Table E-3. Processed salts in 68660 [a]

Composition	Detailed Mass, kg	Simplified Mass, kg
Dry wheat in Swheat	11.72	11.72
H_2O in Swheat	1.30	1.30
H_2O (with trace elements)	0.05	
$Al(NO_3)_3 * 9H_20$	0.62	
$Ca(NO_3)2 * 4H_2O$	2.48	2.70
KNO_3	0.54	
$Mg(NO_3)2 * 6H_2O$	16.30	17.74
$NaNO_3$	3.58	3.89
$Ni(NO_3)2 * 6H_2O$	0.02	
$Pb(NO_3)_2$	0.00	
$(COOH)_2$	0.40	
$Cr(NO_3)_3 * 9H_2O$	0.03	
$Fe(NO_3)_3 * 9H_2O$	1.69	1.84
HNO_3	0.40	
NaF	0.05	
Total	39.19	39.19

[a]Volume of this layer is 0.053 m^3

Table E-4. Processed liquids in 68660[a,b]

Composition	*Mass, kg*
Dry wheat	12.26
H_2O in Swheat	1.36
H_2O in decant	3.13
HNO_3 in decant	1.57
Nitrate salts[b] in decant	
$Ca(NO_3)_2 * 4H_2O$	0.54
$Mg(NO_3)_2 * 6H_2O$	4.27
$NaNO_3$	0.54
$Fe(NO_3)_3 * 9H_2O$	0.43
TEA in neutralizer	3.73
H_2O in neutralizer	4.25
Total	32.08

[a]Remediated liquid layer volume is 0.038 m^3.
[b]Based on measured solubility with composition based on most common salts.

Salt and Radiological Content in 68660

From the evaluation for source term there was an inference that the 14 individual salt bags in parent drum S855793 were mixed and processed with Swheat Scoop® as one batch prior to placement into the two sibling containers. From this finding the salt content can be determined accurately using the historical analytical data for each of the salt bags and the estimated mass of salts modeled to be in 68660 as described above. Table E-5 contains the material types, net weight of salts, and Pu and Am analytical information for each of the bags of MIN02 salts stored in parent container S855793 based on historical records.

Table E-5. MIN02 Salts in S855793 (Daughters 68660 and 68685)

Salt ID	**MT**	**net (Kg)**	**Pu239 (g)**	**Pu240 (g)**	**Am241 (g)**
10LALR1W	53	5.94	3.23	0.35	0.49
10LR5W1	53	4.8	0.47	0.05	0.12
10LR5E1	53	9.71	1.56	0.17	0.48
10LR16W1	53	8.6	2.20	0.20	0.50
10LR16E1	53	7.4	0.59	0.05	0.31
10LR17W1	53	7	0.71	0.06	0.40
10LR17E1	53	7.2	0.33	0.03	0.21
10RR18E1	52	9.68	4.08	0.25	0.39
10OX11W1-1	52	9.96	7.71	0.49	0.37
10OX11W1-2	52	10.97	8.49	0.54	0.41
10LR18E1	52	7.5	1.10	0.07	0.13
10LR18W1	52	12.93	2.13	0.14	0.39
10OX21E1	52	9.6	1.24	0.08	0.14
10OX21W1	52	15.1	2.27	0.15	0.08
	Total	**126.4**	**36.12**	**2.63**	**4.41**

Nine bags of salts (71.08 Kg) were produced from lean residues anion exchange feeds (“W” designates washes and “E” designates effluents). One bag (9.68 Kg) from rich residue anion exchange feed. And, four bags (45.63

Kg) from the anion exchange plutonium effluent after oxalate precipitation. Mixing these materials then placing 26 kilograms of salts into 68660 as predicted by the WIPP TAT models would result in the following inventories of salt types and Pu and Am isotopes shown in Tables E-6 and E-7 below. Also included in Table E-3 is the heat generated in the salts from radiolytic decay for each of the isotopes based on the masses listed. The Decay Heat constants used were 1.9, 6.8, and 114 W/Kg for Pu239, Pu240, and Am241 respectively.

Table E-6. Inventory of Nitrate Salt Types in Drum 68660

LR Feed Salts (Kg)	**RR Feed Salts (Kg)**	**OX Precip. Feed Salts (Kg)**
14.6	2.0	9.4

Table E-7. Pu and Am Inventory and Radiolytic Heat Generation from the Salts in Drum 68660

Pu239 (g)	**Pu240 (g)**	**Am241 (g)**
7.43	0.54	0.91
Decay Heat (W)		
0.014	0.004	0.104

These inventory values are based on the data as measured at the time of generation of the parent. At the time of processing and generation of the daughter drums there was 2 gallons of free liquid recorded to be in the parent which separated from the wet vacuum dried salts. The number and identification of which salt bags this liquid separated from is unknown so it should be noted that the loss of liquid weight will have an impact on the weights listed for each of the salt types in Table E-5 and the Decay Heat estimates in Table E-6. Assuming 3.3M HNO_3 and a density of 1.12 g/mL, 2 gallons of liquid would weigh 8.5 Kg. This is 6.7% of the total salt mass and would therefore have to come from multiple bags of the salts as all but one contained salts weights less than this.

The 2 gallons of processed liquid mixed with Swheat Scoop® and bagged separately was placed into 68660. Shown in Table E-8 are the historical Am and Pu analysis of the liquids leftover after flash evaporation of the waste streams. These liquids were removed for disposal by cementation however the results would be analogous to the activities in the interstitial liquid present in the moisture content of the vacuum dried salts. Note that if liquids were to be observed within a salt bag during processing the operators would have classified it a "containerized" liquid. That liquid would have been drained from the bag and processed with Swheat Scoop® separately from the salts. No such comment was recorded in the records for the processing of S855793.