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a McDermott company

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010108-1
January 8, 2001

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Mr. Jon M. Peckenpaugh
Low Level Waste and Decommissioning
Projects Branch MS T7F-27
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SNM-414
Docket No. 70-364

Subject: Request for Release of Soil Piles SP043, SP044, SP047, SP048, SP054 and SP059

Reference: Parks Facilities Decommissioning Plan, Revision 3, dated July 21, 1998 as supplemented by Revision 3.1, dated September 15, 1998

Dear Mr. Peckenpaugh:

Attached you will find six attachments containing data supporting the release for unrestricted use of Soil Piles SP043, SP044, SP047, SP048, SP054 and SP059. The majority of this soil has been used as backfill on the Parks Facility. SP044 has not been used as backfill because of the presence of trichloroethene above the default Pennsylvania Act II standard. Upon radiological release of this soil, BWXS plans to disposition soil from SP044 as residual waste.

The data provided in this submittal clearly demonstrates that the soil piles meet the radiological release criteria specified in Section 5.2 of the decommissioning plan. BWXT Services, Inc. (BWXS) requests that the NRC review and approve this data prior to March 9, 2001. Your expeditious review and approval of this submittal will be greatly appreciated.

We will meet with the Commission at any time to discuss this submittal, respond quickly to interim Requests for Additional Information (RAI), and promptly provide any additional supporting information required. Additionally, if the NRC (or its subcontractor) desires to perform overchecks or a confirmatory survey of these soil piles, BWXS will gladly provide any necessary assistance in meeting the NRC schedule.

AMSSOI
Public

Subject: Request for Release of Soil Piles SP043, SP044, SP047,
SP048, SP054 and SP059

SNM-414
Docket No. 70-364

If you have any further questions regarding this submittal, please contact me at (724) 842-1472.

Sincerely,



Richard M. Bartosik
Manager, Licensing

Attachments

cc: L.R. Bauer
T. Dimitriadis – NRC Region I
R. Maiers – PaDEP (Harrisburg Bureau of Radiation Protection)
J. J. Matviya – PaDEP (Southwest Region)
D.A. Orlando – USNRC
J. Yusko – PaDEP (Southwest Region)

Attachment A
Soil Pile SP043 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit B, Survey Unit B2. This report covers Soil Pile (SP) 043. Final surveys for this soil pile were conducted from September 2000 through October 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit B are isotopes of americium, plutonium, uranium, cobalt and cesium. No americium, cobalt, or cesium was detected in any of the samples collected. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	0.11 to 0.18
Cobalt-60	0.04 ¹
Cesium-137	0.04 ¹
Total Uranium	6.40 ²

¹ All cobalt-60 and cesium-137 non-detects were 0.04 pCi/g.

² Only one total uranium non-detect.

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit B are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP043. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. Only methylene chloride (a common laboratory contaminant) was detected in this soil. There were no other chemical detections for this soil pile.

2.0 Soil Pile SP043

Soil Pile SP043 consists of overburden soils removed from above piping that fed into the Building B basement. The piping was physically located on the southern end of the building. SP043 was generated in an area where historical characterization indicated that the sum of the fractions indicated values were less than 1.0. Soil was removed from over this area with an excavator, loaded onto trucks, and subsequently staged onto SP043 for sampling.

Once SP043 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP043 consists of a total of approximately 1,600 cubic feet (45 cubic meters). Therefore, a minimum of 2 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 2 radiological samples in 2 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. Both of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP043 is 0.032. Therefore, SP043 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

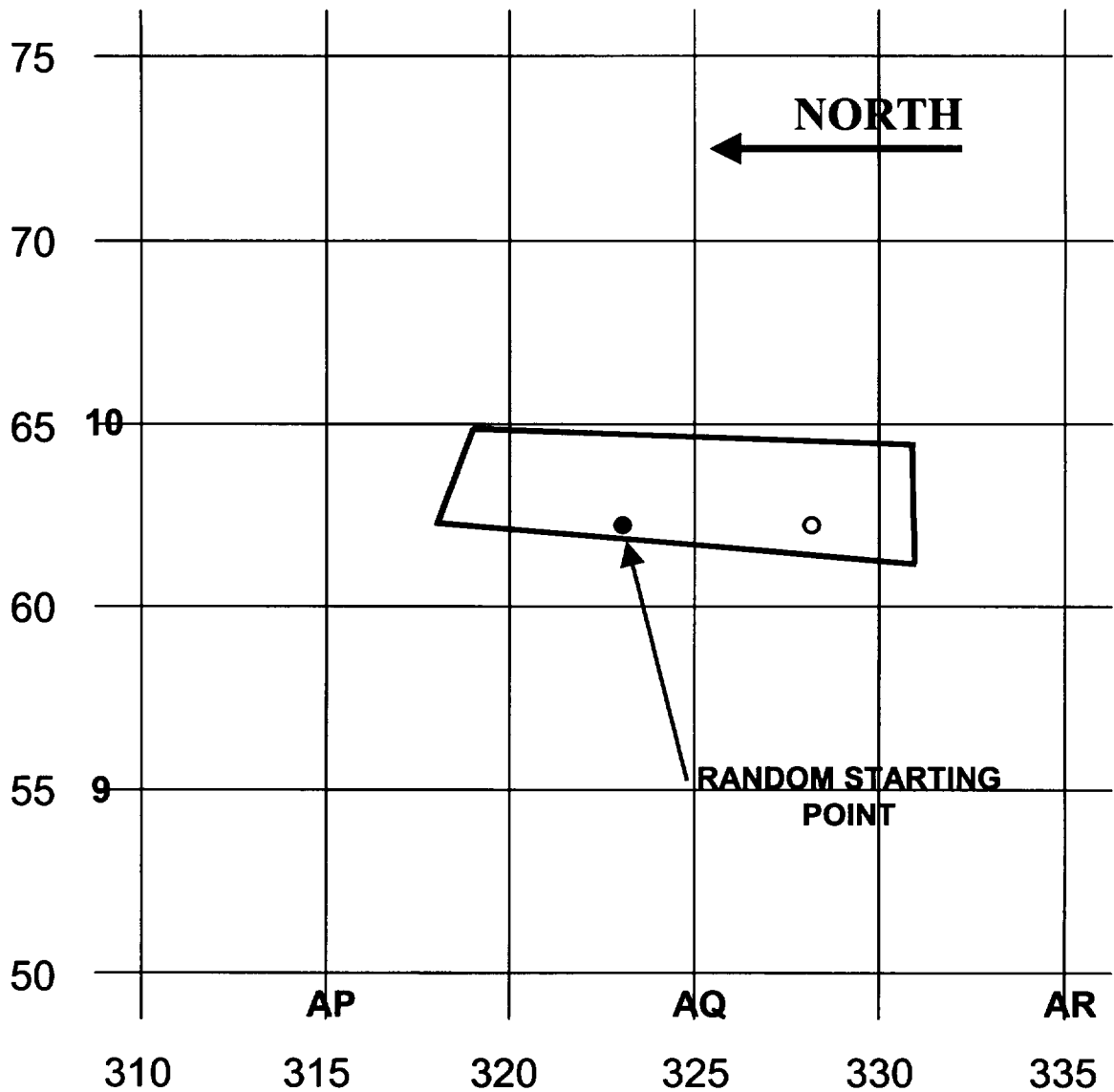
Chemical samples were collected from a discrete sample during the sampling of SP043. Only methylene chloride (a common laboratory contaminant) was detected. The chemical results are summarized in Tab 2.

