EPI HLW-102 1148

Idaho National Engineering Laboratory

KJR-10-93

From : K. J. Rebish
Phone : 6-1234/MS-5218
Date : October 15, 1993
Subject: HLLW Tank Sump Transfer History

To : J. M. Roberts, Manager
Quality and Performance Assurance Department

B. H. O'Brien, Manager
Pilot Plant Support and Development

cc: J. W. Bryant
R. H. Davis
L. F. Ermold
T. G. Finup
G. W. Hogg
D. C. Machovec
V. C. Maio
L. G. Olson
B. T. Richards
M. C. Swenson
F. S. Ward
K. M. Wendt
K. J. Rebish-2

As requested by the INEL Oversite Manager for the State of Idaho Department of Environmental Quality, Attachment A provides all available information on the volumes of liquid removed from each High Level Liquid Waste tank sump over time. This completes WINCO's response to the two-part request detailed in References 1, 2, and 3. The first item of that request concerning tank farm composition history was issued in August, 1993.

For the years 1962-1982, most volumes were reported as liquid level in inches (References 5 and 6). When converting to gallons, the geometry of the sump and vault space must be considered. Reference 4 (attached) provides an explanation of the various sump/vault configurations and formulas from which volumes may be calculated using liquid depths. This is an accurate estimate of the volumes of liquid contained in the sump/vault spaces, but may not correctly reflect volumes transferred upon jetting. Noting level differences only, before and immediately after jetting, does not account for overflow of liquid from one sump or vault half to another, slower draining of liquid from the sand pads beneath WM-182 through -190, and level increases over time as the liquid reaches an equilibrium height. This became evident after studying the logbook records for 1962 through about 1973. After a period of time, the level readings after jetting increased significantly in many cases. Often, the final level settled back to the original level recorded before jetting, making it impossible to calculate a volume transferred from difference in level. The liquid levels, before and after, in inches, and the calculated volume estimate in gallons are included for each transfer not originally reported in gallons. The formulas in Reference 4 were used in these calculations and the values were rounded to the

nearest 10 gallons. A conservative estimate of 2 inches was added to each level value to correct to true height since the probes are about 2 inches off the bottom of each sump. For those formulas accounting for the volume in both sumps and vault halves, the quantity was divided by 2 to more closely estimate the liquid actually transferred. Greater-than (>) values indicate that the liquid was at a level higher than the level probe transmitter calibration range before jetting.

Most information for November, 1978 through February, 1983 was extracted from graphical data (Reference 6). Level decreases in the graphs of $\geq$ 100 gallons were assumed to be transfers, since only a few transfers were identified as such on the graphs.

For sump transfers from 1983 to present, volumes have been recorded in gallons (References 6, 7, and 8). Since quantities are measured at the receiving vessel, some allowance must be made for steam jet dilution (the plant average is 5% - 10%), and the volumes should be interpreted accordingly.

Tables for each HLLW tank are given in Attachment A, list transfers by date, and indicate the receiving vessel if available. The sump which was the source of the jet transfer is also identified as North, South, Cold, or Not Specified (sump identity not reported). An asterisk (*) indicates that a transfer was made but no volume information was recorded. This is the case primarily for records of WM-189 and WM-190 cold sump transfers in the early years. A double asterisk (**) identifies transfers made with both before and after level readings at or above the top of the level probe, preventing any calculation to be made from level difference.

The data given in Attachment A and the assumptions used were independently verified against the original data sources by K. M. Wendt and L. G. Olson. Other personnel who have reviewed this document have initialed beside their names.

Kelly Jean Rebish

K. J. Rebish, Engineer
Pilot Plant Support and Development

Attachments

REFERENCES

1. C. R. Enos, Chief CPP Branch, DOE-ID, to J. M. Roberts, Manager, Quality Assurance, WINCO, "Document Request from the State of Idaho (NP-MB-93196)," dated May 19, 1993.

2. V. C. Maio, notegram to J. W. Bryant, L. F. Ermold, G. W. Hogg, B. H. O'Brien, R. J. Rivard, J. M. Roberts, and T. S. Yoder, "INEL State Oversite Request for Extensive Tank Farm and HLW Information," dated June 1, 1993.

3. J. M. Roberts, JMR-78-93 to C. R. Enos, "Document Requests from the State of Idaho (NP-MB-93196)," dated May 28, 1993.

4. D. M. Kaufman, DMK-2-82 to J. H. Valentine, "Sump/Vault Volume Formulas for Tanks WM-180 through WM-190," dated May 26, 1982.

