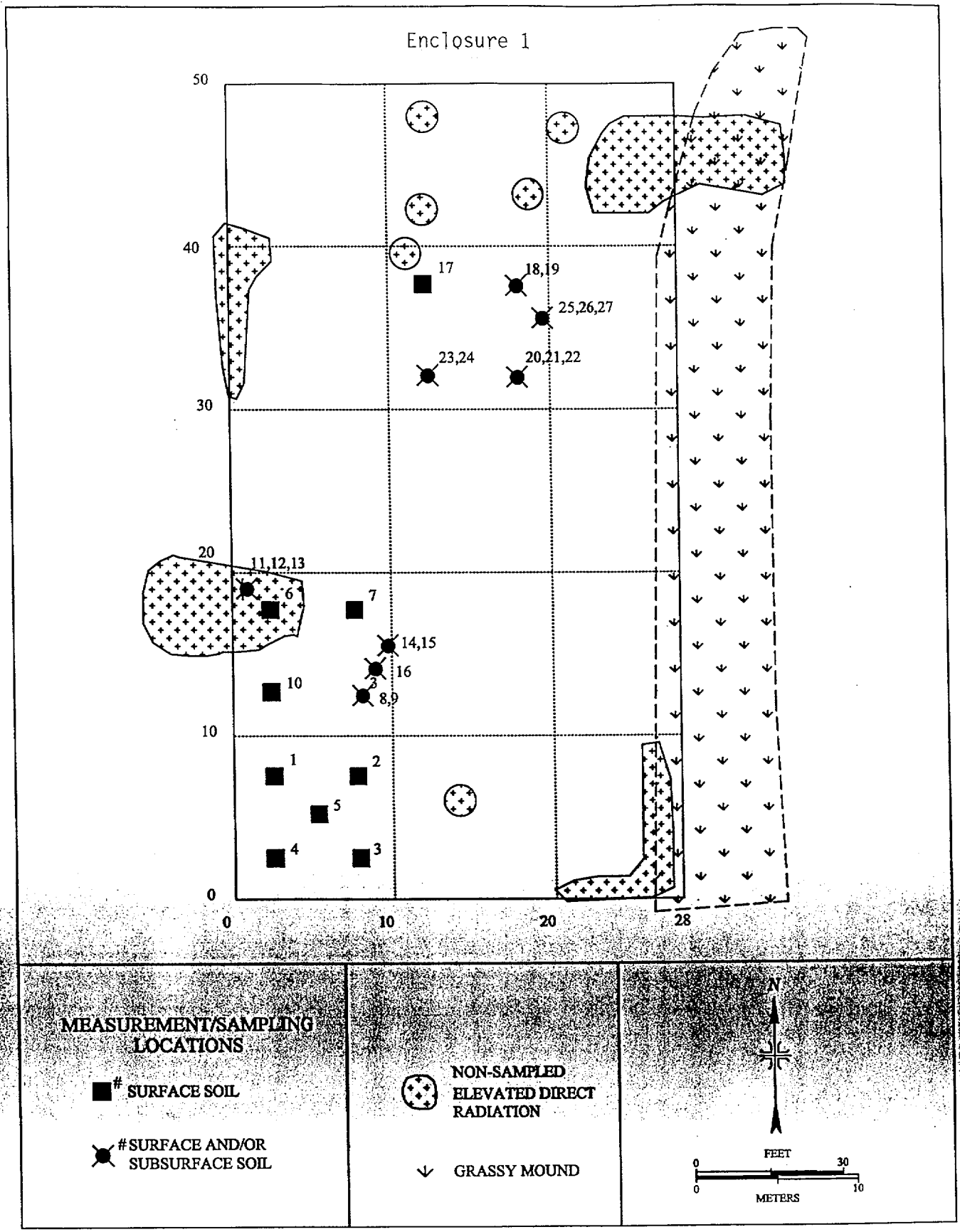

FIGURE 24: Former Monazite Pile - Measurement and Sampling Locations

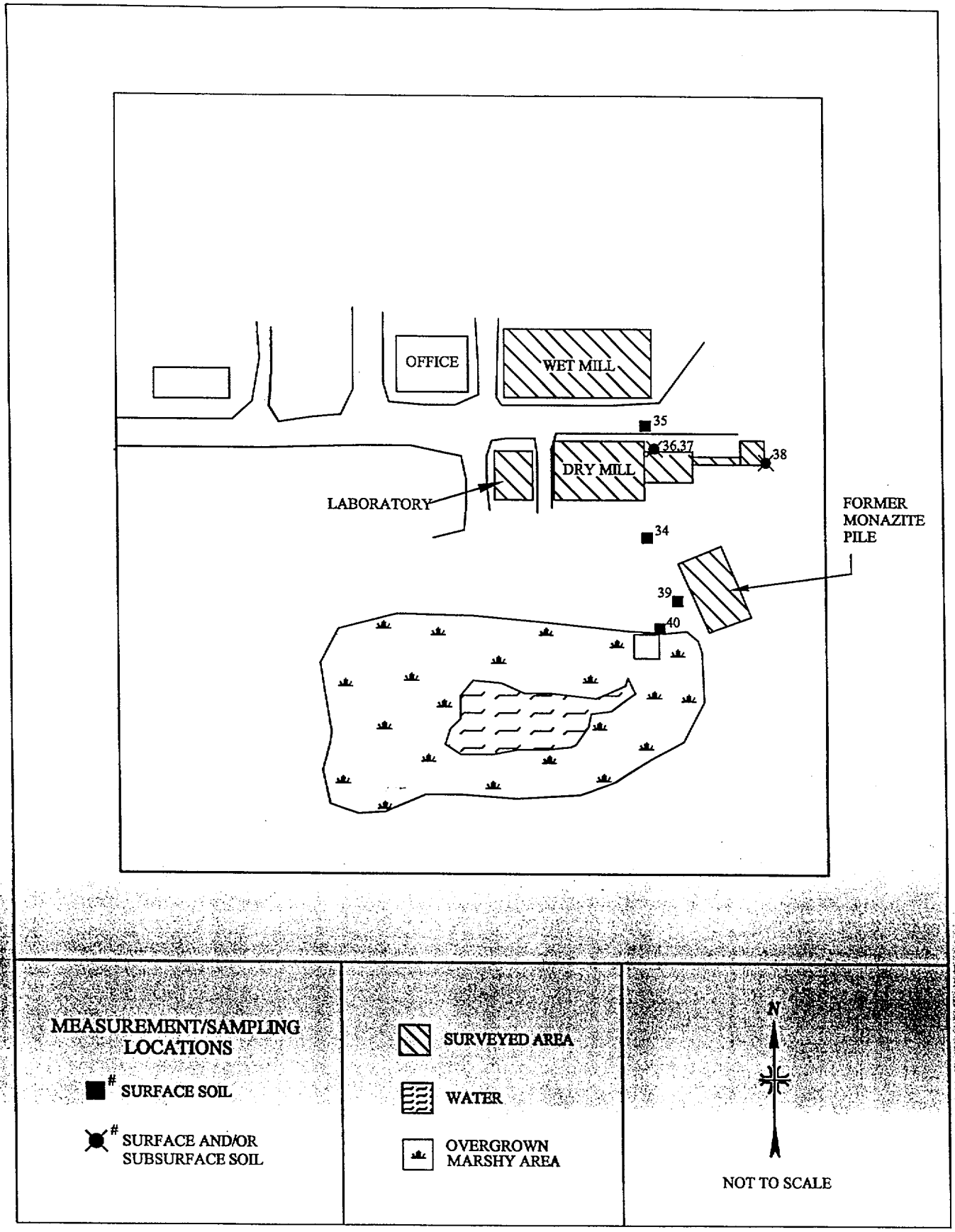

FIGURE 25: Heritage Minerals Site - Exterior Measurement and Sampling Locations

Enclosure 2

TABLE 4

RADIONUCLIDE CONCENTRATIONS IN SOIL
FORMER MONZITE PILE AND ADJACENT AREAS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Sample Number[a]	Depth (cm)	Exposure Rate @ 1m (µR/h)	Radionuclide Concentration (pCi/g)					
			U-238	U-235	Total Uranium[b]	Th-228	Th-232	Total Thorium[c]
Monazite Pile								
1	0-15	17	4.0 ± 1.0[d]	0.1 ± 0.2	8.1	9.4 ± 0.5	9.1 ± 0.8	19
2	0-15	20	2.4 ± 1.0	0.1 ± 0.2	4.9	5.9 ± 0.3	5.8 ± 0.5	12
3	0-15	17	3.6 ± 1.0	0.1 ± 0.2	7.3	9.3 ± 0.5	9.1 ± 0.8	18
4	0-15	20	4.0 ± 1.1	0.1 ± 0.1	8.1	6.6 ± 0.4	6.4 ± 0.6	13
5	0-15	22	2.9 ± 0.9	-0.1 ± 0.1	5.7	6.0 ± 0.3	5.8 ± 0.5	12
Grid Block, 0N, 0E Surface (0-15 cm) Average					*6.8*			*15*