3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP043 meets the release for unrestricted use criteria listed in the DP.

SP043 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP043	0.032	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 also demonstrate that the soil is acceptable for use on the Parks Site.



LEGEND:

● RADIOLOGICAL SAMPLE

○ RADIOLOGICAL AND
CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 45 M³
(1,600 FT³)

**PARKS PROJECT
PROJECT UNIT B**

**FIGURE 1
SOIL PILE SAMPLING
LOCATIONS
SP 043**

11/30/00

REV. 0

Tab 1 to Attachment A Radiological Data Summary

**Soil Pile SP043 Report
Revision 0**

SP043 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241		
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS	
PR6456	01.P4970-010	328	62.0	1	0.18	0.09	0.10	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	6.40	1.20	3.66	U	0.203	0.584	0.054	
PR6456	01.P4971-010	323	62.0	1	0.11	0.06	0.06	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	2.09	-1.91	0.15		0.124	0.357	0.010	
																						AVERAGE:		0.032

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Tab 2 to Attachment A Chemical Data Summary

**Soil Pile SP043 Report
Revision 0**

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP043. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over ten volatile organics were detected in Project Unit B. PCB's were also detected in Project Unit B. A complete summary of the chemical data from Project Unit B is found in Section 7.2.5 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. Only methylene chloride was detected. There were no detections for any other volatiles or PCBs in this sample.

Methylene chloride was detected at 0.008 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 0.30 mg/kg.

BWXT Services strongly believes that this soil is suitable for use on the BWXS site.

		Samples Results (Encore) in SP043	
		Sample ID 11.P4970-003	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	130	U
	Benzene	6.4	U
	Bromodichloromethane	6.4	U
	Bromoform	6.4	U
	Bromomethane	13	U
	2-Butanone (MEK)	13	U
	Carbon Disulfide	6.4	U
	Carbon Tetrachloride	6.4	U
	Chlorobenzene	6.4	U
	Chlorodibromomethane	6.4	U
	Chloroethane	13	U
	Chloromethane	13	U
	Chloroform	6.4	U
	1,1-Dichloroethane	6.4	U
	1,2-Dichloroethane	6.4	U
	1,1-Dichloroethene	6.4	U
	cis-1,2-Dichloroethene	6.4	U
	trans-1,2-Dichloroethene	6.4	U
	1,2-Dichloropropane	6.4	U
	cis-1,3-Dichloropropene	6.4	U
	trans-1,3-Dichloropropene	6.4	U
	Ethylbenzene	6.4	U
	2-Hexanone	64	U
	Methylene Chloride	8.0	
	4-Methyl-2-pentanone (MIBK)	64	U
	Styrene	6.4	U
	1,1,2,2-Tetrachloroethane	6.4	U
	Tetrachloroethene	6.4	U
	Toluene	6.4	U
	1,1,1-Trichloroethane	6.4	U
	1,1,2-Trichloroethane	6.4	U
	Trichloroethene	6.4	U
	Vinyl Chloride	11	U
	Xylenes (total)	6.4	U
	Polychlorinated Biphenyls		
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected

J - Below Contract Required Detection Limit

B - Detected in Blank

Attachment B
Soil Pile SP044 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit B, Survey Unit B2. This report covers Soil Pile (SP) 044. Final surveys for this soil pile were conducted from September 2000 through October 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit B are isotopes of americium, plutonium, uranium, cobalt and cesium. No americium, cobalt, or cesium was detected in any of the samples collected. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	0.13 to 0.18
Cobalt-60	0.03 to 0.04
Cesium-137	0.04 ¹
Total Uranium	No non-detects

¹ Both cesium-137 non-detects were 0.04 pCi/g.

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit B are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP044. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. Carbon disulfide, 2-butanone, methylene chloride (a common laboratory contaminant), and trichloroethene were detected in this soil. There were no other chemical detections for this soil pile.

2.0 Soil Pile SP044

Soil Pile SP044 consists of overburden soils removed from above piping that fed into the Building B basement. The piping was physically located on the northern end of the building.

SP044 was generated in an area where historical characterization indicated that the sum of the fractions indicated values were less than 1.0. Soil was removed from over this area with an excavator, loaded onto trucks, and subsequently staged onto SP044 for sampling.

Once SP044 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP044 consists of a total of approximately 2,500 cubic feet (70 cubic meters). Therefore, a minimum of 3 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 3 radiological samples in 3 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. All of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP044 is 0.112. Therefore, SP044 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

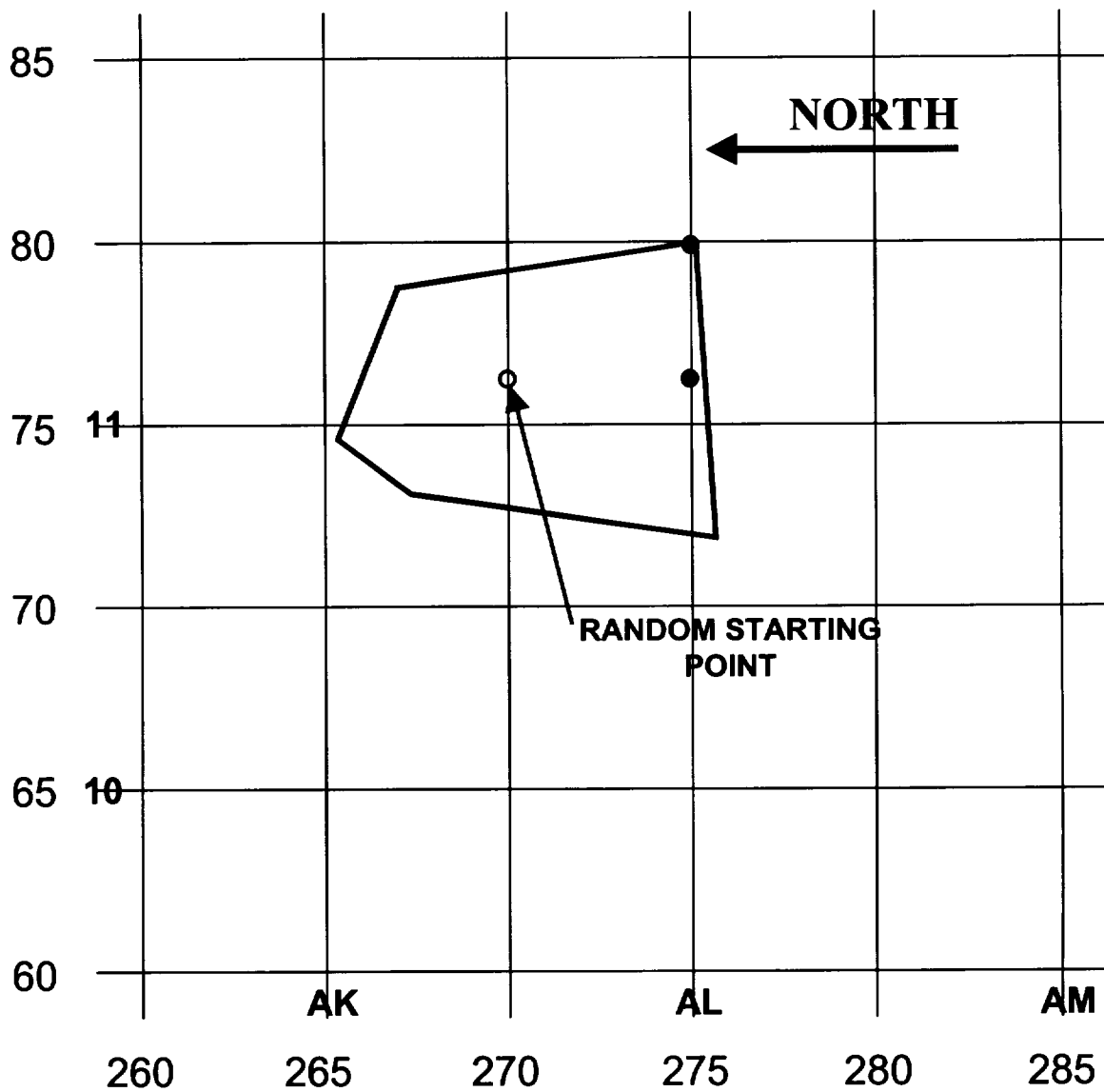
Chemical samples were collected from a discrete sample during the sampling of SP044. Carbon disulfide, 2-butanone, methylene chloride (a common laboratory contaminant), and trichloroethene were detected in this soil. The chemical results are summarized in Tab 2.

