



Annual Environmental Monitoring Report, 2007

Formerly Utilized Sites Remedial Action Program Maywood Superfund Site

Prepared by:

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Prepared for:



**US Army Corps
of Engineers®**

Contract No. DACW41-99-D-9001

June 2008, Revision 0

ANNUAL ENVIRONMENTAL MONITORING REPORT, 2007

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, LODI, AND ROCHELLE PARK, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT No. DACW41-99-D-9001
TASK ORDER 0003
WAD 03, WBS 07**

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
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26 Federal Plaza
New York, New York 10007

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100 West Hunter Avenue
Maywood, New Jersey 07607

June 2008
Revision 0

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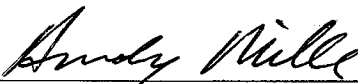
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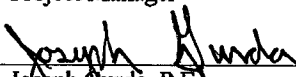
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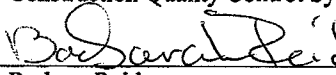
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ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
ASTM	American Society for Testing and Materials
BNI	Bechtel National, Incorporated
Bq	Becquerel
CAP88-PC	Clean Air Act Assessment Package 1988 – Personal Computer
CDQMP	Chemical Data Quality Management Plan
CFR	Code of Federal Regulations
cm	centimeter
DOE	U.S. Department of Energy
Eh	oxidation/reduction potential
EMP	Environmental Monitoring Program
EPA	U.S. Environmental Protection Agency
FGR	Federal Guideline Report
fl oz	fluid ounce
FMSS	FUSRAP Maywood Superfund Site
ft	feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	gram
gal	gallon
GEPP	General Environmental Protection Plan
GW	groundwater
ha	hectare
ICRP	International Commission on Radiological Protection
in.	inch
kg	kilogram
km	kilometer
L	liter
lb	pound
m	meter
m ³	cubic meters
mi	mile
MCW	Maywood Chemical Works
MISS	Maywood Interim Storage Site
mL	milliliter
mrem	millirem
mrem/yr	millirem per year
mSv	millisievert
NJ	New Jersey
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGVD	National Geodetic Vertical Datum
NRC	Nuclear Regulatory Commission
oz	ounce
pCi	picoCurie

pCi/g	picoCuries per gram
pCi/L	picoCuries per liter
Ra-226	radium-226
Ra-228	radium-228
RCRA	Resource Conservation and Recovery Act
Rn	radon
Rn-220	radon-220
Rn-222	radon-222
ROD	Record of Decision
SI	Système Internationale
SOP	Standard Operating Procedure
TEDE	total effective dose equivalent
TETLD	Tissue-Equivalent Thermo-Luminescent Dosimeter
Th	thorium
Th-232	thorium-232
TOC	top of inner casing
U-238	uranium-238
U _(tot)	total uranium
USACE	U. S. Army Corps of Engineers
VOC	volatile organic compound
VP	vicinity property
yd ³	cubic yard

EXECUTIVE SUMMARY

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (FMSS) is comprised of the Maywood Interim Storage Site (MISS) and 23 vicinity properties (VPs). The FMSS is located in Bergen County, New Jersey (NJ) and managed by the U.S. Army Corps of Engineers (USACE) under FUSRAP. In the early history of the FMSS, from 1916 to 1959, the former Maywood Chemical Works extracted radioactive thorium (Th) and rare earth metals from monazite sand resulting in contamination at the FMSS with low levels of Th and lower levels of uranium (U) and radium. These residues or constituents of concern are the focus of this report. The constituents of concern include thorium-232 (Th-232), radium 226 (Ra-226), U-238, and total U (U_{tot}) as described in the *Record of Decision for Soils and Buildings at the FUSRAP Maywood Superfund Site, Maywood, New Jersey*, August 2003 (ROD) (USACE 2003). Additional constituents of concern may be identified through a record of decision for the groundwater operable unit.

Per the requirements of the *General Environmental Protection Plan, FUSRAP Maywood Superfund Site, Maywood, New Jersey*, November 24, 1999 (USACE 1999a), an Environmental Monitoring Program (EMP) was established for the FMSS. One of the main objectives of the EMP is to ensure that the public and the environment are adequately protected from FUSRAP contaminants present at the FMSS. This is accomplished through annual monitoring of the air, surface water, sediment, and groundwater. This report presents the results of the EMP that was conducted for calendar year 2007.

AIR

Data obtained during 2007 was compared to the historical background conditions and to applicable regulatory criteria in the Code of Federal Regulations Title 40, Part 61 (40CFR61), Subpart H and Q (U.S. Environmental Protection Agency [EPA] 2004a), and NJ Administrative Code 7:28-12 Soil Remediation Standards for Radioactive Materials (NJ Department of Environmental Protection 2000).

Gamma Radiation

Calculated doses, above background, to the hypothetically maximally exposed resident and worker from direct gamma radiation at the MISS in 2007, based on the measured Tissue-Equivalent Thermo-Luminescent Dosimeter results, are 27.82 millirems per year (mrem/yr) and 7.51 mrem/yr, respectively. This is well below the Nuclear Regulatory Commission (NRC) standard, specified in 10CFR20, of 100 mrem/yr (NRC 2007).

Airborne Particulates

The airborne particulate dose to the hypothetically maximally exposed individual in the year 2007 was a worker with 27% occupancy time located at 113 Essex Street. The airborne particulate dose to that individual, considering all site conditions throughout the year, was 0.0004 mrem/yr, which is well below the 10 mrem/yr standard specified in the 40CFR61, Subpart H (EPA 2006a).

The maximum measured radon-222 flux concentration during a period of time soil was staged in the fabric structure at the MISS was 0.12 picoCuries per square meter per second ($\text{pCi}/\text{m}^2/\text{s}$) and thus, was well in compliance with the 40CFR61 Subpart Q standard of 20 $\text{pCi}/\text{m}^2/\text{s}$.

SURFACE WATER

During 2007, surface water was collected from ten locations within Westerly and Lodi Brooks. The surface water sample locations are depicted on **Figure D-3A** and **D-3B**, included as Appendix D. Surface water samples were analyzed for total metals, gross alpha, gross beta, Ra-226, radium 228 (Ra-228), and $U_{(tot)}$.

The ROD (USACE 2003) does not address the remediation of potentially contaminated surface water at the FMSS. Surface water at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for surface water at the FMSS.

The gross alpha results ranged from non-detect to a maximum of 3.48 picoCuries per liter (pCi/L) at location SWSD005. The gross beta results ranged from 1.91 pCi/L to a maximum of 8.59 at location SWSD002. The combined Ra-226 and Ra-228 results ranged from 0.02 pCi/L to a maximum of 0.85 pCi/L at location SWSD006. The $U_{(tot)}$ results ranged from 0.19 micrograms per liter ($\mu\text{g/L}$) to a maximum of 2.47 $\mu\text{g/L}$ at location SWSD004.

Of the 25 metal analytes measured, 18 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-5**, included as Appendix A.

SEDIMENT

Sediment was collected from nine locations within Westerly and Lodi Brooks. The sediment sample locations are depicted on **Figures D-3A** and **D-3B**, included as Appendix D. Sediment samples were analyzed for total metals, Ra-226, Th-232, and U-238. In the absence of regulatory criteria for radionuclides in sediment, the limits established in the ROD for soil (USACE 2003) were used to evaluate the shallow streambed sediment. The measured concentration of various radionuclides in sediment samples collected in Lodi and Westerly Brooks did not exceed the soil cleanup criteria established in the ROD.

The highest combined concentration of Ra-226 and Th-232 was found at location SWSD006 in Lodi Brook (4.36 picoCuries per gram [pCi/g]), which does not exceed the ROD soil cleanup criteria of 5 pCi/g above background (6.64 pCi/g, background included). The highest U-238 result was identified at location SWSD009 (2.21 pCi/g), which is well below the ROD soil cleanup criteria of 50 pCi/g above background. Over the past few years the concentrations of radionuclides within the upper Lodi Brook have trended downward. This is due to remediation of properties located adjacent to Lodi Brook.

Sediment was also analyzed for total metals. Of the 25 metal analytes measured, 23 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-6B**, included as Appendix A.

GROUNDWATER

During 2007, groundwater was collected from 24 monitoring wells located on and off the MISS. The groundwater sample locations are depicted on **Figure D-2**, included as Appendix D. Groundwater samples were analyzed for total metals, volatile organic compounds (VOCs), gross alpha, gross beta, Ra-226, Ra-228, and $U_{(tot)}$.

The ROD (USACE 2003) does not address the remediation of potentially contaminated groundwater at the FMSS. Groundwater at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for groundwater at the FMSS. A groundwater operable unit

record of decision that will address remediation of potentially contaminated groundwater and establish groundwater cleanup standards at the FMSS is expected in 2009.

The gross alpha results for the overburden wells ranged from 1.71 pCi/L to a maximum of 96.63 at well MISS05A. The gross alpha results for the bedrock wells ranged from non-detect to a maximum of 57.16 pCi/L at well B38W18D. The gross beta results for the overburden wells ranged from 0.94 pCi/L to a maximum of 91.07 pCi/L at well B38W15S. The gross beta results for the bedrock wells ranged from 0.55 pCi/L to a maximum of 596.63 pCi/L at well MW-26D. The combined Ra-226 and Ra-228 results for the overburden wells ranged from 0.33 pCi/L to a maximum of 4.28 pCi/L at well B38W19S. The combined Ra-226 and Ra-228 results for the bedrock wells ranged from 0.04 pCi/L to a maximum of 6.82 pCi/L at well B38W18D. The $U_{(tot)}$ results for the overburden wells ranged from 0.01 µg/L to a maximum of 159.03 µg/L at well MISS05A. The $U_{(tot)}$ results for the bedrock wells ranged from non-detect to a maximum of 6.50 µg/L at well B38W15D.

Groundwater was also analyzed for total metals and VOCs. Of the 25 metal analytes measured, 24 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-12**, included as Appendix A. Of the 34 VOC analytes measured, 12 were detected above the method detection limit. A summary of the VOCs detected is provided in **Table A-13**, included as Appendix A.

STATUS OF SOIL REMEDIAL ACTIVITIES

As of the end of 2007, all VPs located in the Borough of Lodi have been remediated. Additional properties located within the Borough of Maywood along Lodi Brook have also been remediated. **Table ES-1** provides a summary of the status of the 24 properties.

Table ES-1
Summary of Soil Remedial Activities

Property Address	Status
72 Sidney Street	Completed 2002
100 Hancock Street	Completed 2006
80 Hancock Street	Completed 2006
8 Mill Street	Completed 2007
80 Industrial road	Completed 2007
170 Gregg Street	Completed 2004
160 Essex Street	Completed 2003
174 Essex Street	Completed 2003
99 Essex Street	Remediated during 2007
113 Essex Street	Remediated during 2007
200 NJ Route 17 South	Completed 2006
85, 87, 99-101 NJ Route 17 North	Completed 2006
137 NJ Route 17 North	Completed 2006
167 NJ Route 17 North	Completed 2007
239 NJ Route 17 North	Completed 2007
111 Essex Street	No activity
Hackensack & Lodi Railway	No activity
23 West Howcroft Road	Completed 2006
149-151 Maywood Avenue	Remediated during 2007, ongoing
100 West Hunter Avenue (Stephan Company)	Ongoing, no activity during 2007
61 West Hunter Avenue	No activity
205 Maywood Avenue	Ongoing, no activity during 2007
NYS&W Railway	No activity

Property Address	Status
100 West Hunter Avenue (MISS)	Remediated during 2007
NJ Route 17	Remediated during 2007

SUMMARY

Overall, the results described in this Executive Summary are within the historical ranges and comparable to results reported in previous years. The surface water and sediment results along Lodi Brook were generally lower. This is attributed to previous and ongoing remediation activities along Lodi Brook. Based on the results discussed above, the objectives of the EMP as follows have been met:

- To ensure that the public and the environment are adequately protected from contaminants present at the FMSS;
- To compare EMP results to relevant Federal, State, and local laws and regulations (e.g., comparing the monitoring results with applicable criteria);
- To characterize and define trends in the physical and chemical condition of the environmental media; and
- To identify and quantify new or existing environmental quality problems.

At this time there is no need to revise the EMP since all objectives have been met. As the remedial action progresses, the media sampled and the locations for these samples will continue to be evaluated on a case-by-case basis to ensure that the objectives of the EMP continue to be met. Any changes to the EMP will be made in consultation with the appropriate regulatory agencies.

1.0 INTRODUCTION

The Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (FMSS) is located in Bergen County, New Jersey (NJ), approximately 12 miles (mi) (20 kilometers [km]) northwest of New York City and 13 mi (21 km) northeast of Newark, NJ (Appendix D, **Figure D-1**). The FMSS includes the 11.7-acre (4.7-hectare [ha]) federally-owned Maywood Interim Storage Site (MISS) and over 85 vicinity properties (VPs) in Maywood, Lodi, and Rochelle Park. The MISS is bordered to the west by NJ Route 17, to the north by the New York Susquehanna and Western Railway line, and to the south and east by commercial and industrial properties.

The former Maywood Chemical Works (MCW) site was constructed in 1895. During the years 1916 to 1959, MCW extracted radioactive thorium and rare earth metals from monazite sand for production of mantles for gas lanterns. The waste materials generated during this process contained thorium-232 (Th-232) and associated decay products, with lesser amounts of radionuclides in the uranium-238 (U-238) decay series. Slurry containing waste from these operations was pumped into two earthen-diked retention ponds west of the plant. Some process waste sands were combined with tea and coca leaves from other MCW operations, and then removed from the site and used as mulch and fill material on nearby properties. Additional waste was transported off-site by the Lodi Brook, which ran southward along the facility property line and into the Borough of Lodi. Thorium residues in the brook settled onto adjacent properties where buildings and residences were subsequently built. In 1959, the former MCW facility was sold to the Stepan Company.

In 1961, the Atomic Energy Commission issued a radioactive material license to the Stepan Company for radioactive material storage and remediation of the facility. Between 1966 and 1968, contaminated material was removed from the property west of NJ Route 17 and buried in three pits on the Stepan Company site.

In 1983, the U.S. Environmental Protection Agency (EPA) added the FMSS to the National Priorities List, and the following year cleanup of radioactive contamination at the FMSS was assigned to the U.S. Department of Energy (DOE) by Congress. To expedite remediation of the FMSS, the DOE purchased an 11.7-acre (4.7 ha) portion of the Stepan Company property for use as an interim storage facility for radiologically-contaminated materials (DOE 1992) removed from the VPs. This property referred to as the MISS was the initial focus of the Environmental Monitoring Program (EMP). The soil stockpile was removed for off-site disposal in 1996. On October 13, 1997, the FY 1998 Energy and Water Appropriations Bill transferred management of FUSRAP from the DOE to the U.S. Army Corps of Engineers (USACE). The USACE became a successor to the DOE as of March 17, 1999. FUSRAP activities presently continue with the USACE on the MISS and several of the remaining 23 commercial VPs.

As of the end of 2007, all VPs located in the Borough of Lodi have been remediated. Additional properties located within the Borough of Maywood along Lodi Brook have also been remediated. **Table 1-1** provides a summary of the status of the 24 properties.

Table 1-1
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Property Address	Status
72 Sidney Street	Completed 2002
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85, 87, 99-101 NJ Route 17 North	Completed 2006
137 NJ Route 17 North	Completed 2006
167 NJ Route 17 North	Completed 2007
239 NJ Route 17 North	Completed 2007
111 Essex Street	No activity
Hackensack & Lodi Railway	No activity
23 West Howcroft Road	Completed 2006
149-151 Maywood Avenue	Remediated during 2007, ongoing
100 West Hunter Avenue (Stephan Company)	Ongoing, no activity during 2007
61 West Hunter Avenue	No activity
205 Maywood Avenue	Ongoing, no activity during 2007
NYS&W Railway	No activity
100 West Hunter Avenue (MISS)	Remediated during 2007
NJ Route 17	Remediated during 2007

In keeping with the remedial activities and objectives of FUSRAP, an ongoing EMP has been conducted at the FMSS per the requirements of the *General Environmental Protection Plan, FUSRAP Maywood Superfund Site, Maywood, New Jersey*, November 24, 1999 (GEPP) (USACE 1999a). This program has been designed to ensure the following objectives:

- To ensure that the public and the environment are adequately protected from contaminants present at the FMSS;
- To compare EMP results to relevant Federal, State, and local environmental laws (e.g., comparing the monitoring results with applicable criteria);
- To characterize and define trends in the physical and chemical condition of the environmental media; and
- To identify and quantify new or existing environmental quality problems.

These monitoring activities include the monitoring of credible transport pathways; the selection of suitable monitoring locations; and appropriate sampling methods, techniques, and analyses.

This report has been prepared to satisfy applicable monitoring requirements and to address the above objectives. A detailed description of the measured parameters, evaluation criteria, sampling locations, monitoring methodology, interpretation of results, and conclusions is presented in this report.

1.1 MEASURED PARAMETERS

The key elements of the EMP were:

- Continuous Monitoring
- Measurement of external gamma radiation
- Measurement of radon (Rn) gas concentrations in air (from radon-220 [Rn-220] and radon-222 [Rn-222])
- Quarterly Monitoring
- Groundwater level measurements of monitoring wells
- Annual Monitoring/Sampling
- Sampling and analysis of streambed sediment for radioactive constituents and metals
- Sampling and analysis of surface water for radioactive constituents and metals
- Sampling and analysis of groundwater for radioactive constituents, metals, and volatile organic compounds (VOCs)
- Measurement of Rn flux for soil stockpiled at MISS

1.2 CALCULATED ELEMENTS

As part of the EMP, calculations were performed to determine the dose to the hypothetically maximally exposed individual (off-site and on-site) from external gamma radiation at the MISS as well as airborne particulate dose to the hypothetical maximally exposed individual (off-site) from airborne particulates generated from activities associated with the MISS. In addition, the cumulative dose to the hypothetical maximally exposed individual from external gamma radiation at MISS as well as airborne particulates generated by activities associated with MISS was calculated.

The following briefly describes the methodology for performing the above calculations. More detailed discussions of these calculations and the results with regard to regulatory compliance issues are provided in Sections 5.0, 6.0, and Appendices E and F, respectively.

- External gamma radiation dose rates are measured continuously at various locations at the MISS using Tissue-Equivalent Thermo-Luminescent Dosimeters (TETLDs). When the readings are corrected for shelter/absorption and background concentration, and normalized to exactly one year's exposure, these detectors provide a measurement of the annual external gamma radiation at that location.
- The corrected readings from the TETLDs are used to calculate the external gamma radiation dose to a hypothetical maximally exposed resident and worker conservatively assumed to be located 50 feet (ft) (15.2 meters [m]) from the side of the property with the highest radiation readings. This is a conservative approach since the nearest receptor is located over 200 ft (61.0 m) from the monitoring location with the highest radiation readings.
- The computer program used to model potential off-site exposure from airborne emissions is the Clean Air Act Assessment Package - 1988 Personal Computer program (CAP88-PC), Version 3.0 (EPA 2007a). Airborne emissions contributing to off-site exposure can occur from areas where the radioactively contaminated soil is exposed to the elements (weather) and from operations that generate airborne emissions.

- The CAP88-PC, Version 3.0 (EPA 2007a) model determines the hypothetical maximally exposed individual based on the radionuclide emissions, local meteorological data, and other factors. The model can calculate the effective dose equivalent for any receptor of interest (e.g., residences, schools, workers).
- Although the emission of Rn gas is not considered in this analysis, the daughters of Rn gas generated by the decay of radium-226 (Ra-226) in dust off-site are accounted for by the model in the computation of the effective dose equivalents for the various internal and external exposure pathways.

1.3 UNIT CONVERSIONS

Tables 1-2 and **1-3** list the units of measurement and appropriate abbreviations used in this document. Conventional units for radioactivity are used because the regulatory guidelines are generally provided in these terms; Système Internationale (SI) units of measurement are used in the discussion of all other parameters. Unit conversions are provided in the text for water level information only.

Table 1-2
Units of Measurement and Conversion Factors - Radioactivity

Parameter	Conventional Units	SI Units	Conversion Factor
Dose	millirem (mrem)	milliSievert (mSv)	1 mrem = 0.01 mSv
Activity	picoCurie (pCi)	Becquerel (Bq)	1 pCi = 0.037 Bq

Table 1-3
Units of Measurement and Conversion Factors - Mass, Length, Area, and Volume

Parameter	SI Units	English Units	Conversion Factor
Mass	gram (g)	ounce (oz)	1 g = 0.035 oz
	kilogram (kg)	pound (lb)	1 kg = 2.2046 lb
Length	centimeter (cm)	inch (in.)	1 cm = 0.394 in.
	meter (m)	feet (ft)	1 m = 3.281 ft
	kilometer (km)	mile (mi)	1 km = 0.621 mi
Area	hectare (ha)	acre	1 ha = 2.47 acres
Volume	milliliter (mL)	fluid ounce (fl oz)	1 mL = 0.0338 fl oz
	liter (L)	gallon (gal)	1 L = 0.264 gal
	cubic meter (m ³)	cubic yard (yd ³)	1 m ³ = 1.308 yd ³

2.0 EVALUATION CRITERIA

Regulatory and other criteria used to evaluate the results of the EMP program are summarized as follows, categorized by media and parameters.

2.1 EXTERNAL GAMMA RADIATION AND AIR (AIRBORNE PARTICULATES)

The criteria for evaluating the calculated maximum doses from external gamma radiation and inhalation of radioactive particulates are shown in **Table 2-1** and discussed below:

- 10 Code of Federal Regulations (CFR) 20**
 Dose limits for members of the public from Nuclear Regulatory Commission (NRC) licensed activities are presented in this NRC standard. While the FMSS project is not licensed by the NRC, the project is contractually required to meet the requirements of 10CFR20. The primary dose limit is expressed as a total effective dose equivalent (TEDE). The site limit of 100 millirem per year (mrem/yr) TEDE above background from all sources for a period of a year is specified in this standard. External gamma radiation dose and the calculated doses from all releases are included in the calculation of the TEDE. The 100 mrem/yr TEDE above background specified in this standard includes all pathways (NRC 2007).
- 40CFR61, Subparts H & Q**
 Section 112 of the Clean Air Act authorized EPA to promulgate the National Emission Standards for Hazardous Air Pollutants (NESHAP), which is applicable at the MISS under Subpart H (i.e., for non-Rn, radioactive constituents in particles) and Subpart Q (for Rn emissions) (EPA 2006a). Compliance with Subpart H is verified by applying the EPA-approved CAP88-PC, Version 3.0 (EPA 2007a). Until the storage pile was removed in 1996, compliance with Subpart Q was verified by semi-annual monitoring for Rn-222 flux. Rn flux monitoring was resumed in 2000 for the storage pile created as a result of a Time Critical Removal Action for the swale, remediation and restoration of a portion of the 96 Park Way property, and operation of the pilot facility. Rn flux monitoring was performed during 2007 in the fabric structure, which is only used to store the soil stockpiles at the MISS for a short period of time (see Appendix E, Section 4).

Table 2-1
Criteria for Airborne Radiological Contaminants

Parameter	NRC Standard	EPA Standard or Guideline
Rn Flux ^a		20 pCi m ⁻² s ⁻¹ ^c
Radionuclide Emissions ^a (airborne particulates and radioactive gases)	10 mrem/yr ^d	10 mrem/yr ^e
TEDE ^a (total contribution from all sources ^b)	100 mrem/yr ^f	

Notes: ^a The strictest standards or guidelines for each parameter are used to assess/evaluate regulatory compliance issues.

^b Contributing sources at the MISS consist of external gamma radiation exposure, radionuclide emissions listed above, and ingested radionuclides in water and soil/sediment.

^c EPA standard 40CFR61, Subpart Q (EPA 2006a).

^d NRC standard from 10CFR20.1101(d) for particulate and Rn-220 emissions only; excludes Rn-222 and its decay products (NRC 2007).

^e EPA standard from 40CFR 61, Subpart H, for particulate emissions only; excludes Rn-222 and Rn-220 (EPA 2006a).

^f NRC standard from 10CFR20.1301(a); background is excluded in the calculation of dose.

2.2 SEDIMENT - RADIOLOGICAL CONSTITUENTS

The criteria for evaluating the measured concentrations of radionuclides in sediment at the MISS are shown in **Table 2-2** and discussed below:

- **Soil Cleanup Criteria for the FMSS**

The cleanup criteria established in the *Record of Decision for Soils and Buildings at the FUSRAP Maywood Superfund Site*, August 2003 (ROD) (USACE 2003) for soils at the FMSS were used to evaluate the radiological results for sediment since no sediment criteria currently exists. Specifically, 5 pCi/g of Ra-226 and Th-232 combined above background was used to evaluate sediment concentrations. In addition, 100 pCi/g above background for total uranium ($U_{(tot)}$), which equates to 50 pCi/g of U-238 for all properties addressed in the ROD, was used to evaluate sediment concentrations.

Table 2-2
Radiological Criteria for Sediment

Parameter	ROD Soil Cleanup Criteria ^a
Ra-226	5 pCi/g 5.9 pCi/g (w/ Background)
Th-232	5 pCi/g 5.71 pCi/g (with background)
Ra-226 + Th-232	5 pCi/g 6.64 pCi/g (with background)
U-238	50 pCi/g 51.33 pCi/g (with background)
$U_{(tot)}$	100 pCi/g 103 pCi/g (with background)

Note:

a Soil cleanup criteria established in the ROD for the combined Ra-226 and Th-232 concentration, above background, as well as the $U_{(tot)}$ and U-238 concentration, above background, are used as the basis for evaluating the analytical results for sediment.

3.0 SAMPLING LOCATIONS AND RATIONALE

Contamination at the MISS is present in the former retention ponds, on the ground surface, and in on-site structures. Exposure to members of the public by this radioactive-contaminated material at the MISS is unlikely because of site access restrictions (e.g., fences) and engineering controls (e.g., dust suppression, pile covers, truck decontamination, etc.). Potential pathways include direct exposure to external gamma radiation, inhalation of Rn or radioactively-contaminated particulates in air, and contact with or ingestion of contaminated streambed sediments, surface water, or groundwater. There are no drinking water wells within the area sampled for groundwater contaminants. In addition, surface water is not used as a potable water source. The EMP has been developed to evaluate and monitor these potential exposure routes through annual sampling and analysis for radioactive and chemical constituents. In Appendix D, **Figures D-2, D-3A, and D-3B** show the EMP sampling locations at the MISS and VPs, and indicate the type of media sampled at each location. In Appendix A, **Table A-1** summarizes the 2007 monitoring program at the MISS for external gamma radiation, Rn gas, groundwater, surface water, and sediment.

Measurements of external gamma radiation are taken along fence line locations surrounding the MISS in order to assess potential exposure levels to the public and site workers (Appendix D, **Figure D-2**).

Atmospheric monitoring of Rn gas is conducted on-site, both in known areas of contamination and at fence line locations (Appendix D, **Figure D-2**).

Surface water and sediment sampling includes the analysis for radioactive constituents and metals along Westerly Brook and Lodi Brook (**Table 3-1**, Appendix A, **Tables A-4, A-5, A-6A, and A-6B**, Appendix D, **Figures D-3A and D-3B**). Sampling locations along Lodi and Westerly Brooks are used to assess both upstream and downstream conditions. Because Lodi Brook receives drainage from areas of known contamination, sampling is also conducted along the eastern and western tributaries of this stream.

In 2007, sampling at surface water and sediment locations SWSD011 through SWSD015 was suspended. These locations lie along the lower Lodi Brook in the Borough of Lodi. The rationale for suspending the sampling was based on six years of non-detect sample results and the completion of remedial work at the properties within the drainage area of the lower Lodi Brook. The USACE requested the suspension of sampling at these locations in letters to EPA and New Jersey Department of Environmental Protection (NJDEP), dated March 15, 2007. The EPA and NJDEP concurred with the USACE recommendations in letters to USACE dated May 7, 2007 and April 30, 2007, respectively.

Water level measurements and groundwater samples from monitoring wells enable the assessment of groundwater flow patterns and are used to evaluate groundwater quality upgradient and downgradient of the site, in the source area and at the MISS/Stepan Company boundary (Appendix D, **Figure D-2**). Groundwater in both the surficial unconsolidated sediments and bedrock is monitored at the MISS. For the 2005 sampling effort, changes were made to the groundwater sampling program. These changes were due to ongoing remedial activities. Monitoring wells MISS06A, B38W25D, and B38W25S were abandoned in accordance with NJDEP requirements. Monitoring wells MW-26D, MW26S, and B38W03B were substituted for these wells. Monitoring wells MISS03A and MISS03B were also abandoned per NJDEP requirements. These two wells were not included within the sampling network but were used to determine groundwater depth and flow. In addition, monitoring well B38W12A was abandoned per NJDEP requirements and new well B38W12AR was installed. This well was not sampled, but was only used to determine groundwater depth and flow. There were no changes during the 2007 EMP groundwater monitoring effort.

Table 3-1
Rationale for Selection of Surface Water and Sediment Sampling Locations

Location	Watercourse	Description of Location	Rationale for Selection
SWSD001	Westerly Brook	Located downstream of the MISS at the point where the Westerly Brook stormwater culvert discharges into Saddle Brook.	Downstream of the MISS. Potential area where sediments may accumulate prior to discharge to Saddle River.
SWSD002	Westerly Brook	Located downstream of the MISS. The location is in an area where Westerly Brook is in open channel flow.	Downstream of the MISS in the first area downstream of the MISS where Westerly Brook is in open channel flow. Potential area where sediments may accumulate.
SWSD003	Westerly Brook	Located approximately 100 ft (30.5 m) upstream of the MISS. The location is in an area where Westerly Brook is in open channel flow.	Upstream of and in close proximity to the MISS. Serves as a background location.
SWSD004	Westerly Brook	Located downstream of the MISS. The location is in a catch basin where a portion of Westerly Brook is located in a stormwater culvert.	Initial sampling location downstream of the MISS where sediments may accumulate and where surface water can be sampled.
SWSD005	Lodi Brook	Located south of the MISS on an FMSS VP. The location is at the confluence of the eastern and western tributaries of Lodi Brook, and in an area where Lodi Brook is in open channel flow.	Downstream of the MISS and is located on a VP.
SWSD006	Lodi Brook	Located south of the MISS on an FMSS VP. Eastern tributary of Lodi Brook that is in open channel flow. Does not receive stormwater runoff from the MISS.	Located on a VP and near the head waters to Lodi Brook where there is usually sufficient flow in Lodi Brook for surface water and sediment sampling.
SWSD007	Lodi Brook	Located south of the MISS on an FMSS VP that is in open channel flow. Does not receive stormwater runoff from the MISS.	Located on a VP.
SWSD008	Lodi Brook	Located south of the MISS on an FMSS VP. Does not receive stormwater runoff from the MISS.	Located on a VP. Forms a portion of the headwaters of Lodi Brook in an area designated as wetlands.
SWSD009	Lodi Brook	Located south of the MISS on an FMSS VP. Does not receive stormwater runoff from the MISS.	Located on a VP. Forms a portion of the headwaters of Lodi Brook in an area designated as wetlands.
SWSD010	Lodi Brook	Located south of the MISS on an FMSS VP. Lodi Brook is in open channel flow.	Located on a VP. Downstream of the MISS and VPs.
SWSD011	Lodi Brook	Located south of the MISS on an FMSS VP. Located in a stormwater catch basin to the Lodi Brook stormwater culvert.	In 2007, sampling at this location was suspended.
SWSD012	Lodi Brook	Located south of the MISS on an FMSS VP. Located in a stormwater catch basin to the Lodi Brook stormwater culvert.	In 2007, sampling at this location was suspended.

Location	Watercourse	Description of Location	Rationale for Selection
SWSD013	Lodi Brook	Located south of the MISS on an FMSS VP. Located in a stormwater catch basin to the Lodi Brook stormwater culvert.	In 2007, sampling at this location was suspended.
SWSD014	Lodi Brook	Located south of the MISS on an FMSS VP. Located in a stormwater catch basin to the Lodi Brook stormwater culvert.	In 2007, sampling at this location was suspended.
SWSD015	Lodi Brook	Located south of the MISS on an FMSS VP. The point where the Lodi Brook stormwater culvert discharges into Saddle Brook.	In 2007, sampling at this location was suspended.

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4.0 MONITORING METHODOLOGY

The GEPP (USACE 1999a) addresses the controls designed to prevent contamination from soil, water, and air emission resulting from remediation at the FMSS. The GEPP also describes the methodology for implementing the EMP at the FMSS to monitor the successful implementation of those controls. The EMP monitors the various media where there is potential for exposure of the public and the environment to FMSS contaminants. The majority of the effort concentrates on the MISS where there is a greater potential for exposure. Surface water, sediment, and groundwater in the vicinity of the MISS are also monitored.

Standard analytical methods approved and published by EPA, the American Society for Testing and Materials (ASTM), and/or the American Public Health Association were used for chemical (i.e., all non-radiological) analyses. The laboratories conducting the radiological analyses adhere to EPA-approved methods and procedures developed by the Environmental Measurements Laboratory, ASTM, and the State of NJ. All laboratories analyzing FUSRAP chemical and radiological samples are certified by NJDEP and National Environmental Laboratory Accreditation Program-certified. A detailed listing of the specific procedures and the data quality objectives for the monitoring conducted in the 2007 program is provided in the FMSS Chemical Data Quality Management Plan (CDQMP) (USACE 2004b).

The USACE FUSRAP Maywood Laboratory, located in Maywood NJ, performed radiological analysis of surface water, sediment, and groundwater samples. GPL Laboratory, located in Frederick, Maryland, performed metals analysis of surface water, sediment, and groundwater, and VOC analysis of groundwater samples. STL Laboratory, located in St Louis, Missouri, performed radiological and chemical analysis of USACE split samples.

Environmental monitoring activities were conducted in accordance with the CDQMP and Standard Operating Procedures (SOPs) listed in **Table 4-1**. The monitoring activities are based on guidelines provided in *RCRA Ground Water Monitoring: Draft Technical Guidance* (EPA 1992a); *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846 (EPA 1997); and *A Compendium of Superfund Field Operations Methods* (EPA 1987). Groundwater samples were collected using the USEPA Region II memo dated March 20, 1988, titled *Final USEPA Region II Low Stress (Low Flow) Groundwater Sampling Standard Operating Procedure* (EPA 1988).

Table 4-1
FUSRAP Standard Operating Procedures
Used for Environmental Monitoring Activities

SOP Number	SOP Title
SOP 301-1	Sediment Sampling (USACE 2004b)
SOP 302-1	Surface Water Sampling (USACE 2004b)
SOP 304-1	Purging and Sampling Monitoring Wells (USACE 2004b)
SOP 410-1	Groundwater Level Measurement (USACE 2004b)
SOP 506-1	Decontamination (USACE 2004b)

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5.0 ANALYTICAL DATA AND INTERPRETATION OF RESULTS

This section presents the data and interpretation of results for the 2007 EMP that is subject to the evaluation criteria discussed within Section 2.0. Data for 2007 are presented in Appendix A, **Tables A-2 through A-13**.

The historic data for the ten surface water and sediment locations and 24 groundwater monitoring wells are presented in Appendix B, **Figures B-1 through B-34**.

5.1 EXTERNAL GAMMA RADIATION

External gamma radiation dose rates are measured using TETLDs that are placed at the MISS and at locations off-site. The TETLDs continuously measure external gamma radiation dose rates throughout the year. Locations of TETLDs are shown on **Figure D-2** in Appendix D. Each TETLD measures a cumulative dose over the period of exposure (approximately 1 year). When corrected for shelter/absorption and background, and normalized to exactly 1 year's exposure, these detectors provide a measurement of the annual external gamma radiation dose at that location. TETLD results for the 2007 external gamma radiation dose (i.e., both raw and corrected data) are summarized in Appendix A, **Table A-2**.

The corrected data are used to calculate the external gamma radiation dose to a hypothetical maximally exposed individual conservatively assumed to be located 50 ft from the fenceline. Identification of this hypothetical individual is a function of the fenceline dose, the distance of the individual from the fenceline, and the amount of time that the individual spends at the specific location. The data from the side of the site displaying the highest radiation readings (i.e., location 21) are averaged, and the external gamma dose rate at the distance to individuals at the nearest commercial/industrial facility and residence is then determined. The calculated doses above background to the hypothetical maximally exposed resident (assuming 100% occupancy) and worker (assuming 27% occupancy, 9 hours per day, 5 days per week, 52 weeks per year) from direct gamma radiation at the MISS in 2007 were 27.82 mrem/yr and 7.51 mrem/yr, respectively (see Calc 102682-0307-004 in Appendix F) which are well below the NRC standard of 100 mrem/yr. Location 19 (see Appendix D, **Figure D-2**) was used to determine the average background rate. As a comparison, the calculated doses to the hypothetical maximally exposed resident and worker from direct gamma radiation at the MISS in 2006 were 29.11 mrem/yr and 6.70 mrem/yr, respectively.

5.2 RADON-220 (Rn-220) AND RADON-222 (Rn-222)

Results of the 2007 monitoring for Rn gas (Rn-220 and Rn-222) are presented on **Table A-3** in Appendix A, and detector locations are shown on **Figure D-2** in Appendix D. At each exterior location, two types of detectors were exposed. One detector type, the RadTrack®, allowed both isotopes of Rn to enter. The other detector type, the RadTrack®-modified, contains a membrane that specifically excluded Rn-220. Rn-222 results are reported as received from the laboratory (i.e., the data are obtained directly from the RadTrack®-modified detectors). Rn-220 concentrations are calculated using the RadTrack® and RadTrack®-modified data.

Rn-222 concentrations for 2007 ranged from the Lower Level of Detection to a maximum of 0.2 pCi/L.

For the first six months of the monitoring year, Rn-220 concentrations ranged from 0.17 pCi/L (Background location 19) to a maximum of 3.22 pCi/L (location 31). For the last six months of the monitoring year, Rn-220 concentrations ranged from 0.42 pCi/L (Background location 19) to a maximum

of 4.37 pCi/L (location 4). The results for 2007 were slightly higher than previous years. The higher than normal results may be attributed to soil disturbing activities on the MISS. During 2007, a haul road was constructed on the MISS, 100 West Hunter Avenue (Stepan Company), and 149-151 Maywood Avenue (Sears Logistical Services). The haul road was constructed in areas subject to remediation.

The maximum concentration of Rn-222 and Rn-220 combined for the first six months was 3.42 pCi/L (location 31). The maximum concentration of Rn-222 and Rn-220 combined for the last six months was 4.57 pCi/L (location 4). The maximum annual average result for the 12 month monitoring period was approximately 3.29 pCi/L (location 31).

As with most low concentrations of gases in an open, unconfined area, the Rn emitted from this area dissipates quickly and does not significantly affect workers or the general population, which is located off-site. The closest residential inhabitants live to the northeast, approximately 200 ft (61 m). Locations 32 and 33 (Appendix D, **Figure D-2**) were installed in 1996 in order to examine Rn gas concentrations in this area. Rn-220 results at these two off-site locations were significantly lower than the concentrations detected on-site.

5.3 AIRBORNE PARTICULATE DOSE

To determine the annual effective dose from airborne emissions of radioactive particulates generated during the year 2007 at the MISS and VPs, multiple potential sources were considered (see Appendix E):

- *In-situ* wind erosion at the MISS, Maywood;
- Twelve soil load-outs at the MISS, Maywood;
- Remedial actions at 80 Industrial Road, Lodi;
- Remedial actions at 8 Mill Road, Lodi;
- Remedial actions at 99 Essex Street, Maywood;
- Remedial actions at 113 Essex Street, Maywood;
- Remedial actions at 167 NJ Route 17 North, Maywood;
- Remedial actions at 239 NJ Route 17 North, Maywood;
- Remedial actions at 149-151 Maywood Avenue, Maywood;
- Remedial actions activities at 100 West Hunter Avenue, Maywood;
- Remedial actions in the NJ Route 17 South Right of Way, Maywood;
- Construction activities for the MISS Improvements at 100 West Hunter Avenue, Maywood;
- Construction activities for the Columbia Lane water line repair; and
- Soil preparation laboratory at the 100 West Hunter Avenue (MISS), Maywood.

The particulate release rates from the preceding multiple potential sources were calculated using the methodology contained in the "Industrial Wind Erosion" section of EPA's AP-42 (EPA 1995). The emissions of particulate matter from the exhaust system for the soil sample preparation laboratory was determined based on the number of soil samples prepared, the average quantity of particulate emissions resulting from the grinding of the samples, and the removal efficiency of the High Efficiency Particulate Air filter.

The radionuclide emission rates were based on the particulate release rates and the average radionuclide source concentrations obtained from soil measurements for each of the above operations. Specifically, the source concentrations for the isotopes U-238, Ra-226, and Th-232 were based on the average values obtained from the measurements of these radionuclides in surface soil samples for the *in-situ* soil (DOE 1987), and average values measured in soil samples for the 12 soil load-outs, remedial actions at nine VPs and the MISS, and construction activities for the MISS improvements and Columbia Lane water line repair. Unknown radionuclide source concentrations were based on the known source concentrations assuming secular equilibrium in the decay chains (Shlein 1992).

Although the emission of Rn gas is not considered in this analysis, the daughters of Rn generated by the decay of Ra-226 in dust off-site is accounted for by the model in the computation of the effective dose equivalents for the various internal and external exposure pathways. The radionuclide emissions for the year from each of the above sources were entered into the CAP88-PC, Version 3.0 to perform the following two calculations (EPA 2007b):

Estimation of the hypothetical doses from airborne radioactive particulates at downwind distances corresponding to individuals located at the nearest residences and nearest commercial/industrial facilities as measured from the centers of the above sources. Analyses were performed separately for the 12 soil load-outs, remedial actions at nine VPs and the MISS, and construction activities for the MISS improvements and Columbia Lane water line repair given the differences in receptor locations most affected by each of these areas. The *in-situ* wind erosion and the exhaust hood emissions were found to be negligible, and thus, were not included in the modeling analyses (see Appendix E, Annual NESHAP Compliance Report for Year 2007, Sections 1.5.13 and 1.5.14). Where individual receptors are affected by more than one emission source, doses caused by those sources were added. The hypothetical doses were based on the CAP88-PC, Version 3.0 default assumption that the receptor occupies the location 100% of the time (i.e., 24 hours per day, 7 days per week, 52 weeks per yr). The occupancy factor of 100%, although conservative, is considered to be appropriate for a resident. To estimate the dose to an employee working normal hours, an occupancy factor of 27% (i.e., 9 hours per day, 5 days per week, 52 weeks per yr) was applied to the CAP88-PC, Version 3.0 result. The hypothetical individual receiving the highest of these calculated doses was then identified as the individual maximally exposed to the airborne particulate dose. Since this dose is based in part on wind direction and not simply the distance from the site, this hypothetical maximally-exposed individual may not be the same as the person identified in the dose calculation for external gamma radiation (Section 5.1).

The hypothetical collective dose from airborne radioactive particulates for the population within 50 mi (80 km) of the site was estimated using a population file (generated from county population densities) to determine the number of people in graduated, concentric grid sections radiating outward to 50 mi (80 km) from the center of the site.

The CAP88-PC, Version 3.0 model determines the maximally exposed individual based on the radionuclide emissions, local meteorological data, and other factors. The model can calculate the effective dose equivalent for any receptor of interest (e.g., residences, schools, workers).

The CAP88-PC, Version 3.0 program computes radionuclide concentrations in air, rates of deposition on ground surfaces, concentrations in food, and intake rates to people from ingestion of food produced in the assessment area. By coupling the output of the atmospheric transport models with terrestrial food chain models from the U.S. NRC Regulatory Guide 1.109 ("Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I"), the program estimates the radionuclide concentrations in produce, leafy vegetables, milk, and meat consumed by humans. The population distribution array used in the computer model was calculated from known land surrounding the site and the year 2000 census figures. The program

calculates the effective dose equivalent by combining the inhalation and ingestion intake rates and the air and ground surface concentrations with dose conversion factors provided in Federal Guidance Report (FGR) 13 (EPA 1999). Dose and risk conversion factors include the effective dose equivalent calculated according to the methods in the International Commission on Radiological Protection's Publication 72, Age Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5. Compilation of Ingestion and Inhalation Dose Coefficients" (ICRP 1996). Although FGR 13 contains age-dependent dose factors, CAP88-PC only uses the adult factors in order to retain consistency with previous versions of CAP88-PC. CAP88-PC, Version 3.0 calculates dose to the 23 internal organs modeled in FGR 13, in addition to the 50-year effective dose equivalent. Doses can be tabulated as a function of radionuclide, pathway, location, and organ as shown in the calculation presented in Appendix E.

The hypothetical maximally exposed individual in 2007 was a worker with 27% occupancy time located at 113 Essex Street. The 2007 airborne particulate dose to that individual, considering all site contributions throughout the year, was 0.0004 mrem/yr which is well below the 10 mrem/yr standard specified in 40CFR61, Subpart H. The second calculation noted above indicates that the hypothetical airborne particulate collective dose to the population in 2007, within 50 mi (80 km) of the site, was 0.001 person-rem/yr.

5.4 SURFACE WATER AND SEDIMENT

Surface watercourses and drainage near the MISS and VPs include Westerly and Lodi Brooks (Appendix D, **Figures D-3A** and **D-3B**). Westerly Brook flows through a culvert after it enters the northwestern corner of the MISS. The subsurface culvert redirects Westerly Brook to the west, south, and then to the west again, along the northern and western property boundaries. After leaving the MISS, the culvert remains below grade for approximately 1,100 ft (335 m) before it terminates. At this point, Westerly Brook reemerges and resumes its westward course. Ultimately, Westerly Brook discharges into the Saddle River. Lodi Brook begins on the property located at 149-151 Maywood Avenue in a low marshy area that collects runoff from the 149-151 Maywood Avenue and Stepan Company properties; from there it flows southward under NJ Route 17 remaining underground in a stormwater culvert for most of its course. Exceptions to this are small sections on both sides of Interstate 80 and a small section along NJ Route 17. From this area, the Lodi Brook flows approximately 1.8 mi (2.9 km) downstream of the confluence of Westerly Brook and the Saddle River before joining the Saddle River.

5.4.1 Surface Water

The ROD (USACE 2003) does not address the remediation of potentially contaminated surface water at the FMSS. Surface water at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for surface water at the FMSS.

A total of ten (four locations along Westerly Brook and six locations along Lodi Brook) were sampled in 2007 (Appendix D, **Figures D-3A** and **D-3B**). On Westerly Brook, upstream location SWSD003, and downstream locations SWSD001, SWSD002, and SWSD004 of the MISS were sampled. On Lodi Brook, locations that were sampled included: SWSD006, SWSD007, SWSD008, and SWSD009 (on the eastern tributary of Lodi Brook); SWSD005 (at the confluence of the eastern and western tributaries of Lodi Brook); and SWSD010 (downstream of the MISS and VPs along Lodi Brook). The western tributary of Lodi Brook drains portions of the MISS, Stepan Company, and 149-151 Maywood Avenue properties. Background sampling was conducted in Westerly Brook, upstream (north) of the site, at SWSD003.

Surface water samples in 2007 were collected and analyzed for radionuclides and metals.

Radioactive Constituents

Surface water samples were analyzed for gross alpha, gross beta, Ra-226, Ra-228, and $U_{(tot)}$. The results are presented in Appendix A, **Table A-4**. The gross alpha results ranged from non-detect to a maximum of 3.48 pCi/L at location SWSD005. The gross beta results ranged from 1.91 pCi/L to a maximum of 8.59 at location SWSD002. The combined Ra-226 and Ra-228 results ranged from 0.02 pCi/L to a maximum of 0.85 pCi/L at location SWSD006. The $U_{(tot)}$ results ranged from 0.19 $\mu\text{g/L}$ to a maximum of 2.47 $\mu\text{g/L}$ at location SWSD004.

The gross alpha, gross beta, and combined Ra-226 plus Ra-228 results for the upstream location (SWSD003) and downstream location (SWSD004) within Westerly Brook are shown on **Figure 5-1** through **Figure 5-3**.

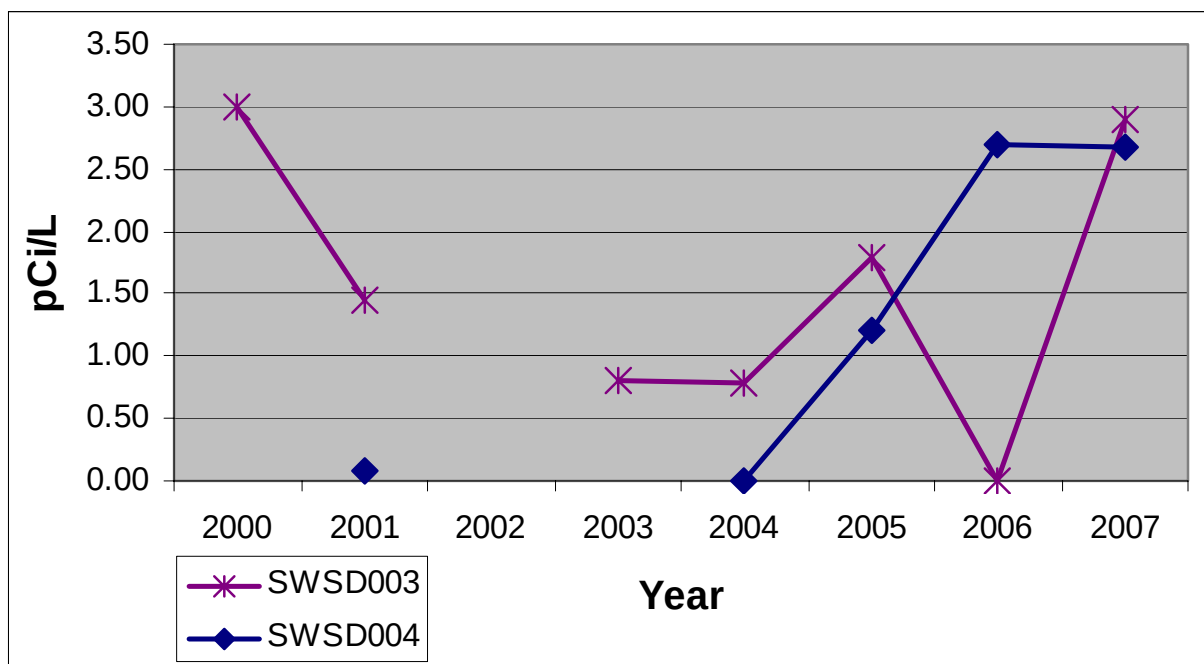


Figure 5-1
Gross Alpha Results for Surface Water in Westerly Brook

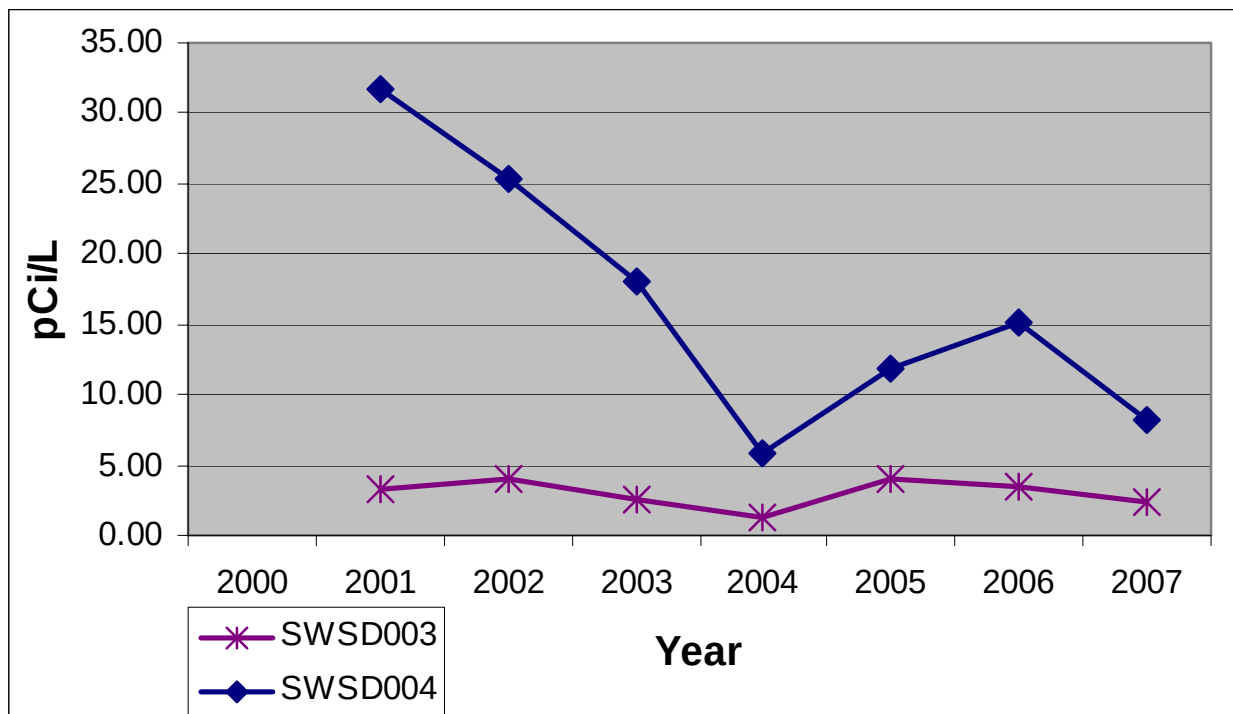


Figure 5-2
Gross Beta Results for Surface Water in Westerly Brook

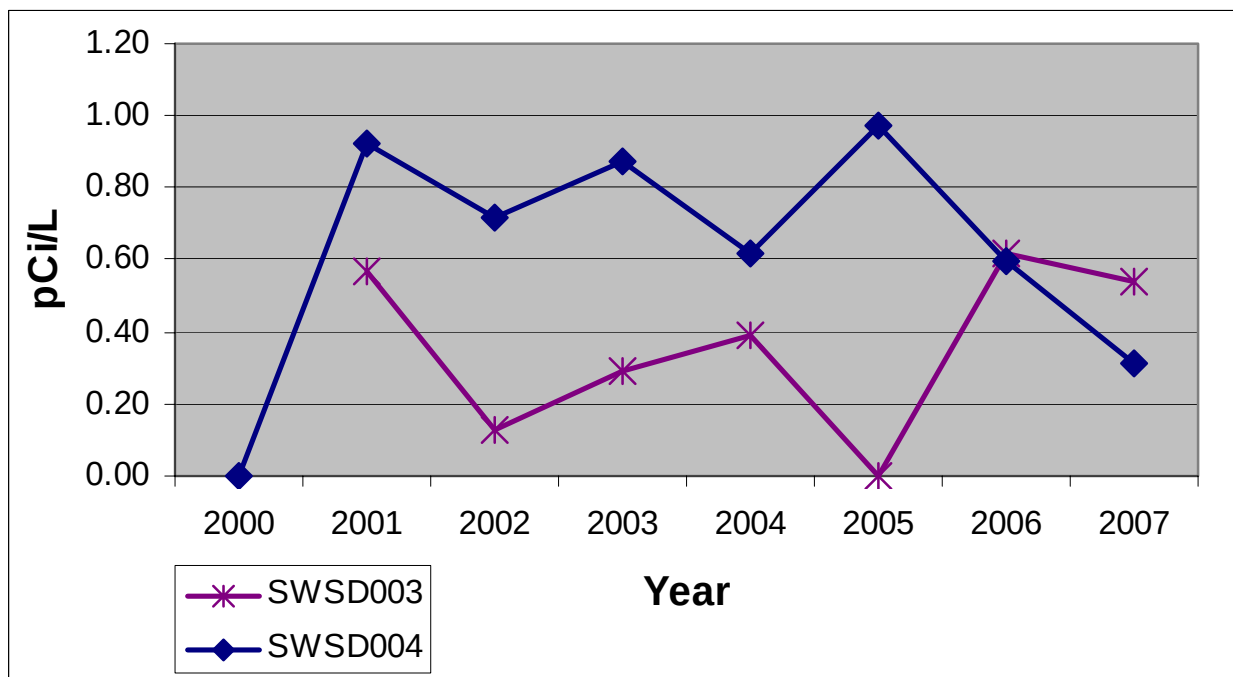


Figure 5-3
Ra-226 + Ra-228 Results for Surface Water in Westerly Brook

The gross alpha, gross beta, and combined Ra-226 plus Ra-228 results for the upstream location (SWSD007) and downstream location (SWSD010) within Lodi Brook are shown on **Figure 5-4** through **Figure 5-6**. The results show that the gross alpha, gross beta, and combined Ra-226 plus Ra-228 levels within the brook are generally trending lower.

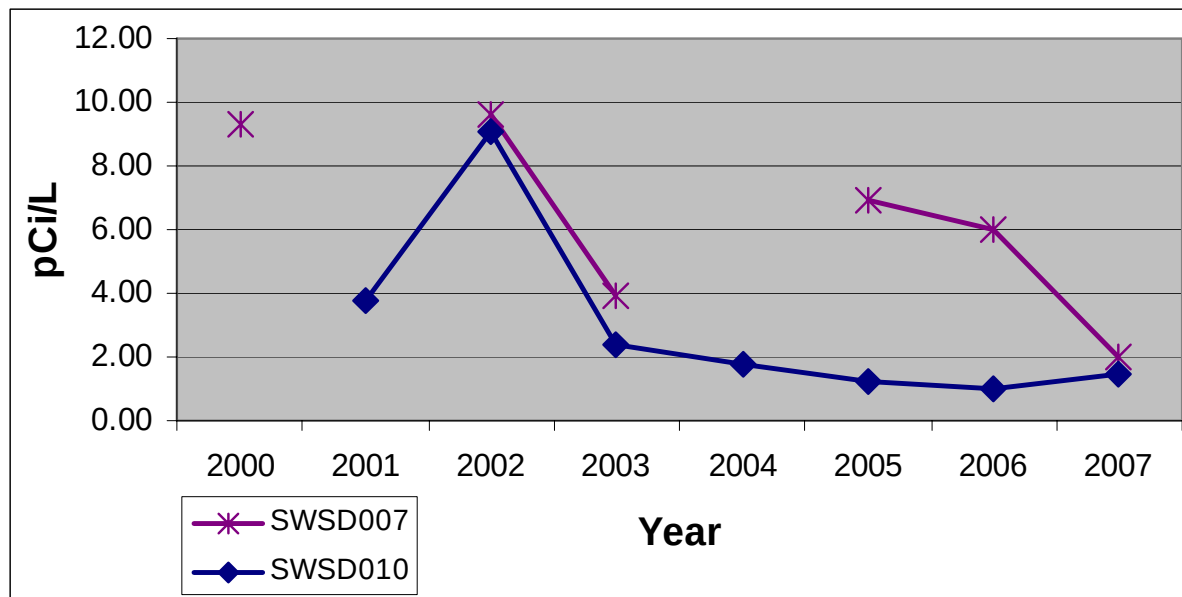


Figure 5-4
Gross Alpha Results for Surface Water in Lodi Brook

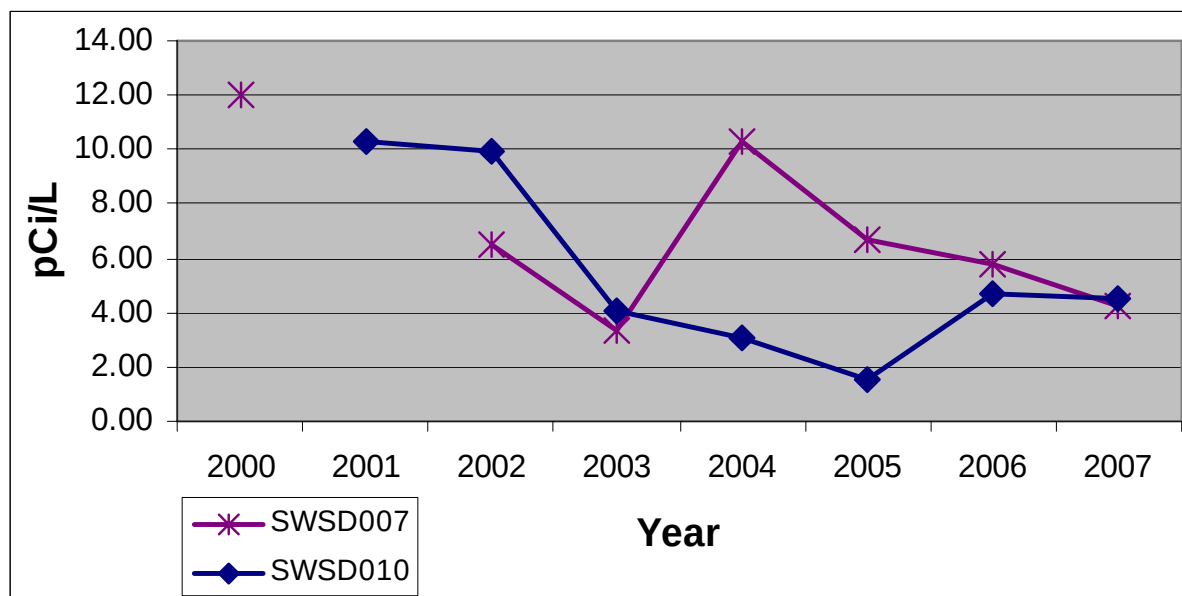


Figure 5-5
Gross Beta Results for Surface Water in Lodi Brook

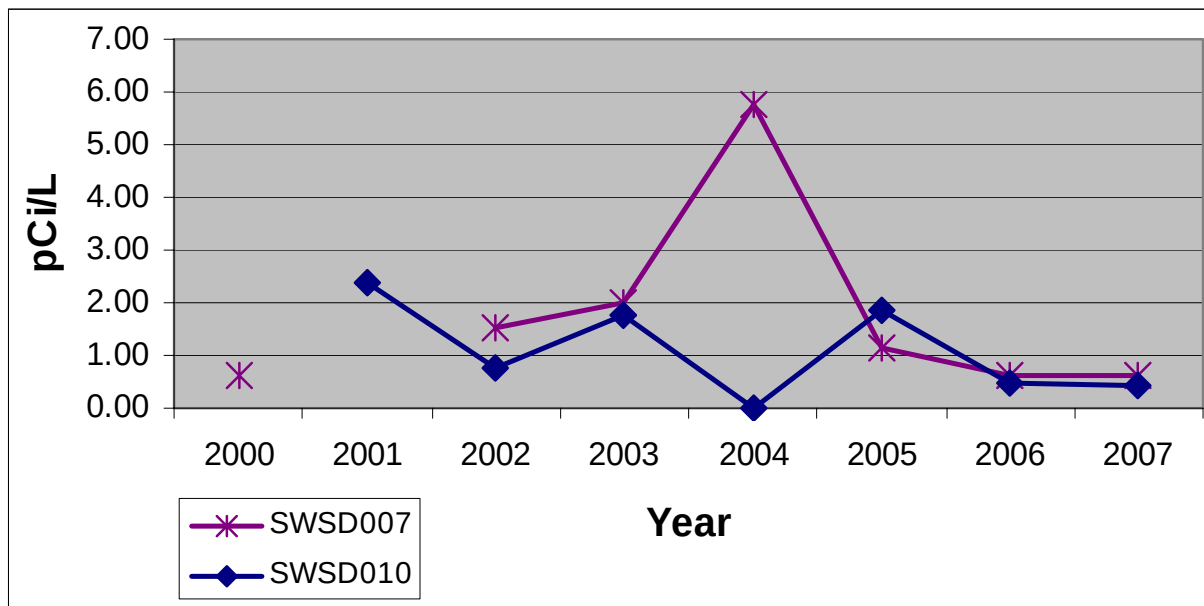


Figure 5-6
Ra-226 + Ra-228 Results for Surface Water in Lodi Brook

Historical results for surface water locations SWSD001 through SWSD010 are presented in **Figures B-1** through **B-10**, located within Appendix B.

Metals

Surface water samples were analyzed for Target Compound List metals including lithium, boron, and thallium. The surface water results are provided in **Table A-5**, included as Appendix A. Metals detected in surface water above the method detection limit, the maximum value detected, and the location where the maximum value was detected is shown in **Table 5-1**.

Table 5-1
Metals Detected in Surface Water

Analyte	Maximum Value (µg/L)	Location of Maximum Value
Aluminum, Total	872	SWSD008
Arsenic, Total	3.3J	SWSD001
Barium, Total	165	SWSD008
Boron, Total	80.9	SWSD004
Cadmium, Total	0.39J	SWSD008
Calcium, Total	98,300	SWSD006
Chromium, Total	4.2	SWSD008
Iron, Total	4,450	SWSD008
Lead, Total	26.4	SWSD008
Lithium, Total	200	SWSD004
Magnesium, Total	13,600	SWSD008
Manganese, Total	1,230	SWSD008
Nickel, Total	4.3	SWSD008
Potassium, Total	11,700	SWSD004
Sodium, Total	95,300	SWSD007
Thallium, Total	0.2J	SWSD006
Vanadium, Total	4.6	SWSD008
Zinc, Total	41.2	SWSD002

The metals identified above are similar to the analytes detected during the 2006 sampling effort. Many of these analytes are found naturally.

Field Parameters

In Appendix A, **Table A-10** presents a summary of field parameters measured during annual surface water sampling activities at the FMSS. Field parameters include temperature, pH, oxidation/reduction potential (Eh), turbidity, specific conductance, and dissolved oxygen. These parameters were monitored prior to surface water sample collection.

5.4.2 Sediment

The sediment sampling program was extended in 2001 to include more sample locations downstream of both Westerly and Lodi Brooks to identify if a pattern of contaminant migration downstream from the FMSS exists. As shown on Appendix D, **Figures D-3A** and **D-3B**, there are four sediment sampling locations (SWSD001 through SWSD004) on Westerly Brook, and 11 sediment sampling locations (SWSD005 through SWSD015) on Lodi Brook. As previously discussed, sampling at locations SWSD011 through SWSD015 was suspended during 2007. Sediment samples were not collected at these five locations which lie along the lower Lodi Brook in the Borough of Lodi. The rationale for suspending the sampling was based on six years of non-detect sample results and the completion of remedial work at the properties within the drainage area of the lower Lodi Brook. In 2007, there was no sediment present at location SWSD004. Therefore, a sample at this location could not be collected.

Radioactive Constituents

Consistent with historical results, the sediment samples collected in Westerly Brook (SWSD001, SWSD002, and SWSD003) were below the ROD soil cleanup criteria. In Lodi Brook (SWSD005, SWSD006, SWSD007, SWSD008, SWSD009, and SWSD010), the sediment sample results also did not exceed the ROD soil cleanup criteria (see Appendix A, **Table A-6A**, and Appendix D, **Figures D-3A** and **D-3B**).

The highest combined concentration of Ra-226 and Th-232 was at location SWSD006 (4.36 pCi/g), which does not exceed the ROD soil cleanup criteria of 5 pCi/g above background (6.64 pCi/g, background included). As a comparison to the 2006 results, the highest combined concentration of Ra-226 and Th-232 (5.24 pCi/g) was reported at SWSD006.

The reported U-238 concentrations at all monitoring locations were well below the ROD soil cleanup criteria of 50 pCi/g above background with a maximum U-238 concentration of 2.21 pCi/g reported at SWSD009. As a comparison to the 2006 results, the concentration of U-238 at all monitoring locations were also below the ROD soil cleanup criteria. The maximum reported U-238 concentration during 2006 was at location SWSD009 (2.51 pCi/g).

The background soil concentration for Ra-226, Th-232, and U-238 in the vicinity of the FMSS are approximately 0.90 pCi/g, 0.71 pCi/g, and 1.33 pCi/g, respectively (USACE 2004a).

The sampling results for 2007 confirms that the level of Ra-226 and Th-232 within Westerly Brook are below background levels (see **Figure 5-7**). The results also confirm the continued presence of radiological concentrations, above background, but below the ROD soil cleanup criteria in the streambed sediment of the upstream location where Lodi Brook originates (see **Figure 5-8**).

Historical results for sediment locations SWSD001 through SWSD010 are also presented in **Figures B-1** through **B-10**, located within Appendix B.

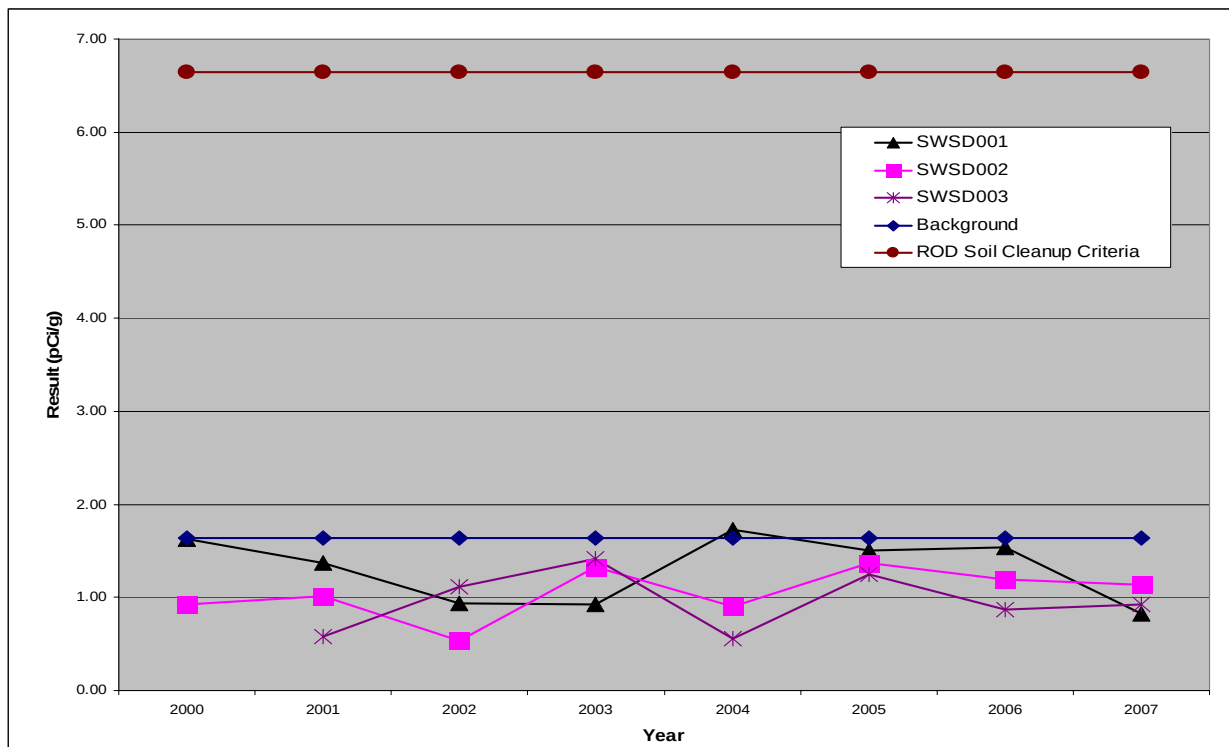


Figure 5-7
Ra-226+Th-232 Results for Sediment in Westerly Brook

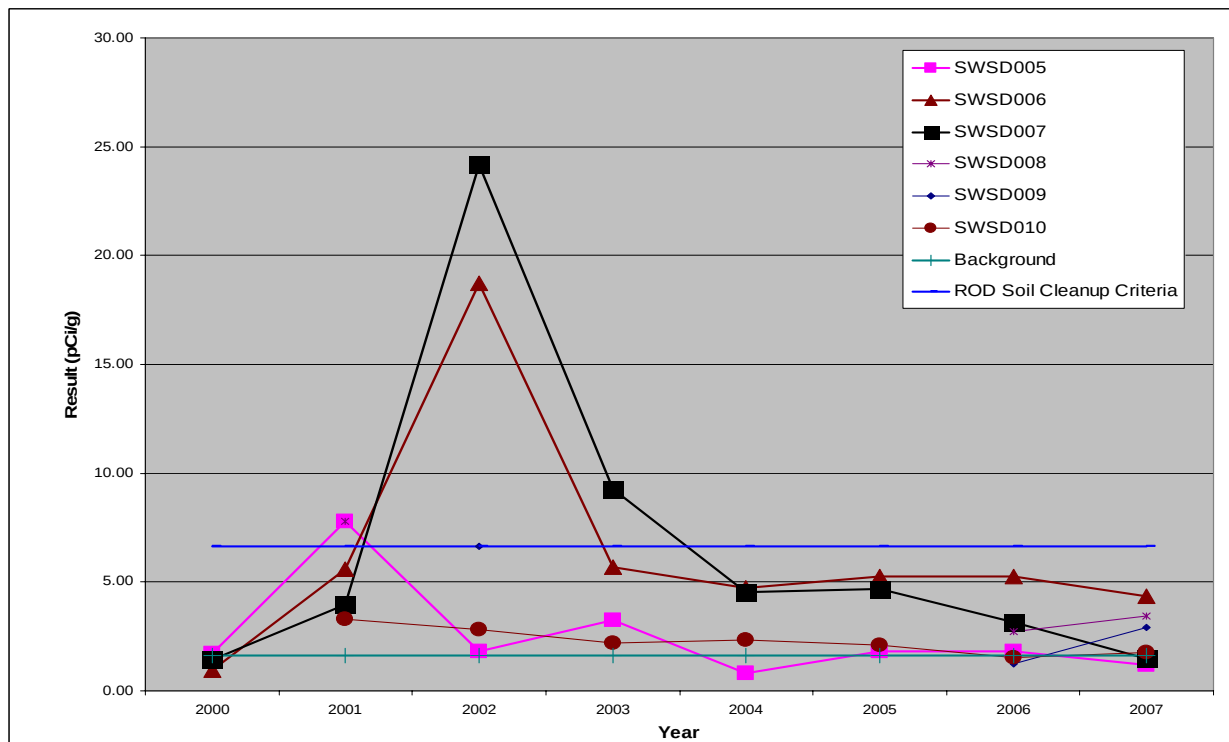


Figure 5-8
Ra-226+Th-232 Results for Sediment in Lodi Brook

Metals

Sediment samples were analyzed for Target Compound List metals including lithium, boron, and thallium. The sediment results are provided in **Table A-6B**, included as Appendix A. Metals detected in sediment above the method detection limit, the maximum value detected, and the location where the maximum value was detected is shown in **Table 5-2**.

Table 5-2
Metals Detected in Sediment

Analyte	Maximum Value (milligrams per kilogram)	Location of Maximum Value
Aluminum, Total	8,950J	SWSD009
Antimony, Total	2.3J	SWSD009
Arsenic, Total	11.3	SWSD006
Barium, Total	247J	SWSD006
Beryllium, Total	1.1	SWSD002
Boron, Total	26	SWSD002
Cadmium, Total	2.1J	SWSD009
Calcium, Total	13,400J	SWSD010
Chromium, Total	40.3J	SWSD006
Iron, Total	19,200	SWSD010
Lead, Total	244J	SWSD009
Lithium, Total	19.5	SWSD006
Magnesium, Total	5,630J	SWSD010
Manganese, Total	604	SWSD001
Mercury, Total	0.32	SWSD006
Nickel, Total	60.1	SWSD002
Potassium, Total	607	SWSD005
Selenium, Total	1.7J	SWSD009
Silver, Total	0.15	SWSD002
Sodium, Total	666J	SWSD009
Thallium, Total	0.48	SWSD006
Vanadium, Total	56.1J	SWSD009
Zinc, Total	784	SWSD002

The metals identified above are similar to the analytes detected during the 2006 sampling effort. Many of these analytes are found naturally.

5.5 GROUNDWATER

The ROD (USACE 2003) does not address the remediation of potentially contaminated groundwater at the FMSS. Groundwater at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for groundwater at the FMSS.

The locations of groundwater monitoring wells at the MISS are shown on Appendix D, **Figure D-2**. During 2007, 24 wells in the groundwater monitoring network were sampled. There were no changes to the groundwater monitoring effort during 2007. Wells that were sampled during 2006 were also sampled during 2007. Changes to the program over the past few years include the following:

- In 2005, monitoring wells MISS06A, B38W25S, and B38W25D were not sampled due to remedial activities adjacent to these wells. The three wells were abandoned per NJDEP requirements in 2005. To compensate for the loss of these wells, monitoring wells MW-26S, MW-26D, and B38W03B were added to the annual sampling effort in 2005. Monitoring well MW-26S was installed during 2005.
- In 2005, monitoring wells MISS03A, MISS03B, and B38W12A were also abandoned per NJDEP requirements so that ongoing remedial activities could proceed. These wells were not part of the annual sampling effort but were included in the quarterly water level measurement effort. To compensate for the loss of these wells, in 2005, monitoring wells MW-25S, MW-25D, MW-26S, and MW-26D were added to the quarterly water level measurement effort. In addition, at the completion of remedial activities near monitoring well B38W12A, a new well (B38W12AR) was installed nearby and has been included as part of the level measurement effort.

Background information, descriptions of activities performed under the groundwater monitoring program, and monitoring results are discussed below.

5.5.1 Groundwater Quality

Natural System

Groundwater within the FMSS flows in both the bedrock and the overlying unconsolidated sediments (i.e., overburden). Bedrock is composed of fractured sandstone and shale belonging to the Passaic Formation. Unconsolidated sediments are composed of interbedded sand and clay of glacial origin. Although there is no continuous confining layer present across the FMSS, the *Remedial Investigation Report for the Maywood Site, New Jersey*, December 1992 (DOE 1992), indicated that the unconsolidated overburden deposits may be divided into three units that interbed with the underlying and overlying unit. The lower lithostratigraphic unit is characterized as consisting of stratified, moderately well sorted to well sorted fine grained sands and silts, with varying amounts of organic material. The middle lithostratigraphic unit consists of layers of clayey silt and silty clay with clayey to clean sand. The upper lithostratigraphic unit consists of undifferentiated deposits of sand, silt, and gravel. These deposits are poorly to moderately sorted.

Bulk groundwater flow is predominantly horizontal; however, hydraulic head elevations obtained within the FMSS indicate that there is a downward component of groundwater flow within the MISS/Stepan Company property, and an apparent upward component of groundwater flow near groundwater discharge points such as the Saddle River and Lodi Brook. Additional information on groundwater flow at the FMSS is presented in the following sections.

Water Level Measurements

Water level measurements were obtained quarterly from 33 monitoring wells (Appendix D, **Figure D-2**). Of these 33 monitoring wells, 14 are completed in unconsolidated overburden deposits, while 19 are completed in bedrock. During the synoptic gauging year 2007, four rounds of water levels were obtained as part of the EMP. The four synoptic gauging rounds were performed on March 22, May 1, July 31, and October 29, 2007. Water levels were not recorded for well MISS07A on October 29 since the well was

dry. Water Level Record Sheets for the four synoptic water level gauging rounds are provided in Appendix C. Water levels fluctuate in response to short and long term seasonal changes in precipitation and evapo-transpiration. In the unconsolidated deposits, groundwater levels measured during the four gauging rounds varied as shown in **Table 5-3**.

Table 5-3
Minimum and Maximum Water Level Elevations in Overburden Monitoring Wells
Synoptic Gauging

Parameter	Measurement Date			
	3/22/2007	5/1/2007	7/31/2007	10/29/2007
Minimum GW Elevation (ft NGVD)	42.83	40.61	39.57	39.37
Maximum GW Elevation (ft NGVD)	54.67	56.67	51.32	50.51
Well Depicting Minimum (GW Elevation)	B38W15S	B38W14S	B38W14S	B38W14S
Well Depicting Maximum (GW Elevation)	MISS02A	MISS02A	MISS02A	MISS02A

Note: GW denotes groundwater.
NGVD denotes National Geodetic Vertical Datum – 1929.

Table A-7 in Appendix A, presents the surveyed elevation of the top of inner casing (TOC), depth to water below TOC, and groundwater elevations for the 14 monitoring wells gauged and completed in the unconsolidated deposits

Minimum water level fluctuations based on the collection of all four gauging rounds were 1.92 ft for well B38W15S. Groundwater elevations were 41.52 ft National Geodetic Vertical Datum (NGVD) and 43.44 ft NGVD on October 29 and May 1, respectively. The maximum water level fluctuation (6.16 ft) was measured in well MISS02A. In this well, groundwater elevation ranged from 50.51 ft NGVD (October 29th) to 56.67 ft NGVD (May 1).

The minimum groundwater elevation (39.37 ft NGVD) was measured in well B38W14S and was measured on October 29. The maximum groundwater elevation (56.67 ft NGVD) was measured in well MISS02A on May 1.

In the bedrock aquifer, groundwater levels measured during the four gauging rounds are provided in **Table 5-4**.