6	0-15	30	10.6 ± 3.5	0.1 ± 0.4	21	21.0 ± 1.2	20.2 ± 1.8	41
7	0-15	15	1.1 ± 0.8	0.1 ± 0.1	2.3	2.8 ± 0.2	2.8 ± 0.3	5.6
8	0-15	25	12.2 ± 3.6	0.7 ± 0.7	25	40.0 ± 2.2	38.7 ± 3.3	79
9	15-30	NA	36.7 ± 5.6	1.1 ± 1.3	75	205 ± 11	211 ± 17	420
10	0-15	20	2.1 ± 0.8	0.1 ± 0.1	4.3	3.9 ± 0.2	3.8 ± 0.4	7.7
11	0-15	NA	50 ± 11	2.0 ± 2.5	100	330 ± 18	330 ± 27	660
12	15-30	NA	45 ± 30	7.9 ± 7.7	97	720 ± 39	820 ± 67	1540
13	30-45	NA	61 ± 23	1.5 ± 4.1	120	430 ± 23	460 ± 37	890

TABLE 4 (continued)

RADIONUCLIDE CONCENTRATIONS IN SOIL
FORMER MONZITE PILE AND ADJACENT AREAS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Sample Number[a]	Depth (cm)	Exposure Rate @ 1m (µR/h)	Radionuclide Concentration (pCi/g)					
			U-238	U-235	Total Uranium[b]	Th-228	Th-232	Total Thorium[c]
14	0-15	20	17.0 ± 4.6	0.0 ± 0.7[e]	34	64.0 ± 3.5	61.4 ± 5.0	130
15	15-30	NA	8.2 ± 3.2	-0.1 ± 0.5	16	23.9 ± 1.3	23.3 ± 2.0	47
