clear and present danger" argument is highly subjective and open to a wide range of interpretation. This argument should not be used to eliminate alternatives that require only a slightly longer schedule than that currently dictated by DOE.

Final Waste Form Characteristics

An important issue for any plutonium disposition strategy is the suitability of the final waste form for permanent disposal. Respondents to the DOE questionnaire (Ref. 7) recommended additional criteria that should be used to screen plutonium disposition technologies, including several criteria related to final waste form characteristics. During the screening process and preparation of the draft Programmatic EIS, DOE gave little consideration to final waste form characteristics and resulting long term environmental impacts, other than the annual volume of high-level waste generated by the various disposition alternatives.

Volume alone is a poor measure of the environmental impact of the final waste form. In fact, a larger volume may be an environmental attribute, since the dilution of plutonium (residual plutonium if the waste is spent fuel) provides greater resistance to diversion and proliferation and their substantial negative environmental impacts. Also, geologic repository loading density and required repository land area are determined by decay heat load of the spent fuel and not by physical volume. For the GT-MHR, the annual volume of spent fuel would be about ten times that from a commercial LWR or plutonium disposition LWR, on an equivalent electrical energy basis, but the required land area for GT-MHR spent fuel would be about one-half that required for LWR spent fuel. The greater volume of GT-MHR spent fuel is a consequence of

01 02 00 Comment Number 14

The cost and schedule analysis was presented in a separate report available for public review beginning in late July 1996. The Advanced Deep Burn Reactors Option, including the MHRs, was considered in the screening process. Notwithstanding the many potential benefits of their use, the technical immaturity would call for costly and lengthy development and demonstration efforts to bring them to a viable status. The Screening Committee decided that the increased Pu burn up offered by this option would not counterbalance its cost, schedule, or technical risks, and therefore, eliminated this option from further consideration.

01 04 00 Comment Number 15

The term "clear and present danger" was used by the NAS in their report on the potential proliferation of weapons materials and referred to the situation in Russia and the former Soviet Republics where weapons materials are not subject to the same strict controls as in the United States. The incentive for choosing technologies that can disposition U.S. materials on a relatively short schedule is to provide an equivalent incentive for Russia to also move forward quickly with disposition.

01 05 00 Comment Number 16

The PEIS provides a comparative analysis of the HLW forms in Appendix H. The purpose of the Proposed Action is to convert the surplus weapons-usable Pu into a form that meets the Spent Fuel Standard for proliferation resistance. Existing, proven waste forms are sufficient to meet the needs of the Proposed Action.

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12 00 00 Comment Number 17

The Pu waste forms being considered for disposal in an NWPA-HLW repository meet the Spent Fuel Standard, and therefore, pose no greater safeguards risk than the disposal of commercial spent nuclear fuel. Further, these materials are classified as CAT IV E, and will be subject to the same safeguard requirements as commercial spent nuclear fuel and defense high-level waste (DHLW).

the low power density of the GT-MHR core, which helps to provide inherent, meltdown-proof safety during normal operation and hypothetical accidents. Approximately 93% of the GT-MHR spent fuel volume is high-purity, nuclear-grade graphite, which by itself would be classified as low-level waste. The high-level waste is confined to the fuel compacts, and the bulk of this waste (99.9%) is contained within the coating layers of the fuel particles. The GT-MHR would destroy and degrade weapons-grade plutonium well beyond the commercial LWR spent fuel standard. The final waste form would be rendered permanently resistant to proliferation, would be contained effectively for geologic time periods by the multiple layers of highly corrosion-resistant ceramic coatings (Refs. 10 through 12), and would be well suited for permanent disposal in a geologic repository. The graphite is also highly resistant to corrosion (Ref. 13) and would serve as an additional protective overpack after permanent disposal. The long-term environmental impacts of permanent disposal would be significantly reduced, and potential high consequence scenarios would be eliminated, including recovery of spent fuel canisters to obtain plutonium for weapons (i.e., the "plutonium mine" issue would be eliminated) and large-scale radionuclide releases caused by severe climatic changes and/or increased seismic activity (i.e., much less reliance would be placed on the geosphere for radionuclide containment). With regard to these issues, GT-MHR spent fuel would be a nearly ideal waste form for permanent disposal (Ref. 14).

In screening reactor technologies for plutonium disposition, the DOE has determined that the commercial LWR "spent fuel standard" was a sufficient end point. The basis for the spent fuel standard stems from the 1994 NAS study (Ref. 8). The NAS recommended that "options for long-term disposition of weapons plutonium should seek to meet a 'spent fuel standard' - that is, to make this plutonium roughly as inaccessible for weapons use as the much larger and growing stock of plutonium in civilian spent fuel." The NAS and DOE have recognized that high levels of radiation are the primary barrier to diversion of plutonium in spent fuel and that this barrier decays over time. The NAS stated that "long-term options will be needed to reduce the proliferation risks posed by the entire global stock of plutonium, particularly as the radioactivity of spent fuel decays," and that "options for reducing these risks include placement of spent fuel in geologic repositories, or pursuit of fission options that would burn existing plutonium stocks nearly completely."

Without performing proper analyses, the DOE has determined that geologic disposal of the waste forms resulting from the alternatives evaluated in the Programmatic EIS will provide the necessary long-term safeguards. In justifying the spent fuel standard, the DOE states in Reference 7 that, "there is a path forward established by the Nuclear Waste Policy Act (of 1982) for disposal of spent fuel in a mined geologic repository, where geologic barriers will reduce the reliance on institutional controls." This conclusion is flawed for the following reasons:

There is no consensus among experts that isolation of spent fuel (or immobilized plutonium) in a geologic repository would provide adequate long-term safeguards. It is important to realize that the NAS study (Ref. 8) makes no judgements and draws no conclusions regarding safeguards provided by geologic isolation. According to the Yucca Mountain Total System Performance Assessment (Ref. 15) and to the 1995 NAS report

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(Ref. 9), the eventual loss of institutional controls and human intrusion is considered to be a credible scenario for assessing long-term performance of a repository. An International Atomic Energy Agency (IAEA) advisory group concluded (Ref. 16) that LWR spent fuel "does not qualify as being irrecoverable at any point prior to, or following, placement in a geologic formation commonly described as a 'permanent repository', and that safeguards should not be terminated on spent fuel." In a recent report (Ref. 17), the U.S. Congress Office of Technology Assessment (OTA) expressed "concerns about leaving plutonium in a repository that might be mined sometime in the future for the purpose of making weapons." This same concern was raised recently by an American Nuclear Society (ANS) Special Panel on Protection and Management of Plutonium (Ref. 18). During a presentation at a recent DOE workshop (Ref. 19), Peterson concluded that "geologic repositories will provide attractive sources of fissile material for nuclear explosives for roughly 200,000 years." These concerns raised independently by NAS, IAEA, OTA, ANS, and others provide strong justification for developing a disposal strategy in which fissile materials are destroyed before geologic disposal, since safeguards and institutional controls cannot be guaranteed for tens of thousands of years.

