3M Corporate Health Physics

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3M

January 13, 2005

Mr. Jamnes L. Cameron
Chief, Decommissioning Branch
US NRC Region III
2443 Warrenville Road, Suite 210
Lisle, Illinois 60532-4352

Subject: Results of Phase 1 Survey at TCAAP

Dear Mr. Cameron:

This letter is to provide you with the results of the initial phase of 3M's Work Plan for Characterizing Cs-137 Contamination at TCAAP. This work plan was developed in response to the expectations of the NRC and provided to Kenneth O'Brien on November 11, 2004. The intent of the work plan is to characterize the area surrounding the site formerly leased by the 3M Company on the Twin Cities Army Ammunition Plant (TCAAP) and determine whether it meets the unrestricted release criteria of 10 CFR 20.1402.

Phase 1 Results

The work plan has two phases. Phase 1, now completed, involved identifying areas of soil contamination, then collecting and analyzing soil samples to determine whether contamination is in microsphere form. If Phase 1 determined the activity was in microsphere form, Phase 2 would be performed to determine whether dose rates in the area meet the US NRC unrestricted release criterion of 25 millirem per year.

A total of 20 locations were identified and sampled in Phase 1. Three samples were obtained from each location and the results of analysis are given in the enclosed reports from Pace Analytical laboratory. The numerical portion of the Client Sample ID in the report denotes the location where the sample was obtained (shown in Figure 1). The letter portion denotes:

A – One kilogram soil sample taken at the point of maximum instrument response

B – One kilogram soil sample taken from soil surrounding sample A

JAN 19 2005

C – Presumed microsphere removed from sample A with minimal amount of associated soil

At all 20 locations sampled a microsphere was identified and the remaining soil showed contamination levels less than the screening level of 11 pCi/g. One sample, 5B, was initially reported as 65.6 pCi/g. At 3M's request, this sample was fractioned into four equal samples that were then assayed. The results show that essentially all activity was in one of the four samples, indicating the presence of an additional microsphere rather than distributed contamination. The other three fractions all showed activity less than the screening level.

During the original discussion of the work plan between 3M and your office the question was raised whether activities that disturbed the soil might result in increased dose rates in the future by moving microspheres to the soil surface. It should be noted that the highest activity microsphere collected in the 20 soil samples was 1.22 microcuries with the median value being 0.3 microcuries. As it would require a microsphere of about 10 microcuries of Cs-137 to provide an annual dose of 25 millirem at a distance of one meter, this appears quite unlikely.

Dose rate measurements were made prior to sample collection at each sample location. These measurements were made using a calibrated Bicron Microrem tissue-equivalent scintillator at one meter directly above the identified contamination. The results of these measurements (Table 1) ranged from 5.5 to 8 microrem per hour. The background reading obtained was 5.5 microrem per hour. Dose rate measurements for Phase 2 will be made with a pressurized ion chamber as described in the work plan.

NRC Data

Following agreement between 3M and your office on the proposed work plan, the NRC received results of soil sampling performed by the NRC in September 2004. One of the samples was reported as showing non microsphere activity at levels above the screening level. As noted above, none of the 3M samples showed a similar result. Based on location information from Mr. George M. McCann of your staff, 3M sample location #11 was collected very close to where the NRC sample in question was taken.

Phase 2

The data from Phase 1 supports 3M's assumption that soil contamination from 3M activities is in microsphere form. Therefore we will continue to Phase 2 as described in

the original work plan. In addition we will perform a detailed walk over survey of a 10 meter by 10-meter area in the vicinity of 3M soil sample #11 to identify any non microsphere contamination present. Soil samples will be taken for laboratory analysis of any suspect locations and any areas greater than the 11pCi/g screening level will be remediated. On completion of surveying and any remediation, at least four soil samples of the area will be collected and sent to Pace Analytical for analysis to confirm that remaining soils are within the screening level. We expect to start work on Phase 2 in April or May 2005 depending on the weather.

Should you have questions concerning this please contact me at 651-736-0740.

Sincerely,

Frederick B. Entwistle
Manager, Corporate Health Physics

encl.