5. F. S. Ward, personal communication, July, 1993.

6. D. C. Machovec, personal communication, September, 1993.

7. D. S. Chinich, personal communication, August, 1993.

8. T. E. McKenna, personal communication, July, 1993.

TABLE I HLLW TANK WM-180 SUMP		
DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)
		SOUTH
03-01-67		70 (34.4 to 6)
03-02-67	WM-181	70 (32.1 to 5.1)

TABLE II HLLW TANK WM-181 SUMP		
DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons
		SOUTH
05-01-88	WL-133	300

TABLE III HLLW TANK WM-182 SUMPS				
DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
12-21-65				>19 (off scale to 0)
02-17-66				17 (9.8 to 0)
01-27-67	SERVICE WASTE			>19 (>10 to 0.5)
01-30-67	SW			>19 (>10 to 0.5)
01-16-68				•
05-03-72	SW			•
10-30-73	WM-182		1000	
08-07-79			2290 (23 to 14)	
09-04-80		440 (12 to 6)		
04-28-81			610 (12.6 to 8.9)	
03-22-82			840 (13.8 to 10.5)	
06-15-82			530 (12.5 to 10.2)	
05-06-83	WL-102		•	
03-30-93	WL-133		2900	
06-12-93	WL-133		1575	

TABLE IV HLLW TANK WM-183 SUMPS				
DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
10-29-73	WM-183		<20 (6 to 2)	
05-16-74				60 IN & S) (7.5 to 0)
09-20-74	WM-183		2560 (35.5 to 25)	
09-21-74	WM-183		1220 (25 to 20)	
09-22-74	WM-183	3580 (25 to 11)	•	
05-07-83	WL-102		100	

TABLE V
HLLW TANK WM-184 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
03-18-80		3180 (22.5 to 0)		
09-09-80		5860 (33.5 to 0.2)		
05-03-81			4520 (28 to 0)	
07-06-81		4760 (29 to 0)		
09-24-81		2680 (27 to 16)		
10-23-81			3050 (22 to 0)	
11-07-81		6440 (40 to 14)		
05-16-85	WL-102	300		
05-10-89	WL-133	200		

TABLE VI
HLLW TANK WM-185 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
10-22-62	WM-185	850 (13.5 to 5.8)	990 (14 to 6.7)	
11-29-62	WM-185		>1280 (>15 to 8.6)	
02-05-63	WM-185	1180 (15 to 10.5)	1000 (14.5 to 10.7) >1280 (>15 to 8.4)	
02-27-63	WM-185	>1010 (>15 to 11.3) 570 (12.5 to 8.4)	1190 (14.7 to 9.5) 510 (12.3 to 8.4)	
04-30-63	WM-185	520 (15 to 13.2)	710 (15 to 12.5) 280 (13.5 to 12.5)	
05-27-63	WM-185	520 (15 to 13.2) 90 (14.5 to 14.2)	570 (15 to 13)	
06-10-63	WM-185	430 (15 to 13.5)	580 (15.5 to 13.5)	
06-12-63	WM-185	490 (14.8 to 13.1)	290 (15.2 to 14.2)	
06-20-63	WM-185	570 (15 to 13)	520 (15.2 to 13.4)	
03-27-64	WM-185	1280 (15 to 7) *	1140 (14.5 to 6.5) *	
04-08-64	WM-185	>1280 (>15 to 8.9) *	>1280 (>15 to 9) *	
04-13-64	WM-185	1190 (14.7 to 7.9)	>1280 (>15 to 7.8) 1020 (14.1 to 7.4)	
05-15-64	WM-185	>1280 (>15 to 8)	>1280 (>15 to 6)	
06-12-64	WM-185	>1280 (>15 to 6.2)	1220 (14.8 to 8)	
06-18-64	WM-185	1250 (14.9 to 8)	850 (13.5 to 6.5)	
08-26-64	WM-185		>60 (>15 to 14.8)	
10-29-64	WM-185		1020 (14.1 to 8)	
12-28-64	WM-185		**	
03-11-65	WM-185	>1270 (>15 to 9.5)	**	

TABLE VI
HLLW TANK WM-185 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
04-01-65	WM-185	730 (13.1 to 8.4)	••	
05-13-65	WM-185	>1270 (>15 to 9.8)	>1280 (>15 to 8.7)	
05-27-65	WM-185	>1040 (>15 to 11.2)	1270 (15 to 9.3)	
06-30-65	WM-185	>170 (>15 to 14.4)	>1270 (>15 to 9.7)	
02-07-66	WM-185		••	
01-30-67	WM-185	1110 (14.4 to 7.8) 100 (10.5 to 7.8)	990 (14 to 6.5)	
01-16-68	WM-185		1050 (14.2 to 8)	
03-08-68	WM-185	>710 (>15 to 12.5)	430 (14.5 to 13)	
04-01-68	WM-185	>1270 (>15 to 9.5)	>1280 (>15 to 8.2)	
06-20-68	WM-185	••		
06-21-68	WM-185	••	>840 (>15 to 12) >820 (>15 to 12.1)	
08-01-68	WM-185	>890 (>15 to 11.8) >920 (>15 to 11.7)	990 (14 to 7.8)	
08-27-68	WM-185	>1220 (>15 to 10.3) >1080 (>15 to 11)	>1220 (>15 to 10.3) >1270 (>15 to 10)	
09-13-68	WM-185	>1180 (>15 to 10.5)		
09-19-68	WM-185	>1080 (>15 to 11)	>1280 (>15 to 8.2)	
01-10-69	WM-185	>1280 (>15 to 8)	••	
01-28-69	WM-185	>1280 (>15 to 7)		
02-18-69	WM-185	>1280 (>15 to 7.5)		
04-03-69	WM-185	>490 (>15 to 13.3)		
06-02-69	WM-185	>660 (>15 to 12.7)		
06-25-69	WM-185	>1280 (>15 to 6.5)		

