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(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
2	1	Design Authority J.W. Bailey	J.W. Bailey	10/11/99	55-05
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2	1	Cog. Eng. L.A. Stauffer	L.A. Stauffer	10/11/99	
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18. L.A. Stauffer 10/11/99
Signature of EDT Originator — Date

19. N/A
Authorized Representative for Receiving Organization — Date

20. J.W. Bailey 10/11/99
Design Authority/ Cognizant Manager — Date

21. DOE APPROVAL (if required)
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Waste Retrieval Sluicing System Campaign Number 3 Solids Volume Transferred Calculation

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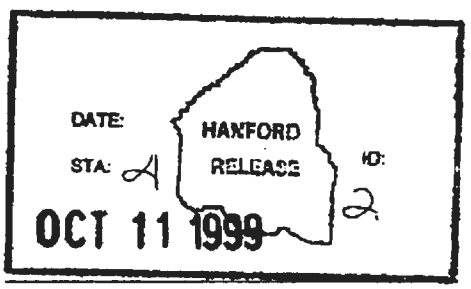

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Waste Retrieval Sluicing System Campaign Number 3 Solids Volume Transferred Calculation

The attached tables provide supporting documentation for completing Performance Agreement TWR 1.2.2, C-106 Sluicing, Performance Expectation. The calculations summarized in the tables were performed using process control procedures and strategies as documented in engineering procedure HNF-SD-WM-PROC-021, Section 23.0, Rev. 2C, subsection 4.4, "Calculation of Sludge Transferred." Four methods are described including:

1. Mass transfer based on Mass Flow Meter
2. Mass transfer based on ENRAF™ Densitometer density profiles
3. Mass transfer based on ENRAF™ Densitometer sediment levels
4. Mass transfer based on dissolved solids.

As discussed in LMHC-9956600 (D. I. Allen, LMHC, to D. C. Bryson, ORP, "Fiscal Year 1999 Performance Agreement TWR 1.2.1, C-106 Sluicing, Increased Performance," dated September 27, 1999), the second method, mass transfer based on ENRAF™ Densitometer density profiles, gives inconclusive results. Therefore the method is not used for estimating the amount of sludge removed from tank 241-C-106.

Table 1 summarizes the results of the WRSS mass transfer methods utilized in determining the amount of sludge removed from tank 241-C-106 and the preliminary estimated amount of sludge removed through sluice batch 3.2.7, which was completed on September 28, 1999. Note that the mass flow meter method values in this table have been adjusted to account for the six-percent solids recycle estimated to occur during each sluice batch. The supporting tables include the calculated results of the mass flow meter method, the sediment level method, and the dissolved solids method per the engineering procedure. Where appropriate, additional tables showing sample calculations and formulas are included.

A list of the tables making up this supporting documentation package is as follows:

Table 1.	Preliminary WRSS Mass Transfer Method Summary
Table 2.	WRSS Mass Flow Meter Solids Volume Calculations Summary
Table 2.1.	Sample Calculations for Mass Flow Meter Revised Sludge Volumes
Table 2.2.	Sample Calculation Formulas for Mass Flow Meter Revised Sludge Volumes
Table 3.	WRSS Settled Solids Volume Calculation Summary
Table 4.	WRSS Dissolved Solids Volume Summary
Table 4.1.	Calculation Formulas for WRSS Dissolved Solids Volume
Table 4.2.	Calculation Formulas for Predicted Post-Batch 241-AY-102 Supernatant Density