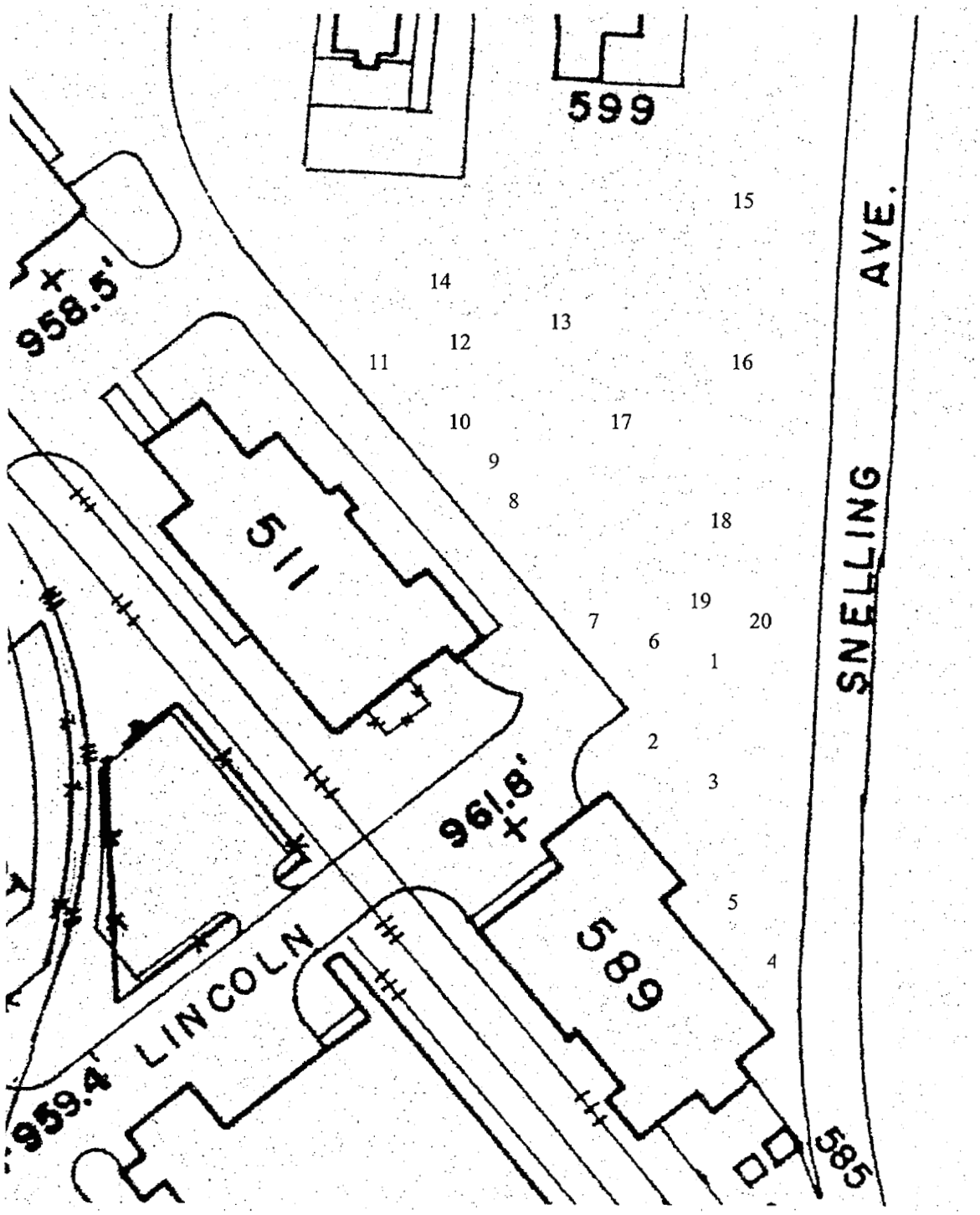

Figure 1

Soil Sampling Locations
Approximate locations denoted by numbers 1 through 20

Table 1

Dose rate readings – Bicron Microrem meter

Location	Dose rate (microrem per hour)
1	6
2	7
3	7
4	6
5	6.5
6	6.5
7	8
8	7
9	6
10	6
11	6.5
12	6.5
13	6.5
14	6
15	6.5
16	5.5
17	6
18	5.5
19	5.5
20	6

Background reading (Building 105) – 5.5 microrem/hour

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December 22, 2004

Mr. Frederick Entwistle
3M Corporation
3M Center, C A Johnson
Building 216-1S-02
St. Paul, MN 55144

Soil Characterization
11/18/04 Sampling Event, 3M CS-137
Pace Project No. 04-2168

Dear Mr. Entwistle:

Enclosed are analytical results for samples submitted by 3M Corporation. Samples were received on December 1, 2004 and logged in for analysis on December 2, 2004.