Even if it were determined that geologic disposal does provide adequate long-term safeguards, there is currently no permanent repository for spent fuel, and there is the distinct possibility that a repository will not be available for many decades. The political controversy associated with the Yucca Mountain repository project has slowed progress considerably. After spending more than \$2 billion, there has still been no determination of whether the site is acceptable for disposal of commercial spent fuel. In the screening report (Ref. 7), the DOE acknowledges "the tremendous cost and time being taken to evaluate the suitability of Yucca Mountain as a mined geologic high-level waste repository."

Mixed-oxide (MOX) spent fuel from an plutonium disposition LWR would be significantly more attractive for diversion than commercial LWR spent fuel, particularly after the radiation field has decayed to lower levels. According to the 1993 DOE Plutonium Disposition Study (Ref. 20), a plutonium disposition LWR MOX spent fuel assembly would contain up to 30 kg of plutonium. This is enough plutonium to manufacture up to 4 weapons. For comparison, a typical commercial LWR spent fuel assembly would contain about 3.5 kg of plutonium of similar quality. A GT-MHR spent fuel element would contain less than 0.25 kg of much lower quality plutonium. In addition to increased diversion risks, the high plutonium content of plutonium disposition LWR MOX spent fuel would have a negative impact on the design of a spent fuel canister and repository loading strategies. Additional processing of MOX spent fuel may be required to lower the plutonium density.

Another issue associated with unprocessed LWR spent fuel as a permanent waste form is poor long-term containment provided by metal-clad fuel rods within metallic canisters. According to the Reference 15 performance assessment, a large fraction of LWR spent fuel would become

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exposed within several hundred to several thousand years because of the expected failure of Zircaloy cladding and corrosion of metallic canisters, and the only remaining barrier for release to the accessible environment would then be the surrounding geologic media. The effectiveness of this barrier for long time periods is uncertain and could be compromised by unforeseen events, including climatic changes and increased seismic activity. In testimony before the House Commerce Subcommittee on Energy and Power on June 30, 1995, John Cantlon, Chairman of the Nuclear Waste Technical Review Board (NWTBR), stated that the NWTBR "has repeatedly urged the DOE to develop a robust, long-lived waste package that will work together with other engineered barriers and the geology at the site to provide long-term isolation of the radioactive waste from the accessible environment." Cantlon stated also that "the use of such waste packages can help improve confidence in the long-term performance of the repository and thus facilitate licensing of the facility." Other experts on disposal of high-level radioactive waste have stated (Ref. 21) that "any strategy of isolation should emphasize the near-field containment of radionuclides, a function primarily of waste form or 'waste package' performance" and that "strategies that rely solely on long travel times, dispersal, or dilution, implicitly presume release and movement of radionuclides." In a recent report (Ref. 22), the NAS concluded that the most harmful releases of radionuclides from a geologic repository could occur well after 10,000 years, which further underscores the need to provide effective near-field containment of radionuclides for geologic time periods. Other potential benefits of superior near-field containment are less required geological characterization of the candidate repository site and greater likelihood that a given site would be found acceptable.

Final waste form characteristics (and not just near-term diversion resistance) will determine the overall schedule for achieving effective disposition of plutonium. Plutonium disposition using deep-burn reactors like the GT-MHR could satisfy long-term safeguards requirements without relying on the availability of a geologic repository or the determination that the repository would provide the needed long-term safeguards. This is a very significant advantage for deep-burn reactors that has been overlooked during the DOE screening process. GT-MHR spent fuel would be a highly stable and highly diversion resistant waste form during potentially long-term storage and after permanent disposal. If future generations could respond to the DOE questionnaire, they would undoubtedly rate final waste form characteristics as the most important criterion for evaluating high-level radioactive waste forms, including those generated from disposition of surplus plutonium.

Final waste form characteristics and long-term environmental impacts should be given a high priority and careful evaluation when evaluating technologies for plutonium disposition. Advanced technologies that produce clearly superior permanent waste forms and have the potential to eliminate long-term, high-consequence environmental impact scenarios should be evaluated as part of the Programmatic EIS, particularly if the schedules for implementing these technologies are not significantly longer than those for more established technologies and if the potential for strong international collaboration exists. The GT-MHR would clearly meet these conditions.

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Use of Borosilicate Glass for Vitrification The vitrification alternative proposed in the draft PEIS would involve manufacturing borosilicate glass logs containing plutonium and high-level waste. Recent evaluations have raised significant issues that may preclude borosilicate glass as a host phase for immobilization of plutonium. These issues include potentially poor long-term durability in a geologic repository and long term irradiation effects. These issues received considerable attention during a recent DOE Plutonium Stabilization and Immobilization Workshop in Washington, DC (December 12-14, 1995). Since weapons grade plutonium consists mostly of the fissile isotope plutonium-239, with a half-life of about 24,000 years, the time over which the waste remains highly radiotoxic would likely exceed the expected lifetime of the glass. Scientists at Argonne National Laboratory have been developing a more durable glass for plutonium immobilization (Ref. 23). DOE should acknowledge the potential problems with borosilicate glass and evaluate alternative glass forms during preparation of the EIS.	18/05.01.08
Viability of Electrometallurgical Treatment According to the draft Programmatic EIS, the DOE will consider electrometallurgical treatment as an option for plutonium disposition. Electrometallurgical treatment was derived from pyroprocessing technology developed for reprocessing liquid metal reactor spent fuel. In its 1995 report (Ref. 9), the NAS evaluated pyroprocessing as an option for plutonium disposition. The NAS determined that pyroprocessing has several disadvantages that "effectively rule it out as a serious competitor for the near-term plutonium disposition mission." The NAS raised concerns with regard to the maturity of the technology, the size of the facility required to complete the disposition mission, and suitability of the final waste form for permanent disposal. In light of this evaluation by the NAS, the DOE should provide stronger justification for continuing to evaluate electrometallurgical treatment as a viable option for plutonium disposition.	18/05.01.08 cont.
Coated-Particle Waste Form for Plutonium Immobilization Coated particles were once considered by the DOE as an alternative waste form for immobilization of high-level waste, and research programs were conducted at Pacific Northwest Laboratory and Oak Ridge National Laboratory (ORNL) in the early 1980s (e.g., Refs. 10 through 12). The feasibility of coating high-level waste was established at ORNL, and coated particles were judged to have by far the best performance potential of the candidate alternative waste forms. DOE should evaluate the coated-particle waste form for plutonium immobilization as part of the EIS process.	19/05.03.08
Environmental Impacts of the CANDU Reactor Option While the Programmatic EIS discusses a full spectrum of environmental impacts of using an existing light water reactor for plutonium disposition, several of the similar environmental impacts for use of existing CANDU reactors (such as those at the Ontario Hydro Bruce-A	20/14.00.00

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05 01 08 Comment Number 18

Alternative forms were evaluated before issuing the Draft PEIS. These results are reported in the document (available in DOE Public Reading Rooms): *Screening of Alternative Immobilization Candidates for Disposition of Surplus Fissile Materials*, February 9, 1996 (UCRL-ID 118819 [L-20790-1]).