16	15-30	30	51 ± 20	1.7 ± 4.7	100	380 ± 20	400 ± 33	770
Grid Block 10N, 0E Surface (0-15 cm) Average					*31*			*150*
17	0-15	15	7.5 ± 1.5	0.4 ± 0.3	15	13.6 ± 0.8	13.0 ± 1.1	27
18	0-15	18	19.0 ± 3.8	1.7 ± 1.1	40	29.9 ± 1.7	32.0 ± 2.9	62
19	15-30	NA	19.9 ± 4.7	2.2 ± 1.2	42	32.9 ± 1.9	35.3 ± 3.3	68
20	0-15	30	11.1 ± 3.2	0.6 ± 0.6	23	32.9 ± 1.8	32.7 ± 2.8	66
21	15-30	NA	15.3 ± 3.7	1.3 ± 0.7	32	46.9 ± 2.5	48.5 ± 4.0	95
22	30-45	NA	17.9 ± 4.4	1.2 ± 0.9	37	60.2 ± 3.2	61.1 ± 5.1	120
23	0-15	15	9.1 ± 1.8	0.4 ± 0.3	19	22.3 ± 1.2	21.8 ± 1.8	44
24	15-30	NA	7.4 ± 1.5	0.5 ± 0.2	15	16.3 ± 0.9	16.5 ± 1.4	33
25	0-15	20	22.8 ± 4.6	1.7 ± 1.5	47	89.1 ± 4.8	89.7 ± 7.4	180
26	15-30	NA	23.6 ± 5.1	1.7 ± 1.2	49	93.7 ± 5.1	94.8 ± 7.8	190
27	30-45	NA	8.1 ± 1.8	0.4 ± 0.3	17	15.2 ± 0.8	14.8 ± 1.3	30
Grid Block 30N, 10E Surface (0-15 cm) Average					*29*			*75*

TABLE 4 (continued)