Methods used are indicated on the attached data table. Appropriate quality assurance/quality control analyses were performed in accordance with Pace, Waltz Mill Site Quality Assurance Plan. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. If you have any questions, please call me at 724-722-5219.

Sincerely,

Richard M. Kinney
Radiochemistry Laboratory Supervisor

RMK:jac

Enclosures

REPORT OF LABORATORY ANALYSIS

PACE ANALYTICAL SERVICES, INC.
CASE NARRATIVE

I. PROJECT LOGIN INFORMATION:

A: PROJECT NUMBERS:

PACE: 04-2168
CLIENT: 11/18/04 Sampling Event, 3M CS-137

B: SAMPLE IDENTIFICATIONS:

Pace ID	Client ID	Pace ID	Client ID
0412-0041	1A	0412-0042	1B
0412-0043	1C	0412-0044	2A
0412-0045	2B	0412-0046	2C
0412-0047	3A	0412-0048	3B
0412-0049	3C	0412-0050	4A
0412-0051	4B	0412-0052	4C
0412-0053	5A	0412-0054	5B
0412-0055	5C	0412-0056	6A
0412-0057	6B	0412-0058	6C
0412-0059	7A	0412-0060	7B
0412-0061	7C	0412-0062	8A
0412-0063	8B	0412-0064	8C
0412-0065	9A	0412-0066	9B
0412-0067	9C	0412-0068	10A
0412-0069	10B	0412-0070	10C
0412-0071	11A	0412-0072	11B
0412-0073	11C	0412-0074	12A
0412-0075	12B	0412-0076	12C
0412-0077	13A	0412-0078	13B
0412-0079	13C	0412-0080	14A
0412-0081	14B	0412-0082	14C
0412-0083	15A	0412-0084	15B
0412-0085	15C	0412-0086	16A
0412-0087	16B	0412-0088	16C
0412-0089	17A	0412-0090	17B
0412-0091	17C	0412-0092	18A
0412-0093	18B	0412-0094	18C
0412-0095	19A	0412-0096	19B
0412-0097	19C	0412-0098	20A
0412-0099	20B	0412-0100	20C

C: SHIPPING/RECEIVING COMMENTS:

Final Report 12/22/04.

II. PREPARATION/ANALYSIS COMMENTS:

PACE ANALYTICAL SERVICES, INC.
CASE NARRATIVE

(Continued)

A: RADIOLOGICAL:
NONE

III. GENERAL COMMENTS:

Trailing zeroes and decimal places appearing on the data should not be interpreted as precision of the analytical procedure, but rather as a result of reporting format.

Sample(s) analyzed and reported on an as-received basis.

Table 1
General Data Table for A & B Samples
3M Corporation
Pace Project No. 04-2168
Soil Characterization; 11/18/04 Sampling Event, 3M CS-137