Table 1. Preliminary WRSS Mass Transfer Method Summary

Date	Batch	Mass Flow Meter Method (in.)	ENRAF™ Densitometer Sediment Level Method (in.)	Cumulative Dissolved Solids Method (in.)	Adjusted Mass Transfer (in.)	Cumulative Adjusted Mass Transfer[1] (in.)
11/18/98 through 4/30/99	1.1.1 to 2.1.2	32.07	23.07	11.69	33.42	33.42
5/1/99 through 7/22/99	2.2.1 to 3.1.1	21.53	16.02	9.40	17.63	51.05
8/4/99	3.1.2	0.10	0.07	10.07	0.42	51.47
8/20/99	3.1.3	1.90	1.76	10.31	1.95	53.42
9/10/99	3.2.1	2.30	3.23	11.25	3.24	56.65
9/14/99	3.2.2	2.00	Included in batch 3.2.3	11.17	N/A	N/A
9/16/99	3.2.3	4.80	5.71	10.91	6.13	62.78
9/21/99	3.2.4	2.60	TBD post batch 3.2.8	10.80	TBD post batch 3.2.8	65.38
9/24/99	3.2.5	1.60	TBD post batch 3.2.8	10.75	TBD post batch 3.2.8	66.98
9/26/99	3.2.6	1.10	TBD post batch 3.2.8	10.74	TBD post batch 3.2.8	68.08
9/28/99	3.2.7	0.30	TBD post batch 3.2.8	10.82	TBD post batch 3.2.8	68.38
9/30/99	3.2.8	TBD	TBD post batch 3.2.8	TBD	TBD post batch 3.2.8	TBD post batch 3.2.8
Total		70.30	TBD	TBD	TBD	68.38

Note:
1. Cumulative adjusted mass transfer after batch 3.2.3 based on mass flow meter method.

Table 2. WRSS Mass Flow Meter Solids Volume Calculations Summary

Date	Batch	Initial Input Density (g/mL)	Initial Sludge Transferred (gal)	Corrected Input Density (g/mL)	Corrected Sludge Transferred (gal)	Corrected Sludge Transferred (inches)
11/18/98	1.1.1	1.054	7,958	N/A	7,958	2.89
12/16/98	1.1.2 (Phase I)	1.037	2,322	N/A	2,322	0.84
3/7/99	1.1.3 (Phase II)	1.061	22,556	1.057	23,870	8.68
3/28/99	1.2.1 (Phase III)	1.095	18,889	1.078	42,870	15.59
4/23/99	2.1.1	1.111	2,350	1.095	1,869	0.68
4/28/1999 & 4/30/99	2.1.2	1.091	14,965	N/A	14,965	5.44
5/24/99	2.2.1	1.096	8,688	N/A	8,688	3.16
6/3/99	2.2.2	1.107	24,350	1.086	36,865	13.41
7/21/1999 & 7/22/99	3.1.1	1.103	17,419	N/A	17,419	6.33
8/4/99	3.1.2	1.1038	253	1.1059	137	0.05
8/20/99	3.1.3	1.1097	3,687	1.1059	5,498	2.00
9/10/99	3.2.1	1.1057	7,776	1.1078	6,755	2.46
9/14/99	3.2.2	1.1100	5,778	1.1101	5,729	2.08
9/16/99	3.2.3	1.1100	14,558	1.1110	13,899	5.05
9/21/99	3.2.4	1.1118	6,417	1.1122	7,575	2.75
9/24/99	3.2.5	1.1126	4,697	1.1125	4,751	1.73
9/26/99	3.2.6	1.1126	2,899	1.1125	3,253	1.18
9/28/99	3.2.7	1.1126	1,103	1.1132	974	0.35
9/30/99	3.2.8	TBD	TBD	TBD	TBD	TBD