3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP044 meets the release for unrestricted use criteria listed in the DP.

SP044 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP044	0.112	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 demonstrate that the soil is not acceptable for use in backfilling the excavations on the Parks Site. Trichloroethene was detected at 980 $\mu\text{g}/\text{kg}$ which is above the default Act II standard of 500 $\mu\text{g}/\text{kg}$. BWXT has a contained-out determination from the Pennsylvania Department of Environmental Protection for soils in Project Unit B that are less than 1,700 $\mu\text{g}/\text{kg}$. Therefore, upon NRC release of this soil for radiological contamination, SP044 will be dispositioned as residual waste.



LEGEND:

● RADIOLOGICAL SAMPLE

○ RADIOLOGICAL AND
CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 70 M³
(2,500 FT³)

**PARKS PROJECT
PROJECT UNIT B**

**FIGURE 1
SOIL PILE SAMPLING
LOCATIONS
SP 044**

11/30/00

REV. 0

Tab 1 to Attachment B Radiological Data Summary

**Soil Pile SP044 Report
Revision 0**

SP044 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241	
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS
PR6456	01.P4972-010	275	80.0	1	0.18	0.09	0.10	U	0.03	0.02	0.02	U	0.05	-0.15	0.01		11.07	7.07	1.50		0.203	0.584	0.249
PR6456	01.P4973-010	275	76.0	1	0.13	0.07	0.07	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	3.39	-0.61	0.20		0.147	0.422	0.011
PR6456	01.P4974-010	270	76.0	1	0.13	0.07	0.07	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	5.94	1.94	0.42		0.147	0.422	0.076
																					AVERAGE:		0.112

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Tab 2 to Attachment B Chemical Data Summary

**Soil Pile SP044 Report
Revision 0**

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP044. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over ten volatile organics were detected in Project Unit B. PCB's were also detected in Project Unit B. A complete summary of the chemical data from Project Unit B is found in Section 7.2.5 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. Carbon disulfide, 2-butanone, methylene chloride (a common laboratory contaminant), and trichloroethene were detected. There were no detections for any other volatiles or PCBs in this sample.

Carbon disulfide was detected at 0.012 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 410 mg/kg.

2-butanone (methyl ethyl ketone) was detected at 0.013 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 280 mg/kg.

Methylene chloride was detected at 0.016 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 0.300 mg/kg.

Trichloroethene was detected at 0.980 mg/kg which is above the most restrictive default Pennsylvania Act II limit of 0.500 mg/kg. However, the detection is less than the 1,700 mg/kg "contained-out" determination from the Pennsylvania DEP and therefore is not a hazardous waste.

Since the trichloroethene detection is above the Pennsylvania Default Act II limit, BWXT Services will disposition this material at an authorized disposal site.

		Samples Results (Encore) in SP044	
		Sample ID 11.P4974-003	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	120	U
	Benzene	6.0	U
	Bromodichloromethane	6.0	U
	Bromoform	6.0	U
	Bromomethane	12	U
	2-Butanone (MEK)	13	
	Carbon Disulfide	12	
	Carbon Tetrachloride	6.0	U
	Chlorobenzene	6.0	U
	Chlorodibromomethane	6.0	U
	Chloroethane	12	U
	Chloromethane	12	U
	Chloroform	6.0	U
	1,1-Dichloroethane	6.0	U
	1,2-Dichloroethane	6.0	U
	1,1-Dichloroethene	6.0	U
	cis-1,2-Dichloroethene	6.0	U
	trans-1,2-Dichloroethene	6.0	U
	1,2-Dichloropropane	6.0	U
	cis-1,3-Dichloropropene	6.0	U
	trans-1,3-Dichloropropene	6.0	U
	Ethylbenzene	6.0	U
	2-Hexanone	60	U
	Methylene Chloride	16	
	4-Methyl-2-pentanone (MIBK)	60	U
	Styrene	6.0	U
	1,1,2,2-Tetrachloroethane	6.0	U
	Tetrachloroethene	6.0	U
	Toluene	6.0	U
	1,1,1-Trichloroethane	6.0	U
	1,1,2-Trichloroethane	6.0	U
	Trichloroethene	980	
	Vinyl Chloride	12	U
	Xylenes (total)	6.0	U
Polychlorinated Biphenyls			
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected

J - Below Contract Required Detection Limit

B - Detected in Blank

Attachment C
Soil Pile SP047 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit A, Survey Unit A1. This report covers Soil Pile (SP) 047. Final surveys for this soil pile were conducted from October 2000 through November 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit A are isotopes of americium, plutonium, uranium, cobalt and cesium. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	0.13 ¹
Cobalt-60	0.03 to 0.04
Cesium-137	0.04 ²
Total Uranium	4.76 to 4.79

¹ Only one non-detect of americium-241

² Both non-detects for cesium-137 were 0.04 pCi/g

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit A are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP047. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. There were no chemical detections for this soil pile.

2.0 Soil Pile SP047

Soil Pile SP047 consists of overburden soils removed from the west side of the former Building A Hot Basement. SP047 was generated in an area where historical characterization indicated that

the sum of the fractions indicated values were less than 1.0. Soil was removed from the hot basement area with an excavator, loaded onto trucks, and subsequently staged onto SP047 for sampling.