Table 5-4
Minimum and Maximum Water Level Elevations in Bedrock Monitoring Wells
Synoptic Gauging

Parameter	Measurement Date			
	3/22/2007	5/1/2007	7/31/2007	10/29/2007
Minimum GW Elevation (ft NGVD)	43.48	43.21	41.31	41.37
Maximum GW Elevation (ft NGVD)	64.79	65.20	61.66	61.64
Well Depicting Minimum GW Elevation	B38W15D	B38W14D	B38W14D	B38W14D
Well Depicting Maximum GW Elevation	B38W02D	B38W02D	B38W02D	B38W02D

Note: GW denotes groundwater.
NGVD denotes National Geodetic Vertical Datum – 1929.

Table A-8 in Appendix A, presents the surveyed elevation of the TOC, depth to water below TOC, and groundwater elevations for the 19 bedrock monitoring wells.

The minimum water level fluctuation based on the collection of four gauging rounds was measured in well B38W15D, where a 1.63 foot fluctuation was measured. The minimum and maximum water levels were measured on October 29 and May 1, respectively.

The maximum water level fluctuation, 7.43 ft, was measured in well B38W05B. For well B38W05B, the minimum water level, 56.83 ft NGVD, and maximum water level, 64.26 ft NGVD, were measured on March 1 and October 29, respectively.

As depicted in **Table A-8**, well B38W14D showed the minimum (41.31 ft NGVD) and B38W02D showed the maximum (65.20 ft NGVD) water level elevations. These elevations occurred during the July 31 and May 1 water level gauging rounds, respectively.

Groundwater Flow System

Water table contour maps for the unconsolidated deposits and bedrock potentiometric surface maps are presented in Appendix D, **Figures D-4** through **D-7**. **Figures D-4** and **D-5** present the groundwater flow for wells completed in the overburden soils; **Figures D-6** and **D-7** present the potentiometric surface maps for the wells completed in bedrock. Water table contour maps and potentiometric surface contour maps were prepared for the May 1, 2007 and October 29, 2007 synoptic gauging rounds, respectively. These two gauging rounds were chosen to depict the Spring (May 1) and Fall (October 29) periods which historically show the highest and lowest amount of rainfall, respectively. Horizontal groundwater flow at the MISS is strongly controlled by the morphology of the bedrock surface. The bedrock slopes westward across the site, flattens, and then rises to a subtle ridge along the Saddle River (DOE 1992). Horizontal hydraulic gradients reflect this configuration and flatten off-site, to the west. A figure depicting the contours of the bedrock surface excerpted from the *Remedial Investigation Report for the Maywood Site, New Jersey*, (December 1992) are presented in Appendix D, **Figure D-8** (DOE 1992). Bedrock highs exist in the northeast portion of the FMSS within the Stepan Company property and locally within the MISS. These bedrock highs form a local groundwater divide and control the direction of groundwater flow in the overburden and bedrock aquifers.

During the 2007 synoptic gauging rounds, the horizontal hydraulic gradient within the overburden varied spatially, but typically ranged from approximately 0.009 ft/ft to 0.012 ft/ft off-site (west of NJ Route 17) and 0.008 ft/ft to 0.012 ft/ft within the MISS/Stepan Company property. The direction of groundwater flow in the overburden aquifer is predominantly to the west towards the Saddle River.

The direction of groundwater flow in bedrock is presented in Appendix D, **Figures D-6** and **D-7** and is similarly towards the west. In the bedrock aquifer, the horizontal hydraulic gradient measured approximately 0.005 ft/ft west of NJ Route 17 (**Figure D-7**). The horizontal gradient within the MISS/Stepan Company property measured approximately 0.014 ft/ft to 0.015 ft/ft in 2007.

Based on the synoptic gauging rounds, information regarding the vertical component of groundwater flow may be inferred. As depicted in Appendix A, **Table A-9**, 13 well clusters were used to determine if a horizontal or vertical gradient (either upward or downward) exists between overburden and bedrock wells or whether the groundwater is in a transitional “horizontal” flow system. Of the nine well clusters located within the MISS/Stepan Company property, the overburden wells depicted a greater hydraulic head than the wells completed in bedrock in six of the nine well clusters. Well clusters B38W24S/D and MW-26S/D showed a consistent upward gradient for the gauging rounds measured. Well cluster, MISS01AA/MISS01B, displayed a transitional/horizontal component of groundwater flow. The data presented in Appendix A, **Table A-9** principally indicates that the MISS/Stepan Company property represents a recharge zone to the aquifer.

Water levels measured in off-site monitoring wells in 2007 principally indicate that for well clusters B38W12AR/12B, B38W14S/14D, and B38W15S/15D, the hydraulic heads in the bedrock aquifer were consistently higher than the heads in the overburden aquifer, indicating flow from the bedrock aquifer to the overburden aquifer. These wells are located in proximity to a drainage swale/Lodi Brook (B38W12AR/12B) and the Saddle River (B38W14S/14D and B38W15S/15D). Well cluster, B38W17A/17B, displayed a transitional/horizontal component of groundwater flow in 2007, as noted in the previous gauging year. This well appears to be located transitionally between a recharge and a discharge area.

Field Parameters

In Appendix A, **Table A-10** presents a summary of field parameters measured during annual groundwater sampling activities at the FMSS. Field parameters included temperature, pH, Eh, turbidity, specific conductance, and dissolved oxygen. These parameters were monitored during the purging of the wells to determine when to commence sample collection. Field procedures require these parameters to reach a stable condition prior to sampling. Measurements are taken systematically during the purging procedure and are recorded in field logbooks. In Appendix A, **Table A-10** presents the stabilized values

5.5.2 Groundwater - Radiological Constituents

Groundwater samples collected in May 2007 from both on-site and off-site monitoring wells (Appendix D, **Figure D-2**) were analyzed for radiological constituents. Eleven (11) shallow wells and 13 deep wells were sampled for radionuclides, metals, and VOCs. The locations of these wells, with respect to the MISS, are given in **Table 5-5**:

Table 5-5
Locations of Wells with Respect to the MISS

Well Type	Location
Upgradient Wells	B38W-01S, 02D, 03B
On-Site Wells	MISS-1AA, 1B, 2A, 2B, 5A, 5B, 7A, 7B B38W-19S, 19D, 18D, 24S, 24D MW-26S, 26D
Downgradient Wells	B38W-14S, 14D, 15S, 15D, 17A, 17B

Groundwater samples were analyzed for gross alpha, gross beta, Ra-226, Ra-228, and $U_{(tot)}$. Results are provided in Appendix A, **Table A-11**.

The gross alpha results for the overburden wells ranged from 1.71 pCi/L to a maximum of 96.63 at well MISS05A. The gross alpha results for the bedrock wells ranged from non-detect to a maximum of 57.16 pCi/L at well B38W18D. The gross beta results for the overburden wells ranged from 0.94 pCi/L to a maximum of 91.07 pCi/L at well B38W15S. The gross beta results for the bedrock wells ranged from 0.55 pCi/L to a maximum of 596.63 pCi/L at well MS-26D. The combined Ra-226 and Ra-228 results for the overburden wells ranged from 0.33 pCi/L to a maximum of 4.28 pCi/L at well B38W19S. The combined Ra-226 and Ra-228 results for the bedrock wells ranged from 0.04 pCi/L to a maximum of 6.82 pCi/L at well B38W18D. The $U_{(tot)}$ results for the overburden wells ranged from 0.01 µg/L to a maximum of 159.03 µg/L at well MISS05A. The $U_{(tot)}$ results for the bedrock wells ranged from non-detect to a maximum of 6.50 µg/L at well B38W15D.

The gross alpha results for monitoring wells B38W18D, MISS02A, and MISS05A are shown on **Figure 5-9**. These wells show higher than normal levels. The gross beta results for monitoring wells B38W15S, B38W17B, B38W19D, MISS01B, MISS05B, and MW-26D are shown on **Figure 5-10**. These wells show elevated readings. **Figures 5-11** through **5-13** show the historical results for monitoring well B38W19S, MISS05A, and B38W18D. These wells show elevated results for Ra-226 plus Ra-228 as compared to the other monitoring wells. **Figure 5-14** shows the historical results for monitoring well MISS05A which has elevated $U_{(tot)}$ results as compared to the other monitoring wells sampled.

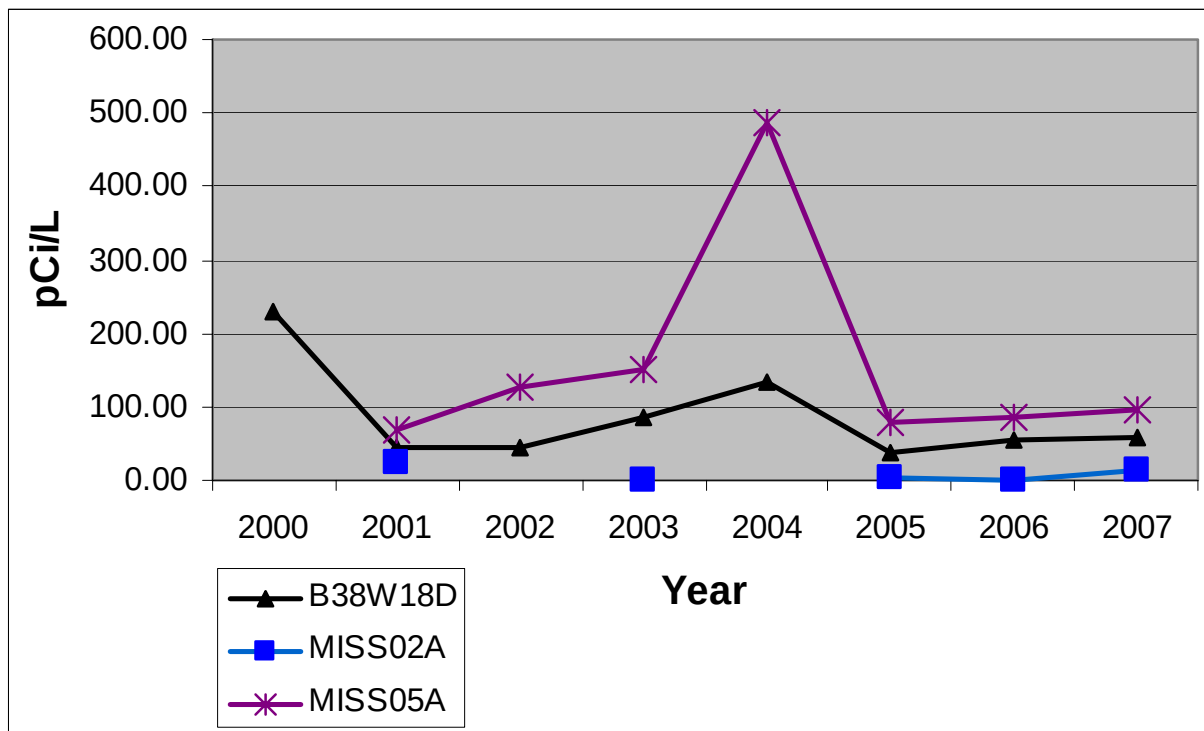


Figure 5-9
Gross Alpha Results for Elevated Monitoring Wells

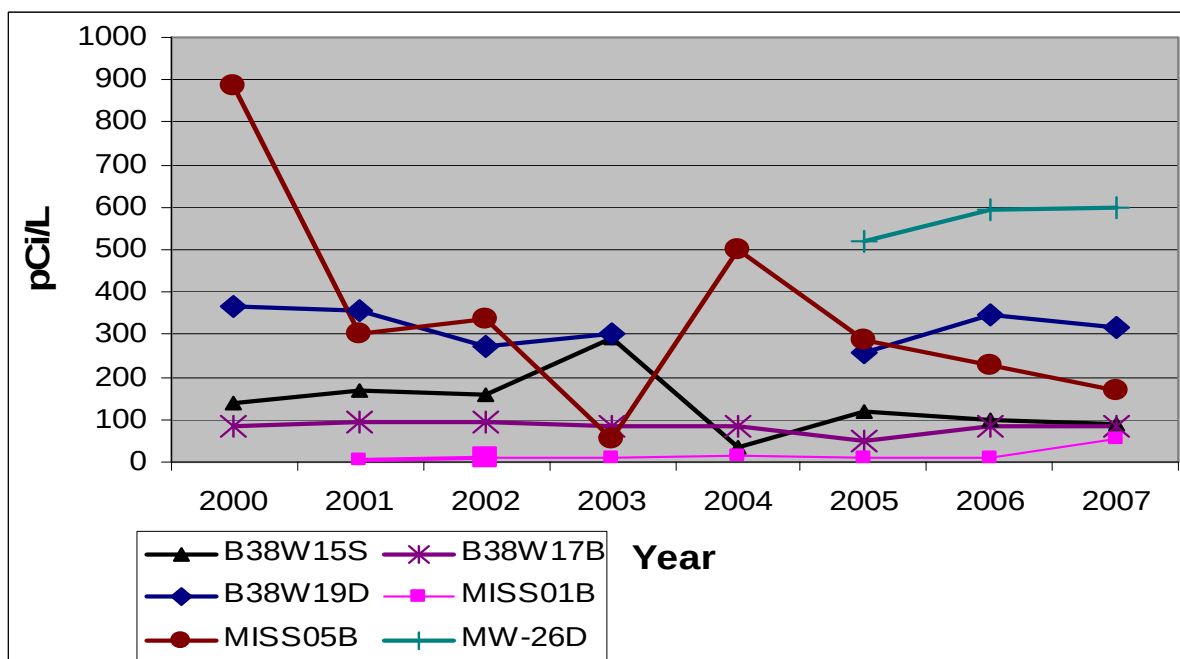


Figure 5-10
Gross Beta Results for Elevated Monitoring Wells

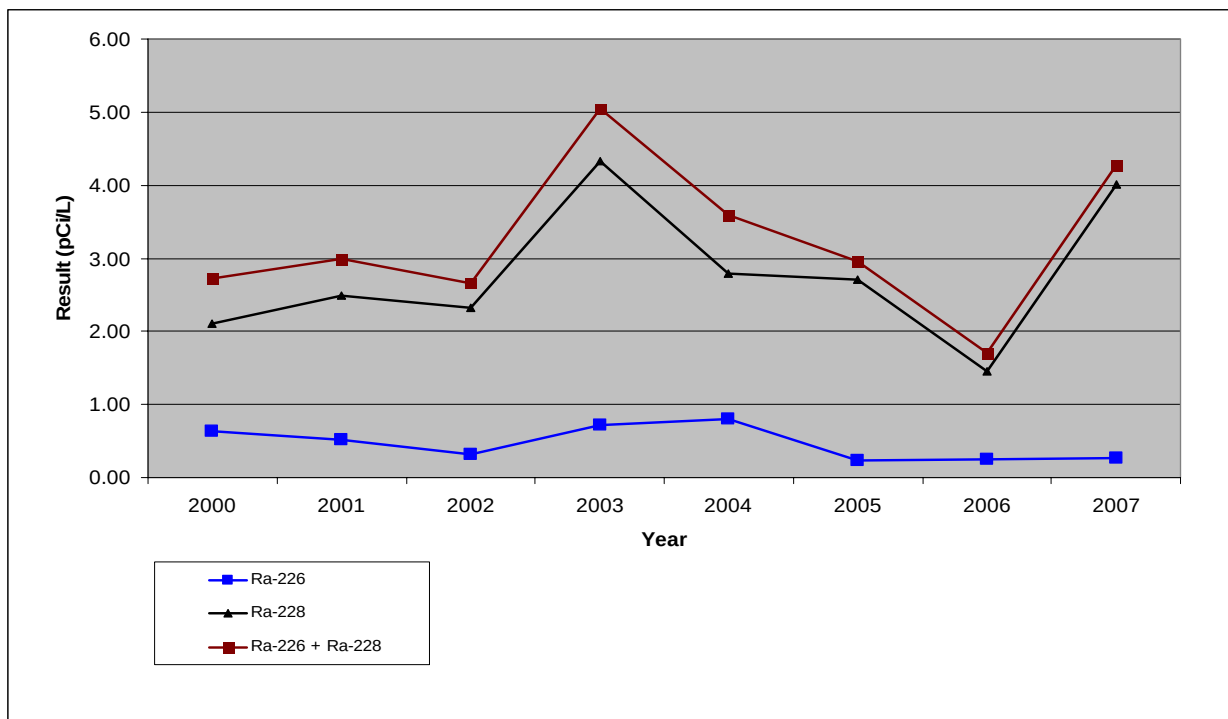


Figure 5-11
Ra-226 + Ra-228 Results for Monitoring Well B38W19S

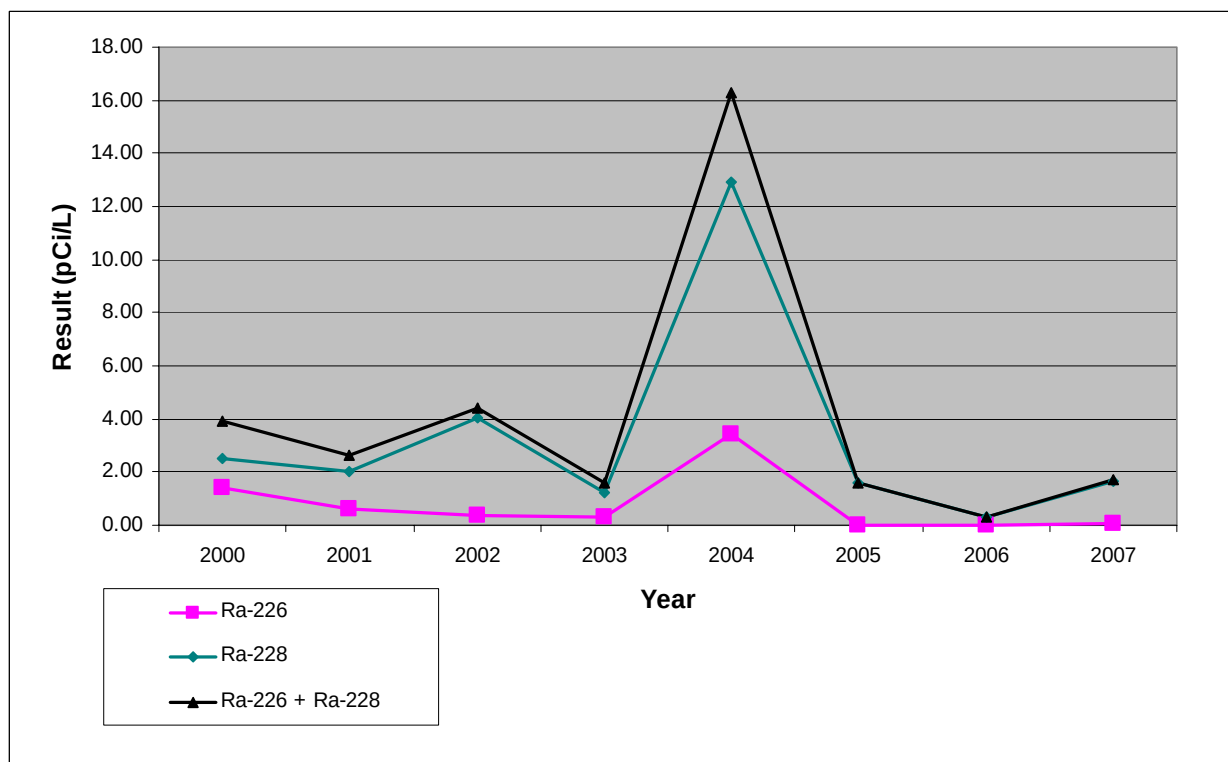


Figure 5-12
Ra-226 + Ra-228 Results for Monitoring Well MISS05A

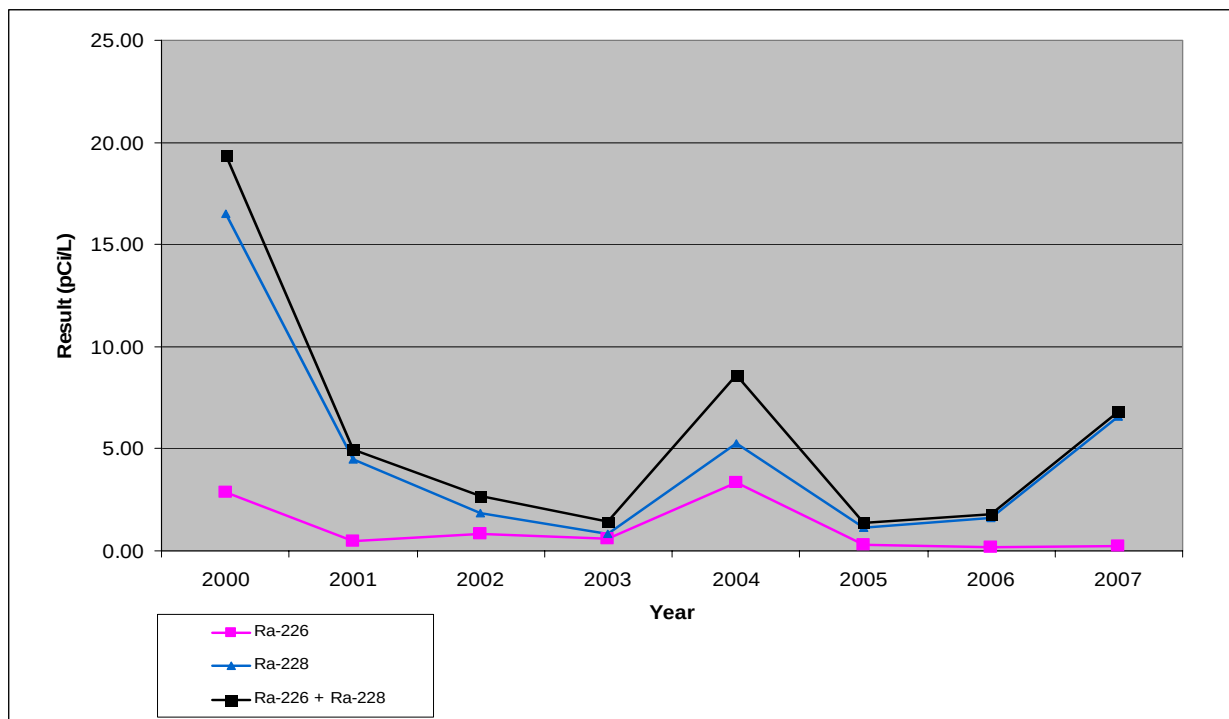


Figure 5-13
Ra-226 + Ra-228 Results for Monitoring Well B38W18D

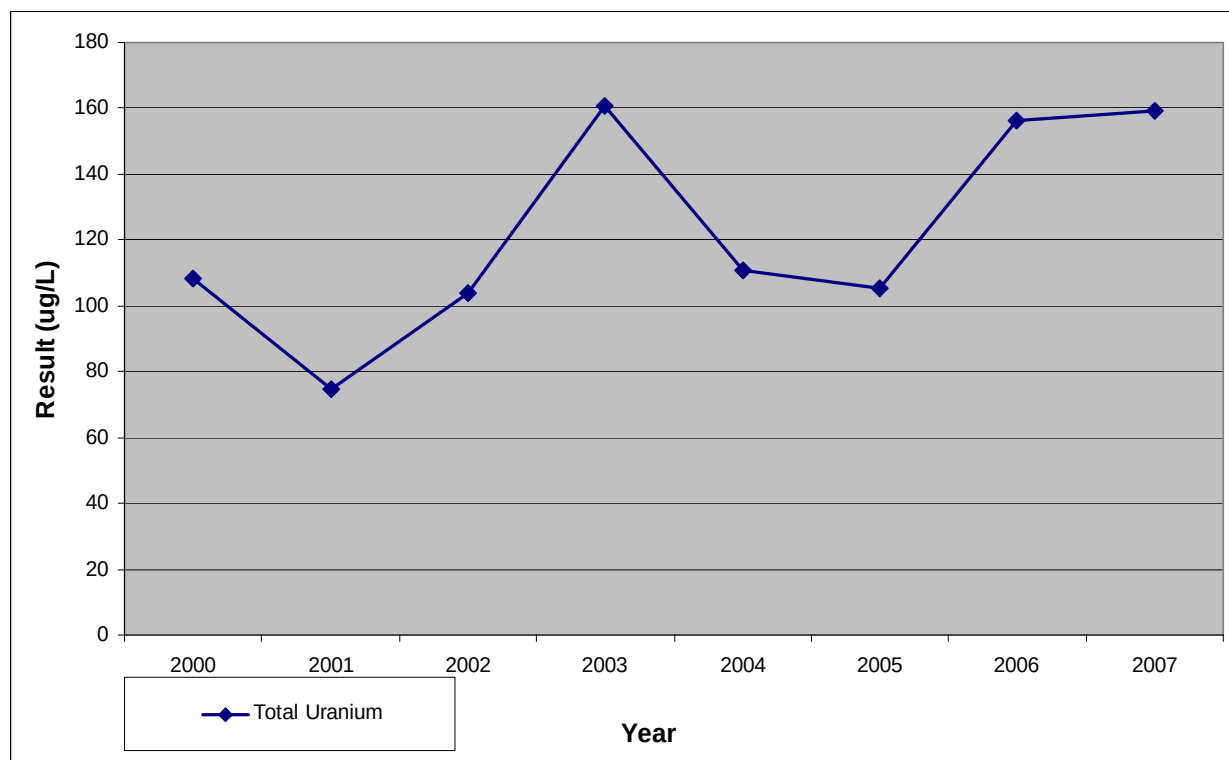


Figure 5-14
U_(tot) Results for Monitoring Well MISS05A

Historical results for all 24 groundwater monitoring wells are presented in **Figures B-11** through **B-34**, located within Appendix B.

5.5.3 Groundwater - Metals

Groundwater samples were analyzed for Target Compound List metals including lithium, boron, and thallium. The results are reported in **Table A-12**, included as Appendix A. Metals detected in groundwater above the method detection limit, the maximum value detected, and the monitoring well where the maximum value was detected is shown in **Table 5-6**.

Table 5-6
Metals Detected in Groundwater

Analyte	Maximum Value (µg/L)	Location of Maximum Value
Aluminum, Total	1,080	MISS07A
Antimony, Total	4	B38W14S
Arsenic, Total	2,270	MISS02A
Barium, Total	325	B38W02D
Beryllium, Total	1.6	B38W01S
Boron, Total	2,090	MISS07B
Cadmium, Total	2.6	B38W15S
Calcium, Total	709,000	B38W02D
Chromium, Total	74.9	B38W18D
Cobalt, Total	25.9	B38W18D
Copper, Total	45.9	B38W15S
Iron, Total	67,900	MW-26S
Lead, Total	11	B38W15S
Lithium, Total	7,320	MISS02B
Magnesium, Total	162,000	MW-26D
Manganese, Total	26,100	MW-26S
Mercury, Total	0.099	MISS02A
Nickel, Total	44.2	B38W18D
Potassium, Total	657,000	MW-26D
Selenium, Total	3.4J	MISS07A
Sodium, Total	1,380,000	MISS07B
Thallium, Total	0.12J	B38W24D
Vanadium, Total	9.4	MISS07B
Zinc, Total	135	B38W18D

The metals identified above are similar to the analytes detected during the 2006 sampling effort. Many of these analytes are found naturally.

5.5.4 Groundwater - Volatile Organic Compounds

Groundwater samples were also analyzed for VOCs. A groundwater VOC results are provided in **Table A-13**, included as Appendix A. VOCs detected in groundwater above the method detection limit, the maximum value detected, and the monitoring well where the maximum value was detected is shown in **Table 5-7**.

Table 5-7
VOCs Detected in Groundwater

Analyte	Maximum Value (µg/L)	Location of Maximum Value
1,1-dichloroethane	1.0	B38W15D
1,1-dichloroethene	1.3	B38W14D
1,2-dichloroethane	0.65	B38W17A
Benzene	35	MISS05B
Bromodichloromethane	0.52J	B38W19D
Cis-1,2-dichloroethene	110J	MISS01B
Tetrachloroethene	210J	B38W18D
Toluene	130J	B38W24S
Total xylene	34J	B38W24S
Trans-1,2-dichloroethene	28	B38W15D
Trichloroethene	38J	B38W14D
Vinyl chloride	2.3	B38W15S

The VOCs identified above are similar to the analytes detected during the 2006 sampling effort.

6.0 CONCLUSIONS

6.1 EXTERNAL GAMMA RADIATION

The 2007 monitors for gamma radiation (TETLDs) were deployed at nine on-site locations and six off-site locations (Appendix D, **Figure D-2**).

The calculated doses, above background, from direct gamma exposure at the MISS to a hypothetical maximally-exposed resident and worker assumed to be located 50 ft (15.2 m) from the fenceline at location 21 were 27.82 mrem/yr and 7.51 mrem/yr, respectively (Calc. 102682-0307-004) (see Appendix F). This is a conservative approach since the nearest receptor is located approximately 200 ft (61.0 m) from location 21. The results obtained from the gamma radiation monitors are consistent with historical data and all 15 locations will continue to be monitored during the 2008 program.

6.2 RADON-220 (Rn-220) AND RADON-222 (Rn-222)

Cumulative Rn measurements were collected at nine on-site locations and six off-site locations (Appendix D, **Figure D-2** and Appendix A, **Table A-3**).

For the first six months of the monitoring year, Rn-220 concentrations ranged from 0.17 pCi/L to a maximum of 3.22 pCi/L (location 31). For the last six months of the monitoring year, Rn-220 concentrations ranged from 0.42 pCi/L to a maximum of 4.37 pCi/L (location 4). The results for 2007 were slightly above the results for previous years.

The maximum concentration of Rn-220 and Rn-222 combined for the first six months is 3.42 pCi/L (location 31). The maximum concentration of Rn-220 and Rn-222 combined for the last six months is 4.57 pCi/L (location 4). The maximum annual average result is approximately 3.29 pCi/L (location 31). With the exception of location 4 during the last six month monitoring period, the results of Rn monitoring are consistent with last year's results and all locations will continue to be monitored during the 2008 program. The higher than normal results may be attributed to soil disturbing activities on the MISS. During 2007, a haul road was constructed on the MISS, 100 West Hunter Avenue (Stepan Company), and 149-151 Maywood Avenue (Sears Logistical Services). The haul road was constructed in areas subject to remediation.

Rn-222 flux monitoring was performed for the soil storage pile located inside the fabric structure at the MISS to determine compliance with 40CFR61, Subpart Q (see Appendix E, Section 4.0). Specifically, the Subpart Q standard requires that no source (i.e., storage pile) at a DOE facility shall emit more than 20 pCi/m²/s of Rn-222, as an average for the entire source, into the ambient air. To determine the Rn-222 flux from the storage pile, charcoal canisters were placed on the stockpile inside the fabric structure at six locations for a period of 24 hours. The charcoal canisters were then sent to a laboratory for analysis. The maximum Rn-222 concentration obtained from the flux monitoring was 0.12 pCi/m²/s and thus, is well in compliance with the Subpart Q standard of 20 pCi/m²/s.

6.3 AIRBORNE PARTICULATE DOSE

The airborne particulate dose to the hypothetical maximally exposed individual in 2007 was a worker with 27% occupancy located at 113 Essex Street. The 2007 airborne particulate dose to that individual, considering all site contributions throughout the year, was 0.0004 mrem/yr. This is well below the 10 mrem/yr standard specified in 40CFR61, Subpart H. The hypothetical airborne particulate collective dose to the population within 50 mi (80 km) of the site was 0.001 person-rem/yr.

Particulate airborne radionuclide emissions are also monitored as part of the Site Radiation Protection Program. Monitoring is conducted at key locations along the perimeter of the MISS and vicinity properties where remediation is underway. At a minimum monitoring is conducted during any soil handling activities, and when utility power is available, monitoring is conducted continuously. Samples are typically exchanged on a monthly basis depending on filter loading and analyzed on-site for gross alpha radioactivity. Results are compared to a derived effluent limit, which is based upon the mixture of radionuclides present at the site and the 10 mrem/yr standard specified in 40CFR61, Subpart H. During 2007 no sample results exceeded the DEL during any monitoring period.

6.4 CUMULATIVE DOSE FROM EXTERNAL GAMMA RADIATION AND AIRBORNE PARTICULATE

The location of the maximally exposed individual from direct gamma radiation and the location of the hypothetical maximally exposed individual from airborne particulates are different. The hypothetical maximally exposed individual from direct gamma radiation emitted at MISS in 2007 occurred 50 ft (15.2 m) from location 21, which is located on the southern perimeter of the site. The calculated dose from external gamma radiation exposure at the above location for the hypothetical maximally exposed individual was 27.82 mrem/yr (see Section 5.1).

The hypothetical maximally exposed individual from airborne particulates, as determined by the dispersion modeling performed for the Annual NESHAP Compliance Report – Year 2007 (see Appendix E), occurred at 113 Essex Street. The calculated annual effective dose from airborne particulates to the hypothetical maximally exposed individual was 0.0004 mrem/yr. The maximum annual effective dose is almost entirely the result of the internal doses received from the inhalation of dust particles with a small contribution from the ingestion of plant borne dust.

Conservatively adding the above calculated doses for the hypothetical maximally exposed individuals from external gamma radiation and airborne particulates results in a hypothetical maximum cumulative dose of 27.82 mrem/yr for the year 2007. This value is well below the NRC standard of 100 mrem/yr (from all sources, excluding Rn).

6.5 SURFACE WATER

The ROD (USACE 2003) does not address the remediation of potentially contaminated surface water at the FMSS. Surface water at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for surface water at the FMSS.

Surface water samples were collected and analyzed for radiological constituents and metals (Appendix A, **Tables A-4** and **A-5**, respectively).

- The gross alpha results ranged from non-detect to a maximum of 3.48 pCi/L at location SWSD005.
- The gross beta results ranged from 1.91 pCi/L to a maximum of 8.59 pCi/L at location SWSD002.
- The combined Ra-226 and Ra-228 results ranged from 0.02 pCi/L to a maximum of 0.85 pCi/L at location SWSD006.
- The $U_{(tot)}$ results ranged from 0.19 μ g/L to a maximum of 2.47 μ g/L at location SWSD004.
- Of the 25 metal analytes measured, 18 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-5**, included as Appendix A.

The 2007 surface water results are similar to the 2006 results. Surface water will continue to be monitored during 2008.

6.6 SEDIMENT

Because there are no radiological standards for sediment, the ROD soil cleanup criteria were used as a basis for evaluating the analytical results. Radionuclide concentrations in sediment samples collected in Westerly Brook (SWSD001, SWSD002, and SWSD003) were within the background concentration range and below the ROD soil cleanup criteria. In Lodi Brook (SWSD005 through SWSD010), radionuclide concentrations in sediment also ranged from background to below the ROD soil cleanup criteria.

The highest combined concentration of Ra-226 and Th-232 was at location SWSD006 (4.36 pCi/g) located in Lodi Brook, which was lower than the ROD soil cleanup criteria of 5 pCi/g above background (6.64 pCi/g, background included). Also, the U-238 concentrations at all monitoring locations were well below the ROD soil cleanup criteria of 50 pCi/g above background. The highest value was reported at location SWSD009 (2.21 pCi/g). The results for 2007 confirm the continued presence of radiological concentrations above background, but below the ROD soil cleanup criteria, in the streambed sediment of the northern section of Lodi Brook. Over the past few years the concentration of radionuclides within Lodi Brook has steadily trended downward due to ongoing remediation effort adjacent to Lodi Brook.

Sediment was also analyzed for total metals. Of the 25 metal analytes measured, 23 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-6B**, included as Appendix A.

The 2007 sediment sampling results are similar to the 2006 results. Sediment will continue to be monitored in 2008.

6.7 GROUNDWATER

The ROD (USACE 2003) does not address the remediation of potentially contaminated groundwater at the FMSS. Groundwater at the FMSS is being addressed under the groundwater operable unit. Therefore a cleanup standard currently does not exist for groundwater at the FMSS. A groundwater operable unit record of decision that will address remediation of potentially contaminated groundwater and establish groundwater cleanup standards at the FMSS is expected in 2009.

During 2007, groundwater was collected from a total of 24 monitoring wells located on and off the MISS. The groundwater sample locations are depicted on **Figure D-2**, included as Appendix D. Groundwater samples were analyzed for gross alpha, gross beta, Ra-226, Ra-228, and $U_{(tot)}$.

- The gross alpha results for the overburden wells ranged from 1.71 pCi/L to a maximum of 96.63 at well MISS05A. The gross alpha results for the bedrock wells ranged from non-detect to a maximum of 57.16 pCi/L at well B38W18D.
- The gross beta results for the overburden wells ranged from 0.94 pCi/L to a maximum of 91.07 pCi/L at well B38W15S. The gross beta results for the bedrock wells ranged from 0.55 pCi/L to a maximum of 596.63 pCi/L at well MW-26D.
- The combined Ra-226 and Ra-228 results for the overburden wells ranged from 0.33 pCi/L to a maximum of 4.28 pCi/L at well B38W19S. The combined Ra-226 and Ra-228 results for the bedrock wells ranged from 0.04 pCi/L to a maximum of 6.82 pCi/L at well B38W18D.

- The $U_{(tot)}$ results for the overburden wells ranged from 0.01 $\mu\text{g/L}$ to a maximum of 159.03 $\mu\text{g/L}$ at well MISS05A. The $U_{(tot)}$ results for the bedrock wells ranged from non-detect to a maximum of 6.50 $\mu\text{g/L}$ at well B38W15D.
- Of the 25 metal analytes measured, 24 were detected above the method detection limit. A summary of the metals detected is provided in **Table A-12**, included as Appendix A.
- Of the 34 VOC analytes measured, 12 were detected above the method detection limit. A summary of the VOCs detected is provided in **Table A-13**, included as Appendix A.

Groundwater will continue to be monitored for radiological and chemical constituents during next year's program.

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APPENDIX A

ANALYTICAL DATA FOR THE YEAR 2007

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APPENDIX A ANALYTICAL DATA FOR THE YEAR 2007

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Table A-1
2007 Environmental Monitoring Program Summary
for External Gamma Radiation and Radon Gas

Air Monitoring																			
Measured Parameter	Station Identification	Number of Analyses or Measurements																	
		No. of Sample Locations				Sample Duplicate				Ship Blank				Contingency Sample				Total Analyses per Year	
		Calendar Year Quarter				Calendar Year Quarter				Calendar Year Quarter				Calendar Year Quarter					
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
LABORATORY MEASUREMENTS																			
External gamma radiation (TETLDs)	4, 5, 10, 12, 19, 20,	15		15						2		2		15		15		64	
Radon-222/Radon-220	21, 22, 23, 24, 25,	15		15		1		1										32	
Radon-222	30, 31, 32, 33	15		15		1		1										32	

Table A-1 (cont)
2007 Environmental Monitoring Program Summary for Groundwater

Measured Parameter	Station Identification	Number of Analyses or Measurements																											
		No. of Sample Locations				Rinsate Blank				Trip Blank				Sample Duplicate				Matrix Spike				Matrix Spike Duplicate				Total Analyses per Year			
		Calendar Year				Calendar Year				Calendar Year				Calendar Year				Calendar Year				Calendar Year							
		Quarter				Quarter				Quarter				Quarter				Quarter				Quarter							
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
FIELD MEASUREMENTS																													
Chemical/Physical	MISS01AA, MISS01B, MISS02A,																												
Dissolved oxygen	MISS02B, MISS05A, MISS05B,		24																										24
Eh ^a	MISS07B, MISS07A,		24																										24
Turbidity	B38W01S, B38W02D, B38W14S,		24																										24
Temperature	B38W14D, B38W15S, B38W15D,		24																										24
Specific conductivity	B38W17A, B38W17B, B38W18D,		24																										24
pH	B38W19S, B38W19D, B38W24S,		24																										24
	B38W24D, B38W25D, MW-26S, MW-26D.																												
LABORATORY MEASUREMENTS																													
Radiological	MISS01AA, MISS01B, MISS02A,																												
iso-U/Total uranium	MISS02B, MISS05A, MISS05B,		24				12								3														39
Thorium-230/232	MISS07B, MISS07A,		24				12								3														39
Radium-226/228	B38W01S, B38W02D, B38W03B,		24				12								3														39
Gross Alpha	B38W14S, B38W14D, B38W15S,		24				12								3				7										46
Gross Beta	B38W15D, B38W17A, B38W17B,		24				12								3				4										43
Chemical	B38W18D, B38W19S, B38W19D,																												
TAL Metals	B38W24S, B38W24D,		24				12								3				3						3				45
Volatile organic compounds	MW-26S, MW-26D.		24				12				12				3				3						3				57

Table A-1 (cont)
2007 Environmental Monitoring Program Summary
for Surface Water and Sediment

Surface Water and Sediment Monitoring																											
Measured Parameter	Station Identification	Number of Analyses or Measurements																									
		Samples				Rinsate Blank				Trip Blank				Sample Duplicate				Matrix Spike				Total Analyses per Year					
		Calendar Year Quarter				Calendar Year Quarter				Calendar Year Quarter				Calendar Year Quarter				Calendar Year Quarter									
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
FIELD MEASUREMENTS																											
Chemical/Physical	SWSD001, SWSD002,																										
Dissolved oxygen	SWSD003, SWSD004,		10																							10	
Eh ^a	SWSD005, SWSD006,		10																							10	
Turbidity	SWSD007, SWSD008,		10																							10	
Temperature	SWSD009, SWSD010.		10																							10	
Specific conductivity			10																							10	
pH			10																							10	
LABORATORY MEASUREMENTS																											
SEDIMENT																											
Radiological	SWSD-001, SWSD-002,																										
Radium-226	SWSD-003, SWSD-005,		9				2								1											12	
Thorium-232	SWSD-006, SWSD-007,		9				2								1											12	
Uranium-238	SWSD-008, SWSD-009,		9				2								1											12	
Chemical	SWSD-010.																										
TAL Metals			9				2								1						1					13	
SURFACE WATER																											
Radiological	SWSD-001, SWSD-002,																										
Radium-226/228	SWSD-003, SWSD-004,		10				2								1											13	
Thorium-228/230/232	SWSD-005, SWSD-006,		10				2								1											13	
Uranium-234/235/238	SWSD-007, SWSD-008,		10				2								1											13	
Gross Alpha	SWSD-009, SWSD-010.		10				2								1						1					14	
Gross Beta			10				1								1						1					13	
Chemical																											
Tal-Metals			10				2								1						1					14	

^a Oxidation/reduction potential (Eh).

^b See Table 14 for a comprehensive list of metals.

Table A-2
2007 External Gamma Radiation Dose Rates
Maywood Interim Storage Site

2/1/2007 to 8/1/2007 TETLD ^a				2/1/2007 to 1/30/2008 TETLD ^a			
Monitoring Locations ^b	Mean Ambient Dose Equivalent ^{c, d} (mrem)	Standard Deviation (mrem)	Corrected (mrem/yr)	Monitoring Locations ^b	Mean Ambient Dose Equivalent ^{c, d} (mrem)	Standard Deviation (mrem)	Corrected (mrem/yr)
4	61.0	1.3	69.4	4	114.0	6.4	59.5
	60.0	1.1	68.5		113.0	4.1	58.4
5	70.0	1.3	89.3	5	130.0	6.3	76.7
	72.0	1.3	93.2		140.0	3.5	87.6
10	100.0	3.8	153.9	10	198.0	5.6	150.2
	100.0	2.3	153.9		198.0	3.6	150.2
12	51.0	1.6	48.6	12	97.0	3.4	41.1
	50.0	2.5	46.0		102.0	4.3	46.5
20	38.0	1.8	20.8	20	71.0	2.7	13.0
	41.0	1.1	26.0		69.0	2.2	10.8
21	305.0	6.9	599.6	21	596.0	14.4	580.5
	310.0	10.9	610.0		596.0	12.2	580.5
22	60.0	1.5	68.9	22	108.0	4.7	53.0
	60.0	3.0	68.5		109.0	2.7	54.0
23	71.0	1.2	91.9	23	131.0	4.6	77.8
	67.0	2.5	84.1		123.0	3.7	69.2
24	155.0	3.7	274.4	24	286.0	5.4	245.4
	158.0	4.2	280.9		287.0	19.8	246.5
25	281.0	13.5	546.3	25	532.0	9.3	511.3
	289.0	4.3	564.9		326.0	18.8	504.8
30	43.0	1.3	31.7	30	78.0	3.3	20.5
	42.0	2.2	28.6		75.0	2.4	17.3
31	65.0	1.8	78.0	31	122.0	4.7	68.1
	65.0	2.6	78.0		124.0	2.7	70.3
32	27.0	0.4	0.0	32	54.0	1.5	0.0
	26.0	1.2	0.0		52.0	2.5	0.0
33	29.0	0.8	0.4	33	60.0	1.1	1.1
	29.0	1.1	0.0		59.0	3.6	0.0
Background	28.0	1.1	<u>Avg. Background</u>	Background	60.0	0.9	<u>Avg. Background</u>
19	29.0	0.7	62.0	19	58.0	1.4	63.8

^a TETLD = Tissue-equivalent thermoluminescent dosimeter. There are two TETLDs per station.

^b Monitoring locations are shown on Figure D-2.

^c TETLD readings are corrected for shelter/absorption factor (s/a = 1.075) and are normalized to one year's exposure. Average corrected background is then subtracted from all other corrected readings.

^d The corrected results are slightly different since the reading is actually the mean of five readings. When calculating the corrected result, the equation considers the sum of the five readings before the corrected result is determined.

Table A-3
2007 Radon Gas Concentrations
Maywood Interim Storage Site

Monitoring Location ^a		02/1/2007 to 8/1/2007				8/1/2007 to 1/30/2008			
		Radon-220 ^b		Radon-222		Radon-220 ^b		Radon-222	
		Average Concentration (pCi/L)	Standard Deviation (%)	Average Concentration (pCi/L)	Standard Deviation (%)	Average Concentration (pCi/L)	Standard Deviation (%)	Average Concentration (pCi/L)	Standard Deviation (%)
MISS perimeter	4	2.07	5.5	0.2*		4.37	3.90	0.2*	
	5	1.77	5.9	0.2*		3.03	4.60	0.2*	
	10	0.91	8.0	0.2*		1.04	7.40	0.2*	
	12	1.78	5.9	0.2*		2.85	4.80	0.2*	
	20	1.12	7.2	0.2*		1.28	6.60	0.2*	
	21	2.73	4.9	0.2*		3.31	4.40	0.2	11.8
Duplicate ^c	21	2.45	5.1	0.2*		3.11	4.60	0.2*	
	22	0.44	9.2	0.2*		0.63	8.50	0.2*	
	23	1.55	6.5	0.2*		1.44	6.30	0.2*	
	24	2.23	5.4	0.2*		3.25	4.50	0.2*	
	25	0.85	8.2	0.2*		1.01	7.60	0.2*	
	30	1.31	7.0	0.2*		0.79	7.70	0.2*	
	31	3.22	4.6	0.2*		3.36	4.50	0.2*	
	32	0.23	12.1	0.2*		0.75	8.50	0.2*	
	33	0.54	9.2	0.2*		0.62	8.60	0.2*	
Background	19	0.17	12.0	0.2*		0.42	10.20	0.2*	

(*) The value reported is the Lower Limit of Detection.

^a Monitoring locations are shown on Figure D-2. All locations are outside any structure.

^b Radon-220 gas concentrations are calculated according to the method outlined in FUSRAP committed calculation 191-CV-028, Rev. 1, using data from RadTrack® and RadTack®-modified detectors.

^c A quality control duplicate is collected at the same time and location, and is analyzed by the same method in order to evaluate precision in sampling and analysis.

Table A-4
2007 Surface Water Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result ^{a,d} (pCi/L)	Result (µg/L)	Error (pCi/L)	Qualifier ^b	MDA ^c (pCi/L)
Samples collected in Westerly Brook:							
SWSD001 (23a-025179) [07G-057]	5/3/2007	GALPHA	2.65		± 1.619		2.49
	5/3/2007	GBETA	8.52		± 0.999		0.94
	5/3/2007	Ra-226	0.05		± 0.184	U	0.35
	5/3/2007	Ra-228	0.27		± 0.314	UJ	0.25
	5/3/2007	Total Radium	0.32		± 0.364		
	5/3/2007	Th-228	0.08		± 0.129	UJ	0.17
	5/3/2007	Th-230	0.39		± 0.279	J	0.20
	5/3/2007	Th-232	0.05		± 0.120	UJ	0.09
	5/3/2007	Total Thorium	0.52		± 0.330		
	5/3/2007	U-234	0.79		± 0.343		0.09
	5/3/2007	U-235	0.03		± 0.093	UJ	0.09
	5/3/2007	U-238	0.39		± 0.241		0.09
	5/3/2007	Total Uranium	1.21	1.17	± 0.429		
SWSD002 (23a-025181) [07G-057]	5/3/2007	GALPHA	2.39		± 1.562	UJ	2.42
	5/3/2007	GBETA	8.59		± 1.047		1.08
	5/3/2007	Ra-226	0.21		± 0.232	UJ	0.14
	5/3/2007	Ra-228	0.11		± 0.256	UJ	0.21
	5/3/2007	Total Radium	0.32		± 0.345		
	5/3/2007	Th-228	0.19		± 0.170		0.15
	5/3/2007	Th-230	0.37		± 0.256	J	0.08
	5/3/2007	Th-232	0.01		± 0.086	UJ	0.08
	5/3/2007	Total Thorium	0.56		± 0.319		
	5/3/2007	U-234	0.98		± 0.388		0.09
	5/3/2007	U-235	0.00		± 0.078	U	0.17
	5/3/2007	U-238	0.74		± 0.335		0.09
	5/3/2007	Total Uranium	1.71	2.19	± 0.519		
SWSD003 (23a-025183) [07G-057]	5/3/2007	GALPHA	2.89		± 1.246		1.36
	5/3/2007	GBETA	2.31		± 0.745		1.02
	5/3/2007	Ra-226	0.05		± 0.146	UJ	0.14
	5/3/2007	Ra-228	0.49		± 0.441		0.35
	5/3/2007	Total Radium	0.54		± 0.465		
	5/3/2007	Th-228	0.30		± 0.218		0.16
	5/3/2007	Th-230	0.14		± 0.191	UJ	0.16
	5/3/2007	Th-232	0.01		± 0.093	UJ	0.09
	5/3/2007	Total Thorium	0.46		± 0.304		
	5/3/2007	U-234	0.12		± 0.136	UJ	0.16
	5/3/2007	U-235	0.00		± 0.084	U	0.19
	5/3/2007	U-238	0.15		± 0.151	UJ	0.16
	5/3/2007	Total Uranium	0.27	0.45	± 0.220		

Table A-4
2007 Surface Water Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result ^{a,d} (pCi/L)	Result (µg/L)	Error (pCi/L)	Qualifier ^b	MDA ^c (pCi/L)
SWSD004 (23a-025185) [07G-057]	5/3/2007	GALPHA	2.68		± 1.560		2.38
	5/3/2007	GBETA	8.15		± 1.027		1.06
	5/3/2007	Ra-226	0.07		± 0.134	UJ	0.22
	5/3/2007	Ra-228	0.24		± 0.300	UJ	0.24
	5/3/2007	Total Radium	0.31		± 0.329		
	5/3/2007	Th-228	0.20		± 0.200	UJ	0.23
	5/3/2007	Th-230	0.77		± 0.359	J	0.09
	5/3/2007	Th-232	0.01		± 0.090	UJ	0.09
	5/3/2007	Total Thorium	0.98		± 0.421		
	5/3/2007	U-234	0.80		± 0.354		0.09
	5/3/2007	U-235	0.04		± 0.099	UJ	0.09
	5/3/2007	U-238	0.83		± 0.362		0.09
	5/3/2007	Total Uranium	1.66	2.47	± 0.516		
Samples collected in Lodi Brook:							
SWSD005 (22a-025187) [07G-0151]	5/2/2007	GALPHA	3.48		± 1.425		1.51
	5/2/2007	GBETA	5.34		± 0.946		1.10
	5/2/2007	Ra-226	0.03		± 0.095	U	0.20
	5/2/2007	Ra-228	0.13		± 0.346	UJ	0.29
	5/2/2007	Total Radium	0.16		± 0.359		
	5/2/2007	Th-228	0.67		± 0.318		0.19
	5/2/2007	Th-230	0.18		± 0.205	UJ	0.16
	5/2/2007	Th-232	0.08		± 0.127	UJ	0.09
	5/2/2007	Total Thorium	0.92		± 0.399		
	5/2/2007	U-234	0.26		± 0.197		0.17
	5/2/2007	U-235	0.07		± 0.117	UJ	0.09
	5/2/2007	U-238	0.20		± 0.180		0.09
	5/2/2007	Total Uranium	0.53	0.60	± 0.291		
SWSD006 (22a-025189) [07G-0151]	5/2/2007	GALPHA	0.63		± 1.603	U	2.72
	5/2/2007	GBETA	3.05		± 1.362		2.02
	5/2/2007	Ra-226	0.02		± 0.125	U	0.28
	5/2/2007	Ra-228	0.00		± 0.299	UJ	0.26
	5/2/2007	Total Radium	0.02		± 0.324		
	5/2/2007	Th-228	0.28		± 0.213		0.17
	5/2/2007	Th-230	0.09		± 0.179	UJ	0.09
	5/2/2007	Th-232	0.08		± 0.136	UJ	0.09
	5/2/2007	Total Thorium	0.45		± 0.310		
	5/2/2007	U-234	0.16		± 0.160		0.09
	5/2/2007	U-235	0.00		± 0.092	UJ	0.09
	5/2/2007	U-238	0.32		± 0.218	J	0.09
	5/2/2007	Total Uranium	0.49	0.96	± 0.286		

Table A-4
2007 Surface Water Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result^{a,d} (pCi/L)	Result (µg/L)	Error (pCi/L)	Qualifier^b	MDA^c (pCi/L)
SWSD006 Duplicate (22a-025199) [07G-0151]	5/2/2007	GALPHA	0.00		± 1.478	U	2.51
	5/2/2007	GBETA	2.58		± 1.408		2.16
	5/2/2007	Ra-226	0.17		± 0.197	UJ	0.23
	5/2/2007	Ra-228	0.68		± 0.377	J	0.29
	5/2/2007	Total Radium	0.85		± 0.425		
	5/2/2007	Th-228	0.24		± 0.194		0.16
	5/2/2007	Th-230	0.17		± 0.201	UJ	0.16
	5/2/2007	Th-232	0.00		± 0.092	UJ	0.09
	5/2/2007	Total Thorium	0.40		± 0.294		
	5/2/2007	U-234	0.25		± 0.201		0.10
	5/2/2007	U-235	0.00		± 0.081	U	0.17
	5/2/2007	U-238	0.11		± 0.140	UJ	0.10
	5/2/2007	Total Uranium	0.35	0.31	± 0.258		
SWSD007 (22a-025191) [07G-0151]	5/2/2007	GALPHA	1.99		± 1.532	UJ	2.42
	5/2/2007	GBETA	4.27		± 1.402		1.96
	5/2/2007	Ra-226	0.02		± 0.131	U	0.29
	5/2/2007	Ra-228	0.58		± 0.369		0.28
	5/2/2007	Total Radium	0.60		± 0.392		
	5/2/2007	Th-228	0.32		± 0.227		0.20
	5/2/2007	Th-230	0.27		± 0.231	J	0.08
	5/2/2007	Th-232	0.01		± 0.086	UJ	0.08
	5/2/2007	Total Thorium	0.60		± 0.335		
	5/2/2007	U-234	0.44		± 0.247		0.08
	5/2/2007	U-235	0.00		± 0.072	U	0.15
	5/2/2007	U-238	0.29		± 0.206		0.18
	5/2/2007	Total Uranium	0.73	0.86	± 0.330		
SWSD008 (22a-025193) [07G-0151]	5/2/2007	GALPHA	1.71		± 1.487	UJ	2.38
	5/2/2007	GBETA	3.48		± 1.269		1.79
	5/2/2007	Ra-226	0.16		± 0.204	UJ	0.28
	5/2/2007	Ra-228	0.24		± 0.314	UJ	0.25
	5/2/2007	Total Radium	0.40		± 0.374		
	5/2/2007	Th-228	0.12		± 0.167	UJ	0.22
	5/2/2007	Th-230	0.18		± 0.204	UJ	0.08
	5/2/2007	Th-232	0.00		± 0.086	UJ	0.08
	5/2/2007	Total Thorium	0.31		± 0.277		
	5/2/2007	U-234	0.36		± 0.222		0.08
	5/2/2007	U-235	0.00		± 0.086	UJ	0.08
	5/2/2007	U-238	0.18		± 0.161		0.08
	5/2/2007	Total Uranium	0.54	0.54	± 0.287		

Table A-4
2007 Surface Water Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result ^{a,d} (pCi/L)	Result (µg/L)	Error (pCi/L)	Qualifier ^b	MDA ^c (pCi/L)
SWSD009 (22a-025195) [07G-057]	5/3/2007	GALPHA	1.21		± 0.761		1.00
	5/3/2007	GBETA	1.91		± 0.708		1.00
	5/3/2007	Ra-226	0.03		± 0.114	U	0.24
	5/3/2007	Ra-228	0.00		± 0.376	UJ	0.34
	5/3/2007	Total Radium	0.03		± 0.393		
	5/3/2007	Th-228	0.24		± 0.195		0.18
	5/3/2007	Th-230	0.30		± 0.239	J	0.08
	5/3/2007	Th-232	0.01		± 0.086	UJ	0.08
	5/3/2007	Total Thorium	0.55		± 0.320		
	5/3/2007	U-234	0.10		± 0.128	UJ	0.09
	5/3/2007	U-235	0.00		± 0.091	UJ	0.09
	5/3/2007	U-238	0.06		± 0.111	UJ	0.09
	5/3/2007	Total Uranium	0.16	0.19	± 0.192		
SWSD010 (22a-025197) [07G-057]	5/3/2007	GALPHA	1.45		± 1.540	UJ	2.51
	5/3/2007	GBETA	4.51		± 0.857		1.03
	5/3/2007	Ra-226	0.04		± 0.120	UJ	0.11
	5/3/2007	Ra-228	0.41		± 0.308		0.26
	5/3/2007	Total Radium	0.45		± 0.331		
	5/3/2007	Th-228	0.24		± 0.223	UJ	0.26
	5/3/2007	Th-230	0.25		± 0.229	J	0.09
	5/3/2007	Th-232	0.04		± 0.109	UJ	0.09
	5/3/2007	Total Thorium	0.53		± 0.338		
	5/3/2007	U-234	0.28		± 0.201		0.09
	5/3/2007	U-235	0.02		± 0.072	U	0.15
	5/3/2007	U-238	0.44		± 0.247		0.08
	5/3/2007	Total Uranium	0.74	1.30	± 0.326		

U = The analyte was not detected.

J = Reported as an estimated value.

R= Rejected by validation.

^aResults reported with ± radiological error equal to 2 sigma (95% confidence level).

^bUSACE data qualifier flags based on the CDQMP-QAPP.

^c Minimum Detectable Activity (MDA)

^d Unbiased actual values are used for sum even when the values are below the Lc and not detected.

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
Samples collected in Westerly Brook:					
SWSD001 (23a-025179) [705024]	5/3/2007	Aluminum, Total	34.9	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.3	J	3.1
	5/3/2007	Barium, Total	127		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	79.3		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	93700		136
	5/3/2007	Chromium, Total	0.6	U	0.6
	5/3/2007	Cobalt, Total	0.64	U	0.64
	5/3/2007	Copper, Total	3.4	U	0.77
	5/3/2007	Iron, Total	402		14.8
	5/3/2007	Lead, Total	1.7	U	1.7
	5/3/2007	Lithium, Total	191		0.08
	5/3/2007	Magnesium, Total	10100		20.9
	5/3/2007	Manganese, Total	365		0.18
	5/3/2007	Mercury, Total	0.021	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	11200		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	66500		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	0.7	U	0.7
	5/3/2007	Zinc, Total	24.8		8.8
SWSD002 (23a-025181) [705024]	5/3/2007	Aluminum, Total	47.3	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.1	U	3.1
	5/3/2007	Barium, Total	129		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	80.2		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	94300		136
	5/3/2007	Chromium, Total	0.6	U	0.6
	5/3/2007	Cobalt, Total	0.64	U	0.64
	5/3/2007	Copper, Total	4.6	U	0.77
	5/3/2007	Iron, Total	559		14.8
	5/3/2007	Lead, Total	1.7	U	1.7
	5/3/2007	Lithium, Total	192		0.08
	5/3/2007	Magnesium, Total	10000		20.9
	5/3/2007	Manganese, Total	432		0.18
	5/3/2007	Mercury, Total	0.021	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	11500		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	66900		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	1	J	0.7
	5/3/2007	Zinc, Total	41.2		8.8

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
SWSD003 ^c (23a-025183) [705024]	5/3/2007	Aluminum, Total	50.9	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.1	U	3.1
	5/3/2007	Barium, Total	152		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	38.8		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	71300		136
	5/3/2007	Chromium, Total	0.6	U	0.6
	5/3/2007	Cobalt, Total	0.64	U	0.64
	5/3/2007	Copper, Total	3.4	U	0.77
	5/3/2007	Iron, Total	486		14.8
	5/3/2007	Lead, Total	1.7	U	1.7
	5/3/2007	Lithium, Total	6.9		0.08
	5/3/2007	Magnesium, Total	7030		20.9
	5/3/2007	Manganese, Total	216		0.18
	5/3/2007	Mercury, Total	0.025	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	1830		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	52000		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	0.7	U	0.7
	5/3/2007	Zinc, Total	19.7		8.8
SWSD004 (23a-025185) [705024]	5/3/2007	Aluminum, Total	36.2	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.1	U	3.1
	5/3/2007	Barium, Total	131		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	80.9		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	95600		136
	5/3/2007	Chromium, Total	0.6	U	0.6
	5/3/2007	Cobalt, Total	0.64	U	0.64
	5/3/2007	Copper, Total	3.8	U	0.77
	5/3/2007	Iron, Total	584		14.8
	5/3/2007	Lead, Total	1.7	U	1.7
	5/3/2007	Lithium, Total	200		0.08
	5/3/2007	Magnesium, Total	9890		20.9
	5/3/2007	Manganese, Total	446		0.18
	5/3/2007	Mercury, Total	0.028	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	11700		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	67900		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	0.7	U	0.7
	5/3/2007	Zinc, Total	31.1		8.8

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
Samples collected in Lodi Brook:					
SWSD005 (22a-025187) [705014]	5/2/2007	Aluminum, Total	127	U	23
	5/2/2007	Antimony, Total	3.2	U	3.2
	5/2/2007	Arsenic, Total	3.1	U	3.1
	5/2/2007	Barium, Total	87.1		0.39
	5/2/2007	Beryllium, Total	0.044	U	0.04
	5/2/2007	Boron, Total	69.2		4.9
	5/2/2007	Cadmium, Total	0.35	U	0.35
	5/2/2007	Calcium, Total	52100		136
	5/2/2007	Chromium, Total	0.81	J	0.6
	5/2/2007	Cobalt, Total	0.64	U	0.64
	5/2/2007	Copper, Total	8.1	U	0.77
	5/2/2007	Iron, Total	774		14.8
	5/2/2007	Lead, Total	1.7		1.7
	5/2/2007	Lithium, Total	58.9		0.08
	5/2/2007	Magnesium, Total	11400		20.9
	5/2/2007	Manganese, Total	178		0.18
	5/2/2007	Mercury, Total	0.021	U	0.02
	5/2/2007	Nickel, Total	1.7	U	1.7
	5/2/2007	Potassium, Total	4320		16.6
	5/2/2007	Selenium, Total	2.8	U	2.8
	5/2/2007	Silver, Total	0.68	U	0.68
	5/2/2007	Sodium, Total	71900		207
	5/2/2007	Thallium, Total	0.095	U	0.1
	5/2/2007	Vanadium, Total	1.4	J	0.7
	5/2/2007	Zinc, Total	21		8.8
SWSD006 (22a-025189) [705014]	5/2/2007	Aluminum, Total	64.1	U	23
	5/2/2007	Antimony, Total	3.2	U	3.2
	5/2/2007	Arsenic, Total	3.1	U	3.1
	5/2/2007	Barium, Total	77.4		0.39
	5/2/2007	Beryllium, Total	0.044	U	0.04
	5/2/2007	Boron, Total	48.4		4.9
	5/2/2007	Cadmium, Total	0.35	U	0.35
	5/2/2007	Calcium, Total	96000		136
	5/2/2007	Chromium, Total	0.86	J	0.6
	5/2/2007	Cobalt, Total	0.64	U	0.64
	5/2/2007	Copper, Total	3.3	U	0.77
	5/2/2007	Iron, Total	275		14.8
	5/2/2007	Lead, Total	2	J	1.7
	5/2/2007	Lithium, Total	13.6		0.08
	5/2/2007	Magnesium, Total	6570		20.9
	5/2/2007	Manganese, Total	119		0.18
	5/2/2007	Mercury, Total	0.021	U	0.02
	5/2/2007	Nickel, Total	1.7	U	1.7
	5/2/2007	Potassium, Total	3520		16.6
	5/2/2007	Selenium, Total	2.8	U	2.8
	5/2/2007	Silver, Total	0.68	U	0.68
	5/2/2007	Sodium, Total	90700		207
	5/2/2007	Thallium, Total	0.2	J	0.1
	5/2/2007	Vanadium, Total	1.7		0.7
	5/2/2007	Zinc, Total	20.7		8.8

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
SWSD006 Duplicate (22a-025199) [705014]	5/2/2007	Aluminum, Total	77.4	U	23
	5/2/2007	Antimony, Total	3.2	U	3.2
	5/2/2007	Arsenic, Total	3.1	U	3.1
	5/2/2007	Barium, Total	78.9		0.39
	5/2/2007	Beryllium, Total	0.044	U	0.04
	5/2/2007	Boron, Total	49.6		4.9
	5/2/2007	Cadmium, Total	0.35	U	0.35
	5/2/2007	Calcium, Total	98300		136
	5/2/2007	Chromium, Total	0.64	J	0.6
	5/2/2007	Cobalt, Total	0.64	U	0.64
	5/2/2007	Copper, Total	4.2	U	0.77
	5/2/2007	Iron, Total	339		14.8
	5/2/2007	Lead, Total	3.6		1.7
	5/2/2007	Lithium, Total	13.6		0.08
	5/2/2007	Magnesium, Total	6710		20.9
	5/2/2007	Manganese, Total	125		0.18
	5/2/2007	Mercury, Total	0.021	U	0.02
	5/2/2007	Nickel, Total	1.7	U	1.7
	5/2/2007	Potassium, Total	3530		16.6
	5/2/2007	Selenium, Total	2.8	U	2.8
	5/2/2007	Silver, Total	0.68	U	0.68
	5/2/2007	Sodium, Total	92000		207
	5/2/2007	Thallium, Total	0.11	J	0.1
	5/2/2007	Vanadium, Total	1.2	J	0.7
	5/2/2007	Zinc, Total	22.5		8.8
SWSD007 (22a-025191) [705014]	5/2/2007	Aluminum, Total	50.7	U	23
	5/2/2007	Antimony, Total	3.2	U	3.2
	5/2/2007	Arsenic, Total	3.1	U	3.1
	5/2/2007	Barium, Total	82.4		0.39
	5/2/2007	Beryllium, Total	0.044	U	0.04
	5/2/2007	Boron, Total	49.7		4.9
	5/2/2007	Cadmium, Total	0.35	U	0.35
	5/2/2007	Calcium, Total	95500		136
	5/2/2007	Chromium, Total	0.6	U	0.6
	5/2/2007	Cobalt, Total	0.64	U	0.64
	5/2/2007	Copper, Total	4.3	U	0.77
	5/2/2007	Iron, Total	306		14.8
	5/2/2007	Lead, Total	2.1	J	1.7
	5/2/2007	Lithium, Total	43.1		0.08
	5/2/2007	Magnesium, Total	7200		20.9
	5/2/2007	Manganese, Total	167		0.18
	5/2/2007	Mercury, Total	0.021	U	0.02
	5/2/2007	Nickel, Total	1.7	U	1.7
	5/2/2007	Potassium, Total	3860		16.6
	5/2/2007	Selenium, Total	2.8	U	2.8
	5/2/2007	Silver, Total	0.68	U	0.68
	5/2/2007	Sodium, Total	95300		207
	5/2/2007	Thallium, Total	0.17	J	0.1
	5/2/2007	Vanadium, Total	1.2	J	0.7
	5/2/2007	Zinc, Total	20		8.8

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
SWSD008 (22a-025193) [705014]	5/2/2007	Aluminum, Total	872		23
	5/2/2007	Antimony, Total	3.2	U	3.2
	5/2/2007	Arsenic, Total	3.1	U	3.1
	5/2/2007	Barium, Total	165		0.39
	5/2/2007	Beryllium, Total	0.044	U	0.04
	5/2/2007	Boron, Total	37.9		4.9
	5/2/2007	Cadmium, Total	0.39	J	0.35
	5/2/2007	Calcium, Total	97600		136
	5/2/2007	Chromium, Total	4.2		0.6
	5/2/2007	Cobalt, Total	0.64	U	0.64
	5/2/2007	Copper, Total	12.6	U	0.77
	5/2/2007	Iron, Total	4450		14.8
	5/2/2007	Lead, Total	26.4		1.7
	5/2/2007	Lithium, Total	7.8		0.08
	5/2/2007	Magnesium, Total	13600		20.9
	5/2/2007	Manganese, Total	1230		0.18
	5/2/2007	Mercury, Total	0.06	U	0.02
	5/2/2007	Nickel, Total	4.3		1.7
	5/2/2007	Potassium, Total	4400		16.6
	5/2/2007	Selenium, Total	2.8	U	2.8
	5/2/2007	Silver, Total	0.68	U	0.68
	5/2/2007	Sodium, Total	64600		207
	5/2/2007	Thallium, Total	0.1	J	0.1
	5/2/2007	Vanadium, Total	4.6		0.7
	5/2/2007	Zinc, Total	40.4		8.8
SWSD009 (22a-025195) [705024]	5/3/2007	Aluminum, Total	80.7	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.1	U	3.1
	5/3/2007	Barium, Total	48.1		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	35.7		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	44100		136
	5/3/2007	Chromium, Total	0.8	J	0.6
	5/3/2007	Cobalt, Total	0.64		0.64
	5/3/2007	Copper, Total	4.5	U	0.77
	5/3/2007	Iron, Total	67.1	U	14.8
	5/3/2007	Lead, Total	1.7	U	1.7
	5/3/2007	Lithium, Total	2		0.08
	5/3/2007	Magnesium, Total	4980		20.9
	5/3/2007	Manganese, Total	8.9		0.18
	5/3/2007	Mercury, Total	0.063	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	1700		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	43500		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	0.7	U	0.7
	5/3/2007	Zinc, Total	8.8	U	8.8

Table A-5
2007 Surface Water Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Data Collected	Analyte ^a	Result (µg/L)	Data Qualifier ^b	Method Detection Limit (ug/L)
SWSD010 (22a-025197) [705024]	5/3/2007	Aluminum, Total	110	U	23
	5/3/2007	Antimony, Total	3.2	U	3.2
	5/3/2007	Arsenic, Total	3.1	U	3.1
	5/3/2007	Barium, Total	97.6		0.39
	5/3/2007	Beryllium, Total	0.044	U	0.04
	5/3/2007	Boron, Total	71		4.9
	5/3/2007	Cadmium, Total	0.35	U	0.35
	5/3/2007	Calcium, Total	66600		136
	5/3/2007	Chromium, Total	0.95	J	0.6
	5/3/2007	Cobalt, Total	0.64	U	0.64
	5/3/2007	Copper, Total	9.4	U	0.77
	5/3/2007	Iron, Total	619		14.8
	5/3/2007	Lead, Total	2.2	J	1.7
	5/3/2007	Lithium, Total	88.1		0.08
	5/3/2007	Magnesium, Total	12300		20.9
	5/3/2007	Manganese, Total	273		0.18
	5/3/2007	Mercury, Total	0.036	U	0.02
	5/3/2007	Nickel, Total	1.7	U	1.7
	5/3/2007	Potassium, Total	4770		16.6
	5/3/2007	Selenium, Total	2.8	U	2.8
	5/3/2007	Silver, Total	0.68	U	0.68
	5/3/2007	Sodium, Total	79500		207
	5/3/2007	Thallium, Total	0.095	U	0.1
	5/3/2007	Vanadium, Total	1.3	J	0.7
	5/3/2007	Zinc, Total	14.7	J	8.8

^aAll analytes were reported, detected and undetected.

^b USACE qualifier flags based on the CDQMP-QAPP: J = Reported as an estimated value; U= analyte was not detected; UJ = Analyte was not detected, and the reporting limit is estimated due

^c SWSD003 is the background location for surface water locations.

Table A-6A
2007 Sediment Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result ^a (pCi/g)	Error (pCi/g)	Qualifier ^b	MDA ^c (pCi/g)	Cleanup Criteria ^d (pCi/g)
Samples collected in Westerly Brook:							
SWSD001 (23a-025180) [07G-058]	5/3/2007	Ra-226	0.39	0.047		0.01	5 ^f
	5/3/2007	Th-232	0.43	0.07		0.02	5 ^f
	5/3/2007	U-238	0.44	0.273	J	0.12	50
SWSD002 (23a-025182) [07G-058]	5/3/2007	Ra-226	0.61	0.06		0.02	5 ^f
	5/3/2007	Th-232	0.53	0.123		0.03	5 ^f
	5/3/2007	U-238	0.10	0.126	UJ	0.16	50
SWSD003 (23a-025184) [07G-058]	5/3/2007	Ra-226	0.51	0.048		0.01	5 ^f
	5/3/2007	Th-232	0.41	0.079		0.02	5 ^f
	5/3/2007	U-238	0.54	0.355	J	0.14	50
Samples collected in Lodi Brook:							
SWSD005 (22a-025188) [07G-0152]	5/2/2007	Ra-226	0.63	0.049		0.01	5 ^f
	5/2/2007	Th-232	0.57	0.09		0.02	5 ^f
	5/2/2007	U-238	0.00	0.001	R	0.15	50
SWSD006 (22a-025190) [07G-0152]	5/2/2007	Ra-226	1.38	0.111	J	0.03	5 ^f
	5/2/2007	Th-232	2.97	0.281	J	0.05	5 ^f
	5/2/2007	U-238	0.58	0.588	UJ	0.31	50
SWSD006 Duplicate (22a-025200) [07G-0152]	5/2/2007	Ra-226	1.18	0.101	J	0.03	5 ^f
	5/2/2007	Th-232	2.28	0.238	J	0.04	5 ^f
	5/2/2007	U-238	0.60	0.498	J	0.25	50
SWSD007 (22a-025192) [07G-0152]	5/2/2007	Ra-226	0.68	0.055		0.02	5 ^f
	5/2/2007	Th-232	0.82	0.117		0.03	5 ^f
	5/2/2007	U-238	0.94	0.277	J	0.13	50
SWSD008 (22a-025194) [07G-0152]	5/2/2007	Ra-226	1.17	0.076		0.02	5 ^f
	5/2/2007	Th-232	2.25	0.197		0.03	5 ^f
	5/2/2007	U-238	2.06	0.439		0.20	50
SWSD009 (22a-025196) [07G-058]	5/3/2007	Ra-226	1.12	0.118	J	0.03	5 ^f
	5/3/2007	Th-232	1.80	0.254	J	0.06	5 ^f
	5/3/2007	U-238	2.21	0.988	J	0.45	50
SWSD010 (22a-025198) [07G-058]	5/3/2007	Ra-226	0.86	0.077		0.02	5 ^f
	5/3/2007	Th-232	0.90	0.128		0.03	5 ^f
	5/3/2007	U-238	0.59	0.288	J	0.15	50

J = Reported as an estimated value. U= analyte was not detected.

^a Results reported with ± radiological error equal to 2 sigma (95% confidence level).

^b USACE data qualifier flags based on the CDQMP-QAPP.

U = The analyte was not detected.

J = Reported as an estimated value.

R= Rejected by validation.

^c Minimum Detectable Activity (MDA)

^d Soil cleanup criteria established by the *Record of Decision for Soils and Building at the FUSRAP Maywood Superfund Site* is used as the basis for evaluating analytical results for sediment.

^e A quality control duplicate is collected at the same time and location and is analyzed by the same method in order to evaluate precision in sampling and analysis.

^f The ROD soil cleanup criteria for the combined concentration of Ra-226 and Th-232 above background.