TABLE VI
HLLW TANK WM-185 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
12-19-69	WM-185	1280 (15 to 8)		
02-04-70	WM-185	*		
05-22-70	WM-185		**	
06-05-70	WM-185	>1280 (>15 to 8.5)		
11-11-72	WM-185		**	
11-15-72	WL-102		870 (16 to 13)	
11-15-73	WL-102		2300	
08-13-74	WL-102			1200
07-18-75	WL-102		2000	
12-04-78			280 (11.4 to 9.8)	
05-28-79	WL-102		990	
07-26-81			170 (10.9 to 9.4)	
09-14-81		210 (11-0)		
03-07-82		440 (12-5)		
03-22-82			230 (11.2 to 10)	
05-26-82		200 (11-9)		
06-15-82		310 (11.9-10.5)		
07-31-82		710 (13-2.1)		
09-09-82		650 (12.8-7.6)		
09-24-82		200 (11-8.5)		
05-01-83	WL-102		2100	
05-06-83	WL-102		260	
04-04-84	WL-102		1487	
05-09-85	WL-102		4500	
07-06-86	WL-102		2000	
10-08-86	WL-102		100	
09-15-87	WL-133			450
07-04-88	WL-133			125

TABLE VI
HLLW TANK WM-185 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
07-04-88	WL-133			50
08-18-88	WL-133		1125	
04-22-89	WL-133		1643	
03-29-90	WL-133		850	
12-06-90	WL-102		175	
12-07-90	WL-133		350	
07-13-91	WL-133		775	
12-11-92	WL-133		800	
03-21-93	WL-133		842	
03-29-93	WL-133		1150	
05-09-93	WL-133		900	
06-16-93	WL-133		900	

TABLE VII
HLLW TANK WM-186 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
08-27-68	WM-186	850 (13.5 to 6)	1000 (14 to 5.8)	
10-31-73	WM-186			<20 (6.6 to 2.7)
04-18-79		780 (13.3 to 9.3)		
05-28-79	WL-102		490 (13.8 to 12)	
01-18-80		460 (13.5 to 11.8)	610 (14.2 to 12)	
03-23-80		340 (12.8 to 11.5)	450 (13.8 to 12.2)	
02-22-81			660 (16.2 to 13.9)	
04-23-81		430 (13.2 to 11.6)	470 (13.7 to 12)	
10-08-81			290 (14 to 13)	
12-12-81		1360 (17.5 to 12.5)		
03-22-82		560 (13.2 to 11)	760 (13.8 to 10.9)	
05-26-82		270 (13 to 12)	290 (14 to 13)	
09-29-82			710 (13 to 0.3)	
05-01-83	WL-102		500	
05-06-83	WL-102		200	
04-04-84	WL-102		750	
05-16-85	WL-102		550	
11-29-88	WL-133		112	
04-07-91	WL-133		500	
05-17-91	WL-133		50	
05-18-91	WL-133		500	
06-09-91	WL-133		700	
03-12-92	WL-133		970	
12-12-92	WL-133		675	
03-21-93	WL-133		321	
03-26-93	WL-133		1075	
05-09-93	WL-133		850	
06-06-93	WL-133		1250	
06-06-93	WL-133		200	