Once SP047 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP047 consists of a total of approximately 1,000 cubic feet (26 cubic meters). Therefore, a minimum of 2 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 2 radiological samples in 2 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. Both of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP047 is 0.030. Therefore, SP047 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

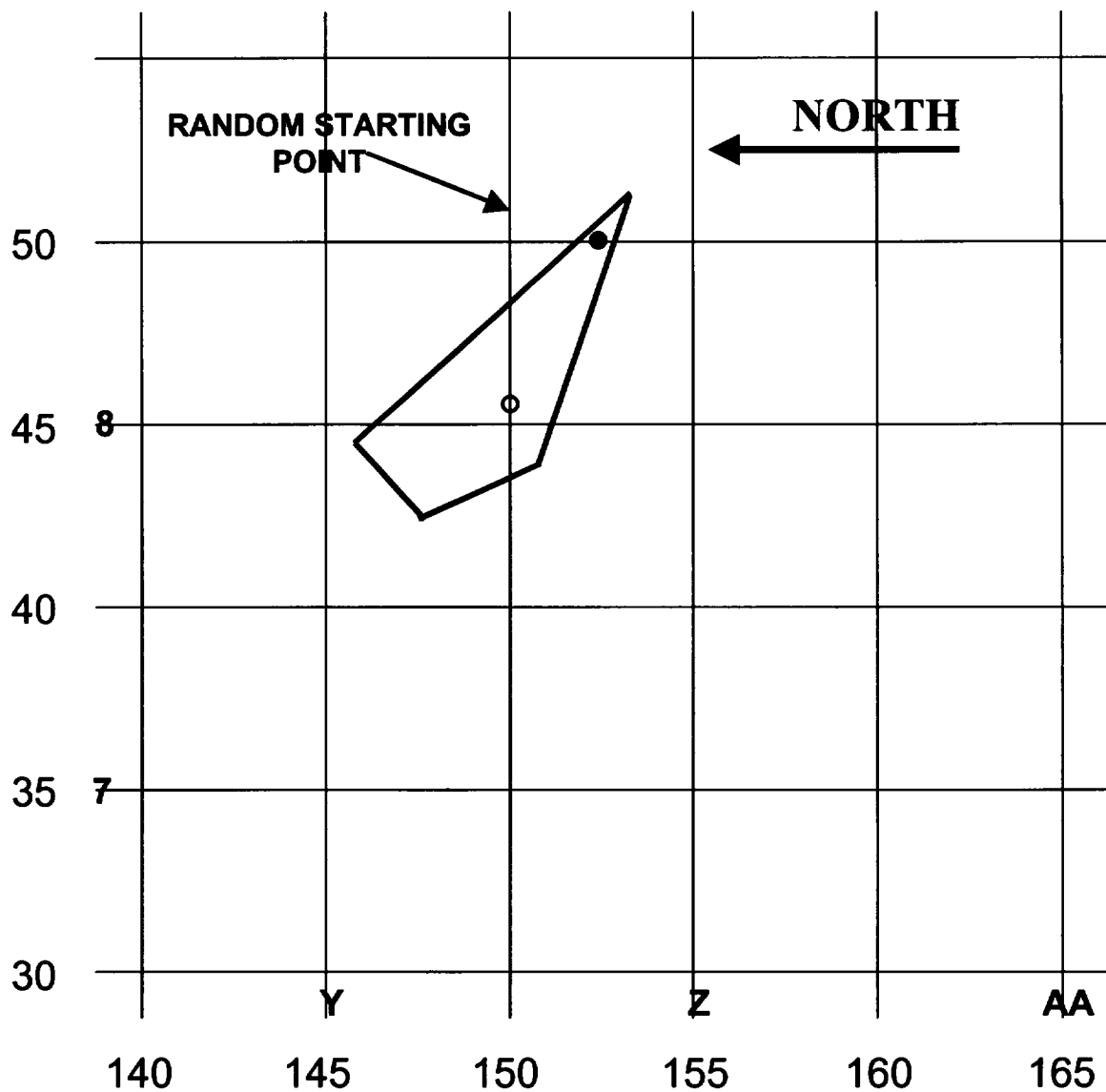
Chemical samples were collected from a discrete sample during the sampling of SP047. The chemical results are summarized in Tab 2.

3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP047 meets the release for unrestricted use criteria listed in the DP.

SP047 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP047	0.030	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 also demonstrate that the soil is acceptable for use on the Parks Site.



LEGEND:

● RADIOLOGICAL SAMPLE

○ RADIOLOGICAL AND
CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 26 M³
(1,000 FT³)

**PARKS PROJECT
PROJECT UNIT A**

**FIGURE 1
SOIL PILE SAMPLING
LOCATIONS
SP 047**

11/30/00

REV. 0

Tab 1 to Attachment C Radiological Data Summary

**Soil Pile SP047 Report
Revision 0**

SP047 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241	
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS
PR6489	01.P5261-010	150	46	1	0.17	0.17	0.13		0.03	0.02	0.02	U	0.04	-0.08	0.02	U	4.79	0.40	2.74	U	0.384	1.103	0.037
PR6489	01.P5262-010	152	50	1	0.13	0.07	0.07	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	4.76	0.38	2.72	U	0.147	0.422	0.024
																					AVERAGE:		0.030

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Tab 2 to Attachment C Chemical Data Summary

**Soil Pile SP047 Report
Revision 0**

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP047. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over fifteen volatile organics were detected in Project Unit A. PCB's were also detected in Project Unit A. A complete summary of the chemical data from Project Unit A is found in Section 7.2.4 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. There were no detections for either volatiles or PCBs in this sample.

BWXT Services strongly believes that this soil is suitable for use on the BWXS site.

		Samples Results (Encore) in SP047	
		Sample ID 11.P5261-005	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	120	U
	Benzene	6.3	U
	Bromodichloromethane	6.3	U
	Bromoform	6.3	U
	Bromomethane	12	U
	2-Butanone (MEK)	12	U
	Carbon Disulfide	6.3	U
	Carbon Tetrachloride	6.3	U
	Chlorobenzene	6.3	U
	Chlorodibromomethane	6.3	U
	Chloroethane	12	U
	Chloromethane	12	U
	Chloroform	6.3	U
	1,1-Dichloroethane	6.3	U
	1,2-Dichloroethane	6.3	U
	1,1-Dichloroethene	6.3	U
	cis-1,2-Dichloroethene	6.3	U
	trans-1,2-Dichloroethene	6.3	U
	1,2-Dichloropropane	6.3	U
	cis-1,3-Dichloropropene	6.3	U
	trans-1,3-Dichloropropene	6.3	U
	Ethylbenzene	6.3	U
	2-Hexanone	63	U
	Methylene Chloride	6.3	U
	4-Methyl-2-pentanone (MIBK)	63	U
	Styrene	6.3	U
	1,1,2,2-Tetrachloroethane	6.3	U
	Tetrachloroethene	6.3	U
	Toluene	6.3	U
	1,1,1-Trichloroethane	6.3	U
	1,1,2-Trichloroethane	6.3	U
	Trichloroethene	6.3	U
	Vinyl Chloride	11	U
	Xylenes (total)	6.3	U
Polychlorinated Biphenyls			
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected
 J - Below Contract Required Detection Limit
 B - Detected in Blank

Attachment D
Soil Pile SP048 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit A, Survey Unit A1. This report covers Soil Pile (SP) 048. Final surveys for this soil pile were conducted from October 2000 through November 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit A are isotopes of americium, plutonium, uranium, cobalt and cesium. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	0.14 to 0.18
Cobalt-60	0.04 to 0.05
Cesium-137	0.04 ¹
Total Uranium	4.15 to 6.52

¹ Both non-detects for cesium-137 were 0.04 pCi/g

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit A are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP048. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. Only trichloroethene was detected in this soil pile. There were no other chemical detections for this soil pile.

2.0 Soil Pile SP048

Soil Pile SP048 consists of overburden soils removed from the west side of the former Building A Hot Basement. SP048 was generated in an area where historical characterization indicated that the sum of the fractions indicated values were less than 1.0. Soil was removed from the hot

basement area with an excavator, loaded onto trucks, and subsequently staged onto SP048 for sampling.