RADIONUCLIDE CONCENTRATIONS IN SOIL
FORMER MONZITE PILE AND ADJACENT AREAS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Sample Number[a]	Depth (cm)	Exposure Rate @ 1m (µR/h)	Radionuclide Concentration (pCi/g)					
			U-238	U-235	Total Uranium[b]	Th-228	Th-232	Total Thorium[c]
Areas Outside the Monazite Pile Area								
34	0-15	NA	23.4 ± 5.5	2.0 ± 1.3	49	30.6 ± 1.8	30.3 ± 3.0	61
35	0-15	NA	19.4 ± 5.4	0.7 ± 0.9	40	44.9 ± 2.5	46.2 ± 4.0	91
36	0-15	NA	9.5 ± 1.7	0.6 ± 0.3	20	15.6 ± 0.9	15.9 ± 1.3	32
37	15-30	NA	9.3 ± 1.9	0.8 ± 0.4	19	18.4 ± 1.0	18.1 ± 1.6	37
38	15-30	NA	6.8 ± 1.1	0.4 ± 0.2	14	10.7 ± 0.6	10.6 ± 0.9	21
39	0-15	NA	24.2 ± 6.2	0.9 ± 1.3	49	95.3 ± 5.2	97.1 ± 8.0	190
40	0-15	24	22.3 ± 5.3	2.4 ± 1.5	47	64.1 ± 3.6	70.2 ± 6.0	130
Backgrounds								
28	0-15	3	0.2 ± 0.2	0.1 ± 0.0	0.5	0.3 ± 0.0	0.3 ± 0.1	0.6
29	0-15	3	0.3 ± 0.2	0.0 ± 0.0	0.6	0.1 ± 0.0	0.2 ± 0.1	0.3
30	0-15	5	0.5 ± 0.3	0.0 ± 0.0	1.0	0.3 ± 0.0	0.3 ± 0.1	0.6
31	0-15	4	0.3 ± 0.4	0.0 ± 0.1	0.6	0.3 ± 0.0	0.3 ± 0.1	0.6
32	0-15	7	0.4 ± 0.4	0.0 ± 0.1	0.8	0.3 ± 0.0	0.3 ± 0.1	0.6
33	0-15	4	1.1 ± 0.4	0.1 ± 0.1	2.3	0.5 ± 0.0	0.5 ± 0.1	1.0

[a]Refer to Figures 23 through 25.
[b]Total uranium concentrations are calculated by multiplying the U-238 result by two and adding the U-235 concentrations.
[c]Total thorium was calculated by adding the Th-228 and Th-232 concentrations.
[d]Uncertainties represent the 95% confidence levels based on total propogated uncertainties.

Enclosure 3

TABLE 3

RADIONUCLIDE CONCENTRATIONS IN RESIDUE SAMPLES
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Radionuclide Concentration (pCi/g)					
	U-238	U-235	Total Uranium[b]	Th-228	Th-232	Total Thorium[c]
Dry Mill, SU39	59 ± 11[d]	5.0 ± 2.4	120	310 ± 17	325 ± 26	640
Dry Mill, SU42	670 ± 140	31 ± 37	1400	1520 ± 130	1580 ± 150	3100
Wet Mill, SU3	410 ± 370	49 ± 130	870	690 ± 100	610 ± 260	1300

[a]Refer to Figures 7, 18, and 20.
[b]Total uranium concentrations are calculated by multiplying the U-238 result by two and adding the U-235 concentrations.
[c]Total thorium was calculated by adding the Th-228 and Th-232 concentrations.
[d] Uncertainties represent the 95% confidence levels based on total propagated uncertainties.

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm²)		Removable Activity (dpm/100 cm²)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Laboratory Building (continued)				
Room 5, Floor	NA	460	1	2
Room 5, Sill	120	300	5	-2
Room 5, Floor	NA	-130	0	-3
Room 5, Sill	NA	-100	3	2
Room 6, Wall	NA	-110	1	-2
Room 6, Floor	NA	-110	0	-3
Room 6, Floor	NA	-240	0	-2
Room 7, Floor	120	150	0	3
Room 7, Wall	310	1,100	1	1
Room 7, Floor	NA	-83	1	-3
Room 9, Sink	NA	200	1	-2
Room 9, Floor	NA	130	0	-1
Wet Mill				
SU1-92A	NA	4,400	0	-5
SU1-93A	NA	810	0	1
SU1-94A	NA	3,300	1	-2
SU1-95A	NA	5,400	1	-1
SU1-29	NA	2,100	0	-3
SU2-30	NA	1,900	1	-1
SU2-31	NA	1,600	5	-4