Notes: N/A = Not Applicable (density not corrected)
TBD = To be determined

Table 2.1. Sample Calculations for Mass Flow Meter Revised Sludge Volumes

	WRSS DAS Dataset 9/24/99			Calculations		
	DI-0621A Slurry Density	DI-0621B Solids Loading	FI-0623 Slurry Mass Flow Rate	Solids Density (ρ_p) =	2.61	
	Slurry Density (g/cc)	Solids Loading (% solids)	Slurry Mass Flow Rate (lbs/min)	Avg. Fluid Density (ρ_f) =	1.1125	
Minimum	0	0	0.00			
Maximum	1.128	2.416	3505.00	% solids C_m	Slurry (lbs.)	Solid (lbs.)
Average	1.006	1.182	2963.89			
Standard Deviation	0.323	0.762	1082.846	1.44		
Sum	3686	4330	10856709		1809452	24554
9/24/99 13:50:30	1.11497	0.37813	3253.75	0.386	542.29	2.09
9/24/99 13:50:40	1.11544	0.4375	3242.5	0.459	540.42	2.48
9/24/99 13:50:50	1.11544	0.44688	3245.3125	0.459	540.89	2.48
9/24/99 13:51:00	1.11553	0.45625	3243.4375	0.473	540.57	2.56
9/24/99 13:51:10	1.11563	0.47188	3232.5	0.488	538.75	2.63
9/24/99 13:51:20	1.11544	0.45	3232.1875	0.459	538.70	2.47
9/24/99 13:51:30	1.11544	0.44375	3248.75	0.459	541.46	2.49
9/24/99 13:51:40	1.11544	0.43437	3245.3125	0.459	540.89	2.48
9/24/99 13:51:50	1.11544	0.4375	3245.3125	0.459	540.89	2.48
9/24/99 13:52:00	1.11534	0.42812	3237.5	0.443	539.58	2.39
9/24/99 13:52:10	1.11534	0.44375	3246.5625	0.443	541.09	2.40
9/24/99 13:52:20	1.11534	0.42188	3246.5625	0.443	541.09	2.40
9/24/99 13:52:30	1.11506	0.38438	3245.9375	0.400	540.99	2.16
9/24/99 13:52:40	1.11534	0.43437	3244.375	0.443	540.73	2.40
9/24/99 13:52:50	1.11534	0.42188	3244.0625	0.443	540.68	2.40

Table 2.2. Sample Calculation Formulas for Mass Flow Meter Revised Sludge Volumes (2 sheets)

	WRSS DAS Dataset 9/24/99		
	DI-0621A Slurry Density	**DI-0621B Solids Loading**	**FI-0623 Slurry Mass Flow Rate**
	Slurry Density (g/cc)	**Solids Loading (% solids)**	**Slurry Mass Flow Rate (lbs/min)**
Minimum	=ROUND(MIN(B$10:B$3661),3)	=ROUND(MIN(C$10:C$3661),3)	=ROUND(MIN(D$10:D$3661),3)
Maximum	=ROUND(MAX(B$10:B$3661),3)	=ROUND(MAX(C$10:C$3661),3)	=ROUND(MAX(D$10:D$3661),3)
Average	=ROUND(AVERAGE(B$10:B$3661),3)	=ROUND(AVERAGE(C$10:C$3661),3)	=ROUND(AVERAGE(D$10:D$3661),3)
Standard Deviation	=ROUND(STDEV(B$10:B$3661),3)	=ROUND(STDEV(C$10:C$3661),3)	=ROUND(STDEV(D$10:D$3661),3)
Sum	=ROUND(SUM(B$10:B$3661),1)	=ROUND(SUM(C$10:C$3661),1)	=ROUND(SUM(D$10:D$3661),1)
36427.5767361111	1.11497	0.37813	3253.75
36427.5768518519	1.11544	0.4375	3242.5
36427.5769675926	1.11544	0.44688	3245.3125
36427.5770833333	1.11553	0.45625	3243.4375
36427.5771990741	1.11563	0.47188	3232.5
36427.5773148148	1.11544	0.45	3232.1875
36427.5774305556	1.11544	0.44375	3248.75
36427.5775462963	1.11544	0.43437	3245.3125
36427.577662037	1.11544	0.4375	3245.3125
36427.5777777778	1.11534	0.42812	3237.5
36427.5778935185	1.11534	0.44375	3246.5625
36427.5780092593	1.11534	0.42188	3246.5625
36427.578125	1.11506	0.38438	3245.9375
36427.5782407407	1.11534	0.43437	3244.375
36427.5783564815	1.11534	0.42188	3244.0625

Table 2.2. Sample Calculation Formulas for Mass Flow Meter Revised Sludge Volumes (2 sheets)