05 03 08 Comment Number 19

Electrometallurgical Treatment was considered a reasonable alternative after completion of the screening process and scoping for the PEIS. The National Research Council recommended successful demonstration of the electrometallurgical treatment process prior to implementation. Upon making the decision on disposition technologies, DOE will demonstrate these technologies.

14 00 00 Comment Number 20

During the screening of alternatives for inclusion in the PEIS, various immobilization forms were considered. The decision was made to include immobilization in ceramic and glass forms. The specific ceramic form was not identified. Research and development (R&D) is both on-going and planned to support the disposition alternative(s), which would include pilot facilities for processes (such as ceramic coated particles) and materials, as necessary. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

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A. J. NEYLAN
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06 05 08 Comment Number 21

The environmental impacts in foreign nations are not addressed under NEPA. However, if the CANDU Reactor Alternative was selected, an assessment of environmental impacts would be accomplished pursuant to Canadian Federal and Provincial law. Further, the ROI used consistently for analysis of this PEIS for sites and technology, includes an 80-kilometer (km) (50-mile [mi]) radius. The distance from the U.S. border to the Bruce-A-Generating Station is greater than the distance for analysis.

Nuclear Generating Station, located on Lake Huron about 300 km (186 miles) northeast of Detroit) are listed in the document as not applicable. Examples include normal radiological impacts, hazardous chemical impacts, and facility accidents. The Programmatic EIS limits its evaluation of the environmental impacts from these sources for all alternatives to a radius of 80 km (50 miles) from the site boundary. The basis for limiting the evaluation to this radius is not presented. It is noteworthy, however, that no such limit is placed upon the evaluation of the environmental impacts from these sources in other Programmatic Environmental Impact Statements such as the Programmatic EIS for Tritium Supply and Recycle.

In effect, DOE has assumed that the environmental impacts from these sources for the CANDU reactor option somehow stop at the U.S./Canadian border and do not affect U.S. citizens living near the plant. This is obviously unrealistic, and DOE should include a full assessment of the environmental impacts of the CANDU reactor option in the final Programmatic EIS.

21/06.05.08

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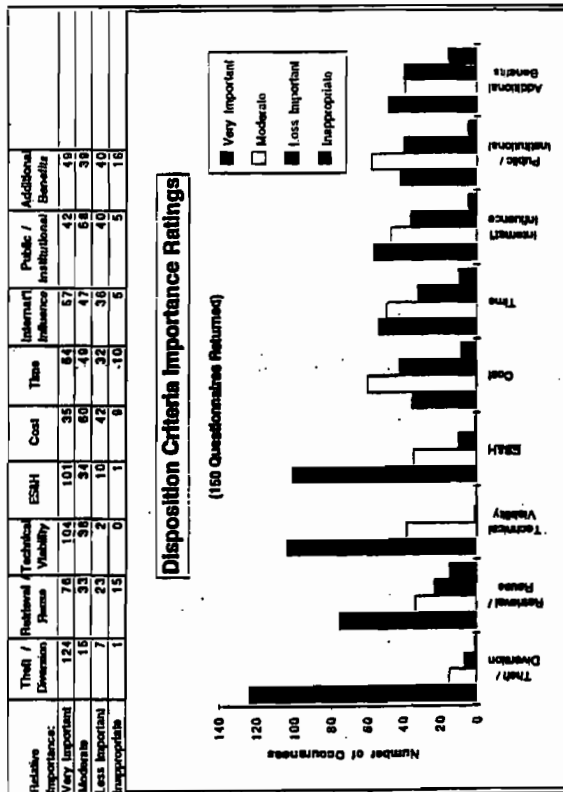


FIGURE 1 (FROM DOE/WD-0002)

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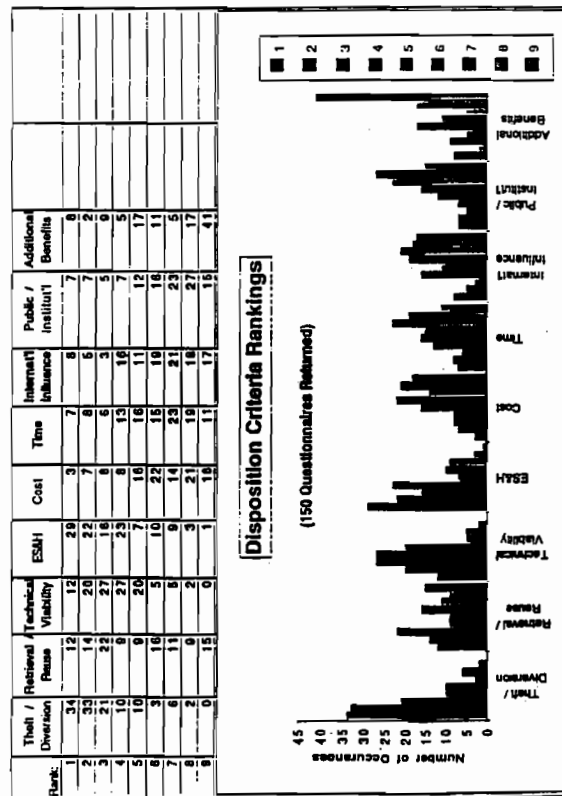


FIGURE 2 (FROM DOE/MD-0002)

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EDWARD EHRLICH
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General Electric Company
175 Curtner Avenue, San Jose, CA 95125

May 6, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786.

Subject: Comments on the Draft Programmatic Environment Impact Statement
for the Disposition of Weapons-Usable Fissile Materials, dated February 1996.

Please accept the attached comments related to the disposition of weapons usable
plutonium.