Table A-6B
2007 Sediment Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Results (mg/kg)	Data Qualifier ^b	Method Detection Limits (mg/kg)
Samples collected in Westerly Brook:					
SWSD001 (23a-025180) [705024]	5/3/2007	Aluminum, Total	3050	J	2.20
	5/3/2007	Antimony, Total	0.34	J	0.31
	5/3/2007	Arsenic, Total	5.4		0.24
	5/3/2007	Barium, Total	49.6	J	0.03
	5/3/2007	Beryllium, Total	0.43		0.02
	5/3/2007	Boron, Total	10.1		0.08
	5/3/2007	Cadmium, Total	0.42		0.02
	5/3/2007	Calcium, Total	2670	J	5.10
	5/3/2007	Chromium, Total	12.7	J	0.04
	5/3/2007	Cobalt, Total	5.2		0.04
	5/3/2007	Copper, Total	46.4		0.07
	5/3/2007	Iron, Total	9370		1.90
	5/3/2007	Lead, Total	74.5		0.16
	5/3/2007	Lithium, Total	5.1		0.04
	5/3/2007	Magnesium, Total	1800	J	0.49
	5/3/2007	Manganese, Total	604		0.01
	5/3/2007	Mercury, Total	0.028		0.00
	5/3/2007	Nickel, Total	19.5		0.12
	5/3/2007	Potassium, Total	240		1.50
	5/3/2007	Selenium, Total	0.34	U	0.34
	5/3/2007	Silver, Total	0.043	U	0.04
	5/3/2007	Sodium, Total	225	U	11.50
	5/3/2007	Thallium, Total	0.097	U	0.10
	5/3/2007	Vanadium, Total	13.4		0.04
	5/3/2007	Zinc, Total	247		0.79
SWSD002 (23a-025182) [705024]	5/3/2007	Aluminum, Total	4170	J	2.00
	5/3/2007	Antimony, Total	1.6		0.28
	5/3/2007	Arsenic, Total	4.3		0.22
	5/3/2007	Barium, Total	43.1	J	0.03
	5/3/2007	Beryllium, Total	1.1		0.02
	5/3/2007	Boron, Total	26		0.07
	5/3/2007	Cadmium, Total	0.53		0.02
	5/3/2007	Calcium, Total	6070	J	4.70
	5/3/2007	Chromium, Total	35	J	0.04
	5/3/2007	Cobalt, Total	10.7		0.04
	5/3/2007	Copper, Total	159		0.06
	5/3/2007	Iron, Total	16300		1.70
	5/3/2007	Lead, Total	172		0.14
	5/3/2007	Lithium, Total	5.9		0.04
	5/3/2007	Magnesium, Total	4060	J	0.45
	5/3/2007	Manganese, Total	226		0.01
	5/3/2007	Mercury, Total	0.02	U	0.00
	5/3/2007	Nickel, Total	60.1		0.11
	5/3/2007	Potassium, Total	293		1.40
	5/3/2007	Selenium, Total	0.82		0.31
	5/3/2007	Silver, Total	0.15		0.04
	5/3/2007	Sodium, Total	477	U	52.10
	5/3/2007	Thallium, Total	0.088	U	0.09
	5/3/2007	Vanadium, Total	17.9		0.04
	5/3/2007	Zinc, Total	784		3.60

Table A-6B
2007 Sediment Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Results (mg/kg)	Data Qualifier ^b	Method Detection Limits (mg/kg)
SWSD003 (23a-025184) [705024]	5/3/2007	Aluminum, Total	2460	J	2.10
	5/3/2007	Antimony, Total	0.33	J	0.29
	5/3/2007	Arsenic, Total	2		0.22
	5/3/2007	Barium, Total	48.2	J	0.03
	5/3/2007	Beryllium, Total	0.46		0.02
	5/3/2007	Boron, Total	6.5		0.08
	5/3/2007	Cadmium, Total	0.43		0.02
	5/3/2007	Calcium, Total	3100	J	4.80
	5/3/2007	Chromium, Total	12.3	J	0.04
	5/3/2007	Cobalt, Total	3.7		0.04
	5/3/2007	Copper, Total	101		0.06
	5/3/2007	Iron, Total	8540		1.80
	5/3/2007	Lead, Total	69.6		0.15
	5/3/2007	Lithium, Total	3.6		0.04
	5/3/2007	Magnesium, Total	1570	J	0.47
	5/3/2007	Manganese, Total	102		0.01
	5/3/2007	Mercury, Total	0.026		0.00
	5/3/2007	Nickel, Total	22.8		0.11
	5/3/2007	Potassium, Total	210		1.40
	5/3/2007	Selenium, Total	0.32	U	0.32
	5/3/2007	Silver, Total	0.041	U	0.04
	5/3/2007	Sodium, Total	192	U	10.90
	5/3/2007	Thallium, Total	0.092	U	0.09
	5/3/2007	Vanadium, Total	10.7		0.04
	5/3/2007	Zinc, Total	179		0.75
Samples collected in Lodi Brook:					
SWSD005 (22a-025188) [705014]	5/2/2007	Aluminum, Total	2410	J	2.10
	5/2/2007	Antimony, Total	0.29	U	0.29
	5/2/2007	Arsenic, Total	0.9		0.23
	5/2/2007	Barium, Total	76.7	J	0.03
	5/2/2007	Beryllium, Total	0.065		0.02
	5/2/2007	Boron, Total	4.7		0.08
	5/2/2007	Cadmium, Total	0.2	U	0.02
	5/2/2007	Calcium, Total	3730	J	4.90
	5/2/2007	Chromium, Total	14.3	J	0.04
	5/2/2007	Cobalt, Total	2.4		0.04
	5/2/2007	Copper, Total	14.9		0.07
	5/2/2007	Iron, Total	6520		1.80
	5/2/2007	Lead, Total	7.7		0.15
	5/2/2007	Lithium, Total	4.7		0.04
	5/2/2007	Magnesium, Total	1620	J	0.47
	5/2/2007	Manganese, Total	130		0.01
	5/2/2007	Mercury, Total	0.017	U	0.00
	5/2/2007	Nickel, Total	5.6		0.11
	5/2/2007	Potassium, Total	607		1.50
	5/2/2007	Selenium, Total	0.32	U	0.32
	5/2/2007	Silver, Total	0.042	U	0.04
	5/2/2007	Sodium, Total	173	U	11.00
	5/2/2007	Thallium, Total	0.12	J	0.09
	5/2/2007	Vanadium, Total	9.3		0.04
	5/2/2007	Zinc, Total	33.7		0.76

Table A-6B
2007 Sediment Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Results (mg/kg)	Data Qualifier ^b	Method Detection Limits (mg/kg)
SWSD006 (22a-025190) [705014]	5/2/2007	Aluminum, Total	5090	J	3.50
	5/2/2007	Antimony, Total	1.8		0.48
	5/2/2007	Arsenic, Total	9.2		0.37
	5/2/2007	Barium, Total	234	J	0.04
	5/2/2007	Beryllium, Total	0.33		0.03
	5/2/2007	Boron, Total	4.9		0.12
	5/2/2007	Cadmium, Total	1.4		0.04
	5/2/2007	Calcium, Total	5550	J	8.00
	5/2/2007	Chromium, Total	31.2	J	0.07
	5/2/2007	Cobalt, Total	4.2		0.07
	5/2/2007	Copper, Total	63.9		0.10
	5/2/2007	Iron, Total	14000		3.00
	5/2/2007	Lead, Total	185		0.25
	5/2/2007	Lithium, Total	14.1		0.07
	5/2/2007	Magnesium, Total	1410	J	0.77
	5/2/2007	Manganese, Total	180		0.02
	5/2/2007	Mercury, Total	0.3		0.01
	5/2/2007	Nickel, Total	12.1		0.18
	5/2/2007	Potassium, Total	370		2.40
	5/2/2007	Selenium, Total	1.3		0.52
	5/2/2007	Silver, Total	0.068	U	0.07
	5/2/2007	Sodium, Total	474	U	35.60
	5/2/2007	Thallium, Total	0.37		0.15
	5/2/2007	Vanadium, Total	27.8		0.07
	5/2/2007	Zinc, Total	282		2.50
SWSD006 Duplicate ^c (22a-025200) [705014]	5/2/2007	Aluminum, Total	6490	J	3.30
	5/2/2007	Antimony, Total	1.6		0.45
	5/2/2007	Arsenic, Total	11.3		0.35
	5/2/2007	Barium, Total	247	J	0.04
	5/2/2007	Beryllium, Total	0.55		0.03
	5/2/2007	Boron, Total	6.8		0.12
	5/2/2007	Cadmium, Total	1.5		0.04
	5/2/2007	Calcium, Total	6000	J	7.50
	5/2/2007	Chromium, Total	40.3	J	0.07
	5/2/2007	Cobalt, Total	6.2		0.06
	5/2/2007	Copper, Total	95.5		0.10
	5/2/2007	Iron, Total	16800		2.80
	5/2/2007	Lead, Total	209		0.23
	5/2/2007	Lithium, Total	19.5		0.07
	5/2/2007	Magnesium, Total	2100	J	0.72
	5/2/2007	Manganese, Total	217		0.02
	5/2/2007	Mercury, Total	0.32		0.01
	5/2/2007	Nickel, Total	18.1		0.17
	5/2/2007	Potassium, Total	433		2.20
	5/2/2007	Selenium, Total	0.99	J	0.49
	5/2/2007	Silver, Total	0.064	U	0.06
	5/2/2007	Sodium, Total	503	U	16.80
	5/2/2007	Thallium, Total	0.48		0.14
	5/2/2007	Vanadium, Total	31.9		0.06
	5/2/2007	Zinc, Total	450		1.20

Table A-6B
2007 Sediment Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Results (mg/kg)	Data Qualifier ^b	Method Detection Limits (mg/kg)
SWSD007 (22a-025192) [705014]	5/2/2007	Aluminum, Total	3500	J	2.70
	5/2/2007	Antimony, Total	0.37	U	0.37
	5/2/2007	Arsenic, Total	1.9		0.28
	5/2/2007	Barium, Total	103	J	0.03
	5/2/2007	Beryllium, Total	0.15		0.02
	5/2/2007	Boron, Total	6.4		0.10
	5/2/2007	Cadmium, Total	0.34	U	0.03
	5/2/2007	Calcium, Total	5690	J	6.10
	5/2/2007	Chromium, Total	14.7	J	0.05
	5/2/2007	Cobalt, Total	3.6		0.05
	5/2/2007	Copper, Total	19		0.08
	5/2/2007	Iron, Total	10400		2.30
	5/2/2007	Lead, Total	21.9		0.19
	5/2/2007	Lithium, Total	6.7		0.05
	5/2/2007	Magnesium, Total	2310	J	0.59
	5/2/2007	Manganese, Total	151		0.02
	5/2/2007	Mercury, Total	0.04	U	0.00
	5/2/2007	Nickel, Total	7.3		0.14
	5/2/2007	Potassium, Total	455		1.80
	5/2/2007	Selenium, Total	0.4	U	0.40
	5/2/2007	Silver, Total	0.052	U	0.05
	5/2/2007	Sodium, Total	316	U	13.70
	5/2/2007	Thallium, Total	0.16	J	0.12
	5/2/2007	Vanadium, Total	15.1		0.05
	5/2/2007	Zinc, Total	57.4		0.95
SWSD008 (22a-025194) [705014]	5/2/2007	Aluminum, Total	7700	J	3.10
	5/2/2007	Antimony, Total	0.86	J	0.42
	5/2/2007	Arsenic, Total	7.6		0.33
	5/2/2007	Barium, Total	193	J	0.04
	5/2/2007	Beryllium, Total	0.45		0.03
	5/2/2007	Boron, Total	4.9		0.11
	5/2/2007	Cadmium, Total	1.2		0.03
	5/2/2007	Calcium, Total	5080	J	7.00
	5/2/2007	Chromium, Total	35.1	J	0.06
	5/2/2007	Cobalt, Total	4.6		0.06
	5/2/2007	Copper, Total	60.7		0.09
	5/2/2007	Iron, Total	12700		2.60
	5/2/2007	Lead, Total	215		0.22
	5/2/2007	Lithium, Total	15.2		0.06
	5/2/2007	Magnesium, Total	1680	J	0.68
	5/2/2007	Manganese, Total	308		0.02
	5/2/2007	Mercury, Total	0.22		0.00
	5/2/2007	Nickel, Total	15.3		0.16
	5/2/2007	Potassium, Total	524		2.10
	5/2/2007	Selenium, Total	0.71	J	0.46
	5/2/2007	Silver, Total	0.06	U	0.06
	5/2/2007	Sodium, Total	322	U	15.80
	5/2/2007	Thallium, Total	0.19	J	0.13
	5/2/2007	Vanadium, Total	33.2		0.06
	5/2/2007	Zinc, Total	205		1.10

Table A-6B
2007 Sediment Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Results (mg/kg)	Data Qualifier ^b	Method Detection Limits (mg/kg)
SWSD009 (22a-025196) [705024]	5/3/2007	Aluminum, Total	8950	J	6.40
	5/3/2007	Antimony, Total	2.3	J	0.88
	5/3/2007	Arsenic, Total	10.8	J	0.68
	5/3/2007	Barium, Total	167	J	0.08
	5/3/2007	Beryllium, Total	0.48	J	0.06
	5/3/2007	Boron, Total	6.1	J	0.23
	5/3/2007	Cadmium, Total	2.1	J	0.07
	5/3/2007	Calcium, Total	5790	J	14.70
	5/3/2007	Chromium, Total	32.1	J	0.13
	5/3/2007	Cobalt, Total	4.9	J	0.12
	5/3/2007	Copper, Total	101	J	0.19
	5/3/2007	Iron, Total	12200	J	5.50
	5/3/2007	Lead, Total	244	J	0.45
	5/3/2007	Lithium, Total	15	J	0.13
	5/3/2007	Magnesium, Total	1970	J	1.40
	5/3/2007	Manganese, Total	104	J	0.04
	5/3/2007	Mercury, Total	0.34	UJ	0.01
	5/3/2007	Nickel, Total	18.7	J	0.34
	5/3/2007	Potassium, Total	554	J	4.40
	5/3/2007	Selenium, Total	1.7	J	0.96
	5/3/2007	Silver, Total	0.12	UJ	0.12
	5/3/2007	Sodium, Total	666	J	32.90
	5/3/2007	Thallium, Total	0.45	J	0.28
	5/3/2007	Vanadium, Total	56.1	J	0.12
	5/3/2007	Zinc, Total	356	J	2.30
SWSD010 (22a-025198) [705024]	5/3/2007	Aluminum, Total	4570	J	2.10
	5/3/2007	Antimony, Total	0.52	J	0.28
	5/3/2007	Arsenic, Total	2		0.22
	5/3/2007	Barium, Total	56.1	J	0.03
	5/3/2007	Beryllium, Total	0.1		0.02
	5/3/2007	Boron, Total	5.5		0.07
	5/3/2007	Cadmium, Total	0.53		0.02
	5/3/2007	Calcium, Total	13400	J	4.70
	5/3/2007	Chromium, Total	26.2	J	0.04
	5/3/2007	Cobalt, Total	5.6		0.04
	5/3/2007	Copper, Total	54.3		0.06
	5/3/2007	Iron, Total	19200		1.80
	5/3/2007	Lead, Total	23.2		0.15
	5/3/2007	Lithium, Total	8.5		0.04
	5/3/2007	Magnesium, Total	5630	J	0.46
	5/3/2007	Manganese, Total	334		0.01
	5/3/2007	Mercury, Total	0.033		0.00
	5/3/2007	Nickel, Total	14.2		0.11
	5/3/2007	Potassium, Total	320		1.40
	5/3/2007	Selenium, Total	0.31	U	0.31
	5/3/2007	Silver, Total	0.04	U	0.04
	5/3/2007	Sodium, Total	392	U	10.60
	5/3/2007	Thallium, Total	0.09	U	0.09
	5/3/2007	Vanadium, Total	22.7		0.04
	5/3/2007	Zinc, Total	147		0.73

^a All analytes were reported, detected and undetected.

^b USACE qualifier flags based on the CDQMP-QAPP: J = Reported as an estimated value; U= analyte was not detected; UJ = Analyte was not detected, and the reporting limit was estimated due to poor quality control consideration.

^c A quality control duplicate is collected at the same time and location, and is analyzed by the same method in order to evaluate precision in sampling and analysis.

Table A-7
2007 Depth to Groundwater and Groundwater Elevation for
Overburden Monitoring Wells

Well	Surveyed Easting	Surveyed Northing	Top of Inner Casing (feet NGVD)	Water Level (feet below TOC)	GW Elevation (feet NGVD)	Fluctuation (feet)	Measurement Date
B38W01S	2164807.07	752837.37	56.57	5.35	51.22	2.02	3/22/2007
B38W01S	2164807.07	752837.37	56.57	4.78	51.79		5/1/2007
B38W01S	2164807.07	752837.37	56.57	6.47	50.10		7/31/2007
B38W01S	2164807.07	752837.37	56.57	6.80	49.77		10/29/2007
B38W12AR	2165389.47	750774.64	49.90	4.74	45.16	1.97	3/22/2007
B38W12AR	2165389.47	750774.64	49.90	4.49	45.41		5/1/2007
B38W12AR	2165389.47	750774.64	49.90	5.88	44.02		7/31/2007
B38W12AR	2165389.47	750774.64	49.90	6.46	43.44		10/29/2007
B38W14S	2163384.82	752600.98	43.89	Not Guaged	N/A	1.24	3/22/2007
B38W14S	2163384.82	752600.98	43.89	3.28	40.61		5/1/2007
B38W14S	2163384.82	752600.98	43.89	4.32	39.57		7/31/2007
B38W14S	2163384.82	752600.98	43.89	4.52	39.37		10/29/2007
B38W15S	2163472.30	752364.90	46.75	3.92	42.83	1.92	3/22/2007
B38W15S	2163472.30	752364.90	46.75	3.31	43.44		5/1/2007
B38W15S	2163472.30	752364.90	46.75	4.95	41.80		7/31/2007
B38W15S	2163472.30	752364.90	46.75	5.23	41.52		10/29/2007
B38W17A	2163922.90	752019.80	53.24	6.80	46.44	2.92	3/22/2007
B38W17A	2163922.90	752019.80	53.24	6.24	47.00		5/1/2007
B38W17A	2163922.90	752019.80	53.24	8.63	44.61		7/31/2007
B38W17A	2163922.90	752019.80	53.24	9.16	44.08		10/29/2007
B38W19S	2164049.13	752513.62	59.91	13.41	46.50	3.05	3/22/2007
B38W19S	2164049.13	752513.62	59.91	12.64	47.27		5/1/2007
B38W19S	2164049.13	752513.62	59.91	15.07	44.84		7/31/2007
B38W19S	2164049.13	752513.62	59.91	15.69	44.22		10/29/2007
B38W24S	2164291.43	752193.57	55.04	7.35	47.69	2.90	3/22/2007
B38W24S	2164291.43	752193.57	55.04	6.47	48.57		5/1/2007
B38W24S	2164291.43	752193.57	55.04	9.20	45.84		7/31/2007
B38W24S	2164291.43	752193.57	55.04	9.37	45.67		10/29/2007
MISS01AA	2164101.98	752963.64	62.70	15.20	47.50	3.11	3/22/2007
MISS01AA	2164101.98	752963.64	62.70	13.80	48.90		5/1/2007
MISS01AA	2164101.98	752963.64	62.70	15.63	47.07		7/31/2007
MISS01AA	2164101.98	752963.64	62.70	16.91	45.79		10/29/2007
MISS02A	2164706.13	752788.00	61.47	6.80	54.67	6.16	3/22/2007
MISS02A	2164706.13	752788.00	61.47	4.80	56.67		5/1/2007
MISS02A	2164706.13	752788.00	61.47	10.15	51.32		7/31/2007
MISS02A	2164706.13	752788.00	61.47	10.96	50.51		10/29/2007

Table A-7
2007 Depth to Groundwater and Groundwater Elevation for
Overburden Monitoring Wells

Well	Surveyed Easting	Surveyed Northing	Top of Inner Casing (feet NGVD)	Water Level (feet below TOC)	GW Elevation (feet NGVD)	Fluctuation (feet)	Measurement Date
MISS04A	2164349.46	752109.73	57.17	7.13	50.04	5.19	3/22/2007
MISS04A	2164349.46	752109.73	57.17	5.10	52.07		5/1/2007
MISS04A	2164349.46	752109.73	57.17	10.29	46.88		7/31/2007
MISS04A	2164349.46	752109.73	57.17	9.95	47.22		10/29/2007
MISS05A	2164044.20	752360.40	58.65	10.62	48.03	4.95	3/22/2007
MISS05A	2164044.20	752360.40	58.65	8.75	49.90		5/1/2007
MISS05A	2164044.20	752360.40	58.65	12.81	45.84		7/31/2007
MISS05A	2164044.20	752360.40	58.65	13.70	44.95		10/29/2007
MISS07A	2164053.10	752657.57	55.60	6.60	49.00	1.93	3/22/2007
MISS07A	2164053.10	752657.57	55.60	6.76	48.84		5/1/2007
MISS07A	2164053.10	752657.57	55.60	8.53	47.07		7/31/2007
MISS07A	2164053.10	752657.57	55.60	7.67	47.93		10/29/2007
MW-25S	2164313.46	752388.71	58.85	7.44	51.41	4.6	3/22/2007
MW-25S	2164313.46	752388.71	58.85	6.64	52.21		5/1/2007
MW-25S	2164313.46	752388.71	58.85	9.80	49.05		7/31/2007
MW-25S	2164313.46	752388.71	58.85	11.24	47.61		10/29/2007
MW-26S	2164357.40	752657.61	61.36	11.52	49.84	2.73	3/22/2007
MW-26S	2164357.40	752657.61	61.36	10.32	51.04		5/1/2007
MW-26S	2164357.40	752657.61	61.36	12.11	49.25		7/31/2007
MW-26S	2164357.40	752657.61	61.36	13.05	48.31		10/29/2007

Notes:

N/A - Not applicable

NGVD - National Geodetic Vertical Datum - 1929

TOC - Top of Casing

Table A-8
2007 Depth to Groundwater and Groundwater Elevation for Bedrock Monitoring Wells

Well	Surveyed Easting	Surveyed Northing	Top of Inner Casing (feet NGVD)	Water Level (feet below TOC)	GW Elevation (feet NGVD)	Fluctuation (feet)	Measurement Date
B38W02D	2165243.12	752558.09	78.04	13.25	64.79	3.56	3/22/2007
B38W02D	2165243.12	752558.09	78.04	12.84	65.20		5/1/2007
B38W02D	2165243.12	752558.09	78.04	16.38	61.66		7/31/2007
B38W02D	2165243.12	752558.09	78.04	16.40	61.64		10/29/2007
B38W03B	2164513.81	752253.19	58.27	8.33	49.94	2.58	3/22/2007
B38W03B	2164513.81	752253.19	58.27	7.71	50.56		5/1/2007
B38W03B	2164513.81	752253.19	58.27	9.87	48.40		7/31/2007
B38W03B	2164513.81	752253.19	58.27	10.29	47.98		10/29/2007
B38W04B	2164950.28	752093.58	65.64	8.79	56.85	3.20	3/22/2007
B38W04B	2164950.28	752093.58	65.64	8.58	57.06		5/1/2007
B38W04B	2164950.28	752093.58	65.64	10.51	55.13		7/31/2007
B38W04B	2164950.28	752093.58	65.64	11.78	53.86		10/29/2007
B38W05B	2165366.54	752175.88	70.98	8.19	62.79	7.43	3/22/2007
B38W05B	2165366.54	752175.88	70.98	6.72	64.26		5/1/2007
B38W05B	2165366.54	752175.88	70.98	12.30	58.68		7/31/2007
B38W05B	2165366.54	752175.88	70.98	14.15	56.83		10/29/2007
B38W07B	2164168.21	751974.70	54.98	6.53	48.45	3.47	3/22/2007
B38W07B	2164168.21	751974.70	54.98	6.33	48.65		5/1/2007
B38W07B	2164168.21	751974.70	54.98	9.42	45.56		7/31/2007
B38W07B	2164168.21	751974.70	54.98	9.80	45.18		10/29/2007
B38W12B	2165393.54	750766.32	49.64	4.10	45.54	2.39	3/22/2007
B38W12B	2165393.54	750766.32	49.64	3.69	45.95		5/1/2007
B38W12B	2165393.54	750766.32	49.64	5.28	44.36		7/31/2007
B38W12B	2165393.54	750766.32	49.64	6.08	43.56		10/29/2007
B38W14D	2163391.63	752597.24	43.79	Not Guaged	N/A	1.90	3/22/2007
B38W14D	2163391.63	752597.24	43.79	0.58	43.21		5/1/2007
B38W14D	2163391.63	752597.24	43.79	2.48	41.31		7/31/2007
B38W14D	2163391.63	752597.24	43.79	2.42	41.37		10/29/2007
B38W15D	2163475.63	752368.54	47.04	3.56	43.48	1.63	3/22/2007
B38W15D	2163475.63	752368.54	47.04	2.96	44.08		5/1/2007
B38W15D	2163475.63	752368.54	47.04	4.23	42.81		7/31/2007
B38W15D	2163475.63	752368.54	47.04	4.59	42.45		10/29/2007
B38W17B	2163927.32	752021.78	53.28	7.04	46.24	2.72	3/22/2007
B38W17B	2163927.32	752021.78	53.28	6.44	46.84		5/1/2007
B38W17B	2163927.32	752021.78	53.28	8.66	44.62		7/31/2007
B38W17B	2163927.32	752021.78	53.28	9.16	44.12		10/29/2007
B38W18D	2164783.97	752505.39	57.85	3.24	54.61	3.15	3/22/2007
B38W18D	2164783.97	752505.39	57.85	1.90	55.95		5/1/2007
B38W18D	2164783.97	752505.39	57.85	4.19	53.66		7/31/2007
B38W18D	2164783.97	752505.39	57.85	5.05	52.80		10/29/2007

Table A-8
2007 Depth to Groundwater and Groundwater Elevation for Bedrock Monitoring Wells

Well	Surveyed Easting	Surveyed Northing	Top of Inner Casing (feet NGVD)	Water Level (feet below TOC)	GW Elevation (feet NGVD)	Fluctuation (feet)	Measurement Date
B38W19D	2164045.10	752522.83	59.98	14.14	45.84	2.43	3/22/2007
B38W19D	2164045.10	752522.83	59.98	13.45	46.53		5/1/2007
B38W19D	2164045.10	752522.83	59.98	15.39	44.59		7/31/2007
B38W19D	2164045.10	752522.83	59.98	15.88	44.10		10/29/2007
B38W24D	2164291.33	752193.57	54.91	7.10	47.81	2.79	3/22/2007
B38W24D	2164291.33	752193.57	54.91	6.28	48.63		5/1/2007
B38W24D	2164291.33	752193.57	54.91	8.91	46.00		7/31/2007
B38W24D	2164291.33	752193.57	54.91	9.07	45.84		10/29/2007
MISS01B	2164092.32	752964.86	61.98	14.45	47.53	1.73	3/22/2007
MISS01B	2164092.32	752964.86	61.98	14.02	47.96		5/1/2007
MISS01B	2164092.32	752964.86	61.98	15.45	46.53		7/31/2007
MISS01B	2164092.32	752964.86	61.98	15.75	46.23		10/29/2007
MISS02B	2164709.45	752771.91	61.38	10.32	51.06	1.93	3/22/2007
MISS02B	2164709.45	752771.91	61.38	9.74	51.64		5/1/2007
MISS02B	2164709.45	752771.91	61.38	11.36	50.02		7/31/2007
MISS02B	2164709.45	752771.91	61.38	11.67	49.71		10/29/2007
MISS04B	2164353.55	752096.08	56.42	8.30	48.12	2.63	3/22/2007
MISS04B	2164353.55	752096.08	56.42	8.97	47.45		5/1/2007
MISS04B	2164353.55	752096.08	56.42	10.78	45.64		7/31/2007
MISS04B	2164353.55	752096.08	56.42	10.93	45.49		10/29/2007
MISS05B	2164044.40	752371.68	59.76	13.72	46.04	2.75	3/22/2007
MISS05B	2164044.40	752371.68	59.76	12.96	46.80		5/1/2007
MISS05B	2164044.40	752371.68	59.76	15.71	44.05		7/31/2007
MISS05B	2164044.40	752371.68	59.76	15.69	44.07		10/29/2007
MISS07B	2164048.77	752652.98	55.77	9.18	46.59	2.03	3/22/2007
MISS07B	2164048.77	752652.98	55.77	8.71	47.06		5/1/2007
MISS07B	2164048.77	752652.98	55.77	10.38	45.39		7/31/2007
MISS07B	2164048.77	752652.98	55.77	10.74	45.03		10/29/2007
MW-25D	2164312.62	752405.13	58.13	10.53	47.60	1.84	3/22/2007
MW-25D	2164312.62	752405.13	58.13	10.16	47.97		5/1/2007
MW-25D	2164312.62	752405.13	58.13	11.70	46.43		7/31/2007
MW-25D	2164312.62	752405.13	58.13	12.00	46.13		10/29/2007
MW-26D	2164344.93	752645.90	60.12	10.00	50.12	2.59	3/22/2007
MW-26D	2164344.93	752645.90	60.12	8.93	51.19		5/1/2007
MW-26D	2164344.93	752645.90	60.12	10.52	49.60		7/31/2007
MW-26D	2164344.93	752645.90	60.12	11.52	48.6		10/29/2007

Notes:

N/A - Not applicable

NGVD - National Geodetic Vertical Datum - 1929

TOC - Top of Casing

Table A-9
2007 Vertical Gradient Calculation for Monitoring Well Clusters

Well	Source	Well Type	GW Elv. NGVD 3/22/2007	GW Elv. NGVD 5/1/2007	GW Elv. NGVD 7/31/2007	GW Elv. NGVD 10/29/2007
On-Site (MISS/Stepan Company Property) Well Clusters						
B38W19S	cluster	Overburden	46.50	47.27	44.84	44.22
B38W19D	cluster	Bedrock	45.84	46.53	44.59	44.10
Hydraulic Head Difference, feet			0.66	0.74	0.25	0.12
Gradient Direction			Downward	Downward	Downward	Downward
B38W24S	cluster	Overburden	47.69	48.57	45.84	45.67
B38W24D	cluster	Bedrock	47.81	48.63	46.00	45.84
Hydraulic Head Difference, feet			-0.12	-0.06	-0.16	-0.17
Gradient Direction			Upward	Upward	Upward	Upward
MISS01AA	cluster	Overburden	47.5	48.9	47.07	45.79
MISS01B	cluster	Bedrock	47.53	47.96	46.53	46.23
Hydraulic Head Difference, feet			-0.03	0.94	0.54	-0.44
Gradient Direction			Upward	Downward	Downward	Upward
MISS02A	cluster	Overburden	54.67	56.67	51.32	50.51
MISS02B	cluster	Bedrock	51.06	51.64	50.02	49.71
Hydraulic Head Difference, feet			3.61	5.03	1.30	0.80
Gradient Direction			Downward	Downward	Downward	Downward
MISS04A	cluster	Overburden	50.04	52.07	46.88	47.22
MISS04B	cluster	Bedrock	48.12	47.45	45.64	45.49
Hydraulic Head Difference, feet			1.92	4.62	1.24	1.73
Gradient Direction			Downward	Downward	Downward	Downward
MISS05A	cluster	Overburden	48.03	49.9	58.65	44.95
MISS05B	cluster	Bedrock	46.04	46.8	44.05	44.07
Hydraulic Head Difference, feet			1.99	3.10	14.60	0.88
Gradient Direction			Downward	Downward	Downward	Downward
MISS07A	cluster	Overburden	49.00	48.84	47.07	47.93
MISS07B	cluster	Bedrock	46.59	47.06	45.39	45.03
Hydraulic Head Difference, feet			2.41	1.78	1.68	2.90
Gradient Direction			Downward	Downward	Downward	Downward
MW-25S	cluster	Overburden	51.41	52.21	49.05	47.61
MW-25D	cluster	Bedrock	47.60	47.97	46.43	46.13
Hydraulic Head Difference, feet			3.81	4.24	2.62	1.48
Gradient Direction			Downward	Downward	Downward	Downward
MW-26S	cluster	Overburden	49.84	51.04	49.25	48.31
MW-26D	cluster	Bedrock	50.12	51.19	49.60	48.60
Hydraulic Head Difference, feet			-0.28	-0.15	-0.35	-0.29
Gradient Direction			Upward	Upward	Upward	Upward
Off-Site Well Clusters						
B38W12AR	cluster	Overburden	45.16	45.41	44.02	43.44
B38W12B	cluster	Bedrock	45.54	45.95	44.36	43.56
Hydraulic Head Difference, feet			-0.38	-0.54	-0.34	-0.12
Gradient Direction			Upward	Upward	Upward	Upward
B38W14S	cluster	Overburden	Not Guaged	40.61	39.57	39.37
B38W14D	cluster	Bedrock	Not Guaged	43.21	41.31	41.37
Hydraulic Head Difference, feet			N/A	-2.60	-1.74	-2.00
Gradient Direction			N/A	Upward	Upward	Upward
B38W15S	cluster	Overburden	42.83	43.44	41.8	41.52
B38W15D	cluster	Bedrock	43.48	44.08	42.81	42.45
Hydraulic Head Difference, feet			-0.65	-0.64	-1.01	-0.93
Gradient Direction			Upward	Upward	Upward	Upward
B38W17A	cluster	Overburden	46.44	47.00	44.61	44.08
B38W17B	cluster	Bedrock	46.24	46.84	44.62	44.12
Hydraulic Head Difference, feet			0.20	0.16	-0.01	-0.04
Gradient Direction			Downward	Downward	Upward	Upward

Notes:

Elv. - Elevation

NGVD - National Geodetic Vertical Datum of 1929

Negative Hydraulic Head Difference depicts an upward vertical gradient

Positive Hydraulic Head Difference depicts a downward vertical gradient

Table A-10
2007 Field Parameter Summary

Sampling Location	Date	Temp (C)	Conductance ^a (µS/cm)	pH	Eh (mV) ^b	DO (mg/l)	Turbidity (NTU) ^c	Discharge (mL/min) ^d
GROUNDWATER								
B38W01S	5/10/2007	13.12	1622	6.57	-45.9	0.00	7.5	380
B38W02D	5/10/2007	14.15	382	6.59	167.3	0.39	10.1	140
B38W03B	5/15/2007	14.18	1869	6.06	-4.6	0.00	1.6	450
B38W14D	5/9/2007	12.94	1130	6.91	113.0	0.29	4.6	300
B38W14S	5/9/2007	10.79	887	6.81	420.6	0.00	0.8	405
B38W15D	5/8/2007	13.76	2376	7.43	85.0	0.09	2.70	400
B38W15S	5/8/2007	12.05	1803	7.33	-71.9	0.14	4.80	225
B38W17A	5/7/2007	13.47	413	5.93	447.7	1.20	15.70	150
B38W17B	5/7/2007	13.61	2454	6.48	-52.9	0.09	1.30	250
B38W18D	5/15/2007	16.19	2641.00	5.72	88.7	0.09	0.00	450
B38W19D	5/22/2007	14.90	4230	6.44	-70.6	0.85	0.00	400
B38W19S	5/22/2007	15.53	2655	5.99	-22.7	1.40	0.00	190
B38W24D	5/14/2007	15.80	704	6.14	-84.7	0.00	18.30	350
B38W24S	5/14/2007	17.64	432	5.88	28.0	0.00	12.70	375
MISS01AA	5/16/2007	18.82	2524	6.62	486.50	0.08	0.18	100
MISS01B	5/16/2007	14.23	831	6.18	365.9	0.00	45.60	540
MISS02A	5/17/2007	15.74	2700	6.54	417.0	1.39	1.06	100
MISS02B	5/17/2007	14.73	4343	6.8	-70.5	0.00	4.59	500
MISS05A	5/23/2007	15.40	2521	5.90	160.7	1.28	0.00	100
MISS05B	5/23/2007	14.30	3331	6.43	-133.4	1.04	27.70	500
MISS07A	5/21/2007	13.14	555	7.21	164.0	5.63	1.20	Dry
MISS07B	5/21/2007	14.45	7094	5.82	-6.1	0.99	19.60	225
MW-26D	5/24/2007	16.69	7576	5.29	-44.5	1.57	0.30	145
MW-26S	5/24/2007	15.12	2522	5.14	-79.8	0.74	0.00	340
SURFACE WATER								
SWSD001	5/3/2007	12.41	977	7.65	52.9	13.18	1.2	e
SWSD002	5/3/2007	11.53	987	7.43	3.7	9.42	0.8	e
SWSD003	5/3/2007	11.29	738	7.17	21.8	10.05	.4	e
SWSD004	5/3/2007	11.42	988	7.29	2.8	9.54	0.6	e
SWSD005	5/2/2007	20.06	827	7.42	1.6	6.07	2.7	e
SWSD006	5/2/2007	13.00	963	7.47	51.0	7.55	0.6	e
SWSD007	5/2/2007	12.99	966	7.44	47.2	8.89	0.3	e
SWSD008	5/2/2007	13.81	903	7.20	-28.0	6.55	16.1	e
SWSD009	5/3/2007	15.05	336	7.87	331.0	11.14	1.9	e
SWSD010	5/3/2007	20.33	1119	7.68	25.9	7.61	6.0	e

^a Specific conductance, measured in milliSiemens/centimeter (mS/cm).

^b Oxidation/reduction potential (Eh), measured in milliVolts (mV).

^c Nephelometric turbidity units (NTU).

^d Milliliters per minute (mL/min).

^e Parameter not applicable.

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
Monitoring Wells Completed in Unconsolidated Sediment							
B38W01S (12a-025128) [07G-0177]	5/10/2007	GALPHA	6.86		± 1.963	J	2.61
	5/10/2007	GBETA	26.15		± 2.588		2.57
	5/10/2007	Ra-226	0.14		± 0.182	UJ	0.24
	5/10/2007	Ra-228	0.39		± 0.337		0.26
	5/10/2007	Total Radium	0.53		± 0.383		
	5/10/2007	Th-228	0.35		± 0.240	J	0.17
	5/10/2007	Th-230	0.19		± 0.214	UJ	0.17
	5/10/2007	Th-232	0.00		± 0.098	UJ	0.09
	5/10/2007	Total Thorium	0.54		± 0.336		
	5/10/2007	U-234	0.05		± 0.097	UJ	0.16
	5/10/2007	U-235	0.00		± 0.090	UJ	0.09
	5/10/2007	U-238	0.03		± 0.089	UJ	0.09
	5/10/2007	Total Uranium	0.09	0.10	± 0.159		
B38W14S (19a-025132) [07G-0174]	5/9/2007	GALPHA	1.71		± 1.589	UJ	2.56
	5/9/2007	GBETA	3.66		± 1.005		1.35
	5/9/2007	Ra-226	0.07		± 0.129	UJ	0.21
	5/9/2007	Ra-228	0.41		± 0.383		0.30
	5/9/2007	Total Radium	0.48		± 0.404		
	5/9/2007	Th-228	0.40		± 0.247	J	0.16
	5/9/2007	Th-230	0.72		± 0.352	J	0.19
	5/9/2007	Th-232	0.01		± 0.093	UJ	0.09
	5/9/2007	Total Thorium	1.13		± 0.440		
	5/9/2007	U-234	1.29		± 0.438		0.09
	5/9/2007	U-235	0.00		± 0.089	UJ	0.09
	5/9/2007	U-238	0.53		± 0.275		0.09
	5/9/2007	Total Uranium	1.83	1.59	± 0.525		
B38W15S (20a-025134) [07G-0170]	5/8/2007	GALPHA	3.52		± 1.816		2.75
	5/8/2007	GBETA	91.07		± 3.649		1.64
	5/8/2007	Ra-226	0.12		± 0.208	UJ	0.16
	5/8/2007	Ra-228	0.54		± 0.265		0.21
	5/8/2007	Total Radium	0.66		± 0.337		
	5/8/2007	Th-228	0.22		± 0.195	J	0.17
	5/8/2007	Th-230	0.17		± 0.213	UJ	0.10
	5/8/2007	Th-232	0.00		± 0.100	UJ	0.10
	5/8/2007	Total Thorium	0.39		± 0.306		
	5/8/2007	U-234	0.60		± 0.290		0.09
	5/8/2007	U-235	0.00		± 0.073	U	0.15
	5/8/2007	U-238	0.25		± 0.190		0.09
	5/8/2007	Total Uranium	0.85	0.74	± 0.354		
B38W17A (20a-025135) [07G-0166]	5/7/2007	GALPHA	2.07		± 0.839	J	0.82
	5/7/2007	GBETA	13.75		± 1.396		1.40
	5/7/2007	Ra-226	0.21		± 0.229	UJ	0.14
	5/7/2007	Ra-228	0.15		± 0.323	UJ	0.29
	5/7/2007	Total Radium	0.36		± 0.396		
	5/7/2007	Th-228	0.13		± 0.171	UJ	0.22
	5/7/2007	Th-230	0.23		± 0.217	J	0.08
	5/7/2007	Th-232	0.03		± 0.095	UJ	0.15
	5/7/2007	Total Thorium	0.39		± 0.292		
	5/7/2007	U-234	0.02		± 0.071	U	0.15
	5/7/2007	U-235	0.00		± 0.087	UJ	0.08
	5/7/2007	U-238	0.06		± 0.106	UJ	0.08
	5/7/2007	Total Uranium	0.08	0.18	± 0.154		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
B38W19S (12b-025139) [07G-0195]	5/22/2007	GALPHA	9.97		± 2.094		2.62
	5/22/2007	GBETA	8.68		± 1.147		1.61
	5/22/2007	Ra-226	0.27		± 0.240		0.23
	5/22/2007	Ra-228	4.01		± 0.625		0.36
	5/22/2007	Total Radium	4.28		± 0.669		
	5/22/2007	Th-228	0.18		± 0.186	UJ	0.21
	5/22/2007	Th-230	0.66		± 0.337	J	0.09
	5/22/2007	Th-232	0.05		± 0.113	UJ	0.09
	5/22/2007	Total Thorium	0.88		± 0.401		
	5/22/2007	U-234	0.10		± 0.132	UJ	0.09
	5/22/2007	U-235	0.00		± 0.093	UJ	0.09
	5/22/2007	U-238	0.20		± 0.175	J	0.09
	5/22/2007	Total Uranium	0.29	0.58	± 0.238		
B38W24S (10a-025141) [07G-0178]	5/14/2007	GALPHA	2.15		± 0.894		0.93
	5/14/2007	GBETA	7.24		± 1.037		1.10
	5/14/2007	Ra-226	0.51		± 0.337		0.14
	5/14/2007	Ra-228	0.86		± 0.405	J	0.29
	5/14/2007	Total Radium	1.37		± 0.527		
	5/14/2007	Th-228	0.62		± 0.545	J	0.59
	5/14/2007	Th-230	0.21		± 0.372	UJ	0.22
	5/14/2007	Th-232	0.00		± 0.191	UJ	0.41
	5/14/2007	Total Thorium	0.83		± 0.687		
	5/14/2007	U-234	0.03		± 0.088	UJ	0.08
	5/14/2007	U-235	0.00		± 0.088	UJ	0.08
	5/14/2007	U-238	0.06		± 0.107	UJ	0.08
	5/14/2007	Total Uranium	0.09	0.18	± 0.164		
MISS01AA (12b-025142) [07G-0184]	5/16/2007	GALPHA	6.29		± 1.854		2.50
	5/16/2007	GBETA	14.48		± 2.364		2.66
	5/16/2007	Ra-226	0.03		± 0.101	U	0.22
	5/16/2007	Ra-228	0.46		± 0.294		0.22
	5/16/2007	Total Radium	0.49		± 0.311		
	5/16/2007	Th-228	0.20		± 0.255	UJ	0.33
	5/16/2007	Th-230	0.25		± 0.281	UJ	0.13
	5/16/2007	Th-232	0.01		± 0.107	U	0.23
	5/16/2007	Total Thorium	0.46		± 0.394		
	5/16/2007	U-234	0.37		± 0.229	J	0.08
	5/16/2007	U-235	0.04		± 0.118	UJ	0.11
	5/16/2007	U-238	0.19		± 0.166	J	0.08
	5/16/2007	Total Uranium	0.60	0.55	± 0.306		
MISS02A (12b-025144) [07G-0186]	5/17/2007	GALPHA	14.40		± 2.596		2.81
	5/17/2007	GBETA	0.94		± 1.056	UJ	1.73
	5/17/2007	Ra-226	0.00		± 0.137	U	0.31
	5/17/2007	Ra-228	0.33		± 0.319		0.24
	5/17/2007	Total Radium	0.33		± 0.347		
	5/17/2007	Th-228			±		
	5/17/2007	Th-230			±		
	5/17/2007	Th-232			±		
	5/17/2007	Total Thorium	0.00		± 0.000		
	5/17/2007	U-234	0.78		± 0.334		0.16
	5/17/2007	U-235	0.03		± 0.090	UJ	0.09
	5/17/2007	U-238	1.02		± 0.385		0.09
	5/17/2007	Total Uranium	1.83	3.02	± 0.518		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
MISS05A (12b-025146) [07G-0199]	5/23/2007	GALPHA	96.63		± 4.798		2.67
	5/23/2007	GBETA	33.18		± 1.687		1.94
	5/23/2007	Ra-226	0.04		± 0.120	U	0.26
	5/23/2007	Ra-228	1.66		± 0.538	J	0.36
	5/23/2007	Total Radium	1.69		± 0.551		
	5/23/2007	Th-228	0.03		± 0.129	U	0.22
	5/23/2007	Th-230	0.25		± 0.225	J	0.08
	5/23/2007	Th-232	0.04		± 0.107	UJ	0.08
	5/23/2007	Total Thorium	0.32		± 0.281		
	5/23/2007	U-234	55.20		± 7.674		0.19
	5/23/2007	U-235	2.29		± 0.665		0.10
	5/23/2007	U-238	53.51		± 7.455		0.10
	5/23/2007	Total Uranium	111.00	159.03	± 10.720		
MISS07A (12b-025148) [07G-0199]	5/21/2007	GALPHA	2.85		± 0.999		0.81
	5/21/2007	GBETA	5.13		± 0.896		1.00
	5/21/2007	Ra-226	0.35		± 0.281		0.25
	5/21/2007	Ra-228	0.45		± 0.320	J	0.28
	5/21/2007	Total Radium	0.80		± 0.426		
	5/21/2007	Th-228	0.00		± 0.072	U	0.15
	5/21/2007	Th-230	0.58		± 0.309	J	0.15
	5/21/2007	Th-232	0.00		± 0.088	UJ	0.08
	5/21/2007	Total Thorium	0.58		± 0.329		
	5/21/2007	U-234	0.37		± 0.234		0.09
	5/21/2007	U-235	0.00		± 0.077	U	0.16
	5/21/2007	U-238	0.20		± 0.177	J	0.09
	5/21/2007	Total Uranium	0.56	0.59	± 0.303		
MW-26S (12b-025151) [07G-0200]	5/24/2007	GALPHA	2.68		± 1.681		2.61
	5/24/2007	GBETA	17.59		± 1.199		1.36
	5/24/2007	Ra-226	0.25		± 0.236	UJ	0.27
	5/24/2007	Ra-228	0.50		± 0.611	UJ	0.56
	5/24/2007	Total Radium	0.75		± 0.655		
	5/24/2007	Th-228	0.07		± 0.117	UJ	0.16
	5/24/2007	Th-230	0.12		± 0.181	UJ	0.09
	5/24/2007	Th-232	0.02		± 0.090	UJ	0.09
	5/24/2007	Total Thorium	0.21		± 0.234		
	5/24/2007	U-234	0.44		± 0.251		0.16
	5/24/2007	U-235	0.00		± 0.092	UJ	0.09
	5/24/2007	U-238	0.52		± 0.274		0.09
	5/24/2007	Total Uranium	0.96	1.53	± 0.383		
Monitoring Wells Completed in Bedrock							
B38W02D (12a-025129) [07G-0177]	5/10/2007	GALPHA	0.59		± 0.632	UJ	0.98
	5/10/2007	GBETA	0.55		± 0.733	U	1.21
	5/10/2007	Ra-226	0.06		± 0.136	U	0.24
	5/10/2007	Ra-228	0.00		± 0.365	UJ	0.30
	5/10/2007	Total Radium	0.06		± 0.390		
	5/10/2007	Th-228	0.19		± 0.211	UJ	0.26
	5/10/2007	Th-230	0.19		± 0.218	UJ	0.10
	5/10/2007	Th-232	0.02		± 0.102	UJ	0.10
	5/10/2007	Total Thorium	0.40		± 0.320		
	5/10/2007	U-234	0.03		± 0.097	UJ	0.09
	5/10/2007	U-235	0.03		± 0.097	UJ	0.09
	5/10/2007	U-238	0.07		± 0.119	UJ	0.09
	5/10/2007	Total Uranium	0.14	0.20	± 0.182		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
B38W03B (12a-025130) [07G-0179]	5/15/2007	GALPHA	0.80		± 1.507	U	2.53
	5/15/2007	GBETA	24.49		± 2.331		1.99
	5/15/2007	Ra-226	0.14		± 0.186	UJ	0.25
	5/15/2007	Ra-228	1.09		± 0.531	J	0.38
	5/15/2007	Total Radium	1.23		± 0.563		
	5/15/2007	Th-228	0.03		± 0.131	U	0.22
	5/15/2007	Th-230	0.14		± 0.189	UJ	0.09
	5/15/2007	Th-232	0.00		± 0.089	UJ	0.09
	5/15/2007	Total Thorium	0.17		± 0.247		
	5/15/2007	U-234	0.00		± 0.100	UJ	0.10
	5/15/2007	U-235	0.00		± 0.100	UJ	0.10
	5/15/2007	U-238	0.00		± 0.100	UJ	0.10
	5/15/2007	Total Uranium	0.00	0.00	± 0.173		
B38W14D (19a-025131) [07G-0174]	5/9/2007	GALPHA	0.00		± 1.661	U	2.79
	5/9/2007	GBETA	1.38		± 0.968	UJ	1.52
	5/9/2007	Ra-226	0.18		± 0.201	UJ	0.24
	5/9/2007	Ra-228	0.15		± 0.217	UJ	0.17
	5/9/2007	Total Radium	0.32		± 0.296		
	5/9/2007	Th-228	0.32		± 0.216	J	0.15
	5/9/2007	Th-230	0.09		± 0.170	UJ	0.15
	5/9/2007	Th-232	0.00		± 0.088	UJ	0.08
	5/9/2007	Total Thorium	0.41		± 0.289		
	5/9/2007	U-234	0.85		± 0.363		0.09
	5/9/2007	U-235	0.03		± 0.097	UJ	0.09
	5/9/2007	U-238	0.36		± 0.233		0.17
	5/9/2007	Total Uranium	1.25	1.08	± 0.442		
B38W15D (20a-025133) [07G-0170]	5/8/2007	GALPHA	8.89		± 2.096		2.64
	5/8/2007	GBETA	43.09		± 2.907		1.92
	5/8/2007	Ra-226	0.09		± 0.156	UJ	0.25
	5/8/2007	Ra-228	0.27		± 0.291	UJ	0.25
	5/8/2007	Total Radium	0.36		± 0.330		
	5/8/2007	Th-228	0.13		± 0.171	UJ	0.22
	5/8/2007	Th-230	0.10		± 0.177	UJ	0.08
	5/8/2007	Th-232	0.00		± 0.072	U	0.15
	5/8/2007	Total Thorium	0.23		± 0.256		
	5/8/2007	U-234	4.70		± 0.982		0.09
	5/8/2007	U-235	0.12		± 0.137	UJ	0.16
	5/8/2007	U-238	2.18		± 0.603		0.09
	5/8/2007	Total Uranium	7.00	6.48	± 1.160		
B38W15D Duplicate (20a-025152) [07G-0170]	5/8/2007	GALPHA	8.80		± 2.023		2.53
	5/8/2007	GBETA	33.43		± 2.691		2.20
	5/8/2007	Ra-226	0.00		± 0.167	UJ	0.38
	5/8/2007	Ra-228	0.04		± 0.371	UJ	0.31
	5/8/2007	Total Radium	0.04		± 0.407		
	5/8/2007	Th-228	0.29		± 0.206	J	0.15
	5/8/2007	Th-230	0.25		± 0.222	J	0.15
	5/8/2007	Th-232	0.01		± 0.088	UJ	0.09
	5/8/2007	Total Thorium	0.55		± 0.315		
	5/8/2007	U-234	4.73		± 0.975		0.09
	5/8/2007	U-235	0.10		± 0.128	UJ	0.09
	5/8/2007	U-238	2.19		± 0.596		0.09
	5/8/2007	Total Uranium	7.01	6.50	± 1.150		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
B38W17B (20a-025136) [07G-0166]	5/7/2007	GALPHA	6.92		± 1.852		2.40
	5/7/2007	GBETA	82.41		± 4.052		2.58
	5/7/2007	Ra-226	0.35		± 0.306		0.32
	5/7/2007	Ra-228	0.73		± 0.490	J	0.41
	5/7/2007	Total Radium	1.08		± 0.578		
	5/7/2007	Th-228	0.32		± 0.220	J	0.16
	5/7/2007	Th-230	0.16		± 0.201	UJ	0.09
	5/7/2007	Th-232	0.02		± 0.103	U	0.18
	5/7/2007	Total Thorium	0.51		± 0.315		
	5/7/2007	U-234	0.16		± 0.159	J	0.09
	5/7/2007	U-235	0.03		± 0.091	UJ	0.09
	5/7/2007	U-238	0.13		± 0.144	UJ	0.09
	5/7/2007	Total Uranium	0.32	0.38	± 0.233		
B38W18D (12b-025137) [07G-0179]	5/15/2007	GALPHA	57.16		± 3.930		2.67
	5/15/2007	GBETA	40.07		± 2.866		1.95
	5/15/2007	Ra-226	0.25		± 0.275	UJ	0.17
	5/15/2007	Ra-228	3.83		± 0.656	J	0.36
	5/15/2007	Total Radium	4.08		± 0.711		
	5/15/2007	Th-228	3.49		± 0.801		0.20
	5/15/2007	Th-230	0.92		± 0.380		0.08
	5/15/2007	Th-232	3.55		± 0.806		0.08
	5/15/2007	Total Thorium	7.95		± 1.198		
	5/15/2007	U-234	1.69		± 0.513		0.16
	5/15/2007	U-235	0.06		± 0.112	UJ	0.09
	5/15/2007	U-238	1.76		± 0.526		0.09
	5/15/2007	Total Uranium	3.52	5.23	± 0.743		
B38W18D Duplicate (12b-025153) [07G-0179]	5/15/2007	GALPHA	55.98		± 3.888		2.71
	5/15/2007	GBETA	38.13		± 2.800		1.97
	5/15/2007	Ra-226	0.23		± 0.252	UJ	0.15
	5/15/2007	Ra-228	6.59		± 0.813	J	0.37
	5/15/2007	Total Radium	6.82		± 0.851		
	5/15/2007	Th-228	4.00		± 0.861		0.17
	5/15/2007	Th-230	0.82		± 0.353		0.15
	5/15/2007	Th-232	4.42		± 0.918		0.15
	5/15/2007	Total Thorium	9.23		± 1.307		
	5/15/2007	U-234	2.06		± 0.571	NV	0.15
	5/15/2007	U-235	0.06		± 0.109	UJ	0.09
	5/15/2007	U-238	1.63		± 0.498		0.09
	5/15/2007	Total Uranium	3.75	4.84	± 0.765		
B38W19D (12b-025138) [07G-0195]	5/22/2007	GALPHA	7.08		± 1.983		2.69
	5/22/2007	GBETA	317.78		± 4.820		2.16
	5/22/2007	Ra-226	0.05		± 0.168	U	0.32
	5/22/2007	Ra-228	1.21		± 0.580	J	0.43
	5/22/2007	Total Radium	1.26		± 0.604		
	5/22/2007	Th-228	0.15		± 0.189	UJ	0.24
	5/22/2007	Th-230	0.19		± 0.212	NV	0.09
	5/22/2007	Th-232	0.00		± 0.090	NV	0.09
	5/22/2007	Total Thorium	0.34		± 0.298		
	5/22/2007	U-234	0.06		± 0.101	UJ	0.16
	5/22/2007	U-235	0.00		± 0.093	UJ	0.09
	5/22/2007	U-238	0.13		± 0.148	UJ	0.09
	5/22/2007	Total Uranium	0.19	0.39	± 0.202		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
B38W19D Duplicate (12b-025205) [07G-0195]	5/22/2007	GALPHA	4.69		± 1.870		2.73
	5/22/2007	GBETA	311.47		± 4.803		2.49
	5/22/2007	Ra-226	0.09		± 0.208	U	0.37
	5/22/2007	Ra-228	0.51		± 0.365	J	0.28
	5/22/2007	Total Radium	0.60		± 0.420		
	5/22/2007	Th-228	0.02		± 0.148	UJ	0.27
	5/22/2007	Th-230	0.43		± 0.278	J	0.09
	5/22/2007	Th-232	0.00		± 0.093	UJ	0.09
	5/22/2007	Total Thorium	0.44		± 0.328		
	5/22/2007	U-234	0.09		± 0.125	UJ	0.08
	5/22/2007	U-235	0.00		± 0.088	UJ	0.09
	5/22/2007	U-238	0.11		± 0.130	UJ	0.15
	5/22/2007	Total Uranium	0.21	0.34	± 0.201		
B38W24D (10a-025140) [07G-0178]	5/14/2007	GALPHA	1.61		± 0.955		1.21
	5/14/2007	GBETA	10.40		± 1.206		1.19
	5/14/2007	Ra-226	0.16		± 0.238	UJ	0.35
	5/14/2007	Ra-228	0.32		± 0.421	UJ	0.33
	5/14/2007	Total Radium	0.48		± 0.484		
	5/14/2007	Th-228	0.11		± 0.187	UJ	0.27
	5/14/2007	Th-230	0.14		± 0.198	UJ	0.09
	5/14/2007	Th-232	0.01		± 0.093	UJ	0.09
	5/14/2007	Total Thorium	0.26		± 0.288		
	5/14/2007	U-234	0.06		± 0.107	UJ	0.08
	5/14/2007	U-235	0.00		± 0.080	U	0.18
	5/14/2007	U-238	0.02		± 0.071	U	0.15
	5/14/2007	Total Uranium	0.08	0.06	± 0.151		
MISS01B (12b-025143) [07G-0184]	5/16/2007	GALPHA	3.70		± 1.760		2.61
	5/16/2007	GBETA	52.99		± 3.155		1.78
	5/16/2007	Ra-226	0.20		± 0.226	UJ	0.14
	5/16/2007	Ra-228	0.63		± 0.391		0.28
	5/16/2007	Total Radium	0.83		± 0.452		
	5/16/2007	Th-228	0.07		± 0.119	UJ	0.16
	5/16/2007	Th-230	0.40		± 0.270		0.09
	5/16/2007	Th-232	0.02		± 0.091	UJ	0.09
	5/16/2007	Total Thorium	0.48		± 0.309		
	5/16/2007	U-234	0.79		± 0.336		0.09
	5/16/2007	U-235	0.00		± 0.090	UJ	0.09
	5/16/2007	U-238	0.53		± 0.270		0.15
	5/16/2007	Total Uranium	1.31	1.56	± 0.440		
MISS02B (12b-025145) [07G-0186]	5/17/2007	GALPHA	15.42		± 2.614		2.78
	5/17/2007	GBETA	41.05		± 2.573		2.64
	5/17/2007	Ra-226	0.00		± 0.123	U	0.26
	5/17/2007	Ra-228	0.59		± 0.333		0.24
	5/17/2007	Total Radium	0.59		± 0.355		
	5/17/2007	Th-228	0.39		± 0.252		0.23
	5/17/2007	Th-230	0.36		± 0.253		0.08
	5/17/2007	Th-232	0.00		± 0.085	U	0.20
	5/17/2007	Total Thorium	0.74		± 0.367		
	5/17/2007	U-234	0.15		± 0.149		0.08
	5/17/2007	U-235	0.00		± 0.086	UJ	0.08
	5/17/2007	U-238	0.13		± 0.143	UJ	0.09
	5/17/2007	Total Uranium	0.28	0.38	± 0.224		

Table A-11
2007 Groundwater Analytical Results - Radioactive Constituents

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte	Result (pCi/L)	Result ^a (µg/L)	Error (pCi/L)	Data Qualifier	MDA (pCi/L)
MISS05B (12b-025147) [07G-0199]	5/23/2007	GALPHA	2.88		± 1.649		2.54
	5/23/2007	GBETA	166.34		± 3.484		1.95
	5/23/2007	Ra-226	0.11		± 0.186	UJ	0.15
	5/23/2007	Ra-228	0.60		± 0.380		0.31
	5/23/2007	Total Radium	0.71		± 0.423		
	5/23/2007	Th-228			±		
	5/23/2007	Th-230			±		
	5/23/2007	Th-232			±		
	5/23/2007	Total Thorium	0.00		± 0.000		
	5/23/2007	U-234			±		
	5/23/2007	U-235			±		
	5/23/2007	U-238			±		
	5/23/2007	Total Uranium	0.00	0.00	± 0.000		
MISS07B (12b-025149) [07G-0189]	5/21/2007	GALPHA	4.93		± 1.843		2.66
	5/21/2007	GBETA	18.94		± 3.929		6.19
	5/21/2007	Ra-226	0.04		± 0.122	U	0.26
	5/21/2007	Ra-228	0.45		± 0.379	J	0.30
	5/21/2007	Total Radium	0.49		± 0.398		
	5/21/2007	Th-228	0.20		± 0.187	J	0.20
	5/21/2007	Th-230	0.12		± 0.189	UJ	0.09
	5/21/2007	Th-232	0.01		± 0.077	U	0.16
	5/21/2007	Total Thorium	0.32		± 0.277		
	5/21/2007	U-234	3.46		± 0.795		0.09
	5/21/2007	U-235	0.06		± 0.112	UJ	0.09
	5/21/2007	U-238	1.79		± 0.532		0.09
	5/21/2007	Total Uranium	5.32	5.33	± 0.963		
MW-26D (12b-025150) [07G-0200]	5/24/2007	GALPHA	0.26		± 1.874	U	3.25
	5/24/2007	GBETA	596.63		± 7.227		3.74
	5/24/2007	Ra-226	0.20		± 0.224	UJ	0.14
	5/24/2007	Ra-228	0.27		± 0.329	UJ	0.30
	5/24/2007	Total Radium	0.47		± 0.398		
	5/24/2007	Th-228			±		
	5/24/2007	Th-230			±		
	5/24/2007	Th-232			±		
	5/24/2007	Total Thorium	0.00		± 0.000		
	5/24/2007	U-234	0.32		± 0.229		0.10
	5/24/2007	U-235	0.00		± 0.101	UJ	0.10
	5/24/2007	U-238	0.32		± 0.228	J	0.10
	5/24/2007	Total Uranium	0.64	0.95	± 0.339		

N/A = Not available

U = The analyte was not detected.

UJ = Analyte was not detected; estimated value reported. The result is below the MDA or less than the associated error term.

J= Reported as an estimated value. R= Rejected by validation.

^a Results reported with (±) radiological error quoted at 2 sigma (95 percent confidence level).

^b USACE data qualifier flags based on the CDQMP-QAPP;

^c Minimum Detectable Activity (MDA).

^d Monitoring wells B38W01S and B38W02D are the background locations for wells that are completed in overburden and bedrock wells respectively.

^e A quality control duplicate is collected at the same time and location, and is analyzed by the same method in order to evaluate precision in sampling and analysis.

^f The gross alpha concentrations were determined by subtracting the total uranium concentrations from the reported gross alpha values.

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
Monitoring Wells Completed in Unconsolidated Sediment:					
B38W01S ^c (12a-025128) [705077]	5/10/2007	Aluminum, Total	76.9	U	23
	5/10/2007	Antimony, Total	3.2	U	3.2
	5/10/2007	Arsenic, Total	3.1	U	3.1
	5/10/2007	Barium, Total	17.3		0.39
	5/10/2007	Beryllium, Total	1.6		0.044
	5/10/2007	Boron, Total	215		4.9
	5/10/2007	Cadmium, Total	0.35	U	0.35
	5/10/2007	Calcium, Total	354000		136
	5/10/2007	Chromium, Total	1.2	U	0.6
	5/10/2007	Cobalt, Total	0.64	U	0.64
	5/10/2007	Copper, Total	1.9	U	0.77
	5/10/2007	Iron, Total	18400		14.8
	5/10/2007	Lead, Total	1.7	U	1.7
	5/10/2007	Lithium, Total	885		0.79
	5/10/2007	Magnesium, Total	27200		20.9
	5/10/2007	Manganese, Total	2220		0.18
	5/10/2007	Mercury, Total	0.021	U	0.021
	5/10/2007	Nickel, Total	1.7	U	1.7
	5/10/2007	Potassium, Total	33000		16.6
	5/10/2007	Selenium, Total	2.8	U	2.8
	5/10/2007	Silver, Total	0.68	U	0.68
	5/10/2007	Sodium, Total	36400		207
	5/10/2007	Thallium, Total	0.095	U	0.095
	5/10/2007	Vanadium, Total	0.7	U	0.7
	5/10/2007	Zinc, Total	9.9	U	8.8
B38W14S (19a-025132) [705061]	5/9/2007	Aluminum, Total	23	U	23
	5/9/2007	Antimony, Total	4	J	3.2
	5/9/2007	Arsenic, Total	3.1	U	3.1
	5/9/2007	Barium, Total	104		0.39
	5/9/2007	Beryllium, Total	0.19	U	0.044
	5/9/2007	Boron, Total	53.6		4.9
	5/9/2007	Cadmium, Total	0.35	U	0.35
	5/9/2007	Calcium, Total	100000		136
	5/9/2007	Chromium, Total	1.3	U	0.6
	5/9/2007	Cobalt, Total	0.64	U	0.64
	5/9/2007	Copper, Total	3.1	U	0.77
	5/9/2007	Iron, Total	15.8	U	14.8
	5/9/2007	Lead, Total	2.2	U	1.7
	5/9/2007	Lithium, Total	145		0.079
	5/9/2007	Magnesium, Total	30300		20.9
	5/9/2007	Manganese, Total	43.4		0.18
	5/9/2007	Mercury, Total	0.024	J	0.021
	5/9/2007	Nickel, Total	4		1.7
	5/9/2007	Potassium, Total	6360		16.6
	5/9/2007	Selenium, Total	2.8	U	2.8
	5/9/2007	Silver, Total	0.68	U	0.68
	5/9/2007	Sodium, Total	38900		207
	5/9/2007	Thallium, Total	0.095	U	0.095
	5/9/2007	Vanadium, Total	1.6		0.7
	5/9/2007	Zinc, Total	17.2	J	8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W15S (20a-025134) [705048]	5/8/2007	Aluminum, Total	122		23
	5/8/2007	Antimony, Total	3.2	U	3.2
	5/8/2007	Arsenic, Total	3.1	U	3.1
	5/8/2007	Barium, Total	26.3		0.39
	5/8/2007	Beryllium, Total	0.044	U	0.044
	5/8/2007	Boron, Total	425		4.9
	5/8/2007	Cadmium, Total	2.6		0.35
	5/8/2007	Calcium, Total	50400		136
	5/8/2007	Chromium, Total	2.5	U	0.6
	5/8/2007	Cobalt, Total	0.64	U	0.64
	5/8/2007	Copper, Total	45.9		0.77
	5/8/2007	Iron, Total	749		14.8
	5/8/2007	Lead, Total	10.9		1.7
	5/8/2007	Lithium, Total	1540		0.79
	5/8/2007	Magnesium, Total	17200		20.9
	5/8/2007	Manganese, Total	1350		0.18
	5/8/2007	Mercury, Total	0.021	U	0.021
	5/8/2007	Nickel, Total	4.7		1.7
	5/8/2007	Potassium, Total	95600		33.2
	5/8/2007	Selenium, Total	2.8	U	2.8
	5/8/2007	Silver, Total	0.68	U	0.68
	5/8/2007	Sodium, Total	222000		207
	5/8/2007	Thallium, Total	0.095	U	0.095
	5/8/2007	Vanadium, Total	1.8		0.7
	5/8/2007	Zinc, Total	25.4		8.8
B38W17A (20a-025135) [705036]	5/7/2007	Aluminum, Total	140		23
	5/7/2007	Antimony, Total	3.2	U	3.2
	5/7/2007	Arsenic, Total	3.1	U	3.1
	5/7/2007	Barium, Total	39.4		0.39
	5/7/2007	Beryllium, Total	0.06	U	0.044
	5/7/2007	Boron, Total	40		4.9
	5/7/2007	Cadmium, Total	0.35	U	0.35
	5/7/2007	Calcium, Total	36300		136
	5/7/2007	Chromium, Total	37.2		0.6
	5/7/2007	Cobalt, Total	0.64	U	0.64
	5/7/2007	Copper, Total	6.8		0.77
	5/7/2007	Iron, Total	487		14.8
	5/7/2007	Lead, Total	3.7		1.7
	5/7/2007	Lithium, Total	217		0.079
	5/7/2007	Magnesium, Total	4160		20.9
	5/7/2007	Manganese, Total	34.2		0.18
	5/7/2007	Mercury, Total	0.046	U	0.021
	5/7/2007	Nickel, Total	10.3		1.7
	5/7/2007	Potassium, Total	15300		16.6
	5/7/2007	Selenium, Total	2.8	U	2.8
	5/7/2007	Silver, Total	0.68	U	0.68
	5/7/2007	Sodium, Total	33800		207
	5/7/2007	Thallium, Total	0.15	U	0.095
	5/7/2007	Vanadium, Total	0.76	J	0.7
	5/7/2007	Zinc, Total	27.2		8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W19S (12b-025139) [705151]	5/22/2007	Aluminum, Total	23	U	23
	5/22/2007	Antimony, Total	3.2	U	3.2
	5/22/2007	Arsenic, Total	9.8		3.1
	5/22/2007	Barium, Total	27.6		0.39
	5/22/2007	Beryllium, Total	0.044	U	0.044
	5/22/2007	Boron, Total	406		4.9
	5/22/2007	Cadmium, Total	0.35	U	0.35
	5/22/2007	Calcium, Total	647000		81.6
	5/22/2007	Chromium, Total	0.98	U	0.6
	5/22/2007	Cobalt, Total	0.64	U	0.64
	5/22/2007	Copper, Total	6.1	U	0.77
	5/22/2007	Iron, Total	2600		14.8
	5/22/2007	Lead, Total	2	U	1.7
	5/22/2007	Lithium, Total	678		0.4
	5/22/2007	Magnesium, Total	17800		20.9
	5/22/2007	Manganese, Total	448		0.1
	5/22/2007	Mercury, Total	0.021	U	0.021
	5/22/2007	Nickel, Total	1.7	U	1.7
	5/22/2007	Potassium, Total	10900		16.6
	5/22/2007	Selenium, Total	2.8	U	2.8
	5/22/2007	Silver, Total	1.3	U	1.3
	5/22/2007	Sodium, Total	12600		207
	5/22/2007	Thallium, Total	0.2	U	0.095
	5/22/2007	Vanadium, Total	1.1	U	1.1
	5/22/2007	Zinc, Total	24.4	U	8.8
B38W24S (10a-025141) [705089]	5/14/2007	Aluminum, Total	23	U	23
	5/14/2007	Antimony, Total	3.2	U	3.2
	5/14/2007	Arsenic, Total	3.1	U	3.1
	5/14/2007	Barium, Total	66.2		0.39
	5/14/2007	Beryllium, Total	1.2	U	0.044
	5/14/2007	Boron, Total	65.6		4.9
	5/14/2007	Cadmium, Total	0.35	U	0.35
	5/14/2007	Calcium, Total	40300		136
	5/14/2007	Chromium, Total	0.6	U	0.6
	5/14/2007	Cobalt, Total	1.2	U	0.64
	5/14/2007	Copper, Total	3.8	U	0.77
	5/14/2007	Iron, Total	17500		14.8
	5/14/2007	Lead, Total	1.7	U	1.7
	5/14/2007	Lithium, Total	15.5		0.079
	5/14/2007	Magnesium, Total	5720		20.9
	5/14/2007	Manganese, Total	2170		0.18
	5/14/2007	Mercury, Total	0.021	U	0.021
	5/14/2007	Nickel, Total	1.7	U	1.7
	5/14/2007	Potassium, Total	8930		16.6
	5/14/2007	Selenium, Total	2.8	U	2.8
	5/14/2007	Silver, Total	0.68	U	0.68
	5/14/2007	Sodium, Total	11600		207
	5/14/2007	Thallium, Total	0.095	U	0.095
	5/14/2007	Vanadium, Total	0.7	U	0.7
	5/14/2007	Zinc, Total	24		8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MISS01AA (12b-025142) [705118]	5/16/2007	Aluminum, Total	23	U	23
	5/16/2007	Antimony, Total	3.2	U	3.2
	5/16/2007	Arsenic, Total	3.1	U	3.1
	5/16/2007	Barium, Total	9.9		0.39
	5/16/2007	Beryllium, Total	0.26	U	0.044
	5/16/2007	Boron, Total	184		4.9
	5/16/2007	Cadmium, Total	0.35	U	0.35
	5/16/2007	Calcium, Total	504000		136
	5/16/2007	Chromium, Total	0.6	U	0.6
	5/16/2007	Cobalt, Total	0.86	U	0.64
	5/16/2007	Copper, Total	7.9		0.77
	5/16/2007	Iron, Total	59.9	U	14.8
	5/16/2007	Lead, Total	1.7	U	1.7
	5/16/2007	Lithium, Total	141		0.079
	5/16/2007	Magnesium, Total	24600		20.9
	5/16/2007	Manganese, Total	82.8		0.18
	5/16/2007	Mercury, Total	0.024	U	0.021
	5/16/2007	Nickel, Total	1.7	U	1.7
	5/16/2007	Potassium, Total	881		16.6
	5/16/2007	Selenium, Total	2.8	U	2.8
	5/16/2007	Silver, Total	0.68	U	0.68
	5/16/2007	Sodium, Total	3170		207
	5/16/2007	Thallium, Total	0.095	U	0.095
	5/16/2007	Vanadium, Total	2		0.7
	5/16/2007	Zinc, Total	35.1		8.8
MISS02A (12b-025144) [705120]	5/17/2007	Aluminum, Total	77.5		23
	5/17/2007	Antimony, Total	3.2	U	3.2
	5/17/2007	Arsenic, Total	2270		6.2
	5/17/2007	Barium, Total	5		0.39
	5/17/2007	Beryllium, Total	0.37	U	0.044
	5/17/2007	Boron, Total	838		4.9
	5/17/2007	Cadmium, Total	0.35	U	0.35
	5/17/2007	Calcium, Total	172000		136
	5/17/2007	Chromium, Total	2.8	U	0.6
	5/17/2007	Cobalt, Total	0.64	U	0.64
	5/17/2007	Copper, Total	32.1		0.77
	5/17/2007	Iron, Total	70.5	U	14.8
	5/17/2007	Lead, Total	1.7	U	1.7
	5/17/2007	Lithium, Total	5410		4
	5/17/2007	Magnesium, Total	25600		20.9
	5/17/2007	Manganese, Total	63.3		0.18
	5/17/2007	Mercury, Total	0.099		0.021
	5/17/2007	Nickel, Total	6.7		1.7
	5/17/2007	Potassium, Total	2610		16.6
	5/17/2007	Selenium, Total	2.9	J	2.8
	5/17/2007	Silver, Total	0.68	U	0.68
	5/17/2007	Sodium, Total	482000		207
	5/17/2007	Thallium, Total	0.095	U	0.095
	5/17/2007	Vanadium, Total	1.9		0.7
	5/17/2007	Zinc, Total	21.3		8.8

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2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MISS05A (12b-025146) [705160]	5/23/2007	Aluminum, Total	29.1	U	23
	5/23/2007	Antimony, Total	3.2	U	3.2
	5/23/2007	Arsenic, Total	3.1	U	3.1
	5/23/2007	Barium, Total	13.9		0.39
	5/23/2007	Beryllium, Total	0.2	U	0.044
	5/23/2007	Boron, Total	172		4.9
	5/23/2007	Cadmium, Total	0.35	U	0.35
	5/23/2007	Calcium, Total	600000		272
	5/23/2007	Chromium, Total	1.1	J	0.6
	5/23/2007	Cobalt, Total	0.64	U	0.64
	5/23/2007	Copper, Total	17.6		0.77
	5/23/2007	Iron, Total	169	U	14.8
	5/23/2007	Lead, Total	1.7	U	1.7
	5/23/2007	Lithium, Total	314		0.16
	5/23/2007	Magnesium, Total	20000		20.9
	5/23/2007	Manganese, Total	101		0.18
	5/23/2007	Mercury, Total	0.021	U	0.021
	5/23/2007	Nickel, Total	2	J	1.7
	5/23/2007	Potassium, Total	20400		16.6
	5/23/2007	Selenium, Total	2.8	U	2.8
	5/23/2007	Silver, Total	0.68	U	0.68
	5/23/2007	Sodium, Total	9030		207
	5/23/2007	Thallium, Total	0.095	U	0.095
	5/23/2007	Vanadium, Total	1.7		0.7
	5/23/2007	Zinc, Total	53.7		8.8
MISS07A (12b-025148) [705141]	5/21/2007	Aluminum, Total	1080		23
	5/21/2007	Antimony, Total	3.8	J	3.2
	5/21/2007	Arsenic, Total	3.1	U	3.1
	5/21/2007	Barium, Total	75.6		0.39
	5/21/2007	Beryllium, Total	0.32	U	0.044
	5/21/2007	Boron, Total	25		4.9
	5/21/2007	Cadmium, Total	0.65	J	0.35
	5/21/2007	Calcium, Total	67000		136
	5/21/2007	Chromium, Total	3.5		0.6
	5/21/2007	Cobalt, Total	0.64	U	0.64
	5/21/2007	Copper, Total	5.9		0.77
	5/21/2007	Iron, Total	825		14.8
	5/21/2007	Lead, Total	3.9	U	1.7
	5/21/2007	Lithium, Total	177		0.079
	5/21/2007	Magnesium, Total	5420		20.9
	5/21/2007	Manganese, Total	31.8		0.18
	5/21/2007	Mercury, Total	0.021	U	0.021
	5/21/2007	Nickel, Total	1.7	U	1.7
	5/21/2007	Potassium, Total	3590		16.6
	5/21/2007	Selenium, Total	3.4	J	2.8
	5/21/2007	Silver, Total	0.68	U	0.68
	5/21/2007	Sodium, Total	17000		207
	5/21/2007	Thallium, Total	0.095	U	0.095
	5/21/2007	Vanadium, Total	2.6		0.7
	5/21/2007	Zinc, Total	20.3		8.8

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2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MW-26S (12b-025151) [705167]	5/24/2007	Aluminum, Total	63.1	U	23
	5/24/2007	Antimony, Total	3.2	U	3.2
	5/24/2007	Arsenic, Total	5.5	J	3.1
	5/24/2007	Barium, Total	199		0.39
	5/24/2007	Beryllium, Total	0.044	U	0.044
	5/24/2007	Boron, Total	143		4.9
	5/24/2007	Cadmium, Total	0.35	U	0.35
	5/24/2007	Calcium, Total	353000		136
	5/24/2007	Chromium, Total	0.6	U	0.6
	5/24/2007	Cobalt, Total	18		0.64
	5/24/2007	Copper, Total	4.2	U	0.77
	5/24/2007	Iron, Total	67900		14.8
	5/24/2007	Lead, Total	1.7	U	1.7
	5/24/2007	Lithium, Total	1710		1.6
	5/24/2007	Magnesium, Total	28200		20.9
	5/24/2007	Manganese, Total	26100		0.9
	5/24/2007	Mercury, Total	0.021	U	0.021
	5/24/2007	Nickel, Total	2.6	J	1.7
	5/24/2007	Potassium, Total	27100		16.6
	5/24/2007	Selenium, Total	2.8	U	2.8
	5/24/2007	Silver, Total	0.68	U	0.68
	5/24/2007	Sodium, Total	126000		207
	5/24/2007	Thallium, Total	0.18	U	0.095
	5/24/2007	Vanadium, Total	0.89	J	0.7
	5/24/2007	Zinc, Total	19.9	U	8.8
Monitoring Wells Completed in Bedrock					
B38W02D ^e (12a-025129) [705077]	5/10/2007	Aluminum, Total	66.7	U	23
	5/10/2007	Antimony, Total	3.2	U	3.2
	5/10/2007	Arsenic, Total	3.1	U	3.1
	5/10/2007	Barium, Total	325		0.39
	5/10/2007	Beryllium, Total	0.2	U	0.044
	5/10/2007	Boron, Total	18.8		4.9
	5/10/2007	Cadmium, Total	0.35	U	0.35
	5/10/2007	Calcium, Total	70900		136
	5/10/2007	Chromium, Total	12	U	0.6
	5/10/2007	Cobalt, Total	0.64	U	0.64
	5/10/2007	Copper, Total	3.1	U	0.77
	5/10/2007	Iron, Total	221	U	14.8
	5/10/2007	Lead, Total	1.7	U	1.7
	5/10/2007	Lithium, Total	9.6		0.079
	5/10/2007	Magnesium, Total	4310		20.9
	5/10/2007	Manganese, Total	562		0.18
	5/10/2007	Mercury, Total	0.021	U	0.021
	5/10/2007	Nickel, Total	7.1		1.7
	5/10/2007	Potassium, Total	959		16.6
	5/10/2007	Selenium, Total	2.8	U	2.8
	5/10/2007	Silver, Total	0.68	U	0.68
	5/10/2007	Sodium, Total	9930		207
	5/10/2007	Thallium, Total	0.095	U	0.095
	5/10/2007	Vanadium, Total	0.7	U	0.7
	5/10/2007	Zinc, Total	9.5	U	8.8

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W03B (12a-025130) [705097]	5/15/2007	Aluminum, Total	31	J	23
	5/15/2007	Antimony, Total	3.2	U	3.2
	5/15/2007	Arsenic, Total	3.1	U	3.1
	5/15/2007	Barium, Total	17.7		0.39
	5/15/2007	Beryllium, Total	0.6	U	0.044
	5/15/2007	Boron, Total	93.8		4.9
	5/15/2007	Cadmium, Total	0.35	U	0.35
	5/15/2007	Calcium, Total	312000		136
	5/15/2007	Chromium, Total	2.2	U	0.6
	5/15/2007	Cobalt, Total	0.64	U	0.64
	5/15/2007	Copper, Total	2.3	U	0.77
	5/15/2007	Iron, Total	21200		14.8
	5/15/2007	Lead, Total	1.7	U	1.7
	5/15/2007	Lithium, Total	40.9		0.079
	5/15/2007	Magnesium, Total	34800		20.9
	5/15/2007	Manganese, Total	5280		0.18
	5/15/2007	Mercury, Total	0.028	U	0.021
	5/15/2007	Nickel, Total	1.7	U	1.7
	5/15/2007	Potassium, Total	12200		16.6
	5/15/2007	Selenium, Total	2.8	U	2.8
	5/15/2007	Silver, Total	0.68	U	0.68
	5/15/2007	Sodium, Total	73100		207
	5/15/2007	Thallium, Total	0.095	U	0.095
	5/15/2007	Vanadium, Total	0.71	J	0.7
	5/15/2007	Zinc, Total	9.8	J	8.8
B38W14D (19a-025131) [705061]	5/9/2007	Aluminum, Total	86.9		23
	5/9/2007	Antimony, Total	3.2	U	3.2
	5/9/2007	Arsenic, Total	3.1	U	3.1
	5/9/2007	Barium, Total	161		0.39
	5/9/2007	Beryllium, Total	0.16	U	0.044
	5/9/2007	Boron, Total	49.9		4.9
	5/9/2007	Cadmium, Total	0.35	U	0.35
	5/9/2007	Calcium, Total	128000		136
	5/9/2007	Chromium, Total	3.5		0.6
	5/9/2007	Cobalt, Total	0.64	U	0.64
	5/9/2007	Copper, Total	3.5		0.77
	5/9/2007	Iron, Total	117		14.8
	5/9/2007	Lead, Total	1.7	U	1.7
	5/9/2007	Lithium, Total	15.6		0.079
	5/9/2007	Magnesium, Total	31800		20.9
	5/9/2007	Manganese, Total	5.8		0.18
	5/9/2007	Mercury, Total	0.021	U	0.021
	5/9/2007	Nickel, Total	3.9		1.7
	5/9/2007	Potassium, Total	2360		16.6
	5/9/2007	Selenium, Total	2.8	U	2.8
	5/9/2007	Silver, Total	0.68	U	0.68
	5/9/2007	Sodium, Total	54200		207
	5/9/2007	Thallium, Total	0.095	U	0.095
	5/9/2007	Vanadium, Total	1.2	J	0.7
	5/9/2007	Zinc, Total	9.2	J	8.8