Calculations		
Solids Density (ρ_p) =	2.61	
Avg. Fluid Density (ρ_f) =	1.1125	
% solids C_m	Slurry (lbs.)	Solid (lbs.)
=AVERAGE(E10:E3661)		
	=SUM(F10:F3661)	=SUM(G10:G3661)
=100*(F3*(B10-F4))/(B10*(F3-F4))	=D10*10/60	=F10*E10/100
=100*(F3*(B11-F4))/(B11*(F3-F4))	=D11*10/60	=F11*E11/100
=100*(F3*(B12-F4))/(B12*(F3-F4))	=D12*10/60	=F12*E12/100
=100*(F3*(B13-F4))/(B13*(F3-F4))	=D13*10/60	=F13*E13/100
=100*(F3*(B14-F4))/(B14*(F3-F4))	=D14*10/60	=F14*E14/100
=100*(F3*(B15-F4))/(B15*(F3-F4))	=D15*10/60	=F15*E15/100
=100*(F3*(B16-F4))/(B16*(F3-F4))	=D16*10/60	=F16*E16/100
=100*(F3*(B17-F4))/(B17*(F3-F4))	=D17*10/60	=F17*E17/100
=100*(F3*(B18-F4))/(B18*(F3-F4))	=D18*10/60	=F18*E18/100
=100*(F3*(B19-F4))/(B19*(F3-F4))	=D19*10/60	=F19*E19/100
=100*(F3*(B20-F4))/(B20*(F3-F4))	=D20*10/60	=F20*E20/100
=100*(F3*(B21-F4))/(B21*(F3-F4))	=D21*10/60	=F21*E21/100
=100*(F3*(B22-F4))/(B22*(F3-F4))	=D22*10/60	=F22*E22/100
=100*(F3*(B23-F4))/(B23*(F3-F4))	=D23*10/60	=F23*E23/100
=100*(F3*(B24-F4))/(B24*(F3-F4))	=D24*10/60	=F24*E24/100

Table 3. WRSS Settled Solids Volume Calculation Summary (2 sheets)

Date	Batch	Settled Solids Calc. Method	Initial Solids Level (in.)	Max. Solids Level (in.)	Fast Settling Solids Level (in.)	Medium Settling Solids Level (in.)	Level Change Ratio – Baseline (Current)	Base-line Compar-ison Ratio	Solids Level Increase Calculated By Method (in.)	Final Solids Level Increase (Average of viable Methods) (in.)	Comments
11/18/98	1.1.1	1	9.11	12.9	12.47	12.2	N/A	N/A	2.82	2.82	Calculation documented in HNF-4379
12/16/98	1.1.2 Phase I	1	See comments	See comments	See comments	See comments	N/A	N/A	Included above	Included above	Calculation documented in HNF-4379
3/7/99	1.1.3 Phase II	1	See comments	See comments	See comments	See comments	N/A	N/A	4.79	4.79	Calculation documented in HNF-4379
3/28/99	1.2.1 PhaseIII	1	See comments	See comments	See comments	See comments	N/A	N/A	6.61	6.61	Calculation documented in HNF-4379
4/23/99	2.1.1	N/A	25.88	N/A	N/A	N/A	N/A	N/A	See comments	See comments	Included in Batch 2.1.2 below
4/30/99	2.1.2	1	25.88	37.59	36.38	36.18	N/A	N/A	8.71	8.85	
		2	25.88	37.59	36.38	36.18	8.81	0.91	8.98	--	
			--	--	--	--	9.68	--	--	--	
		3	25.88	37.59	36.38	36.18	5.41	0.65	--	--	Not used - poor comparison ratio
			--	--	--	--	8.30	--	--	--	
5/24/99	2.2.1	1	35.12	39.26	38.69	N/A	N/A	N/A	3.08	12.20	Final value = (3.08+9.21+12.12)/2
		2	35.12	39.26	38.69	N/A	8.81	1.21	--	--	Not used - poor comparison ratio
			--	--	--	--	7.26	--	--	--	
		3	35.12	39.26	38.69	N/A	N/A	N/A	--	--	Not used - poor comparison ratio
6/3/99	2.2.2	1	38.69	51.07	49.94	48.18	N/A	N/A	9.21		
		2	38.69	51.07	49.94	48.18	8.81	0.80	--	--	Not used - poor comparison ratio
			--	--	--	--	10.96	--	--	--	
		3	38.69	51.07	49.94	48.18	5.41	1.26	--	--	Not used - poor comparison ratio
			--	--	--	--	4.28	--	--	--	
	2.2	2	35.12	51.07	49.37	N/R	8.81	0.94	12.12		Method 2 calculated against entire increment 2.2 due to improved comparison ratio.
							9.38				
7/21/99	3.1.1	1	46.66	51.8	N/A	51.25	N/A	N/A	3.82	3.82	

Table 3. WRSS Settled Solids Volume Calculation Summary (2 sheets)