Yours Truly

Edward Ehrlich

Edward Ehrlich
Project Manager,
GE-NE
175 Curtner Avenue
San Jose, CA 95125
(408) 925-1714
FAX (408) 925-4257

Due to the close of the comment period on Tuesday May 7, transmittal of our
comments to the DOE will be via FAX to 1-800-820-5156

cc: Lynn Wallis
Steve Hucik

F-021

*Storage and Disposition of Weapons-Usable Fissile Materials Draft
Programmatic Environmental Impact Statement
(February 1996)
DOE/EIS-0229-D*

Volume/Section/Page	Comments	
Summary-Abstract/ compared to S-7	The summary abstract conclusion, that the disposition of weapons usable Pu is necessary, is in conflict with a no action alternative. Considering the continuing threat of diversion of Russia's weapons usable plutonium, a near-term bilateral, reliable Pu disposition program would appear to be a highly necessary activity and therefore a no action alternative which would neglect the "clear and present danger" situation, should be entirely unacceptable. The PEIS also fails to adequately address 1) the sense of urgency which should be evaluated by the reliable timeliness of each alternative and 2) the environmental risk which a nuclear threat due to diverted material would represent. Further delay in embarking on a practical disposition program and failure of the chosen alternatives to reliably fulfill the mission would enable and enhance that threat.	1/08.03.01
Summary S-5	The PEIS describes international cooperation as a PEIS criteria but fails to give appropriate credibility to the furthering of international cooperation which bilateral reactor based programs in both the U.S. and Russia would provide. It has been publicly suggested by DOE personnel that the disposition programs in each country could be different, however a vitrification program which would leave the weapons usable Pu unchanged and readily recoverable by the industrial infrastructures available in either the U.S. or Russia, cannot be credible to either side. Equivalent programs in the two countries for the large quantities of pit Plutonium must contain an element of irreversibility which only the LWR option offers.	2/01.00.00
	The PEIS fails to give appropriate credit under both its timeliness and cost criteria of the industrial reliability and predictability of the existing LWR option; especially as compared to 1) the uncertainties in the R&D required for other options, 2) the technical, cost, and schedule uncertainties inherent in the prototype stage of other options, and 3) in the reliability and cost uncertainties of the mission production stage of the other options being considered.	3/01.03.00
		4/08.03.01

F-021

08 03 01 Comment Number 1

Analyses of the No Action Alternative are required by NEPA to serve as a baseline. As stated in Chapter 1 of the PEIS, the purpose of the Proposed Action is to provide safe, secure, and cost-effective storage for the non surplus weapons-usable fissile materials and for surplus Pu pending disposition, since the disposition process would take time. The intent is to conduct the disposition process until all surplus Pu materials are taken care of.

01 00 00 Comment Number 2

Timeliness is one of the criteria used in the screening process for selecting reasonable alternatives to be analyzed in the PEIS. The endpoint for each disposition alternative is to convert the surplus Pu into a proliferation-resistant form that meets the Spent Fuel Standard, as described in the PEIS.

01 03 00 Comment Number 3

As described in the PEIS, the endpoint for all disposition alternatives is to convert the surplus Pu into a proliferation-resistant form that meets the Spent Fuel Standard. Vitrification of Pu can meet this Standard since the Pu would be as unattractive and inaccessible as that in spent nuclear fuel. The United States and Russia currently have a joint program to assess the feasibility of all the reasonable disposition alternatives, including the use of Pu in LWRs.

08 03 01 Comment Number 4

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

Summary/Reactor Category/S-15	The statement "a dedicated facility would have to be built at a U.S. site to implement the reactor alternative" (MOX fuel fabrication facility) is considered somewhat misleading. MOX fabrication capabilities exist in Europe and could support the reactor alternative. The PEIS explains European capabilities in later sections and details the need for a U.S. capability. However, this paragraph is considered incorrect as written. It may be prudent for policy reasons to proceed with a MOX facility in the U.S. to assure a reliable, proliferation independent MOX fuel supply for a U.S. LWR program, but the decision to build MOX facility in the U.S. is more a political decision than one fully necessitated by the technology, logistics or the available infrastructure.	5/06.01.09
Summary/Existing Light Water Reactor Alternative/S-15	The first paragraph in this section states that a minimum of four (4) BWRs would be required for a Pu throughput of 2-3 t/yr. With optimized fuel and fuel cycle designs recently divulged to the DOE, this throughput can be achieved with two (2) existing BWRs utilizing full MOX cores or with three (3) existing BWRs utilizing a high Pu throughput (no burnable poisons in the MOX fuel rods) design. The PEIS timeliness and technological viability criteria should also consider that BWRs can operate with up to a full MOX core configuration without changes to the plant design, equipment, systems, or fuel bundle mechanical configuration. The capability for operation with MOX is achieved entirely through the design of the fuel pellet and core nuclear design. Systems operations and core and fuel bundle mechanical designs all remain unchanged. MOX cores for BWRs can also be designed within the operating envelope of the current UO ₂ fuel design licensing criteria which sustains the existing margin to the operation in BWRs since the onset of GE's Pu disposition evaluations. These considerations enable licensing of MOX fuel designs for BWRs and licensing of BWR plants for operation with MOX fuel to be implemented as straightforward, low technical risk activities. This approach has been the basis for MOX fuel designs and MOX fuel operation in BWRs since the onset of GE's Pu disposition evaluations. Modifications of mechanical, chemical, and control systems of pressurized water reactors (PWRs) were required in order to transition from UO ₂ fuel to even the nominal 1/3 MOX core operating schemes being used in France. Where more challenging MOX operating cycles are being considered, PWR plants will require even further modifications and changes to reactor control and operating systems. DOE should NOT confuse the PWR requirement for control rod additions and soluble boron reactivity control systems changes as being applicable to BWRs as there are no such requirements for BWRs.	6/01.05.00
		7/06.02.09

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06 01 09 Comment Number 5

Europe is moving toward a balance between the capacity to fabricate MOX fuel and the capacity to utilize MOX fuel in reactors. Additionally, Europe has excess separated Pu stores which they intend to use as MOX fuel as the fuel fabrication infrastructure and reactor infrastructure permits. Therefore, use of European reactors for consumption of U.S. Pu-source MOX fuel would merely displace the use of separated European Pu and result in no net reduction in world inventories of separated Pu. Hence, the statement that Europe has no excess MOX capacity. Additionally, facility utilization projections indicate that, while some excess MOX fuel fabrication capacity may exist in Europe for the next few years, current capacity is soon expected to be fully utilized for commercial MOX fabrication. Therefore, the United States may not be able to rely on the use of existing European MOX fabrication capacity for the entire disposition campaign. However, as a part of efforts to develop weapons-grade Pu MOX fuel, DOE is consulting with European Fuel Fabricators to benefit from their experience in MOX fuel fabrication and may have some MOX Lead Test Assemblies and/or initial core loads fabricated in Europe. Also, participation in the construction and operation of a MOX Fuel Fabrication Facility in the United States will be open to European fuel vendors.

01 05 00 Comment Number 6

The Technical Summary Report for disposition, made available to the public in July 1996, recognizes the fact that full MOX cores could be utilized for Pu disposition. The Final PEIS and Summary have been revised to incorporate this information.