Once SP048 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP048 consists of a total of approximately 3,700 cubic feet (104 cubic meters). Therefore, a minimum of 5 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 5 radiological samples in 5 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. Both of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP048 is 0.089. Therefore, SP048 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

Chemical samples were collected from a discrete sample during the sampling of SP048. The chemical results are summarized in Tab 2.

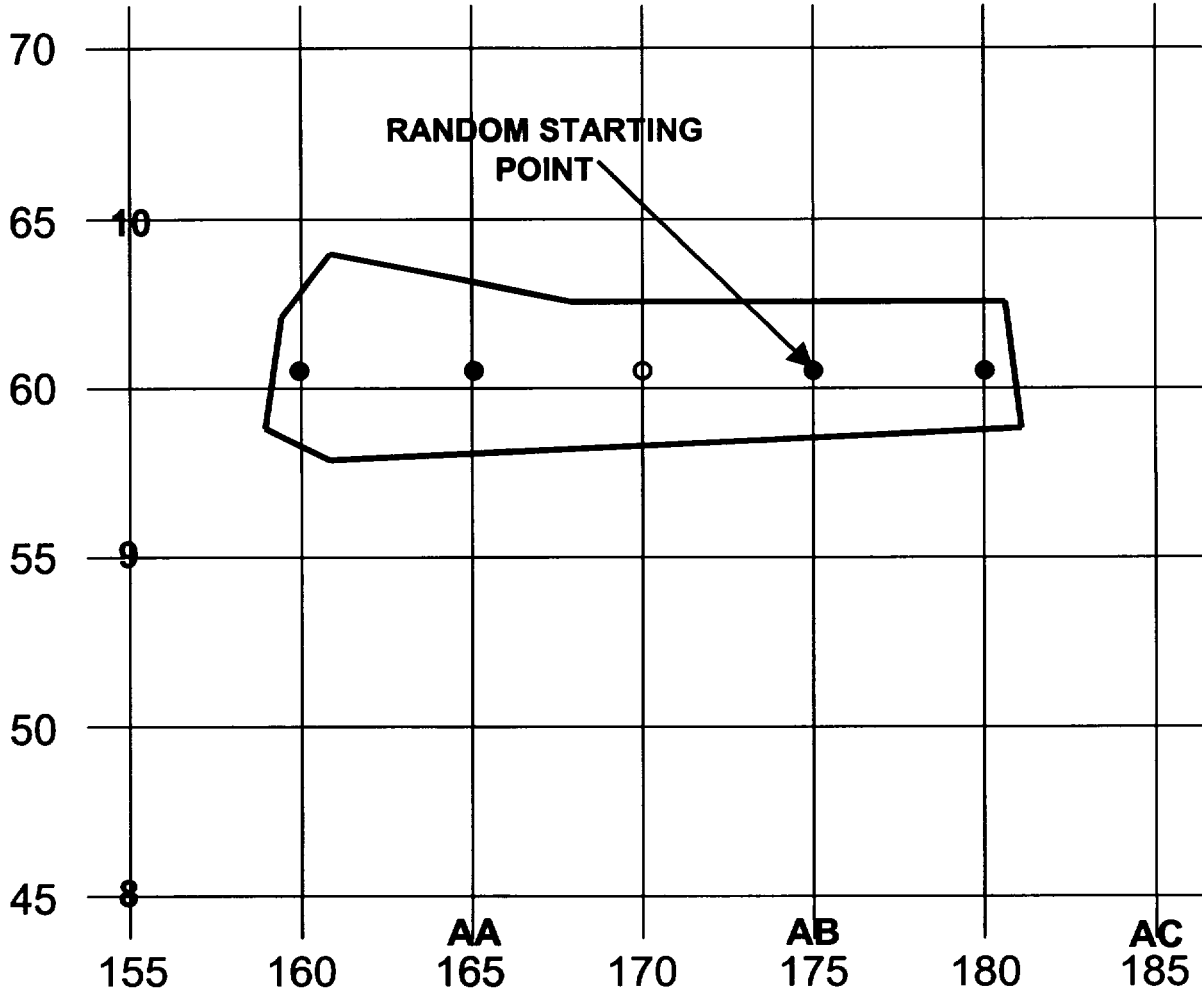
3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP048 meets the release for unrestricted use criteria listed in the DP.

SP048 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP048	0.089	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 also demonstrate that the soil is acceptable for use on the Parks Site.

NORTH
←



LEGEND:

- RADIOLOGICAL SAMPLE
- RADIOLOGICAL AND CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 104 M³
(3,700 FT³)

PARKS PROJECT PROJECT UNIT A	
FIGURE 1 SOIL PILE SAMPLING LOCATIONS SP 048	
11/29/00	REV. 0

Tab 1 to Attachment D Radiological Data Summary

**Soil Pile SP048 Report
Revision 0**

SP048 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241	
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS
PR6487	01.P5253-010	170	60.5	1	0.14	0.07	0.08	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	5.12	0.56	2.93	U	0.158	0.454	0.030
PR6487	01.P5254-010	165	60.5	1	0.17	0.09	0.10	U	0.04	0.02	0.02	U	0.12	-0.08	0.01		5.57	1.57	3.18		0.192	0.552	0.066
PR6487	01.P5255-010	160	60.5	1	1.75	1.75	0.13		0.05	0.03	0.03	U	0.12	-0.08	0.02		6.52	1.26	3.73	U	3.955	11.358	0.271
PR6487	01.P5256-010	175	60.5	1	0.15	0.08	0.09	U	0.04	0.02	0.02	U	0.06	-0.14	0.01		4.15	0.08	2.37	U	0.170	0.487	0.015
PR6487	01.P5257-010	180	60.5	1	0.18	0.09	0.10	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	5.54	1.54	3.17		0.203	0.584	0.065
																					AVERAGE:		0.089

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP048. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over fifteen volatile organics were detected in Project Unit A. PCB's were also detected in Project Unit A. A complete summary of the chemical data from Project Unit A is found in Section 7.2.4 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. Only trichloroethene was detected in the sample. There were no detections for any other volatiles or PCBs in this sample.

Trichloroethene was detected at 0.020 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 0.500 mg/kg.

BWXT Services strongly believes that this soil is suitable for use on the BWXS site.

		Samples Results (Encore) in SP048	
		Sample ID 11.P5253-005	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	100	U
	Benzene	5.0	U
	Bromodichloromethane	5.0	U
	Bromoform	5.0	U
	Bromomethane	10	U
	2-Butanone (MEK)	10	U
	Carbon Disulfide	5.0	U
	Carbon Tetrachloride	5.0	U
	Chlorobenzene	5.0	U
	Chlorodibromomethane	5.0	U
	Chloroethane	10	U
	Chloromethane	10	U
	Chloroform	5.0	U
	1,1-Dichloroethane	5.0	U
	1,2-Dichloroethane	5.0	U
	1,1-Dichloroethene	5.0	U
	cis-1,2-Dichloroethene	5.0	U
	trans-1,2-Dichloroethene	5.0	U
	1,2-Dichloropropane	5.0	U
	cis-1,3-Dichloropropene	5.0	U
	trans-1,3-Dichloropropene	5.0	U
	Ethylbenzene	5.0	U
	2-Hexanone	50	U
	Methylene Chloride	5.0	U
	4-Methyl-2-pentanone (MIBK)	50	U
	Styrene	5.0	U
	1,1,2,2-Tetrachloroethane	5.0	U
	Tetrachloroethene	5.0	U
	Toluene	5.0	U
	1,1,1-Trichloroethane	5.0	U
	1,1,2-Trichloroethane	5.0	U
	Trichloroethene	20	
	Vinyl Chloride	10	U
	Xylenes (total)	5.0	U
Polychlorinated Biphenyls			
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected

J - Below Contract Required Detection Limit

B - Detected in Blank

Attachment E
Soil Pile SP054 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit A, Survey Unit A1. This report covers Soil Pile (SP) 054. Final surveys for this soil pile were conducted from October 2000 through November 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit A are isotopes of americium, plutonium, uranium, cobalt and cesium. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	0.12 to 0.18
Cobalt-60	0.02 to 0.04
Cesium-137	0.03 to 0.04
Total Uranium	5.50 ¹

¹ Only one non-detect for total uranium

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit A are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP054. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. Methylene chloride, toluene, and total xylenes were detected in SP054. There were no other chemical detections for this soil pile.

