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Subject: SEIS input due 4/30/07

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Manufacturing Repository Components, Items 1-2:

The TAD canister internal baskets_slovic.doc

Pallet & Shield calc input for 043007.pdf

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The TAD canister internal baskets will contain significant quantities of borated stainless steel (ASTM A887-89, Type 304B4). Each PWR TAD canister basket will contain approximately 12,000 pounds of borated stainless steel and each BWR TAD canister basket will contain approximately 16,000 pounds of borated stainless steel. Additionally, the TAD canister itself will be made of approximately 52,000 pounds of Type 300-series austenitic stainless steel.

In order to emplace 63,000 MTHM of commercial spent nuclear fuel (CSNF), approximately 7,500 TAD canisters will be required. TAD canisters will be required to be produced for approximately 32 years, beginning in 2011 when the TAD system is licensed for use at commercial nuclear power plants and continuing until 2042 when the 63,000 MTHM of CSNF has been received at the repository.

The production of 7,500 TAD canisters will require approximately 51,000 tons of borated stainless steel and approximately 190,000 tons of stainless steel. In any give year, the production of TAD canisters will vary between an average of 240 per year to a high of 400 per year. This results in a need for between 1,632 tons and 2,720 tons of borated stainless steel and for between 6,096 tons and 10,160 tons of stainless steel per year.

6.3 DRIP SHIELD CALCULATION

Based on the inputs in Table 6.1-2, the total mass for each material in a drip shield can be calculated. The calculation results are provided in Table 6.3-1.

Table 6.3-1 Calculated Material Mass of the Drip Shield Assembly

Material	Components	Mass, *kg*
SB-575 N06022 (Alloy 22)	Base Subassembly	109
SB-265 R52400 (Ti-7)	Connection Subassemblies	3,646
SB-265 R56405 (Ti-29)	Support Beams and Bulkheads	1,142
	Total Assembly	4,897

The total assembly mass agrees within 2 % of the Reference 2.2.19 value of 5000 *kg*.

7. RESULTS AND CONCLUSIONS

Table 7.1-1 summarizes the calculations conducted in this study based on the inputs, assumptions and information from referenced sources. Table 7.1-1 also calculates a combined grouping by materials of the masses per meter of emplacement drift of the emplacement pallets and drip shields together. Table 7.1-1 also includes 10% upper and lower bounds on these values based on Assumption 3.2.3.

The calculation results are reasonable based on the inputs.

The drip shield mass per length is based on dividing the total drip shield mass by 5.485 meters (see Section 6.1.4 and Assumption 3.2.2), the assumed interlocked drip shield length.

Total Number of Drip shields ≅ 11,500 - 11,077
Drip shields will be placed ~ 2100
Drip Shield Emplacement will be 10 Years (assumption)
3-4 Emplacements/day

10 years (300 days) Availability = 3000 emplacement days
11,500/3000 = 3.6 Emplacements/day

300 days (109 kg Alloy 22) = 32,700 kg/Year Alloy 22
" (3,646 kg Ti-7) = 1,093,800 kg/Year Ti-7
" (1,142 kg Ti-29) = 342,600 kg/Year Ti-29

6.1.3 Quantity of Emplacement Pallets, Waste Package Lengths and Spacing

For computing emplacement pallet mass per meter of emplacement drift, a weighted-average approach is used. It is based on short pallets supporting 1,147 (5-HLW Short / DOE SNF Short) (see Reference 2.2.3, Table 2-11 and Attachments I & II) waste packages 3.697 meters in length (see Attachments I & II) and standard pallets supporting 9,930 waste packages (see Reference 2.2.3, Table 2-11 and Attachments I & II) of varying lengths, with lengths as defined in References 2.2.46 through 2.2.51. Attachments I & II show the average waste package length, used in Table 6.2-3, for those waste packages supported by the standard emplacement pallet. The waste packages are spaced 0.1 meters apart per Reference 2.2.2, Section 8.2.1.7. This is also used in Table 6.2-3.

6.1.4 Length of Interlocked Drip Shield

The length of drip shield used in Table 7.1-1 for computing mass per length of emplacement drift is from Reference 2.2.20 using Assumption 3.2.2 and is equal to 5.805 – 0.320 = 5.485 meters.

6.2 EMPLACEMENT PALLET CALCULATION

Based on the inputs in Table 6.1-1, the total mass for each material in a standard emplacement pallet can be computed. The calculation results are provided in Table 6.2-1.