06 02 09 Comment Number 7

The Technical Summary Report for disposition, made available to the public in July 1996, recognizes this information.

Summary/Attachment BOS-133	In the Existing Light Water Reactors Alternative (per single unit) column under Waste Management, it states that spent nuclear fuel generation would increase approximately 23 t for BWRs. If the BWR operating cycles and core management/storage philosophies are not changed with the introduction of MOX fuel, the amount of spent fuel generated should not increase.	8/09.11.08
Vol. I/1.2, 6th para./1-5	We consider the statement that the NAS has identified several disposition options to be misleading. The NAS report states that the "two most promising alternatives" are fabrication and use as fuel (spent fuel option) and vitrification. The third option, burial in deep boreholes, has been less thoroughly studied. Considering the delays and uncertainty surrounding the Yucca Mt. repository, the uncertainties associated with deep borehole burial might be even more uncertain and therefore the program schedule, cost, and technical risks of the deep borehole option would seem to make that option not a credible nor reliable near term option.	9/01.04.00
Vol. I/Table 2.4.5.1-1/2-123	The column "minimum 4 BWR" is incorrect (see similar comment above). The GE ABWR is not listed in the "Evolutionary Reactor Types". Information on the ABWR is provided in NEDO-32351 and the ABWR should be available as an evolutionary reactor option.	10/06.02.09
Vol. I/2.4.5.2, Facility Operations/2-126	Again, "four BWRs" should be changed to "three BWRs" for partial MOX cores or "two BWRs" for full MOX designs.	
Vol. I/Table 2.4.5.2-1/2-129	Given the same fuel cycles as for LEU fuel, MOX cores should not generate additional spent fuel assemblies (as compared to typical LEU cores).	
Vol. I/Table 2.5-2a/2-255	If core management philosophy is unchanged, spent nuclear fuel generation would NOT increase by the 23 t for BWRs. DOE's assertion does not appear justified.	8/09.11.08 cont.
Vol. II/4.3.5.2.10, 3rd para./4-692	DOE appears incorrect in concluding that the number of discharged fuel bundles is higher for a MOX core than the typical LEU core. This paragraph raises the concern of increased waste and storage requirements for MOX fueled reactors that can be considered neither accurate nor justified.	
Vol. II/4.3.5.5/4-769	This paragraph might infer that there are CANDU reactors within the United States.	11/16.00.00

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09 11 08 Comment Number 8

MOX fuel used in the Existing LWR would remain in the reactor until sufficient burnup is achieved to meet the Spent Fuel Standard. This would be shorter than conventional uranium fuel cycles which remain in the reactor to achieve full economic value. MOX fuel will be withdrawn before full burnup is achieved and therefore more spent fuel will be generated. This assumption was used in order to bound the impacts for spent fuel generation and storage. It also would dispose of the excess weapons-usable fissile materials as quickly as possible. If the core management philosophy is different from the assumption used in the PEIS, as noted by the commentator, the resultant environmental impacts would be less. The facility operations section of Chapter 2 of the Final PEIS for the Reactor Alternatives acknowledges that there would be a range in the amount of MOX throughput dependant upon the reactor types and fuel management.

01 04 00 Comment Number 9

Comment noted.

06 02 09 Comment Number 10

The PEIS has been changed to reflect that 3 to 5 LWRs would be required to accomplish the mission in approximately 25 years and starting up in 10 to 12 years. The Technical Summary Report issued by DOE in July 1996 provides more details.

16 00 00 Comment Number 11

Comment noted. Text was changed to improve clarity.

GENERAL ELECTRIC COMPANY, SAN JOSE, CA,
EDWARD EHRLICH
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Vol. III/H.4/H-7	The GE Advanced Boiling Water Reactor is designed for MOX fuels, and therefore should be included in this discussion. The PWR discussion in Section H.5 includes all three LWR options.	12/06.04.08
Vol. III/H.4.1/H-7	Dependent upon the DOE decision to pursue partial or full MOX cores, less than four (4) BWRs can accommodate this mission.	10/06.02.09 cont.
Vol. III/H.4.3/H-8	The figures referenced in the paragraphs on criticality and thermal are reversed.	13/16.00.00
Vol. III/App. N, 4th para/N-1	This is a confusing paragraph since BWR fuel designs also use burnable poison rods.	14/06.00.08

06 04 08 Comment Number 12

Section H.4 addresses the existing and partially completed LWRs and Section H.5 addresses the existing, partially completed, and evolutionary LWRs. The General Electric (GE) evolutionary LWR was not addressed in the PEIS but would give comparable results. Additional analyses on the spent nuclear fuel disposition would be completed if the Evolutionary LWR Alternative is selected.

16 00 00 Comment Number 13

The commentor is correct. The figures referenced in Appendix H were changed for the Final PEIS. A consistency check was performed on the Final PEIS as a part of the Quality Assurance Procedure.

06 00 08 Comment Number 14

The paragraph in Appendix N has been revised in the Final PEIS for clarity.

F-021

GEORGIA INSTITUTE OF TECHNOLOGY, NUCLEAR ENGINEERING
PROGRAM, ATLANTA, GA, W. M. STACEY AND J. A. FAVORITE
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**A PROPOSAL FOR
PLUTONIUM DISPOSITION***

W. M. STACEY
J. A. FAVORITE
NUCLEAR ENGINEERING PROGRAM
GEORGIA INSTITUTE OF TECHNOLOGY
APRIL, 1996

PROCESS WEAPONS-GRADE PLUTONIUM IN A
VOLUMETRIC NEUTRON IRRADIATION FACILITY
TO BUILD UP HIGHER ACTINIDES AND FISSION
PRODUCTS SUFFICIENT TO DETER DIVERSION OR
THEFT FOR WEAPONS PRODUCTION

1/14.00.00

STORE THE IRRADIATED PLUTONIUM FOR
EVENTUAL USE AS A FUEL IN COMMERCIAL
NUCLEAR REACTORS

2/08.03.01

* BASED ON A DESIGN STUDY PERFORMED BY A GEORGIA TECH NE&HP
DESIGN TEAM AND PUBLISHED IN FUSION TECHNOLOGY, 27, 326, 1995.

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14 00 00 Comment Number 1

A fusion-induced neutron flux would not be available until 2015 as described in the comment. This timeframe would not be consistent with the purpose of and need for disposition of Pu to reduce proliferation. In addition, this technology is immature compared to existing fission reactor technology. Several other new reactor technologies were eliminated for similar reasons, as described in Chapter 2 of the PEIS.

08 03 01 Comment Number 2

The Department of Energy acknowledges the commentor's support for Pu disposition in reactors. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

IRRADIATION OF WEAPONS GRADE Pu TO 115 Mw/kg
(11% ^{240}Pu) IS SUFFICIENT TO DETER THEFT.