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W15D (20a-025133) [705048]	5/8/2007	Aluminum, Total	23	U	23
	5/8/2007	Antimony, Total	3.2	U	3.2
	5/8/2007	Arsenic, Total	5.3	J	3.1
	5/8/2007	Barium, Total	21.4		0.39
	5/8/2007	Beryllium, Total	0.19	U	0.044
	5/8/2007	Boron, Total	533		4.9
	5/8/2007	Cadmium, Total	0.35	U	0.35
	5/8/2007	Calcium, Total	85500		136
	5/8/2007	Chromium, Total	3.9		0.6
	5/8/2007	Cobalt, Total	1.6		0.64
	5/8/2007	Copper, Total	2.7	U	0.77
	5/8/2007	Iron, Total	45.3	U	14.8
	5/8/2007	Lead, Total	1.7	U	1.7
	5/8/2007	Lithium, Total	2470		1.6
	5/8/2007	Magnesium, Total	33400		20.9
	5/8/2007	Manganese, Total	893		0.18
	5/8/2007	Mercury, Total	0.033	U	0.021
	5/8/2007	Nickel, Total	8.8		1.7
	5/8/2007	Potassium, Total	44300		16.6
	5/8/2007	Selenium, Total	2.8	U	2.8
	5/8/2007	Silver, Total	0.68	U	0.68
	5/8/2007	Sodium, Total	331000		207
	5/8/2007	Thallium, Total	0.095	U	0.095
	5/8/2007	Vanadium, Total	3.7		0.7
	5/8/2007	Zinc, Total	16.4	J	8.8
B38W15D Duplicate (20a-025152) [705048]	5/8/2007	Aluminum, Total	23	U	23
	5/8/2007	Antimony, Total	3.2	U	3.2
	5/8/2007	Arsenic, Total	6.7		3.1
	5/8/2007	Barium, Total	21.4		0.39
	5/8/2007	Beryllium, Total	0.12	U	0.044
	5/8/2007	Boron, Total	540		4.9
	5/8/2007	Cadmium, Total	0.35	U	0.35
	5/8/2007	Calcium, Total	86400		136
	5/8/2007	Chromium, Total	3.3		0.6
	5/8/2007	Cobalt, Total	1.5		0.64
	5/8/2007	Copper, Total	3.1	U	0.77
	5/8/2007	Iron, Total	39.6	U	14.8
	5/8/2007	Lead, Total	2.6	U	1.7
	5/8/2007	Lithium, Total	2410		1.6
	5/8/2007	Magnesium, Total	33800		20.9
	5/8/2007	Manganese, Total	898		0.18
	5/8/2007	Mercury, Total	0.021	U	0.021
	5/8/2007	Nickel, Total	8.4		1.7
	5/8/2007	Potassium, Total	44100		16.6
	5/8/2007	Selenium, Total	2.8	U	2.8
	5/8/2007	Silver, Total	0.68	U	0.68
	5/8/2007	Sodium, Total	334000		207
	5/8/2007	Thallium, Total	0.095	U	0.095
	5/8/2007	Vanadium, Total	3.8		0.7
	5/8/2007	Zinc, Total	12.2	J	8.8

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W17B (20a-025136) [705036]	5/7/2007	Aluminum, Total	23	U	23
	5/7/2007	Antimony, Total	3.2	U	3.2
	5/7/2007	Arsenic, Total	3.1	U	3.1
	5/7/2007	Barium, Total	78.5		0.39
	5/7/2007	Beryllium, Total	0.049	U	0.044
	5/7/2007	Boron, Total	195		4.9
	5/7/2007	Cadmium, Total	0.35	U	0.35
	5/7/2007	Calcium, Total	288000		136
	5/7/2007	Chromium, Total	2.5	U	0.6
	5/7/2007	Cobalt, Total	0.64	U	0.64
	5/7/2007	Copper, Total	2.3		0.77
	5/7/2007	Iron, Total	9500		14.8
	5/7/2007	Lead, Total	1.7	U	1.7
	5/7/2007	Lithium, Total	748		0.4
	5/7/2007	Magnesium, Total	16500		20.9
	5/7/2007	Manganese, Total	3790		0.18
	5/7/2007	Mercury, Total	0.021	U	0.021
	5/7/2007	Nickel, Total	2.7	J	1.7
	5/7/2007	Potassium, Total	83600		33.2
	5/7/2007	Selenium, Total	2.8	U	2.8
	5/7/2007	Silver, Total	0.68	U	0.68
	5/7/2007	Sodium, Total	112000		207
	5/7/2007	Thallium, Total	0.11	U	0.095
	5/7/2007	Vanadium, Total	1.1	J	0.7
	5/7/2007	Zinc, Total	8.8	U	8.8
B38W18D (12b-025137) [705097]	5/15/2007	Aluminum, Total	788		23
	5/15/2007	Antimony, Total	3.2	U	3.2
	5/15/2007	Arsenic, Total	19.8		3.1
	5/15/2007	Barium, Total	26.2		0.39
	5/15/2007	Beryllium, Total	1.3	U	0.044
	5/15/2007	Boron, Total	273		4.9
	5/15/2007	Cadmium, Total	0.35	U	0.35
	5/15/2007	Calcium, Total	292000		136
	5/15/2007	Chromium, Total	74.9		0.6
	5/15/2007	Cobalt, Total	25.8		0.64
	5/15/2007	Copper, Total	7.6		0.77
	5/15/2007	Iron, Total	27900		14.8
	5/15/2007	Lead, Total	4.8	U	1.7
	5/15/2007	Lithium, Total	1920		0.79
	5/15/2007	Magnesium, Total	26000		20.9
	5/15/2007	Manganese, Total	7710		0.18
	5/15/2007	Mercury, Total	0.032	U	0.021
	5/15/2007	Nickel, Total	44.2		1.7
	5/15/2007	Potassium, Total	11700		16.6
	5/15/2007	Selenium, Total	2.8	U	2.8
	5/15/2007	Silver, Total	0.68	U	0.68
	5/15/2007	Sodium, Total	169000		207
	5/15/2007	Thallium, Total	0.095	U	0.095
	5/15/2007	Vanadium, Total	2.7		0.7
	5/15/2007	Zinc, Total	135		8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W18D Duplicate (12b-025153) [705097]	5/15/2007	Aluminum, Total	567		23
	5/15/2007	Antimony, Total	3.2	U	3.2
	5/15/2007	Arsenic, Total	16.4		3.1
	5/15/2007	Barium, Total	25.9		0.39
	5/15/2007	Beryllium, Total	1.4		0.044
	5/15/2007	Boron, Total	282		4.9
	5/15/2007	Cadmium, Total	0.35	U	0.35
	5/15/2007	Calcium, Total	295000		136
	5/15/2007	Chromium, Total	56.2		0.6
	5/15/2007	Cobalt, Total	25.9		0.64
	5/15/2007	Copper, Total	5.6		0.77
	5/15/2007	Iron, Total	27700		14.8
	5/15/2007	Lead, Total	3.1	U	1.7
	5/15/2007	Lithium, Total	2000		0.79
	5/15/2007	Magnesium, Total	25800		20.9
	5/15/2007	Manganese, Total	7800		0.18
	5/15/2007	Mercury, Total	0.024	U	0.021
	5/15/2007	Nickel, Total	33.1		1.7
	5/15/2007	Potassium, Total	10900		16.6
	5/15/2007	Selenium, Total	2.8	U	2.8
	5/15/2007	Silver, Total	0.68	U	0.68
	5/15/2007	Sodium, Total	168000		207
	5/15/2007	Thallium, Total	0.095	U	0.095
	5/15/2007	Vanadium, Total	1.5		0.7
	5/15/2007	Zinc, Total	128		8.8
B38W19D (12b-025138) [705151]	5/22/2007	Aluminum, Total	94.5	U	23
	5/22/2007	Antimony, Total	3.2	U	3.2
	5/22/2007	Arsenic, Total	57.3		3.1
	5/22/2007	Barium, Total	54.2		0.39
	5/22/2007	Beryllium, Total	0.044	U	0.044
	5/22/2007	Boron, Total	428		4.9
	5/22/2007	Cadmium, Total	0.35	U	0.35
	5/22/2007	Calcium, Total	329000		136
	5/22/2007	Chromium, Total	2.3		0.6
	5/22/2007	Cobalt, Total	0.64	U	0.64
	5/22/2007	Copper, Total	6.4	U	0.77
	5/22/2007	Iron, Total	6410		14.8
	5/22/2007	Lead, Total	1.7	U	1.7
	5/22/2007	Lithium, Total	2400		1.6
	5/22/2007	Magnesium, Total	34600		20.9
	5/22/2007	Manganese, Total	3440		0.1
	5/22/2007	Mercury, Total	0.021	U	0.021
	5/22/2007	Nickel, Total	1.7	U	1.7
	5/22/2007	Potassium, Total	384000		190
	5/22/2007	Selenium, Total	2.8	U	2.8
	5/22/2007	Silver, Total	1.3	U	1.3
	5/22/2007	Sodium, Total	261000		207
	5/22/2007	Thallium, Total	0.26	U	0.095
	5/22/2007	Vanadium, Total	2.8		1.1
	5/22/2007	Zinc, Total	14.5	U	8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
B38W19D Duplicate (12b-025205) [705151]	5/22/2007	Aluminum, Total	23.3	U	23
	5/22/2007	Antimony, Total	3.2	U	3.2
	5/22/2007	Arsenic, Total	55.2		3.1
	5/22/2007	Barium, Total	52.9		0.39
	5/22/2007	Beryllium, Total	0.044	U	0.044
	5/22/2007	Boron, Total	426		4.9
	5/22/2007	Cadmium, Total	0.35	U	0.35
	5/22/2007	Calcium, Total	332000		136
	5/22/2007	Chromium, Total	1.9	U	0.6
	5/22/2007	Cobalt, Total	0.64	U	0.64
	5/22/2007	Copper, Total	6.2	U	0.77
	5/22/2007	Iron, Total	6430		14.8
	5/22/2007	Lead, Total	1.7	U	1.7
	5/22/2007	Lithium, Total	2420		1.6
	5/22/2007	Magnesium, Total	34900		20.9
	5/22/2007	Manganese, Total	3500		0.1
	5/22/2007	Mercury, Total	0.041	J	0.021
	5/22/2007	Nickel, Total	1.7	U	1.7
	5/22/2007	Potassium, Total	385000		190
	5/22/2007	Selenium, Total	2.8	U	2.8
	5/22/2007	Silver, Total	1.3	U	1.3
	5/22/2007	Sodium, Total	257000		207
	5/22/2007	Thallium, Total	0.11	U	0.095
	5/22/2007	Vanadium, Total	3.4		1.1
	5/22/2007	Zinc, Total	25.6	U	8.8
B38W24D (10a-025140) [705089]	5/14/2007	Aluminum, Total	106	U	23
	5/14/2007	Antimony, Total	3.2	U	3.2
	5/14/2007	Arsenic, Total	3.1	U	3.1
	5/14/2007	Barium, Total	38.8		0.39
	5/14/2007	Beryllium, Total	0.61	U	0.044
	5/14/2007	Boron, Total	78.6		4.9
	5/14/2007	Cadmium, Total	0.35	U	0.35
	5/14/2007	Calcium, Total	61700		136
	5/14/2007	Chromium, Total	3.7		0.6
	5/14/2007	Cobalt, Total	1.2	U	0.64
	5/14/2007	Copper, Total	2.5	U	0.77
	5/14/2007	Iron, Total	18800		14.8
	5/14/2007	Lead, Total	2.2	U	1.7
	5/14/2007	Lithium, Total	38.6		0.079
	5/14/2007	Magnesium, Total	8580		20.9
	5/14/2007	Manganese, Total	4420		0.18
	5/14/2007	Mercury, Total	0.029	U	0.021
	5/14/2007	Nickel, Total	2.6	J	1.7
	5/14/2007	Potassium, Total	11300		16.6
	5/14/2007	Selenium, Total	2.8	U	2.8
	5/14/2007	Silver, Total	0.68	U	0.68
	5/14/2007	Sodium, Total	28000		207
	5/14/2007	Thallium, Total	0.12	J	0.095
	5/14/2007	Vanadium, Total	0.93	J	0.7
	5/14/2007	Zinc, Total	13.9	J	8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MISS01B (12b-025143) [705118]	5/16/2007	Aluminum, Total	89.7		23
	5/16/2007	Antimony, Total	3.2	U	3.2
	5/16/2007	Arsenic, Total	3.6	J	3.1
	5/16/2007	Barium, Total	109		0.39
	5/16/2007	Beryllium, Total	0.29	U	0.044
	5/16/2007	Boron, Total	75.3		4.9
	5/16/2007	Cadmium, Total	0.35	U	0.35
	5/16/2007	Calcium, Total	96600		136
	5/16/2007	Chromium, Total	1.9		0.6
	5/16/2007	Cobalt, Total	0.64	U	0.64
	5/16/2007	Copper, Total	3	U	0.77
	5/16/2007	Iron, Total	5630		14.8
	5/16/2007	Lead, Total	1.7	U	1.7
	5/16/2007	Lithium, Total	57.2		0.079
	5/16/2007	Magnesium, Total	18400		20.9
	5/16/2007	Manganese, Total	405		0.18
	5/16/2007	Mercury, Total	0.021	U	0.021
	5/16/2007	Nickel, Total	1.7	U	1.7
	5/16/2007	Potassium, Total	14800		16.6
	5/16/2007	Selenium, Total	2.9	J	2.8
	5/16/2007	Silver, Total	0.68	U	0.68
	5/16/2007	Sodium, Total	59300		207
	5/16/2007	Thallium, Total	0.095	U	0.095
	5/16/2007	Vanadium, Total	7.8		0.7
	5/16/2007	Zinc, Total	8.8	U	8.8
MISS02B (12b-025145) [705120]	5/17/2007	Aluminum, Total	184		23
	5/17/2007	Antimony, Total	3.2	U	3.2
	5/17/2007	Arsenic, Total	3.1	U	3.1
	5/17/2007	Barium, Total	15.3		0.39
	5/17/2007	Beryllium, Total	0.98	U	0.044
	5/17/2007	Boron, Total	868		4.9
	5/17/2007	Cadmium, Total	0.35	U	0.35
	5/17/2007	Calcium, Total	282000		136
	5/17/2007	Chromium, Total	8.9		0.6
	5/17/2007	Cobalt, Total	2.6	U	0.64
	5/17/2007	Copper, Total	2.6	U	0.77
	5/17/2007	Iron, Total	12400		14.8
	5/17/2007	Lead, Total	1.7	U	1.7
	5/17/2007	Lithium, Total	7320		4
	5/17/2007	Magnesium, Total	35100		20.9
	5/17/2007	Manganese, Total	4880		0.18
	5/17/2007	Mercury, Total	0.025	J	0.021
	5/17/2007	Nickel, Total	6.1		1.7
	5/17/2007	Potassium, Total	50400		16.6
	5/17/2007	Selenium, Total	2.8	U	2.8
	5/17/2007	Silver, Total	0.68	U	0.68
	5/17/2007	Sodium, Total	768000		414
	5/17/2007	Thallium, Total	0.095	U	0.095
	5/17/2007	Vanadium, Total	2.9		0.7
	5/17/2007	Zinc, Total	8.8	U	8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MISS05B (12b-025147) [705160]	5/23/2007	Aluminum, Total	30.8	U	23
	5/23/2007	Antimony, Total	3.2	U	3.2
	5/23/2007	Arsenic, Total	26.8		3.1
	5/23/2007	Barium, Total	62.5		0.39
	5/23/2007	Beryllium, Total	0.17	U	0.044
	5/23/2007	Boron, Total	287		4.9
	5/23/2007	Cadmium, Total	0.35	U	0.35
	5/23/2007	Calcium, Total	382000		136
	5/23/2007	Chromium, Total	3.1		0.6
	5/23/2007	Cobalt, Total	0.64	U	0.64
	5/23/2007	Copper, Total	2.4		0.77
	5/23/2007	Iron, Total	10700		14.8
	5/23/2007	Lead, Total	1.7	U	1.7
	5/23/2007	Lithium, Total	1200		0.4
	5/23/2007	Magnesium, Total	32700		20.9
	5/23/2007	Manganese, Total	2160		0.18
	5/23/2007	Mercury, Total	0.021	U	0.021
	5/23/2007	Nickel, Total	2.1	J	1.7
	5/23/2007	Potassium, Total	190000		166
	5/23/2007	Selenium, Total	2.8	U	2.8
	5/23/2007	Silver, Total	0.68	U	0.68
	5/23/2007	Sodium, Total	167000		207
	5/23/2007	Thallium, Total	0.095	U	0.095
	5/23/2007	Vanadium, Total	2.6		0.7
	5/23/2007	Zinc, Total	8.8	U	8.8
MISS07B (12b-025149) [705141]	5/21/2007	Aluminum, Total	23	U	23
	5/21/2007	Antimony, Total	3.2	U	3.2
	5/21/2007	Arsenic, Total	59.6		3.1
	5/21/2007	Barium, Total	18.4		0.39
	5/21/2007	Beryllium, Total	0.25	U	0.044
	5/21/2007	Boron, Total	2090		4.9
	5/21/2007	Cadmium, Total	0.35	U	0.35
	5/21/2007	Calcium, Total	238000		136
	5/21/2007	Chromium, Total	1.4	U	0.6
	5/21/2007	Cobalt, Total	4.1	U	0.64
	5/21/2007	Copper, Total	3.8	U	0.77
	5/21/2007	Iron, Total	11400		14.8
	5/21/2007	Lead, Total	1.7	U	1.7
	5/21/2007	Lithium, Total	5360		4
	5/21/2007	Magnesium, Total	76900		20.9
	5/21/2007	Manganese, Total	4490		0.18
	5/21/2007	Mercury, Total	0.021	U	0.021
	5/21/2007	Nickel, Total	6.2		1.7
	5/21/2007	Potassium, Total	46000		16.6
	5/21/2007	Selenium, Total	2.8	U	2.8
	5/21/2007	Silver, Total	0.68	U	0.68
	5/21/2007	Sodium, Total	1380000		1040
	5/21/2007	Thallium, Total	0.095	U	0.095
	5/21/2007	Vanadium, Total	9.4		0.7
	5/21/2007	Zinc, Total	8.8	U	8.8

Table A-12
2007 Groundwater Analytical Results - Metals

Sampling Location (Sample ID) [SDG Number]	Date Collected	Detected Analyte ^a	Result (ug/L)	Data Qualifiers ^b	Method Detection Limit (ug/L)
MW-26D (12b-025150) [705167]	5/24/2007	Aluminum, Total	35.6	U	23
	5/24/2007	Antimony, Total	3.2	U	3.2
	5/24/2007	Arsenic, Total	3.1	U	3.1
	5/24/2007	Barium, Total	16.1		0.39
	5/24/2007	Beryllium, Total	0.044	U	0.044
	5/24/2007	Boron, Total	12.9		4.9
	5/24/2007	Cadmium, Total	0.35	U	0.35
	5/24/2007	Calcium, Total	509000		136
	5/24/2007	Chromium, Total	4.2	U	0.6
	5/24/2007	Cobalt, Total	0.64	U	0.64
	5/24/2007	Copper, Total	3.4	U	0.77
	5/24/2007	Iron, Total	65400		14.8
	5/24/2007	Lead, Total	1.7	U	1.7
	5/24/2007	Lithium, Total	526		0.4
	5/24/2007	Magnesium, Total	162000		20.9
	5/24/2007	Manganese, Total	7890		0.18
	5/24/2007	Mercury, Total	0.021	U	0.021
	5/24/2007	Nickel, Total	1.7	U	1.7
	5/24/2007	Potassium, Total	657000		332
	5/24/2007	Selenium, Total	2.8	U	2.8
	5/24/2007	Silver, Total	0.68	U	0.68
	5/24/2007	Sodium, Total	800000		4140
	5/24/2007	Thallium, Total	0.36	U	0.095
	5/24/2007	Vanadium, Total	4.2		0.7
	5/24/2007	Zinc, Total	13.3	U	8.8

^a All analytes were reported, detected and undetected.

^b USACE data qualifier flags based on the CDQMP-QAPP: J = Reported as an estimated value, R = Rejected value. U= Analyte was not detected. UJ = Analyte was not detected, and the reporting limit was estimated due to quality control consideration.

^c Monitoring wells B38W01S and B38W02D are the background locations for wells completed in overburden and bedrock wells respectively.

Table A-13
2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
Monitoring Wells Completed in Unconsolidated Sediment:					
B38W01S ^e (12a-025128) [705077]	5/10/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/10/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/10/2007	1,1,2-Trichloroethane	1	R	0.2
	5/10/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/10/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/10/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/10/2007	1,2-Dichloropropane	1	U	0.2
	5/10/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/10/2007	2-Hexanone	5	UJ	0.4
	5/10/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/10/2007	Acetone	5	R	1.6
	5/10/2007	Benzene	1	U	0.1
	5/10/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/10/2007	Bromoform	1	UJ	0.2
	5/10/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/10/2007	Carbon disulfide	1	U	0.3
	5/10/2007	Carbon tetrachloride	1	R	0.2
	5/10/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/10/2007	Chloroethane	2	U	0.2
	5/10/2007	Chloroform	1	U	0.2
	5/10/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/10/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/10/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/10/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/10/2007	Ethylbenzene	1	U	0.2
	5/10/2007	Methylene Chloride	1	U	0.2
	5/10/2007	Styrene	1	UJ	0.1
	5/10/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/10/2007	Toluene	1	U	0.1
	5/10/2007	Total Xylene	1	UJ	0.4
	5/10/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/10/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/10/2007	Trichloroethene (TCE)	1	U	0.2
	5/10/2007	Vinyl chloride	1	U	0.3

Table A-13
2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W14S (19a-025132) [705061]	5/9/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/9/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/9/2007	1,1,2-Trichloroethane	1	R	0.2
	5/9/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/9/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/9/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/9/2007	1,2-Dichloropropane	1	U	0.2
	5/9/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/9/2007	2-Hexanone	5	UJ	0.4
	5/9/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/9/2007	Acetone	5	R	1.6
	5/9/2007	Benzene	1	U	0.1
	5/9/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/9/2007	Bromoform	1	R	0.2
	5/9/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/9/2007	Carbon disulfide	1	U	0.3
	5/9/2007	Carbon tetrachloride	1	R	0.2
	5/9/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/9/2007	Chloroethane	2	U	0.2
	5/9/2007	Chloroform	1	U	0.2
	5/9/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/9/2007	cis-1,2-Dichloroethene	1.7		0.2
	5/9/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/9/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/9/2007	Ethylbenzene	1	U	0.2
	5/9/2007	Methylene Chloride	1	U	0.2
	5/9/2007	Styrene	1	UJ	0.1
	5/9/2007	Tetrachloroethene (PCE)	9.4	J	0.1
	5/9/2007	Toluene	1	U	0.1
	5/9/2007	Total Xylene	1	UJ	0.4
	5/9/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/9/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/9/2007	Trichloroethene (TCE)	1.2		0.2
	5/9/2007	Vinyl chloride	1	U	0.3

Table A-13
2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W15S (20a-025134) [705048]	5/8/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/8/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/8/2007	1,1,2-Trichloroethane	1	R	0.2
	5/8/2007	1,1-Dichloroethane (1,1-DCA)	0.3	J	0.1
	5/8/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/8/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/8/2007	1,2-Dichloropropane	1	U	0.2
	5/8/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/8/2007	2-Hexanone	5	UJ	0.4
	5/8/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/8/2007	Acetone	5	R	1.6
	5/8/2007	Benzene	1	U	0.1
	5/8/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/8/2007	Bromoform	1	UJ	0.2
	5/8/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/8/2007	Carbon disulfide	1	U	0.3
	5/8/2007	Carbon tetrachloride	1	R	0.2
	5/8/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/8/2007	Chloroethane	2	U	0.2
	5/8/2007	Chloroform	1	U	0.2
	5/8/2007	Chloromethane (Methyl Chloride)	2	R	0.1
	5/8/2007	cis-1,2-Dichloroethene	2.5		0.2
	5/8/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/8/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/8/2007	Ethylbenzene	1	U	0.2
	5/8/2007	Methylene Chloride	0.85	U	0.2
	5/8/2007	Styrene	1	UJ	0.1
	5/8/2007	Tetrachloroethene (PCE)	0.22	J	0.1
	5/8/2007	Toluene	1	U	0.1
	5/8/2007	Total Xylene	1	UJ	0.4
	5/8/2007	trans-1,2-Dichloroethene	1.1		0.1
	5/8/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/8/2007	Trichloroethene (TCE)	0.23	J	0.2
	5/8/2007	Vinyl chloride	2.3		0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W17A (20a-025135) [705036]	5/7/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/7/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/7/2007	1,1,2-Trichloroethane	1	R	0.2
	5/7/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/7/2007	1,1-Dichloroethene (1,1-DCE)	1	UJ	0.2
	5/7/2007	1,2-Dichloroethane (1,2-DCA)	0.65	J	0.2
	5/7/2007	1,2-Dichloropropane	1	U	0.2
	5/7/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/7/2007	2-Hexanone	5	UJ	0.4
	5/7/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.3
	5/7/2007	Acetone	5	R	1.6
	5/7/2007	Benzene	1	U	0.1
	5/7/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/7/2007	Bromoform	1	UJ	0.2
	5/7/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/7/2007	Carbon disulfide	1	U	0.3
	5/7/2007	Carbon tetrachloride	1	R	0.2
	5/7/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/7/2007	Chloroethane	2	U	0.2
	5/7/2007	Chloroform	1	U	0.2
	5/7/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/7/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/7/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/7/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/7/2007	Ethylbenzene	1	UJ	0.2
	5/7/2007	Methylene Chloride	1	UJ	0.2
	5/7/2007	Styrene	1	UJ	0.1
	5/7/2007	Tetrachloroethene (PCE)	1		0.1
	5/7/2007	Toluene	1	U	0.1
	5/7/2007	Total Xylene	1	U	0.4
	5/7/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/7/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/7/2007	Trichloroethene (TCE)	1	U	0.2
	5/7/2007	Vinyl chloride	1	UJ	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W19S (12b-025139) [705151]	5/22/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/22/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/22/2007	1,1,2-Trichloroethane	1	U	0.2
	5/22/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/22/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/22/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/22/2007	1,2-Dichloropropane	1	U	0.2
	5/22/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/22/2007	2-Hexanone	5	UJ	0.4
	5/22/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/22/2007	Acetone	5	R	1.6
	5/22/2007	Benzene	1	U	0.1
	5/22/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/22/2007	Bromoform	1	UJ	0.2
	5/22/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/22/2007	Carbon disulfide	1	UJ	0.3
	5/22/2007	Carbon tetrachloride	1	UJ	0.2
	5/22/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/22/2007	Chloroethane	2	U	0.2
	5/22/2007	Chloroform	1	U	0.2
	5/22/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/22/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/22/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/22/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/22/2007	Ethylbenzene	1	U	0.2
	5/22/2007	Methylene Chloride	0.32	UJ	0.2
	5/22/2007	Styrene	1	U	0.1
	5/22/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/22/2007	Toluene	1	U	0.1
	5/22/2007	Total Xylene	1	U	0.4
	5/22/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/22/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/22/2007	Trichloroethene (TCE)	1	U	0.2
	5/22/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W24S (10a-025141) [705089]	5/14/2007	1,1,1-Trichloroethane (TCA)	5	U	1.6
	5/14/2007	1,1,2,2-Tetrachloroethane	5	UJ	1.2
	5/14/2007	1,1,2-Trichloroethane	5	U	0.95
	5/14/2007	1,1-Dichloroethane (1,1-DCA)	5	U	1.4
	5/14/2007	1,1-Dichloroethene (1,1-DCE)	5	UJ	2
	5/14/2007	1,2-Dichloroethane (1,2-DCA)	5	U	0.95
	5/14/2007	1,2-Dichloropropane	5	U	0.65
	5/14/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	10	UJ	4.2
	5/14/2007	2-Hexanone	10	U	2.5
	5/14/2007	4-Methyl-2-pentanone (MIBK)	100	J	2
	5/14/2007	Acetone	10	UJ	2.6
	5/14/2007	Benzene	5	U	1.2
	5/14/2007	Bromodichloromethane (Dichlorobromomethane)	5	U	0.96
	5/14/2007	Bromoform	5	U	1.4
	5/14/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	10	U	3.2
	5/14/2007	Carbon disulfide	5	UJ	1.4
	5/14/2007	Carbon tetrachloride	5	U	2.1
	5/14/2007	Chlorobenzene (Monochlorobenzene)	5	U	0.81
	5/14/2007	Chloroethane	10	UJ	2.6
	5/14/2007	Chloroform	5	U	1.6
	5/14/2007	Chloromethane (Methyl Chloride)	10	UJ	1.5
	5/14/2007	cis-1,2-Dichloroethene	5	U	1.2
	5/14/2007	cis-1,3-Dichloropropene	5	U	0.96
	5/14/2007	Dibromochloromethane (Chlorodibromomethane)	5	U	0.49
	5/14/2007	Ethylbenzene	8	J	1.4
	5/14/2007	Methylene Chloride	10	U	1.4
	5/14/2007	Styrene	5	U	1
	5/14/2007	Tetrachloroethene (PCE)	5	U	2.3
	5/14/2007	Toluene	130	J	1.1
	5/14/2007	Total Xylene	34	J	3.4
	5/14/2007	trans-1,2-Dichloroethene	5	U	1.5
	5/14/2007	trans-1,3-Dichloropropene	5	U	0.87
	5/14/2007	Trichloroethene (TCE)	5	U	1.9
	5/14/2007	Vinyl chloride	10	UJ	2.1

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS01AA (12b-025142) [705118]	5/16/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/16/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/16/2007	1,1,2-Trichloroethane	1	UJ	0.2
	5/16/2007	1,1-Dichloroethane (1,1-DCA)	1	UJ	0.1
	5/16/2007	1,1-Dichloroethene (1,1-DCE)	1	UJ	0.2
	5/16/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/16/2007	1,2-Dichloropropane	1	UJ	0.2
	5/16/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/16/2007	2-Hexanone	5	UJ	0.4
	5/16/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.3
	5/16/2007	Acetone	5	R	1.6
	5/16/2007	Benzene	1	UJ	0.1
	5/16/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/16/2007	Bromoform	1	UJ	0.2
	5/16/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/16/2007	Carbon disulfide	1	UJ	0.3
	5/16/2007	Carbon tetrachloride	1	UJ	0.2
	5/16/2007	Chlorobenzene (Monochlorobenzene)	1	UJ	0.1
	5/16/2007	Chloroethane	2	UJ	0.2
	5/16/2007	Chloroform	1	UJ	0.2
	5/16/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/16/2007	cis-1,2-Dichloroethene	1	UJ	0.2
	5/16/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/16/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/16/2007	Ethylbenzene	1	UJ	0.2
	5/16/2007	Methylene Chloride	1.5		0.2
	5/16/2007	Styrene	1	UJ	0.1
	5/16/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/16/2007	Toluene	1	UJ	0.1
	5/16/2007	Total Xylene	1	UJ	0.4
	5/16/2007	trans-1,2-Dichloroethene	1	UJ	0.1
	5/16/2007	trans-1,3-Dichloropropene	1	UJ	0.3
	5/16/2007	Trichloroethene (TCE)	1	UJ	0.2
	5/16/2007	Vinyl chloride	1	UJ	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS02A (12b-025144) [705120]	5/17/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/17/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/17/2007	1,1,2-Trichloroethane	1	U	0.2
	5/17/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/17/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/17/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/17/2007	1,2-Dichloropropane	1	U	0.2
	5/17/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/17/2007	2-Hexanone	5	UJ	0.4
	5/17/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/17/2007	Acetone	3.2	R	1.6
	5/17/2007	Benzene	1	U	0.1
	5/17/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/17/2007	Bromoform	1	UJ	0.2
	5/17/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/17/2007	Carbon disulfide	1	U	0.3
	5/17/2007	Carbon tetrachloride	1	U	0.2
	5/17/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/17/2007	Chloroethane	2	U	0.2
	5/17/2007	Chloroform	1	U	0.2
	5/17/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/17/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/17/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/17/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/17/2007	Ethylbenzene	1	U	0.2
	5/17/2007	Methylene Chloride	0.83	J	0.2
	5/17/2007	Styrene	1	U	0.1
	5/17/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/17/2007	Toluene	1	U	0.1
	5/17/2007	Total Xylene	1	U	0.4
	5/17/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/17/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/17/2007	Trichloroethene (TCE)	1	U	0.2
	5/17/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS05A (12b-025146) [705160]	5/23/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/23/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/23/2007	1,1,2-Trichloroethane	1	R	0.2
	5/23/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/23/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/23/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/23/2007	1,2-Dichloropropane	1	U	0.2
	5/23/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/23/2007	2-Hexanone	5	UJ	0.4
	5/23/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/23/2007	Acetone	5	R	1.6
	5/23/2007	Benzene	1	U	0.1
	5/23/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/23/2007	Bromoform	1	UJ	0.2
	5/23/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/23/2007	Carbon disulfide	1	UJ	0.3
	5/23/2007	Carbon tetrachloride	1	UJ	0.2
	5/23/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/23/2007	Chloroethane	2	U	0.2
	5/23/2007	Chloroform	1	U	0.2
	5/23/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/23/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/23/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/23/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/23/2007	Ethylbenzene	1	U	0.2
	5/23/2007	Methylene Chloride	1	UJ	0.2
	5/23/2007	Styrene	1	U	0.1
	5/23/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/23/2007	Toluene	1	U	0.1
	5/23/2007	Total Xylene	1	U	0.4
	5/23/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/23/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/23/2007	Trichloroethene (TCE)	1	U	0.2
	5/23/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS07A (12b-025148) [705148]	5/21/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/21/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/21/2007	1,1,2-Trichloroethane	1	UJ	0.2
	5/21/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/21/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/21/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/21/2007	1,2-Dichloropropane	1	U	0.2
	5/21/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/21/2007	2-Hexanone	5	UJ	0.4
	5/21/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/21/2007	Acetone	5	R	1.6
	5/21/2007	Benzene	1	U	0.1
	5/21/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/21/2007	Bromoform	1	UJ	0.2
	5/21/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/21/2007	Carbon disulfide	1	UJ	0.3
	5/21/2007	Carbon tetrachloride	1	UJ	0.2
	5/21/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/21/2007	Chloroethane	2	U	0.2
	5/21/2007	Chloroform	1	U	0.2
	5/21/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/21/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/21/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/21/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/21/2007	Ethylbenzene	1	U	0.2
	5/21/2007	Methylene Chloride	0.56	UJ	0.2
	5/21/2007	Styrene	1	U	0.1
	5/21/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/21/2007	Toluene	0.36	J	0.1
	5/21/2007	Total Xylene	1	U	0.4
	5/21/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/21/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/21/2007	Trichloroethene (TCE)	1	U	0.2
	5/21/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MW-26S (12b-025151) [705167]	5/24/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/24/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/24/2007	1,1,2-Trichloroethane	1	UJ	0.2
	5/24/2007	1,1-Dichloroethane (1,1-DCA)	1	UJ	0.1
	5/24/2007	1,1-Dichloroethene (1,1-DCE)	1	UJ	0.2
	5/24/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/24/2007	1,2-Dichloropropane	1	UJ	0.2
	5/24/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/24/2007	2-Hexanone	5	UJ	0.4
	5/24/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.3
	5/24/2007	Acetone	4.3	R	1.6
	5/24/2007	Benzene	1	UJ	0.1
	5/24/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/24/2007	Bromoform	1	UJ	0.2
	5/24/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/24/2007	Carbon disulfide	1	UJ	0.3
	5/24/2007	Carbon tetrachloride	1	UJ	0.2
	5/24/2007	Chlorobenzene (Monochlorobenzene)	1	UJ	0.1
	5/24/2007	Chloroethane	2	UJ	0.2
	5/24/2007	Chloroform	1	UJ	0.2
	5/24/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/24/2007	cis-1,2-Dichloroethene	1	UJ	0.2
	5/24/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/24/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/24/2007	Ethylbenzene	1	UJ	0.2
	5/24/2007	Methylene Chloride	1	UJ	0.2
	5/24/2007	Styrene	1	UJ	0.1
	5/24/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/24/2007	Toluene	1	UJ	0.1
	5/24/2007	Total Xylene	1	UJ	0.4
	5/24/2007	trans-1,2-Dichloroethene	1	UJ	0.1
	5/24/2007	trans-1,3-Dichloropropene	1	UJ	0.3
	5/24/2007	Trichloroethene (TCE)	1	UJ	0.2
	5/24/2007	Vinyl chloride	1	UJ	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
Monitoring Wells Completed in Bedrock:					
B38W02D (12a-025129) [705077]	5/10/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/10/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/10/2007	1,1,2-Trichloroethane	1	R	0.2
	5/10/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/10/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/10/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/10/2007	1,2-Dichloropropane	1	U	0.2
	5/10/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/10/2007	2-Hexanone	5	UJ	0.4
	5/10/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/10/2007	Acetone	5	R	1.6
	5/10/2007	Benzene	1	U	0.1
	5/10/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/10/2007	Bromoform	1	UJ	0.2
	5/10/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/10/2007	Carbon disulfide	1	U	0.3
	5/10/2007	Carbon tetrachloride	1	R	0.2
	5/10/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/10/2007	Chloroethane	2	U	0.2
	5/10/2007	Chloroform	1	U	0.2
	5/10/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/10/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/10/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/10/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/10/2007	Ethylbenzene	1	U	0.2
	5/10/2007	Methylene Chloride	0.72	U	0.2
	5/10/2007	Styrene	1	UJ	0.1
	5/10/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/10/2007	Toluene	1	U	0.1
	5/10/2007	Total Xylene	1	UJ	0.4
	5/10/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/10/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/10/2007	Trichloroethene (TCE)	1	U	0.2
	5/10/2007	Vinyl chloride	1	U	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W03B (12a-025130) [705097]	5/15/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/15/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/15/2007	1,1,2-Trichloroethane	1	R	0.2
	5/15/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/15/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/15/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/15/2007	1,2-Dichloropropane	1	U	0.2
	5/15/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/15/2007	2-Hexanone	5	UJ	0.4
	5/15/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/15/2007	Acetone	5	R	1.6
	5/15/2007	Benzene	0.72	J	0.1
	5/15/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/15/2007	Bromoform	1	R	0.2
	5/15/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/15/2007	Carbon disulfide	1	U	0.3
	5/15/2007	Carbon tetrachloride	1	R	0.2
	5/15/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/15/2007	Chloroethane	2	U	0.2
	5/15/2007	Chloroform	1	U	0.2
	5/15/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/15/2007	cis-1,2-Dichloroethene	0.55	J	0.2
	5/15/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/15/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/15/2007	Ethylbenzene	1	U	0.2
	5/15/2007	Methylene Chloride	1	U	0.2
	5/15/2007	Styrene	1	UJ	0.1
	5/15/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/15/2007	Toluene	1	U	0.1
	5/15/2007	Total Xylene	1	UJ	0.4
	5/15/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/15/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/15/2007	Trichloroethene (TCE)	1	U	0.2
	5/15/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W14D (19a-025131) [705061]	5/9/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/9/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/9/2007	1,1,2-Trichloroethane	1	R	0.2
	5/9/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/9/2007	1,1-Dichloroethene (1,1-DCE)	1.3		0.2
	5/9/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/9/2007	1,2-Dichloropropane	1	U	0.2
	5/9/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/9/2007	2-Hexanone	5	U	0.4
	5/9/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/9/2007	Acetone	5	R	1.6
	5/9/2007	Benzene	1	U	0.1
	5/9/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/9/2007	Bromoform	1	R	0.2
	5/9/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/9/2007	Carbon disulfide	1	U	0.3
	5/9/2007	Carbon tetrachloride	1	R	0.2
	5/9/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/9/2007	Chloroethane	2	U	0.2
	5/9/2007	Chloroform	1.1		0.2
	5/9/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/9/2007	cis-1,2-Dichloroethene	49		0.2
	5/9/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/9/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/9/2007	Ethylbenzene	1	U	0.2
	5/9/2007	Methylene Chloride	1	U	0.2
	5/9/2007	Styrene	1	UJ	0.1
	5/9/2007	Tetrachloroethene (PCE)	180	J	1.4
	5/9/2007	Toluene	1	U	0.1
	5/9/2007	Total Xylene	1	UJ	0.4
	5/9/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/9/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/9/2007	Trichloroethene (TCE)	38	J	0.2
	5/9/2007	Vinyl chloride	1	U	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W15D (20a-025133) [705048]	5/8/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/8/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/8/2007	1,1,2-Trichloroethane	1	R	0.2
	5/8/2007	1,1-Dichloroethane (1,1-DCA)	1		0.1
	5/8/2007	1,1-Dichloroethene (1,1-DCE)	1.1		0.2
	5/8/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/8/2007	1,2-Dichloropropane	1	U	0.2
	5/8/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/8/2007	2-Hexanone	5	UJ	0.4
	5/8/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/8/2007	Acetone	5	R	1.6
	5/8/2007	Benzene	1	U	0.1
	5/8/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/8/2007	Bromoform	1	UJ	0.2
	5/8/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/8/2007	Carbon disulfide	1	U	0.3
	5/8/2007	Carbon tetrachloride	1	R	0.2
	5/8/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/8/2007	Chloroethane	2	U	0.2
	5/8/2007	Chloroform	1	U	0.2
	5/8/2007	Chloromethane (Methyl Chloride)	2	R	0.1
	5/8/2007	cis-1,2-Dichloroethene	46		0.2
	5/8/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/8/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/8/2007	Ethylbenzene	1	U	0.2
	5/8/2007	Methylene Chloride	0.92	U	0.2
	5/8/2007	Styrene	1	UJ	0.1
	5/8/2007	Tetrachloroethene (PCE)	140	J	1.4
	5/8/2007	Toluene	1	U	0.1
	5/8/2007	Total Xylene	1	UJ	0.4
	5/8/2007	trans-1,2-Dichloroethene	28		0.1
	5/8/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/8/2007	Trichloroethene (TCE)	31		0.2
	5/8/2007	Vinyl chloride	0.85	J	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W15D Duplicate (20a-025152) [705048]	5/8/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/8/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/8/2007	1,1,2-Trichloroethane	1	R	0.2
	5/8/2007	1,1-Dichloroethane (1,1-DCA)	1		0.1
	5/8/2007	1,1-Dichloroethene (1,1-DCE)	1		0.2
	5/8/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/8/2007	1,2-Dichloropropane	1	U	0.2
	5/8/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/8/2007	2-Hexanone	5	UJ	0.4
	5/8/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/8/2007	Acetone	5	R	1.6
	5/8/2007	Benzene	1	U	0.1
	5/8/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/8/2007	Bromoform	1	UJ	0.2
	5/8/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/8/2007	Carbon disulfide	1	U	0.3
	5/8/2007	Carbon tetrachloride	1	R	0.2
	5/8/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/8/2007	Chloroethane	2	U	0.2
	5/8/2007	Chloroform	1	U	0.2
	5/8/2007	Chloromethane (Methyl Chloride)	2	R	0.1
	5/8/2007	cis-1,2-Dichloroethene	45		0.2
	5/8/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/8/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/8/2007	Ethylbenzene	1	U	0.2
	5/8/2007	Methylene Chloride	0.95	U	0.2
	5/8/2007	Styrene	1	UJ	0.1
	5/8/2007	Tetrachloroethene (PCE)	210	J	1.4
	5/8/2007	Toluene	1	U	0.1
	5/8/2007	Total Xylene	1	UJ	0.4
	5/8/2007	trans-1,2-Dichloroethene	27		0.1
	5/8/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/8/2007	Trichloroethene (TCE)	31		0.2
	5/8/2007	Vinyl chloride	0.81	J	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W17B (20a-025136) [705036]	5/7/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/7/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/7/2007	1,1,2-Trichloroethane	1	R	0.2
	5/7/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/7/2007	1,1-Dichloroethene (1,1-DCE)	1	UJ	0.2
	5/7/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/7/2007	1,2-Dichloropropane	1	U	0.2
	5/7/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/7/2007	2-Hexanone	5	UJ	0.4
	5/7/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.3
	5/7/2007	Acetone	5	R	1.6
	5/7/2007	Benzene	1	U	0.1
	5/7/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/7/2007	Bromoform	1	UJ	0.2
	5/7/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/7/2007	Carbon disulfide	1	U	0.3
	5/7/2007	Carbon tetrachloride	1	R	0.2
	5/7/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/7/2007	Chloroethane	2	U	0.2
	5/7/2007	Chloroform	1	U	0.2
	5/7/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/7/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/7/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/7/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/7/2007	Ethylbenzene	1	UJ	0.2
	5/7/2007	Methylene Chloride	0.77	UJ	0.2
	5/7/2007	Styrene	1	UJ	0.1
	5/7/2007	Tetrachloroethene (PCE)	0.5	U	0.1
	5/7/2007	Toluene	1	U	0.1
	5/7/2007	Total Xylene	1	U	0.4
	5/7/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/7/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/7/2007	Trichloroethene (TCE)	1	U	0.2
	5/7/2007	Vinyl chloride	1	UJ	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W18D (12b-025137) [705097]	5/15/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/15/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/15/2007	1,1,2-Trichloroethane	1	R	0.2
	5/15/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/15/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/15/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/15/2007	1,2-Dichloropropane	1	U	0.2
	5/15/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/15/2007	2-Hexanone	5	UJ	0.4
	5/15/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/15/2007	Acetone	5	R	1.6
	5/15/2007	Benzene	1	U	0.1
	5/15/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/15/2007	Bromoform	1	R	0.2
	5/15/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/15/2007	Carbon disulfide	1	U	0.3
	5/15/2007	Carbon tetrachloride	1	R	0.2
	5/15/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/15/2007	Chloroethane	2	U	0.2
	5/15/2007	Chloroform	1	U	0.2
	5/15/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/15/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/15/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/15/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/15/2007	Ethylbenzene	1	U	0.2
	5/15/2007	Methylene Chloride	1.1		0.2
	5/15/2007	Styrene	1	UJ	0.1
	5/15/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/15/2007	Toluene	1	U	0.1
	5/15/2007	Total Xylene	1	UJ	0.4
	5/15/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/15/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/15/2007	Trichloroethene (TCE)	1	U	0.2
	5/15/2007	Vinyl chloride	1	U	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W18D Duplicate (12b-025153) [705097]	5/15/2007	1,1,1-Trichloroethane (TCA)	1	U	0.2
	5/15/2007	1,1,2,2-Tetrachloroethane	1	R	0.2
	5/15/2007	1,1,2-Trichloroethane	1	R	0.2
	5/15/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/15/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/15/2007	1,2-Dichloroethane (1,2-DCA)	1	U	0.2
	5/15/2007	1,2-Dichloropropane	1	U	0.2
	5/15/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/15/2007	2-Hexanone	5	UJ	0.4
	5/15/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/15/2007	Acetone	5	R	1.6
	5/15/2007	Benzene	1	U	0.1
	5/15/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/15/2007	Bromoform	1	R	0.2
	5/15/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	R	0.2
	5/15/2007	Carbon disulfide	1	U	0.3
	5/15/2007	Carbon tetrachloride	1	R	0.2
	5/15/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/15/2007	Chloroethane	2	U	0.2
	5/15/2007	Chloroform	1	U	0.2
	5/15/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/15/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/15/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/15/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/15/2007	Ethylbenzene	1	U	0.2
	5/15/2007	Methylene Chloride	1		0.2
	5/15/2007	Styrene	1	UJ	0.1
	5/15/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/15/2007	Toluene	1	U	0.1
	5/15/2007	Total Xylene	1	UJ	0.4
	5/15/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/15/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/15/2007	Trichloroethene (TCE)	1	U	0.2
	5/15/2007	Vinyl chloride	1	U	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W19D (12b-025138) [705151]	5/22/2007	1,1,1 - Trichloroethane (TCA)	1	U	0.1
	5/22/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/22/2007	1,1,2-Trichloroethane	1	U	0.2
	5/22/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/22/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/22/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/22/2007	1,2-Dichloropropane	1	U	0.2
	5/22/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/22/2007	2-Hexanone	5	UJ	0.4
	5/22/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/22/2007	Acetone	2.4	R	1.6
	5/22/2007	Benzene	0.57	J	0.1
	5/22/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/22/2007	Bromoform	1	UJ	0.2
	5/22/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/22/2007	Carbon disulfide	1	UJ	0.3
	5/22/2007	Carbon tetrachloride	1	UJ	0.2
	5/22/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/22/2007	Chloroethane	2	U	0.2
	5/22/2007	Chloroform	1	U	0.2
	5/22/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/22/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/22/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/22/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/22/2007	Ethylbenzene	1	U	0.2
	5/22/2007	Methylene Chloride	0.74	UJ	0.2
	5/22/2007	Styrene	1	U	0.1
	5/22/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/22/2007	Toluene	1	U	0.1
	5/22/2007	Total Xylene	1	U	0.4
	5/22/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/22/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/22/2007	Trichloroethene (TCE)	1	U	0.2
	5/22/2007	Vinyl chloride	1	U	0.3

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2007 Groundwater Analytical Results - Volatile Organic Compounds

Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W19D Duplicate (12b-025205) [705151]	5/22/2007	1,1,1 - Trichloroethane (TCA)	1	U	0.1
	5/22/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/22/2007	1,1,2-Trichloroethane	1	U	0.2
	5/22/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/22/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/22/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/22/2007	1,2-Dichloropropane	1	U	0.2
	5/22/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	1	U	0.2
	5/22/2007	2-Hexanone	5	UJ	0.6
	5/22/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.4
	5/22/2007	Acetone	5	U	0.3
	5/22/2007	Benzene	5	R	1.6
	5/22/2007	Bromodichloromethane (Dichlorobromomethane)	0.52	J	0.1
	5/22/2007	Bromoform	1	U	0.2
	5/22/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/22/2007	Carbon disulfide	1	UJ	0.2
	5/22/2007	Carbon tetrachloride	1	UJ	0.3
	5/22/2007	Chlorobenzene (Monochlorobenzene)	1	UJ	0.2
	5/22/2007	Chloroethane	1	U	0.1
	5/22/2007	Chloroform	2	U	0.2
	5/22/2007	Chloromethane (Methyl Chloride)	1	U	0.2
	5/22/2007	cis-1,2-Dichloroethene	2	UJ	0.1
	5/22/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/22/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/22/2007	Ethylbenzene	1	U	0.2
	5/22/2007	Methylene Chloride	0.78	UJ	0.2
	5/22/2007	Styrene	1	U	0.1
	5/22/2007	Tetrachloroethene (PCE)	1	U	0.1
	5/22/2007	Toluene	1	U	0.1
	5/22/2007	Total Xylene	1	U	0.4
	5/22/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/22/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/22/2007	Trichloroethene (TCE)	1	U	0.2
	5/22/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
B38W24D (10a-025140) [705089]	5/14/2007	1,1,1-Trichloroethane (TCA)	5	U	1.6
	5/14/2007	1,1,2,2-Tetrachloroethane	5	UJ	1.2
	5/14/2007	1,1,2-Trichloroethane	5	U	0.95
	5/14/2007	1,1-Dichloroethane (1,1-DCA)	5	U	1.4
	5/14/2007	1,1-Dichloroethene (1,1-DCE)	5	U	2
	5/14/2007	1,2-Dichloroethane (1,2-DCA)	5	U	0.95
	5/14/2007	1,2-Dichloropropane	5	U	0.65
	5/14/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	10	U	4.2
	5/14/2007	2-Hexanone	10	U	2.5
	5/14/2007	4-Methyl-2-pentanone (MIBK)	10	U	2
	5/14/2007	Acetone	20	UJ	2.6
	5/14/2007	Benzene	5	U	1.2
	5/14/2007	Bromodichloromethane (Dichlorobromomethane)	5	U	0.96
	5/14/2007	Bromoform	5	U	1.4
	5/14/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	10	U	3.2
	5/14/2007	Carbon disulfide	5	UJ	1.4
	5/14/2007	Carbon tetrachloride	5	U	2.1
	5/14/2007	Chlorobenzene (Monochlorobenzene)	5	U	0.81
	5/14/2007	Chloroethane	10	U	2.6
	5/14/2007	Chloroform	5	U	1.6
	5/14/2007	Chloromethane (Methyl Chloride)	10	UJ	1.5
	5/14/2007	cis-1,2-Dichloroethene	5	U	1.2
	5/14/2007	cis-1,3-Dichloropropene	5	U	0.96
	5/14/2007	Dibromochloromethane (Chlorodibromomethane)	5	U	0.49
	5/14/2007	Ethylbenzene	5	U	1.4
	5/14/2007	Methylene Chloride	4.3	U	1.4
	5/14/2007	Styrene	5	U	1
	5/14/2007	Tetrachloroethene (PCE)	5	U	2.3
	5/14/2007	Toluene	5	U	1.1
	5/14/2007	Total Xylene	5	U	3.4
	5/14/2007	trans-1,2-Dichloroethene	5	U	1.5
	5/14/2007	trans-1,3-Dichloropropene	5	U	0.87
	5/14/2007	Trichloroethene (TCE)	5	U	1.9
	5/14/2007	Vinyl chloride	10	UJ	2.1

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS01B (12b-025143) [705118]	5/16/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/16/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/16/2007	1,1,2-Trichloroethane	1	U	0.2
	5/16/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/16/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/16/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/16/2007	1,2-Dichloropropane	1	U	0.2
	5/16/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/16/2007	2-Hexanone	5	UJ	0.4
	5/16/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/16/2007	Acetone	5	R	1.6
	5/16/2007	Benzene	1	U	0.1
	5/16/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/16/2007	Bromoform	1	UJ	0.2
	5/16/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/16/2007	Carbon disulfide	1	U	0.3
	5/16/2007	Carbon tetrachloride	1	U	0.2
	5/16/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/16/2007	Chloroethane	2	U	0.2
	5/16/2007	Chloroform	1	U	0.2
	5/16/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/16/2007	cis-1,2-Dichloroethene	110	J	1.5
	5/16/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/16/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/16/2007	Ethylbenzene	1	U	0.2
	5/16/2007	Methylene Chloride	1	UJ	0.2
	5/16/2007	Styrene	1	U	0.1
	5/16/2007	Tetrachloroethene (PCE)	150	J	1.4
	5/16/2007	Toluene	1	U	0.1
	5/16/2007	Total Xylene	1	U	0.4
	5/16/2007	trans-1,2-Dichloroethene	5.7		0.1
	5/16/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/16/2007	Trichloroethene (TCE)	28		0.2
	5/16/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS02B (12b-025145) [705120]	5/17/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/17/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/17/2007	1,1,2-Trichloroethane	1	U	0.2
	5/17/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/17/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/17/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/17/2007	1,2-Dichloropropane	1	U	0.2
	5/17/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	U	0.6
	5/17/2007	2-Hexanone	5	UJ	0.4
	5/17/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/17/2007	Acetone	5	R	1.6
	5/17/2007	Benzene	1	U	0.1
	5/17/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/17/2007	Bromoform	1	UJ	0.2
	5/17/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/17/2007	Carbon disulfide	1	U	0.3
	5/17/2007	Carbon tetrachloride	1	U	0.2
	5/17/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/17/2007	Chloroethane	2	U	0.2
	5/17/2007	Chloroform	1	U	0.2
	5/17/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/17/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/17/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/17/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/17/2007	Ethylbenzene	1	U	0.2
	5/17/2007	Methylene Chloride	1	UJ	0.2
	5/17/2007	Styrene	1	U	0.1
	5/17/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/17/2007	Toluene	1	U	0.1
	5/17/2007	Total Xylene	1	U	0.4
	5/17/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/17/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/17/2007	Trichloroethene (TCE)	1	U	0.2
	5/17/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS05B (12b-025147) [705160]	5/23/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/23/2007	1,1,2,2-Tetrachloroethane	1	U	0.2
	5/23/2007	1,1,2-Trichloroethane	1	R	0.2
	5/23/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/23/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/23/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/23/2007	1,2-Dichloropropane	1	U	0.2
	5/23/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/23/2007	2-Hexanone	5	UJ	0.4
	5/23/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/23/2007	Acetone	5	R	1.6
	5/23/2007	Benzene	35		0.1
	5/23/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/23/2007	Bromoform	1	UJ	0.2
	5/23/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/23/2007	Carbon disulfide	1	UJ	0.3
	5/23/2007	Carbon tetrachloride	1	UJ	0.2
	5/23/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/23/2007	Chloroethane	2	U	0.2
	5/23/2007	Chloroform	1	U	0.2
	5/23/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/23/2007	cis-1,2-Dichloroethene	1	U	0.2
	5/23/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/23/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/23/2007	Ethylbenzene	1	U	0.2
	5/23/2007	Methylene Chloride	1	UJ	0.2
	5/23/2007	Styrene	1	U	0.1
	5/23/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/23/2007	Toluene	1	U	0.1
	5/23/2007	Total Xylene	1	U	0.4
	5/23/2007	trans-1,2-Dichloroethene	1	U	0.1
	5/23/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/23/2007	Trichloroethene (TCE)	1	U	0.2
	5/23/2007	Vinyl chloride	1	U	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MISS07B (12b-025149) [705141]	5/21/2007	1,1,1-Trichloroethane (TCA)	1	U	0.1
	5/21/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/21/2007	1,1,2-Trichloroethane	1	UJ	0.2
	5/21/2007	1,1-Dichloroethane (1,1-DCA)	1	U	0.1
	5/21/2007	1,1-Dichloroethene (1,1-DCE)	1	U	0.2
	5/21/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/21/2007	1,2-Dichloropropane	1	U	0.2
	5/21/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/21/2007	2-Hexanone	5	UJ	0.4
	5/21/2007	4-Methyl-2-pentanone (MIBK)	5	U	0.3
	5/21/2007	Acetone	5	R	1.6
	5/21/2007	Benzene	1	U	0.1
	5/21/2007	Bromodichloromethane (Dichlorobromomethane)	1	U	0.2
	5/21/2007	Bromoform	1	UJ	0.2
	5/21/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/21/2007	Carbon disulfide	1	UJ	0.3
	5/21/2007	Carbon tetrachloride	1	UJ	0.2
	5/21/2007	Chlorobenzene (Monochlorobenzene)	1	U	0.1
	5/21/2007	Chloroethane	2	U	0.2
	5/21/2007	Chloroform	1	U	0.2
	5/21/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/21/2007	cis-1,2-Dichloroethene	2.5		0.2
	5/21/2007	cis-1,3-Dichloropropene	1	U	0.2
	5/21/2007	Dibromochloromethane (Chlorodibromomethane)	1	U	0.2
	5/21/2007	Ethylbenzene	1	U	0.2
	5/21/2007	Methylene Chloride	0.67	UJ	0.2
	5/21/2007	Styrene	1	U	0.1
	5/21/2007	Tetrachloroethene (PCE)	7	J	0.1
	5/21/2007	Toluene	1	U	0.1
	5/21/2007	Total Xylene	1	U	0.4
	5/21/2007	trans-1,2-Dichloroethene	3.1		0.1
	5/21/2007	trans-1,3-Dichloropropene	1	U	0.3
	5/21/2007	Trichloroethene (TCE)	1.2	J	0.2
	5/21/2007	Vinyl chloride	0.48	J	0.3

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Sampling Location (Sample ID) [SDG Number]	Date Collected	Analyte ^a	Result (µg/L)	Date Qualifiers ^b	Method Detection Limit (µg/L)
MW-26D (12b-025150) [705167]	5/24/2007	1,1,1-Trichloroethane (TCA)	1	UJ	0.1
	5/24/2007	1,1,2,2-Tetrachloroethane	1	UJ	0.2
	5/24/2007	1,1,2-Trichloroethane	1	UJ	0.2
	5/24/2007	1,1-Dichloroethane (1,1-DCA)	1	UJ	0.1
	5/24/2007	1,1-Dichloroethene (1,1-DCE)	1	UJ	0.2
	5/24/2007	1,2-Dichloroethane (1,2-DCA)	1	UJ	0.2
	5/24/2007	1,2-Dichloropropane	1	UJ	0.2
	5/24/2007	2-Butanone (MEK or Methyl Ethyl Ketone)	5	UJ	0.6
	5/24/2007	2-Hexanone	5	UJ	0.4
	5/24/2007	4-Methyl-2-pentanone (MIBK)	5	UJ	0.3
	5/24/2007	Acetone	2.2	R	1.6
	5/24/2007	Benzene	13		0.1
	5/24/2007	Bromodichloromethane (Dichlorobromomethane)	1	UJ	0.2
	5/24/2007	Bromoform	1	UJ	0.2
	5/24/2007	Bromomethane (Methyl Bromomethane or Methyl Bromide)	1	UJ	0.2
	5/24/2007	Carbon disulfide	1	UJ	0.3
	5/24/2007	Carbon tetrachloride	1	UJ	0.2
	5/24/2007	Chlorobenzene (Monochlorobenzene)	1	UJ	0.1
	5/24/2007	Chloroethane	2	UJ	0.2
	5/24/2007	Chloroform	1	UJ	0.2
	5/24/2007	Chloromethane (Methyl Chloride)	2	UJ	0.1
	5/24/2007	cis-1,2-Dichloroethene	1	UJ	0.2
	5/24/2007	cis-1,3-Dichloropropene	1	UJ	0.2
	5/24/2007	Dibromochloromethane (Chlorodibromomethane)	1	UJ	0.2
	5/24/2007	Ethylbenzene	1	UJ	0.2
	5/24/2007	Methylene Chloride	0.56	UJ	0.2
	5/24/2007	Styrene	1	UJ	0.1
	5/24/2007	Tetrachloroethene (PCE)	1	UJ	0.1
	5/24/2007	Toluene	1	UJ	0.1
	5/24/2007	Total Xylene	1	UJ	0.4
	5/24/2007	trans-1,2-Dichloroethene	1	UJ	0.1
	5/24/2007	trans-1,3-Dichloropropene	1	UJ	0.3
	5/24/2007	Trichloroethene (TCE)	1	UJ	0.2
	5/24/2007	Vinyl chloride	1	UJ	0.3

^a All analytes were reported, detected and undetected.

^b USACE and laboratory data qualifier flags based on the CDQMP-QAPP; J = Reported as an estimated value. Data quality evaluation indicates that the analytical result is an estimate of the actual value; R = Rejected value; U= Analyte was analyzed for but not detected; UJ= Analyte was not detected, and the reporting limit was estimated due to quality control consideration.

^c Monitoring well B38W01S is the background location for wells that are completed in unconsolidated sediment.

Table A-14
2007 List of Analytes and Reporting Limits for
Metals and Volatile Organic Compounds

Groundwater and Surface Water Metals	Reporting Limit (µg/L)	Groundwater Volatile Organic Compounds	Reporting Limit (µg/L)
Aluminum, Total	200	1,1,1-Trichloroethane	1
Antimony, Total	20	1,1,2,2-Tetrachloroethane	1
Arsenic, Total	20	1,1,2-Trichloroethane	1
Barium, Total	5	1,1-Dichloroethane	1
Beryllium, Total	2	1,1-Dichloroethene	1
Boron, Total	15	1,2-Dichloroethane	1
Cadmium, Total	6	1,2-Dichloropropane	1
Calcium	1000	2-Butanone	5
Chromium, Total	5	2-Hexanone	5
Cobalt, Total	5	4-Methyl-2-pentanone	5
Copper, Total	10	Acetone	5
Iron, Total	150	Benzene	1
Lead, Total	10	Bromodichloromethane	1
Lithium	2	Bromoform	1
Magnesium	250	Bromomethane	1
Manganese, Total	5	Carbon disulfide	1
Mercury, Total	0.2	Carbon tetrachloride	1
Nickel, Total	10	Chlorobenzene	1
Potassium	250	Chloroethane	2
Selenium, Total	20	Chloroform	1
Silver, Total	5	Chloromethane	2
Sodium	2500	cis-1,2-Dichloroethene	1
Thallium, Total	2	cis-1,3-Dichloropropene	1
Vanadium, Total	10	Dibromochloromethane	1
Zinc, Total	20	Ethylbenzene	1
		Methylene Chloride	1
		Styrene	1
		Tetrachloroethene	1
		Toluene	1
		Total Xylene	1
		trans-1,2-Dichloroethene	1
		trans-1,3-Dichloropropene	1
		Trichloroethene	1
		Vinyl chloride	1

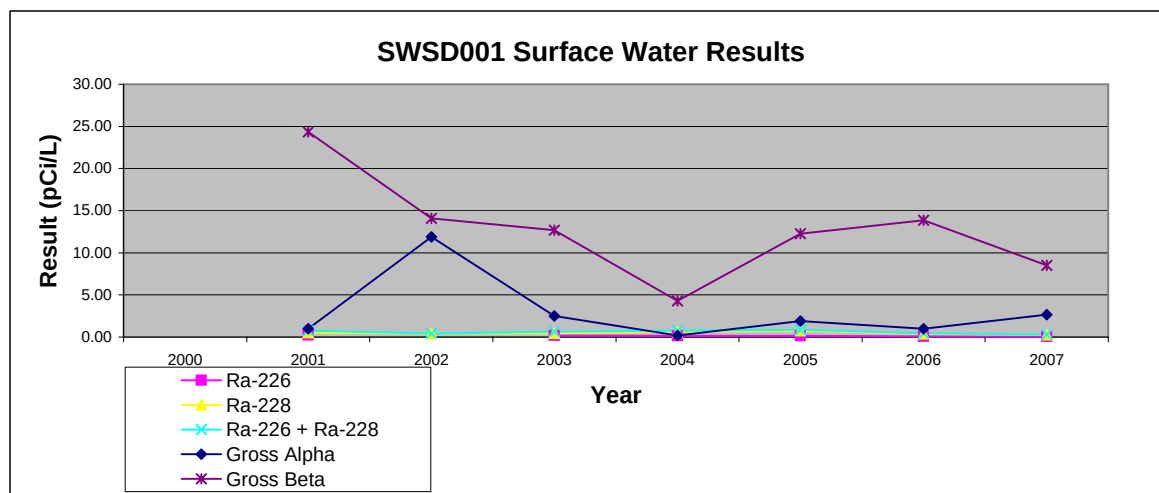
APPENDIX B HISTORICAL RESULTS

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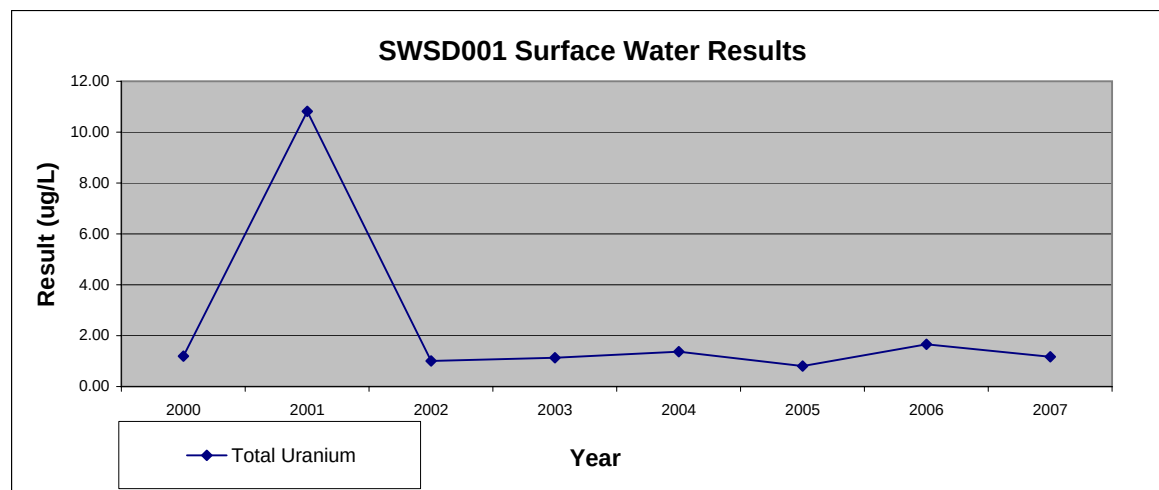
APPENDIX B HISTORICAL RESULTS

FIGURE B-1	HISTORICAL RADIOLOGICAL RESULTS FOR SWSD001
FIGURE B-2	HISTORICAL RADIOLOGICAL RESULTS FOR SWSD002
FIGURE B-3	HISTORICAL RADIOLOGICAL RESULTS FOR SWSD003
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FIGURE B-15	HISTORICAL RADIOLOGICAL RESULTS FOR B38W19S
FIGURE B-16	HISTORICAL RADIOLOGICAL RESULTS FOR B38W24S
FIGURE B-17	HISTORICAL RADIOLOGICAL RESULTS FOR MISS01AA
FIGURE B-18	HISTORICAL RADIOLOGICAL RESULTS FOR MISS02A
FIGURE B-19	HISTORICAL RADIOLOGICAL RESULTS FOR MISS05A
FIGURE B-20	HISTORICAL RADIOLOGICAL RESULTS FOR MISS07A
FIGURE B-21	HISTORICAL RADIOLOGICAL RESULTS FOR MW-26S
FIGURE B-22	HISTORICAL RADIOLOGICAL RESULTS FOR B38W02D
FIGURE B-23	HISTORICAL RADIOLOGICAL RESULTS FOR B38W03B
FIGURE B-24	HISTORICAL RADIOLOGICAL RESULTS FOR B38W14D
FIGURE B-25	HISTORICAL RADIOLOGICAL RESULTS FOR B38W15D
FIGURE B-26	HISTORICAL RADIOLOGICAL RESULTS FOR B38W17B
FIGURE B-27	HISTORICAL RADIOLOGICAL RESULTS FOR B38W18D
FIGURE B-28	HISTORICAL RADIOLOGICAL RESULTS FOR B38W19D
FIGURE B-29	HISTORICAL RADIOLOGICAL RESULTS FOR B38W24D
FIGURE B-30	HISTORICAL RADIOLOGICAL RESULTS FOR MISS01B
FIGURE B-31	HISTORICAL RADIOLOGICAL RESULTS FOR MISS02B
FIGURE B-32	HISTORICAL RADIOLOGICAL RESULTS FOR MISS05B
FIGURE B-33	HISTORICAL RADIOLOGICAL RESULTS FOR MISS07B
FIGURE B-34	HISTORICAL RADIOLOGICAL RESULTS FOR MW-26D

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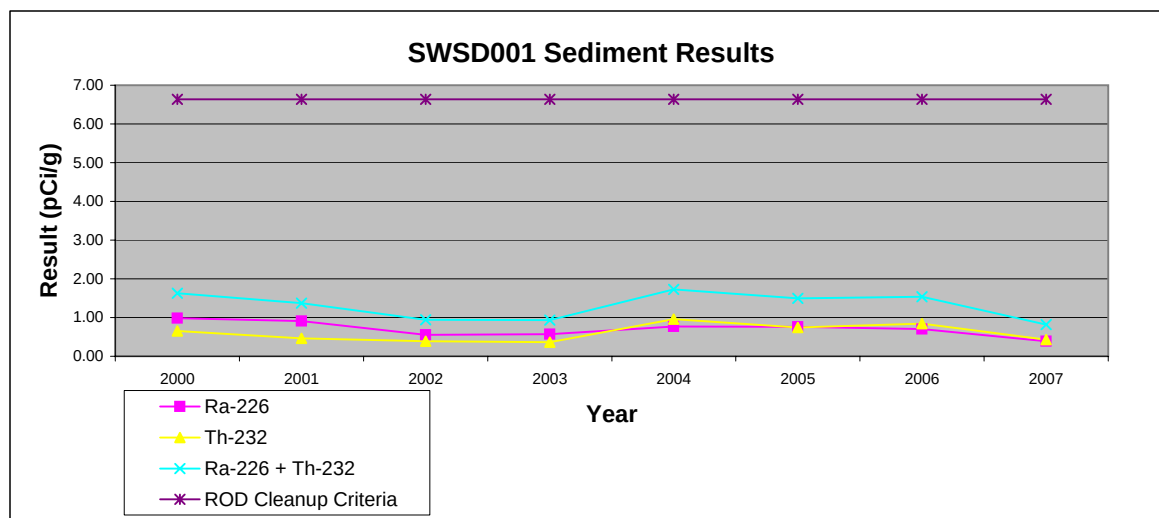
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001	1.00	24.35	0.23	0.54	0.77
2002	11.90	14.10		0.42	0.42
2003	2.50	12.70	0.19	0.44	0.63
2004	0.19	4.31	0.15	0.60	0.75
2005	1.90	12.25	0.14	0.75	0.89
2006	0.99	13.87	0.07	0.39	0.46
2007	2.65	8.52	0.05	0.27	0.32



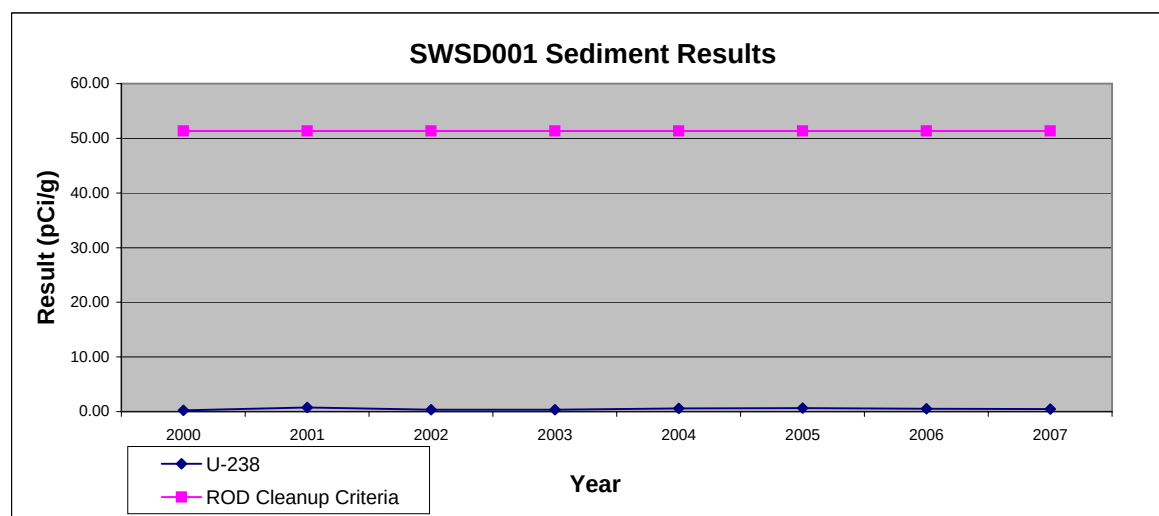
Year	Total Uranium
2000	1.19
2001	10.82
2002	1.01
2003	1.13
2004	1.37
2005	0.80
2006	1.66
2007	1.17

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-1
Historical Results For Radiological Parameters at SWSD001



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
2000	0.98	0.65	1.63	6.64
2001	0.91	0.46	1.37	6.64
2002	0.55	0.39	0.94	6.64
2003	0.57	0.36	0.93	6.64
2004	0.77	0.96	1.73	6.64
2005	0.76	0.74	1.50	6.64
2006	0.70	0.84	1.54	6.64
2007	0.39	0.43	0.82	6.64

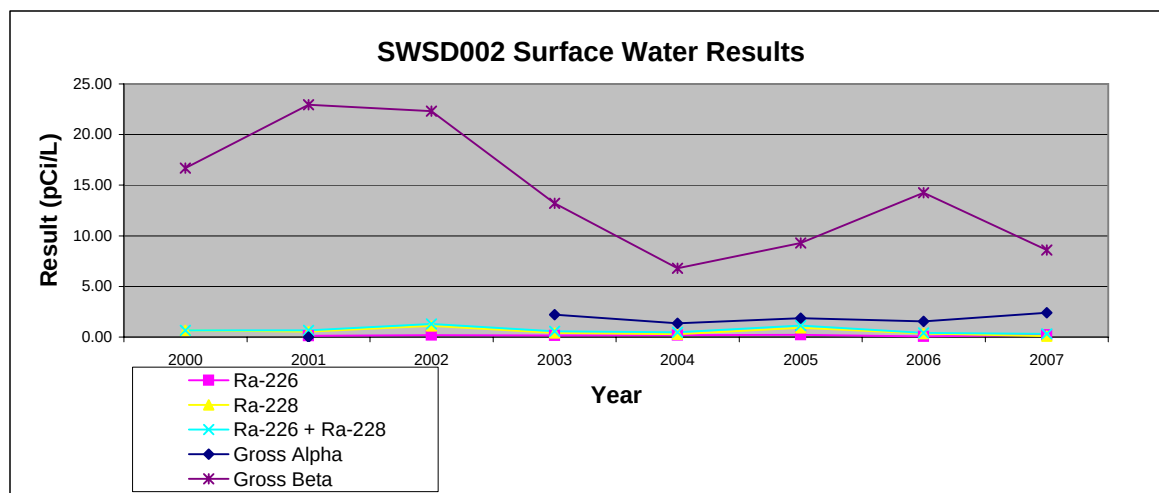


Year	U-238	ROD Cleanup Criteria
2000	0.24	51.33
2001	0.78	51.33
2002	0.33	51.33
2003	0.36	51.33
2004	0.56	51.33
2005	0.63	51.33
2006	0.50	51.33
2007	0.44	51.33

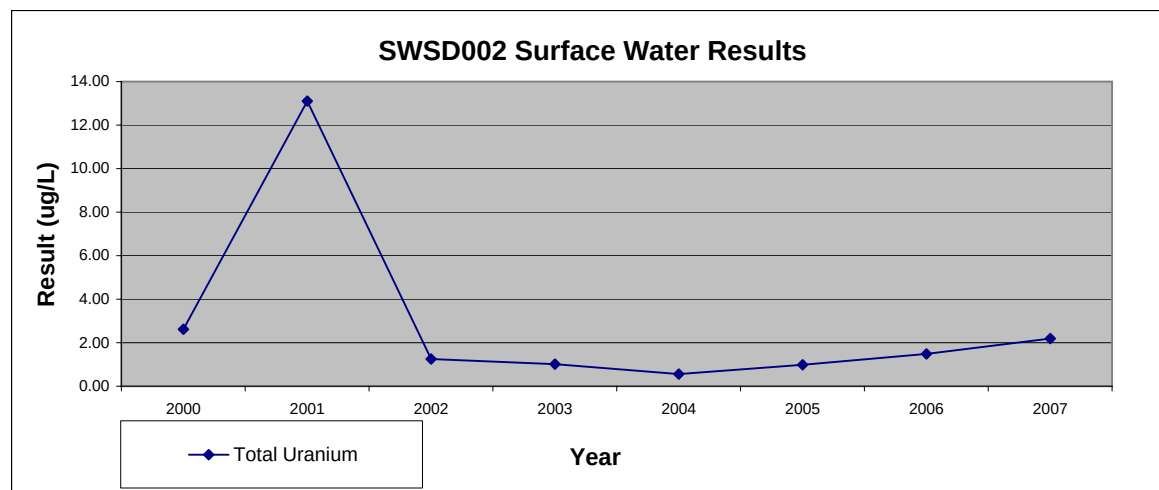
NOTES:

- a) For years where duplicate samples were collected, the highest result was used for statistical puposes.
- b) The ROD soil cleanup criteria is the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.
- c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-1
Historical Results For Radiological Parameters at SWSD001 (Continued)