2.0 Soil Pile SP054

Soil Pile SP054 consists of overburden soils removed from above the Outfall 3 line removal excavation. SP054 was generated in an area where historical characterization indicated that the

sum of the fractions indicated values were less than 1.0. Soil was removed from the Outfall 3 overburden excavation area with an excavator, loaded onto trucks, and subsequently staged onto SP054 for sampling.

Once SP054 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP054 consists of a total of approximately 3,200 cubic feet (90 cubic meters). Therefore, a minimum of 4 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 4 radiological samples in 4 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. All of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP054 is 0.025. Therefore, SP054 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

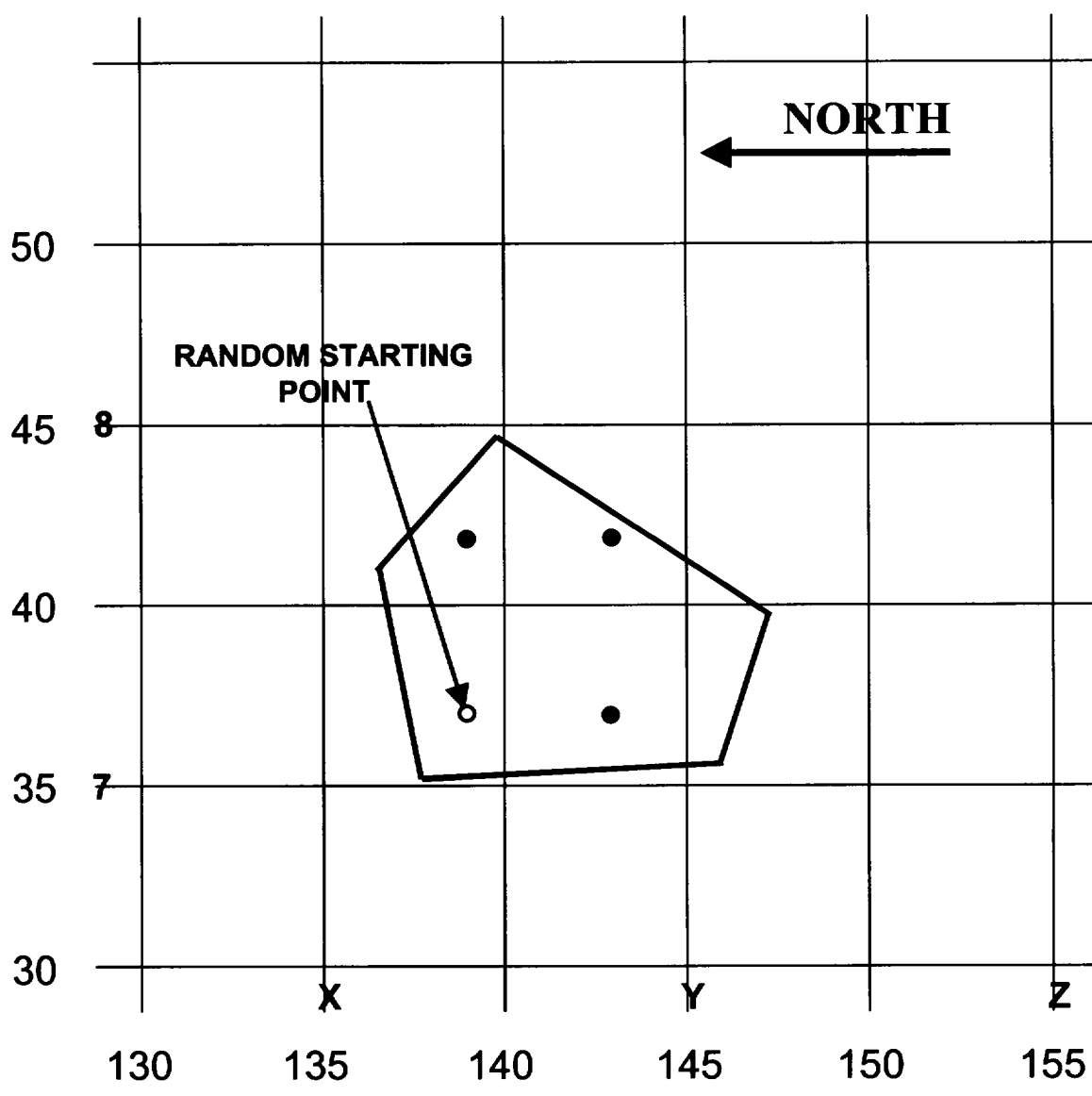
Chemical samples were collected from a discrete sample during the sampling of SP054. Methylene chloride, toluene, and total xylenes were detected in SP054. The chemical results are summarized in Tab 2.

3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP054 meets the release for unrestricted use criteria listed in the DP.

SP054 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP054	0.025	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 also demonstrate that the soil is acceptable for use on the Parks Site.



LEGEND:

● RADIOLOGICAL SAMPLE

○ RADIOLOGICAL AND CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 90 M³
(3,200 FT³)

PARKS PROJECT PROJECT UNIT A	
FIGURE 1 SOIL PILE SAMPLING LOCATIONS SP 054	
11/30/00	REV. 0

Tab 1 to Attachment E Radiological Data Summary

**Soil Pile SP054 Report
Revision 0**

SP054 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241	
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS
PR6518	01.P5523-010	139	37	1	0.18	0.09	0.10	U	0.02	0.01	0.01	U	0.06	-0.14	0.01		4.70	0.70	2.69		0.203	0.584	0.036
PR6518	01.P5524-010	144	37	1	0.12	0.06	0.07	U	0.04	0.02	0.02	U	0.04	-0.08	0.02	U	5.50	0.75	3.14	U	0.136	0.389	0.035
PR6518	01.P5525-010	143	42	1	0.17	0.09	0.10	U	0.03	0.02	0.02	U	0.03	-0.09	0.02	U	4.02	0.02	2.30		0.192	0.552	0.014
PR6518	01.P5526-010	139	42	1	0.18	0.09	0.10	U	0.04	0.02	0.02	U	0.03	-0.09	0.02	U	3.75	-0.25	2.14		0.203	0.584	0.014
																					AVERAGE:		0.025

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Tab 2 to Attachment E Chemical Data Summary

**Soil Pile SP054 Report
Revision 0**

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP054. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over fifteen volatile organics were detected in Project Unit A. PCB's were also detected in Project Unit A. A complete summary of the chemical data from Project Unit A is found in Section 7.2.4 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. Methylene chloride, toluene, and total xylenes were detected in SP054. There were no other detections for either volatiles or PCBs in this sample.