Date	Batch	Settled Solids Calc. Method	Initial Solids Level (in.)	Max. Solids Level (in.)	Fast Settling Solids Level (in.)	Medium Settling Solids Level (in.)	Level Change Ratio – Baseline (Current)	Base-line Compar-ison Ratio	Solids Level Increase Calculated By Method (in.)	Final Solids Level Increase (Average of viable Methods) (in.)	Comments
& 7/22/99		2	46.66	51.8	N/A	51.25	N/A	N/A	N/A	--	Not used - lack of data
		3	46.66	51.8	N/A	51.25	5.41	0.58	--	--	Not used - poor comparison ratio
			--	--	--	--	9.35	--	--		--
8/4/99	3.1.2	1	51.25	51.34	N/A	N/A	N/A	N/A	0.07	0.07	Data to support the use of Methods 2 and 3 is not available
8/20/99	3.1.3	1	50.98	53.34	N/A	N/A	N/A	N/A	1.76	1.76	Same comment as above
9/10/99	3.2.1	1	52.7	57.04	N/A	N/A	N/A	N/A	3.23	3.23	Same comment as above
9/14/99	3.2.2	1	57.04	N/A	N/A	N/A	N/A	N/A	Included below	Included below	Same comment as above
9/16/99	3.2.3	1	57.04	64.72	N/A	N/A	N/A	N/A	5.71	5.71	Same comment as above
9/21/99	3.2.4	1	64.31	TBD	N/A	N/A	N/A	N/A	TBD	TBD	Solids level TBD post batch 3.2.8
9/24/99	3.2.5	1	TBD	TBD	N/A	N/A	N/A	N/A	TBD	TBD	Solids level TBD post batch 3.2.8
9/26/99	3.2.6	1	TBD	TBD	N/A	N/A	N/A	N/A	TBD	TBD	Solids level TBD post batch 3.2.8
9/28/99	3.2.7	1	TBD	TBD	N/A	N/A	N/A	N/A	TBD	TBD	Solids level TBD post batch 3.2.8
9/30/99	3.2.8	1	TBD	TBD	N/A	N/A	N/A	N/A	TBD	TBD	Solids level TBD post batch 3.2.8

Table 4. WRSS Dissolved Solids Volume Summary

Date	Batch	AY-102 Liquid Level (in.)	AY-102 Sediment Level[1] (in.)	AY-102 Supernatant Density[2] (g/mL)	Predicted Supernatant Density (g/mL)	Dissolved Sludge Volume (in.)
11/18/98	1.1.1	169.73	11.9	1.032	1.0356	-0.94
12/16/98	1.1.2 (Phase I)	169.83	11.28	1.056	1.0363	5.09
3/7/99	1.1.3 (Phase II)	170.55	19.16	1.063	1.0423	5.20
3/28/99	1.2.1 (Phase III)	170.7	28.45	1.091	1.0521	9.42
4/23/99	2.1.1	178.85	27.45	1.099	1.0525	11.92
4/28/99 & 4/30/99	2.1.2	185.19	36.59	1.101	1.0556	11.69
5/24/99	2.2.1	187.59	38.69	1.0968	1.0573	10.23
6/3/99	2.2.2	199.92	51.07	1.0858	1.0643	5.74
7/21/99 & 7/22/99	3.1.1	200.17	51.8	1.1056	1.0704	9.40
8/4/99	3.1.2	196.77	51.34	1.1061	1.0676	10.07
8/20/99	3.1.3	207.58	53.34	1.1057	1.0685	10.31
9/10/99	3.2.1	210.26	55.66	1.1099	1.0696	11.25
9/14/99	3.2.2	212.36	57.04	1.1102	1.0705	11.17
9/16/99	3.2.3	215.27	64.72	1.1118	1.0726	10.91
9/21/99	3.2.4	215.94	65.82	1.1126	1.0738	10.80
9/24/99	3.2.5	220.02	67.12	1.1123	1.0744	10.75
9/26/99	3.2.6	220.95	68.21	1.1127	1.0749	10.74
9/28/99	3.2.7	218.97	68.7	1.1137	1.0751	10.82
9/30/99	3.2.8	TBD	TBD	TBD	TBD	TBD

1. Sediment level maximum value for batch
2. Supernatant density from ENRAF™ densitometer profiles or combination profiles and grab samples for batches 1.1.2, 2.1.1, 2.2.1, 3.1.1, 3.1.2, and 3.2.1 through 3.2.7.