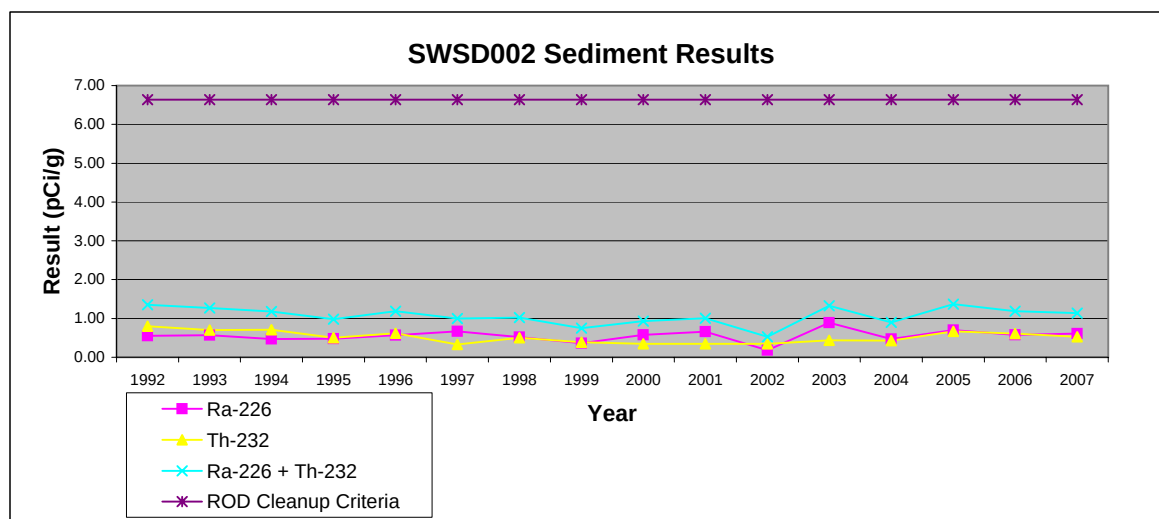
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000		16.70		0.66	0.66
2001	0.00	22.96	0.13	0.54	0.67
2002		22.30	0.19	1.10	1.29
2003	2.20	13.20	0.17	0.41	0.58
2004	1.35	6.80	0.18	0.30	0.48
2005	1.86	9.30	0.22	0.91	1.13
2006	1.55	14.25	0.07	0.34	0.41
2007	2.39	8.59	0.21	0.11	0.32



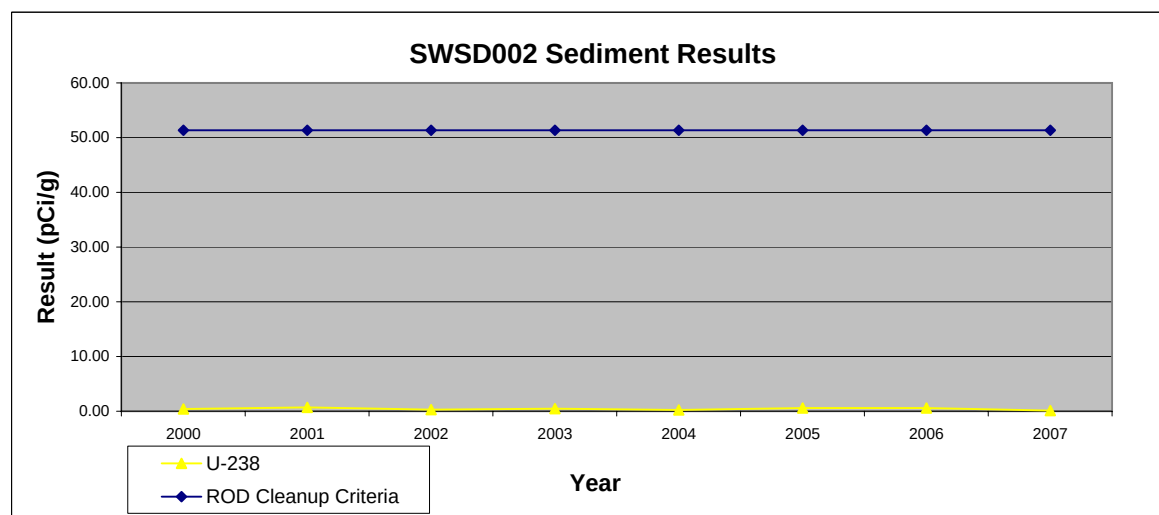
Year	Total Uranium
2000	2.62
2001	13.11
2002	1.25
2003	1.01
2004	0.56
2005	0.98
2006	1.49
2007	2.19

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-2
Historical Results For Radiological Parameters at SWSD002



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
1992	0.55	0.80	1.35	6.64
1993	0.57	0.70	1.27	6.64
1994	0.47	0.71	1.18	6.64
1995	0.48	0.50	0.98	6.64
1996	0.57	0.62	1.19	6.64
1997	0.67	0.33	1.00	6.64
1998	0.52	0.50	1.02	6.64
1999	0.36	0.39	0.75	6.64
2000	0.58	0.35	0.93	6.64
2001	0.66	0.35	1.01	6.64
2002	0.18	0.35	0.53	6.64
2003	0.89	0.44	1.33	6.64
2004	0.47	0.43	0.90	6.64
2005	0.70	0.67	1.37	6.64
2006	0.58	0.61	1.19	6.64
2007	0.61	0.53	1.14	6.64

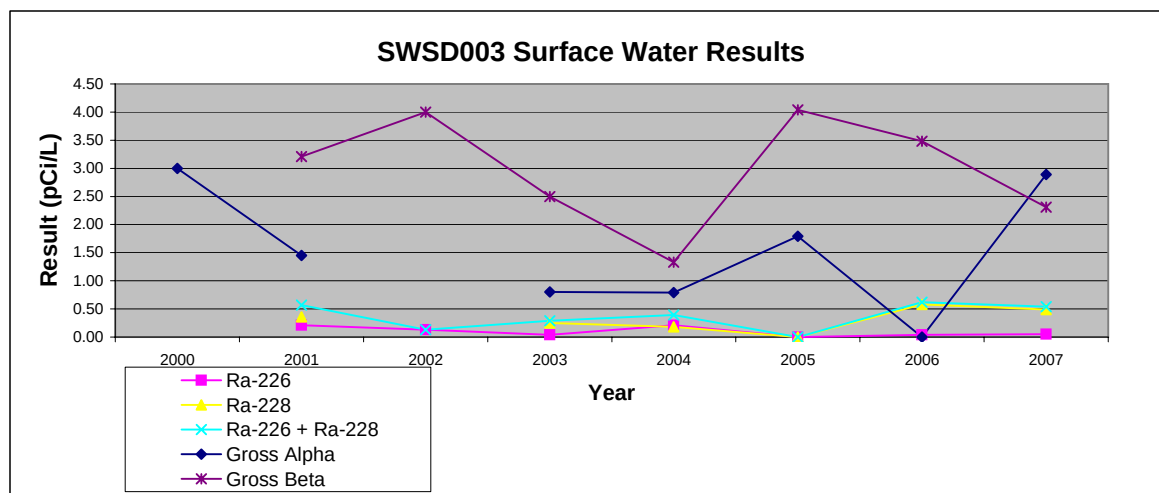


Year	U-238	ROD Cleanup Criteria
2000	0.42	51.33
2001	0.72	51.33
2002	0.28	51.33
2003	0.45	51.33
2004	0.23	51.33
2005	0.56	51.33
2006	0.58	51.33
2007	0.10	51.33

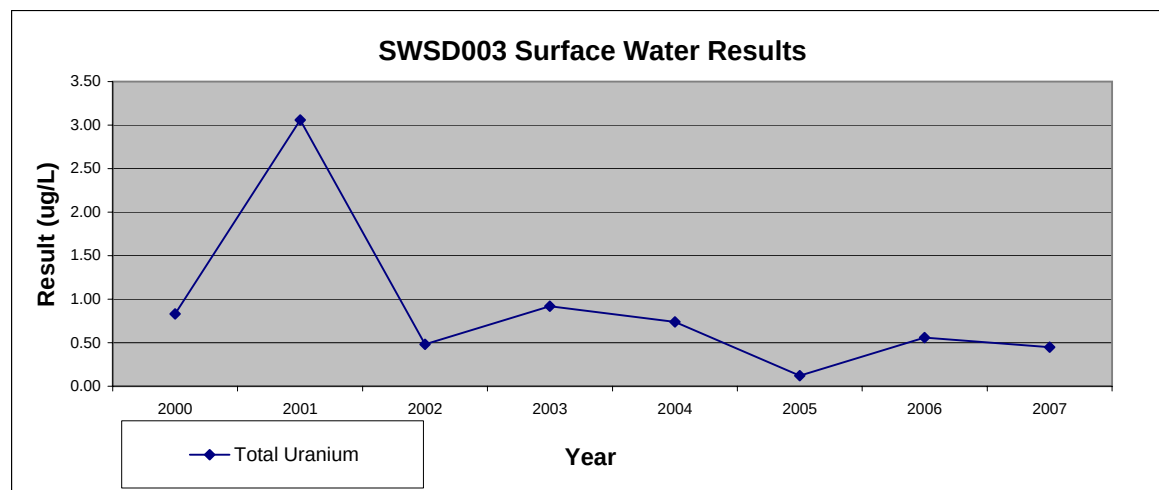
NOTES:

- a) For years where duplicate samples were collected, the highest result was used for statistical purposes.
- b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.
- c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-2
Historical Results For Radiological Parameters at SWSD002 (Continued)



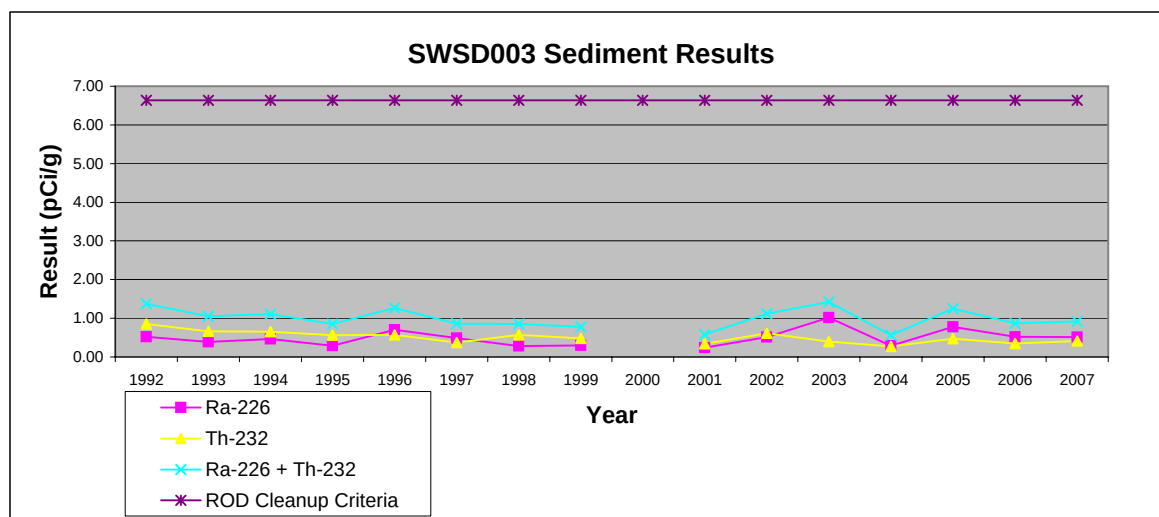
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	3.00				
2001	1.45	3.21	0.21	0.36	0.57
2002		4.00	0.13		0.13
2003	0.80	2.50	0.04	0.25	0.29
2004	0.79	1.33	0.21	0.18	0.39
2005	1.79	4.04	0.00	0.00	0.00
2006	0.00	3.48	0.04	0.58	0.62
2007	2.89	2.31	0.05	0.49	0.54



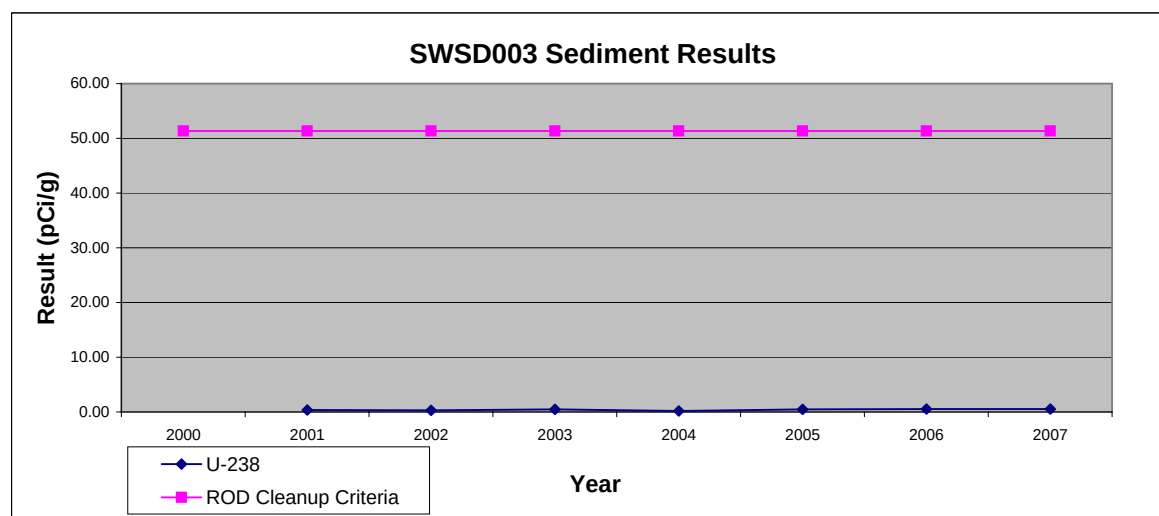
Year	Total Uranium
2000	0.83
2001	3.06
2002	0.48
2003	0.92
2004	0.74
2005	0.12
2006	0.56
2007	0.45

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-3
Historical Results For Radiological Parameters at SWSD003



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
1992	0.52	0.85	1.37	6.64
1993	0.39	0.66	1.05	6.64
1994	0.46	0.65	1.11	6.64
1995	0.29	0.56	0.85	6.64
1996	0.70	0.57	1.27	6.64
1997	0.49	0.37	0.86	6.64
1998	0.28	0.57	0.85	6.64
1999	0.30	0.48	0.78	6.64
2000				6.64
2001	0.24	0.34	0.58	6.64
2002	0.51	0.61	1.12	6.64
2003	1.02	0.40	1.42	6.64
2004	0.29	0.27	0.56	6.64
2005	0.78	0.47	1.25	6.64
2006	0.52	0.35	0.87	6.64
2007	0.51	0.41	0.92	6.64

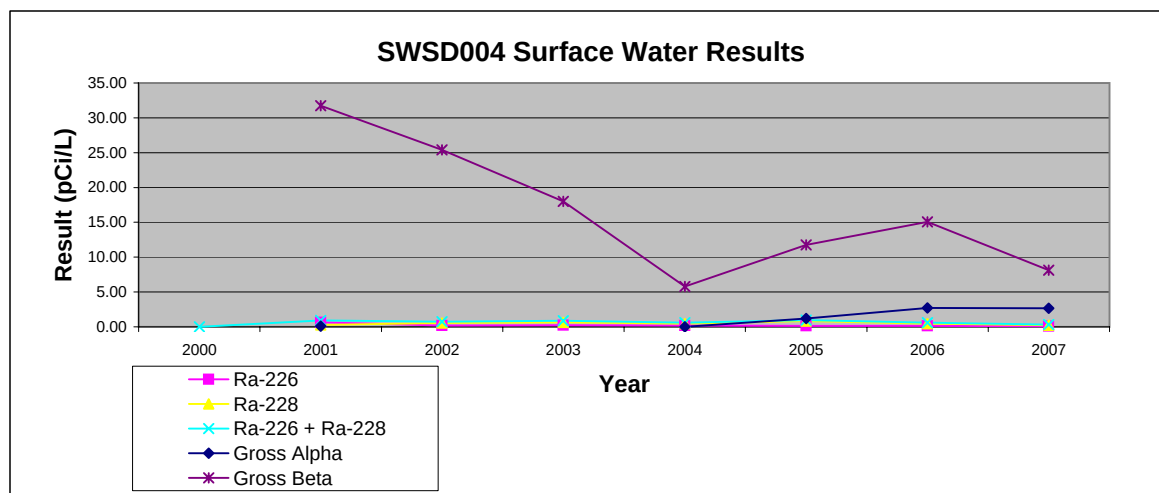


Year	U-238	ROD Cleanup Criteria
2000		51.33
2001	0.38	51.33
2002	0.27	51.33
2003	0.46	51.33
2004	0.17	51.33
2005	0.48	51.33
2006	0.50	51.33
2007	0.54	51.33

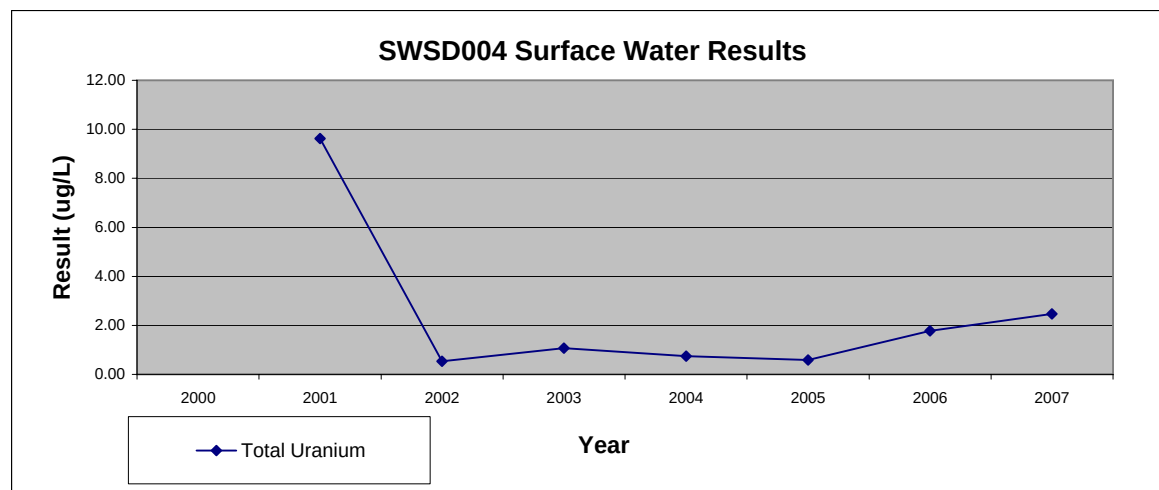
NOTES:

- a) For years where duplicate samples were collected, the highest result was used for statistical puposes.
- b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.
- c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-3
Historical Results For Radiological Parameters at SWSD003 (Continued)



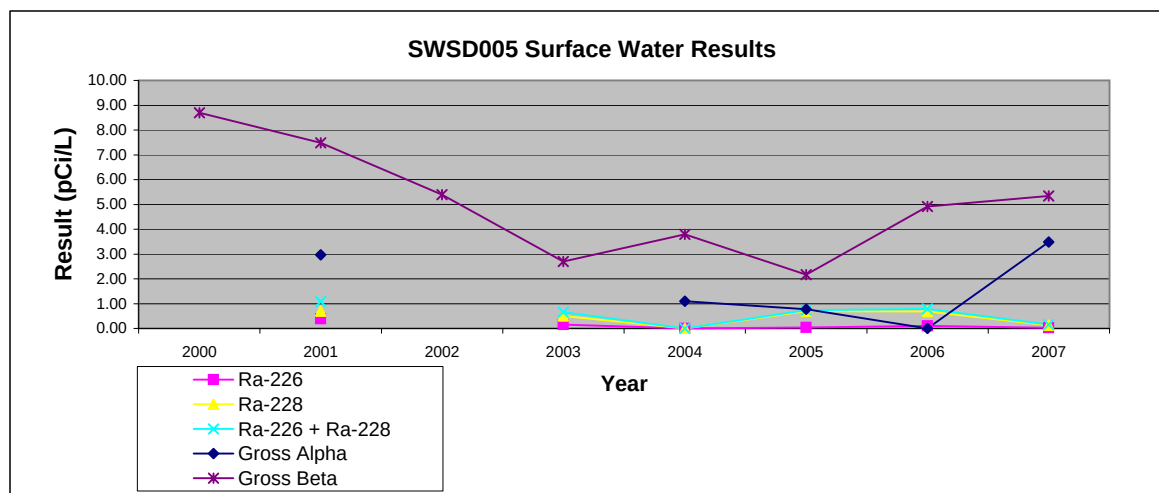
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					0.00
2001	0.08	31.75	0.65	0.27	0.92
2002		25.40	0.18	0.54	0.72
2003		18.00	0.22	0.65	0.87
2004	0.00	5.80	0.17	0.45	0.62
2005	1.21	11.76	0.16	0.81	0.97
2006	2.69	15.05	0.16	0.44	0.60
2007	2.68	8.15	0.07	0.24	0.31



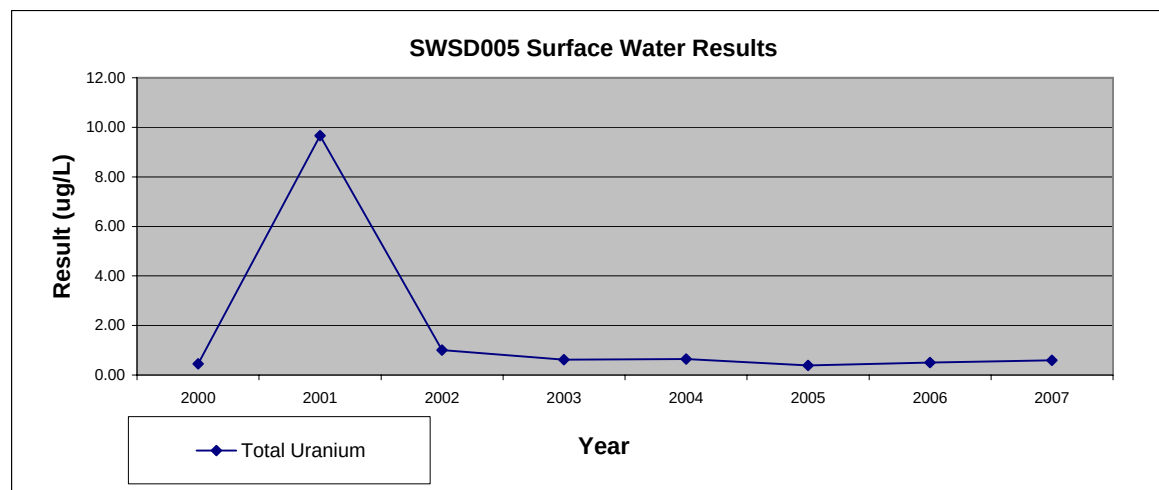
Year	Total Uranium
2000	
2001	9.63
2002	0.53
2003	1.07
2004	0.74
2005	0.59
2006	1.78
2007	2.47

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-4
Historical Results For Radiological Parameters at SWSD004



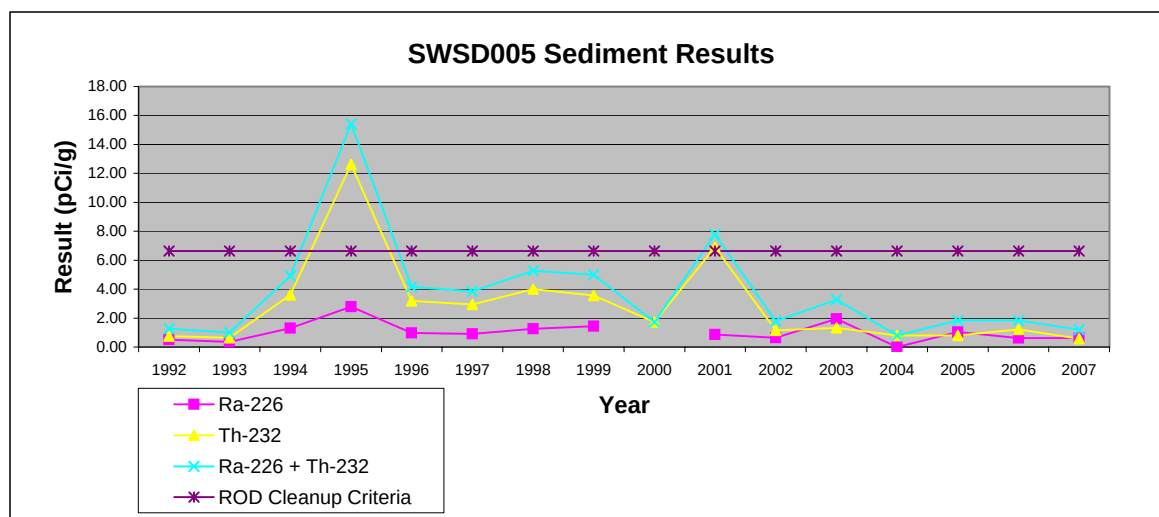
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000		8.70			
2001	2.97	7.49	0.39	0.70	1.09
2002		5.40			
2003		2.70	0.16	0.50	0.66
2004	1.10	3.80	0.00	0.00	0.00
2005	0.78	2.17	0.04	0.70	0.74
2006	0.00	4.91	0.10	0.69	0.79
2007	3.48	5.34	0.03	0.13	0.16



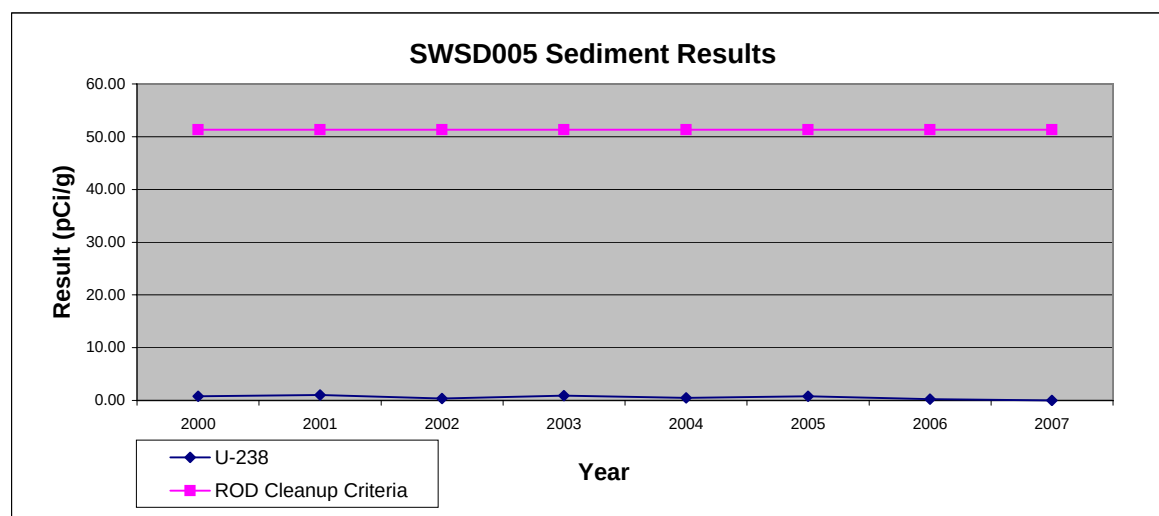
Year	Total Uranium
2000	0.45
2001	9.66
2002	1.01
2003	0.62
2004	0.65
2005	0.39
2006	0.51
2007	0.60

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-5
Historical Results For Radiological Parameters at SWSD005



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
1992	0.51	0.76	1.27	6.64
1993	0.35	0.65	1.00	6.64
1994	1.30	3.60	4.90	6.64
1995	2.79	12.62	15.41	6.64
1996	0.97	3.18	4.15	6.64
1997	0.90	2.94	3.84	6.64
1998	1.26	4.00	5.26	6.64
1999	1.44	3.56	5.00	6.64
2000		1.73	1.73	6.64
2001	0.87	6.91	7.78	6.64
2002	0.64	1.16	1.80	6.64
2003	1.95	1.32	3.27	6.64
2004	0.00	0.80	0.80	6.64
2005	1.03	0.80	1.83	6.64
2006	0.61	1.22	1.83	6.64
2007	0.63	0.57	1.20	6.64



Year	U-238	ROD Cleanup Criteria
2000	0.77	51.33
2001	1.06	51.33
2002	0.35	51.33
2003	0.90	51.33
2004	0.47	51.33
2005	0.80	51.33
2006	0.27	51.33
2007	0.00	51.33

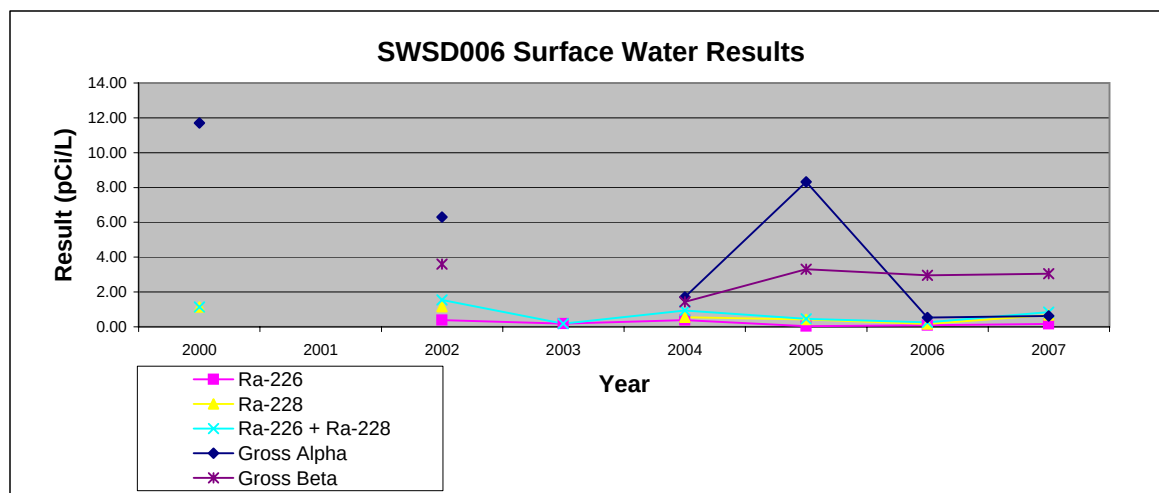
NOTES:

a) For years where duplicate or multiple samples were collected, the highest result was used for statistical purposes.

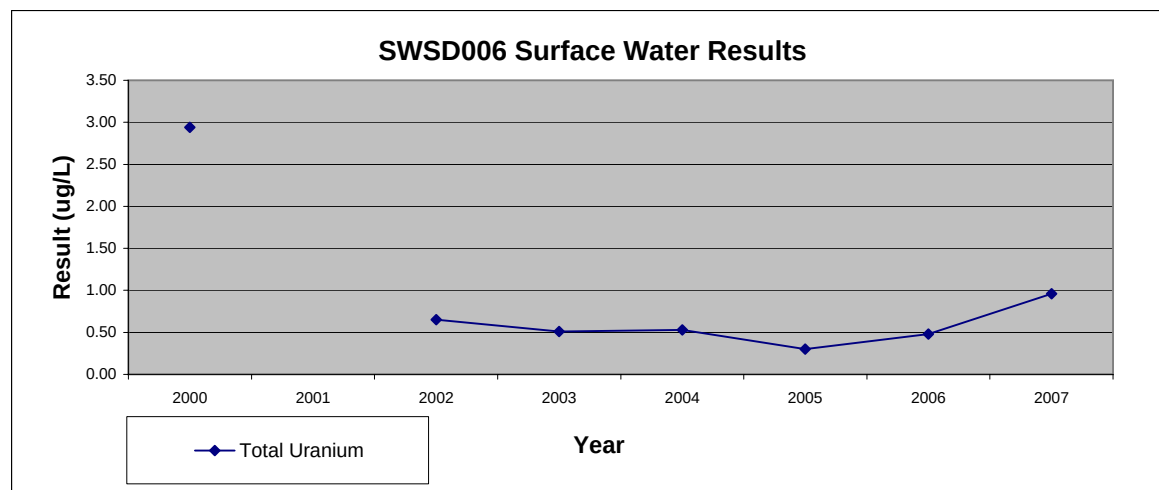
b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.

c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-5
Historical Results For Radiological Parameters at SWSD005 (Continued)



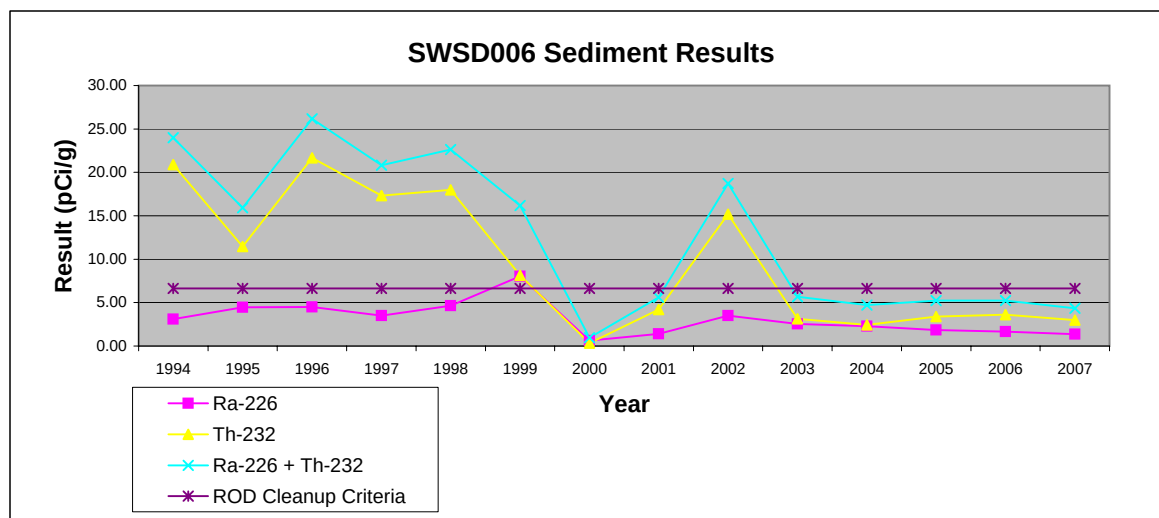
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	11.70			1.14	1.14
2001					
2002	6.30	3.60	0.38	1.16	1.54
2003			0.18		0.18
2004	1.70	1.44	0.38	0.55	0.93
2005	8.32	3.30	0.04	0.42	0.46
2006	0.54	2.96	0.10	0.16	0.26
2007	0.63	3.05	0.17	0.68	0.85



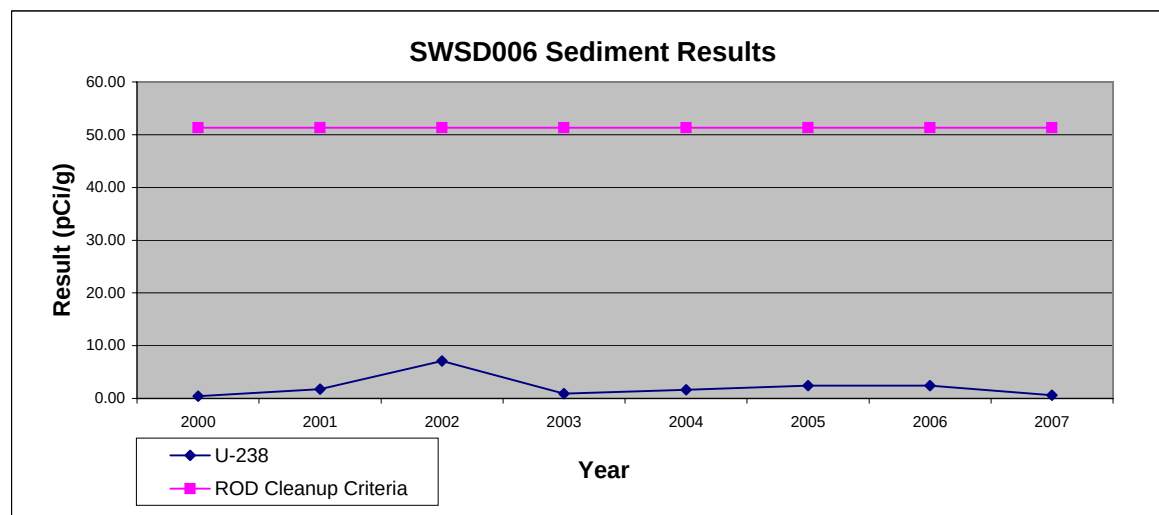
Year	Total Uranium
2000	2.94
2001	0.65
2002	0.51
2003	0.53
2004	0.30
2005	0.48
2006	0.96

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-6
Historical Results For Radiological Parameters at SWSD006



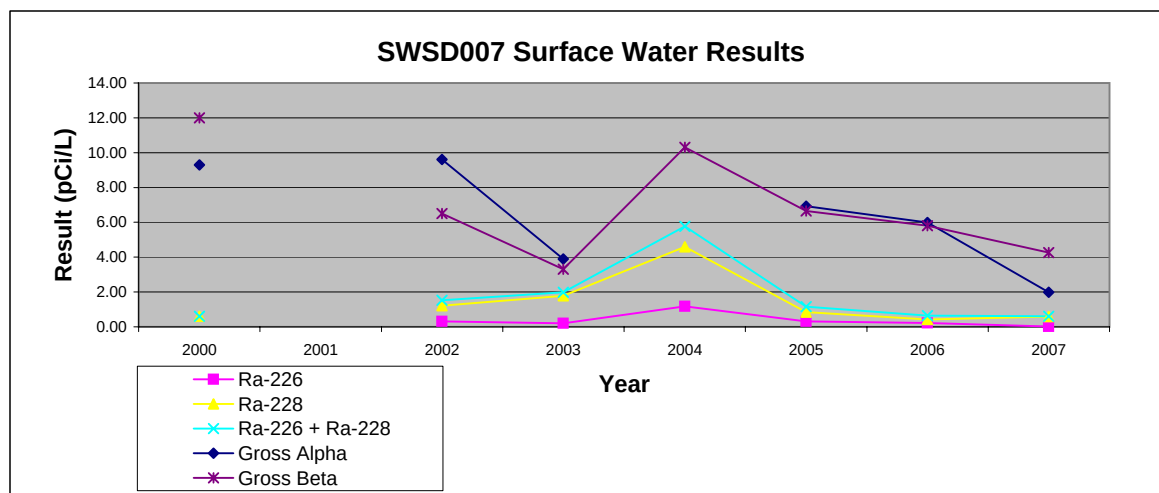
Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
1994	3.10	20.90	24.00	6.64
1995	4.45	11.47	15.92	6.64
1996	4.50	21.66	26.16	6.64
1997	3.50	17.34	20.84	6.64
1998	4.65	17.97	22.62	6.64
1999	8.04	8.13	16.17	6.64
2000	0.64	0.33	0.97	6.64
2001	1.41	4.19	5.60	6.64
2002	3.51	15.20	18.71	6.64
2003	2.54	3.14	5.68	6.64
2004	2.27	2.45	4.72	6.64
2005	1.85	3.39	5.24	6.64
2006	1.65	3.60	5.25	6.64
2007	1.38	2.97	4.35	6.64



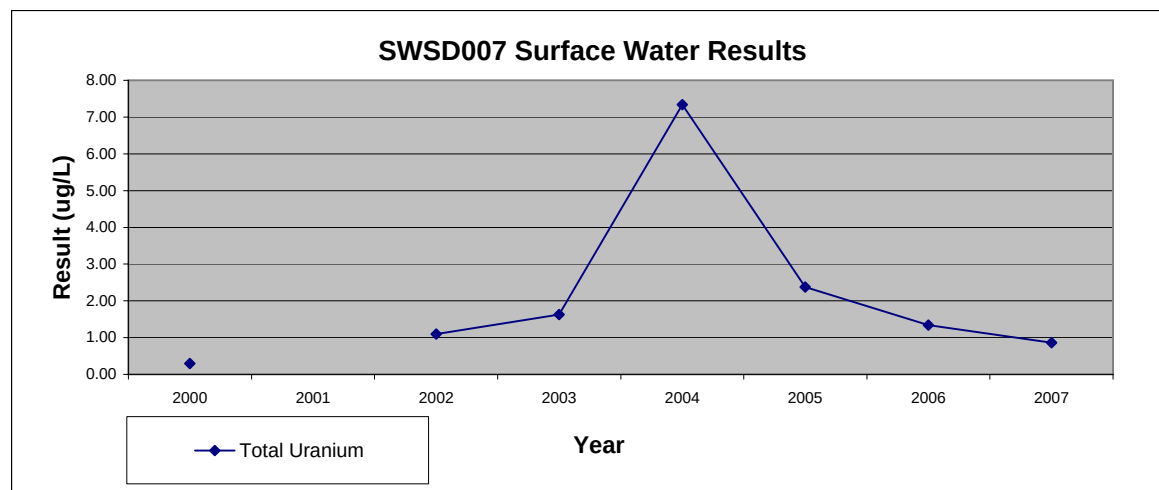
Year	U-238	ROD Cleanup Criteria
2000	0.40	51.33
2001	1.77	51.33
2002	7.10	51.33
2003	0.89	51.33
2004	1.61	51.33
2005	2.45	51.33
2006	2.42	51.33
2007	0.60	51.33

- NOTES:
- a) For years where duplicate or multiple samples were collected, the highest result was used for statistical puposes.
 - b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.
 - c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-6
Historical Results For Radiological Parameters at SWSD006 (Continued)



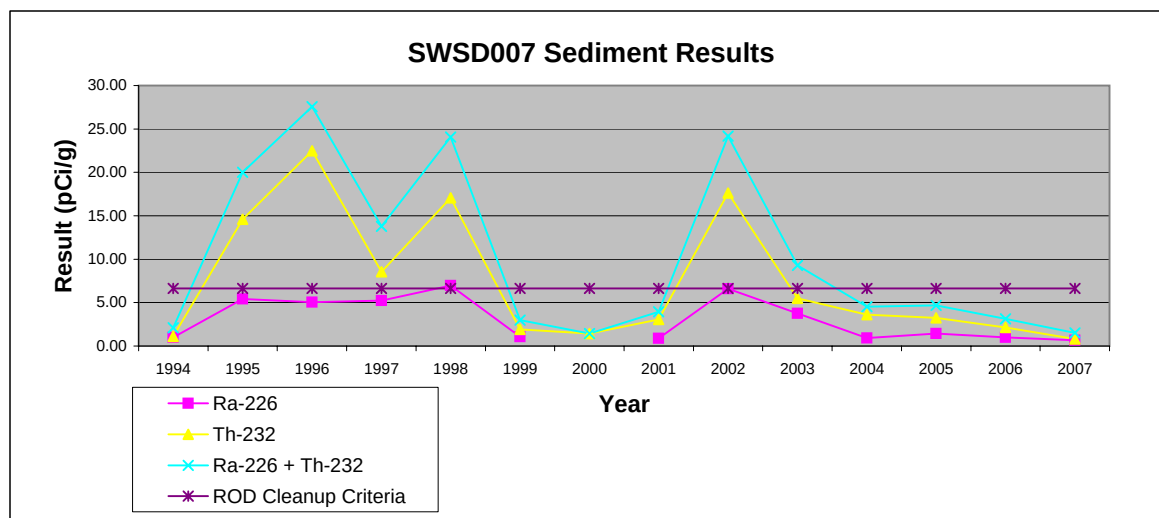
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	9.30	12.00		0.60	0.60
2001					
2002	9.60	6.50	0.32	1.21	1.53
2003	3.90	3.30	0.20	1.79	1.99
2004		10.30	1.17	4.59	5.76
2005	6.92	6.66	0.31	0.85	1.16
2006	5.99	5.81	0.22	0.42	0.64
2007	1.99	4.27	0.02	0.58	0.60



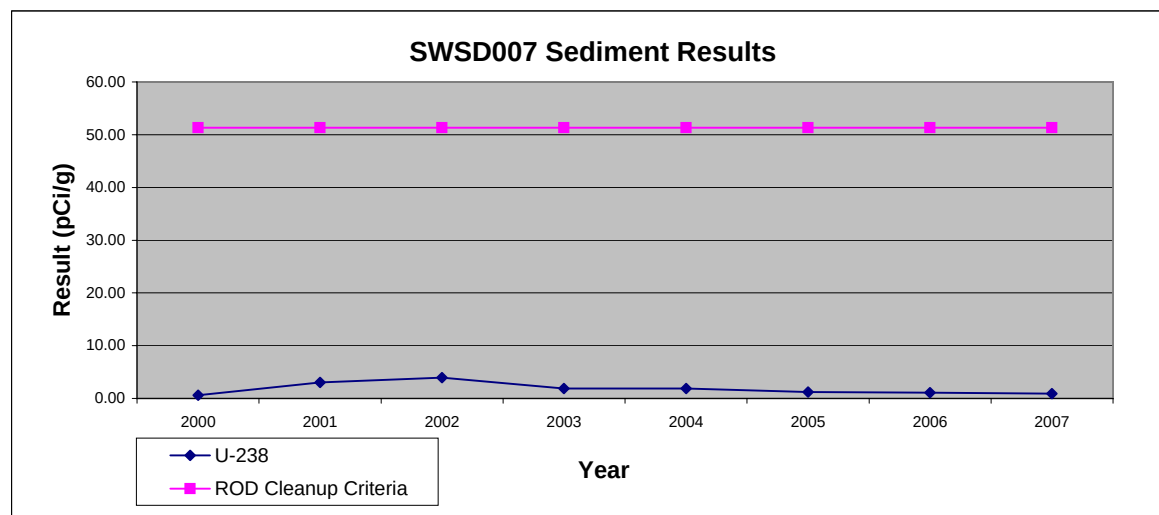
Year	Total Uranium
2000	0.30
2001	
2002	1.10
2003	1.63
2004	7.34
2005	2.38
2006	1.34
2007	0.86

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-7
Historical Results For Radiological Parameters at SWSD007



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
1994	0.99	1.10	2.09	6.64
1995	5.40	14.60	20.00	6.64
1996	5.05	22.50	27.55	6.64
1997	5.23	8.54	13.77	6.64
1998	6.97	17.08	24.05	6.64
1999	1.07	1.90	2.97	6.64
2000		1.43	1.43	6.64
2001	0.89	3.06	3.95	6.64
2002	6.58	17.60	24.18	6.64
2003	3.77	5.50	9.27	6.64
2004	0.91	3.62	4.53	6.64
2005	1.44	3.23	4.67	6.64
2006	0.98	2.15	3.13	6.64
2007	0.68	0.82	1.50	6.64



Year	U-238	ROD Cleanup Criteria
2000	0.62	51.33
2001	3.01	51.33
2002	3.97	51.33
2003	1.87	51.33
2004	1.87	51.33
2005	1.22	51.33
2006	1.11	51.33
2007	0.94	51.33

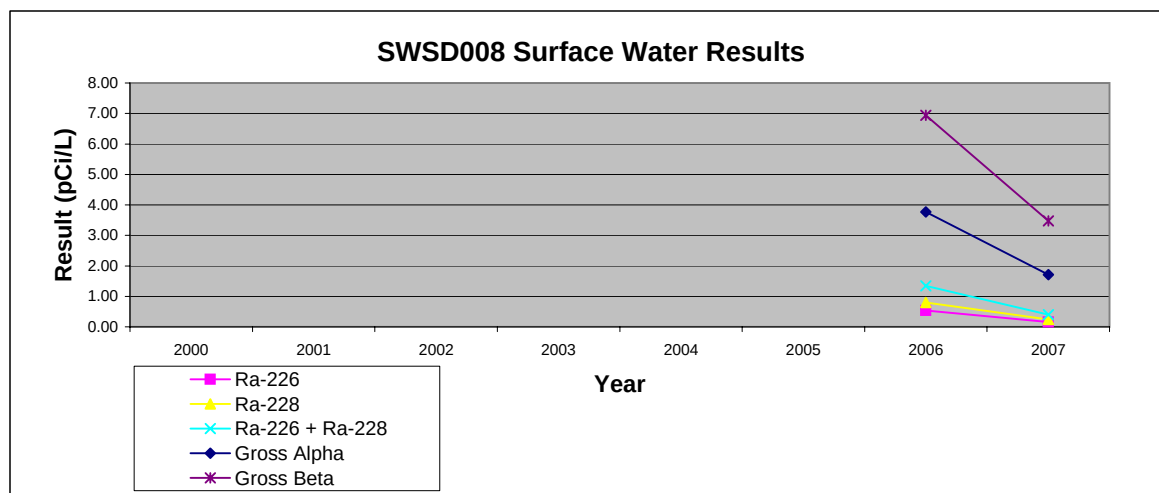
NOTES:

a) For years where duplicate or multiple samples were collected, the highest result was used for statistical puposes.

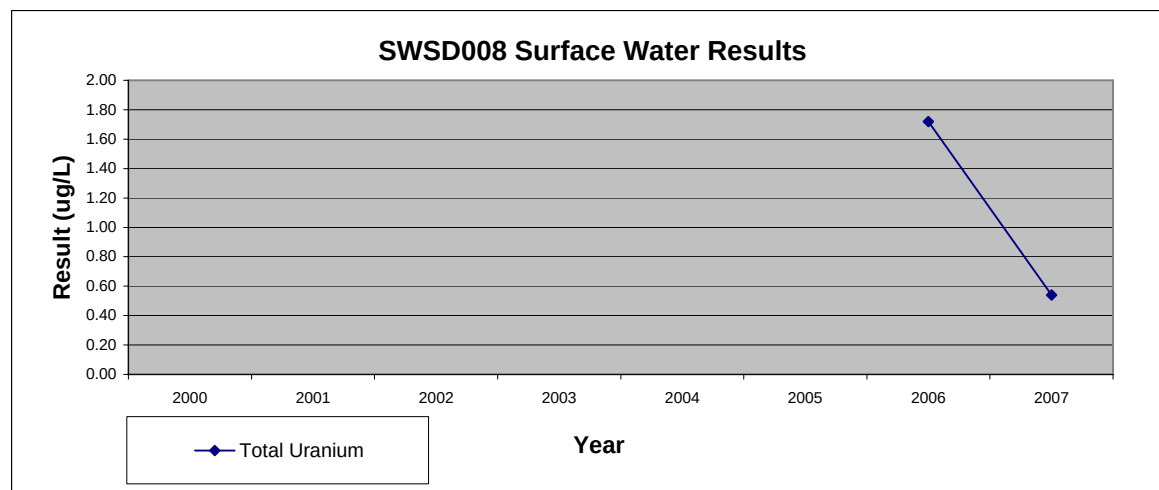
b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.

c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-7
Historical Results For Radiological Parameters at SWSD007 (Continued)



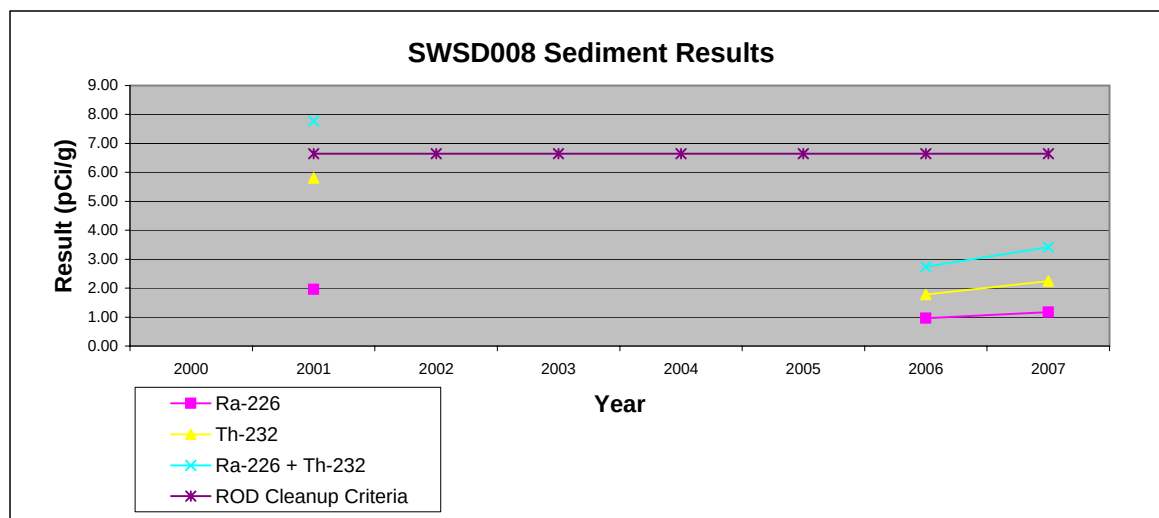
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001					
2002					
2003					
2004					
2005					
2006	3.77	6.94	0.54	0.80	1.34
2007	1.71	3.48	0.16	0.24	0.40



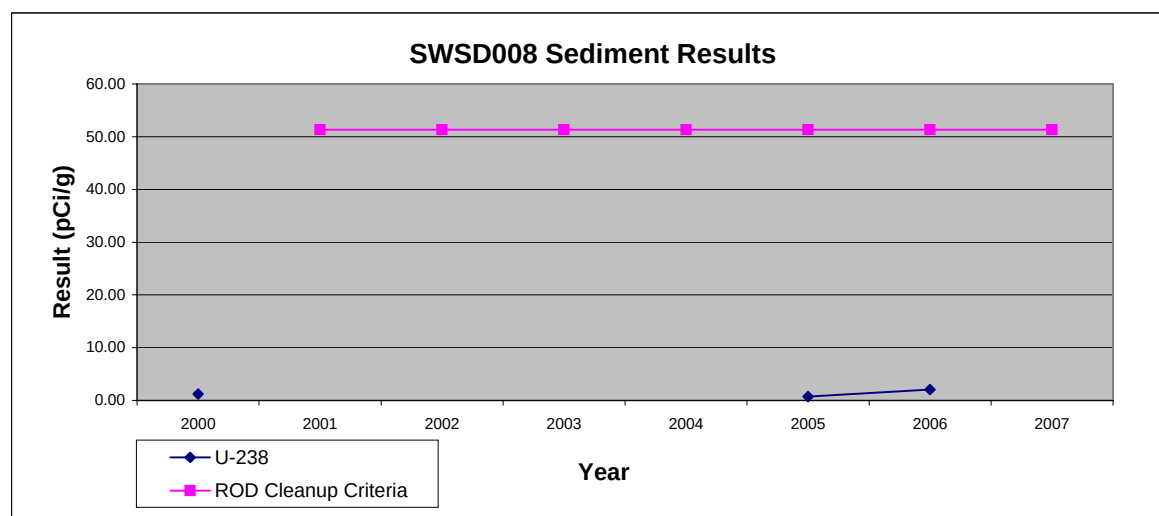
Year	Total Uranium
2000	
2001	
2002	
2003	
2004	
2005	
2006	1.72
2007	0.54

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-8
Historical Results For Radiological Parameters at SWSD008



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
2000				
2001	1.96	5.81	7.77	6.64
2002				6.64
2003				6.64
2004				6.64
2005				6.64
2006	0.96	1.78	2.74	6.64
2007	1.17	2.25	3.42	6.64



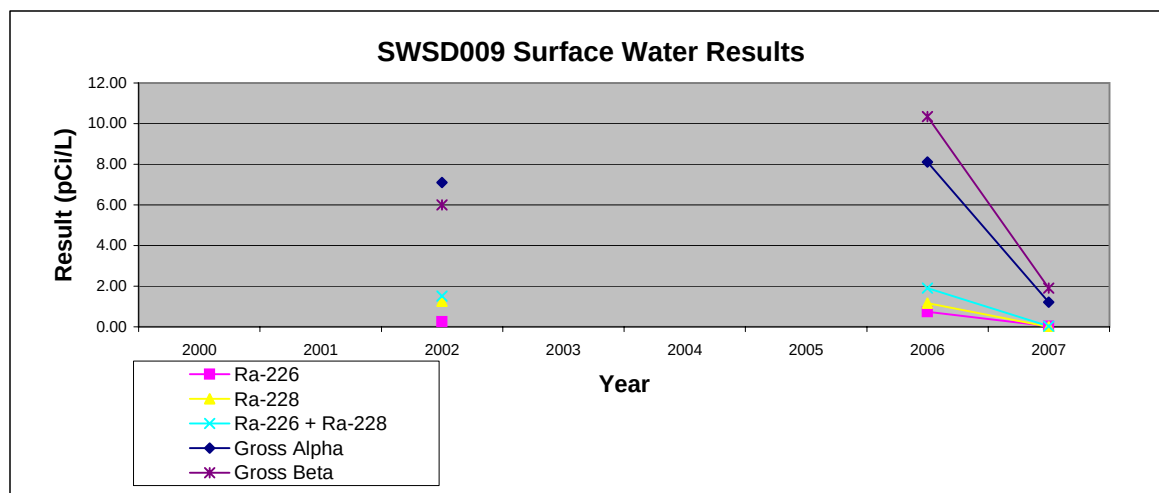
Year	U-238	ROD Cleanup Criteria
2000		
2001	1.20	51.33
2002		51.33
2003		51.33
2004		51.33
2005		51.33
2006	0.71	51.33
2007	2.06	51.33

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

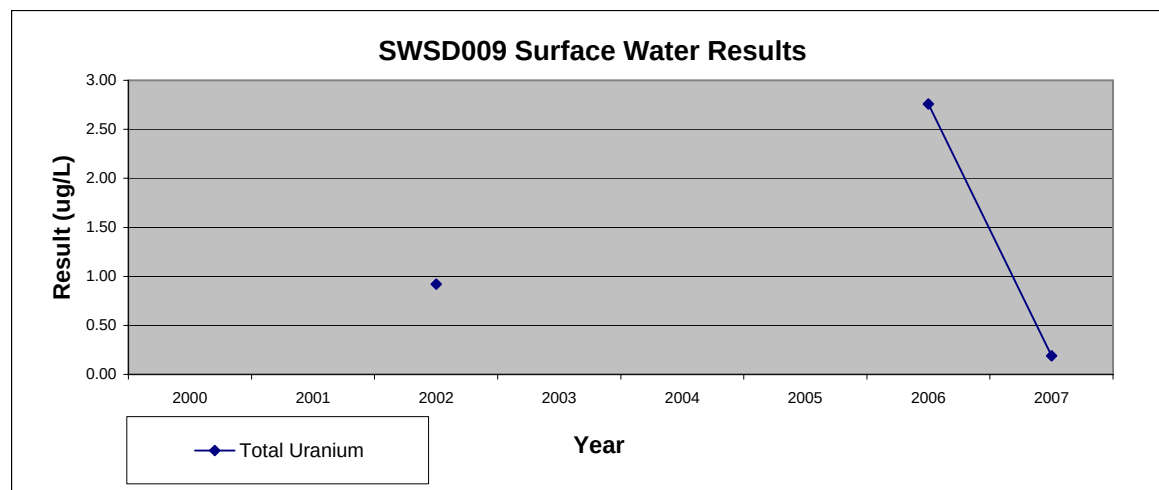
b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.

c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-8
Historical Results For Radiological Parameters at SWSD008 (Continued)



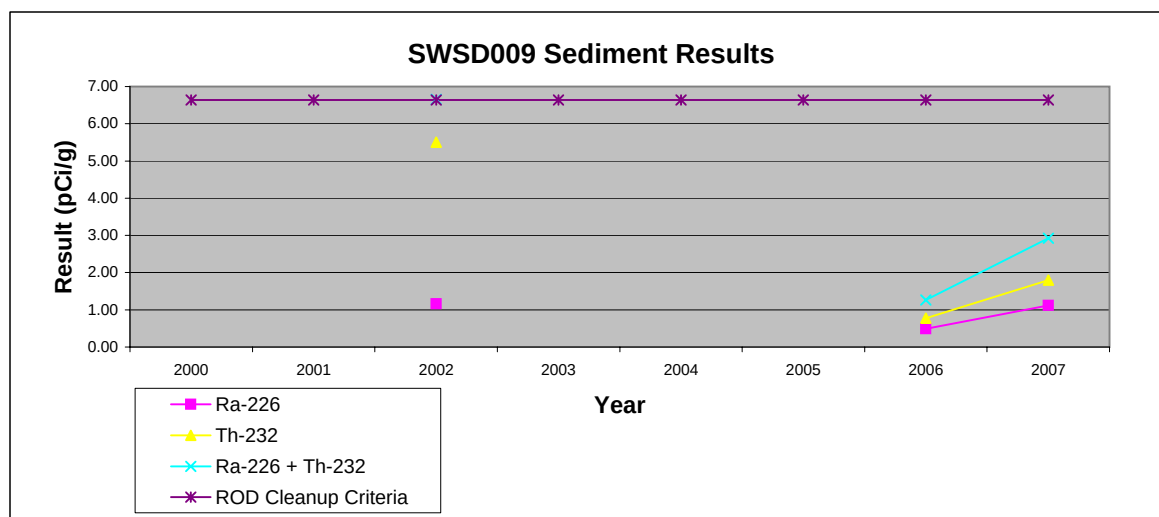
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001					
2002	7.10	6.00	0.25	1.26	1.51
2003					
2004					
2005					
2006	8.11	10.34	0.74	1.16	1.90
2007	1.21	1.91	0.03	0.00	0.03



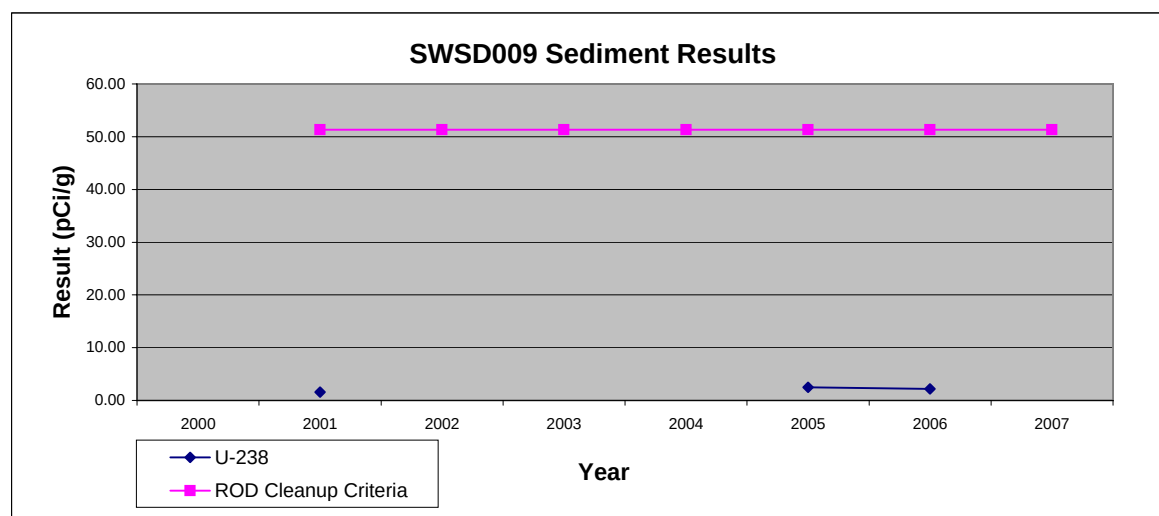
Year	Total Uranium
2000	
2001	
2002	0.92
2003	
2004	
2005	
2006	2.76
2007	0.19

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-9
Historical Results For Radiological Parameters at SWSD009



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
2000				6.64
2001				6.64
2002	1.16	5.50	6.66	6.64
2003				6.64
2004				6.64
2005				6.64
2006	0.49	0.77	1.26	6.64
2007	1.12	1.80	2.92	6.64

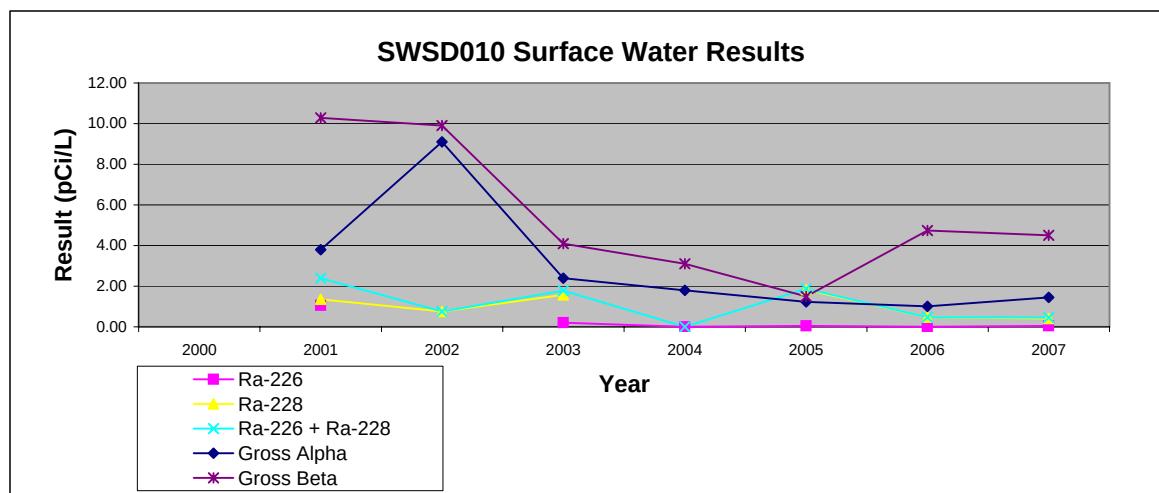


Year	U-238	ROD Cleanup Criteria
2000		51.33
2001	1.60	51.33
2002		51.33
2003		51.33
2004		51.33
2005	2.51	51.33
2006	2.21	51.33
2007		51.33

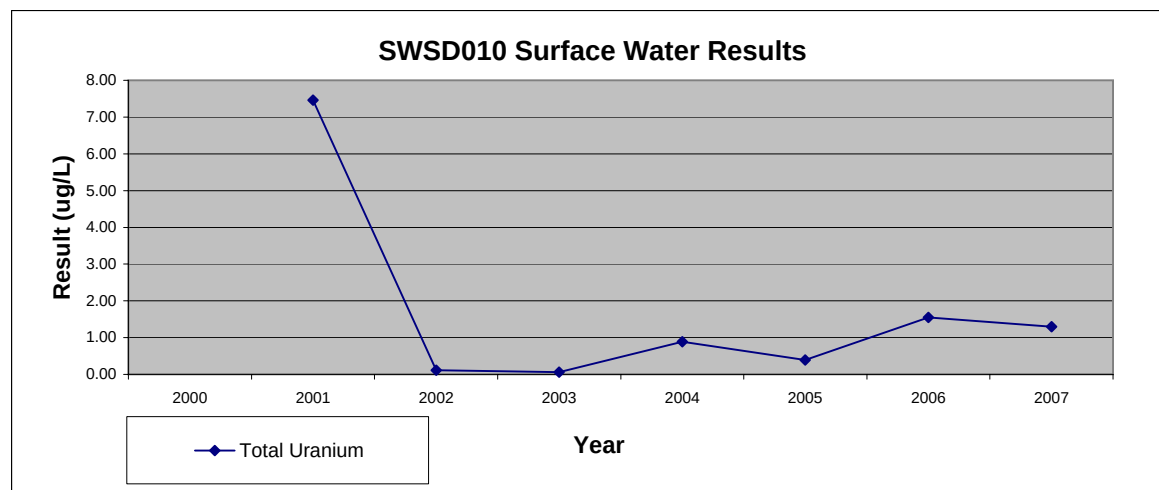
NOTES:

- a) For years where duplicate samples were collected, the highest result was used for statistical puposes.
- b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.
- c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-9
Historical Results For Radiological Parameters at SWSD009 (Continued)



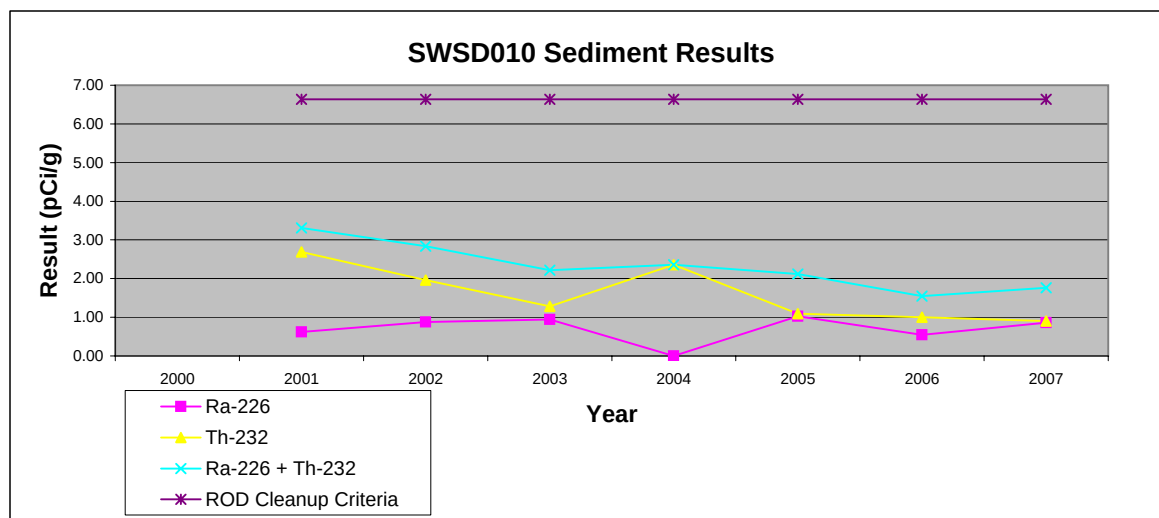
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001	3.80	10.29	1.05	1.35	2.40
2002	9.10	9.90		0.76	0.76
2003	2.40	4.10	0.20	1.58	1.78
2004	1.80	3.10	0.00		0.00
2005	1.23	1.50	0.05	1.82	1.87
2006	1.01	4.74	0.00	0.47	0.47
2007	1.45	4.51	0.04	0.41	0.45



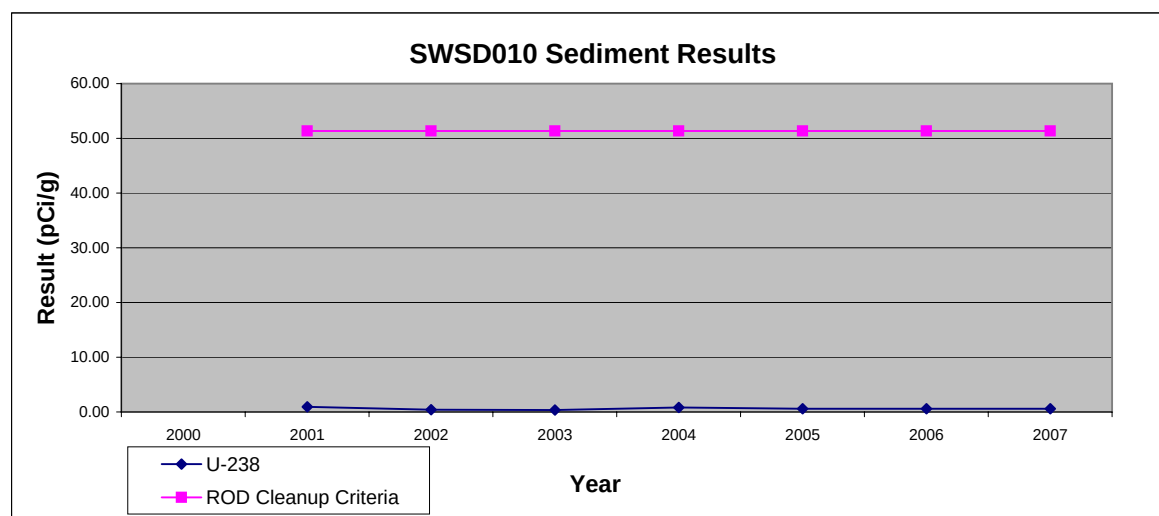
Year	Total Uranium
2000	
2001	7.46
2002	0.11
2003	0.06
2004	0.89
2005	0.39
2006	1.55
2007	1.30

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-10
Historical Results For Radiological Parameters at SWSD010



Year	Ra-226	Th-232	Ra-226 + Th-232	ROD Cleanup Criteria
2000				
2001	0.62	2.69	3.31	6.64
2002	0.88	1.96	2.84	6.64
2003	0.94	1.28	2.22	6.64
2004	0.00	2.36	2.36	6.64
2005	1.03	1.09	2.12	6.64
2006	0.55	1.00	1.55	6.64
2007	0.86	0.90	1.76	6.64



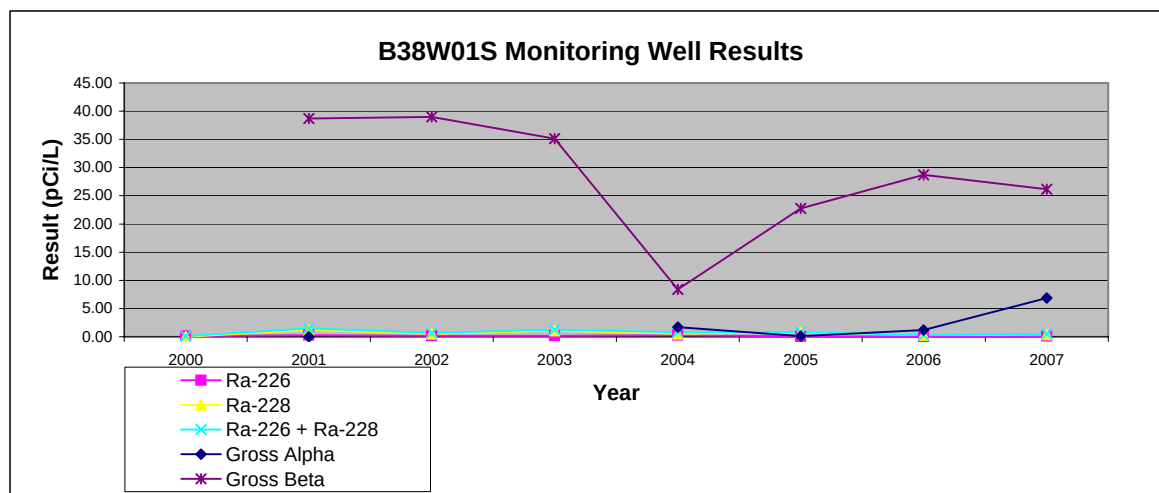
Year	U-238	ROD Cleanup Criteria
2000		
2001	0.96	51.33
2002	0.39	51.33
2003	0.35	51.33
2004	0.80	51.33
2005	0.60	51.33
2006	0.60	51.33
2007	0.59	51.33

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

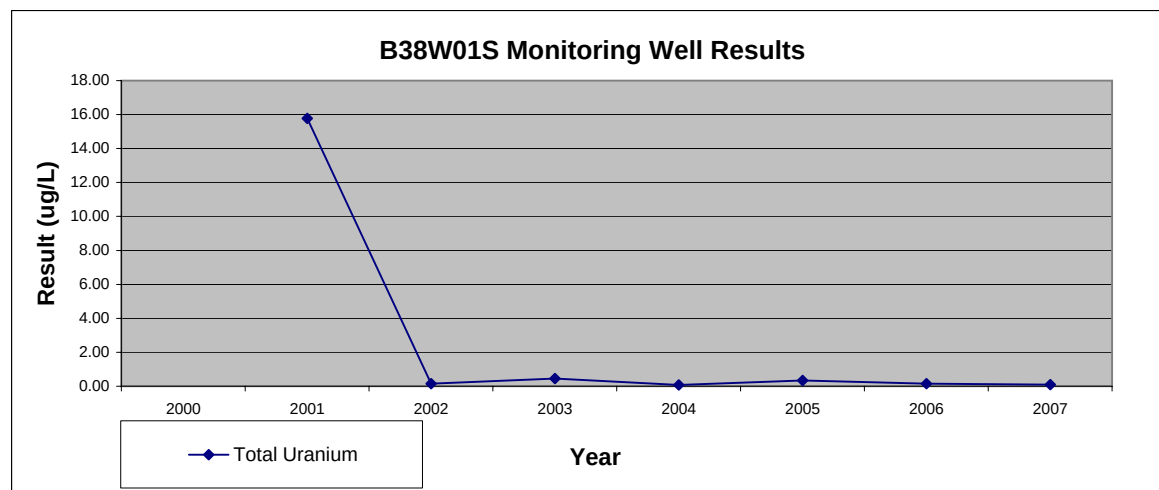
b) The ROD soil cleanup criteria for the combination of Ra-226 and Th-232 is 5 pCi/g above background. Background is approximately 1.64 pCi/g.

c) The ROD soil cleanup criteria for U-238 is 50 pCi/g above background. Background is approximately 1.33 pCi/g.