Methylene chloride was detected at 0.012 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 0.300 mg/kg.

Toluene was detected at 0.011 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 100 mg/kg.

Total xylenes were detected at 0.009 mg/kg. This compares to the most restrictive Pennsylvania Act II limit of 1000 mg/kg.

BWXT Services strongly believes that this soil is suitable for use on the BWXS site.

		Samples Results (Encore) in SP054	
		Sample ID 11.P5523-005	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	110	U
	Benzene	5.4	U
	Bromodichloromethane	5.4	U
	Bromoform	5.4	U
	Bromomethane	11	U
	2-Butanone (MEK)	11	U
	Carbon Disulfide	5.4	U
	Carbon Tetrachloride	5.4	U
	Chlorobenzene	5.4	U
	Chlorodibromomethane	5.4	U
	Chloroethane	11	U
	Chloromethane	11	U
	Chloroform	5.4	U
	1,1-Dichloroethane	5.4	U
	1,2-Dichloroethane	5.4	U
	1,1-Dichloroethene	5.4	U
	cis-1,2-Dichloroethene	5.4	U
	trans-1,2-Dichloroethene	5.4	U
	1,2-Dichloropropane	5.4	U
	cis-1,3-Dichloropropene	5.4	U
	trans-1,3-Dichloropropene	5.4	U
	Ethylbenzene	5.4	U
	2-Hexanone	54	U
	Methylene Chloride	12	
	4-Methyl-2-pentanone (MIBK)	54	U
	Styrene	5.4	U
	1,1,2,2-Tetrachloroethane	5.4	U
	Tetrachloroethene	5.4	U
	Toluene	11	
	1,1,1-Trichloroethane	5.4	U
	1,1,2-Trichloroethane	5.4	U
	Trichloroethene	5.4	U
	Vinyl Chloride	11	U
	Xylenes (total)	9.0	
Polychlorinated Biphenyls			
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected
 J - Below Contract Required Detection Limit
 B - Detected in Blank

Attachment F
Soil Pile SP059 Report
Revision 0

1.0 Introduction

Several soil piles have been generated during the remediation of the radiologically contaminated soil in Project Unit A, Survey Unit A1. This report covers Soil Pile (SP) 059. Final surveys for this soil pile were conducted from October 2000 through November 2000. The surveys were conducted in accordance with the guidelines established in Section 5.2 of the Parks Facilities Decommissioning Plan (DP) and BWXT Services, Inc. (BWXS) implementing procedures.

The radionuclides of interest in Project Unit A are isotopes of americium, plutonium, uranium, cobalt and cesium. Typical Minimum Detectable Activity for these radionuclides as discussed in the Parks Decommissioning Plan are: U-235 – 0.1 pCi/g; Am-241 – 0.06 pCi/g; Cs-137 – 0.04 pCi/g; and Co-60 – 0.1 pCi/g.

For this particular data set, the range of non-detectable values for the radionuclides referenced in the report are:

Radionuclide	Range of Non-Detectable Values (Values in pCi/g)
Americium-241	No non-detects
Cobalt-60	0.03 to 0.04
Cesium-137	No non-detects
Total Uranium	4.21 to 6.41

BWXS applied the sum-of-the-fraction rule for this data set. The release criteria for soil piles in Project Unit A are found on the Table on Page 5-8 of the decommissioning plan. The release criteria for the radionuclides are: uranium – 30 pCi/g; americium-241 – 30 pCi/g; plutonium-alpha – 25 pCi/g; plutonium-241 – 1250 pCi/g; cobalt-60 – 8 pCi/g; and cesium-137 – 15 pCi/g.

Tab 1 contains the radiological data for SP059. The data in Tab 1 is presented as both gross and net data with the backgrounds of 4.0 pCi/g uranium and 0.2 pCi/g cesium (as discussed in the DP) subtracted. The net values that are less than zero represent normal statistical deviation around background.

Tab 2 contains a summary of the chemical data for this soil pile. There were no chemical detections for this soil pile.

2.0 Soil Pile SP059

Soil Pile SP059 consists of soils removed from the north side of the Building A. SP059 was generated in an area where historical characterization indicated that the sum of the fractions indicated values between 0.5 and 1.5. Soil was removed from this area with an excavator, loaded onto trucks, and subsequently staged onto SP059 for sampling.

Once SP059 was prepared for sampling (flattened to a height of less than one meter and measured), no further material was added to the pile. SP059 consists of a total of approximately 1,500 cubic feet (43 cubic meters). Therefore, a minimum of 2 samples was required by the DP (one sample per 25 cubic meters).

The soil pile grid system was started at a randomly selected point at which a 5-meter grid was superimposed on the soil pile. Soil samples were collected using hand auger sampling techniques at the grid nodes (intersection points). Samples were collected throughout the depth of the pile. The material in each one-meter layer of soil was then composited and was considered an individual sample for radiological analysis. BWXS collected a total of 2 radiological samples in 2 hand auger boreholes at the locations indicated on Figure 1.

The radiological samples were analyzed by gamma spectroscopy. Both of the radiological samples were below the release criteria. The average sum of the fraction number for the soil samples in SP059 is 0.194. Therefore, SP059 is less than the criteria specified in the DP. The data supporting this conclusion is found in Tab 1.

Since this pile was in an area where the in-situ characterization data indicated potential sum of the fractions between 0.5 and 1.5, the soil pile was also walked over with survey instruments. No elevated areas were detected in the soil pile.