Table 4.1 Calculation Formulas for WRSS Dissolved Solids Volume (2 sheets)

Date	Batch	AY-102 Liquid Level (in.)	AY-102 Sediment Level[1] (in.)	AY-102 Supernatant Density[2] (g/mL)	Predicted Supernatant Density (g/mL)
36117	1.1.1	169.73	11.9	1.032	1.0356
36145	1.1.2 (Phase I)	169.83	11.28	1.056	1.0363
36226	1.1.3 (Phase II)	170.55	19.16	1.063	1.0423
36247	1.2.1 (Phase III)	170.7	28.45	1.091	1.0521
36273	2.1.1	178.85	27.45	1.099	1.0525
4/28/99 & 4/30/99	2.1.2	185.19	36.59	1.101	1.0556
36304	2.2.1	187.59	38.69	1.0968	1.0573
36314	2.2.2	199.92	51.07	1.0858	1.0643
7/21/99 & 7/22/99	3.1.1	200.17	51.8	1.1056	1.0704
36376	3.1.2	196.77	51.34	1.1061	1.0676
36392	3.1.3	207.58	53.34	1.1057	1.0685
36413	3.2.1	210.26	55.66	1.1099	1.0696
36417	3.2.2	212.36	57.04	1.1102	1.0705
36419	3.2.3	215.27	64.72	1.1118	1.0726
36424	3.2.4	215.94	65.82	1.1126	1.0738
36427	3.2.5	220.02	67.12	1.1123	1.0744
36429	3.2.6	220.95	68.21	1.1127	1.0749
36431	3.2.7	218.97	68.7	1.1137	1.0751
36433	3.2.8	TBD	TBD	TBD	TBD

1. Sediment level maximum value for batch
2. Supernatant density from ENRAF™ densitometer profiles or combination profiles and grab samples for batches 1.1.2, 2.1.1, 2.2.1, 3.1.1, 3.1.2, and 3.2.1 through 3.2.7.

Table 4.1 Calculation Formulas for WRSS Dissolved Solids Volume (2 sheets)

Dissolved Sludge Volume (in.)
=((C3-D3)+0.5*(1.55*47.2)/(1.1958*78.6)*(D3-9))*(E3-F3)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C4-D4)+0.5*(1.55*47.2)/(1.1958*78.6)*(D4-9))*(E4-F4)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C5-D5)+0.5*(1.55*47.2)/(1.1958*78.6)*(D5-9))*(E5-F5)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C6-D6)+0.5*(1.55*47.2)/(1.1958*78.6)*(D6-9))*(E6-F6)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C7-D7)+0.5*(1.55*47.2)/(1.1958*78.6)*(D7-9))*(E7-F7)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C8-D8)+0.5*(1.55*47.2)/(1.1958*78.6)*(D8-9))*(E8-F8)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C9-D9)+0.5*(1.55*47.2)/(1.1958*78.6)*(D9-9))*(E9-F9)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C10-D10)+0.5*(1.55*47.2)/(1.1958*78.6)*(D10-9))*(E10-F10)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C11-D11)+0.5*(1.55*47.2)/(1.1958*78.6)*(D11-9))*(E11-F11)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C12-D12)+0.5*(1.55*47.2)/(1.1958*78.6)*(D12-9))*(E12-F12)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C13-D13)+0.5*(1.55*47.2)/(1.1958*78.6)*(D13-9))*(E13-F13)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C14-D14)+0.5*(1.55*47.2)/(1.1958*78.6)*(D14-9))*(E14-F14)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C15-D15)+0.5*(1.55*47.2)/(1.1958*78.6)*(D15-9))*(E15-F15)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C16-D16)+0.5*(1.55*47.2)/(1.1958*78.6)*(D16-9))*(E16-F16)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C17-D17)+0.5*(1.55*47.2)/(1.1958*78.6)*(D17-9))*(E17-F17)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C18-D18)+0.5*(1.55*47.2)/(1.1958*78.6)*(D18-9))*(E18-F18)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C19-D19)+0.5*(1.55*47.2)/(1.1958*78.6)*(D19-9))*(E19-F19)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
=((C20-D20)+0.5*(1.55*47.2)/(1.1958*78.6)*(D20-9))*(E20-F20)*(1/453.6)*(1000/1)*(3.7856/1)*(2750/1)*(1/14200)
TBD