Figure B-10
Historical Results For Radiological Parameters at SWSD010 (Continued)



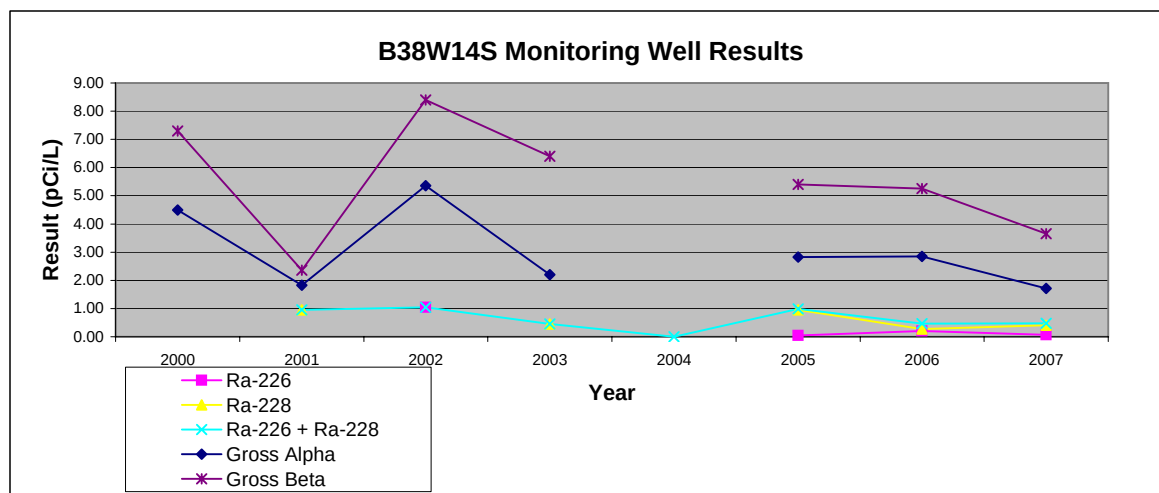
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000			0.13	0.00	0.13
2001	0.00	38.70	0.28	1.19	1.47
2002		39.00	0.17	0.52	0.69
2003		35.10	0.18	1.08	1.26
2004	1.70	8.40	0.27	0.50	0.77
2005	0.11	22.74	0.06	0.77	0.83
2006	1.17	28.69	0.02	0.26	0.28
2007	6.86	26.15	0.14	0.39	0.53



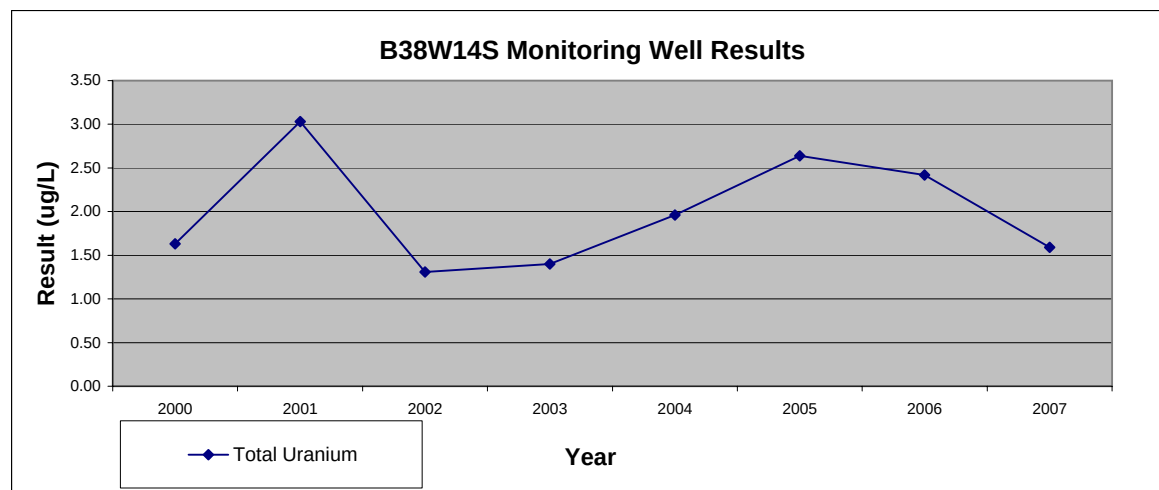
Year	Total Uranium
2000	0.15
2001	15.78
2002	0.15
2003	0.45
2004	0.08
2005	0.33
2006	0.15
2007	0.10

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-11
Historical Results For Radiological Parameters at B38W01S



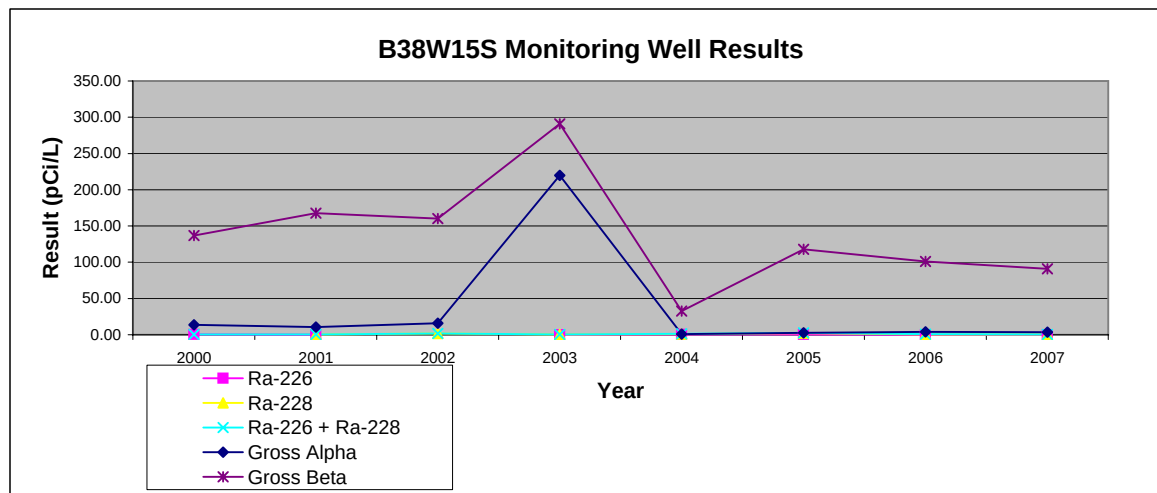
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	4.50	7.30			
2001	1.83	2.36		0.95	0.95
2002	5.36	8.40	1.04		1.04
2003	2.20	6.40		0.45	0.45
2004					0.00
2005	2.83	5.40	0.04	0.95	0.99
2006	2.85	5.26	0.20	0.27	0.47
2007	1.71	3.66	0.07	0.41	0.48



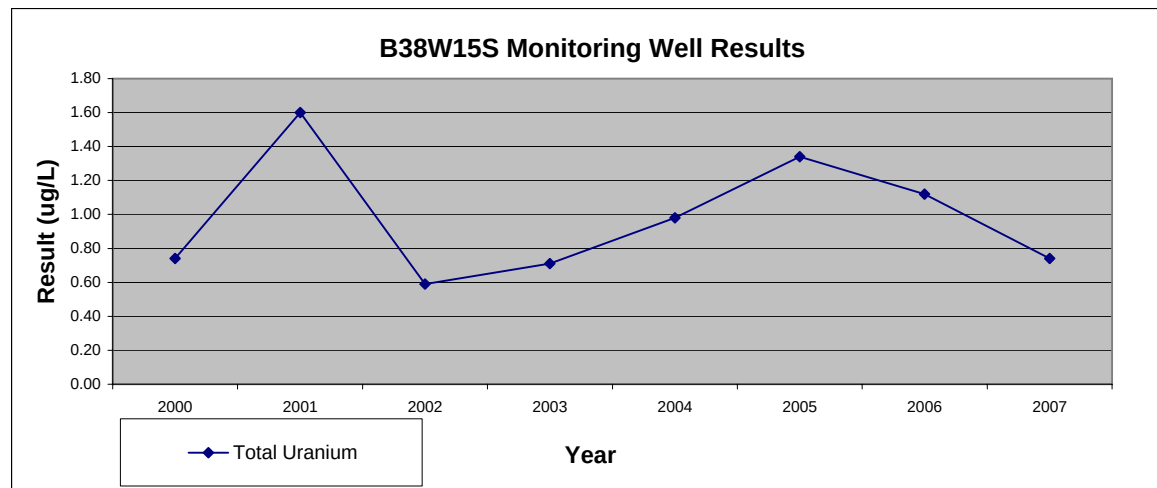
Year	Total Uranium
2000	1.63
2001	3.03
2002	1.31
2003	1.40
2004	1.96
2005	2.64
2006	2.42
2007	1.59

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-12
Historical Results For Radiological Parameters at B38W14S



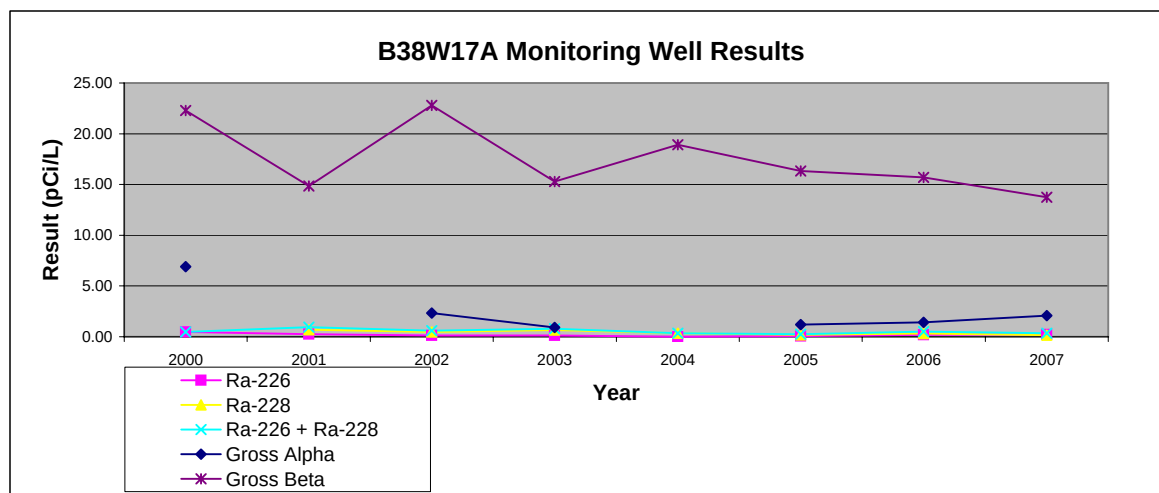
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	13.80	137.00	0.34		0.34
2001	10.43	167.87	0.15	0.44	0.59
2002	15.94	160.00		1.55	1.55
2003	220.00	291.00	0.12	0.35	0.47
2004	0.80	32.50	0.23	0.90	1.13
2005	2.53	117.82	0.32	2.36	2.68
2006	4.10	101.23	0.20	0.56	0.76
2007	3.52	91.07	0.12	0.54	0.66



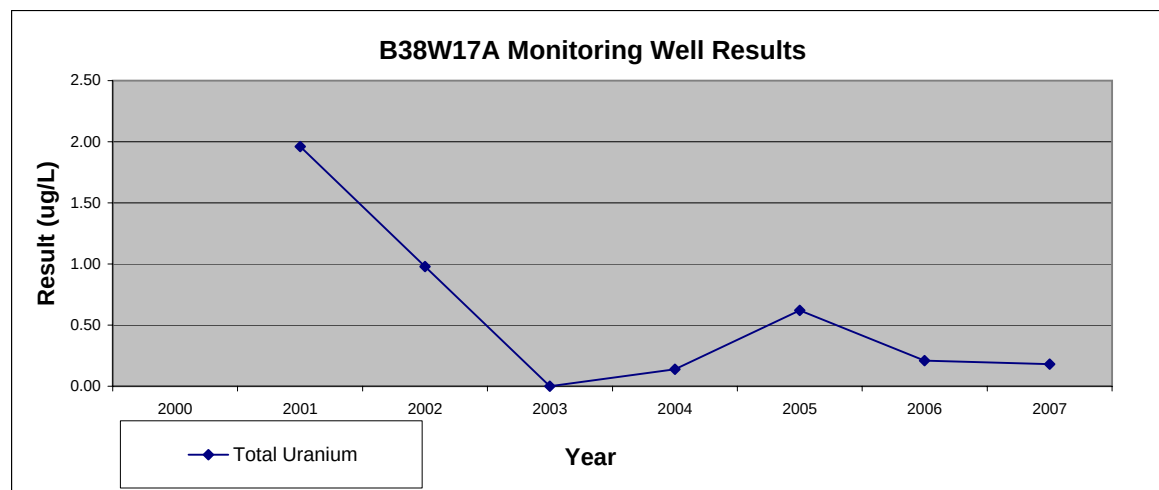
Year	Total Uranium
2000	0.74
2001	1.60
2002	0.59
2003	0.71
2004	0.98
2005	1.34
2006	1.12
2007	0.74

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-13
Historical Results For Radiological Parameters at B38W15S



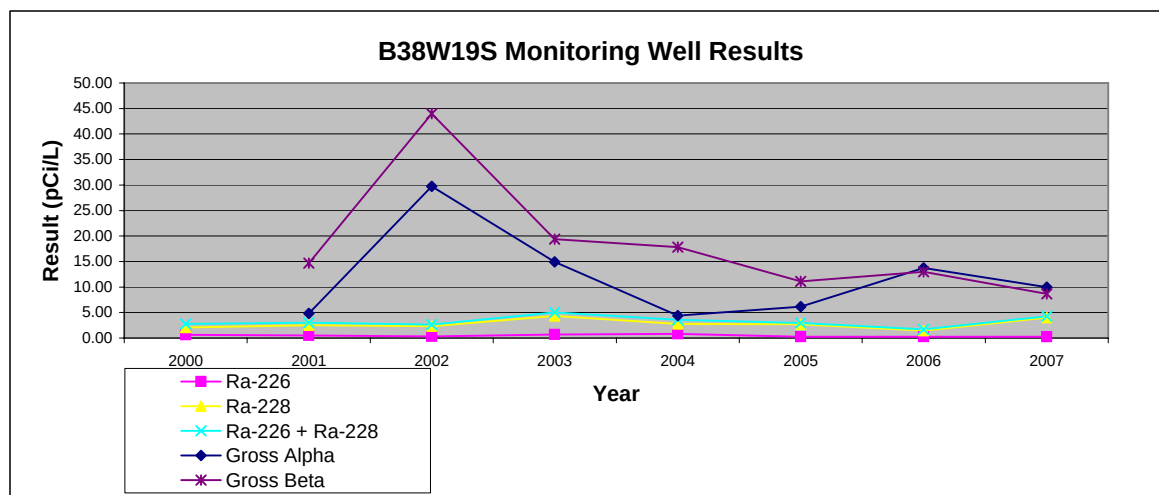
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	6.90	22.30	0.48		0.48
2001		14.85	0.24	0.70	0.94
2002	2.34	22.80	0.14	0.46	0.60
2003	0.90	15.30	0.13	0.66	0.79
2004		18.90	0.01	0.34	0.35
2005	1.20	16.34	0.06	0.19	0.25
2006	1.43	15.70	0.18	0.32	0.50
2007	2.07	13.75	0.21	0.15	0.36



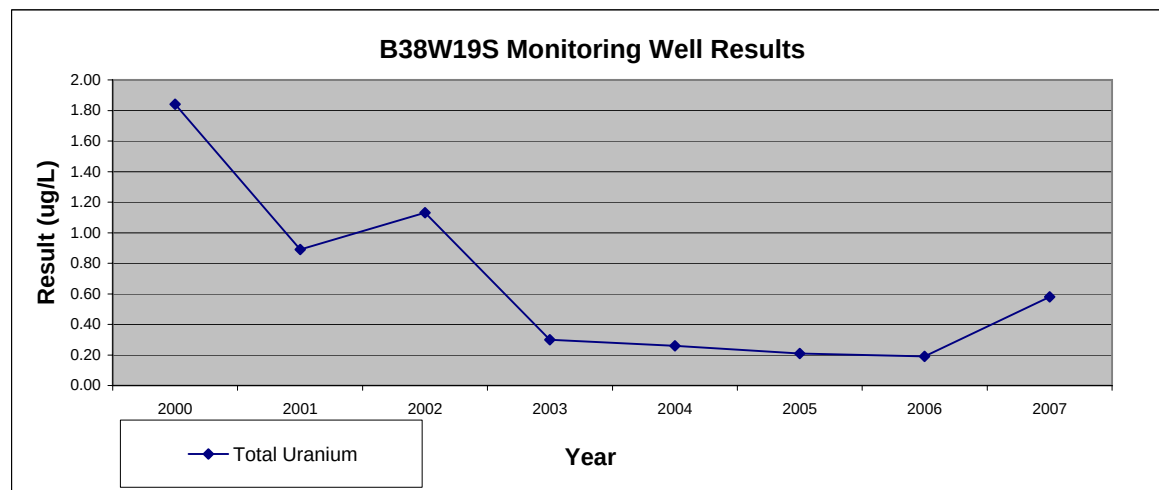
Year	Total Uranium
2000	
2001	1.96
2002	0.98
2003	0.00
2004	0.14
2005	0.62
2006	0.21
2007	0.18

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-14
Historical Results For Radiological Parameters at B38W17A



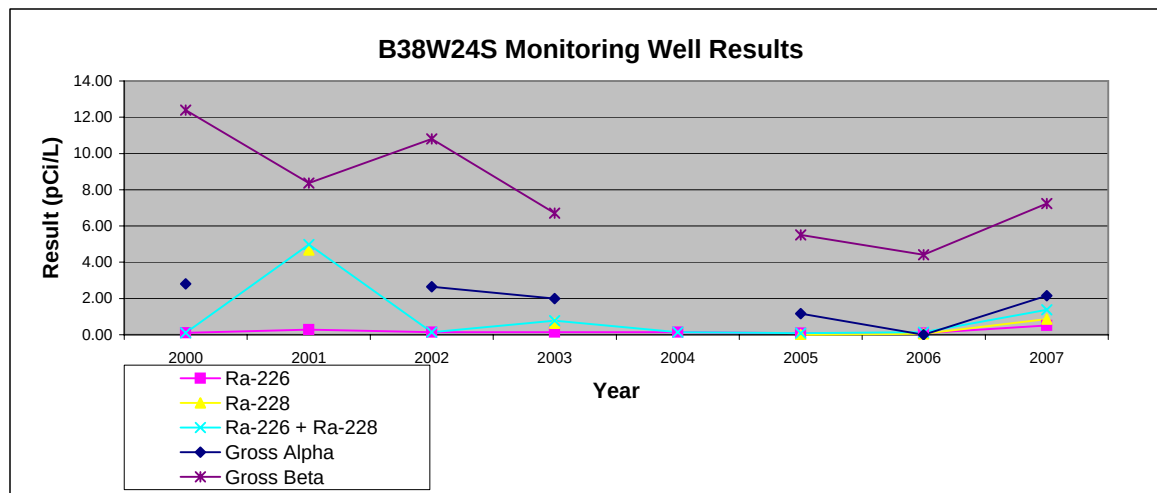
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000			0.63	2.10	2.73
2001	4.83	14.71	0.51	2.49	3.00
2002	29.76	44.00	0.32	2.33	2.65
2003	14.90	19.40	0.72	4.33	5.05
2004	4.40	17.80	0.81	2.79	3.60
2005	6.12	11.10	0.24	2.71	2.95
2006	13.76	12.97	0.25	1.45	1.70
2007	9.97	8.68	0.27	4.01	4.28



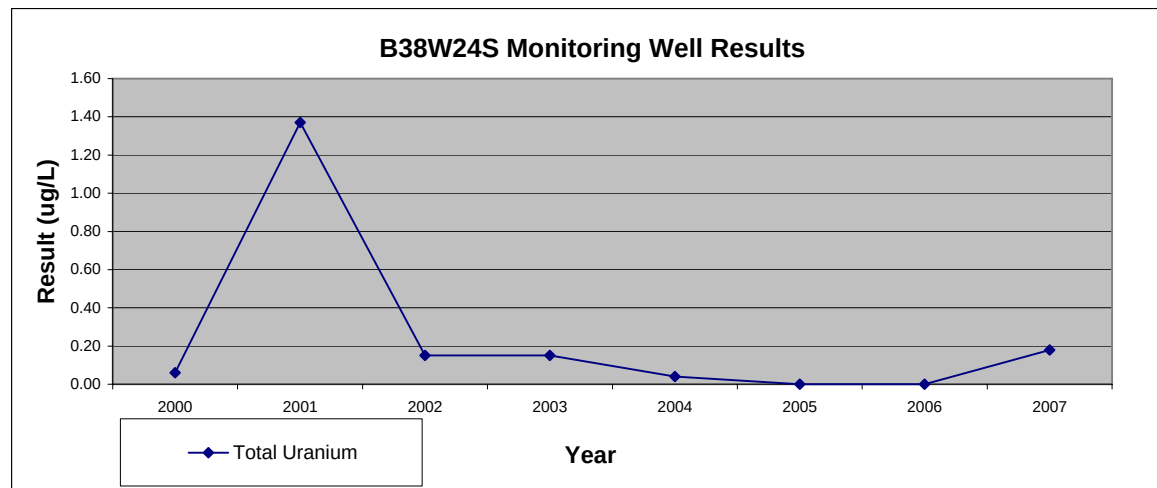
Year	Total Uranium
2000	1.84
2001	0.89
2002	1.13
2003	0.30
2004	0.26
2005	0.21
2006	0.19
2007	0.58

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-15
Historical Results For Radiological Parameters at B38W19S



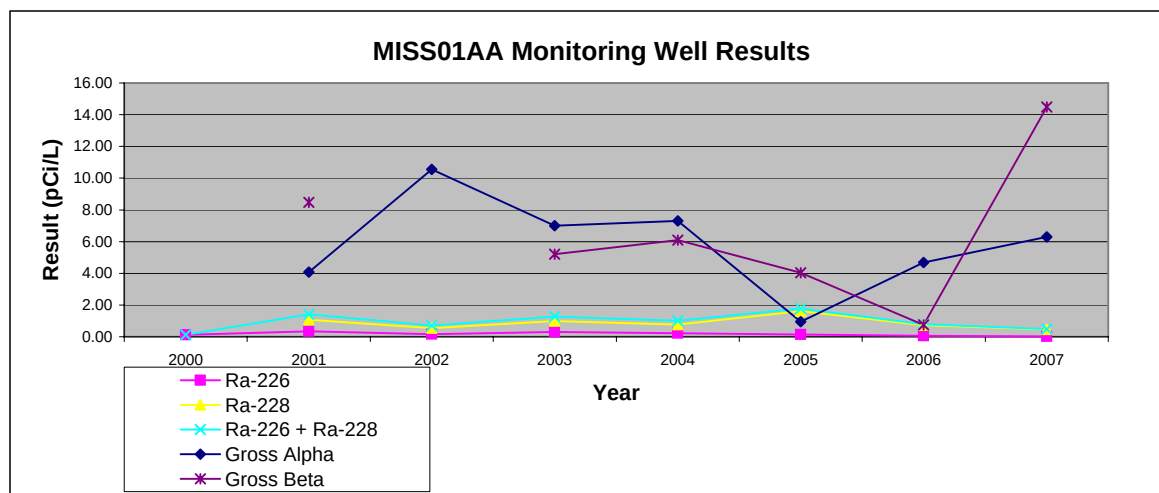
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	2.80	12.40	0.10		0.10
2001		8.37	0.29	4.68	4.97
2002	2.65	10.80	0.15		0.15
2003	2.00	6.70	0.14	0.64	0.78
2004			0.15		0.15
2005	1.16	5.50	0.09	0.00	0.09
2006	0.00	4.41	0.08	0.06	0.14
2007	2.15	7.24	0.51	0.86	1.37



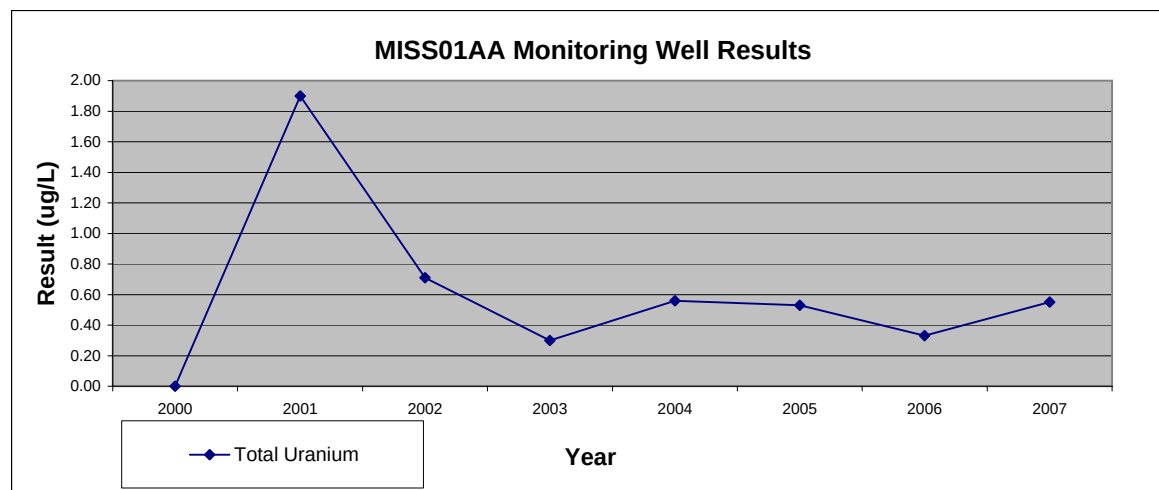
Year	Total Uranium
2000	0.06
2001	1.37
2002	0.15
2003	0.15
2004	0.04
2005	0.00
2006	0.00
2007	0.18

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-16
Historical Results For Radiological Parameters at B38W24S



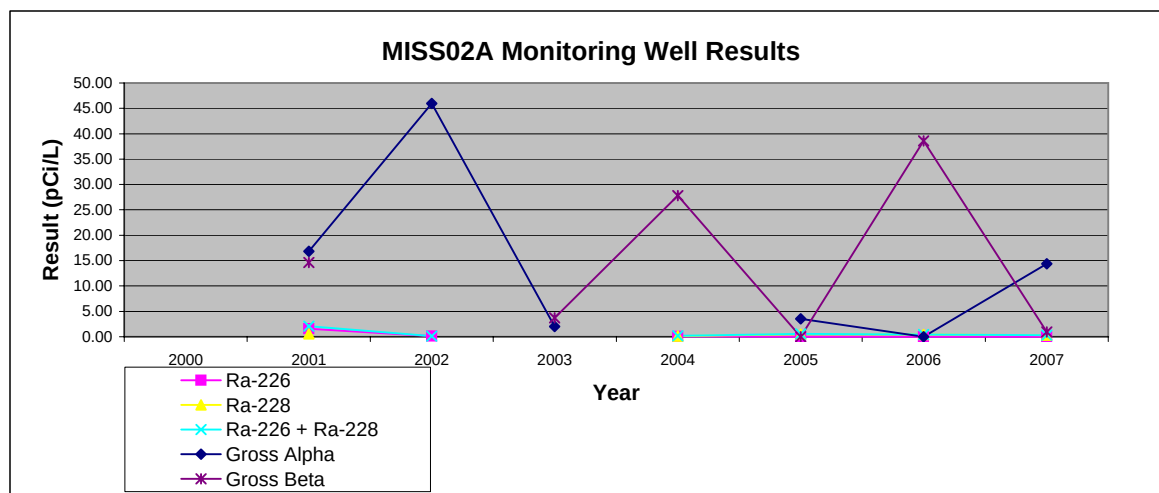
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000			0.13		0.13
2001	4.07	8.47	0.35	1.06	1.41
2002	10.55		0.16	0.55	0.71
2003	7.00	5.20	0.30	0.98	1.28
2004	7.30	6.10	0.23	0.77	1.00
2005	0.94	4.03	0.15	1.62	1.77
2006	4.69	0.74	0.06	0.73	0.79
2007	6.29	14.48	0.03	0.46	0.49



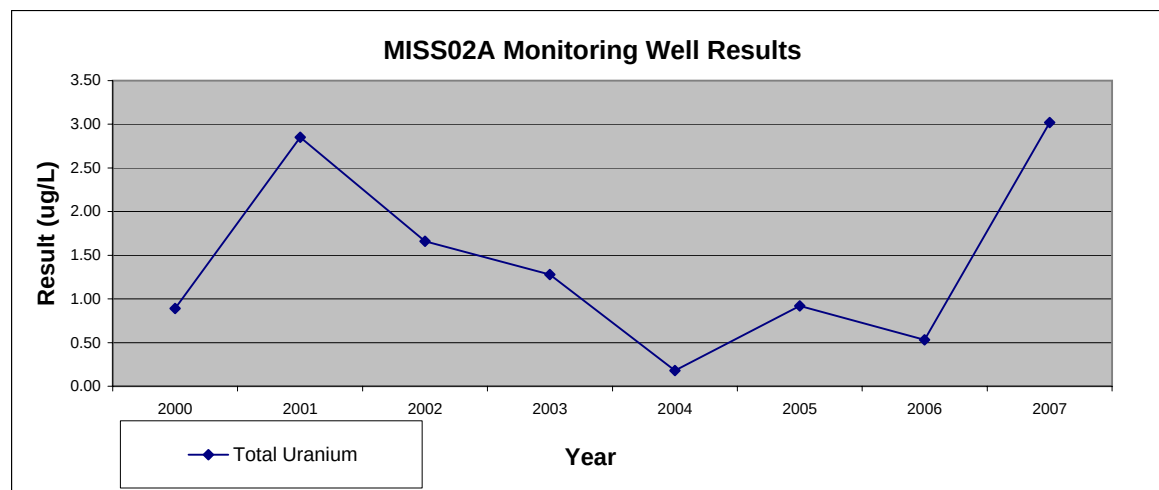
Year	Total Uranium
2000	0.00
2001	1.90
2002	0.71
2003	0.30
2004	0.56
2005	0.53
2006	0.33
2007	0.55

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-17
Historical Results For Radiological Parameters at MISS01AA



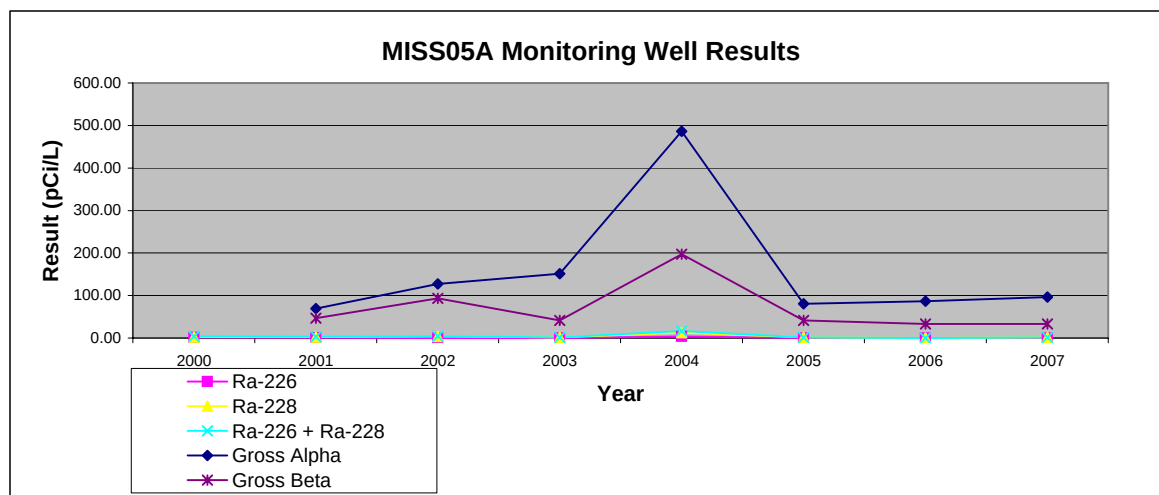
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001	16.83	14.62	1.55	0.55	2.10
2002	45.99		0.15		0.15
2003	2.00	3.70			
2004		27.80	0.05	0.15	0.20
2005	3.54	0.00	0.03	0.51	0.54
2006	0.00	38.58	0.00	0.43	0.43
2007	14.40	0.94	0.00	0.33	0.33



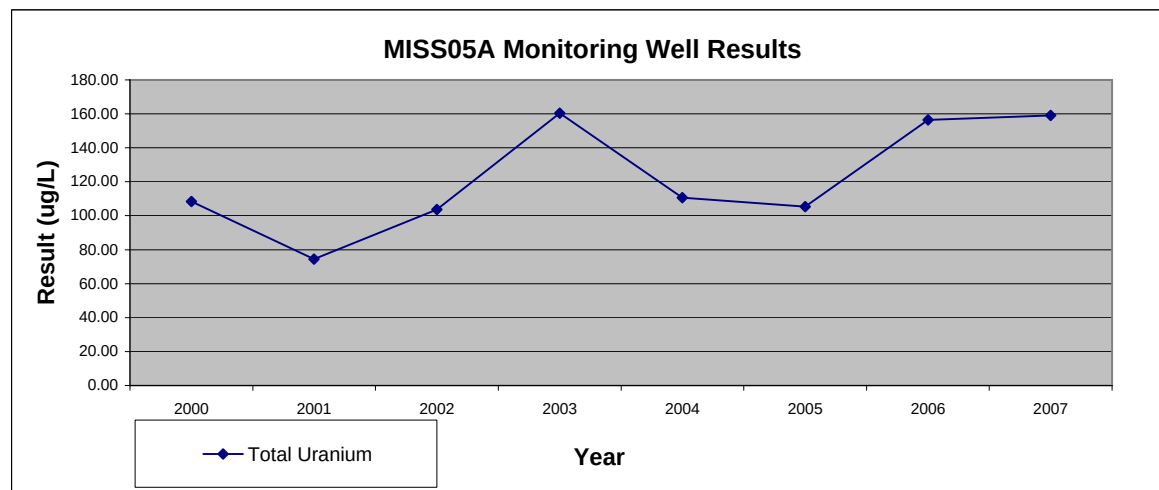
Year	Total Uranium
2000	0.89
2001	2.85
2002	1.66
2003	1.28
2004	0.18
2005	0.92
2006	0.53
2007	3.02

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-18
Historical Results For Radiological Parameters at MISS02A



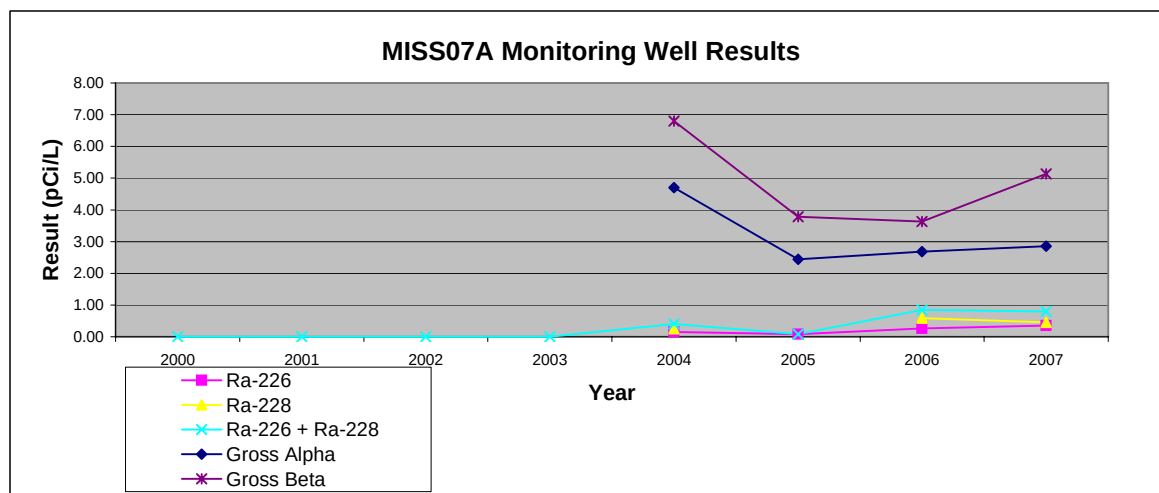
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000			1.39	2.50	3.89
2001	69.00	46.96	0.60	2.05	2.65
2002	127.08	93.00	0.36	4.02	4.38
2003	151.00	41.70	0.32	1.25	1.57
2004	486.00	197.00	3.40	12.90	16.30
2005	80.56	41.68	0.00	1.58	1.58
2006	86.67	32.93	0.00	0.31	0.31
2007	96.63	33.18	0.04	1.66	1.70



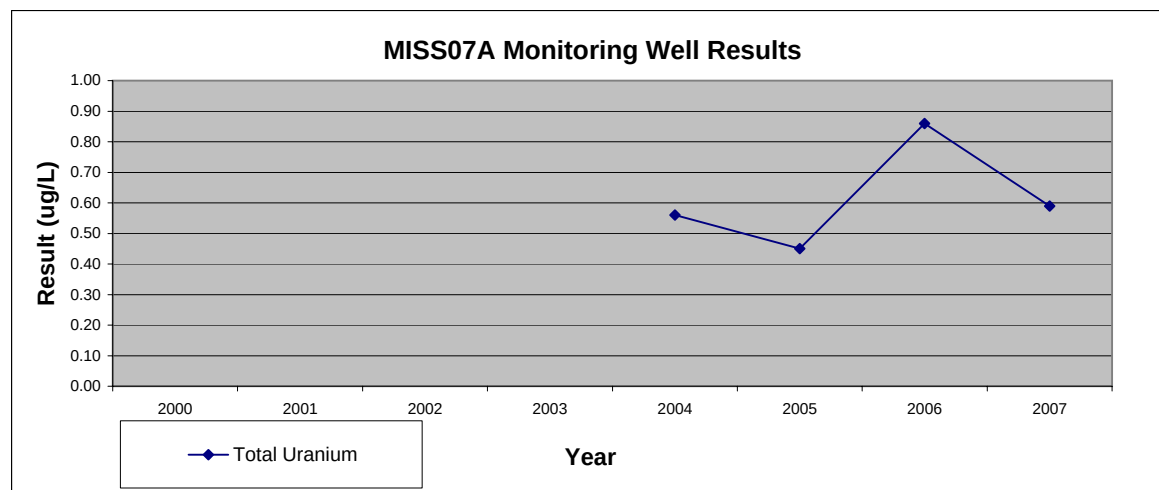
Year	Total Uranium
2000	108.47
2001	74.53
2002	103.71
2003	160.48
2004	110.55
2005	105.35
2006	156.45
2007	159.03

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-19
Historical Results For Radiological Parameters at MISS05A



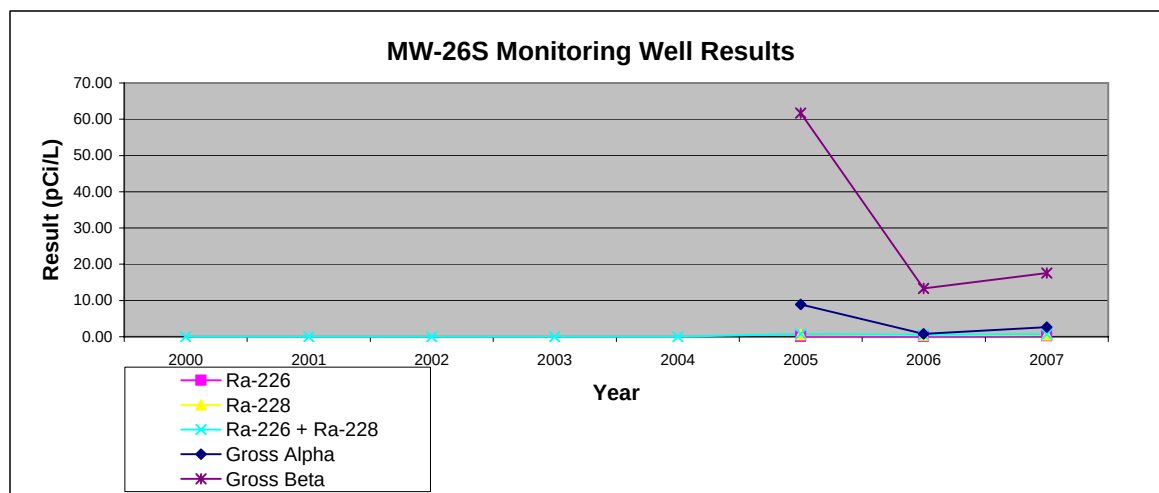
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					0.00
2001					0.00
2002					0.00
2003					0.00
2004	4.70	6.80	0.15	0.25	0.40
2005	2.44	3.78	0.08		0.08
2006	2.68	3.63	0.26	0.59	0.85
2007	2.85	5.13	0.35	0.45	0.80



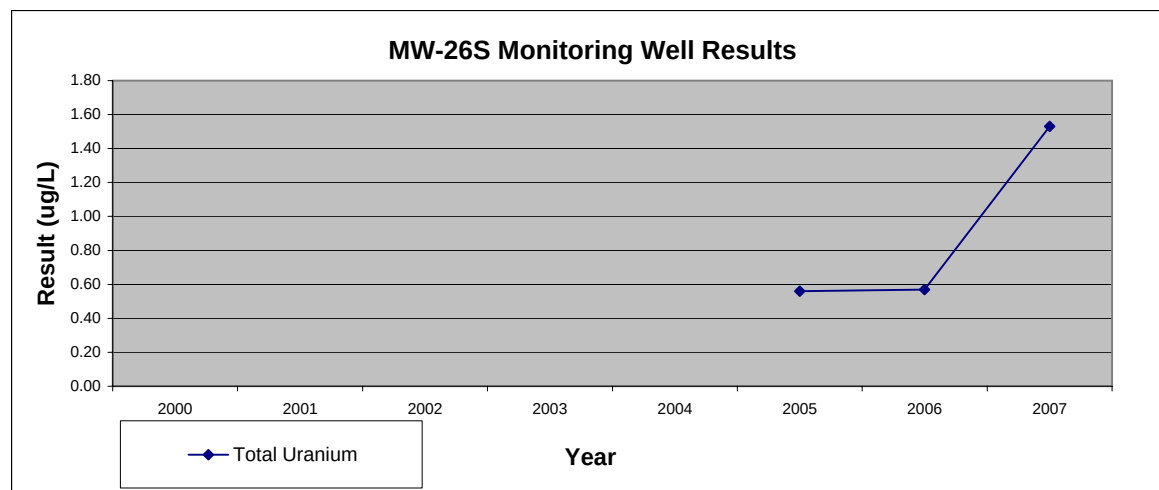
Year	Total Uranium
2000	
2001	
2002	
2003	
2004	0.56
2005	0.45
2006	0.86
2007	0.59

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-20
Historical Results For Radiological Parameters at MISS07A



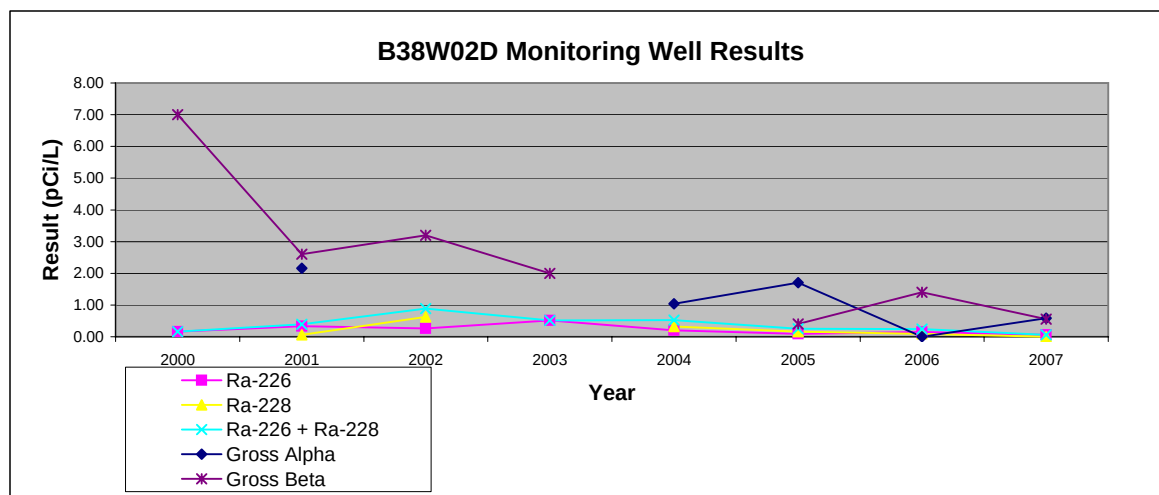
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					0.00
2001					0.00
2002					0.00
2003					0.00
2004					0.00
2005	8.92	61.71	0.11	0.65	0.76
2006	0.80	13.36	0.08	0.48	0.56
2007	2.68	17.59	0.25	0.50	0.75



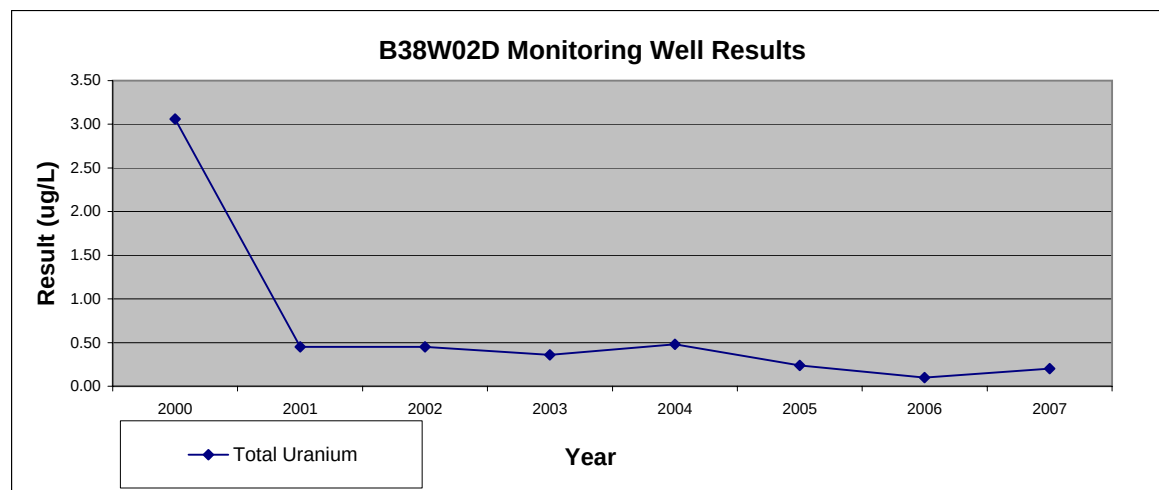
Year	Total Uranium
2000	
2001	
2002	
2003	
2004	
2005	0.56
2006	0.57
2007	1.53

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-21
Historical Results For Radiological Parameters at MW-26S



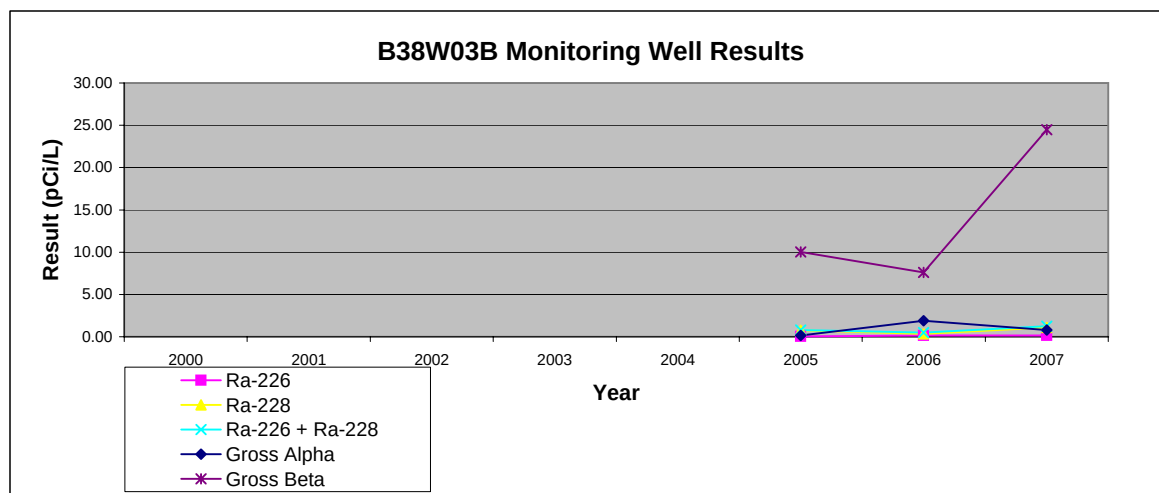
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000		7.00	0.16		0.16
2001	2.16	2.60	0.33	0.06	0.39
2002		3.20	0.26	0.63	0.89
2003		2.00	0.51		0.51
2004	1.04		0.20	0.32	0.52
2005	1.70	0.40	0.09	0.16	0.25
2006	0.00	1.40	0.15	0.09	0.24
2007	0.59	0.55	0.06	0.00	0.06



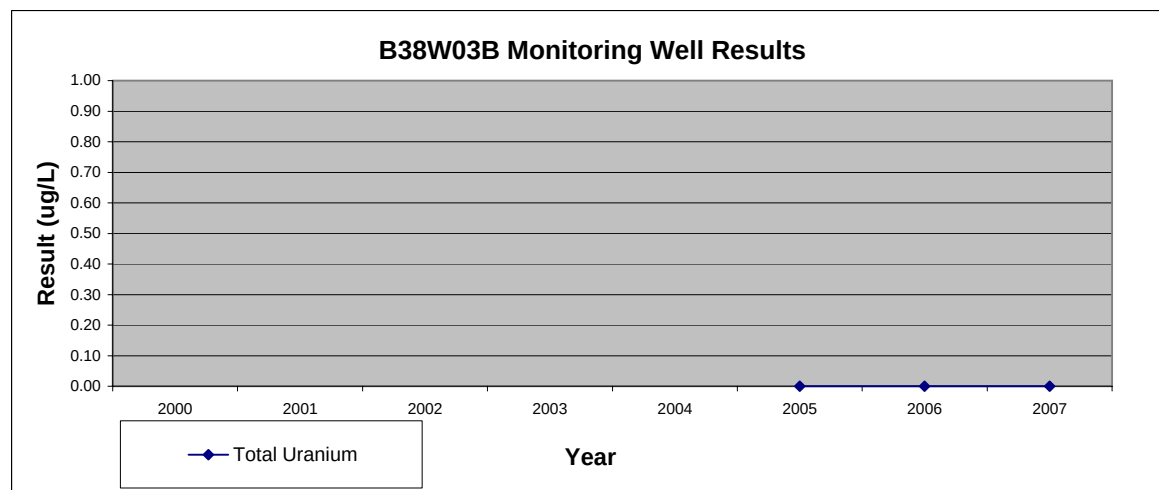
Year	Total Uranium
2000	3.06
2001	0.45
2002	0.45
2003	0.36
2004	0.48
2005	0.24
2006	0.10
2007	0.20

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-22
Historical Results For Radiological Parameters at B38W02D



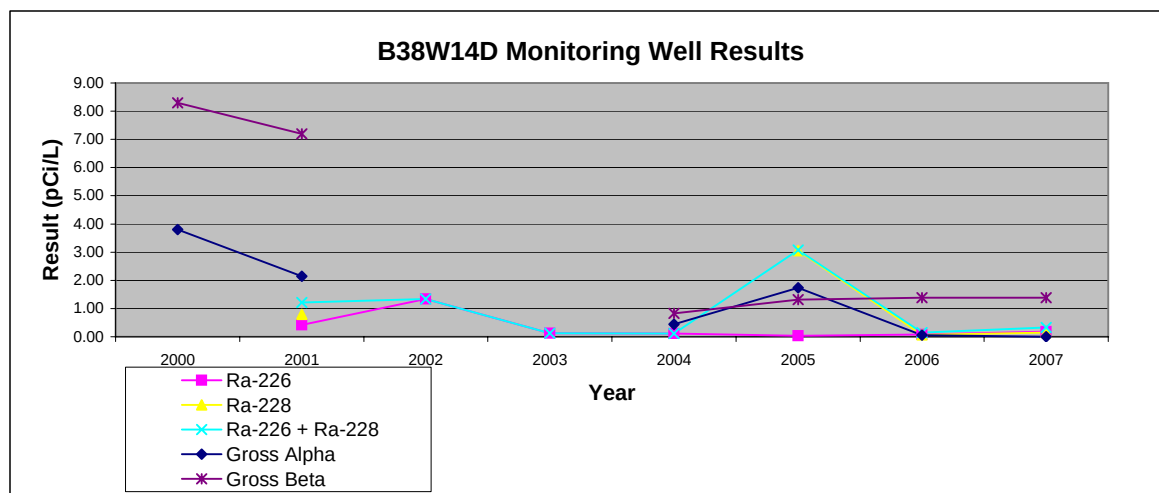
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001					
2002					
2003					
2004					
2005	0.15	10.02	0.04	0.77	0.81
2006	1.90	7.61	0.16	0.35	0.51
2007	0.80	24.49	0.14	1.09	1.23



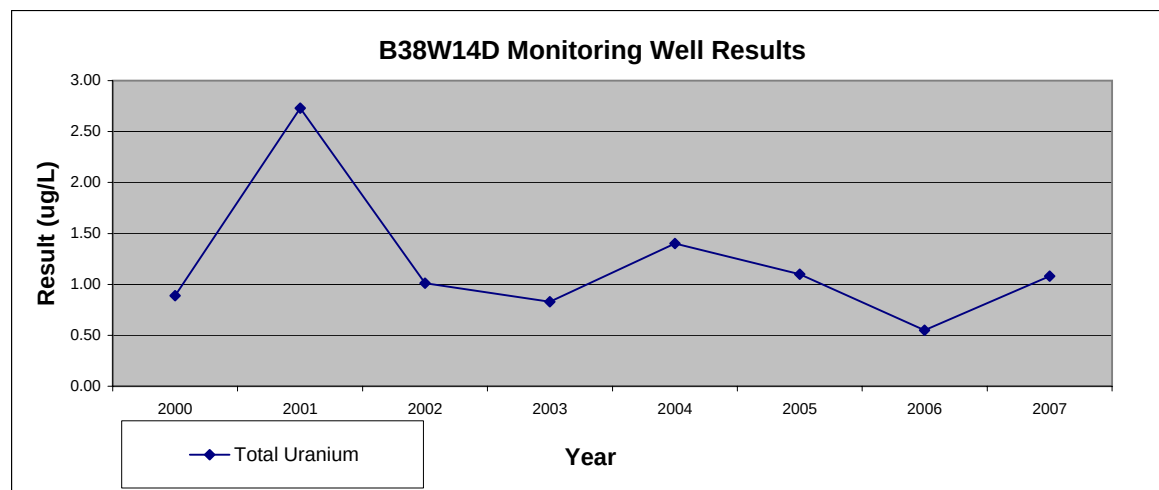
Year	Total Uranium
2000	
2001	
2002	
2003	
2004	
2005	0.00
2006	0.00
2007	0.00

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-23
Historical Results For Radiological Parameters at B38W03B



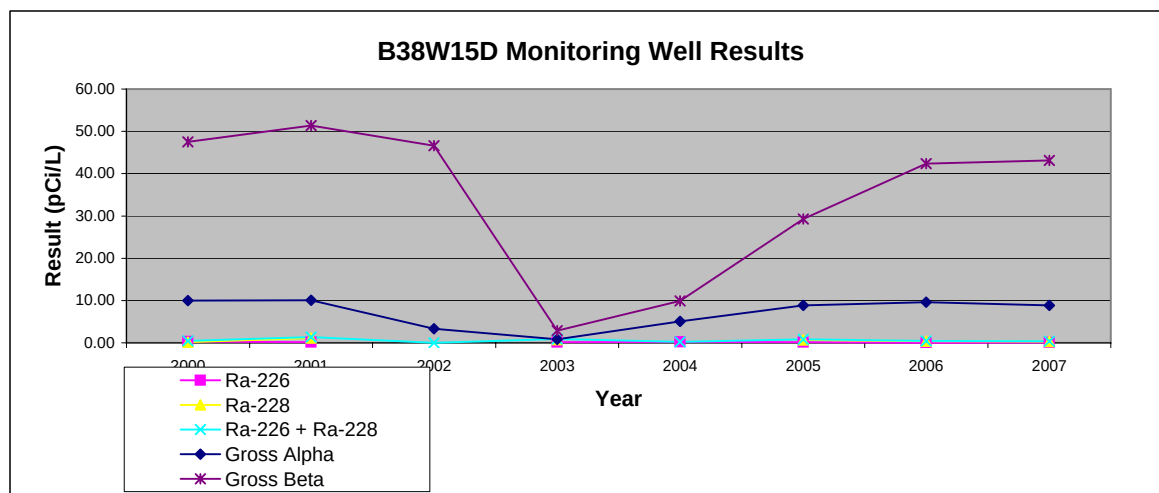
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	3.80	8.30			
2001	2.14	7.20	0.42	0.80	1.22
2002			1.34		1.34
2003			0.13		0.13
2004	0.44	0.83	0.11		0.11
2005	1.74	1.32	0.03	3.05	3.08
2006	0.06	1.39	0.08	0.07	0.15
2007	0.00	1.38	0.18	0.15	0.33



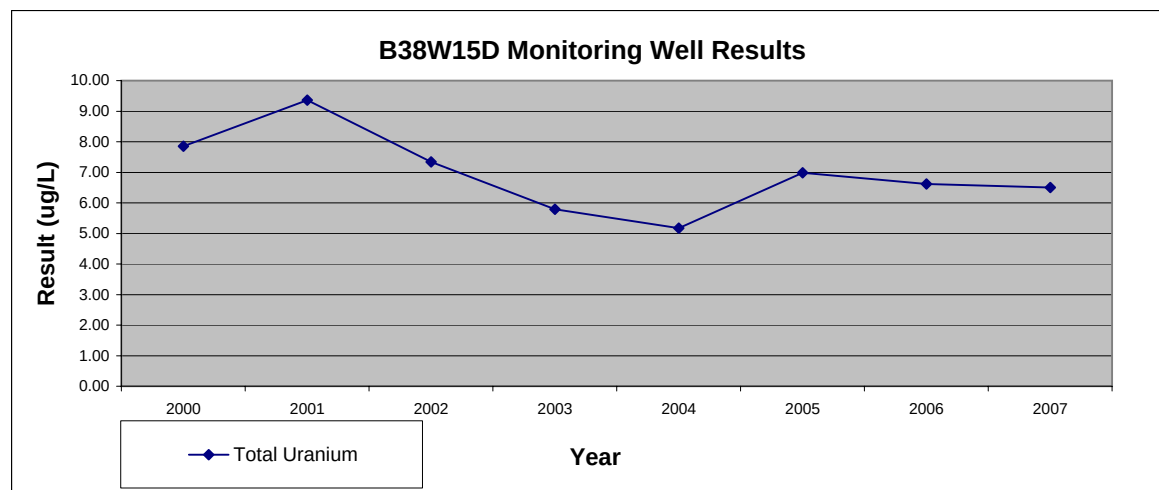
Year	Total Uranium
2000	0.89
2001	2.73
2002	1.01
2003	0.83
2004	1.40
2005	1.10
2006	0.55
2007	1.08

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-24
Historical Results For Radiological Parameters at B38W14D



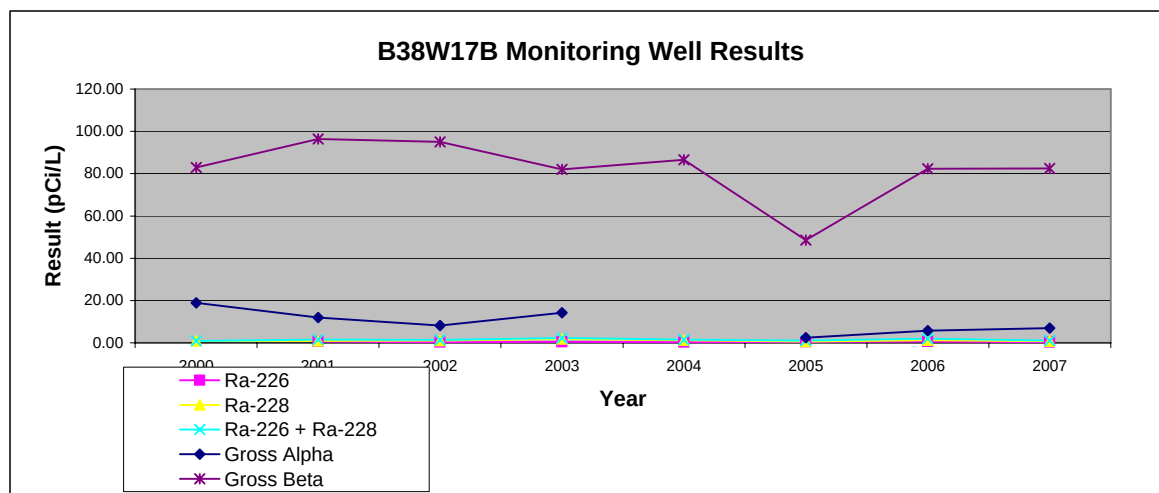
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	10.00	47.50	0.30	0.15	0.45
2001	10.09	51.37	0.17	1.16	1.33
2002	3.31	46.60			0.00
2003	0.80	2.90	0.18	0.73	0.91
2004	5.10	9.90	0.26		0.26
2005	8.89	29.29	0.15	0.68	0.83
2006	9.60	42.34	0.02	0.40	0.42
2007	8.89	43.09	0.09	0.27	0.36



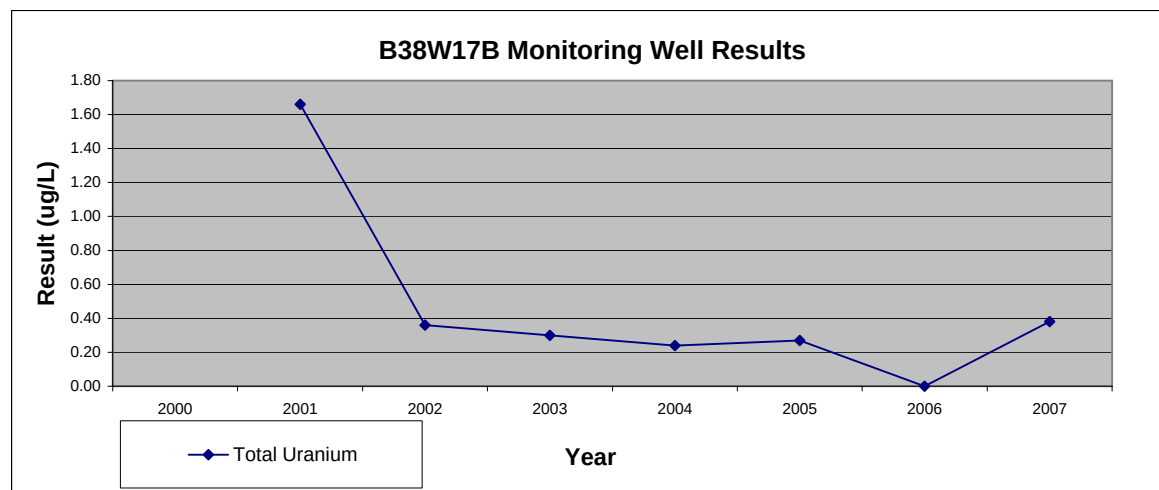
Year	Total Uranium
2000	7.85
2001	9.36
2002	7.34
2003	5.79
2004	5.17
2005	6.98
2006	6.62
2007	6.50

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-25
Historical Results For Radiological Parameters at B38W15D



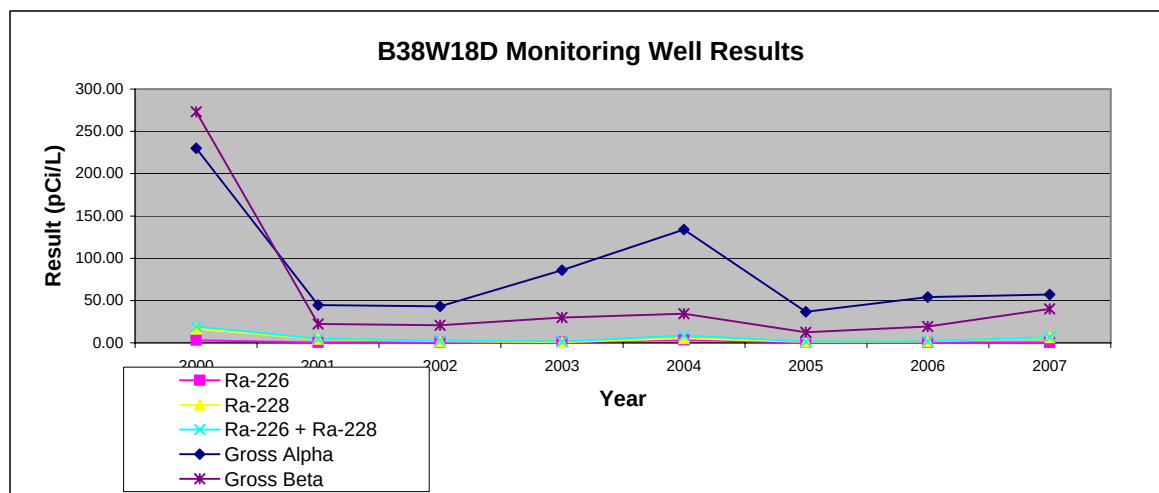
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	18.90	83.00		0.97	0.97
2001	11.90	96.42	0.62	0.89	1.51
2002	8.15	95.00	0.36	1.03	1.39
2003	14.30	82.00	0.45	1.79	2.24
2004	86.60	86.60	0.27	1.17	1.44
2005	2.35	48.54	0.46	0.59	1.05
2006	5.74	82.31	0.64	1.26	1.90
2007	6.92	82.41	0.35	0.73	1.08



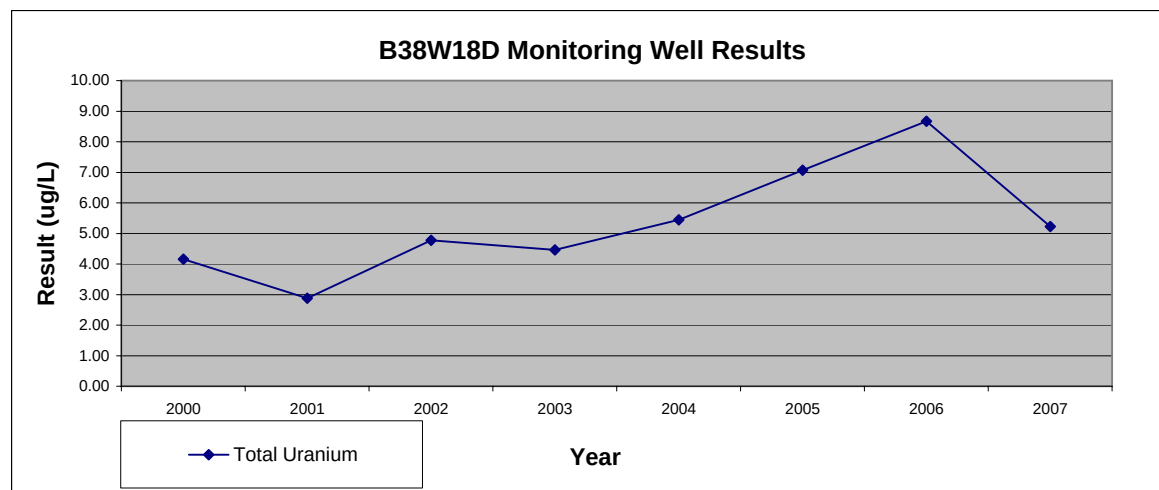
Year	Total Uranium
2000	
2001	1.66
2002	0.36
2003	0.30
2004	0.24
2005	0.27
2006	0.00
2007	0.38

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-26
Historical Results For Radiological Parameters at B38W17B



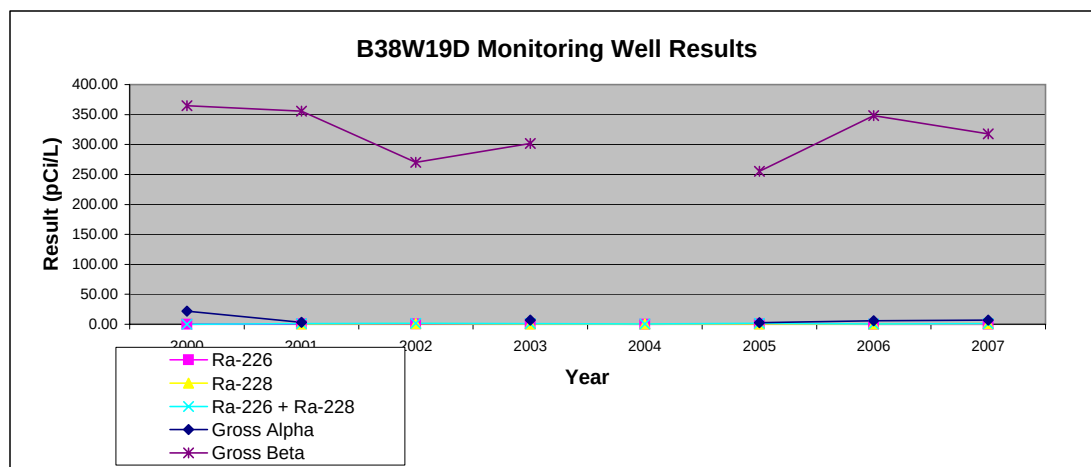
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	230.00	273.00	2.87	16.53	19.40
2001	44.65	22.35	0.48	4.46	4.94
2002	42.98	20.70	0.86	1.83	2.69
2003	86.00	30.00	0.61	0.81	1.42
2004	134.00	34.60	3.35	5.25	8.60
2005	36.79	12.43	0.28	1.11	1.39
2006	54.08	19.24	0.19	1.61	1.80
2007	57.16	40.07	0.25	6.59	6.84



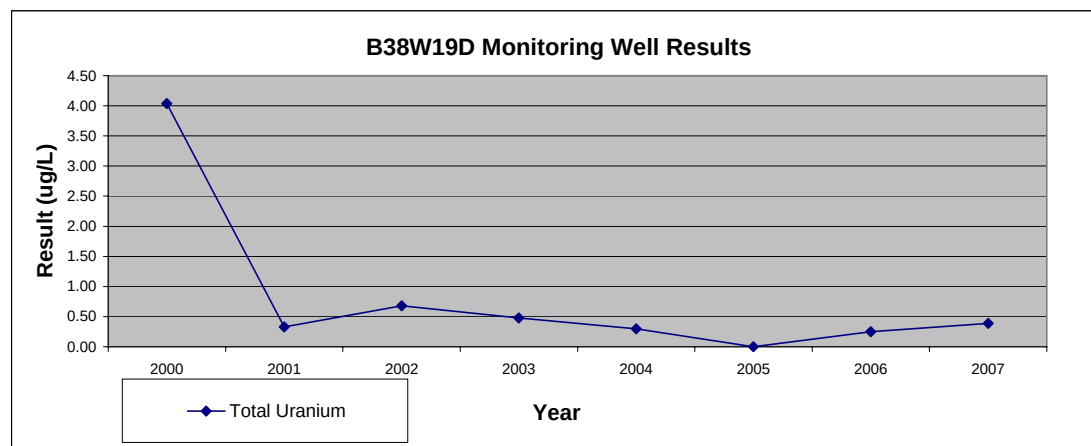
Year	Total Uranium
2000	4.16
2001	2.88
2002	4.78
2003	4.46
2004	5.44
2005	7.07
2006	8.67
2007	5.23

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-27
Historical Results For Radiological Parameters at B38W18D



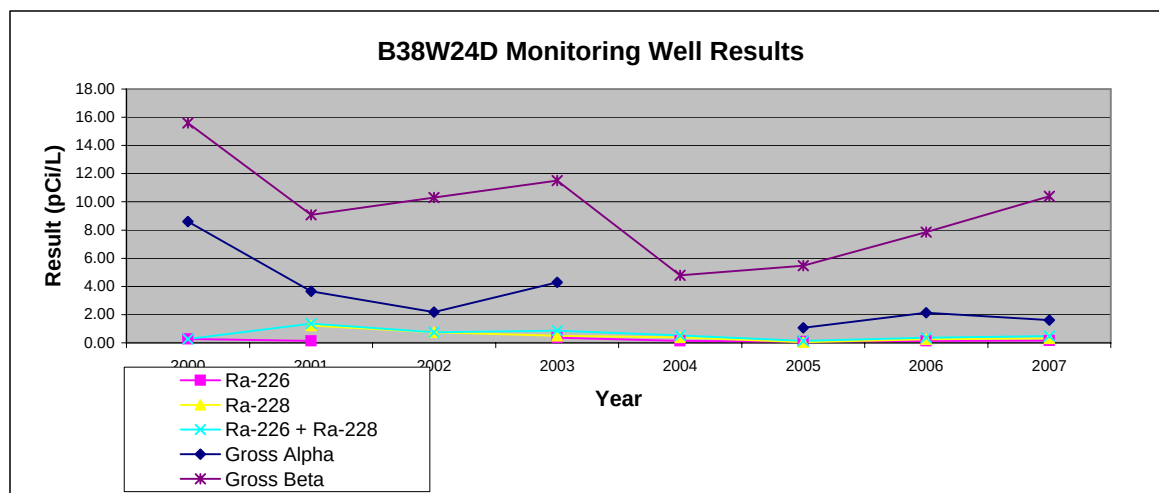
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	22.00	365.00	0.16		0.16
2001	3.39	355.75	0.28	0.70	0.98
2002		270.00	0.53	0.89	1.42
2003	7.20	302.00	0.46	0.71	1.17
2004			0.22	0.57	0.79
2005	2.44	255.26	0.75	0.63	1.38
2006	6.07	348.39	0.08	0.62	0.70
2007	7.08	317.78	0.09	1.21	1.30



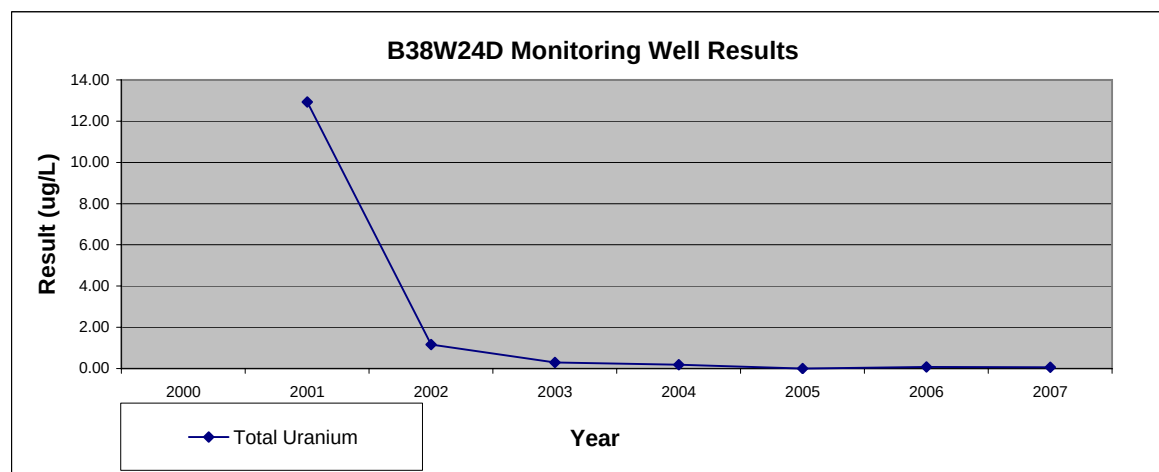
Year	Total Uranium
2000	4.04
2001	0.33
2002	0.68
2003	0.48
2004	0.30
2005	0.00
2006	0.25
2007	0.39

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-28
Historical Results For Radiological Parameters at B38W19D



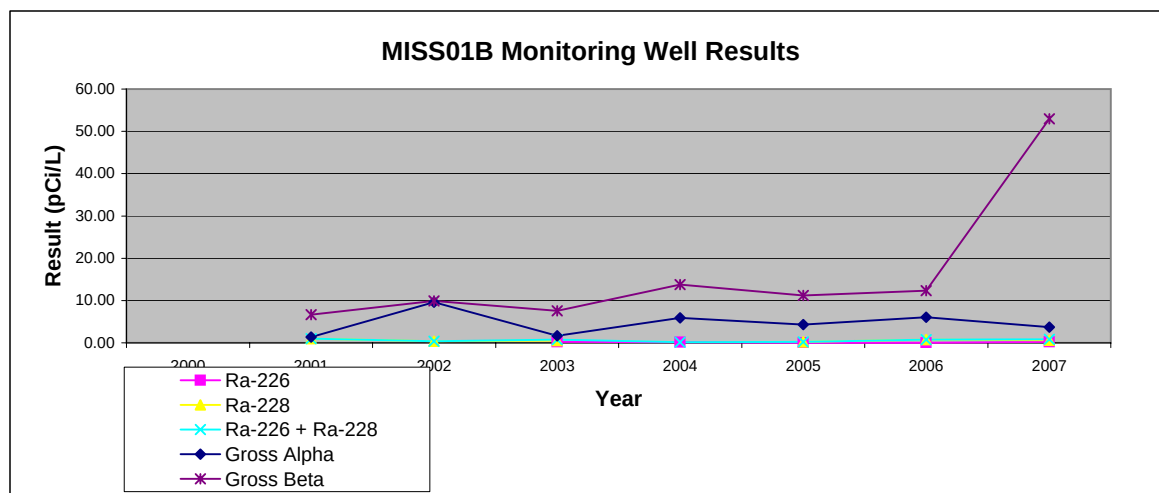
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	8.60	15.60	0.28		0.28
2001	3.65	9.08	0.14	1.22	1.36
2002	2.19	10.30		0.75	0.75
2003	4.30	11.50	0.36	0.51	0.87
2004		4.80	0.14	0.39	0.53
2005	1.07	5.46	0.09	0.05	0.14
2006	2.13	7.86	0.13	0.24	0.37
2007	1.61	10.40	0.16	0.32	0.48



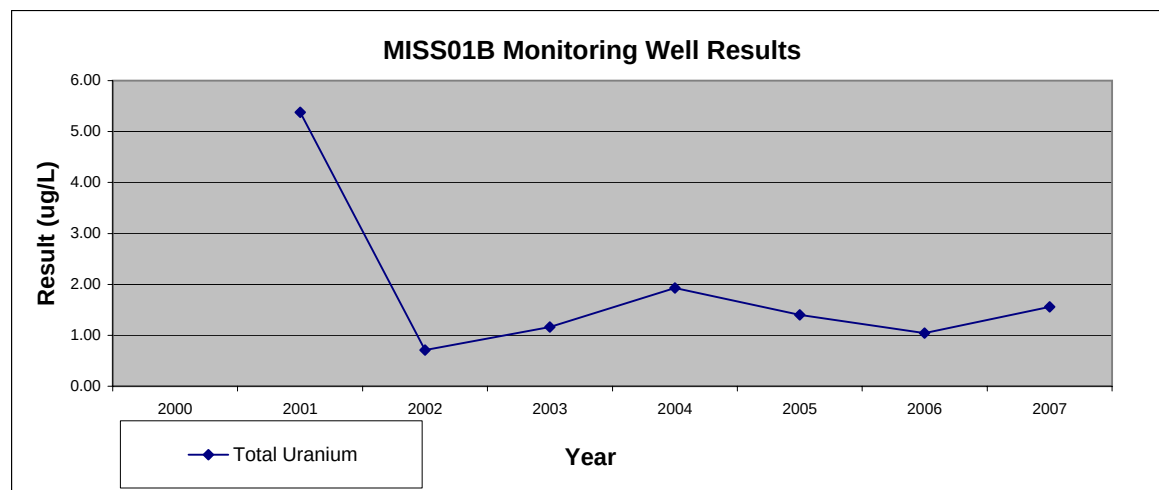
Year	Total Uranium
2000	
2001	12.93
2002	1.16
2003	0.30
2004	0.18
2005	0.00
2006	0.07
2007	0.06

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-29
Historical Results For Radiological Parameters at B38W24D



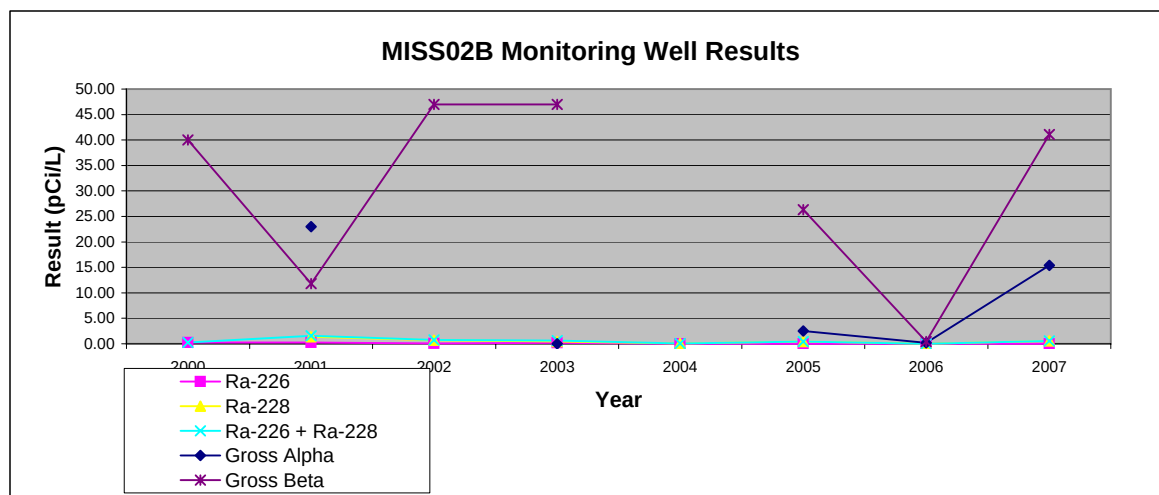
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001	1.34	6.64		1.02	1.02
2002	9.63	9.90		0.40	0.40
2003	1.70	7.60	0.22	0.52	0.74
2004	5.90	13.80	0.12		0.12
2005	4.34	11.22	0.01	0.23	0.24
2006	6.09	12.30	0.01	0.75	0.76
2007	3.70	52.99	0.20	0.63	0.83



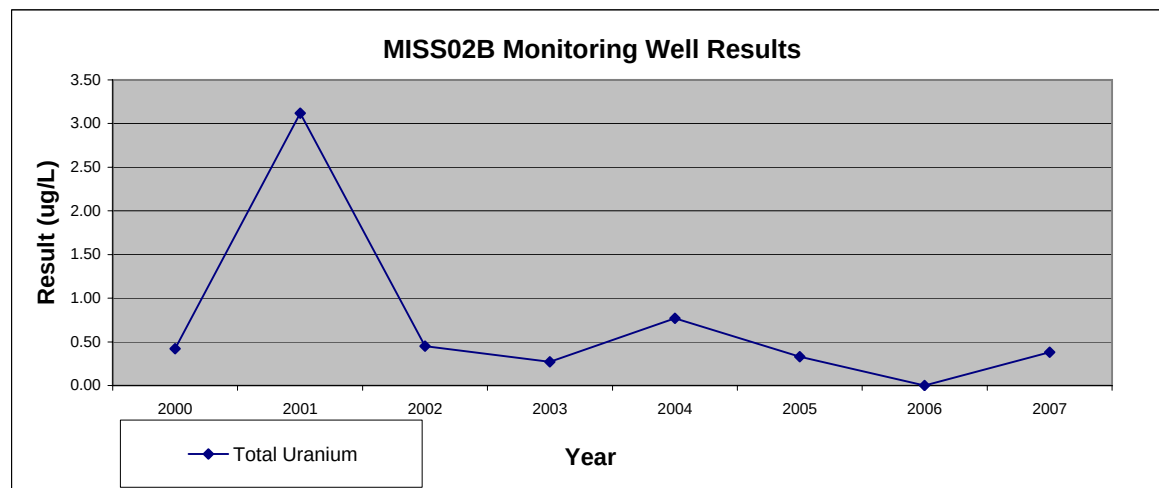
Year	Total Uranium
2000	
2001	5.38
2002	0.71
2003	1.16
2004	1.93
2005	1.40
2006	1.04
2007	1.56

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-30
Historical Results For Radiological Parameters at MISS01B



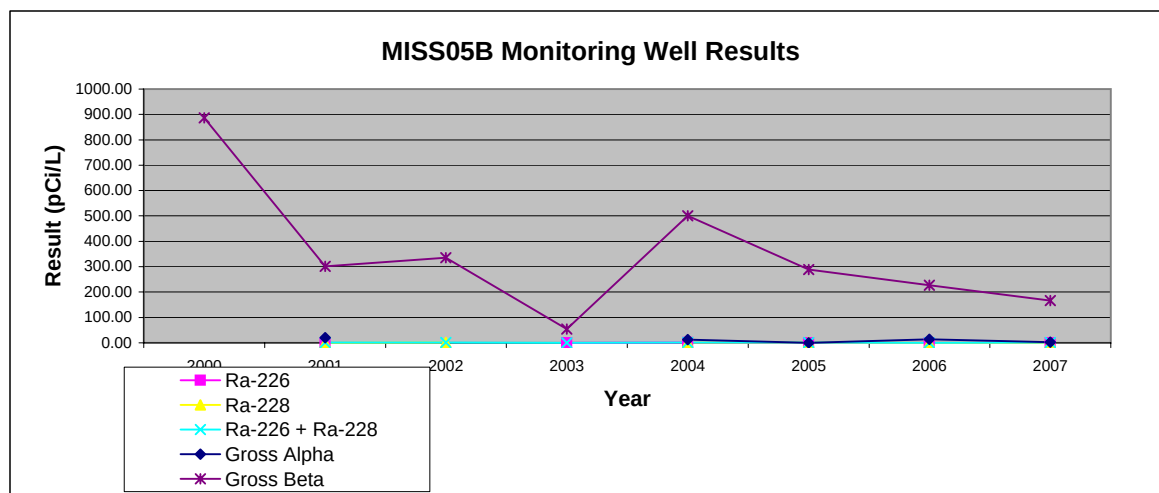
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000		40.00	0.25		0.25
2001	22.99	11.83	0.23	1.36	1.59
2002		47.00	0.04	0.71	0.75
2003	0.00	47.00	0.18	0.44	0.62
2004			0.01	0.07	0.08
2005	2.53	26.33	0.00	0.44	0.44
2006	0.16	0.43	0.02	0.00	0.02
2007	15.42	41.05	0.00	0.59	0.59



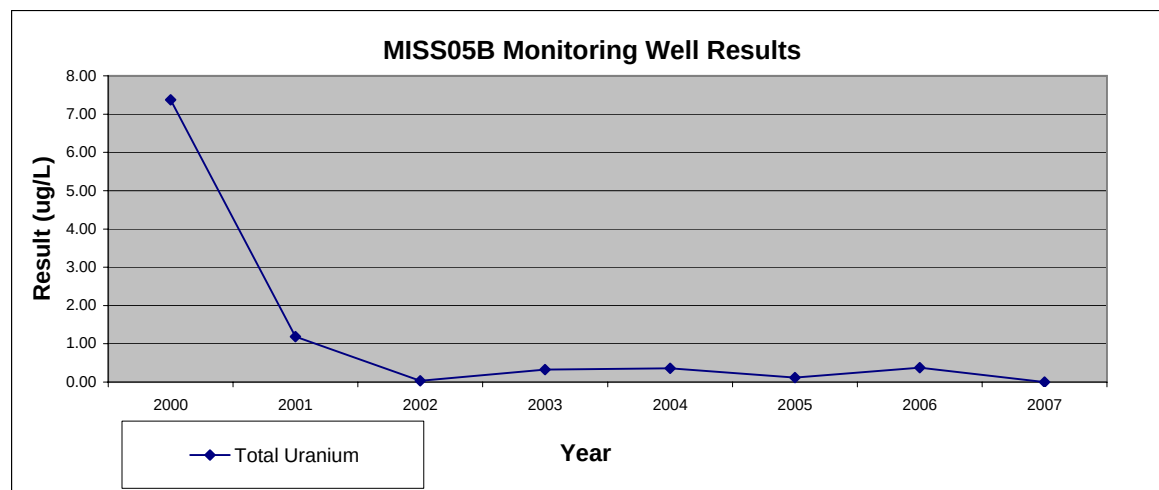
Year	Total Uranium
2000	0.42
2001	3.12
2002	0.45
2003	0.27
2004	0.77
2005	0.33
2006	0.00
2007	0.38

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-31
Historical Results For Radiological Parameters at MISS02B



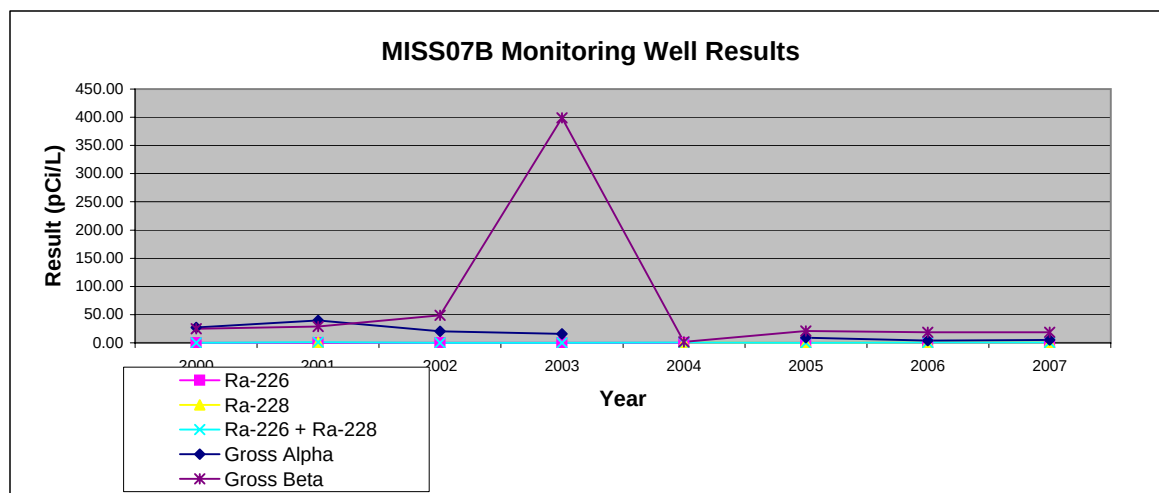
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	19.98	886.00	0.33	0.44	0.77
2001	301.10	336.00	0.23	0.73	1.46
2002	54.50	501.00	0.20	0.78	0.98
2003	12.00	289.08	0.04	0.31	0.35
2004	0.33	227.25	0.11	0.60	0.71
2005	13.42	166.34	0.11	0.60	0.71
2006	2.88	166.34	0.11	0.60	0.71
2007	2.88	166.34	0.11	0.60	0.71



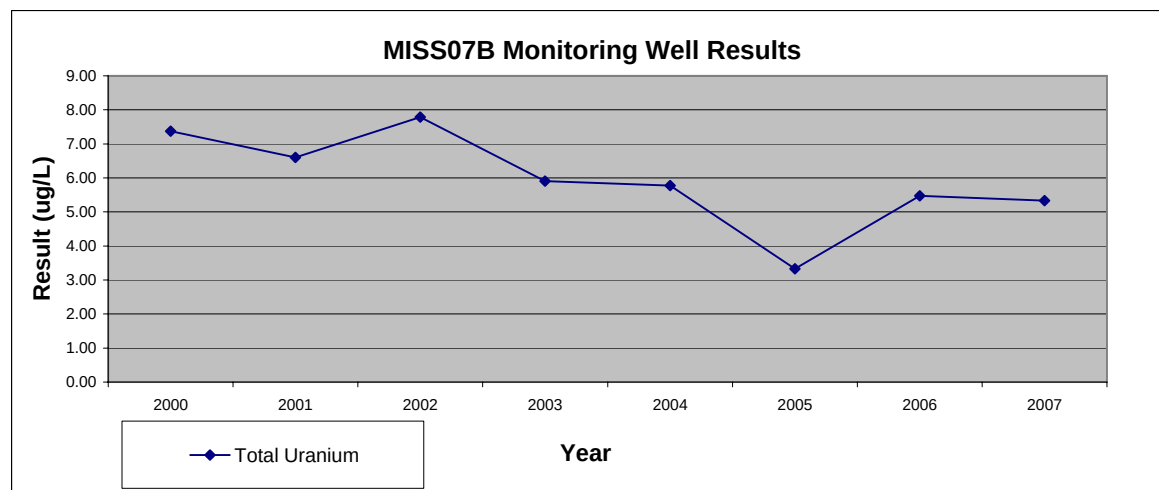
Year	Total Uranium
2000	7.37
2001	1.19
2002	0.03
2003	0.33
2004	0.36
2005	0.12
2006	0.38
2007	0.00

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical puposes.