A VOLUMETRIC NEUTRON SOURCE CAPABLE OF
PRODUCING 10^{21} n/s AND A FAST NEUTRON FLUX OF
 2×10^{15} n/cm²s OVER AN IRRADIATION VOLUME OF $\sim 60m^3$
CAN PROCESS ~ 10 TONNES PER YEAR OF Pu .

A FUSION NEUTRON SOURCE, BASED ON THE
TECHNOLOGY THAT IS BEING DEVELOPED FOR ITER
AND THE FUSION PHYSICS THAT WILL BE
DEMONSTRATED IN ITER (2008-2015), CAN PRODUCE A
DISTRIBUTED NEUTRON SOURCE OF 10^{21} n/s.

A CONCEPT FOR A $\sim 60m^3$ IRRADIATION FACILITY HAS
BEEN DEVELOPED, BASED ON EXISTING NUCLEAR FUEL
TECHNOLOGY, LIQUID LITHIUM COOLING AND A
REFRACTORY METAL STRUCTURAL MATERIAL.

THE IRRADIATION FACILITY WOULD BREED THE
NEEDED FUSION FUEL (TRITIUM) AND PRODUCE 2700
MW ELECTRICAL POWER.

A FUSION-BASED IRRADIATION FACILITY FOR Pu
PROCESSING COULD BE BROUGHT ON LINE IN 2015-25,
OR EARLIER WITH AN ACCELERATED PROGRAM.

THE IRRADIATION FACILITY AND THE TEMPORARY
STORAGE FACILITY FOR THE PROCESSED Pu WOULD BE
ON A GOVERNMENT SITE.

1/14.00.00
cont.

M-133

A TRANSMUTATION FACILITY FOR WEAPONS-GRADE PLUTONIUM DISPOSITION BASED ON A TOKAMAK FUSION NEUTRON SOURCE

W. M. STACEY, B. L. PILGER, J. A. MOWREY, D. C. NORRIS,
M. DIETSCH, E. A. HOFFMAN, B. A. ARCHEDID,
A. W. ANTHONY, M. S. AYRES, T. P. BELFLOWER, J. D. BOHNER,
S. F. CAPUTLU, H. M. COWARD, H. M. DILLER, J. A. FAVORITE,
P. T. FEIR, J. S. GUSTAFSON, N. L. JENKINS, T. L. JOHNSTON,
J. L. MARTIN, C. H. MAHASS, D. M. NICHTER, D. F. PARKER,
R. A. SIDWELL, A. L. TURNER, and J. D. WARTTELL
Georgia Institute of Technology, Nuclear Engineering and Health Physics Program
Atlanta, Georgia 30332-8223

Received September 23, 1994
Accepted for Publication December 20, 1994

It is suggested that weapons-grade plutonium could be processed through a transmutation facility to build up sufficient actinide and fission product inventories to serve as a deterrent to diversion or theft during subsequent storage, pending eventual use as fuel in commercial nuclear reactors. A transmutation facility consisting of a tokamak fusion neutron source surrounded by fuel assemblies containing the weapons-grade plutonium in the form of PuO_2 pebbles in a blanket shroud is investigated. A design concept/operation scenario is developed for a facility that would be able to transmute the world's estimated surplus inventory of weapons-grade plutonium to 11% ^{240}Pu concentration in ~25 yr. The

fission neutron source would be based on plasma physics and plasma support technology being qualified in ongoing research and development (R&D) programs, and the plutonium fuel would be based on existing technology. A new R&D program would be required to qualify a refractory metal alloy structural material that would be needed to handle the high heat fluxes, oxidation, corrosion of existing technologies and acceleration of existing R&D programs would seem to be adequate to qualify all required technologies. Such a facility might feasibly be deployed in 20 to 30 yr, or sooner with a crash program.

1. INTRODUCTION

It has been estimated that 100 to 260 tonnes of weapons-grade plutonium ($>93\%$ ^{239}Pu) exists in the form of nuclear warheads and in processing and storage systems.^{1,2} An even larger quantity, ~1400 tonnes, of highly enriched weapons-grade uranium exists.³ Under the conditions of the Strategic Arms Reduction Treaties I and II, ~90 tonnes of weapons-grade plutonium and 450 tonnes of highly enriched uranium in the United States and the former Soviet Union will become surplus to military needs as weapons are dismantled over the next decade.^{4,5} There is a substantially larger civilian stockpile, ~780 tonnes, of reactor-grade (^{239}Pu admixed with large fractions of higher transuramics)

plutonium⁶ of which ~80% is in the form of spent fuel, although ~115 tonnes has been separated for reuse in fission reactors.⁷

The disposition of all of this plutonium and highly enriched uranium is a pressing international concern. The security of approximately one-half of the weapons-grade plutonium and uranium that will be in the custody of the former Soviet Union is of particular concern; some 25 tonnes cannot be accounted for.⁸ The threat of some of this material falling into the hands of unauthorized parties (terrorist groups or irresponsible governments) is quite palpable. Even if the security is improved substantially, these large stockpiles of highly enriched, weapons-grade materials would remain a tempting target for diversion or theft. For the uranium,

KEYWORDS: plutonium disposition, plutonium management, fusion transmutation facility.

GERRELLS, ELSWORTH, SAN JOSE, CA
PAGE 1 OF 8

May 7, 1996

U.S. Department of Energy
Office of Fissile Materials Disposition
P.O. Box 23786
Washington, DC 20026-3786

Dear Sir:

My comments on the February 1996 Draft Programmatic Environment Impact
Statement for the Disposition of Weapons-Usable Fissile Materials are attached.

Yours Truly,

Elis Gerrells
Elsworth Gerrells
1145 Holy Ann Place
San Jose, CA 95120

F-038

01 06 00 Comment Number 1

Comments on DRAFT Programmatic Environmental Impact Statement for the Storage and Disposition of Weapons Useable Fissile Materials

(Comments apply to the storage and disposition of excess weapons plutonium.)

Timeliness, Reliability, Costs, Risk Effectiveness

The PEIS fails to take into account the potential costs and environmental impact of the most significant risk factor associated with the plutonium disposition program. That is the risk and impact of the divergence or theft of that weapons useable material from the Russian stockpile.

Programs underway to establish a better inventory and more reliable physical security over the Russian weapon materials are potentially piecemeal and band-aid activities with uncertain results.