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm²)		Removable Activity (dpm/100 cm²)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Wet Mill (continued)				
SU2-32	NA	1,200	3	-1
SU2-33	NA	1,000	1	2
SU2-34	230	3,100	0	-3
SU3-71A	NA	6,300	1	-1
SU3-72A	NA	3,700	0	3
SU3-73A	NA	2,300	3	3
SU3-74A	NA	5,100	0	-2
SU3-75A	NA	2,900	0	-2
SU7-76A	NA	3,800	0	5
SU7-77A	NA	5,800	3	2
SU7-78A	NA	3,600	0	-3
SU7-79A	320	6,100	0	20
SU7-80A	NA	2,900	1	-3
SU7-81A	NA	5,400	0	9
SU9-82A	NA	5,000	3	2
SU9-83A	1,200	7,200	0	1
SU9-84A	NA	8,600	5	-2
SU9-85A	NA	5,500	9	14
SU9-86A	NA	5,200	0	-1
SU12-61A	NA	17,000	0	5

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm^2)		Removable Activity (dpm/100 cm^2)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Wet Mill (continued)				
SU12-62A	1,500	27,000	1	-1
SU12-63A	NA	8,900	3	5
SU12-64A	NA	5,600	1	4
SU12-65A	NA	4,000	3	-3
SU15-66A	NA	5,900	3	2
SU15-67A	700	9,500	0	1
SU15-68A	NA	7,600	0	-4
SU15-70A	NA	3,900	0	-1
SU27-57A	NA	19,000	1	10
SU27-58A	NA	11,000	0	-2
SU27-59A	240	19,000	0	-3
SU27-60A	NA	20,000	0	5
SU30-87A	NA	12,000	0	-2
SU30-88A	NA	3,300	0	-2
SU30-89A	NA	3,400	0	2
SU30-90A	NA	4,300	0	-3
SU30-91A	NA	2,200	3	5
SU31-52A	2,300	35,000	7	10
SU31-53A	NA	32,000	7	5

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm²)		Removable Activity (dpm/100 cm²)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Wet Mill (continued)				
SU31-54A	NA	8,800	3	4
SU31-55A	NA	8,900	1	-3
SU31-56A	390	11,000	0	-2
Dry Mill				
SU35-14	NA	7,200	NA	NA
SU35-15	NA	3,500	0	3
SU35-16	NA	3,300	9	1
SU35-17	2,400	14,000	0	-1
SU37-18	NA	8,600	3	-1
SU37-19	NA	17,000	16	4
SU37-20	NA	8,100	13	-1
SU37-21	NA	3,500	11	11
SU37-22	NA	2,500	9	2
SU37-23	660	6,500	3	-1
SU38-10	NA	1,100	1	2
SU38-11	NA	250	3	12
SU38-12	NA	4,000	1	5
SU38-13	NA	1,800	0	6
SU39-1	NA	28,000	3	-2
SU39-2	200	28,000	9	2

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm^2)		Removable Activity (dpm/100 cm^2)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Dry Mill (continued)				
SU39-3	2,600	89,000	5	21
SU39-4	NA	9,000	0	4
SU39-5	NA	9,500	NA	NA
SU39-6	NA	3,000	0	1
SU39-7	NA	8,300	33	25
SU39-8	NA	250	0	-2
SU39-9	NA	580	0	-2
SU40-24	1,100	2,700	5	4
SU40-25	NA	21,000	0	3
SU40-26	1,100	23,000	1	4
SU40-27	NA	2,100	1	-3
SU40-28	NA	12,000	0	-2
SU42-39A	960	15,000	160	730
SU42-40A	NA	5,700	0	1
SU42-41A	NA	4,500	5	8
Floor - 33A	NA	1,600	0	-3
Floor - 34A	1,000	4,800	5	4
Desk - 35A	NA	3,400	0	-2
Floor - 36A	NA	73	1	-2

TABLE 1 (continued)

SUMMARY OF SURFACE ACTIVITY LEVELS
HERITAGE MINERALS INCORPORATED FACILITY
LAKEHURST, NEW JERSEY

Location[a]	Total Activity (dpm/100 cm²)		Removable Activity (dpm/100 cm²)	
	Alpha	Alpha plus Beta[b]	Alpha	Beta
Dry Mill (continued)				
Floor - 37A	NA	6,200	1	-3
Column - 38A	370	6,600	13	20
I-Beam - 42A	2,400	16,000	3	-1
I-Beam - 43A	670	12,000	3	5
I-Beam - 44A	NA	5,800	5	6
I-Beam - 45A	NA	4,600	5	36
Wall - 46A	NA	4,500	0	-3
Wall - 47A	560	6,100	0	2
Wall - 48A	NA	4,800	1	2
Floor - 49A	NA	6,100	1	5
Floor - 50A	NA	2,300	1	4
Floor - 51A	NA	2,100	0	4

[a]Refer to Figures 4 through 21.
[b]ESSAP's data indicate that the alpha contribution to the alpha plus beta surface activity measurement count rate was consistently less than ten percent.