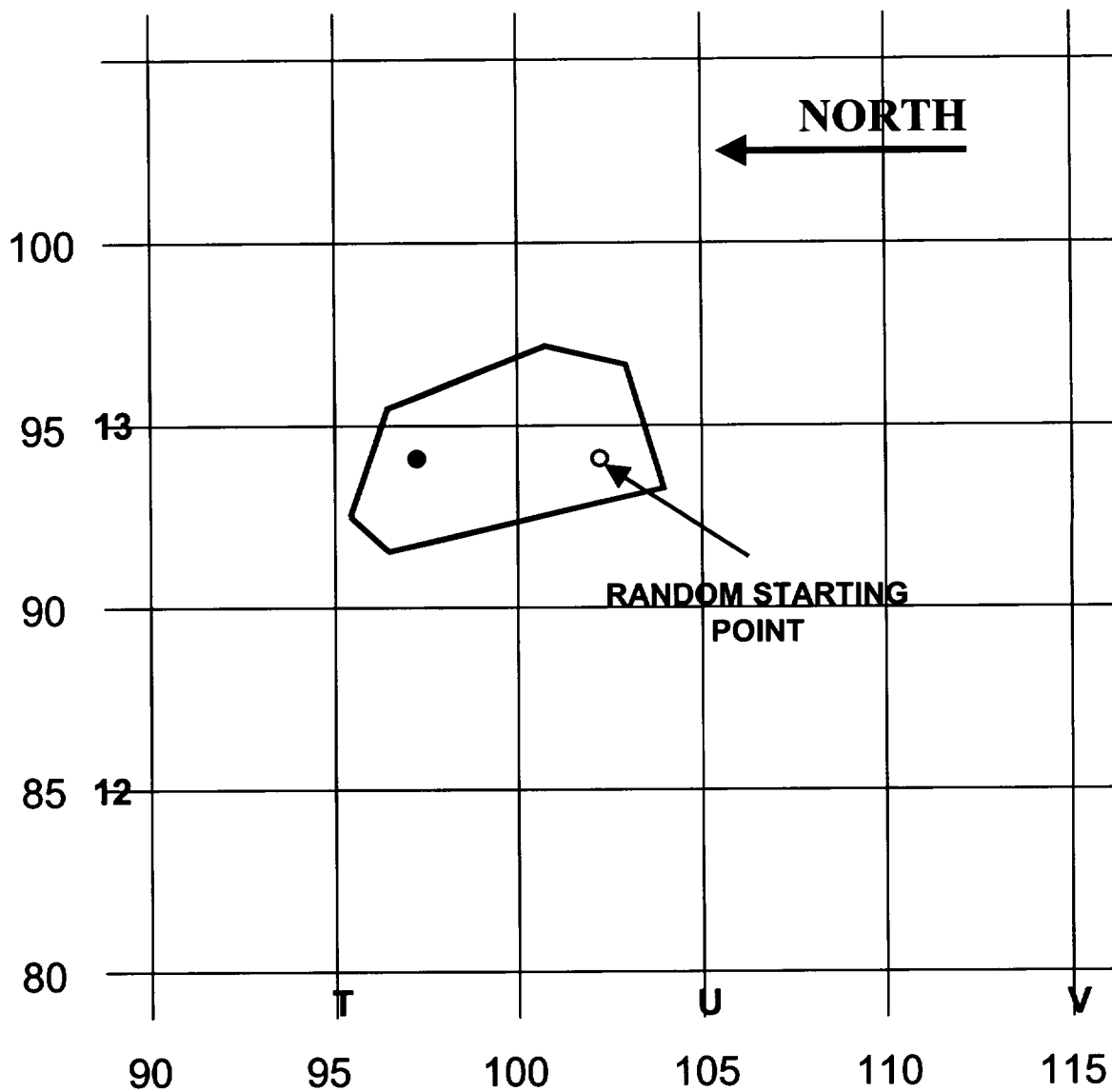
Chemical samples were collected from a discrete sample during the sampling of SP059. The chemical results are summarized in Tab 2. There were no detections for any volatiles or PCBs.

3.0 Summary

The following table summarizes the Soil Pile data and demonstrates that SP059 meets the release for unrestricted use criteria listed in the DP.

SP059 Radiological Data Summary		
Pile	Average	Soil Pile Criteria
SP059	0.194	Sum of Fractions of 1

Since none of the individual detections for the material slated for release contain results above the sum of the fraction release criteria, none of the other averaging criteria are applicable. The chemical data presented in Tab 2 also demonstrate that the soil is acceptable for use on the Parks Site.



LEGEND:

● RADIOLOGICAL SAMPLE

○ RADIOLOGICAL AND
CHEMICAL SAMPLE

SOIL PILE VOLUME:
APPROXIMATELY 43 M³
(1,500 FT³)

**PARKS PROJECT
PROJECT UNIT A**

**FIGURE 1
SOIL PILE SAMPLING
LOCATIONS
SP 059**

11/30/00

REV. 0

Tab 1 to Attachment F Radiological Data Summary

**Soil Pile SP059 Report
Revision 0**

SP059 Final Survey

					Gross Am-241				Gross Co-60				Net Cs-137				Net Total Uranium				PU(Alpha)	PU-241	
COC	Sample #	X	Y	Z	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	Gross pCi/g	Net pCi/g	Sigma Error	Qual	(AM241*2.26) pCi/g	(AM241*6.49) pCi/g	SUM OF FRACTIONS
PR6502	01.P5335-010	97	94	1	1.33	1.33	0.11		0.04	0.02	0.02	U	0.14	-0.06	0.02		6.41	1.21	3.66	U	3.006	8.632	0.214
PR6502	01.P5336-010	102	94	1	1.30	1.30	0.08		0.03	0.02	0.02	U	0.05	-0.15	0.01		4.21	0.11	2.41	U	2.938	8.437	0.173
																					AVERAGE:		0.194

Notes:

U = MDA

COC# = Chain of Custody

Net Values are determined by subtracting background (where applicable) and then correcting for minimum detectable activity results.

Backgrounds of 0.2 pCi/g of cesium-137, 4.0 pCi/g of total uranium and 10 µr/hr one meter readings used

In performing the sum of the fractions calculations, all minimum detectable activity sample results are assigned a value of ½ of the reported mean of the sample (*Statistical Methods for Environmental Pollution Monitoring*, Richard O. Gilbert, 1987, Chapter 14.2.1).

If a sample analysis yields a negative value, it is assigned a value of zero for the sum of the fractions calculations.

Chemical Data Summary

BWXS collected samples for volatile organics and polychlorinated biphenyls (PCBs) from soil pile SP059. Chemical sample locations were randomly selected at a rate of 1 per 10 radiological samples. One sample was collected and analyzed. Volatiles and PCBs were selected for analysis based on the results of the 1995 site-wide characterization program.

The *Parks Facilities Characterization Report*, Revision 0, dated April 30, 1996 provides details of the site-wide characterization effort. Over fifteen volatile organics were detected in Project Unit A. PCB's were also detected in Project Unit A. A complete summary of the chemical data from Project Unit A is found in Section 7.2.4 of the *Parks Facilities Characterization Report*.

During the collection of the chemical samples, the samplers looked for discoloration to bias the sample. No discoloration was identified. The chemical data for the soil pile is presented in the table attached to this tab.

The sampling was done using EPA Method 5035 for collecting the volatile sample. There were no detections for any volatiles or PCBs in this sample.

BWXT Services strongly believes that this soil is suitable for use on the BWXS site.

		Samples Results (Encore) in SP059	
		Sample ID	
		11.P5440-005	
Class	Parameter	Result	Qualifier
Volatile Organics (all values in ug/kg)			
	Acetone	130	U
	Benzene	6.2	U
	Bromodichloromethane	6.2	U
	Bromoform	6.2	U
	Bromomethane	13	U
	2-Butanone (MEK)	13	U
	Carbon Disulfide	6.2	U
	Carbon Tetrachloride	6.2	U
	Chlorobenzene	6.2	U
	Chlorodibromomethane	6.2	U
	Chloroethane	13	U
	Chloromethane	13	U
	Chloroform	6.2	U
	1,1-Dichloroethane	6.2	U
	1,2-Dichloroethane	6.2	U
	1,1-Dichloroethene	6.2	U
	cis-1,2-Dichloroethene	6.2	U
	trans-1,2-Dichloroethene	6.2	U
	1,2-Dichloropropane	6.2	U
	cis-1,3-Dichloropropene	6.2	U
	trans-1,3-Dichloropropene	6.2	U
	Ethylbenzene	6.2	U
	2-Hexanone	62	U
	Methylene Chloride	6.2	U
	4-Methyl-2-pentanone (MIBK)	62	U
	Styrene	6.2	U
	1,1,2,2-Tetrachloroethane	6.2	U
	Tetrachloroethene	6.2	U
	Toluene	6.2	U
	1,1,1-Trichloroethane	6.2	U
	1,1,2-Trichloroethane	6.2	U
	Trichloroethene	6.2	U
	Vinyl Chloride	13	U
	Xylenes (total)	6.2	U
Polychlorinated Biphenyls			
	Total PCBs (mg/kg)	1	U

Notes: U - Not Detected
 J - Below Contract Required Detection Limit
 B - Detected in Blank