TABLE VIII
HLLW TANK WM-187 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
04-04-62	WM-187	910 (13.8 to 11.5)	3500 (20.4 to 11.3)	
04-11-62	WM-187	1420 (15.4 to 11.9)		
04-30-63	WM-187		1420 (15.4 to 11.9)	
05-27-63	WM-187	1070 (15.3 to 12.7)		
06-10-63	WM-187	1370 (15 to 11.6)		
06-20-63	WM-187	1440 (15 to 11.4)		
03-28-64	WM-187	>1580 (>15 to 11)	>1510 (>15 to 11.2)	
03-29-64	WM-187		100 (11.3 to 11)	
06-12-64	WM-187	>860 (>15 to 12.9)		
08-26-64	WM-187	>1060 (>15 to 12.4)		
10-29-64	WM-187		850 (14.4 to 12.3)	
12-28-64	WM-187	**		
01-14-65	WM-187		>210 (>15 to 14.5)	
03-11-65	WM-187		>900 (>15 to 12.8)	
04-01-65	WM-187		400 (13.4 to 12.4)	
05-13-65	WM-187		>1060 (>15 to 12.4)	
05-27-65	WM-187		>1060 (>15 to 12.4)	
06-30-65	WM-187		>1060 (>15 to 12.4)	
08-02-65	WM-187		>1020 (>15 to 12.5)	
08-04-66	WM-187		40 (13.8 to 13.7)	
08-05-66	WM-187	80 (14.9 to 14.7)	250 (14.2 to 13.6)	
08-15-66	WM-187	>1910 (>15 to 5.2)		
07-21-67	WM-187	>1910 (>15 to 5.2)	1370 (13.8 to 10.1)	

TABLE VIII
HLLW TANK WM-187 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
07-21-67	WM-187	970 (12.7 to 6.5)	>1640 (>15 to 10.8)	
03-28-68	WM-187	1610 (14.3 to 9.3)	1740 (14.6 to 8.9)	
06-20-68	WM-187	400 (11.2 to 4.7)	>1910 (>15 to 6.2)	
08-26-68	WM-187		>1220 (>15 to 12)	
08-27-68	WM-187	890 (12.5 to 5)		
10-25-68	WM-187		1370 (13.7 to 6.3)	
11-21-68	WM-187	**	1450 (14.7 to 11)	
01-27-69	WM-187		>1400 (>15 to 11.5)	
03-17-69	WM-187		**	
03-18-69	WM-187	>1580 (>15 to 11)		
11-11-72	WM-187	*		
09-05-73	WL-102	8840		
08-21-74	WL-102			7200
07-07-75	WL-102	10,450		
12-03-76				5480 (32 to 17)
12-09-76	WL-102			*
11-25-78		1850 (20.5 to 15.5)		
12-04-78		870 (16.8 to 14.6)		
12-05-78			840 (13.2 to 11)	
12-17-78		970 (14.4 to 12)		
05-28-79	WL-102		1310	
01-18-80		1070 (14.2 to 11.5)	1230 (14 to 10.8)	
03-13-80		410 (14 to 13)	450 (13.7 to 12.6)	
03-23-80		540 (13 to 11.6)	620 (12.5 to 10.8)	
04-12-80		540 (12.9 to 11.5)	550 (12.5 to 11)	

11/73 3000 gal to 187 from Sumps

TABLE VIII
HLLW TANK WM-187 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
04-22-80		1060 (14 to 11.3)	990 (13.5 to 10.9)	
10-15-80		390 (11.2 to 9.3)		
09-14-81		460 (12.7 to 11.5)		
11-12-81		150 (10.5 to 9.5)		
01-01-82		90 (10.3 to 9.5)		
04-01-82		270 (12.5 to 11.8)	220 (12 to 11.4)	
02-11-83		1740 (16.3 to 12)	1630 (16 to 12)	
03-21-83	WL-102		2850	
05-07-83	WL-102		850	
04-10-84	WL-102		5750	
05-07-84	WL-102		500	
08-25-86	WL-102		4700	
10-05-86	WL-102		8500	
07-19-87	WL-133		2200	
11-05-87	WL-133		550	
03-16-88	WL-133		100	
04-09-88	WL-133		350	
04-29-88	WL-133		150	
05-14-88	WL-133			175
07-24-88	WL-133	200	200	
02-23-89	WL-133		2600	
03-23-89	WL-133		955	
05-14-89	WL-133		784	
12-10-89	WL-133		450	
12-10-89	WL-102		2125	
06-22-90	WL-133		690	
06-24-90	WL-102		1700	
03-05-91	WL-133		575	
05-12-91	WL-133		575	
05-12-91	WL-133		1625	
06-23-91	WL-133		1900	

TABLE VIII
HLLW TANK WM-187 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
03-30-92	WL-133		2100	
12-12-92	WL-133		1825	
12-13-92	WL-133		100	
03-15-93	WL-133		400	
03-15-93	WL-133		200	
03-23-93	WL-133		1125	
03-28-93	WL-133		1050	
03-29-93	WL-133		1800	
05-08-93	WL-133		2400	
06-06-93	WL-133		550	
06-08-93	WL-133		2750	