Pace Sample ID	Client Sample ID	Date Collected	Analyzed	Parameter Identification Cs-137 RA-100 pCi/g Act ± Unc	(MDC)
0412-0041	1A	(11/18/04)	12/14/04	1.83 ± 0.229	(0.071)
0412-0042	1B	(11/18/04)	12/14/04	0.695 ± 0.124	(0.067)
0412-0044	2A	(11/18/04)	12/15/04	1.07 ± 0.189	(0.119)
0412-0045	2B	(11/18/04)	12/14/04	1.01 ± 0.197	(0.129)
0412-0047	3A	(11/18/04)	12/14/04	5.18 ± 0.447	(0.146)
0412-0048	3B	(11/18/04)	12/15/04	3.13 ± 0.320	(0.124)
0412-0050	4A	(11/18/04)	12/14/04	0.694 ± 0.128	(0.079)
0412-0051	4B	(11/18/04)	12/14/04	0.630 ± 0.168	(0.137)
0412-0053	5A	(11/18/04)	12/14/04	2.40 ± 0.249	(0.049)
0412-0054	5B	(11/18/04)	12/14/04	65.6 ± 3.29	(0.233)
0412-0056	6A	(11/18/04)	12/14/04	0.344 ± 0.075	(0.069)
0412-0057	6B	(11/18/04)	12/14/04	0.347 ± 0.121	(0.104)
0412-0059	7A	(11/18/04)	12/15/04	2.74 ± 0.303	(0.136)
0412-0060	7B	(11/18/04)	12/14/04	1.49 ± 0.246	(0.146)
0412-0062	8A	(11/18/04)	12/14/04	2.93 ± 0.246	(0.093)
0412-0063	8B	(11/18/04)	12/14/04	2.23 ± 0.227	(0.100)
0412-0065	9A	(11/18/04)	12/14/04	1.02 ± 0.179	(0.132)
0412-0066	9B	(11/18/04)	12/14/04	0.639 ± 0.148	(0.119)
0412-0068	10A	(11/18/04)	12/14/04	2.12 ± 0.261	(0.146)
0412-0069	10B	(11/18/04)	12/10/04	1.73 ± 0.218	(0.068)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

Table 1
(Continued)

Pace Sample ID	Client Sample ID	Date Collected	Analyzed	Parameter Identification Cs-137 RA-100 pCi/g Act ± Unc	(MDC)
0412-0071	11A	(11/18/04)	12/14/04	1.69 ± 0.225	(0.083)
0412-0072	11B	(11/18/04)	12/14/04	1.38 ± 0.224	(0.118)
0412-0074	12A	(11/18/04)	12/14/04	0.925 ± 0.169	(0.150)
0412-0075	12B	(11/18/04)	12/14/04	1.07 ± 0.191	(0.125)
0412-0077	13A	(11/18/04)	12/14/04	0.814 ± 0.173	(0.151)
0412-0078	13B	(11/18/04)	12/15/04	0.617 ± 0.122	(0.080)
0412-0080	14A	(11/18/04)	12/15/04	1.96 ± 0.309	(0.185)
0412-0081	14B	(11/18/04)	12/14/04	1.83 ± 0.192	(0.096)
0412-0083	15A	(11/18/04)	12/14/04	1.93 ± 0.249	(0.138)
0412-0084	15B	(11/18/04)	12/15/04	1.26 ± 0.182	(0.080)
0412-0086	16A	(11/18/04)	12/15/04	0.893 ± 0.206	(0.132)
0412-0087	16B	(11/18/04)	12/15/04	0.718 ± 0.152	(0.120)
0412-0089	17A	(11/18/04)	12/15/04	5.17 ± 0.486	(0.146)
0412-0090	17B	(11/18/04)	12/15/04	3.85 ± 0.421	(0.184)
0412-0092	18A	(11/18/04)	12/14/04	2.96 ± 0.333	(0.082)
0412-0093	18B	(11/18/04)	12/15/04	3.99 ± 0.419	(0.142)
0412-0095	19A	(11/18/04)	12/14/04	0.540 ± 0.161	(0.132)
0412-0096	19B	(11/18/04)	12/15/04	0.412 ± 0.117	(0.069)
0412-0098	20A	(11/18/04)	12/14/04	1.62 ± 0.209	(0.074)
0412-0099	20B	(11/18/04)	12/15/04	0.415 ± 0.098	(0.080)
0412-0101	Method Blank	(12/1/04)	12/15/04	0.005 ± 2.72	(4.82)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

Table 2
General Data Table for "C" Samples
3M Corporation
Pace Project No. 04-2168
Soil Characterization; 11/18/04 Sampling Event, 3M CS-137