Figure B-32
Historical Results For Radiological Parameters at MISS05B



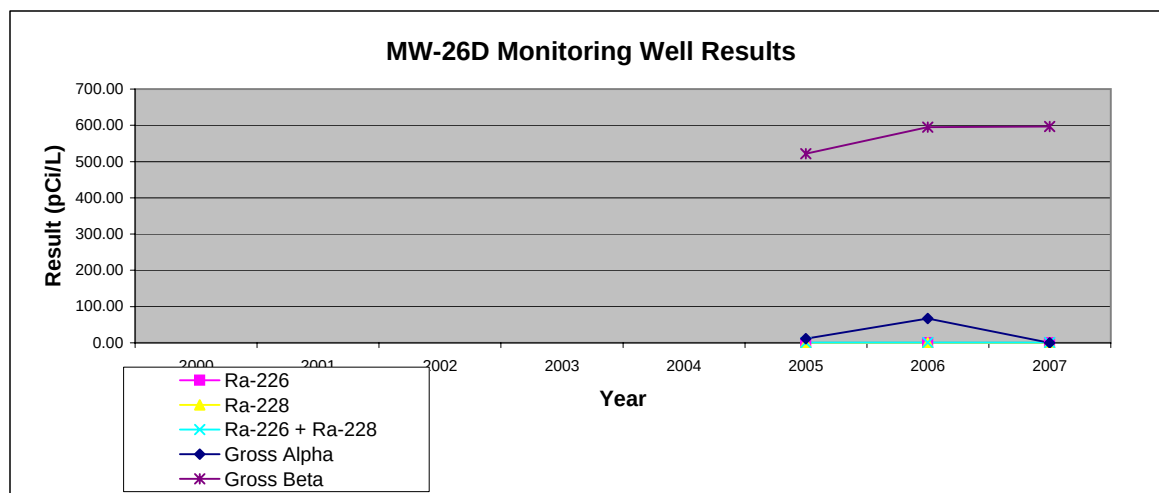
Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000	27.00	25.00	0.10		0.10
2001	40.00	28.87	0.18	0.77	0.95
2002	20.43	49.00	0.10		0.10
2003	16.00	399.00	0.20		0.20
2004	1.70	1.70	0.18	0.37	0.55
2005	9.29	21.24	0.00	0.00	0.00
2006	4.00	18.54	0.03	0.35	0.38
2007	4.93	18.94	0.04	0.45	0.49



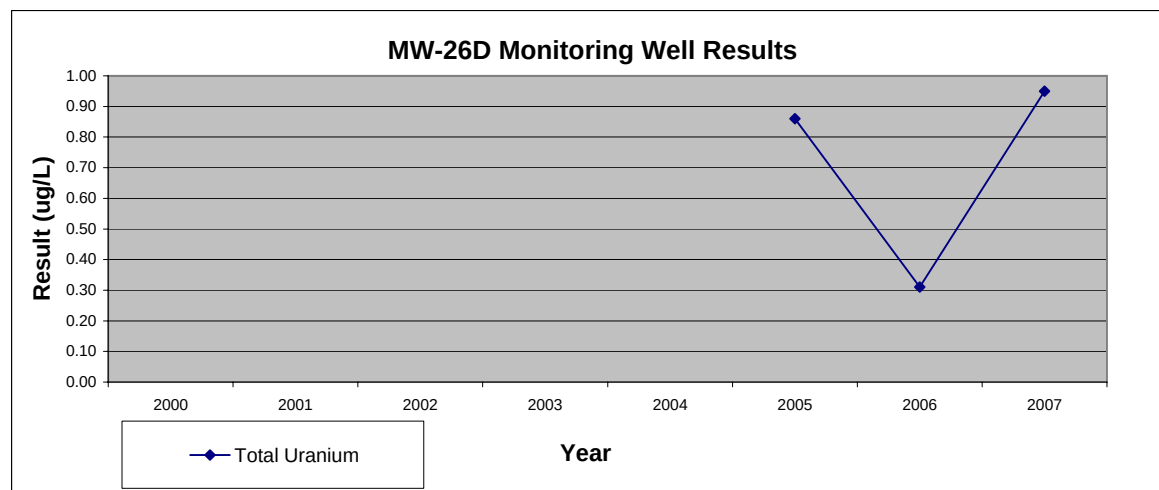
Year	Total Uranium
2000	7.37
2001	6.60
2002	7.79
2003	5.91
2004	5.77
2005	3.33
2006	5.47
2007	5.33

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-33
Historical Results For Radiological Parameters at MISS07B



Year	Gross Alpha	Gross Beta	Ra-226	Ra-228	Ra-226 + Ra-228
2000					
2001					
2002					
2003					
2004					
2005	11.30	521.65	0.11	0.42	0.53
2006	67.51	595.36	0.21	0.27	0.48
2007	0.26	596.63	0.20	0.27	0.47



Year	Total Uranium
2000	
2001	
2002	
2003	
2004	
2005	0.86
2006	0.31
2007	0.95

NOTES: a) For years where duplicate samples were collected, the highest result was used for statistical purposes.

Figure B-34
Historical Results For Radiological Parameters at MW-26D

APPENDIX C

WATER LEVEL MEASUREMENTS FOR THE YEAR 2007

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Water Level Record Sheet

Quarter: 1st
Date: 3/22/2007
Samplers: C.G. Moyer, K.Gibbs

Well Number	Time (24-hour format)	Average Depth to Water (0.01 ft)	Top of Riser Elevation (0.01 ft)	Measurement Reference Point
MISS-1AA	09:52	15.2	62.70	Riser Casing
MISS-1B	09:54	14.45	61.98	Riser Casing
MISS-2A	09:47	6.80	61.47	Riser Casing
MISS-2B	09:45	10.32	61.38	Riser Casing
MISS-4A	10:40	7.13	57.17	Riser Casing
MISS-4B	10:44	8.30	56.42	Riser Casing
MISS-5A	10:52	10.62	58.65	Riser Casing
MISS-5B	10:51	13.72	59.76	Riser Casing
MISS-7A	11:01	6.60	55.60	Riser Casing
MISS-7B	11:00	9.18	55.77	Riser Casing
B38W01S	14:20	5.35	56.57	Riser Casing
B38W02D	14:25	13.25	78.04	Riser Casing
B38W03B	10:21	8.33	58.27	Riser Casing
B38W04B	10:17	8.79	65.64	Riser Casing
B38W05B	13:20	8.19	70.98	Riser Casing
B38W07B	10:49	6.53	54.98	Riser Casing
B38W12AR	13:26	4.74	49.90	Riser Casing
B38W12B	13:25	4.10	49.64	Riser Casing
B38W14S	Not Measured	Not Measured	43.89	Riser Casing
B38W14D	Not Measured	Not Measured	43.79	Riser Casing
B38W15S	13:51	3.92	46.75	Riser Casing
B38W15D	13:42	3.56	47.04	Riser Casing
B38W17A	13:33	6.80	53.24	Riser Casing
B38W17B	13:34	7.04	53.28	Riser Casing
B38W18D	11:09	3.24	57.85	Riser Casing
B38W19S	10:56	13.41	59.91	Riser Casing
B38W19D	10:58	14.14	59.98	Riser Casing
B38W24S	10:32	7.35	55.04	Riser Casing
B38W24D	10:39	7.10	54.91	Riser Casing
MW-25S	10:26	7.44	58.85	Riser Casing
MW-25D	10:29	10.53	58.13	Riser Casing
MW-26S	10:07	11.52	61.36	Riser Casing
MW-26D	10:05	10.00	60.12	Riser Casing

Water Level Record Sheet

Quarter: 2nd
Date: 5/1/2007
Samplers: J.Cook, M.Zigo

Well Number	Time (24-hour format)	Average Depth to Water (0.01 ft)	Top of Riser Elevation (0.01 ft)	Measurement Reference Point
MISS-1AA	08:13	13.80	62.70	Riser Casing
MISS-1B	08:14	14.02	61.98	Riser Casing
MISS-2A	08:06	4.80	61.47	Riser Casing
MISS-2B	08:05	9.74	61.38	Riser Casing
MISS-4A	08:44	5.10	57.17	Riser Casing
MISS-4B	08:45	8.97	56.42	Riser Casing
MISS-5A	09:09	8.75	58.65	Riser Casing
MISS-5B	09:10	12.96	59.76	Riser Casing
MISS-7A	09:18	6.76	55.60	Riser Casing
MISS-7B	09:17	8.71	55.77	Riser Casing
B38W01S	10:24	4.78	56.57	Riser Casing
B38W02D	10:31	12.84	78.04	Riser Casing
B38W03B	08:40	7.71	58.27	Riser Casing
B38W04B	08:36	8.58	65.64	Riser Casing
B38W05B	09:26	6.72	70.98	Riser Casing
B38W07B	09:05	6.33	54.98	Riser Casing
B38W12AR	09:31	4.49	49.90	Riser Casing
B38W12B	09:30	3.69	49.64	Riser Casing
B38W14S	10:07	3.28	43.89	Riser Casing
B38W14D	10:13	0.58	43.79	Riser Casing
B38W15S	09:47	3.31	46.75	Riser Casing
B38W15D	09:50	2.96	47.04	Riser Casing
B38W17A	09:41	6.24	53.24	Riser Casing
B38W17B	09:40	6.44	53.28	Riser Casing
B38W18D	07:59	1.90	57.85	Riser Casing
B38W19S	09:14	12.64	59.91	Riser Casing
B38W19D	09:13	13.45	59.98	Riser Casing
B38W24S	08:48	6.47	55.04	Riser Casing
B38W24D	08:54	6.28	54.91	Riser Casing
MW-25S	08:59	6.64	58.85	Riser Casing
MW-25D	09:01	10.16	58.13	Riser Casing
MW-26S	08:26	10.32	61.36	Riser Casing
MW-26D	08:24	8.93	60.12	Riser Casing

Water Level Record Sheet

Quarter: 3rd
Date: 7/31/2007
Samplers: J.Cook, D.Whitlock

Well Number	Time (24-hour format)	Average Depth to Water (0.01 ft)	Top of Riser Elevation (0.01 ft)	Measurement Reference Point
MISS-1AA	08:12	15.63	62.70	Riser Casing
MISS-1B	08:14	15.45	61.98	Riser Casing
MISS-2A	08:10	10.15	61.47	Riser Casing
MISS-2B	08:08	11.36	61.38	Riser Casing
MISS-4A	08:48	10.29	57.17	Riser Casing
MISS-4B	08:50	10.78	56.42	Riser Casing
MISS-5A	08:59	12.81	58.65	Riser Casing
MISS-5B	09:01	15.71	59.76	Riser Casing
MISS-7A	09:08	8.53	55.60	Riser Casing
MISS-7B	09:09	10.38	55.77	Riser Casing
B38W01S	10:04	6.47	56.57	Riser Casing
B38W02D	09:58	16.38	78.04	Riser Casing
B38W03B	08:36	9.87	58.27	Riser Casing
B38W04B	08:32	10.51	65.64	Riser Casing
B38W05B	09:18	12.30	70.98	Riser Casing
B38W07B	08:56	9.42	54.98	Riser Casing
B38W12AR	09:22	5.88	49.90	Riser Casing
B38W12B	09:23	5.28	49.64	Riser Casing
B38W14S	09:48	4.32	43.89	Riser Casing
B38W14D	09:49	2.48	43.79	Riser Casing
B38W15S	09:38	4.95	46.75	Riser Casing
B38W15D	09:40	4.23	47.04	Riser Casing
B38W17A	09:31	8.63	53.24	Riser Casing
B38W17B	09:30	8.66	53.28	Riser Casing
B38W18D	08:04	4.19	57.85	Riser Casing
B38W19S	09:06	15.07	59.91	Riser Casing
B38W19D	09:04	15.39	59.98	Riser Casing
B38W24S	08:44	9.20	55.04	Riser Casing
B38W24D	08:46	8.91	54.91	Riser Casing
MW-25S	08:39	9.80	58.85	Riser Casing
MW-25D	08:41	11.70	58.13	Riser Casing
MW-26S	08:25	12.11	61.36	Riser Casing
MW-26D	08:23	10.52	60.12	Riser Casing

Water Level Record Sheet

Quarter: 4th
Date: 10/29/2007
Samplers: J. Cook, D. Whitlock

Well Number	Time (24-hour format)	Average Depth to Water (0.01 ft)	Top of Riser Elevation (0.01 ft)	Measurement Reference Point
MISS-1AA	07:51	16.91	2.70	Riser Casing
MISS-1B	07:53	15.75	61.98	Riser Casing
MISS-2A	07:47	10.96	61.47	Riser Casing
MISS-2B	07:49	11.67	61.38	Riser Casing
MISS-4A	08:26	9.95	57.17	Riser Casing
MISS-4B	08:28	10.93	56.42	Riser Casing
MISS-5A	08:44	13.70	58.65	Riser Casing
MISS-5B	08:42	15.69	59.76	Riser Casing
MISS-7A	08:52	7.67	55.60	Riser Casing
MISS-7B	08:51	10.74	55.77	Riser Casing
B38W01S	09:38	6.80	56.57	Riser Casing
B38W02D	09:43	16.40	78.04	Riser Casing
B38W03B	08:14	10.29	58.27	Riser Casing
B38W04B	08:10	11.78	65.64	Riser Casing
B38W05B	08:57	14.15	70.98	Riser Casing
B38W07B	08:38	9.80	54.98	Riser Casing
B38W12AR	09:02	6.46	49.90	Riser Casing
B38W12B	09:03	6.08	49.64	Riser Casing
B38W14S	09:26	4.52	43.89	Riser Casing
B38W14D	09:30	2.42	43.79	Riser Casing
B38W15S	09:16	5.23	46.75	Riser Casing
B38W15D	09:19	4.59	47.04	Riser Casing
B38W17A	09:10	9.16	53.24	Riser Casing
B38W17B	09:11	9.16	53.28	Riser Casing
B38W18D	07:44	5.05	57.85	Riser Casing
B38W19S	08:46	15.69	59.91	Riser Casing
B38W19D	08:47	15.88	59.98	Riser Casing
B38W24S	08:18	9.37	55.04	Riser Casing
B38W24D	08:12	9.07	54.91	Riser Casing
MW-25S	08:35	11.24	58.85	Riser Casing
MW-25D	08:34	12.00	58.13	Riser Casing
MW-26S	08:03	13.05	61.36	Riser Casing
MW-26D	08:01	11.52	60.12	Riser Casing

APPENDIX D FIGURES

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APPENDIX D FIGURES

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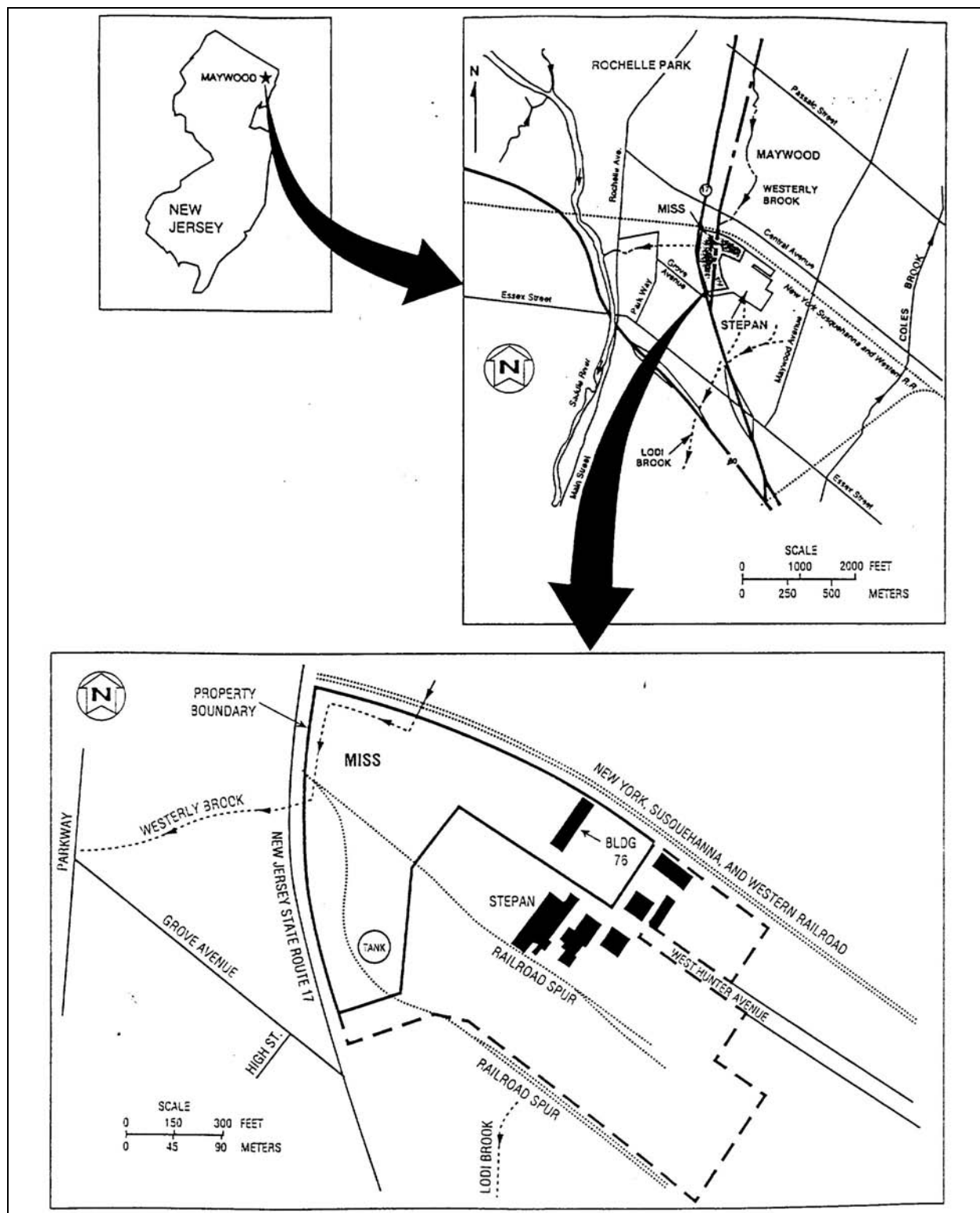


Figure D-1
MISS, Site Location and Map

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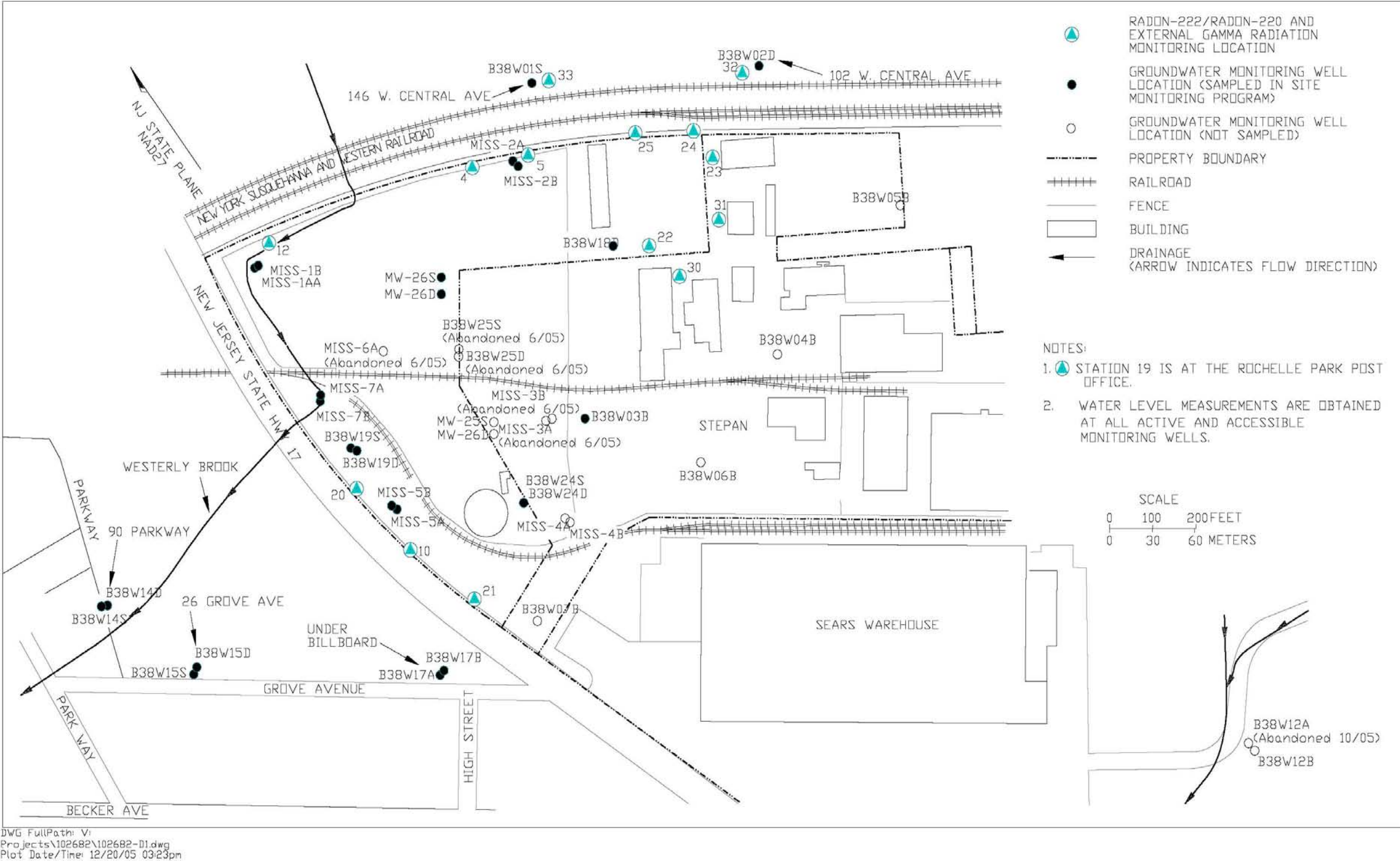


Figure D-2
Sampling Locations: External Gamma Radiation, Radon-222 / Radon-220, and Groundwater Monitoring Wells

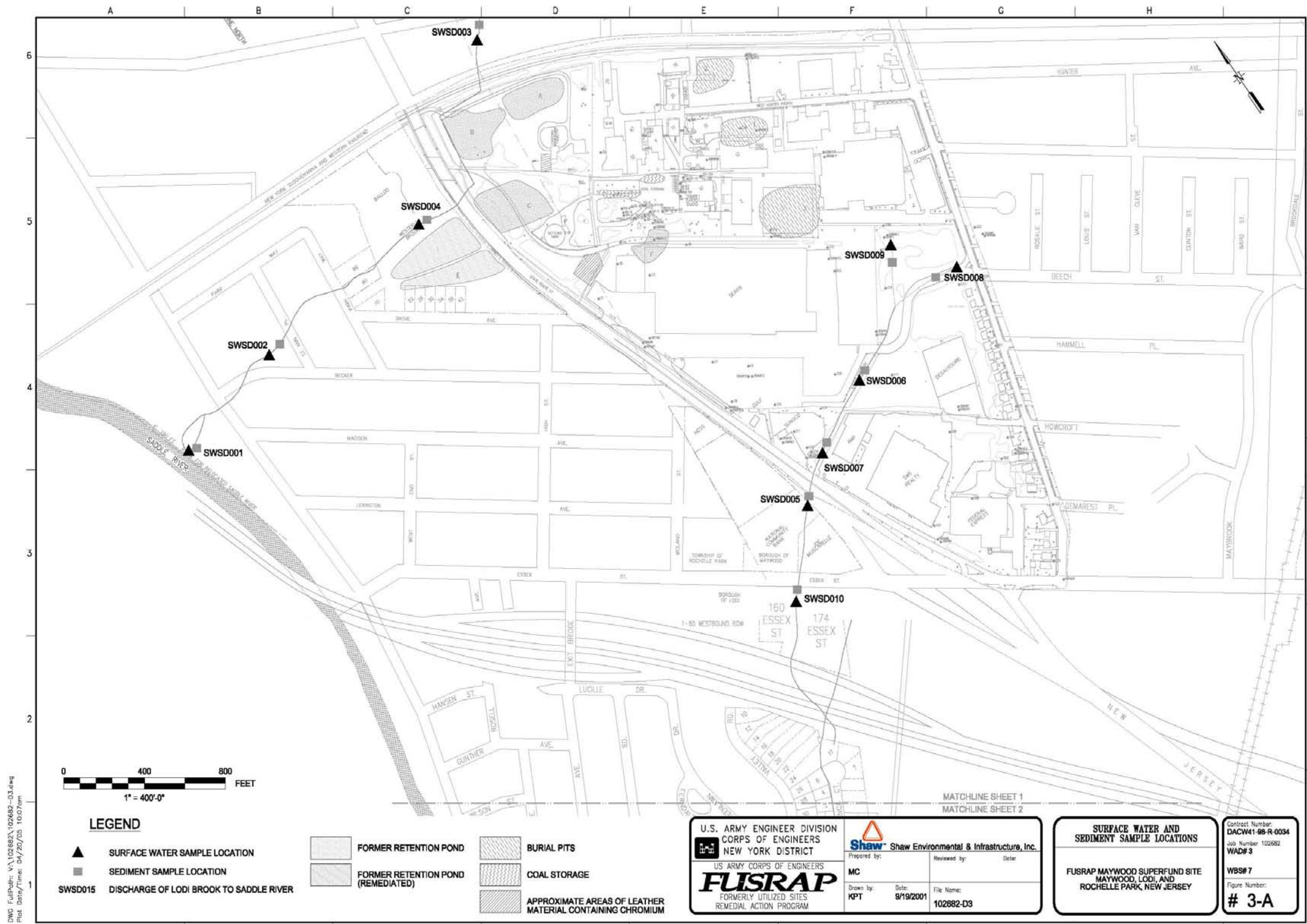


Figure D-3A
Surface Water and Sediment Sample Locations

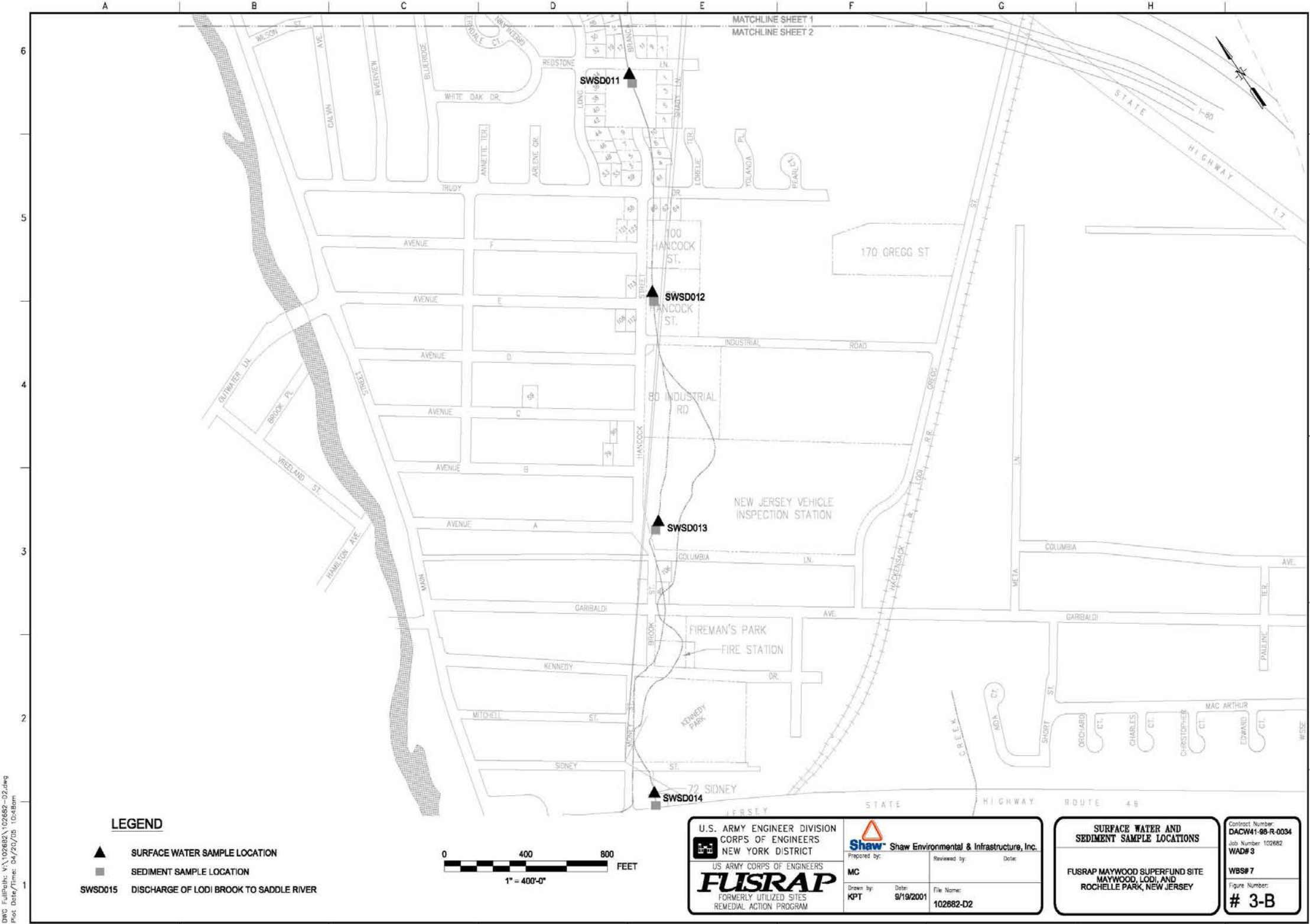


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Surface Water and Sediment Sample Locations

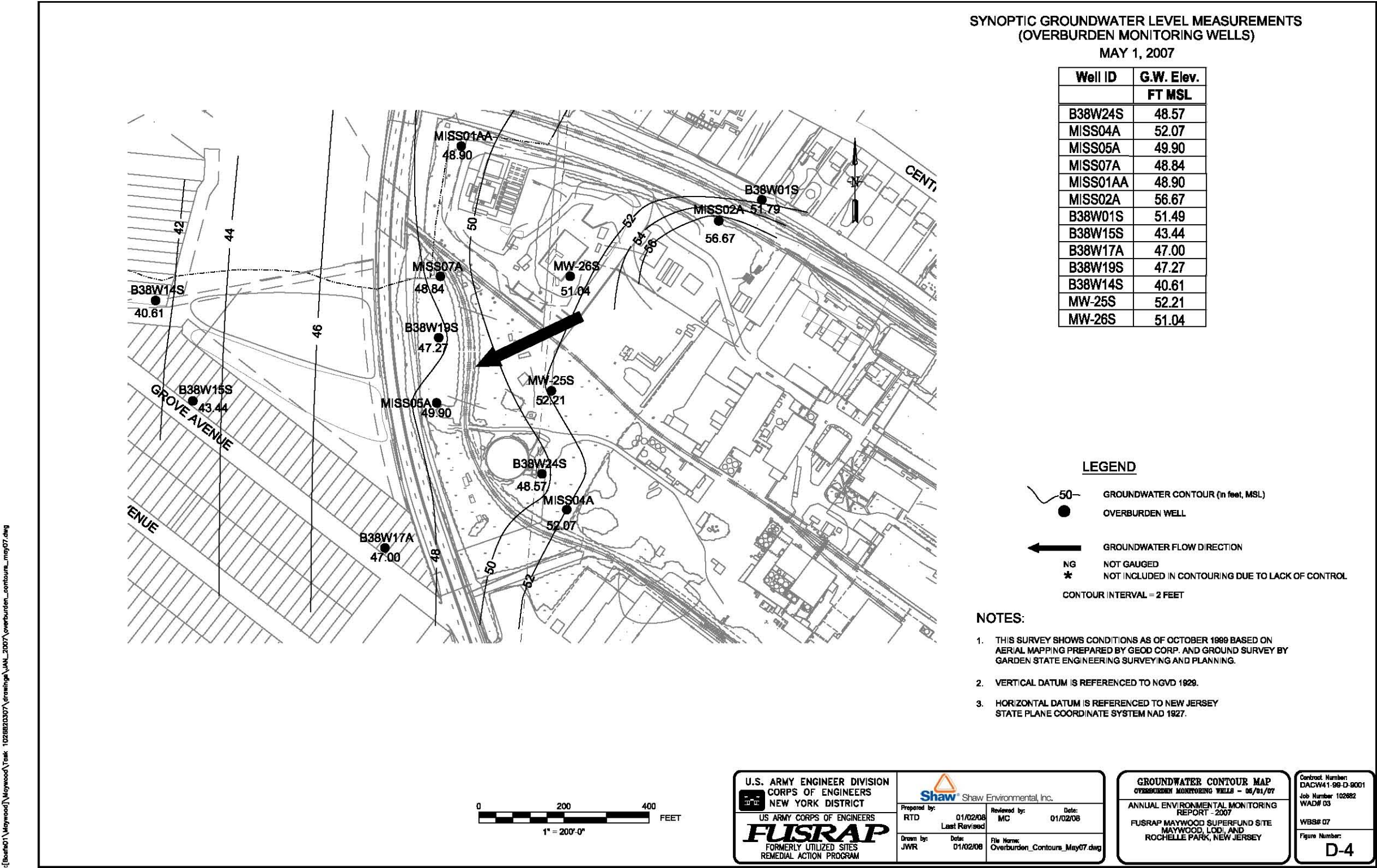


Figure D-4
Synoptic Groundwater Level Measurements, Overburden Monitoring Wells – May 1, 2007

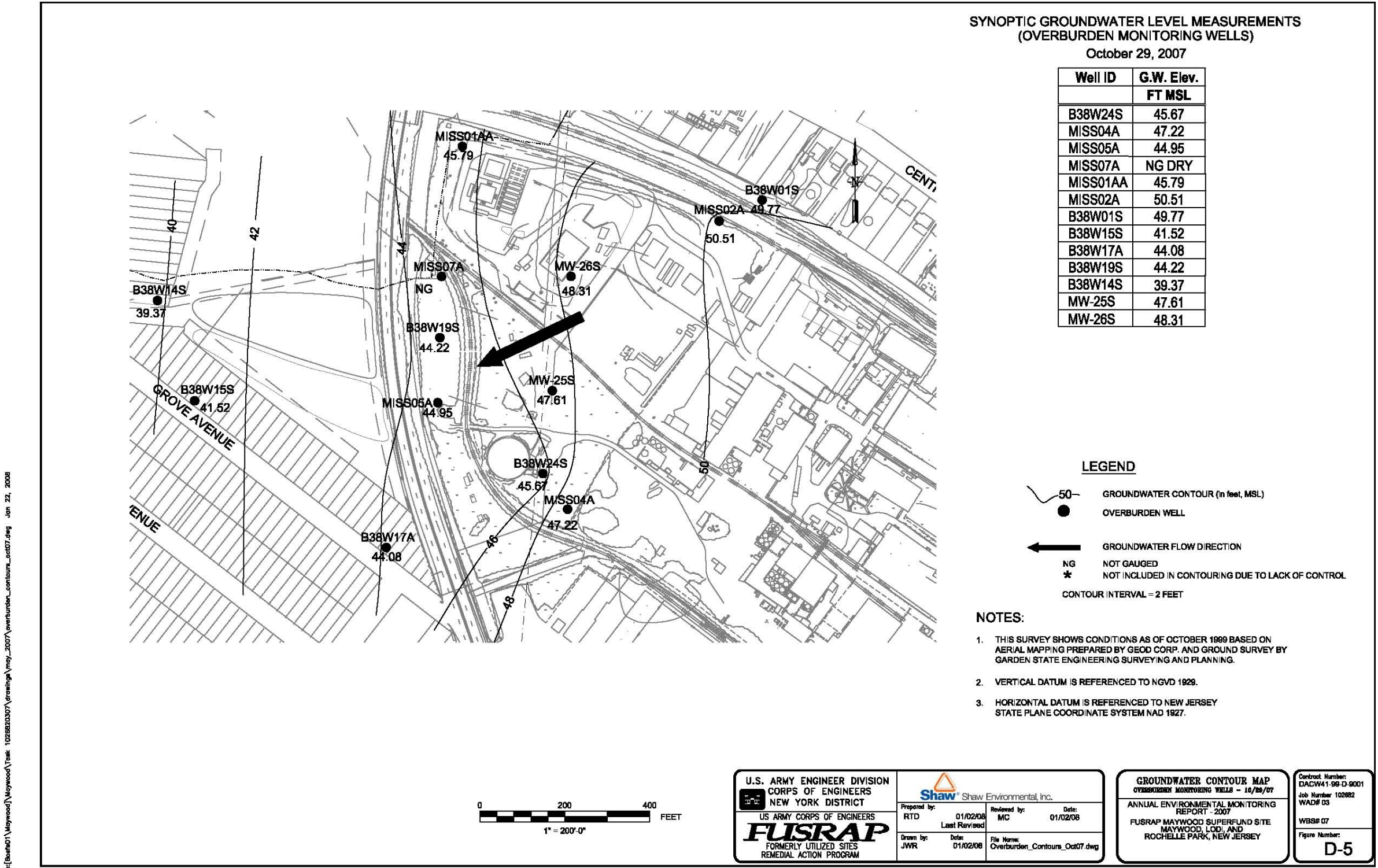


Figure D-5
Synoptic Groundwater Level Measurements, Overburden Monitoring Wells – October 29, 2007

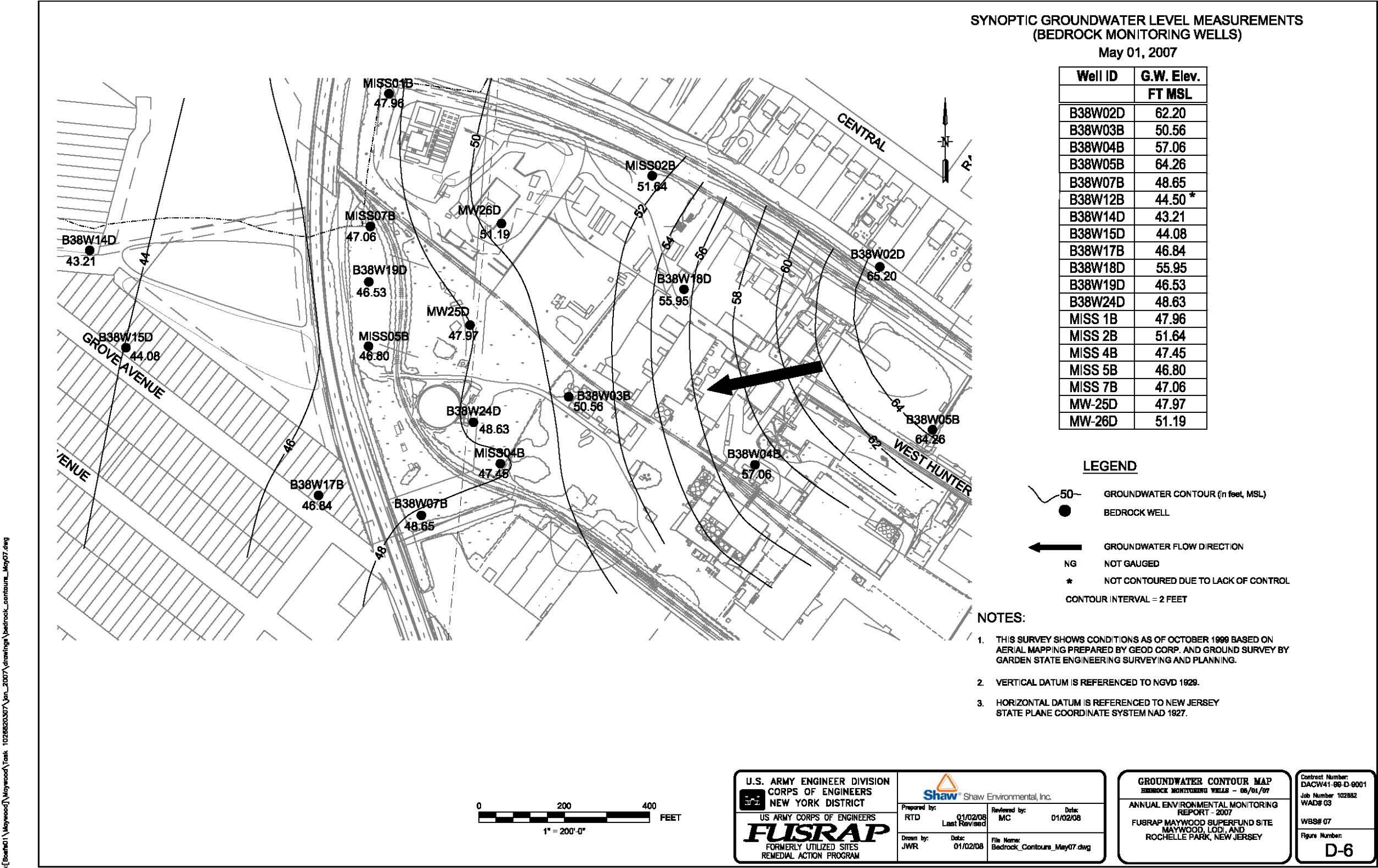


Figure D-6
Synoptic Groundwater Level Measurements, Bedrock Monitoring Wells – May 1, 2007

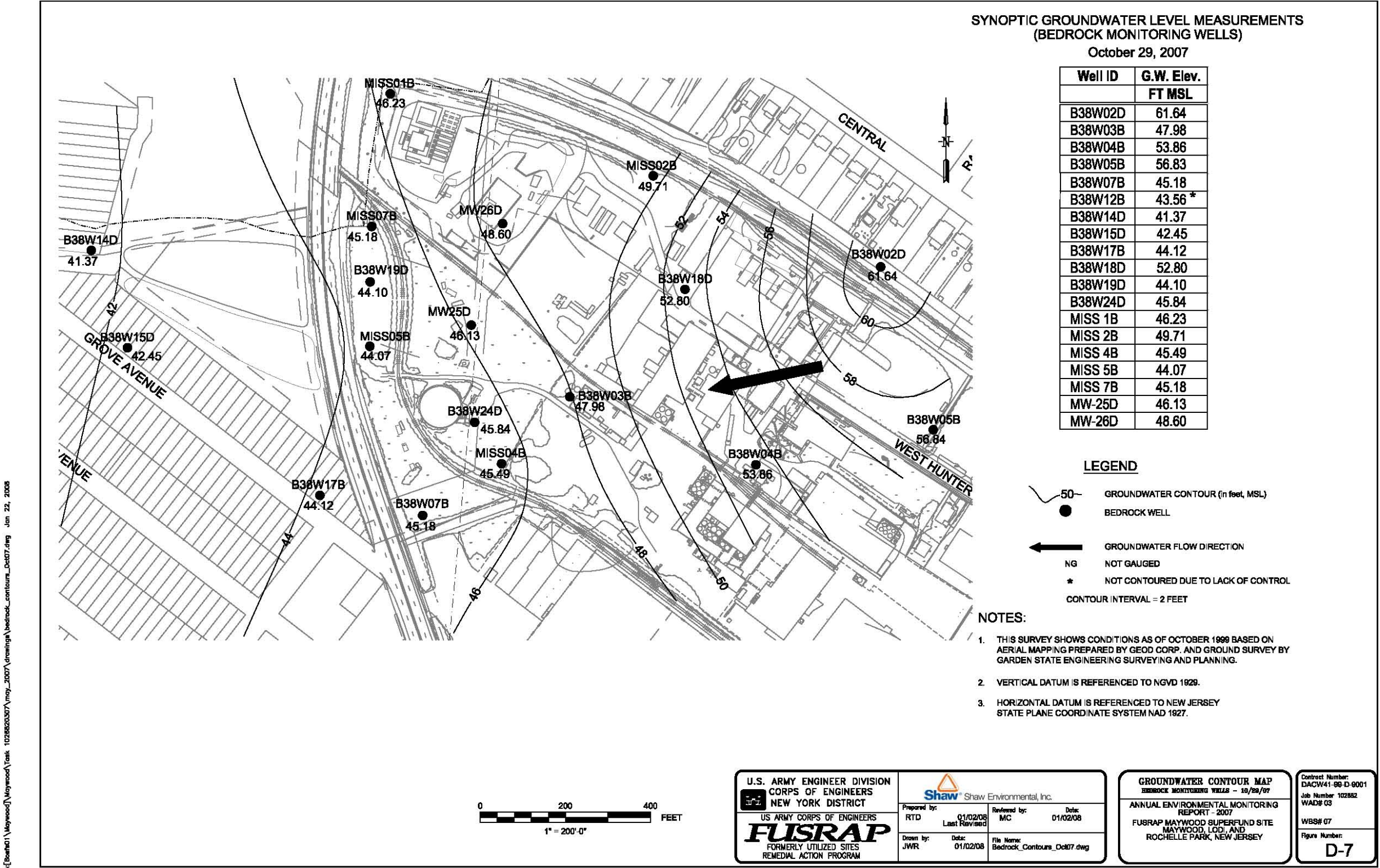
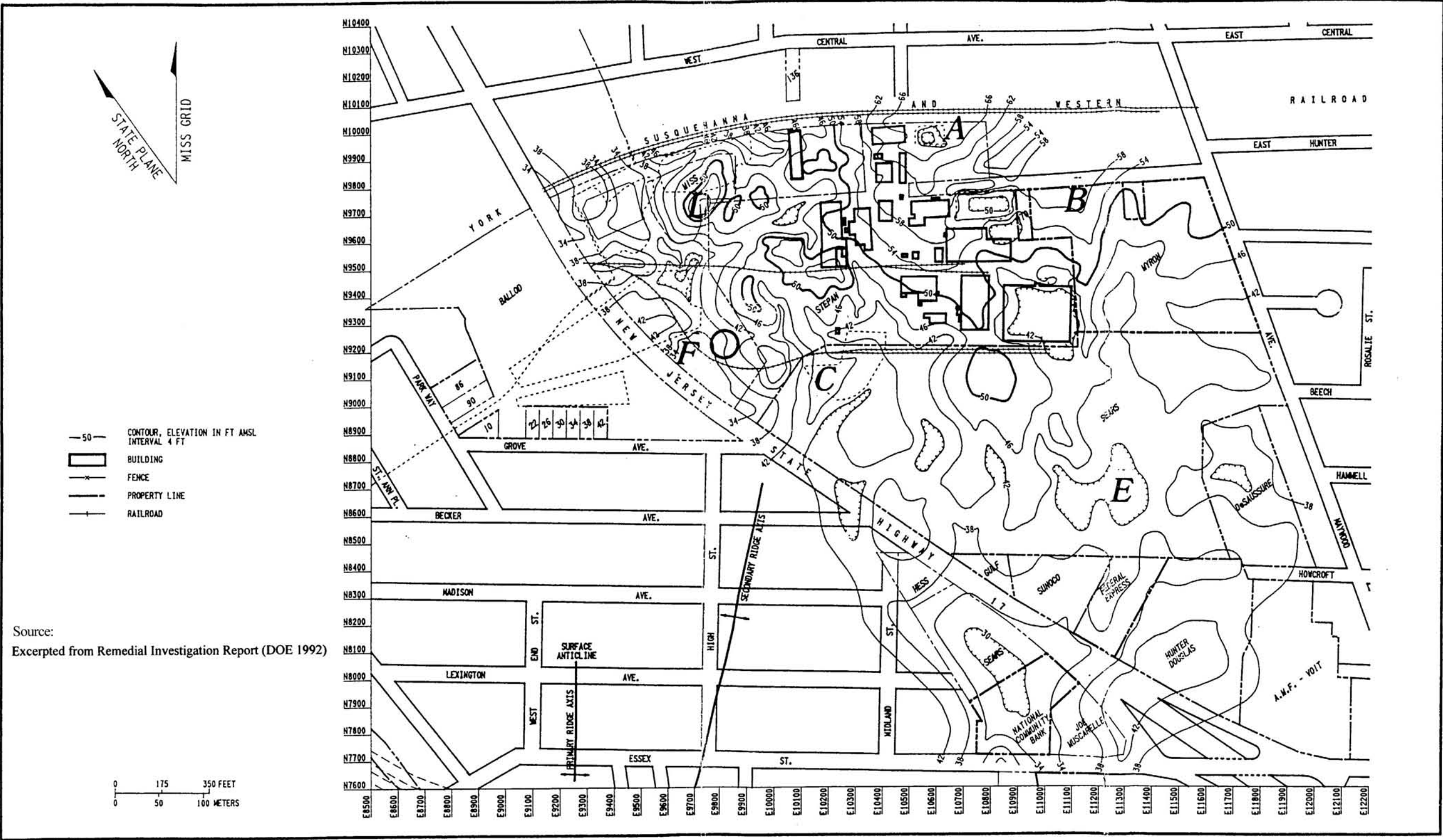


Figure D-7
Synoptic Groundwater Level Measurements, Bedrock Monitoring Wells – October 29, 2007



APPENDIX E

ANNUAL NESHAP COMPLIANCE REPORT FOR THE YEAR 2007

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Annual NESHAP Compliance Report For the Year 2007

Formerly Utilized Sites Remedial Action Program Maywood Superfund Site

Prepared by:

Shaw Environmental, Inc.
100 West Hunter Avenue
Maywood, New Jersey 07607

Prepared for:



**US Army Corps
of Engineers®**

Contract No. DACW41-99-D-9001

June 2008

ANNUAL NESHAP COMPLIANCE REPORT, YEAR 2007

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT No. DACW41-99-D-9001
TASK ORDER No. 0003
WAD 03, WBS 07**

Submitted to

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10007

Submitted by:

Shaw Environmental, Inc.
100 West Hunter Avenue
Maywood, NJ 07607

June 2008

Issued to: _____

Date: _____

Copy No. _____ ☐ Controlled ☐ Uncontrolled

ANNUAL NESHAP COMPLIANCE REPORT, YEAR 2007

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

SITE-SPECIFIC ENVIRONMENTAL RESTORATION

CONTRACT No. DACW41-99-D-9001

TASK ORDER No. 0003

WAD 03, WBS 07

Submitted to

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

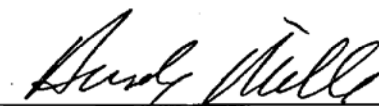
Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10007

Submitted by:

Shaw Environmental, Inc.
100 West Hunter Avenue
Maywood, NJ 07607

June 2008

Reviewed / Approved by:

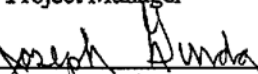


Andy Mills
Project Manager

Date:

6/24/08

Reviewed / Approved by:

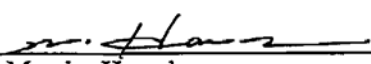


Joseph Gurda
Project Environmental Engineer

Date:

6/24/08

Reviewed / Approved by:

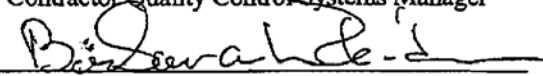


Maurice Hanashy
Contractor Quality Control Systems Manager

Date:

6/24/08

Reviewed / Approved by:



Barbara Reider
Certified Health Physicist

Date:

6/23/08

RECORD OF REVISIONS

Revision No.	Description of Revision	Date
A	Draft issue for internal review and comment	April 2008
B	Draft issue for USACE review and comment	May 2008
0	Issue to EPA	June 2008

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Note: Appendix C also contains an MS-Excel Spreadsheet on CD-ROM.

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ABBREVIATIONS AND ACRONYMS

Ac-227	actinium-227
Ac-228	actinium-228
AEC	Atomic Energy Commission
AP-42	Compilation of Air Pollutant Emission Factors – Volume 1
Bi-210	bismuth-210
Bi-211	bismuth-211
Bi-212	bismuth-212
Bi-214	bismuth-214
°C	degrees Centigrade
CAP88-PC	Clean Air Act Assessment Package 1988 – Personal Computer (Version 3.0)
CERCLA	Comprehensive Environmental Response, Compensation and Liabilities Act
cm	centimeters
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
E	east
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FMSS	Formerly Utilized Sites Remedial Action Program Maywood Superfund Site
Fr-223	francium-223
ft ²	square feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
g	gram
HEPA	High Efficiency Particulate Air
in.	inches
ICRP	International Commission on Radiological Protection
kph	kilometers per hour
km	kilometers
m	meters
m ²	square meters
m ³	cubic meters
MCW	Maywood Chemical Works
mi	miles
MISS	Maywood Interim Storage Site
ml	milliliter
mph	miles per hour
mrem	millirem
mrem/yr	millirem per year
mSy/yr	millisievert per year
NESHAP	National Emission Standards for Hazardous Air Pollutants
NJ	New Jersey
NJDOT	New Jersey Department of Transportation
NJMVC	New Jersey Motor Vehicle Commission
N	north
N/A	not applicable

ABBREVIATIONS AND ACRONYMS

NNE	north-northeast
NOAA	National Oceanic and Atmospheric Administration
ORNL	Oak Ridge National Laboratory
Pb-210	lead-210
Pb-211	lead-211
Pb-212	lead-212
Pb-214	lead-214
pCi/g	picocuries per gram
pCi/m ² /s	picocuries per square meter per second
Po-210	polonium-210
Po-211	polonium-211
Po-212	polonium-212
Po-214	polonium-214
Po-215	polonium-215
Po-216	polonium-216
Po-218	polonium-218
Pa-231	protactinium-231
Pa-234	protactinium-234
Pa-234m	protactinium-234 metastable
Ra	radium
Ra-223	radium-223
Ra-224	radium-224
Ra-226	radium-226
Ra-228	radium-228
Rn	radon
Rn-220	radon-220
Rn-222	radon-222
S	south
SLS	Sears Logistical Services
SSE	south-southeast
Th	thorium
Th-227	thorium-227
Th-228	thorium-228
Th-230	thorium-230
Th-231	thorium-231
Th-232	thorium-232
Th-234	thorium-234
Tl-207	thallium-207
Tl-208	thallium-208
U	uranium
U-234	uranium-234
U-235	uranium-235
U-238	uranium-238
UST	underground storage tank
USACE	U.S. Army Corps of Engineers
W	west
yd ³	cubic yards

1.0 FACILITY INFORMATION

1.1 REGULATORY OVERVIEW

The provisions of the National Emission Standards for Hazardous Air Pollutants (NESHAP), as codified in the Code of Federal Regulations, Title 40, Part 61 (40 CFR 61), Subpart H, apply to operations at any facility owned or operated by the U.S. Department of Energy (DOE) that emits any radionuclides other than radon-222 (Rn-222) or radon-220 (Rn-220) into the air. These provisions state that emissions of radionuclides to the ambient air from DOE facilities shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent of 10 millirems per year (mrem/yr).

To determine compliance with the NESHAP-Subpart H standard, radionuclide emissions shall be determined and effective dose equivalent values to members of the public calculated using U.S. Environmental Protection Agency (EPA) approved sampling procedures, computer models Clean Air Act Assessment Package – 1988 Personal Computer (CAP88-PC) or Clean Air Act Compliance Software for Personal Computers (AIRDOS-PC), or other procedures for which the EPA has granted prior approval. Compliance with this standard shall be determined by calculating the highest effective dose equivalent to any member of the public at any off-site point where there is a residence, school, business or office. The owners or operators of an applicable facility shall submit an annual compliance report to both the EPA headquarters and the appropriate regional office by June 30.

Activities at the DOE-owned Maywood Interim Storage Site (MISS) result in the emissions of radiologically contaminated particulates into the air. Thus, the MISS is an applicable facility and this report has been prepared to satisfy the requirements of 40 CFR 61, Subpart H by USACE on behalf of the DOE. A detailed description of the MISS, the site history, and emission sources of radionuclides is provided below.

1.2 SITE DESCRIPTION

The MISS is an 11.7-acre (4.7-hectare) property located in the Borough of Maywood and the Township of Rochelle Park in Bergen County, New Jersey (NJ). The MISS lies approximately 12 miles (mi) (20 kilometers [km]) northwest of New York City and 13 mi (21 km) northeast of Newark, NJ (see **Appendix A, Figure A-1**). The MISS property was previously part of a 30-acre (12-hectare) property owned by the Stepan Company and it was formerly part of the Maywood Chemical Works (MCW). The property is bordered on the west by NJ Route 17; on the north by the New York, Susquehanna, and Western Railway line; and on the south and east by commercial and industrial properties.

The MISS is part of the Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site, or FMSS. The FMSS consists of 88 residential, commercial, municipal, and state or Federal properties designated under the Comprehensive Environmental Response, Compensation, and Liabilities Act (CERCLA). All 64 residential and municipal properties have been remediated either by the DOE or U.S. Army Corps of Engineers (USACE) during Phase I. The remaining 24 properties are being addressed by the USACE in Phase II and were sub-divided into 12 Clusters (i.e., sets of contiguous properties) to facilitate the pre-design investigation and subsequent removal actions for those properties (see **Appendix A, Figure A-2**). The interim storage of radiologically contaminated material removed from the clusters occurs at the DOE-owned MISS.

Land use in the vicinity of the MISS is primarily commercial and residential (see **Appendix A, Figure A-3**). The nearest schools are located approximately 0.5 mi (0.8 km) northeast and northwest of the MISS. There is no farmland in the vicinity of the MISS.

Based on the National Oceanic and Atmospheric Administration (NOAA) records for the year 2007 for Teterboro Airport (NOAA 2007b), monthly average temperatures ranged from a low of 28.7 degrees Fahrenheit (°F) (-1.8 degrees Centigrade [°C]) in February to a high of 75.9°F (24.2°C) in July. Total monthly precipitation ranged from a low of 1.66 inches (in.) (4.2 centimeters [cm]) in May to a high of 13.62 in. (34.6 cm) in April. Monthly average wind speed ranged from a low of 5.4 miles per hour (mph) (8.7 kilometers per hour [kph]) from the west in August to a high of 10.1 mph (16.3 kph) from the west-northwest in February. The most frequent winds are from the north closely followed by north-northwest and the south (see **Appendix A, Figure A-4**). In addition, winds with a westerly component occur more frequently than those with an easterly component while southeast winds are the least frequent wind direction.

Due to the absence of on-site meteorological monitoring data, observations from Teterboro Airport were used to represent the general climatic conditions at the MISS. Teterboro Airport is located approximately 3 mi (4.8 km) south of the MISS and thus, meteorological data collected at this location is considered to be the best available data to represent the climatic regime at the MISS.

1.3 SITE HISTORY

The MISS was established to provide storage for low level radioactive soils found in the vicinity of the former MCW. From 1916 through 1959, the MCW processed monazite sand (a thorium-containing ore) for industrial uses. Process wastes were placed in surface impoundments on-site. Some of these process wastes migrated off-site via surface water drainage and some were later used as mulch and fill on nearby properties, contaminating them with radioactive thorium (Th).

After the enactment of the Atomic Energy Act of 1954, the Atomic Energy Commission (AEC) issued a license to the MCW for the processing and manufacture of radioactive material. The MCW stopped processing Th in 1959 and shortly thereafter was sold to the Stepan Company. Based on AEC inspections and information, remedial actions were performed by the Stepan Company.

Subsequent radiological surveys from 1980 to 1984 identified additional areas of contamination, both on-site and off-site. Through a provision of the Energy and Water Development Appropriations Act of 1984, Congress authorized the DOE to conduct a decontamination research and development project at the former MCW site. The site was subsequently assigned to FUSRAP. In 1984, the DOE negotiated a lease for Stepan Company land on which the MISS would be established. The land was transferred in 1985 to DOE ownership and currently provides interim storage for contaminated materials removed from vicinity properties.

FUSRAP was transferred from DOE to the USACE by Congressional action. The limits of USACE's responsibilities for the FMSS are defined under a Federal Facilities Agreement (FFA) between DOE and the EPA, Region II, which became effective April 22, 1991. The USACE became a successor to the DOE as of October 13, 1997.

1.4 MODEL SOURCES

The computer program used to model potential off-site exposure from airborne emissions is the CAP88-PC program -Version 3.0 (Shroff 2006). Airborne emissions contributing to off-site exposure could occur from areas where the radioactively contaminated soil is exposed to the elements and from

operations that generate airborne emissions (see **Appendix A, Figure A-5**). During the year 2007, the potential sources of airborne emissions at the MISS and vicinity properties were as follows:

- In situ, contaminated areas totaling approximately 635,000 square feet (ft²) (59,000 square meters [m²]) of the MISS and the adjacent Stepan Company property (within the MISS fence line) were potentially exposed to wind erosion during the year 2007.
- The performance of soil load-out, transportation, and disposal operations at the MISS during the year 2007. Specifically, twelve (12) soil load-out operations were performed during the year 2007. The various soil stockpiles consisted of soil and debris that had been transported to the MISS from the remedial actions/construction activities performed at the following nine (9) properties: Cluster No. 2C (80 Industrial Road); Cluster No. 2D (8 Mill Road); Cluster 5A (99 Essex Street); Cluster 5B (113 Essex Street); Cluster No. 6C (167 NJ Route 17 North); Cluster No. 6D (239 NJ Route 17 North); Cluster No. 9A (149-151 Maywood Avenue); Cluster No. 12B (100 West Hunter Avenue) and Cluster No. 12C (NJ Route 17 ROW). These 12 load-outs involved the movement of approximately 47,884 tons of material, which was placed into rail cars for transport to a disposal facility in Utah. The nearest commercial / residential buildings are located approximately 440 feet (135 meters [m]) west of the MISS soil load-out area.
- The performance of a remedial action at Cluster No. 2C (80 Industrial Road) which is comprised of a single lot in the Borough of Lodi: Block 205.02, Lot 4.02, occupying an area of about 3.6 acres. The remedial action involved the excavation of a small area adjacent to the building that was previously inaccessible; approximately 768 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m); the nearest residences are located approximately 213 feet (65 m).
- The performance of a remedial action at Cluster No. 2D (8 Mill Street) which included the New Jersey Department of Motor Vehicles (NJDMV) inspection and driver testing areas and additional areas along Hancock Street and the property boundary with 60 Industrial Road. The year 2007 remedial action involved the excavation of approximately 13,635 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 130 feet (40 m) northeast of Cluster No. 2D; the nearest residences are located approximately 295 feet (90 m) northwest of Cluster No. 2D.
- The performance of a remedial action at Cluster No. 5A (99 Essex Street) which is comprised of a single lot in the Borough of Maywood: Block 125, Lot 1, occupying an area of approximately 1.3 acres. The remedial action involved the excavation of contaminated soil on the northern and southern sides of the building; approximately 4,185 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m) northeast of Cluster No. 5A; the nearest residences are located approximately 885 feet (270 m) north-north-west of Cluster No. 5A.
- The performance of a remedial action at Cluster No. 5B (113 Essex Street) which is comprised of a single lot in the Borough of Maywood: Block 125, Lot 2, covering an area of approximately 2.1 acres. This remedial action involved the excavation of contaminated soil on the northern, eastern and western sides of the building; approximately 9,901 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m) south of Cluster No. 5B; the nearest residences are located approximately 575 feet (175 m) north-northwest of Cluster No. 5B.
- The performance of a remedial action at Cluster 6C (167 NJ Route 17 North), which is comprised of a single lot in the Borough of Maywood: Block 124, Lot 2, occupying an area of approximately 1.7 acres. The property, which was formerly operated by Sunoco, included an inactive gasoline service area (pump islands) and a one-story 800-ft² cinder block building. The

building was demolished in October 2005. The remedial action involved the excavation of contaminated soil in the utility corridor adjacent to NJ Route 17 northbound; approximately 4,192 tons of soil was loaded into trucks and transported to the fabric structure at the MISS. The nearest commercial buildings are located approximately 197 feet (60 m) west-northwest of Cluster No. 6C; the nearest residences are located approximately 509 feet (155 m) west-northwest of Cluster No. 6C.

- The performance of a remedial action at Cluster No. 6D (239 NJ Route 17 North) which is comprised of a single lot in the Borough of Maywood: Block 124, Lot 2, occupying an area of about 0.4 acre. The property, which was formerly operated by Gulf, included an inactive gasoline service area (pump islands) and a one-story 800-ft² cinder block building. The building was demolished in 2006 to facilitate future remedial actions. The remedial action involved the excavation of contaminated soil in the utility corridor adjacent to NJ Route 17 northbound; approximately 5,056 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 130 feet (40 m) west of Cluster No. 6D; the nearest residences are located approximately 410 feet (125 m) west-northwest of Cluster No. 6D.
- The performance of a remedial action at Cluster No. 9A which is located in both the Borough of Maywood and the Township of Rochelle Park. This property is located at 149-151 Maywood Avenue and occupies Block 124, Lot 30 within the Borough of Maywood and Block 17.02, Lot 1 within the Township of Rochelle Park. The property comprises approximately 27 acres and is occupied by the Sears Logistical Services (SLS). The remedial action involved the excavation of contaminated soil at various locations to support the installation of perimeter lighting and a catch basin/drain manhole and to perform repairs for a broken fire hydrant and water line; approximately 884 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 148 feet (45 m) west of Lodi Brook; the nearest residences are located approximately 330 feet (100 m) west-southwest of the area near Maywood Avenue.
- The performance of a remedial action at Cluster No. 12B (100 West Hunter Avenue [MISS]) to support the construction of the Stepan haul road. This road will facilitate future remediation of the triangle properties (Cluster Nos. 9A, 10A and 12B) by providing more direct access to the MISS for the disposal of the contaminated soil. The new haul road will also allow the use of off road vehicles which have a much larger capacity and will eliminate the need to use public roads for transporting the contaminated soil from the triangle properties to the fabric structure. This removal action involved the excavation of approximately 2,037 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 540 feet (165 m) west of Cluster No. 12B; the nearest residences are located approximately 540 feet (165 m) west of Cluster No. 12B.
- The performance of construction activities (MISS improvements) at Cluster No. 12B (100 West Hunter Avenue [MISS]) to improve storm water drainage in the vicinity of the restricted area including the concrete bulkhead adjacent to the rail spur that is used for the soil load-out operations. In addition, an alternate haul road was constructed on the west side of the MISS to facilitate the flow of truck traffic on the roads at the MISS during soil load-outs. This effort involved the excavation of approximately 6,276 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 540 feet (165 m) west of Cluster No. 12B; the nearest residences are located approximately 540 feet (165 m) west of Cluster No. 12B.
- The performance of a remedial action for a portion of Cluster No. 12C to facilitate a New Jersey Department of Transportation (NJDOT) roadway improvement project for the NJ Route 17/Essex

Street interchange. The remedial action involved the excavation of approximately 660 tons of soil in the NJ Route 17 ROW adjacent to Cluster Nos. 5A, 5B and 5C that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 100 feet (30 m) south of Cluster No. 12C; the nearest residences are located approximately 640 feet (195 m) northwest of Cluster No. 12C.

- The performance of an excavation to support the repair of a damaged water line located at the intersection of Columbia Lane and Hancock Street. This effort involved the excavation and transport of 290 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 590 feet (180 m) northeast of the Columbia Lane water line repairs. The nearest residential receptors are located approximately 50 feet (15 m) south, south-southwest, and south-southeast of the Columbia Lane water line repairs.
- The operation of the exhaust system for the soil sample preparation laboratory located in the on-site radiochemistry laboratory at the MISS. Soil samples collected for the various soil load-outs at the MISS from excavations performed at the vicinity properties were brought to this laboratory to prepare the samples for radiological analysis. The individual soil samples were dried and then ground before placing the soil into sealed containers. The grinding operations were performed on a downdraft table. Air from the downdraft table is routed to a high efficiency particulate air (HEPA) filter and then exhausted into the general room air of the preparation laboratory. The emissions of particulates to the ambient air from the grinding operations in the soil sample preparation laboratory are nil.

The above sources of radiologically contaminated airborne particulates resulting from the remedial actions at the vicinity properties and soil handling/load-out activities at the MISS are shown on **Figure A-5** as well as the locations of the surrounding residences and commercial buildings. The simulated airborne emissions from these potential sources are used by CAP88-PC to estimate the annual dose from airborne particulates to the population within 50 mi (80 km) of the site (see **Appendix C**). In addition, for user-defined distances from the center of the emission areas, CAP88-PC estimates individual effective dose equivalents in all compass directions. For specific potentially exposed individuals (workers and residents) at known distances and compass directions from the site, the user can determine and compare the calculated effective dose equivalents. For purposes of these analyses, workers are defined as employees at off-site work locations rather than the construction workers involved in the performance of the remedial actions at the vicinity properties or activities at the MISS.

Analyses were performed separately for the soil load-outs, Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions, and construction activities for the MISS improvements and Columbia Lane water line repair given the differences in receptor locations most affected by each of these areas. The in situ wind erosion emissions and the soil preparation laboratory emissions were found to be negligible and thus, these sources were not included in the modeling analyses. Where individual receptors are affected by more than one emission source, doses caused by those sources are added. The individual (worker or resident) corresponding to the maximum effective dose equivalent is identified as the hypothetical maximally exposed individual. Because the dose received from airborne emissions is dependent on prevailing wind direction in addition to the proximity to the site, the hypothetical maximally exposed individual is not necessarily the person nearest the site. The model was used to predict the annual effective dose at numerous receptors resulting from the combined impact of the above sources. Although the model determined the annual effective dose at numerous receptors, only the hypothetical maximally exposed resident and worker are discussed in this report.

The individual effective dose equivalents given in the CAP88-PC output are based on the default assumption that the receptor occupies the location 100% of the time (i.e., 24 hours per day, 7 days per

week, 52 weeks per year). The occupancy factor of 100%, although conservative, is considered to be appropriate for a resident. To estimate the dose to an employee working normal hours, an occupancy factor of 27% (i.e., 9 hours per day, 5 days per week, and 52 weeks per year) is applied to the CAP88-PC result.

The program calculates the effective dose equivalents by combining the inhalation and ingestion intake rates and the air and ground surface concentrations with dose conversion factors provided in Federal Guidance Report 13 (FGR13 1999). Dose and risk conversion factors include the effective dose equivalent calculated according to the methods in the International Commission on Radiological Protection's (ICRP) Publication 72, "Age Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5. Compilation of Ingestion and Inhalation Dose Coefficients" (ICRP 1996). Although FGR 13 contains age-dependent dose factors, CAP88-PC only uses the adult factors in order to retain consistency with previous versions of CAP88-PC. CAP88-PC calculates dose to the 23 internal organs modeled in FGR 13, in addition to the 50-year effective dose equivalent. Doses can be tabulated as a function of radionuclide, pathway, location, and organ as shown in the output (see **Appendix C**, pages 32 – 199) for the CAP88-PC runs.

1.5 DETAILED SOURCE DESCRIPTIONS

As discussed in the previous section, the key sources of airborne radioactive particulate releases to the atmosphere during the year 2007 were the 12 soil load-outs at the MISS, Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions, and the construction activities for the MISS improvements and Columbia Lane water line repair (**Appendix A, Figures A-2 and A-5**). In addition, in situ wind erosion at the MISS and operation of the on-site radiochemistry laboratory were potential sources of radioactive particulates. A more comprehensive discussion of the activities performed at the above sources, including the soil radiological concentrations and the potential pathways for the airborne release of contaminated particulates, is provided below.

1.5.1 Soil Load-Outs at the MISS

During the year 2007, various stockpiles were created at the MISS consisting of soil and debris that was transported to the on-site fabric structure from the remedial actions performed at Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C properties as well as construction activities for the MISS improvements and Columbia Lane water line repair. The fabric structure is a 72 feet wide (21.9 m), 100 feet (30.5 m) long, and 24 feet (7.3 m) high truss frame building (see **Appendix B, Figure B-1**). The trusses are made of galvanized steel located 10 feet (3.1 m) apart. The cover is made of a heavy duty, fire rated, rip stop reinforced polyethylene. Each end of the structure has a roll-up fabric door. Placement of the soil stockpiles inside the fabric structure prevented wind erosion and the generation of storm water runoff from the piles. Concrete blocks were placed around the fabric structure to prevent storm water run-on from entering the structure and contacting the piles.

Twelve (12) soil load-out, transportation, and disposal operations were performed during the year 2007. For each soil load-out, **Table 1-1** provides the time period, the tonnage of soil shipped, the properties from which the soil originated, and the number of rail cars used for off-site shipment. Each rail car held approximately 70 to 85 cubic yards (yd³) (53.5 to 65.0 cubic meters [m³]) of soil. All of the soil was transported by rail to the EnergySolutions facility in Clive, Utah for disposal.

Table 1-1
Year 2007 Soil Load-Outs at the MISS – Operational Data

Soil Load-Out	Time Period	Soil Shipped (tons)	Soil Origin (Cluster)	Number of Rail Cars Shipped
Number 1	Jan. 22 – Jan. 31	4,264	2D,6D	40
Number 2	Feb. 21 – Mar. 12	4,264	2C,2D,5B,6D	40
Number 3	Mar. 13 – Mar. 20	2,666	2D,5B,6D	25
Number 4	Apr. 18 – Apr. 25	4,693	2D,5B,6D	44
Number 5	Apr. 26 – May 10	5,759	2D,5B,6D	54
Number 6	Jun. 5 – Jun. 14	5,117	2D,5B,6C	40
Number 7	Jul. 19 – Jul. 30	4,159	2D, 5B, 6C	39
Number 8	Aug. 27 – Sep. 4	3,521	5B, 6C,12B	33
Number 9	Sep. 17 – Sep. 27	4,909	5B,6C,9A,12B	46
Number 10	Oct. 15 – Oct. 17	2,133	5A,6C,12B	20
Number 11	Dec. 3 – Dec. 11	3,197	5A,5B,9A,12B	30
Number 12	Dec. 11 – Dec. 20	3,202	5A,5B,12B,12C	30
	Total	47,884		441

Upon arrival at the MISS, the soil in the dump trucks from the vicinity properties is emptied on the ground at the soil staging area and subsequently placed inside the fabric structure using a front end loader or excavator. If the fabric structure is full, the soil is placed into a temporary storage pile located to the east of the fabric structure. The temporary storage pile is covered with a tarp when soil handling operations are completed to prevent wind-generated dust emissions. During soil load-outs, only the working face of the pile is uncovered to minimize dust emissions.