TABLE IX
HLLW TANK WM-188 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
04-11-62	WM-188	770 (14.2 to 12.3)	730 (14.2 to 12.4)	
10-23-62	WM-188		120 (14.2 to 13.9)	
11-01-62	WM-188		530 (14 to 12.7)	
11-02-62	WM-188		240 (12.8 to 12.2)	
04-30-63	WM-188		980 (15 to 12.6)	
05-27-63	WM-188		900 (15 to 12.8)	
06-10-63	WM-188		820 (15 to 13)	
06-13-63	WM-188		940 (15 to 12.7)	
07-01-63	WM-188		1690 (16.7 to 12.5)	
04-13-64	WM-188		1480 (14.6 to 10.8)	
07-23-64	WM-188		820 (14.5 to 12.5)	
01-14-65	WM-188		>1290 (>15 to 11.8)	
04-09-65	WM-188		>1400 (>15 to 11.5)	
06-30-65	WM-188		>1740 (>15 to 10.5)	
08-04-66	WM-188	800 (13 to 11)	1350 (14.2 to 10.7)	
01-16-68	WM-188	1560 (14.2 to 9.7)		
03-28-68	WM-188	>1900 (>15 to 8.7)		
04-01-68	WM-188		170 (10.5 to 4.9)	
06-20-68	WM-188	>1910 (>15 to 4.2)	170 (10.5 to 4.4)	
08-23-68	WM-188	>1910 (>15 to 4.2)		
01-10-69	WM-188	>1330 (>15 to 11.7)	>1910 (>15 to 4.0)	
01-27-69	WM-188	>1400 (>15 to 11.5)		
03-17-69	WM-188	>1910 (>15 to 8.2)		

TABLE IX
HLLW TANK WM-188 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
04-09-69	WM-188	>1910 (>15 to 4.2)		
07-28-69	WM-188	•		
11-12-72	WM-188		•	
08-29-73	WL-102	•	6100	
08-15-74	WL-102			5000
07-09-75	WL-102		10000	
11-24-76	WL-102		7000	
12-05-78		4010 (22 to 11.5)		
12-06-78			3590 (19.5 to 9.4)	
05-28-79	WL-102	2175		
08-22-79		830 (16 to 14)		
01-13-80	WL-102	1780 (15.5 to 11)	1160 (13.2 to 8.6)	
03-23-80		1500 (14.5 to 10.6)	770 (12.2 to 8)	
12-24-80		360 (11.3 to 10.2)		
04-23-81		1560 (14.2 to 9.9)	730 (12.1 to 7.7)	
10-03-81		330 (11 to 7)		
01-31-82		730 (12.1 to 7)		
03-27-82		1220 (13.9 to 10.7)	300 (10.9 to 8)	
04-01-82		240 (10.7 to 0)		
05-26-82		750 (13 to 11)		
03-12-83	WL-102	2350		
05-07-83	WL-102	1150		
03-13-84	WL-102	3300		
05-06-84	WL-102	875		
04-12-85	WL-102	3100		
04-15-85	WL-102	3880		
03-29-86	WL-102			9013
03-30-86	WL-102	735		

TABLE IX
HLLW TANK WM-188 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)		
		NORTH	SOUTH	NOT SPECIFIED
10-07-86	WL-102	2750		
05-27-88	WL-133	2200		
03-13-89	WL-133	3929		
12-11-89	WL-133	2500		
06-23-90	WL-133	1800		
05-19-91	WL-133	1400		
05-19-91	WL-133	1175		
10-20-91	WL-133	1950		
06-23-92	WL-133	2050		
12-13-92	WL-133	1400		
03-23-93	WL-133	2978		
04-04-93	WL-133	1650		
04-05-93	WL-133	850		
05-19-93	WL-133	2175		
06-19-93	WL-133	2300		

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
08-31-66	SW			•	
08-31-66	WM-189	•	•		
03-30-67	WM-189	•	•	•	
07-21-67	SW			•	
09-08-67	SW			•	
11-15-67	WM-189	•	•		
03-07-68	SW			•	
03-07-68	WM-189	•	•		
03-28-68	SW			•	
03-28-68	WM-189		•		
06-20-68	SW			•	
06-20-68		•	•		
08-01-68	SW			•	
08-01-68	WM-189		•		
08-26-68			•		
10-22-68		•	•		
10-25-68				•	
01-10-69	SW			•	
01-27-69	SW			•	
02-19-69				•	
03-17-69				•	
04-03-69				•	
05-23-69	SW			•	
02-04-70	SW			•	
06-05-70	SW			•	
02-05-71	SW			•	
04-16-71	SW			•	
04-23-71	SW			•	
06-25-71	SW			•	
10-14-71	SW			•	
02-10-72	SW			•	
02-11-72		<20 (3.25 to 2.75)	<20 (4.75 to 0.5)		
02-24-72	SW			•	
08-25-72	SW			•	
08-03-73	SW			•	