Table 6.2-1 Total Material Mass of the Standard Emplacement Pallet Assembly

Material	Components	Mass, *kg*
SA-240 S31600 (316 Stainless Steel)	(Longitudinal) Tube 1	724
SB-575 N06022 (Alloy 22)	All Plates and Tubes 2 and 3	1,290
	Total Assembly	2014

The total assembly mass agrees closely with the values reported in Reference 2.2.4. The masses of the short emplacement pallet's ends are the same as those for the standard emplacement pallets (see Assumptions 3.1.1 and 3.2.1). Reference 2.2.4 provides an overall nominal weight of 1730 *kg* for the short emplacement pallet. Based on Assumption 3.2.1, the weight of the four longitudinal tubes in the short emplacement pallet is 108 *kg* x 4 = 432 *kg* (Attachment II - Emplacement Pallet Components Mass Calculation.xmcd). The total mass for each material in a short emplacement pallet is provided in Table 6.2-2.

Table 6.2-2 Total Material Mass of the Short Emplacement Pallet Assembly

Material	Components	Mass, *kg*
SA-240 S31600 (316 Stainless Steel)	(Longitudinal) Tube 1	432
SB-575 N06022 (Alloy 22)	All Plates and Tubes 2 and 3	1,290
	Total Assembly	1,722

Total 11,077 pallets 9930 Long (Standard)
1147 short

Emplacement 2017 – 2067

RPM Operations and Maintenance Input for SEIS Request "Manufacturing Repository Components", Item 2

Concerning information gathering for the SEIS, RPM Operations was assigned responsibility for input to subject line item. That input follows.

Item 2: Latest information of the specific components that will need to be manufactured including materials for manufacturing and estimate unit costs.

Response: Per the 2006 Total System Life Cycle Cost Model, following are the estimated specific components required.

Component	# of components for 70K MTHM case	Unit Cost	Component Construction Schedule
Waste Packages	10,390	~$600,000, including emplacement pallet	Throughout the entire 50 year emplacement schedule
Emplacement Pallets	10,390	Included with waste package	Throughout the entire 50 year emplacement schedule
Aging Overpacks	1,368	~$265,000	All completed in first 25 years of operation
Drip Shields	10,708	~$350,000	Currently shown to be emplaced starting in 2103
TADS	7,377	Not included in TSLCC. Only a rough estimate available— $1-2 million	All completed in first 25 years of operation
DPCs	333	N/A	N/A
Transportation casks	Not included in TSLCC. Only a rough estimate available; i.e., 30 – 90.	Not included in TSLCC. Only a rough estimate available— ~5 million, including impact limiters	~20 put in service at start of operations. Do not know schedule for additional transportation casks.

Waste Package Description:

The waste package consists of a single design with six configurations. The different waste package configurations have multiple internal structures and different external dimensions to allow acceptance of various waste forms. The waste forms received and packaged for disposal are canistered SNF in TAD canisters, canistered SNF owned by the

DOE, including canistered naval SNF, and canistered HLW from prior commercial and defense fuel reprocessing operations. The waste package consists of two concentric cylinders in which the waste forms are placed. The inner vessel includes the inner cylinder, bottom lid, and top inner lid. The outer corrosion barrier includes the outer cylinder, outer bottom lid, and top outer lid. The inner vessel is Stainless Steel Type 316 (UNS S31600), modified with additional constraints on the nitrogen and carbon content. The outer corrosion barrier is modified Alloy 22 (UNS N06022), a corrosion-resistant, nickel-based alloy.

Aging Overpack Description:

Vertical aging overpacks consist of a carbon steel inner liner (~2" thickness), a cylinder of steel reinforced concrete (Type II Portland Cement) that measures ~30", and depending on the vendor, may have an exterior carbon steel shell of a 1 –2" thickness. The nominal empty weight is ~140 tons.

Horizontal aging modules for NUHOMs canisters are also reinforced concrete construction.

Emplacement Pallet Description:

The emplacement pallet description has not changed from the FEIS.

Drip Shield Description:

The drip shield description has not changed from the FEIS, except that the "lower-temperature operating mode" is eliminated.

DPC Description:

DPCs are the canisters currently in use in the nuclear industry and will be replaced by TADs. No description required for the SEIS.

TAD Description:

The TAD external dimensions will be ~212" long with a diameter of ~66". The TAD will be manufactured entirely of Type 304 or Type 316 stainless steel. The nominal weight without fuel assemblies is ~55,000 lbs.

Transportation Casks Descriptions:

The rail and truck shipment cask descriptions have not changed from the FEIS, nor have the estimated numbers required.

RPM Operations and Maintenance Input for SEIS Request "Manufacturing Repository Components", Item 2

Site Transfer Casks:

Site transfer casks will be used to transfer TADs and DPCs between and within site facilities. These have not yet been designed or estimated for required numbers or cost. It is likely that they will be constructed of stainless steel.