At an April 8, 1996 CSIS forum in Washington DC chaired by Dr. James Schlesinger, some key findings with respect to the threat of nuclear material in Russia included:

- threat is escalating,
- desperate, corrupt insiders are a serious threat
- military controls lessening
- finances are short
- trafficking trend is upward
- the threat outpacing security improvements, even with U.S. financial help
- smuggling routes are numerous, shifting through the Caucasus, Europe, Central Asia
- Russian organized crime is involved now - a dangerous mix of power, greed, corrupt officials/military
- countermeasures are expensive - a need to secure at the source
- protection at source paramount, but post-theft measures needed also
- neutralization is worst option - when conducted abroad, political and safety risks abound, capabilities limited.

Recommendations by the task force included:

- sustained funding and long term vision
- institutional measures
- bilateral safeguards (for material removed from warheads)
- the U.S. needs development of an indigenous safeguards culture in the former Soviet Union - not brought in from Los Alamos and put there

At the forum, Mr. Graham Allison urged that focus should be the "loose nukes" (the bomb-making nuclear materials). He concluded we are living on borrowed time.

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The purpose of the Proposed Action is, in part, to establish the technical and program infrastructure that will enable the United States to take unilateral action or negotiate reciprocal actions with other nations for the disposition of surplus weapons-usable Pu. This PEIS addresses the environmental impacts of the reasonable alternatives for DOE's Proposed Action. Analyses of the cost, schedule, technical, and Nonproliferation Policy impacts are described in separate documents to support DOE's ROD. The documents related to technical, cost, and schedule analyses were made available for public review beginning in July 1996. The nonproliferation analysis was made available to the public beginning in October 1996. DOE also conducted a series of public meetings, prior to the issuance of the Final PEIS, to discuss the analysis of the Nonproliferation Policy as it relates to the Proposed Action and alternatives.

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Record of Decision. Therefore these cost differentials between options under consideration should be meaningless when compared to the cost of the proliferation and threat risk. In that context, the overriding cost-benefit analysis clearly makes the most effective, reliable and timely solution available the desirable option. An overriding cost-benefit advantage of the light water reactor option is its assurance that the threat to national security could be reliably and effectively addressed in the short time frame intended, and the light water reactor option should therefore merit DOE support, and given those same considerations, other widespread public and political support. Recognizing this, the National Academy of Sciences urged that costs should not be a major factor in getting on with the Pu disposition program and that a timely and reliable response should be primary. The environmental impact of a clandestine nuclear device even if only hidden or if exploded in a U.S. city, would have an overwhelming environmental impact compared to some of the trivial issues being studied and elevated to equal consideration in the PEIS. Even a credible threat of a nuclear device by a sub-national terrorist group could cause serious social dislocation.	2/08.03.01
Timeliness, reliability, and cost-risk effectiveness do not appear to be valued in DOE's PEIS evaluation. Since early 1994 and again since then, the National Academy of Sciences has strongly urged the DOE to expedite the disposition activity. They recognize the "clear and present danger" of divergence or "breakout" of Russian nuclear material.	3/08.03.00
DOE's actions to-date do not reflect the sense of urgency or timeliness in implementing a meaningful disposition program as recommended by the National Academy. Since 1993, resources have been directed to studies, and then more studies, and time and money have been expended on consideration of options with little real potential or technical value and with high technical, cost, and schedule risks. The PEIS and ROD originally advertised by DOE as intended for expedited completion in mid-1996, has been underfunded and most likely, intentionally delayed until after the presidential elections. Even now, resources are being committed or used by DOE on prototype technical activities which could have little real impact on accelerating a meaningful disposition effort but which appear to be undertaken to facilitate the opportunity to make grand but bogus claims of progress, solely to further political purposes in an election year. The PEIS spends years and millions of dollars considering endangered wildlife species and the minute distinctions of potential economic discrimination between the various options. DOE would be better to consider the impact of the delay and underfunding that has occurred in the disposition program on the economic discrimination that would befall all the citizens of any major population center targeted by a terrorist nuclear device, and also the risk that the citizens of that target location could become another endangered species.	5/08.00.00

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08 03 01

Comment Number 2

The Department of Energy acknowledges the commentor's support for the Existing LWR Alternative. Decisions on disposition of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 00

Comment Number 3

The time required to implement and complete the Proposed Action under each of the alternatives is included in this PEIS. A detailed schedule, reliability, and cost information have been included in a separate Technical Summary Report. Information on environmental impacts in this PEIS along with technical, cost and schedule information in the Technical Summary Reports, and other information will be provided to the decisionmaker.

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Comment Number 4

The schedule analysis, along with the cost, technical, and Nonproliferation Policy analyses on the Proposed Action and reasonable alternatives, is presented in separate documents to support the DOE's ROD. The documents related to technical, cost, and schedule analyses were available for public review beginning in July 1996. The nonproliferation analysis was made available to the public beginning in October 1996. The ROD is expected in late 1996.

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Comment Number 5

Comment noted.

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DOE's technical staff clearly and very early identified a dual track approach of (1) converting the bulk of the excess weapons usable Pu materials to mixed oxide fuel and dispositioning it in existing LWRs, and (2) developing some form of vitrification technology for encapsulating smaller quantities of low level Pu from waste streams and scrap Pu that are not suitable for LWR fuel. These are the best available mix of technology and industrially reliable capabilities.	6/08.03.01
DOE funding should be directed toward accelerating the LWR option which addresses the bulk and weapons usable material while also sustaining a lower level of vitrification activities to address the smaller quantity and less-usable, and therefore less threatening, Pu wastes.	7/08.03.01
Consideration of Vitrification as a single solution for all U.S. excess material does not represent a credible or reliable and unrecoverable option. There are serious environmental and nuclear criticality uncertainties associated with the vitrification of large quantities of fissile material.	8/05.01.08
There are also so many developmental uncertainties and production reliability concerns with all vitrification options such that the risk of it never providing a reliable bulk conversion option are very great. The vitrification options are considered experimental even by those who advocate their development. There is significant risk in the cost and schedule and successful resolution of technical issues even in an R&D phase in bringing those options to a prototype state. The costs, schedule and program risks are even greater when the prototype technology needs to be expanded and relied upon for the production disposition mission. If the eventually industrial reliability might be only 35-60 %, would it be viable? Can DOE truly expect to estimate what the O&M costs of production are for a vitrification program?	6/08.03.01 cont.
Furthermore, DOE's own scientists at LANL have published that recovery of Pu from vitrified forms is a simple chemical process and easily achievable. This makes vitrification less of a barrier than the LWR spent fuel option and also must have less credibility for encouraging a reciprocal bilateral program with Russia for that same reason. Therefore, the bulk of the weapons usable material should be dispositioned by the LWR option which is the only option that achieves an isotopic change of weapons usage forms of plutonium and increases the undesirable Pu 240 content and reduces overall the amount of Pu by about 1/3 in a once through cycle.	
Proliferation and Technology Issues	
At a guest lecture tour through the U.S. in April '96 by a noted expert on Plutonium, Prof. Wolfgang Stoll of Germany, Professor Stoll offered a foreign view of U.S. non-proliferation tactics.	
Prof. Stoll offered that the U.S. is undermining its ability to achieve a timely disposition program for weapons usable materials if it rejects MOX fuel technology as a means of	

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08 03 01 Comment Number 6

The Department of Energy acknowledges the commentor's support for the implementation of both the Reactor and Immobilization Alternatives. Decisions on disposition will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 03 01 Comment Number 7

The Department of Energy acknowledges the commentor's opposition to the Vitrification Alternative. Decisions on disposition of weapons-usable fissile materials will be made based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

05 01 08 Comment Number 8

Further information on the technical viability, schedule, and costs of the Immobilization Alternatives is provided in the Technical Summary Report and related Immobilization Alternative Summary Reports published in July 1996.