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
08-31-73	WM-189	<20 (13.8 to 10.8)			
01-19-74	SW			150 (16 to 0)	
01-21-74	SW			•	
03-06-74	SW			•	
03-25-74				•	
03-26-74	SW			•	
05-15-74				•	
07-29-74	SW			•	
04-18-75	SW			•	
06-15-75				•	
03-23-76	SW			390 (41.5 to 0)	
08-15-76				350 (38.4 to 1.3)	
05-15-78	WL-102			700	
11-09-78	WL-102			1120 (109 to 6)	
05-03-79				980 (105 to 0.5)	
06-13-79		860 (43 to 36)	860 (42 to 35)		
07-18-79		960 (43 to 35)	820 (41 to 33)	90 (69 to 59)	
10-05-79	WL-102			780 (95.5 to 12)	
03-13-80		4320 (47.5 to 11)		860 (102 to 10)	
03-15-80			1230 (45 to 18)		
07-01-80				600 (87 to 23)	
11-24-80				410 (73 to 29)	
03-04-81				380 (91 to 50)	
04-13-81				790 (89 to 4)	
04-28-81				700 (109 to 51)	
05-13-81		5050 (49.5 to 6)		790 (96 to 12)	

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
06-01-81			3380 (47.5 to 42)		
07-21-81				800 (93 to 7)	
07-26-81			1830 (52.5 to 47.5)		
01-11-82		4860 (49 to 21)			
01-31-82				820 (90.5 to 3)	
03-12-82				660 (96 to 25)	
03-27-82				560 (60 to 0)	
04-01-82		4690 (48.5 to 0)	1290 (45.5 to 0)		
05-11-82				1010 (109 to 18)	
07-11-82			1460 (52 to 48)		
08-05-82					
11-18-82				860 (103 to 13)	
12-18-82			550 (44 to 39)		
01-17-83				520 (107.5 to 53)	
03-03-83	WL-102			1200	
03-11-83	WL-102			1100	
03-22-83	WL-102			1050	
04-10-83	WL-102			1142	
06-22-83	WL-102			850	
04-03-84	WL-102		3576		
04-05-84	WL-102			2460	
09-05-86	WL-102		1250	1050	
09-06-86	WL-102			3200	
09-14-86	WL-102			6600	
09-17-86	WL-102			6350	
09-18-86	WL-102			4050	
09-19-86	WL-102			5700	
09-20-86	WL-102			4800	

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
10-04-86	WL-102		1400		
10-07-86	WL-102			900	
10-15-86	WL-102		400		
11-22-86	WL-102			600	
11-25-86	WL-102		400		
12-26-86	WL-102			350	
02-08-87	WL-133		600		
03-06-87	WL-133		155		
03-07-87	WL-133			200	
04-28-87	WL-133		150		
05-13-87	WL-102		557		
05-23-87	WL-133		450		
06-02-87	WL-133		300		
06-04-87	WL-133			100	
06-17-87	WL-133			300	
07-05-87	WL-133			300	
07-07-87	WL-133		300		
07-14-87	WL-133			400	
07-25-87	WL-133			325	
07-28-87	WL-133		300	350	
08-05-87	WL-133			200	
08-17-87	WL-133				200
08-30-87	WL-133		200	300	
09-15-87	WL-133			325	
09-21-87	WL-133		172		
10-04-87	WL-133		100	375	50
10-18-87	WL-133			375	
11-03-87	WL-133			400	
12-01-87	WL-133			500	
12-31-87	WL-133			600	
02-01-88	WL-133				450
02-17-88	WL-133			650	
03-01-88	WL-133			350	
03-12-88	WL-133			400	
04-24-88	WL-133			500	

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
05-04-88	WL-133			350	
05-22-88	WL-133	350			
05-23-88	WL-133			550	
06-18-88	WL-133	100			
06-18-88	WL-133	600			
06-23-88	WL-133			700	
07-10-88	WL-133			275	
07-16-88	WL-133	100			
07-24-88	WL-133			400	
07-24-88	WL-133			425	
08-22-88	WL-133			400	
08-23-88	WL-133		375		
09-06-88	WL-133			325	
09-15-88	WL-133			200	
09-29-88	WL-133			350	
10-08-88	WL-133			450	
10-24-88	WL-133			325	
10-31-88	WL-133		425		
11-05-88	WL-133			260	
11-23-88	WL-133		220		
11-25-88	WL-133			413	
12-02-88	WL-133			500	
01-16-89	WL-133			327	
01-22-89	WL-102			566	
02-21-89	WL-133		691	791	
03-02-89	WL-133		167		
03-05-89	WL-133			710	
03-12-89	WL-133			841	
03-16-89	WL-133	189		515	
03-23-89	WL-133		199	557	
03-27-89	WL-133		214		
04-02-89	WL-133		226		
04-06-89	WL-133		240		
04-10-89	WL-133			712	
04-13-89	WL-133		345		