Table 4.2. Calculation Formulas for Predicted Post-Batch AY-102 Supernatant Density[1] (2 sheets)

241-AY-102 Pre-Sluicing Supernatant	1.02375
241-C-106 Waste Supernatant	1.17
241-C-106 Waste Interstitial Liquid	1.1958
Combined 2AY & 6C Supernatant	=((B3*157.34)+(B4*11.25))/168.59
Combined 2AY & 6C Supernatant + IL in 0.2408ft sludge	=((B6*168.59)+(B5*9.3453*0.2408))/(168.59+9.3453*0.2408)
Combined 2AY & 6C Supernatant + IL in 0.3108ft sludge	=((B6*168.59)+(B5*9.3453*0.3108))/(168.59+9.3453*0.3108)
Combined 2AY & 6C Supernatant + IL in 1.0341ft sludge	=((B6*168.59)+(B5*9.3453*1.0341))/(168.59+9.3453*1.0341)
Combined 2AY & 6C Supernatant + IL in 2.3331ft sludge	=((B6*168.59)+(B5*9.3453*2.3331))/(168.59+9.3453*2.3331)
Combined 2AY & 6C Supernatant + IL in 2.3898ft sludge	=((B6*168.59)+(B5*9.3453*2.3898))/(168.59+9.3453*2.3898)
Combined 2AY & 6C Supernatant + IL in 2.8431ft sludge	=((B6*168.59)+(B5*9.3453*2.8431))/(168.59+9.3453*2.8431)
Combined 2AY & 6C Supernatant + IL in 3.1064 ft sludge	=((B6*168.59)+($B5*9.3453*3.1064))/(168.59+9.3453*3.1064)
Combined 2AY & 6C Supernatant + IL in 4.2239 ft sludge	=((B6*168.59)+(B5*9.3453*4.2239))/(168.59+9.3453*4.2239)

1. Density Units in g/mL

Table 4.2. Calculation Formulas for Predicted Post-Batch AY-102 Supernatant Density[1] (2 sheets)

Caustic Addition	=((B6*168.59)+(B5*9.3453*4.2239)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.2239+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 4.258 ft sludge	=((B6*168.59)+(B5*9.3453*4.258)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.258+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 4.417 ft sludge	=((B6*168.59)+(B5*9.3453*4.417)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.417+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 4.608 ft sludge	=((B6*168.59)+(B5*9.3453*4.608)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.608+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 4.7514 ft sludge	=((B6*168.59)+(B5*9.3453*4.7514)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.7514+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 4.775 ft sludge	=((B6*168.59)+(B5*9.3453*4.775)+(1*1.09+1.511*1.64))/(168.59+9.3453*4.775+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 5.175 ft sludge	=((B6*168.59)+(B5*9.3453*5.175)+(1*1.09+1.511*1.64))/(168.59+9.3453*5.175+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 5.392 ft sludge	=((B6*168.59)+(B5*9.3453*5.392)+(1*1.09+1.511*1.64))/(168.59+9.3453*5.392+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 5.525 ft sludge	=((B6*168.59)+(B5*9.3453*5.525)+(1*1.09+1.511*1.64))/(168.59+9.3453*5.525+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 5.617 ft sludge	=((B6*168.59)+(B5*9.3453*5.617)+(1*1.09+1.511*1.64))/(168.59+9.3453*5.617+1.09+1.64)
Combined 2AY & 6C Supernatant + IL in 5.645 ft sludge	=((B6*168.59)+(B5*9.3453*5.645)+(1*1.09+1.511*1.64))/(168.59+9.3453*5.645+1.09+1.64)

1. Density Units in g/mL

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	Process Control	
Project Title/Work Order		Date 10/11/99
HNF-5267, Rev. 0, "Waste Retrieval Sluicing System Campaign Number 3 Solids Volume Transferred Calculation"		EDT No. 626583
		ECN No. N/A

Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
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Lockheed Martin Hanford Corp.					
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