Enclosure 5

The following table presents the communications chronology between NRC and HMI staff and representatives after DP approval. **Bold** items denote NRC communications with HMI related to timeliness for completing decommissioning activities by October 19, 2001.

DATE	COMMUNICATION TYPE	SUMMARY
10/19/99	NRC letter to HMI	Decommissioning Plan approved
11/99-7/00	Telephone calls between NRC and HMI project managers	Discussed approach to decommissioning activities and track HMI's negotiations to select the decommissioning contractor
8/8/00	NRC inspection	Determined status of site security, rad controls; discuss progress for contractor selection
8/16/00	NRC IR 2000-01 issued	Requested HMI to keep NRC informed about contractor negotiations
9/20/00	NRC letter to HMI	NRC concerned about slow progress for contractor selection. HMI schedule to complete all activities by 10/19/01 requested w/in 30 days
10/24/00	HMI response letter to NRC	Contractor selection expected before end CY00. Schedule TBD after contractor assigned.
12/15/00	HMI letter to NRC	Costs of contractor proposals remain under review. Separate disposal contract for monazite pile material being negotiated with IUC.
12/29/00	NRC letter to IUC	License amendment authorizing HMI material to be accepted as alternate feed
3/20/01	Management meeting	Discussions related to delays to implement the DP held with HMI property owner and staff, NJDEP representatives, and Mayor, Manchester Twp., NJ.
3/23/01	NRC letter to HMI	Meeting summary
6/7/01	HMI letter to NRC	Contracts approved for: decommissioning work, IUC receipt of material, and rail transport to IUC.
6/28/01	Site inspection	Observed preparation work for decommissioning activities.
7/11, 16-17, and 8/1/01	Site inspections	Observed monazite pile removal and intermodal container loading and survey. Interviewed contract workers.
9/24/01	HMI letter to NRC	Notification that site cleanup to be completed and final status surveys expected to be submitted to NRC to meet 10/19/01 deadline.

DATE	COMMUNICATION TYPE	SUMMARY
9/26/01	Site inspection	Inspected site to observe remediated areas and determine readiness for NRC confirmatory survey.
11/28/01	RSI (HMI contractor) Final Status Survey Report	Survey data showed mills and outdoor areas remediated to meet DP commitments and NRC release guidelines.
12/10-13/01	Site inspection	ORISE confirmatory survey
12/01-1/02	NRC telephone communications with ORISE, HMI, and RSI	Discussion of preliminary ORISE survey results
1/22/02	Management meeting	Presentation of ORISE confirmatory survey results showed contaminated soil did not meet NRC unrestricted release guidelines. Discussed ORISE survey methodology for taking soil samples and measuring surface contamination.
2/14/02	NRC letter to HMI	Transmittal of preliminary ORISE survey data
2/26/02	Site inspection	Examined contaminated areas identified in ORISE report; discussed remediation schedule.
3/26/02	HMI letter to NRC	HMI recognized that additional sampling in the monazite pile area was needed. However, the licensee noted that all identified contamination in mills and pile area not due to HMI operations.
4/10/02	NRC letter to HMI	Transmittal of ORISE report. Request to address report issues. RAI if HMI to pursue exemption to decommissioning timeliness requirements. Confirmation of management meeting to be held on 4/23/02.
4/15/01	HMI letter to NRC	Transmittal of final status survey report
4/22/02	RSI letter to HMI (cc to NRC)	ORISE survey results overstated amount of contaminated residual material on surfaces.
4/23/02	Management meeting	Licensee discussed details of near-term actions identified in March 26, 2002 letter.
5/9/02	Site inspection	Toured licensed areas with NMSS staff to evaluate contamination to be considered in staff's site dose assessment.
6/20/02	HMI letter to NRC	Provided contractor and third party evaluations which disagreed with ORISE survey techniques.
8/5/02	HMI letter to NRC	Provided proposed sampling protocol to identify potential licensable material in outdoor areas (draft submitted 7/15/02).

DATE	COMMUNICATION TYPE	SUMMARY
7/16/02-10/23/02	Technical Assistance Request (TAR) panel and NMSS review	Provided HMI information to NMSS staff under TAR to resolve overcounting issues. Results supported ORISE survey techniques.
11/22/02	NRC letter to HMI	Transmitted TAR evaluation for measurement of residual material on surfaces.
11/22/02	HMI letter to NRC	Submitted detailed report of site process history prior to and including HMI ownership.