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
05-04-89	WL-133			242	
05-09-89	WL-133		356		
05-14-89	WL-133		149		
05-31-89	WL-133			400	
06-13-89	WL-133			600	
06-30-89	WL-133			455	
07-11-89	WL-133			356	
08-09-89	WL-133		914	908	
12-09-89	WL-133			1600	
12-09-89	WL-133			850	
12-10-89	WL-133		100		
01-10-90	WL-133			1100	
01-20-90	WL-133			725	
02-12-90	WL-133			1000	
02-19-90	WL-133		300		
03-26-90	WL-133		450		
06-02-90	WL-102	350			
06-13-90	WL-133		200		
07-06-90	WL-102		300		
11-24-90	WL-102		300		
11-25-90	WL-102		50		
02-19-91	WL-133		460		
03-12-91	WL-133		540		
04-01-91	WL-133		550		
05-06-91	WL-133	200			
05-11-91	WL-133		550		
05-16-91	WL-133		550		
05-20-91	WL-133		300		
05-25-91	WL-133		260		
06-01-91	WL-133		200		
06-06-91	WL-133			1750	
06-06-91	WL-133			1700	
06-06-91	WL-133			1175	
06-07-91	WL-133		450	675	
06-20-91	WL-133		175		

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
07-09-91	WL-133		250		
07-18-91	WL-133		375		
08-07-91	WL-133		275		
09-21-91	WL-133		280		
10-21-91	WL-133		125		
11-07-91	WL-133	400			
12-06-91	WL-133		800		
12-18-91	WL-133		250		
12-24-91	WL-133		150		
12-30-91	WL-133		200		
01-08-92	WL-133		150		
01-25-92	WL-133		200		
03-05-92	WL-133		525		
03-19-92	WL-133		275		
04-07-92	WL-133		325		
04-20-92	WL-133	250			
05-01-92	WL-133		282		
06-16-92	WL-133		150		
06-20-92	WL-133		350		
06-24-92	WL-133	150			
06-29-92	WL-133		150		
07-11-92	WL-133			1350	
07-13-92	WL-133		200		
09-05-92	WL-133		200	575	
09-13-92	WL-133			500	
10-15-92	WL-133			700	
12-13-92	WL-133		150		
03-01-93	WL-133			700	
03-08-93	WL-133		300		
03-14-93	WL-133		200		
03-15-93	WL-133			500	
03-16-93	WL-133		250		
03-17-93	WL-133			695	
03-18-93	WL-133		350		
03-19-93	WL-133		475		

TABLE X
HLLW TANK WM-189 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
03-20-93	WL-133		250		
03-22-93	WL-133		389	587	
03-25-93	WL-133		350	950	
03-28-93	WL-133		408		
03-30-93	WL-133		250		
04-03-93	WL-133		205		
04-08-93	WL-133			850	
04-09-93	WL-133		225		
04-16-93	WL-133		350		
04-26-93	WL-133		175		
05-06-93	WL-133				150
05-07-93	WL-133		200		
05-08-93	WL-133			1125	
05-09-93	WL-133		250	650	
05-14-93	WL-133		350		
05-18-93	WL-133			2050	
05-24-93	WL-133		200		
06-06-93	WL-133		350		
06-07-93	WL-133		400	1025	
06-09-93	WL-133		204		
06-12-93	WL-133		200		
06-18-93	WL-133		240		
06-19-93	WL-133			1125	

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
08-31-66	SW			•	
08-31-66	WM-190	•	•		
03-30-67	WM-190			•	
07-21-67	SW			•	
09-08-67	SW			•	
09-08-67	WM-190				• [N or S]
11-15-67	WM-190	•	•		
01-16-68	SW			•	
03-07-68	SW			•	
03-07-68	WM-190	•	•		
03-28-68	WM-190		•		
03-28-68	SW			•	
06-10-68	SW			•	
06-19-68	SW			•	
06-20-68	SW			•	
06-20-68		•	•		
07-18-68	SW			•	
08-01-68	SW			•	
08-01-68	WM-190	•	•		
08-23-68	SW			•	
08-26-68		•	•		
09-06-68	SW			•	
09-13-68	SW			•	
10-22-68	SW			•	
01-10-69	SW			•	
01-27-69	SW			•	
02-19-69				•	
04-03-69				•	
05-23-69	SW			•	
02-04-70	SW			•	
06-05-70	SW			•	
02-05-71	SW			•	
04-16-71	SW			•	
04-23-71	SW			•	
06-25-71	SW			•	