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dispositioning weapons materials. There is reluctance by some to proceed with disposition of weapons material through burning of MOX because of misinformation expectation by anti-nuclear idealists that if the U.S. does not use the technology, then it will also not be used by others for commercial purposes. Prof. Stoll assured his American audience that other nations are already far ahead of the U.S. in MOX fuel technology, commercial use, and experience with it, and that they will continue to pursue and use that technology to meet their spent fuel disposal and long term energy independence commitments and plans in safeguarded and proliferation resistant programs.

In fact, by not participating in MOX technology, the U.S. is abandoning it's technological leadership to others and will cease to have a voice or influence over the non-proliferation considerations of those programs. The U.S. expectations were characterized as naive, as the U.S. very mistakenly expects the rest of the world to unflinchingly march to the beat of our drum. It was suggested that, instead, the U.S. would have much more influence and control over MOX technology by being the technology leader in that discipline, and where the U.S. might be able to turn technical support on or off to control the use of the technology in appropriately safeguarded and non-proliferation committed programs.

In subsequent discussions, it was noted that facilities and production processes for MOX fuel that would be used in a U.S. disposition program could be designed so it would be highly impractical to consider the use of those same facilities for the highly irradiated recycled Pu that would be considered if a commercial MOX program were intended. Furthermore, the facility could be designed for convenient decontamination from low exposure weapons grade Pu and built-in decommission considerations could be designed in so that could be readily achieved upon termination of the disposition program. It is also relevant to explain to the political opponents of LWR disposition that the U.S. disposition program is going to be limited program with only a few plants participating into order to achieve rapid and reliable disposition of weapons for a strategic non-proliferation goal and it is in no way oriented to promote the commercial use of MOX. There are "professional" protest lobbies (Greenpeace for one) that would decry any and all DOE disposition options and especially the LWR option; while others recognize the facility of the LWR option and decry the environment risks of geological disposal of vitrification products. Yet they offer no alternate solution to the environmental threat of doing nothing and the role they play in further delaying meaningful disposition.

Involved localities and common sense public good

Some professional environmental protesters would have the DOE abandon consideration of all near term options and spend additional decades in R&D on "still unidentified, ultimate disposition methods" which, of course, must have no potential for environmental impact. Pursuing a longer term solution for the much less threatening proliferation risk from reactor grade plutonium, instead of focusing on the near term

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security issues stemming from weapons grade plutonium, could result in the proverbial "locking of the barn door after the horses are stolen".

Few activities, if any, undertaken in modern industrial society have no risk. Society chooses to drive automobiles despite 50,000 traffic fatalities yearly. The risks of no action and action too long delayed are much greater than those highly improbable risks that some would demand we avoid in arriving at a record of decision and getting on with the program as expeditiously as practical.

When the general public and their political representatives are given these facts through public meetings and other information initiatives which the Department of Energy should be undertaking, and when they are made aware that the use of MOX fuel in reactors to convert weapons usable materials to spent fuel is a quick, reasonable and practical solution to the threat of diversion and otherwise relatively easy reuse that might be achieved with other options, the LWR option should win broad public and political acceptance.

Public responses at PEIS public scoping meetings in 1995 and this year's draft PEIS comment meeting have clearly demonstrated broad community support in those locales that are candidates for Pu disposition activities. There have been significant expressions of state and local level political and public support. The candidate communities are knowledgeable of the real nature of the plutonium hazard, (not the hyped hysteria that some portray) have favorable experience with plutonium activities, are comfortable with the real issues of plutonium handling and processing activities which will be common to all disposition options, and are confident in the ability of well-managed organizations to conduct the program safely and in an environmentally sound way. Particular locations which have had poor experiences with DOE facilities, or those with a well-established culture of opposition by special interests to DOE and nuclear-related operations are clearly not being considered as sites for program activities and should therefore not be a factor. A key, therefore, to achieving an accurate and meaningful public consensus lies in appropriately identifying and obtaining a consensus of those local and regional stakeholders who are truly affected.

Because U.S. national security is potentially affected by a lack of action as much as by specific actions taken in addressing this excess weapons material threat, special interests and/or bias and ideological critics who would seek to block the program with protests in the name of having "a higher vision" than the rest of us, or even by legal challenges, despite it otherwise being a broad-based acceptable solution, are doing a gross disservice to our country. The overwhelming public interest clearly lies in implementing an effective and timely solution. A solution which has broad public and political consensus, which is being hampered by a limited special interest challenge, has a strong argument for passing over those objections, especially when they are clearly politically motivated, largely procedural, filled with stunted and inflammatory "scare tactic rhetoric" or otherwise without substantive merit, considering the all the risks and options.

9/08.03.01

10/08.02.00

08 03 01 Comment Number 9

The Department of Energy acknowledges the commentator's opposition to the No Action Alternative. Decisions on storage of weapons-usable fissile materials will be based upon environmental analyses, technical and economic studies, national policy considerations, and public input.

08 02 00 Comment Number 10

Comment noted. However, the storage and disposition of weapons-usable Pu is an issue of national interest. NEPA requires full public participation, and all comments receive equal consideration.

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DOE disposition actions must remain focused on the nature and potential of the immediate threat of divergence of weapons useable materials and the timeliness and reliability of the response and solution to the threat offered by the proposed options, and not on "micro" issues of cost, support or non-support of nuclear power, value or use of the Pu material, and local or regional economic or political interests. The LWR option would seem to be the only credible option for the U.S. to offer the Russians to enter into a bilateral program. Anything that does less, does nothing to reduce the threat of diversion of Russian material which will remain at risk until converted into a form not readily useable in weapons.	11/01.03.00	01 03 00	Comment Number 11
	12/01.03.00	01 03 00	Comment Number 12

Comment noted.

Comment noted. All Reactor Alternatives analyzed in the PEIS are viable options that would serve the same purpose the commentator described.

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