APPENDIX G

RADIATION SURVEY REPORT FOR BUNKER AT AOC 1

M E M O R A N D U M

To: George Moreau

From: John Hackett

Subject: Schenectady Army Depot Vorheesville Area Radiation Survey

On Thursday, November 18, 2004, a brief radiological survey was conducted outside and within a partially buried metal tank at the former Schenectady Army Depot - Vorheesville Area (SADVA). Wooden beams blocking the entrance of the tank were pulled aside using a backhoe on Wednesday, November 17, 2004.

The tank appeared to be of metal construction, and was about 8 feet in diameter and 7 feet tall. There was a circular chimney about 6 inches in diameter in the ceiling of the tank. A metal rack or grill about 3 feet off the ground was present in the rear of the tank. On the floor immediately inside the door was a wooden pallet. In addition the front and rear hoods of a Saab automobile were in the tank. After the wooden beams were initially removed, it was discovered that the metal door to the tank was opened. After the survey activities were completed, the door was locked.

Field measurements were collected at the tank using a 2"x2" sodium iodide (NaI) gamma scintillator (for measuring ambient gamma radiation) and GM pancake probe (for measuring localized alpha, beta, and gamma radiation). Results from the survey are tabulated in the following tables.

2"x2" NaI Gamma Scintillator measurements	
Check source (Cs-137)	295-300 microRoengtens per hour (uR/hr)
Background (in car)	5-7 uR/hr
Background (on road outside tank)	7-10 uR/hr
Immediately outside tank	13-14 uR/hr
Inside tank	9-10 uR/hr
Instrument Used: Ludlum 44-10 2x2 NaI probe (PR 208815) with Ludlum 2350-1 ratemeter (201185); Calibration due date – 28-May-2005	

GM Pancake Probe measurements	
Check source (Cs-137)	**9000 counts per minute (cpm)**
Background (in car)	**40 cpm**
Background (on road outside tank)	**<100 cpm**
Immediately outside tank	**<100 cpm**
Wood pallet	**<100 cpm**
Saab hood	**<100 cpm**
Floor of tank	**<100 cpm**
Wall of tank	**<100 cpm**
Instrument Used: Ludlum 44-9 GM Pancake Probe (PR 130951) with Ludlum Model 12 ratemeter (128246); Calibration due date – 27-May-2005	

None of the collected field measurements appear to indicate the presence of radioactivity above natural background. The highest ambient gamma measurements (collected with the 2"x2" NaI detector) outside the tank can be explained by the geometry of the measurement – the walls of the "walkway" leading to the tank door contribute to the ambient radioactivity acting upon the detector, in addition to the ground surface. The lower measurements inside the tank reflect both the lower background of the metal construction of the tank as well as the shielding of the natural radioactivity in the soil. None of the measurements with the GM pancake were near levels that would be considered indicative of contamination (200-300 cpm would indicate possible contamination based on the background readings).

In addition to field instrument measurements, ten smear samples were collected from various surfaces inside and outside the tank. Results from the smear sampling are presented in the attached Table 1. The smear samples were counted for gross alpha and beta radiation in an office setting using a Ludum 43-10-1 phoswich smear counter with a Ludlum 2360 scaler meter. The gross count rates were converted to a surface concentration in units of decays per minute per square centimeter (dpm/cm^2) by using the smear area (~100 cm^2), the smear counter efficiency for alpha and beta radiation (0.367 and 0.291, respectively), and a 10% smear filter efficiency. All of the gross results are below the Nuclear Regulatory Commission (NRC) removable alpha activity limit of 100 dpm/cm^2 for natural uranium (a contaminant of concern at similar Army

sites), and the gross beta results are below the NRC removable beta-gamma activity limit of 100 dpm/cm^2 (NRC Regulatory Guide 1.86)

Two radon electrets were deployed at approximately 10 am on November 17, 2004. A third electret was kept unopened as a blank. The electrets were collected on Friday, November 19, 2004, and sent to the manufacturer (Rad-Elec) for analysis. These radon measurements were collected as a screening step to determine if elevated radon levels were present due to elevated naturally-occurring radioactivity or as the result of contamination (e.g., natural uranium, uranium ore and elevated decay progeny) within the tank.