Pace Sample ID	Client Sample ID	Date Collected	Analyzed	Parameter Identification Cs-137 RA-100 pCi/sample Act ± Unc	(MDC)
0412-0043	1C	(11/18/04)	12/13/04	398000 ± 19000	(339)
0412-0046	2C	(11/18/04)	12/13/04	336000 ± 16900	(292)
0412-0049	3C	(11/18/04)	12/13/04	375000 ± 18500	(297)
0412-0052	4C	(11/18/04)	12/13/04	200000 ± 9920	(203)
0412-0055	5C	(11/18/04)	12/13/04	199000 ± 10300	(191)
0412-0058	6C	(11/18/04)	12/13/04	310000 ± 15700	(313)
0412-0061	7C	(11/18/04)	12/13/04	343000 ± 17000	(258)
0412-0064	8C	(11/18/04)	12/13/04	290000 ± 14600	(305)
0412-0067	9C	(11/18/04)	12/13/04	111000 ± 5550	(146)
0412-0070	10C	(11/18/04)	12/13/04	253000 ± 12800	(277)
0412-0073	11C	(11/18/04)	12/13/04	630000 ± 31700	(430)
0412-0076	12C	(11/18/04)	12/13/04	286000 ± 14500	(279)
0412-0079	13C	(11/18/04)	12/13/04	227000 ± 11200	(225)
0412-0082	14C	(11/18/04)	12/13/04	257000 ± 13000	(291)
0412-0085	15C	(11/18/04)	12/13/04	1220000 ± 60100	(535)
0412-0088	16C	(11/18/04)	12/13/04	499000 ± 24600	(329)
0412-0091	17C	(11/18/04)	12/13/04	839000 ± 41300	(434)
0412-0094	18C	(11/18/04)	12/13/04	470000 ± 23700	(393)
0412-0097	19C	(11/18/04)	12/13/04	203000 ± 10300	(246)
0412-0100	20C	(11/18/04)	12/13/04	276000 ± 13700	(232)
0412-0101	Method Blank	(12/1/04)	12/15/04	0.005 ± 2.72	(4.82)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.

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January 5, 2005

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CORPORATE HEALTH PHYSICS

Mr. Frederick Entwistle
3M Corporation
3M Center, C A Johnson
Building 216-1S-02
St. Paul, MN 55144

Soil Characterization
Relog of (Split) Sample 5B
Pace Project No. 05-0010

Dear Mr. Entwistle:

Enclosed are analytical results for samples submitted by 3M Corporation. Samples were received and logged in for analysis on January 4, 2005.

Methods used are indicated on the attached data table. Appropriate quality assurance/quality control analyses were performed in accordance with Pace, Waltz Mill Site Quality Assurance Plan. The results reported in this project meet the requirements as specified in Chapter 5 of the NELAC Standards. Any deviations or discrepancies from the NELAC standards are documented in the case narrative(s) of this report. If you have any questions, please call me at 724-722-5219.

Sincerely,

Richard M. Kinney
Radiochemistry Laboratory Supervisor

RMK:jac

Enclosures

PACE ANALYTICAL SERVICES, INC.
CASE NARRATIVE

I. PROJECT LOGIN INFORMATION:

A: PROJECT NUMBERS:

PACE: 05-0010
CLIENT: Relog of (Split) Sample 5B

B: SAMPLE IDENTIFICATIONS:

Pace ID	Client ID	Pace ID	Client ID
0501-0019	5B-1	0501-0020	5B-2
0501-0021	5B-3	0501-0022	5B-4

C: SHIPPING/RECEIVING COMMENTS:

Final Report 01/05/05.

II. PREPARATION/ANALYSIS COMMENTS:

A: RADIOLOGICAL:
NONE

III. GENERAL COMMENTS:

Trailing zeroes and decimal places appearing on the data should not be interpreted as precision of the analytical procedure, but rather as a result of reporting format.

Sample(s) analyzed and reported on an as-received basis.

Table 1
General Data Table
3M Corporation
Pace Project No. 05-0010
Soil Characterization; Relog of (Split) Sample 5B

Pace Sample ID	Client Sample ID	Date Collected	Analyzed	Parameter Identification Cs-137 RA-100 pCi/g Act ± Unc	(MDC)
0501-0019	5B-1		01/05/05	123 ± 6.15	(0.311)
0501-0020	5B-2		01/05/05	2.75 ± 0.248	(0.086)
0501-0021	5B-3		01/05/05	2.80 ± 0.294	(0.132)
0501-0022	5B-4		01/05/05	3.41 ± 0.931	(0.118)
0501-0023	Method Blank		01/05/05	0.008 ± 0.045	(0.092)

Act=Activity, Unc=2 sigma Uncertainty and (MDC)=the associated Minimum Detectable Concentration.