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
10-14-71	SW			•	
02-04-72	SW			•	
02-11-72		<20 (5.75 to 4.5)			
02-19-72	WM-190	•	•		
02-19-72	SW			•	
02-21-72	SW			•	
08-25-72	SW			•	
04-27-73	SW			•	
07-11-73	SW			20 (7.4 to 5.1)	
08-02-73	SW			•	
10-05-73	SW			•	
11-14-73		•	•		
12-28-73	SW			•	
01-30-74	SW			240 (26.9 to 1.3)	
03-22-74	WM-189 COLD SUMP			•	
05-07-74	SW			•	
12-05-74	SW			•	
04-18-75	SW			•	
06-15-75				•	
12-31-75	SW			•	
03-23-76	SW			390 (42 to 0)	
08-15-76				500 (55 to 1.3)	
05-16-78	WL-102			500	
06-19-78	WL-102			5500	
11-08-78	WL-102			1240	
04-18-79				1000 (107 to 0)	
05-04-79			220 (36.5 to 31.5)		
07-18-79				160 (96 to 78.5)	
08-12-79				960 (102.5 to 0)	

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
10-15-79			160 (26.5 to 34)		
12-14-79			860 (43 to 36)		
02-17-80			4820 (49 to 34.5)		
03-13-80				650 (90 to 20.5)	
05-07-80			490 (39.5 to 35)		
07-01-80		1140 (44 to 3)		590 (73 to 9.5)	
07-06-80			80 (35 to 3.5)		
11-24-80				420 (89 to 44)	
02-20-81			80 (35 to 2.5)		
02-27-81				830 (94 to 5)	
04-23-81				630 (71 to 4)	
06-21-81				740 (91 to 12)	
09-09-81				840 (94 to 4)	
02-15-82				860 (94.5 to 3)	
04-01-82				770 (83 to 1)	
05-16-82				650 (91 to 21)	
07-16-82				780 (91 to 8)	
11-18-82				870 (97 to 4)	
01-22-83				360 (73.5 to 35.5)	
02-11-83				810 (96 to 9)	
03-05-83	WL-102			1130	
03-20-83	WL-102			800	
03-21-83	WL-102			800	
05-07-83	WL-102			1000	

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
07-30-83	WL-102			900	
03-09-84	WL-102			1700	
04-03-84	WL-102	800			
04-05-84	WL-102			3470	
05-07-84	WL-102			1650	
09-16-84	WL-102			3170	
04-05-85	WL-102			2500	
04-17-85	WL-102			1400	
07-09-85	WL-102			1850	
09-12-85	WL-102			1000	
02-07-86	WL-102				2050
03-28-86	WL-102				4410
05-25-86	WL-102			1250	
08-25-86	WL-102	4200			
09-11-86	WL-102			1950	
10-08-86	WL-102	250			
10-21-86	WL-102			250	
11-25-86	WL-102	50			
02-08-87	WL-133				600
04-30-87	WL-133			600	
05-01-87	WL-133	150			
06-05-87	WL-133			450	
07-06-87	WL-133	260			
07-14-87	WL-133			400	
09-16-87	WL-133	400		300	
12-28-87	WL-133			550	
05-15-88	WL-133			400	
05-23-88	WL-133				225
06-29-88	WL-133			300	
07-15-88	WL-133	300			
08-15-88	WL-133			750	
02-22-89	WL-133	299			
03-07-89	WL-133			177	
03-12-89	WL-133			729	
03-16-89	WL-133	376			

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
03-22-89	WL-133			650	
04-23-89	WL-133			591	
05-14-89	WL-133	231			
05-20-89	WL-133			479	
06-25-89	WL-133			375	
08-09-89	WL-133			745	
12-09-89	WL-133			525	
03-23-90	WL-133	425		750	
06-01-90	WL-133			600	
06-11-90	WL-133			450	
07-06-90	WL-102	300		350	
08-16-90	WL-133			250	
11-24-90	WL-102			400	
02-04-91	WL-133			655	
03-23-91	WL-133			575	
04-06-91	WL-133	221			
04-22-91	WL-133	275			
05-11-91	WL-133	250			
05-14-91	WL-133			750	
06-21-91	WL-133	300			
07-09-91	WL-133			400	
08-14-91	WL-133			400	
10-01-91	WL-133	300			
10-18-91	WL-133			250	
11-12-91	WL-133		200		
12-06-91	WL-133			620	
03-12-92	WL-133			350	
06-29-92	WL-133	210			
07-09-92	WL-133			300	
09-05-92	WL-133			50	
09-08-92	WL-133			50	
12-13-92	WL-133	150			
03-22-93	WL-133			1075	
03-26-93	WL-133			725	
03-28-93	WL-133			775	

TABLE XI
HLLW TANK WM-190 SUMPS

DATE OF TRANSFER	TO TANK	VOLUME REMOVED, gallons (values in parentheses are inches liquid level)			
		NORTH	SOUTH	COLD	NOT SPECIFIED
04-02-93	WL-133	150		500	
04-04-93	WL-133			86	
04-20-93	WL-133			450	
05-08-93	WL-133			600	
05-10-93	WL-133			1450	
05-15-93	WL-133	250			
06-07-93	WL-133			1425	
06-16-93	WL-133	200			
06-19-93	WL-133			850	