The results of the radon analysis appear below. The detected concentrations do not indicate an concern with radon levels resulting from naturally-occuring materials or from contamination within the tank..

Radon measurements	
Blank (SW1880)	0.0 pCi/L
Bunker 1 (SBH858)	0.5 pCi/L
Bunker 2 (SQ3775)	0.7 pCi/L
E-Perm Electret Ion Chambers were deployed for approximately 2.5 days within the bunker and analyzed by Rad-Elec, Inc.	

Based on the results discussed above, it is concluded that there is no radioactive contamination inside the tank, and that additional radiological characterization work is not necessary. Photographs of the exterior and the interior of the tank appear below.

Reference:

NRC Regulatory Guide 1.86. Termination of Operating License for Nuclear Reactors. July, 1974.

Photos:

Tank Entrance

Tank Interior 1 – A radon electret is visible on the left. The Saab hood is sitting on the rack at the rear of the tank

Tank Interior 2 – A second radon electret is visible on the plastic bin. The other hood and wood pallet are on the left.

SMEAR SAMPLING RESULTS - SADVA TANK SURVEY, NOVEMBER 2004

No.	Location	Meter ID	Alpha (counts)	Beta (counts)	Count Time (min)	Alpha Count Rate (cpm) [1/]	Gross Alpha Count Rate (dpm/cm^2) [2/]	Beta Count Rate (cpm)	Gross Beta Count Rate (dpm/cm^2)
1	Wood pallet	202403/207930	0	406	5	0	0.000	81.2	27.904
2	SAAB hood	202403/207930	0	311	5	0	0.000	62.2	21.375
3	Floor to right of door	202403/207930	2	376	5	0.4	0.109	75.2	25.842
4	Floor to left of door	202403/207930	0	405	5	0	0.000	81	27.835
5	Wall to right of door	202403/207930	0	398	5	0	0.000	79.6	27.354
6	Wall to left of door	202403/207930	1	351	5	0.2	0.054	70.2	24.124
7	Inside of door	202403/207930	0	357	5	0	0.000	71.4	24.536
8	Outside door handle	202403/207930	0	365	5	0	0.000	73	25.086
9	Ceiling of tank	202403/207930	0	409	5	0	0.000	81.8	28.110
10	Grill at rear of tank	202403/207930	0	371	5	0	0.000	74.2	25.498

Instrument Used: Ludlum 43-10-1 Phoswich Smear Counter (PR207930) with Ludlum 2360 Scaler (202403); Calibration due date:13-Feb-05

Pre-measurement Instrument Check

	Alpha Count Rate (cpm)	Beta Count Rate (cpm)
Bkgd	0	75.2
Th-230	4230	688
Tc-99	23	2348

Post-measurement Instrument Check

	Alpha Count Rate (cpm)	Beta Count Rate (cpm)
Bkgd	0.4	72.8
Th-230	4145	653
Tc-99	22	2493

Instrument Efficiency Determination

	Alpha	Beta		
			Th-230 Source	11,400 dpm
Pre-check	0.371	0.282	Tc-99 Source	8,320 dpm
Post-check	0.364	0.300		

	Alpha	Beta
Average Efficiency	0.367	0.291

Notes:

[1/] cpm = counts per minute

[2/] dpm/cm^2 = decays per minute per square centimeter

Rad Elec Inc.

5714-C Industry Lane
Frederick, Maryland 21704 USA
(800) 526-5482 • (301) 694-0011
FAX (301) 694-0013
Web Pages: http://www.radelec.com

Radon Test Report

December 02, 2004

Customer:

Parsons Engineering
Attn: George Moreau
290 Elwood Davis Rd., Ste. 312
Liverpool, NY 13088

Test Site:

John Huckett
1700 Broadway, Suite 900
Denver, CO 80209

E-PERM Electret Ion Chambers were used for short-term radon screening measurements that were conducted at the above referenced test site by: Parsons Engineering

The results are as follows:

Electret	Type	Location	Test Start Date	Test End Date	Results pCi/L
SW1880	SST	Bunker	11/17/04 10:10 AM	11/19/04 3:10 PM	0.0

Radon Concentration in: Bunker 0.0 pCi/L

Deployed By: SD
Retrieved By: SD
Analyzed By: FRS NEHA #101322RT

Conditions: See Comment
Tampering: No Tampering Observed
Comment: Blank

Radon Health Risk Information

Radon is the second leading cause of lung cancer, after smoking. The U. S. Environmental Protection Agency (USEPA) and the Surgeon General strongly recommend that further action be taken when the home's radon test results are 4.0 pCi/L or greater. The national average indoor radon level is about 1.3 pCi/L. The higher the home's radon level, the greater the health risk to you and your family. Reducing your radon levels can be done easily, effectively and fairly inexpensively. Even homes with very high radon levels can be reduced below 4.0 pCi/L.

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Denver, CO 80209

E-PERM Electret Ion Chambers were used for short-term radon screening measurements that were conducted at the above referenced test site by: Parsons Engineering

The results are as follows:

Electret	Type	Location	Test Start Date	Test End Date	Results pCi/L
SBH858	SST	Bunker	11/17/04 10:10 AM	11/19/04 3:10 PM	0.5
SQ3775	SST	Bunker	11/17/04 10:10 AM	11/19/04 3:10 PM	0.7

Average Radon Concentration in: Bunker **0.6 pCi/L**

Deployed By: SD
Retrieved By: SD
Analyzed By: FRS NEHA #101322RT

Conditions: See Comment
Tampering: No Tampering Observed
Comment: Did not maintain cl;osed building conditions 12 hours prior to initiating test

Radon Health Risk Information

Radon is the second leading cause of lung cancer, after smoking. The U. S. Environmental Protection Agency (USEPA) and the Surgeon General strongly recommend that further action be taken when the home's radon test results are 4.0 pCi/L or greater. The national average indoor radon level is about 1.3 pCi/L. The higher the home's radon level, the greater the health risk to you and your family. Reducing your radon levels can be done easily, effectively and fairly inexpensively. Even homes with very high radon levels can be reduced below 4.0 pCi/L.

DEPLOYMENT DATA FORM

CUSTOMER NAME	TESTING COMPANY
Name: John Hackett / Parsons	Name: Rad Elec Inc.
Address: 1700 Broadway, Suite 900	Address: 5714-C Industry Lane
City, State: Denver, CO 80290-	City, State: Frederick, MD 21701
	800-526-5482

TEST DATES

Start Date: 11/17/04 Start Time: 10:10 Deployed By: Scott Dillman

End Date: 11/19/04 End Time: 15:10 Retrieved By: Scott Dillman

DETECTOR INFORMATION

Electret Serial #	Device Type	Room	Location in Room	Comments
SBH858	Radon monitor	Bunker	North side 3 ft off floor	SADVA-1
SQ 3775	Radon monitor	Bunker	South side 1 ft off floor	SADVA-2
SW1880	Radon Monitor	Blank	Blank sample not in room	SADVA-3

DEPLOYMENT SITE INFORMATION

Protocols

Closed House Conditions 12 Hours Prior To Testing? YES or (NO)

Closed House Conditions During Testing Period? (YES) or NO

Compliance Sheet Signed? YES or NO

General House Information

House Type (BASEMENT) or SLAB ON GRADE or CRAWL SPACE

Finished or Unfinished Basement? FINISHED or (UNFINISHED)

Walkout Basement? (YES) or NO

Crawl Space Vents? OPEN or CLOSED (NA)

Central HVAC System YES or (NO)

Thermostat Set At: _____

~~Fireplace Dampers~~ (OPEN) or CLOSED

Weather Conditions

Approximate Rainfall During Testing Period: trace

Sustained Wind Velocity Above 30 mph? YES or (NO)

Other Abnormal Weather Conditions? NO

Tamper Controls

Tamper Indicating Controls Used? (YES) or NO

Description of Tamper Controls: Bunker pad locked during test

Were Tamper Controls Intact When Dectectors Retrieved? (YES) or NO

If Not Intact - Describe Condition: _____