A front end loader is used to transport soil directly from either the fabric structure or the outside stockpile into rail cars containing liners. In 2004, a concrete bulkhead was constructed adjacent to the rail spur to allow soil to be directly loaded into the rail cars using a front end loader. An excavator was no longer needed to load soil into the rail cars from the storage bins thereby eliminating one soil handling compared to the original load-out operation.

In addition, the concreted bulkhead allows the front end loaders access to all of the six on-site rail cars without having to move the train. An average of six rail cars is loaded each day for shipment to the off-site disposal facility. The maximum number of rail cars loaded on a daily basis for off-site disposal is eight.

In 2007, various improvements were made at the MISS to facilitate soil load-out operations and improve storm water management in the vicinity of the restricted area including the concrete bulkhead used for soil load-out operations. These improvements included paving a large portion of the bulkhead with asphalt; creation of a retention pond; and re-grading the area north of the asphalt pavement and east of the fabric structure to divert storm water into the retention pond (see Section 1.5.10 for more detailed information on the MISS improvements). These improvements resulted in a more stable and cleaner working surface for soil load-out operations; eliminated the need for periodic clean-up of the track bed for the MISS rail spur from soil washing off the bulkhead; and better overall environmental management of the storm water.

The use of a liner ensured that the rail cars complied with U.S. Department of Transportation (DOT) requirements, the waste materials were protected from the elements, the potential loss of soil during shipping was prevented, and potential impacts to the community were minimized. In **Appendix B, Figure B-1** shows various photographs depicting the soil load-out operation.

Prior to loading the soil into each rail car, a composite sample was generated from the soil in the stockpile. Numerous soil samples were collected from the perimeter of the stockpile. These samples were homogenized into one composite sample and analyzed by gamma spectroscopy for Th, radium (Ra), and uranium (U). The average soil radionuclide concentrations of thorium-232 (Th-232), radium-226 (Ra-226), and uranium-238 (U-238) for the various soil load-outs are shown in **Table 1-2**.

In addition, the soil moisture content was determined for each individual rail car. A portion of the composite sample generated for radiological analysis of each rail car was used to determine the soil moisture content. If the moisture content of the soil was too high, a pre-determined amount of absorbent material (based upon the soil moisture content) was placed on top of the soil in the loaded railcars.

Upon completion of loading, the liner was closed and an outgoing radiological release rail car survey performed. Prior to a loaded rail car being shipped off-site for disposal, an inspection of the rail car liner was performed by the Contractor Quality Control Manager to ensure that the liners were properly secured, no defects were present in the liner, no loose soil is present on the liner, and the proper labels and placards were attached in accordance with the DOT's requirements.

Table 1-2
Year 2007 Soil Load-Outs at the MISS – Average Soil Radionuclide Concentrations

Soil Load-Out	Time Period	Soil Shipped (tons)	Th-232 Concentration (pCi/g) ¹	Ra-226 Concentration (pCi/g)	U-238 Concentration (pCi/g)
Number 1	Jan. 22 – Jan. 31	4,264	4.20	0.76	0.99
Number 2	Feb. 21 – Mar. 12	4,264	2.38	0.63	0.88
Number 3	Mar. 13 – Mar. 20	2,666	2.07	0.50	0.73
Number 4	Apr. 18 – Apr. 25	4,693	3.39	0.82	1.22
Number 5	Apr. 26 – May 10	5,759	5.25	1.08	1.52
Number 6	Jun. 5 – Jun. 14	5,117	3.16	0.68	1.05
Number 7	Jul. 19 – Jul. 30	4,159	1.60	0.52	0.86
Number 8	Aug. 27 – Sep. 4	3,521	3.50	1.10	1.22
Number 9	Sep. 17 – Sep. 27	4,909	6.10	1.20	1.29
Number 10	Oct. 15 – Oct. 17	2,133	1.75	0.57	1.11
Number 11	Dec. 3 – Dec. 11	3,197	3.66	0.91	1.08
Number 12	Dec. 11 – Dec. 20	3,202	4.41	1.18	1.39
	Total	47,884			

Note 1: (pCi/g) = picocuries per gram.

1.5.2 Cluster No. 2C Remedial Action

Cluster No. 2 consists of four properties in the Borough of Lodi. The property located at 100 Hancock Street is called Property No. 02A; 80 Hancock Street is called Property No. 02B, 80 Industrial Road is called Property No. 02C; while the property located at 8 Mill Street is called Property No. 02D.

Property No. 02C occupies Block 205.02, Lot 4.02 in the Borough of Lodi and is approximately 3.6 acres in size. The property is currently owned and occupied by American Jewel Windows. A one story concrete block building covers more than one quarter of the property. There is an asphalt-paved parking lot along the north-western side and an asphalt-paved parking/loading area along the eastern side of the property. There is a vegetated area on the northern side of the building.

An employee parking lot for about 25 to 30 cars is located on the east side of the property.

A buried conduit containing the present-day channel of Lodi Brook runs parallel to Hancock Street through this property. Prior to realignment during property development, Lodi Brook ran across the property in a southeasterly direction through the area where the building now stands. This former channel is the suspected transport mechanism for the radiological contamination found at the site as well as the placement of radiologically contaminated fill material from the MCW over the years. The property is bordered to the north by Industrial Road, to the west by Hancock Street, and east by a commercial building and to the south by Property No. 02D.

The excavation for the remedial action at Cluster No. 2C commenced on January 16, 2007 and continued through January 24, 2007. The excavation of impacted soils at Cluster No. 2C during 2007 was performed for a small area adjacent to the west side the building located at 80 Industrial Road (see **Appendix A, Figure A-5**). The depth of the excavation was approximately 6 feet.

A main electrical feeder pole and transformer were located in this area and thus, the nearby contaminated soil was inaccessible when earlier excavations were being performed. During 2007, an addition was being constructed on the western side of the building. This action required that the main electrical feeder pole and transformer be relocated and provided an opportunity for the previously inaccessible soil to be excavated and the remedial action to be completed. The final restoration of the project was completed in October 18, 2007.

During 2007, a total of approximately 768 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the dump trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 2C properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-2** shows selected photographs of the Cluster No. 2C remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 2C soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 2.38, 0.63, and 0.88 pCi/g, respectively.

1.5.3 Cluster No. 2D Remedial Action

Cluster No. 2 consists of four properties in the Borough of Lodi. The property located at 100 Hancock Street is called Property No. 02A; 80 Hancock Street is called Property No. 02B; 80 Industrial Road is called Property No. 02C; while the property located at 8 Mill Street is called Property No. 02D.

Property No. 02D occupies Block 205.02, Lot 1 in the Borough of Lodi and is approximately 13.6 acres in area. The property is bordered on the north by Property No. 02C, on the south by Columbia Lane, on the east by Gregg Street, and on the west by Hancock Street.

The property is currently owned by the State of New Jersey and occupied by the Lodi Motor Vehicle Agency and the NJMVC's Inspection Station. There is a one-story concrete block/brick veneer building that houses offices for inspection station personnel and personnel employed by the Lodi Motor Vehicle Agency. Approximately half of the property is covered with asphalt pavement and the other half with grassy islands.

The Lodi Motor Vehicle Agency issues titles, licenses and registration; and administers the associated written and driving tests to obtain a license. The western portion of the property is used for driving tests and the eastern section is used for vehicle inspections. The remainder of the property and northeast portion of the building are used for licensing and driver testing. The primary access to the building is via the northern entrance on Mill Street. Typically, several hundred people are present on the property daily for vehicle inspections, licensing and driver testing.

A buried culvert containing the present-day channel of the Lodi Brook runs through the western portion of this property. Prior to realignment during the property development, the Lodi Brook ran across the property in a southeasterly direction. This former channel is the suspected transport mechanism for the radiological contamination found at the site as well as the placement of radiologically contaminated fill material from the MCW over the years.

Excavation of contaminated soil had previously been performed at Cluster No. 2D through December 2006. The excavation of contaminated soil for the remedial action at Cluster No. 2D resumed on January 9, 2007 and continued through June 25, 2007. The excavation started in the western corner of the property; the initial excavation removed contaminated soil just above the ground water level and deeper areas extending below the ground water level were remediated by continuous pumping and transporting water during excavation.

The excavation of contaminated soils was completed at the NJMVC's vehicle inspection area and driver testing area. In addition, excavation was performed for an area along the property line with 60 Industrial Road and a small area adjacent to Hancock Street (see **Appendix A, Figure A-5**). The depth of the excavation ranged from approximately 2 to 10 feet.

During 2007, a total of approximately 13,635 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the dump trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 2D properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-3** shows selected photographs of the Cluster No. 2D remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 2D soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.15, 0.71, and 1.04 pCi/g, respectively.

1.5.4 Cluster No. 5A Remedial Action

Cluster No. 5 is comprised of three properties located within the Borough of Maywood. The property located at 99 Essex Street is called Property No. 05A; the property located at 113 Essex Street is called Property No. 05B; while the property located at 200 NJ Route 17 is called Property No. 05C.

Cluster No. 5A is comprised of a single lot within the Borough of Maywood: Block 125, Lot 1, which has a size of approximately 1.3 acres. The property contains a two story building and is surrounded by asphalt pavement with small landscaped areas adjacent to the building on three sides. The building contains offices, open clerical areas and conference rooms. A basement area contains offices, storage areas and a boiler room.

The west side of the property is bordered by the 113 Street building. The NJ Route 17 exit ramp lies east of the property and Essex Street borders the property to the south.

Over the years, radiologically contaminated soil from the former MCW was transported downstream to the Cluster No. 5 properties via an open channel (i.e., Lodi Brook). After time, the open channel was diverted into a culvert that channels the Lodi Brook and local storm water to the Saddle River. During the installation of the culvert at Cluster No. 5 properties, the contamination was spread unknowingly when the contaminated soil was used as backfill. In addition, residents were known to use the process waste generated by the former MCW as fill material. These were the major mechanisms for the distribution of radiologically impacted materials to off-site properties such as Cluster No. 5.

The excavation for the remedial action at Cluster No. 5A commenced on September 28, 2007 and continued throughout the year. The excavation of impacted soils at Cluster No. 5A started on the south side of the building located at 99 Essex Street. Excavation was next performed on the north side of the building progressing from east to west (see **Appendix A, Figure A-5**). The depth of the excavation ranged from 2 to 6 feet.

During 2007, a total of approximately 4,185 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the dump trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 5C properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-4** shows selected photographs of the Cluster No. 5A remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 5A soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.27, 0.89, and 1.19 pCi/g, respectively.

1.5.5 Cluster No. 5B Removal Action

Property No. 05B is comprised of a single lot within the Borough of Maywood: Block 125, Lot 2, which has a size of approximately 2.1 acres. A two-story, brick veneer building, constructed in the mid-1960's, is located on the property. The property and building were recently purchased by Tru Med Properties; only a few employees presently work in the building. Most of the property is covered with asphalt pavement utilized for parking areas, with a small landscaped lawn area located in front of the building. Property No. 05B is bounded to the north by Property No. 05C, to the east by NJ Route 17, to the west by commercial properties, and to the south by Property No. 05A.

Over the years, radiologically contaminated soil from the former MCW was transported downstream to the Cluster No. 5 properties via an open channel (i.e., Lodi Brook). After time, the open channel was diverted into a culvert that channels the Lodi Brook and local storm water to the Saddle River. At present, the Lodi Brook crosses the property in a 10-foot wide concrete box culvert located a few feet south of the original easement, which is at the rear of the on-site building. The four catch basins located in the parking lot collect storm runoff from the site and ultimately direct the flow to the eastern section of the site and to the Lodi Brook culvert.

During the installation of the culvert at Cluster No. 5 properties, the contamination was spread unknowingly when the contaminated soil was used as backfill. In addition, residents were known to use the process waste generated by the former MCW as fill material. These were the major mechanisms for the distribution of radiologically impacted materials to off-site properties such as Cluster No. 5.

The excavation for the remedial action at Cluster No. 5B commenced on February 6, 2007 and continued throughout the year. Excavation of impacted soils was performed on the northern, eastern and western sides of the building as well as for a small area adjacent to NJ Route 17 southbound (see **Appendix A, Figure A-5**). The depth of the excavation ranged from 2 to 10 feet.

The remedial action involved the excavation and transport of approximately 9,901 tons of soil. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the trucks were emptied and soil stockpiled using a front-end loader before placement into the fabric structure. At both the Cluster No. 5B properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-5** shows selected photographs of the Cluster No. 5B remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 5B soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.55, 0.86, and 1.12 pCi/g, respectively.

1.5.6 Cluster No. 6C Remedial Action

Cluster No. 6 consists of five properties within the Borough of Maywood. The property located at 85-103 NJ Route 17 North is called Property No. 06A; 137 NJ Route 17 North is called Property No. 06B; 167 Route 17 North is called Property No. 06C; 239 NJ Route 17 is called Property No. 06D; while 29 Essex Street is called Property No. 06E.

Cluster No. 06C occupies Block 124, Lot 2 in the Borough of Maywood and is owned, and was formerly operated, by Sunoco. The Sunoco Service Station, which included a one-story 800-ft² cinder block building, was inactive for several years. The building was demolished in October 2005. The 1.7-acre parcel is bordered to the northwest by Property No. 06D, to the southeast by Property No. 06B, to the north by Cluster No. 9, and to the southwest by the northbound lane of NJ Route 17.

On the eastern side of the property, a southwest-draining swale carries the east branch of Upper Lodi Brook along the approximate course of the former natural stream channel. The centerline and right embankment are located on Property No. 06C and the top of the left embankment is located on adjacent Property No. 06B. After heavy rainfalls in September 1999 associated with Hurricane Floyd, a surface layer of sediments was cleaned out and the swale was reshaped and seeded in this reach. The work was authorized under a time-critical removal action to reduce the potential for sediment contaminant transport.

To the northwest, perimeter drains and culverts drain the western portion of Cluster No. 9 and other areas from the northwest to the southeast. There is a southeastward-draining interceptor in the utility corridor alongside the northbound lane of NJ Route 17.

Downstream from Property No. 06C, the Upper Lodi Brook's east and west branches flow in separate conduits through the NJ Route 17 embankment. They combine downstream in a junction box just west of

the southbound lane, within Cluster No. 5. The transport of Lodi Brook sediments and erosion of contaminated fill from along its course were the primary mechanisms for radioactive contamination to this, neighboring, and downstream properties.

The excavation for the remedial action at Cluster No. 6C commenced on May 16, 2007 and continued throughout the year. Excavation of impacted soils was performed in the utility corridor adjacent to NJ Route 17 northbound which included a 30 inch diameter high pressure gas main, a 53 inch by 34 inch elliptical reinforced concrete storm drain and a 16 inch sewer pipe (see **Appendix A, Figure A-5**). Excavation was performed to a maximum depth of 10 feet.

During 2007, a total of approximately 4,192 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 6C properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-6** shows selected photographs of the Cluster No. 6C remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 6C soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.22, 0.81, and 1.11 pCi/g, respectively.

1.5.7 Cluster No. 6D Remedial Action

Cluster No. 6 consists of five properties within the Borough of Maywood. The property located at 85-103 NJ Route 17 North is called Property No. 06A; 137 NJ Route 17 North is called Property No. 06B; 167 Route 17 North is called Property No. 06C; 239 NJ Route 17 is called Property No. 06D; while 29 Essex Street is called Property No. 06E.

Cluster No. 6D occupies Block 124, Lot 1 in the Borough of Maywood. The property is bordered on the north by Cluster 9, on the west by the northbound lane of NJ Route 17, and on the southeast by Cluster No. 6C. Runoff from Cluster No. 6D runs east-southeast toward the western branch of upper Lodi Brook.

This 0.4 acre parcel was formerly an active Gulf Service Station owned by Cumberland Farms. There was a one-story 800-ft² brick veneer building with two gasoline service islands. The area surrounding the building was covered by asphalt pavement except for two landscape planters containing shrubs and a strip of grass at the rear of the building. The building was demolished in 2006 to facilitate future remedial actions.

Excavation of contaminated soil had previously been performed at Cluster No. 6D through December 2006. The excavation for the remedial action at Cluster No. 6D resumed on January 4, 2007 and continued through July 24, 2007. Excavation of impacted soils was performed in the utility corridor adjacent to NJ Route 17 northbound which included a 30 inch diameter high pressure gas main, a 24 inch reinforced concrete storm drain and a 16 inch sewer line (see **Appendix A, Figure A-5**). Excavation was performed to a maximum depth of 12.5 feet.

Approximately 5,056 tons of soil was excavated from Cluster No. 6D and transported by truck to the MISS for subsequent disposal. Upon arrival at the MISS, the trucks were emptied and the soil transferred

into the fabric structure using a front-end loader. At both the Cluster No. 6D properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-7** shows selected photographs of the Cluster No. 6D remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 6D soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.46, 0.76, and 1.07 pCi/g, respectively.

1.5.8 Cluster No. 9A Remedial Action

Cluster No. 9 consists of one property in the Borough of Maywood and the Township of Rochelle Park. This property is located at 149-151 Maywood Avenue and occupies Block 124, Lot 30 within the Borough of Maywood and Block 17.02, Lot 1 within the Township of Rochelle Park. The property comprises approximately 27 acres and is occupied by SLS.

There is a 6.5-acre two-story cinder block building on the property. The first floor contains a large warehouse, loading dock, boiler room, dispatch office, customer pickup area, employee locker room and offices. The second floor contain offices, work areas for telemarketers, conference and staff training areas and office space.

Approximately 11 acres of the site are paved; the remaining areas are vegetated including a 3-acre wetland located on the east side of the warehouse. There are two rail spurs behind the warehouse on the border with Cluster No. 10. The property is bounded by New Jersey Route 17 on the west; by Cluster No. 6 on the south; Cluster No. 8 and Maywood Avenue on the east; and by Cluster No. 11 and Cluster No. 10 on the north.

The excavation for the remedial action at Cluster No. 9A commenced on May 29, 2007 and continued periodically through October 29, 2007. Excavation of impacted soils was performed in the following areas: a small area located in the utility corridor adjacent to NJ Route 17 northbound to install a light pole base for the Sears Logistical Services (SLS) perimeter lighting; a small area located east of NJ Route 17 northbound near the boundary with Cluster No. 6C to install a catch basin/drain manhole as part of the 53 inch by 34 inch elliptical drain line replacement; a small area located along the SLS access road to repair a broken fire hydrant; and a small area located northwest of SLS to repair a broken water line (see **Appendix A, Figure A-5**). The depth of the excavations ranged from 2 feet for the broken fire hydrant to 10 feet for the elliptical drain line replacement.

A total of approximately 884 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the dump trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 9A property and the MISS, water sprays were used for dust suppression.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 9A soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 4.88, 1.06, and 1.19 pCi/g, respectively.

1.5.9 Cluster No. 12B - Stepan Haul Road at the MISS

Excavation was performed in 2007 for the construction of a haul road from the SLS property through the Stepan property to the MISS. The haul road is approximately 230 feet in length and 25 to 30 feet in width.

The haul road will provide a shorter route to the soil staging area at the MISS. The haul road will eliminate the need for the dump trucks to use public streets to transport the contaminated soil from the remediation of the triangle cluster properties (i.e., Cluster Nos. 9A, 10A and 11A) to the MISS. In addition, the haul road will allow the use of much larger capacity dump trucks (i.e., off-road trucks) to transport the contaminated soil from the remediation of the triangle cluster properties resulting in a more efficient and economical operation (see **Appendix A, Figure A-5**).

Construction activities commenced on September 21, 2007 and continued through the remainder of the year. The depth of excavation for the Stepan Haul Road ranged from 2 to 4 feet. A total of approximately 2,037 tons of soil was excavated and transported to the soil staging area by dump trucks and subsequently transferred into the fabric structure using a front-end loader. At the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-8** shows selected photographs of the construction activities for the Stepan Haul Road.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 12B soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.88, 0.99, and 1.22 pCi/g, respectively.

1.5.10 Cluster No. 12B - MISS Improvements

Various improvements were made at the MISS during 2007 to facilitate soil load-out operations and address storm water management in the vicinity of the restricted area including the concrete bulkhead that is used for soil load-out operations. Due to erosion from rainfall events, soil from the bulkhead area at MISS was transported onto the track bed of the MISS rail spur resulting in slippery conditions for the workers during load-outs. This was also a mechanism for the transport of contaminated soil beyond the restricted area. Consequently, it was necessary to perform periodic clean-up operations of the MISS rail spur track bed over the years.

The primary purpose of the MISS improvements was to eliminate the above condition by improving storm water management. Construction activities associated with the MISS improvements started on August 28, 2007 and continued throughout the remainder of the year.

To improve storm water management and provide a cleaner and more stable working surface, asphalt paving was installed along the entire length of the bulkhead; the width of the paved area stretched from the existing concrete pad in the center of the restricted area to the concrete bulkhead (see **Appendix A, Figure A-5**). The area paved with asphalt was approximately 24,000 square feet. The asphalt pavement was sloped to direct runoff away from the concrete bulkhead.

In addition, soil was excavated to create a retention pond on the western edge of the bulkhead; the pond is approximately 50 feet in width, 100 feet in length and approximately 8 feet deep. The pond was built to collect storm water from the restricted area.

The restricted area north of the asphalt pavement and east of the fabric structure was graded to divert the storm water to the retention pond thereby preventing soil from flowing over the bulkhead onto the rail tracks. Also, a swale was installed along the perimeter of the restricted area to prevent storm water from the clean area from entering the restricted area. The runoff flows around the restricted area to the rail spur using swales, catch basins and piping.

The benefits of the MISS improvements include the following:

- provides a stable and cleaner working surface for equipment operations and worker activities during soil load-outs;
- prevents run-on from the clean areas onto the restricted area
- contains and manages run-off from the restricted area by diverting the storm water to a retention pond; and
- eliminates the need for periodic clean-up of the rail track bed in the vicinity of the concrete bulkhead.

The final piece of the 2007 MISS improvements was the construction of an alternate haul road located west of the retention pond near NJ Route 17. This road was constructed to facilitate the flow of truck traffic on the roads at the MISS during soil load-outs.

The depth of the excavation ranged from 1 foot for the grading activities along the bulkhead in the restricted area to 13 feet for the retention pond and alternate haul road. A total of approximately 6,051 tons of soil was excavated and transported to the soil staging area and subsequently transferred into the fabric structure using a front-end loader. At the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-9** shows selected photographs of the construction activities for the MISS improvements.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 12B soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 3.88, 0.99, and 1.22 pCi/g, respectively.

1.5.11 Cluster No. 12C Remedial Action

The performance of a remedial action at Cluster No. 12C which is comprised of the NJ Route 17 ROW and extends approximately 3,000 feet along the eastern and western edges of NJ Route 17 from the intersection of the New York Susquehanna & Western Railway to near Essex Street. A remedial action was performed for a portion of the NJ Route 17 ROW to facilitate the NJDOT roadway improvement project for the NJ Route 17/Essex Street interchange.

The excavation for the remedial action at Cluster No. 12C commenced on December 17, 2007 and continued through December 20, 2007. Excavation was performed for two separate areas in the NJ Route 17 southbound ROW adjacent to Cluster Nos. 5A, 5B, and 5C. One excavated area was located adjacent to Cluster No. 5C and was 65 feet in length, 10 feet in width and 2.5 feet in depth; the other excavated area was located adjacent to Cluster Nos. 5B and 5C and was 300 feet in length, 10 feet in width and 2.5 feet in depth (see **Appendix A, Figure A-5**). The remedial action involved the excavation of approximately 660 tons of soil in the NJ Route 17 southbound ROW

Upon arrival at the MISS, the trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both the Cluster No. 12C properties and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-10** shows selected photographs of the Cluster No. 12C remedial action.

The average soil radionuclide concentrations for the excavated soil were determined from sampling that was conducted during the various load-outs at the MISS that included Cluster No. 12C soil. Composite samples were collected from the railcar soil stockpiles prior to loading. These samples were analyzed by gamma spectroscopy for Th, Ra, and U. The average radionuclide concentrations of Th-232, Ra-226, and U-238 obtained from the applicable soil load-outs were 4.41, 1.18, and 1.39 pCi/g, respectively

1.5.12 Columbia Lane Water Line Repair

A water line located at the intersection of Columbia Lane and Hancock Street was not operational and thus, it was necessary for the Passaic Valley Water Company to repair the line. To facilitate this effort, the excavation of impacted soils was performed to locate and expose the damaged section of the water line.

The excavation for the repair of the water line was performed on February 7, 2008. The water line was located under a 48 inch ID storm line that runs parallel to Hancock Street (see **Appendix A, Figure A-5**). The depth of the excavation for the water line repair was approximately 8 feet.

A total of 290 tons of soil was excavated and transported by truck to the MISS for subsequent disposal. An excavator was used to remove and load the soil into lined dump trucks. The dump trucks were covered with a tarp before proceeding to the MISS.

Upon arrival at the MISS, the dump trucks were emptied and the soil transferred into the fabric structure using a front-end loader. At both Columbia Lane and the MISS, water sprays were used for dust suppression. In **Appendix B, Figure B-11** shows selected photographs of the construction activities for the water line repair. The average radionuclide concentrations of Th-232, Ra-226 and U-238 obtained from sampling of the excavated soil was 4.14, 2.27 and 10.89 pCi/g, respectively.

1.5.13 In Situ Wind Erosion

The MISS and adjacent Stepan Company property (within the MISS fence line) consists of approximately 635,000 ft² (59,000 m²) of contaminated areas that were potentially exposed to wind erosion throughout the year 2007. Implementation of the MISS improvements during 2007 changed the surface characteristics of the northern portion of the MISS (north of the Stepan Company rail spur). Specifically, a significant increase in the amount of asphalt pavement at the MISS occurred due to the installation of asphalt on the concrete bulkhead (see Section 1.5.10).

The amount of bare soil present at the MISS, which has the greatest wind erosion potential, had decreased considerably from past years due to the placement of gravel / stone and a plastic liner over much of the area as well as the installation of a fabric structure for storage. The installation of additional pavement as part of the MISS improvements has further decreased the potential for in situ wind erosion at the MISS. At present, the approximate breakdown of the types of various surfaces found at the MISS and adjacent Stepan Company property (see **Appendix A, Figure A-5**) is the following: bare soil is 23,000 ft² (2,137 m²), vegetation is 238,000 ft² (22,111 m²), gravel / stone is 245,000 ft² (22,761 m²), water basin is 8,000 ft² (740 m²), asphalt is 114,000 ft² (10,591 m²) and fabric structure is 7,000 ft² (650 m²).

Other than for bare soil, the wind erosion potential for the other surfaces at the MISS is negligible. It should be noted that any storage piles created as a result of construction activities or removal actions were covered with tarps and sandbags to prevent wind erosion. In addition, best management practices such as spraying water on dry soil and the application of a calcium chloride solution was used during the year to reduce the potential for wind erosion. The calcium chloride solution was either applied by spray or by truck to the various surface types (i.e., gravel / stone, sparsely vegetated areas, and bare soil) at the MISS as well as the access roads. The wind erosion potential of radiologically contaminated particulates at the vicinity properties is minimal since significant ground cover is generally present and primarily subsurface contamination exists at these locations.

In order to assess the amount of wind erosion that occurred during the year 2007 at the MISS, it is necessary to determine the fastest 2-minute wind speeds over the course of the year and then compare them to the friction velocity most representative of bare soil as defined in EPA publication AP-42, *Compilation of Air Pollutant Emission Factors Volume 1: Stationary Point and Area Sources*, Chapter 13 “Industrial Wind Erosion” (EPA 2006). The fastest 2-minute wind speed is the highest observed wind speed over a 2-minute averaging period as compared to a peak gust with an averaging time of a few seconds. The fastest 2-minute wind speed is typically on the order of 30 mph, while a peak gust can be 60 mph or more. The threshold friction velocity is that wind speed just above ground level that is capable of causing erodible particles to become airborne.

As mentioned previously, meteorological data from nearby Teterboro Airport was used to represent conditions at the MISS. The results of this analysis showed that the fastest 2-minute wind speeds obtained from Teterboro Airport for the year 2007 do not result in the threshold friction velocity being exceeded at any time during the year. The fastest 2-minute wind speed at 33 feet above ground level would need to be 44 mph or greater to exceed the threshold friction velocity while the highest observed value during the year 2007 was 33 mph. Thus, by definition, no in situ wind erosion occurred at the MISS during the year 2007.

1.5.14 Soil Sample Preparation Laboratory

Soil sample preparation activities are performed in the radiochemistry laboratory at the MISS. Soil samples collected for the various soil load-outs at the MISS from excavations performed for the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions and the construction activities for the MISS improvements and Columbia Lane water line repair were taken to this facility to prepare them for radiological analysis. The laboratory is divided into three main functional areas: Preparation Lab, Wet Chemistry Lab, and the Counting Room. The Preparation Lab contains the convection ovens, the pulverizer grinder, the canner, analytic balances and a downdraft table. In **Appendix B, Figure B-12** shows selected photographs depicting operations at the soil sample preparation laboratory in the on-site radiochemistry laboratory.

Soil samples from the field operations or core samples are brought to the Preparation Lab. Samples are dried and homogenized to meet regulatory and industry standards for the analysis of soils. The contents of the samples are emptied into a “drying” pan and placed into an electric convection oven for at least four hours to dry the samples. Each sample is weighed before and after drying to establish the moisture content.

The presence of rocks or void spaces in the prepared sample could lead to inaccurate radioanalytical results. Therefore, after drying, the soil samples are transferred to a bench pulverizer grinder positioned on a downdraft table. The purpose of the grinding operation is to reduce the particulate size of the sample and to homogenize it for analysis. Rocks are separated from the sample and are not ground in the pulverizer. The dried and pulverized samples are then transferred to the “sample container” and weighed.

The particle size reduction allows for compaction of the soil into the given volume of the “sample container” minimizing void space. The remaining sample is also weighed to determine sample loss from the operation. The grinding of the individual soil samples results in very minimal particulate emissions.

The purpose of the downdraft table is to prevent the release of particulate emissions to the laboratory air from the grinding operation. The grinder sits atop the working surface of the downdraft table. The working surface is also where samples are transferred once dried and pulverized into the “sample container”. Air flow from the downdraft table is routed to a HEPA filter (particulate removal efficiency of 99.97%) and then exhausted into the general room air of the Preparation Lab.

Two types of sample containers were used in the Preparation Lab: “tuna can” style and “Marinelli” style. The “tuna can” container (approximately 227 milliliter [ml] in volume) provided a small geometry for the gamma spec detector and sat on top of the detector. The “Marinelli” style is a specially designed plastic container that fits over and around the detector. A “Marinelli” style container that is approximately 500 ml in volume was used to provide more sensitivity for the gamma spec analyses.

Approximately 376 “tuna can” style and 1,103 “Marinelli” style soil samples were prepared for radiological analysis from January 1, 2007 to December 31, 2007. The total time that grinding was performed during soil sample preparation was approximately 247 hours. The average weight of the soil samples prior to grinding was 581.2 grams (g). The average weight of the soil samples after grinding was 564.5 g. Thus, the average amount of “unrecovered” dried soil during the grinding process was approximately 16.7 g. At least 97.5% (16.28 g) of the “unrecovered” mass was subsequently recovered from the remaining soil not used to fill the sample containers and during the grinder decontamination process with no more than 2.5% (0.42 g) entering the HEPA filtration system as particulate emissions.

Based on the above, the total amount of airborne particulate emissions generated during the preparation of all the soil samples was approximately 621 g. However, after passage through the HEPA filter, the particulate emissions discharged to the general room air were approximately 0.19 g. The discharge of this miniscule amount of contaminated particulates to the atmosphere would have a negligible impact on the off-site radiological exposure; therefore, this source was not included in the CAP88-PC modeling analyses.

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2.0 AIR EMISSIONS DATA

The potential radionuclide particulate emission sources and controls for the year 2007 are summarized in **Table 2-1**.

Table 2-1
Description of Radionuclide Particulate Emissions Sources

Point Sources	Type Control	Efficiency
Soil Sample Preparation Laboratory	HEPA Filter	99.97%
Non-Point Sources	Type Controls	Efficiency
In situ soil	Gravel / Stone	99%
	Vegetative Cover	99%
	Bare Soil	0%
	Application of dust suppressant	Highly Effective
Soil Load-outs	Water sprays for dust suppression. Use of lined rail cars to prevent soil loss.	No credit taken for dust controls
Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions; and construction activities for the MISS improvements and Columbia Lane water line repair.	Water sprays for dust suppression. Use of lined containers / dump trucks with tarps when transporting soil to the fabric structure at the MISS.	No credit taken for dust controls

Radionuclide emission rates are based on the particulate release rates and average radionuclide source concentrations determined from sample measurements. The radioactive particulate release rates from in situ wind erosion, the various soil load-outs, and soil handling activities for the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions as well as construction activities for the MISS improvements and Columbia Lane water line repair are calculated using the EPA document AP-42 (EPA 2006).

Source concentration for isotopes of Th-232, Ra-226, and U-238 are based on average values determined for the various soil load-outs at the MISS from excavations performed for the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions and construction activities for the MISS improvements and Columbia Lane water line repair. Unknown radionuclide source concentrations are based on the known source concentrations assuming secular equilibrium in the decay chains. The radionuclide emissions for the year 2007 from each of the above emission sources, with the exception of the soil sample preparation laboratory, are shown in **Table 2-2**.

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Table 2-2
Year 2007 – Airborne Radionuclide Emissions from Various Source Operations (Curies per year)

Source Radionuclides	In Situ Soil ²	Soil Load-Outs	Cluster No. 2C Remedial Action	Cluster No. 2D Remedial Action	Cluster No. 5A Remedial Action	Cluster No. 5B Remedial Action	Cluster No. 6C Remedial Action	Cluster No. 6D Remedial Action	Cluster No. 9A Remedial Action	Cluster No. 12B Remedial Action/MISS Improvements ³	Cluster No. 12C Remedial Action	Columbia Lane Water Line Repairs ³
Uranium-238 (U-238)	0	1.08E-08	4.49E-11	9.62E-10	3.31E-10	7.37E-10	3.09E-10	3.59E-10	6.99E-11	6.74E-10	6.09E-11	2.10E-10
Thorium-234 (Th-234)	0	1.08E-08	4.49E-11	9.62E-10	3.31E-10	7.37E-10	3.09E-10	3.59E-10	6.99E-11	6.74E-10	6.09E-11	2.10E-10
Protactinium-234 metastable (Pa-234m)	0	1.08E-08	4.49E-11	9.62E-10	3.31E-10	7.37E-10	3.09E-10	3.59E-10	6.99E-11	6.74E-10	6.09E-11	2.10E-10
Protactinium-234 (Pa-234)	0	1.41E-11	5.84E-14	1.25E-12	4.30E-13	9.58E-13	4.02E-13	4.67E-13	9.08E-14	8.76E-13	7.92E-14	2.73E-13
Uranium-234 (U-234)	0	1.16E-08	4.80E-11	1.03E-09	3.54E-10	7.88E-10	3.31E-10	3.84E-10	7.47E-11	7.21E-10	6.52E-11	2.24E-10
Thorium-230 (Th-230)	0	1.16E-08	4.80E-11	1.03E-09	3.54E-10	7.88E-10	3.31E-10	3.84E-10	7.47E-11	7.21E-10	6.52E-11	2.24E-10
Radium-226 (Ra-226)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Polonium-218 (Po-218)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Lead-214 (Pb-214)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Bismuth-214 (Bi-214)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Polonium-214 (Po-214)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Lead-210 (Pb-210)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Bismuth-210 (Bi-210)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Polonium-210 (Po-210)	0	8.10E-09	3.21E-11	6.57E-10	2.47E-10	5.66E-10	2.26E-10	2.55E-10	6.22E-11	5.47E-10	5.17E-11	4.37E-11
Uranium-235 (U-235)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Thorium-231 (Th-231)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Protactinium-231 (Pa-231)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Actinium-227 (Ac-227)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Thorium-227 (Th-227)	0	4.99E-10	2.07E-12	4.44E-11	1.53E-11	3.40E-11	1.43E-11	1.66E-11	3.23E-12	3.11E-11	2.81E-12	9.69E-12
Francium-223 (Fr-223)	0	6.98E-12	2.90E-14	6.22E-13	2.14E-13	4.76E-13	2.00E-13	2.32E-13	4.51E-14	4.35E-13	3.94E-14	4.51E-14
Radium-223 (Ra-223)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Polonium-215 (Po-215)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Lead-211 (Pb-211)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Bismuth-211 (Bi-211)	0	5.06E-10	2.10E-12	4.50E-11	1.55E-11	3.45E-11	1.45E-11	1.68E-11	3.27E-12	3.15E-11	2.85E-12	9.82E-12
Polonium-211 (Po-211)	0	1.38E-12	5.74E-15	1.23E-13	4.23E-14	9.41E-14	3.95E-14	4.59E-14	8.93E-15	8.61E-14	7.79E-15	2.68E-14
Tellurium-207 (Tl-207)	0	5.05E-10	2.10E-12	4.49E-11	1.54E-11	3.44E-11	1.44E-11	1.68E-11	3.26E-12	3.15E-11	2.85E-12	9.79E-12
Thorium-232 (Th-232)	0	3.47E-08	1.21E-10	2.91E-09	9.09E-10	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Radium-228 (Ra-228)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Actinium-228 (Ac-228)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Thorium-228 (Th-228)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Radium-224 (Ra-224)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Polonium-216 (Po-216)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Lead-212 (Pb-212)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Bismuth-212 (Bi-212)	0	3.47E-08	1.21E-10	2.91E-09	2.33E-09	2.33E-09	8.97E-10	1.16E-09	2.87E-10	2.14E-09	1.93E-10	7.98E-11
Polonium-212 (Po-212)	0	2.23E-08	7.78E-11	1.87E-09	1.50E-09	1.50E-09	5.74E-10	7.45E-10	1.84E-10	1.37E-09	1.24E-10	5.11E-11
Tellurium-208 (Tl-208)	0	1.25E-08	4.36E-11	1.05E-09	8.39E-10	8.39E-10	3.22E-10	4.18E-10	1.03E-10	7.70E-10	6.95E-11	2.87E-11

Notes: 1. Soil sample preparation laboratory is not considered a source due to the miniscule amount of particulates released to the atmosphere.
2. The in situ soil emissions are zero as the fastest 2-min wind speeds at Teterboro Airport for the year 2007 did not result in the threshold friction velocity being exceeded at any time and thus, no in situ wind erosion occurred.
3. The MISS improvements project and Columbia Lane water line repair were not remedial actions; these excavations were conducted to support construction activities.

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3.0 DOSE ASSESSMENTS

3.1 DESCRIPTION OF DOSE MODEL

The effective dose equivalents for the collective population and the hypothetical maximally exposed individual were calculated in a three-step process. The first step was to model the release of particulates from the site using the methodology given in the EPA's "Estimation of Air Impacts from Area Sources of Particulate Matter Emissions at Superfund Sites" (EPA-451 / R-93-004). Particulate emissions were determined based on the number of times the soil was disturbed (e.g., excavated, stockpiled, loaded into trucks / containers / rail cars, unloaded, and moved) at both the source and at the MISS. The second step was to input these particulate release rates, along with local population and meteorological data, into the CAP88-PC program (Shroff 2006). The third step involved summing the doses calculated by the CAP88-PC program from the various activities at the individual receptors and determining the dose for the hypothetical maximally exposed individual.

The model was used to predict the annual effective dose at numerous receptors resulting from the combined impacts of radiologically contaminated particulate emissions from the various soil load-outs, the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions and construction activities for the MISS improvements and Columbia Lane water line repair. Although the emission of radon (Rn) gas is not considered in this analysis, the daughters of Rn gas generated by the decay of Ra-226 in dust off-site is accounted for by the model in the computation of the effective dose equivalents for the various internal and external exposure pathways.

The CAP88-PC model uses a modified Gaussian plume equation to estimate the average dispersion of radionuclides released from a site. Assessments are done for a circular grid of distances and directions for a radius of 50 mi (80 km) around the site. The program computes radionuclide concentrations in air, rates of deposition on ground surfaces, concentrations in food, and intake rates to people from ingestion of food produced in the assessment area.

By coupling the output of the atmospheric transport models with the terrestrial food chain models from the U.S. Nuclear Regulatory Commission Regulatory Guide 1.109 (NRC 1977), the program estimates the radionuclide concentrations in produce, leafy vegetables, milk, and meat consumed by humans. The population distribution array used in the computer model was calculated from known land uses surrounding the site and year 2000 census figures.

CAP88-PC also uses a database of dose and risk factors provided in FGR13 for estimating dose and risk. Dose and risk conversion factors include the effective dose equivalent calculated according to the methods in ICRP Publication Number 72. Although FGR 13 contains age-dependent dose factors, CAP88-PC only uses the adult factors in order to retain consistency with previous versions of CAP88-PC. Dose and risk factors are provided for the pathways of ingestion and inhalation intake, ground level immersion, and ground surface irradiation. For assessments where Rn-222 decay products are not considered, the dose estimates are made by combining the inhalation and ingestion intake rates as well as the air and ground surface concentrations with the appropriate dose conversion factors.

3.2 SUMMARY OF INPUT PARAMETERS

The required input parameters for the computation of the annual effective dose equivalents to the hypothetical maximally exposed individual, as well as the collective population dose, by the CAP88-PC program include:

- Average annual temperature for the year 2007: 55.0°F (12.8°C) (NOAA 2007b);
- Total annual precipitation for the year 2007: 55.9 in. (142.0 cm) (NOAA 2007b);
- Wind speed and direction: Teterboro Airport, NJ – Stability Array (STAR) Data for 1998-2007 (NOAA 2007a);
- Population distribution: calculated from the year 2000 census data;
- Annual radionuclide emission rates from the various source operations at the MISS and the vicinity properties (see **Table 2-2**);
- Surface areas of the individual emission sources; and
- Distances to the individual resident and worker receptor locations.

3.3 COMPLIANCE ASSESSMENT

The maximum annual effective dose to residents and workers resulting from each of the sources individually during the year 2007 (various soil load-outs, the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions and construction activities for the MISS improvements and Columbia Lane water line repair) as determined by the CAP88-PC modeling analyses are given in **Table 3-1** and shown on **Figure A-5**. The annual effective dose to the hypothetical maximally exposed resident and worker, as well as the collective population dose, resulting from total site activities combined during the year 2007 are the following:

- Resident located 770 feet (235 m) north-northeast (NNE) of the MISS site (100% occupancy): 2.10×10^{-6} millisievert per year (mSv/yr) or 2.10×10^{-4} mrem/yr;
- Worker located 33 feet (10 m) south of Cluster 5B (27% occupancy): 3.78×10^{-6} mSv/yr (3.78×10^{-4} mrem/yr); and
- Annual effective dose to the public within 50 mi (80 km) of the MISS: 1.14×10^{-3} person-rem/year.

Although exposures from other directions and distances may be reported in the model output, only those directions / distances corresponding to a potential receptor are reported here. The contributions of clusters to the doses caused by other nearby clusters were considered and found not to affect the value as reported for the maximum dose for the primary cluster. All calculated exposures were on a similar order of magnitude of those reported above (much less than 1 mrem/yr).

The maximum annual effective dose to the residents and workers are well below the NESHAP-Subpart H standard of 10 mrem/yr (40 CFR 61.92). The maximum annual effective doses are almost entirely the result of the internal doses received from the inhalation of dust particles with a small contribution from the ingestion of plant borne dust. Air immersion in the dust plume and ground surface irradiation contributes a negligible amount to the total dose.

Table 3-1
Maximum Annual Effective Dose Equivalents

Source	Location of Maximum Impact	Annual Dose Rate (mrem/yr)	Occupancy Factor (%)	Annual Effective Dose (mrem/yr)
MISS Soil Load-outs				
• Population (person-rem/yr)	N/A	9.29E-04	N/A	9.29E-04
• Maximally Exposed Resident	235 m NNE	2.0E-04	100	2.0E-04
• Maximally Exposed Worker	160 m N	3.6E-04	27	9.72E-05
Cluster No. 2C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 2D				
• Population (person-rem/yr)	N/A	7.55E-05	N/A	7.55E-05
• Maximally Exposed Resident	160 m S	4.5E-05	100	4.5E-05
• Maximally Exposed Worker	40 m NNE	4.7E-04	27	1.27E-04
Cluster No. 5A				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 5B				
• Population (person-rem/yr)	N/A	5.56E-05	N/A	5.56E-05
• Maximally Exposed Resident	240 m N	9.8E-06	100	9.8E-06
• Maximally Exposed Worker	10 m S	1.4E-03	27	3.78E-04
Cluster No. 6C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 6D				
• Population (person-rem/yr)	N/A	5.85E-05	N/A	5.85E-05
• Maximally Exposed Resident	125 m NW	2.5E-06	100	2.5E-06
• Maximally Exposed Worker	45 m SW	6.8E-05	27	1.84E-05
Cluster No. 9A				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 12B/MISS Improvements				
• Population (person-rem/yr)	N/A	5.11E-05	N/A	5.11E-05
• Maximally Exposed Resident	195 m NE	1.3E-05	100	1.3E-05
• Maximally Exposed Worker	165 m NNE	2.2E-05	27	5.94E-06
Cluster No. 12C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Columbia Lane Water Line Repair				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Total Site				
• Population (person-rem/yr)	N/A	1.14E-03	N/A	1.14E-03
• Maximally Exposed Resident	235 m NNE of MISS	2.1E-04	100	2.1E-04
• Maximally Exposed Worker	Soil Load 10 m S of Cluster 5B	1.4E-03	27	3.78E-04

- Notes:
1. Although exposures from other directions and distances may be reported in the model output, only those directions / distances corresponding to a potential receptor are reported here. Note: all calculated exposures were on a similar order of magnitude of those reported here (much less than 1 mrem/yr).
 2. The total site doses for the maximally exposed resident and worker represent the combined impacts of radiologically contaminated particulate emissions from the various soil load outs, Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B, and 12C remedial actions and construction activities for the MISS improvements and Columbia Lane water line repair at the specified locations. The location of the "total site" maximally exposed resident and worker is relative to the MISS site and Cluster 5B; respectively.
 3. The collective population dose is the total dose received by the public living within 50 mi (80 km) of the MISS. The total site population dose was calculated by summing the population doses resulting from radiologically contaminated particulate emissions from the various soil load outs

- at the MISS, the Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B and 12C remedial actions and the construction activities for the MISS improvements and Columbia Lane water line repair.
4. Negligible refers to the fact that the radionuclide emission rates are so small that CAP88-PC (Version 3.0) reports the doses as zero.
 5. A central reference point was established at each cluster and at the MISS soil load-out area for modeling purposes; the distance to the maximum impact from excavation and soil handling operations is relative to the central reference point.
 6. Appendix C contains the detailed calculation for determining the maximum annual effective dose equivalents.

3.4 CERTIFICATION

I certify under penalty of law that I have personally examined, and am familiar with, the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment (see 18 U.S.C. 1001).

Name / Title: _____

Signature: _____ Date: _____

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4.0 RADON-222 FLUX MONITORING

Rn-222 flux monitoring is typically performed to determine compliance with 40 CFR 61, Subpart Q for stockpiles that are present for a significant period of time such as 6 months or greater. Although this was not the case at the MISS during the year 2007, it was decided to perform flux monitoring since the soil is now stored inside a fabric structure instead of in the open air. Furthermore, soil was being stockpiled / loaded-out on a fairly continuous basis during 2007. Thus, it was deemed prudent to perform Rn-222 flux monitoring for the soil stockpiles to assess regulatory compliance.

Rn-222 flux monitoring was performed on August 22-23, 2007 to determine compliance with 40 CFR 61, Subpart Q. To determine the Rn flux from the storage pile, charcoal canisters were placed on the stockpile inside the fabric structure at six locations. The Rn-222 flux measurement locations are shown in **Appendix A** on **Figure A-6**.

The results of the Rn-222 flux monitoring are presented in **Table 4-1**. The measured concentrations from the storage piles inside the fabric structure were well in compliance with the 20 picocuries per square meter per second (pCi/m²/s) Rn-222 flux standard specified in 40 CFR 61, Subpart Q.

Table 4-1
Year 2007 – Rn Flux Monitoring Results for
Soil Stockpiles inside the Fabric Structure at the MISS

Sample ID ¹	Date Collected	Date Analyzed	Analyte	Result (pCi/m ² /s)	Error ² (pCi/m ² /s)	MDA ³ (pCi/m ² /s)
RC-1	08/22/07	08/24/07	Rn-222	4.39E-02	5.37E-02	1.36E-01
RC-2	08/22/07	08/24/07	Rn-222	1.08E-02	4.17E-02	1.04E-01
RC-3	08/22/07	08/24/07	Rn-222	1.21E-01	7.35E-02	1.79E-01
RC-4	08/22/07	08/24/07	Rn-222	1.86E-02	3.01E-02	9.30E-02
RC-5	08/22/07	08/24/07	Rn-222	1.94E-02	4.53E-02	1.13E-01
RC-6	08/22/07	08/24/07	Rn-222	1.03E-01	5.49E-02	1.51E-01

- Notes: 1. All monitoring locations for the storage piles are shown on **Figure A-6**.
2. The error is reported at the 95% confidence level.
3. The Minimum Detected Activity (MDA) is reported at the 95% confidence level.

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APPENDIX A

SELECTED FUSRAP MAYWOOD SUPERFUND SITE MAPS

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APPENDIX A

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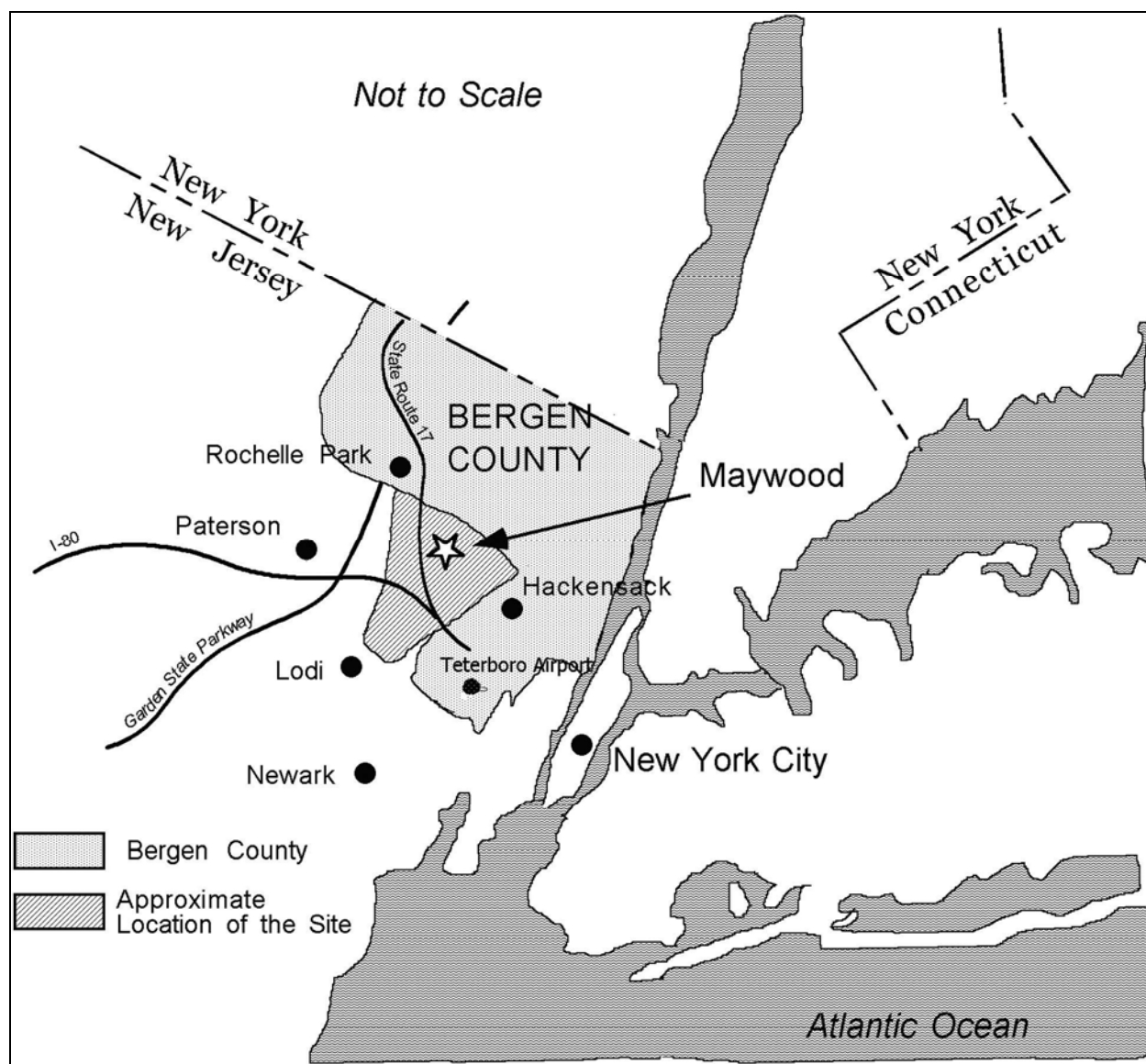
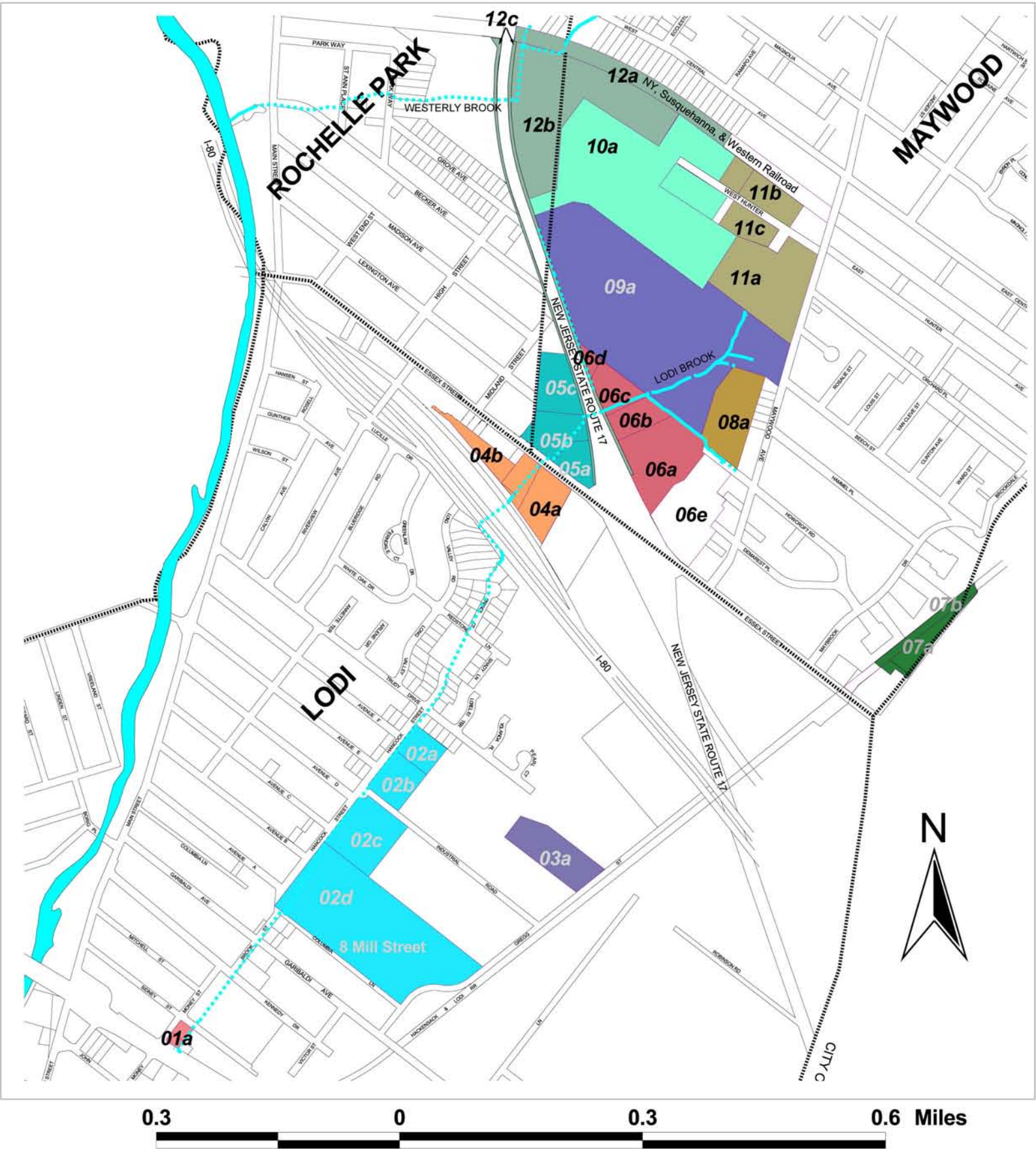
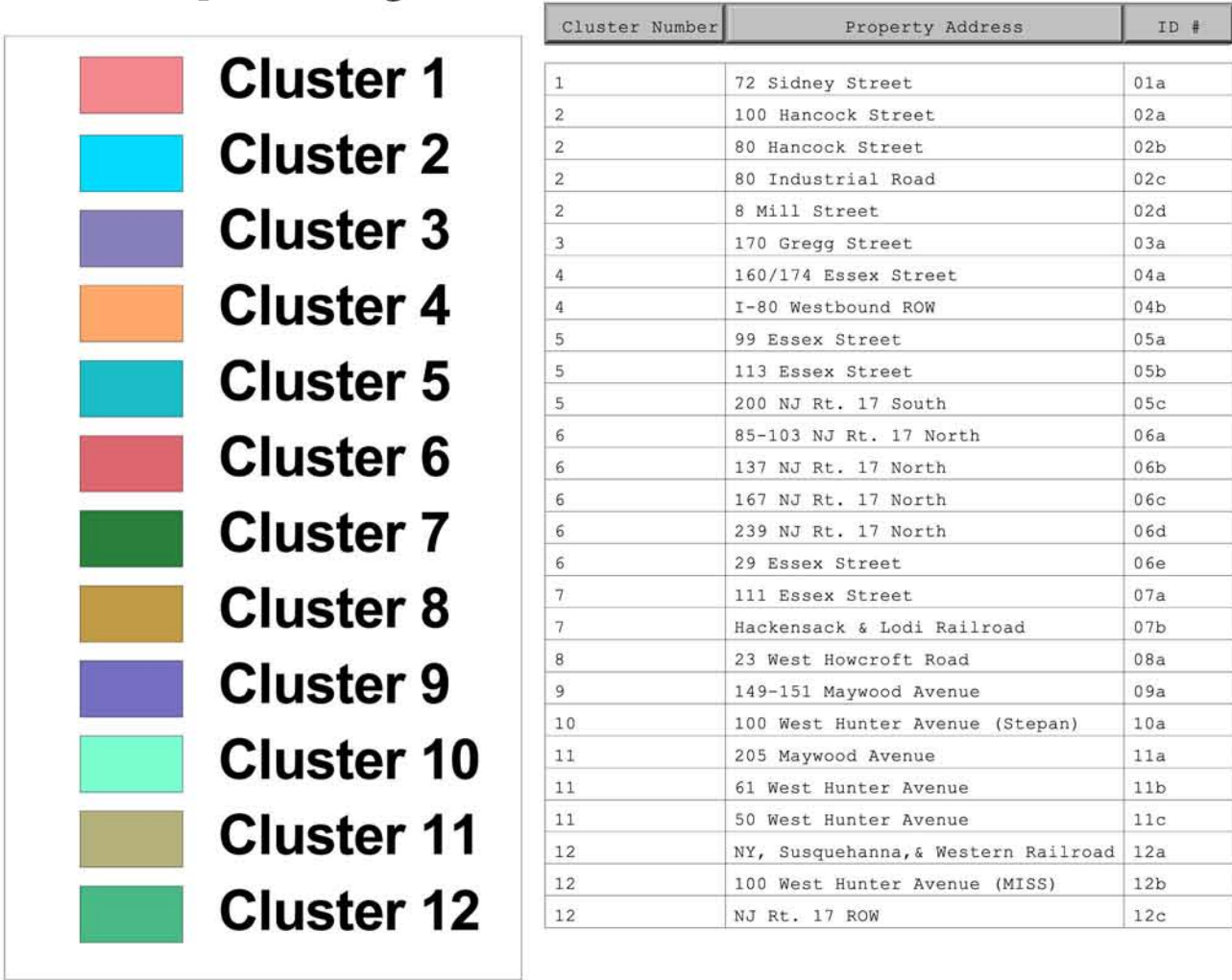


Figure A-1
FMSS and MISS General Location Map

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Figure A-2

Phase II Vicinity Property Clusters





US Army Corps
of Engineers®



FUSRAP
Maywood Superfund Site



Shaw®
Shaw Environmental, Inc.

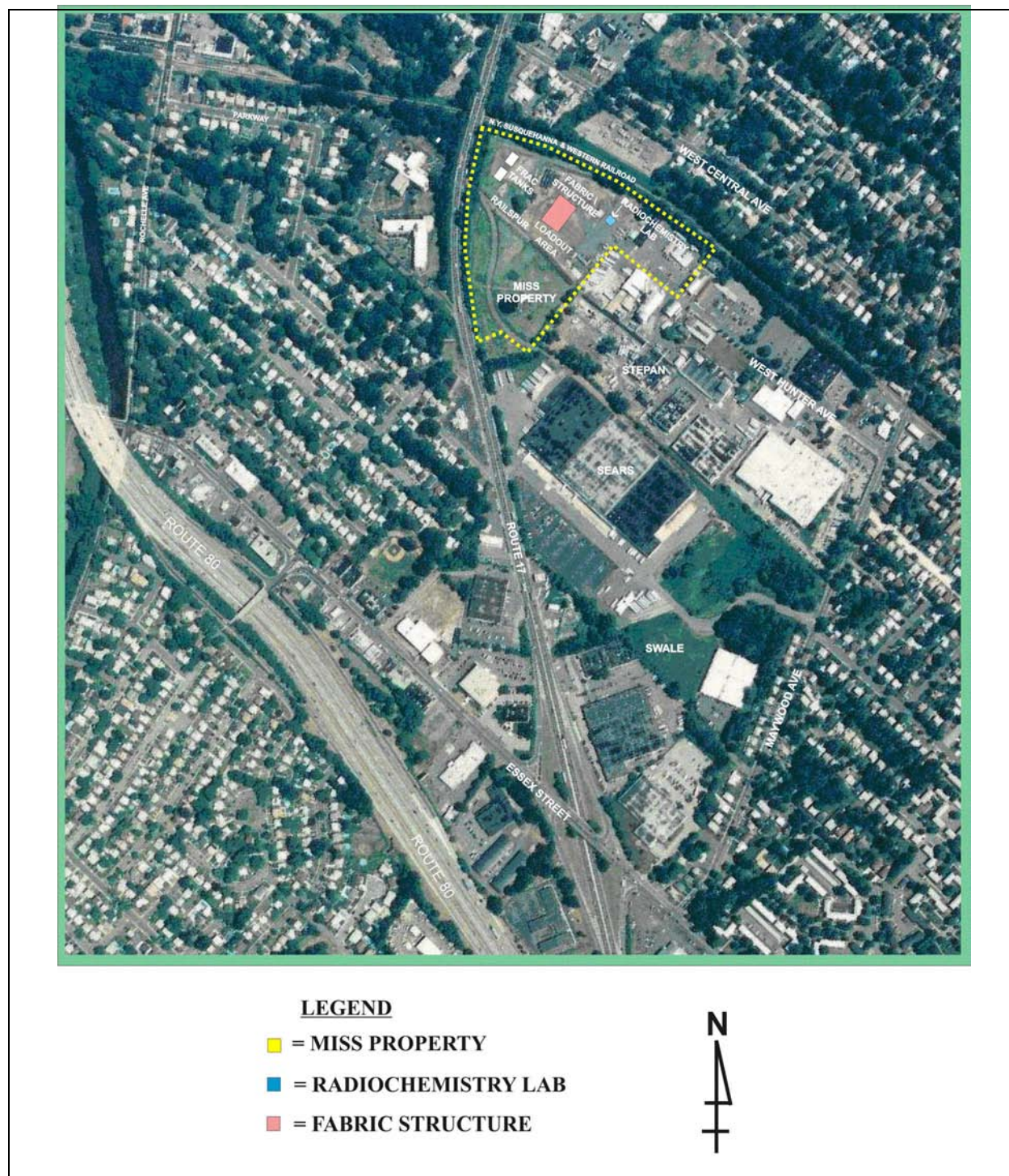


Figure A-3
Aerial View of MISS and Adjacent Properties

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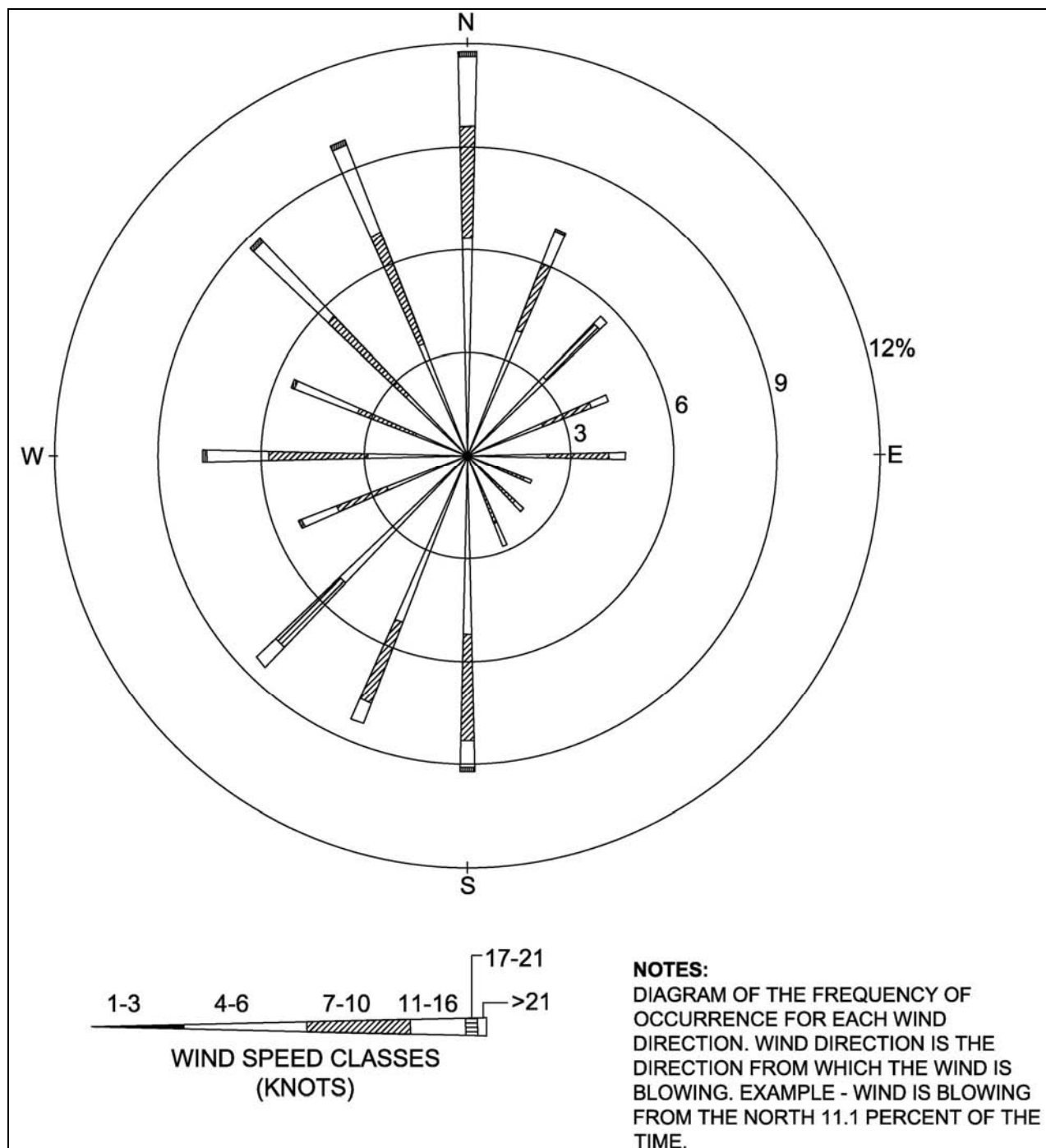
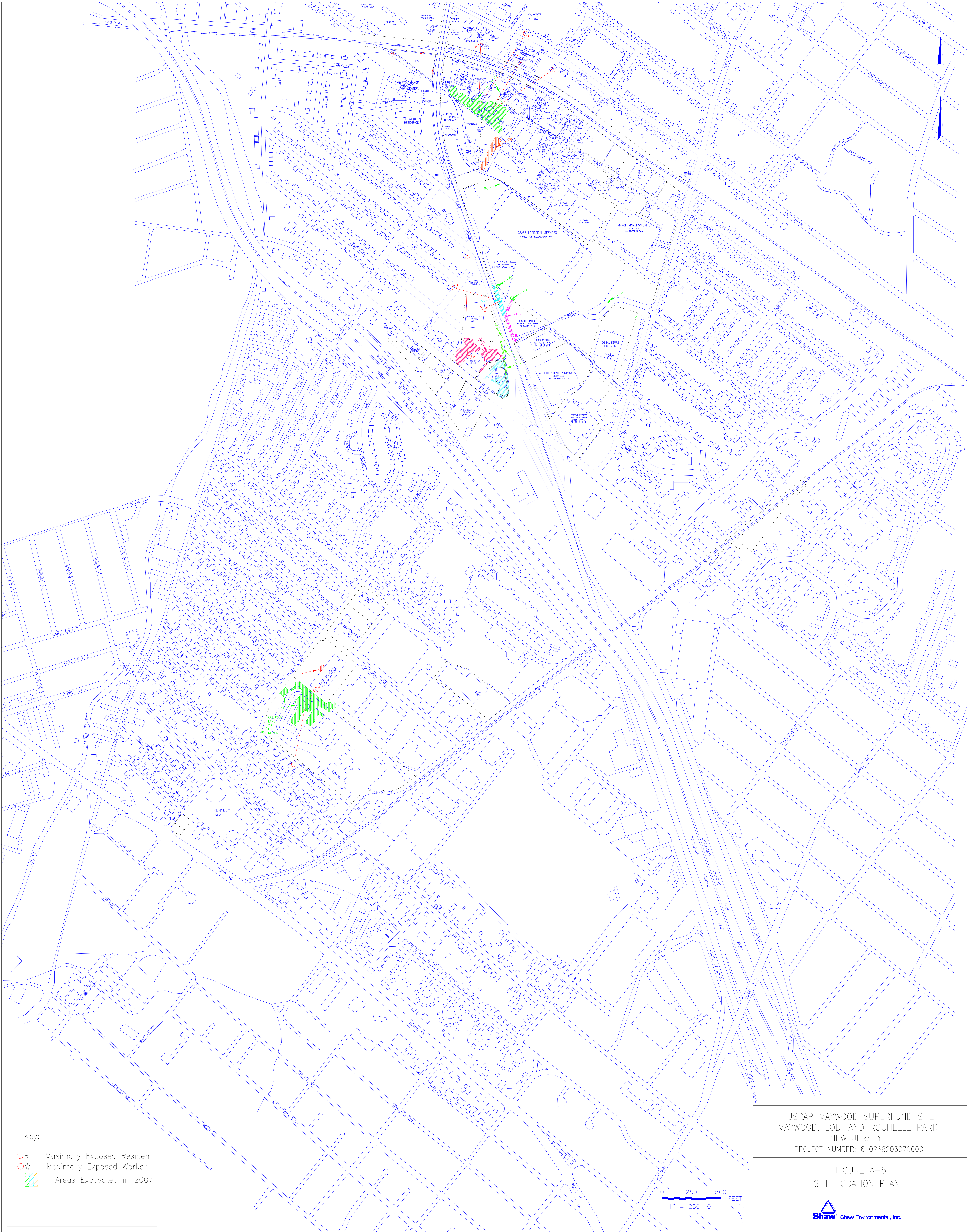


Figure A-4
Windrose, Teterboro, NJ (1998-2007)

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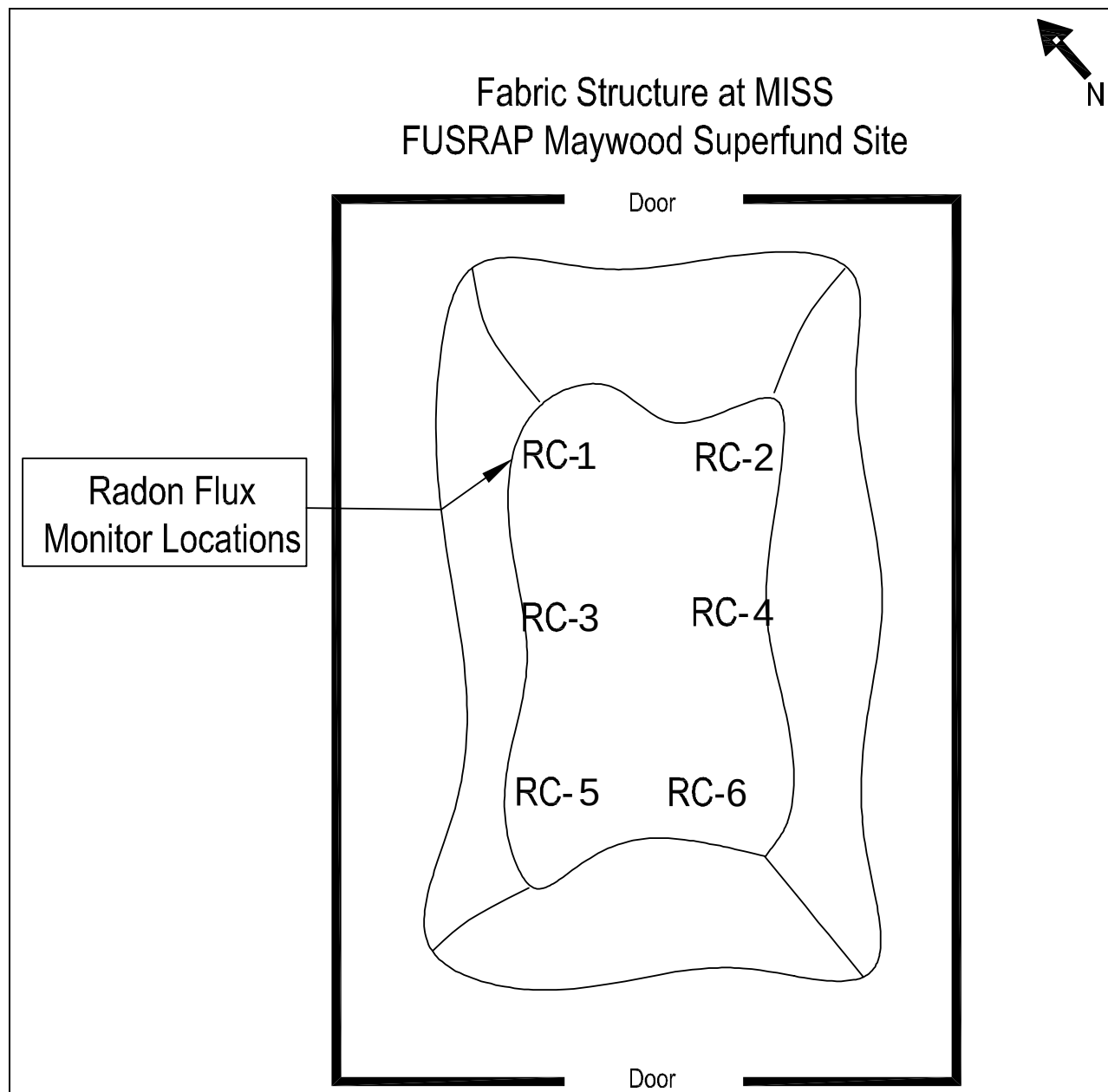


Figure A-6
Location of Radon Flux Monitors inside the Fabric Structure at the MISS

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APPENDIX B SELECTED PHOTOGRAPHS

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Figure B-12	On-Site Radiochemistry Laboratory at the MISS	B-27

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The soil receiving area at the MISS is located behind the fabric structure. An excavator is used to place incoming soil from the vicinity properties into the fabric structure.



The stockpile of excavated soil from the vicinity properties is stored inside the fabric structure at the MISS prior to the start of load-out activities.



A front end loader is used to transport soil from inside the fabric structure directly to the rail cars.



A front end loader on concrete bulkhead placing soil from the fabric structure into lined rail cars for offsite disposal.



The rail car liners are secured prior to shipment for offsite disposal.



View of empty fabric structure at MISS after completion of successful soil load out.

Figure B-1
Soil Load-Out Activities at the MISS

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Initial conditions showing the main electrical feeder pole and transformer pad.



The feeder pole/transformer pad needed to be removed for expansion of building. Area was previously inaccessible.



After completion of excavation, building addition was completed and asphalt paving installed.



View showing newly paved and striped parking area on northwest of the building addition.

Figure B-2
Cluster No. 2C Remedial Action

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Excavation was performed at the NJMVC property near the boundary with Cluster No. 2C (80 Industrial Road)



Plastic sheeting was installed at the face of the excavation to separate the excavated areas from contaminated areas.



Excavator was used to load the contaminated soil into lined dump trucks for transport to the MISS.



Another view of excavated areas at the NJMVC property.



Completed excavation was backfilled with common fill and structural fill.



Completion of backfilling the excavation with structural fill.

Figure B-3
Cluster No. 2D Remedial Action

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Excavating around utilities on the east side of 113 Essex Street between the building and a concrete box culvert.



Excavating adjacent to the north side of the building at 113 Essex Street.



Excavating on the north west side of 113 Essex St. Plastic sheeting was used to cover the contaminated soil.



Excavation on the north side of the building at 113 Essex Street was backfilled with structural fill and compacted.



View of concrete form work for restoration activities on the west side of building at 113 Essex Street.



View of concrete form work and reinforcement bars for stair case restoration on the north side of 113 Essex Street.

Figure B-5
Cluster No. 5B Remedial Action

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Excavation around elliptical storm drain that runs perpendicular to NJ Route 17.



Excavator was used to load contaminated soil into dump truck for transport to the MISS.



Dewatering of the excavation was performed to remove groundwater.



View of the 53 inch by 34 inch elliptical reinforced concrete storm drain adjacent to Route 17 northbound.



Excavator was used to remove a section of the existing elliptical storm drain.



View of deeper excavation within the utility corridor adjacent to Route 17 northbound.

Figure B-6
Cluster No. 6C Remedial Action

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Excavation in utility corridor adjacent to NJ Route 17 northbound.



Excavation in the utility corridor exposed high pressure gas main and storm drain.



Pumps were used to remove accumulated water in excavation.



View of exposed sewer manhole during excavation.



Excavated area adjacent to NJ Route 17 northbound was backfilled with structural fill.



Flowable fill was used for backfilling the excavation around the elliptical pipe.

Figure B-7
Cluster No. 6D Remedial Action

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Excavation at the MISS for the construction of the Stepan Haul Road.



Plastic sheeting was installed at the face of the excavation to separate the excavated areas from contaminated areas.



Excavated soil was transported by dump trucks to the soil staging area at the MISS for placement in fabric structure.



The excavation uncovered old foundations that had to be removed to construct the haul road.



Excavation was backfilled with structural fill, graded and compacted to create haul road.



Another view of haul road which will allow the use of much larger capacity dump trucks for soil transport.

Figure B-8
Cluster No. 12B Remedial Action – Stepan Haul Road

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View of the truck dumping area located behind the fabric structure.



A view of grading activities being performed in the restricted area in preparation for grading activities.



View of graded area along the bulk head for asphalt paving.



View of asphalt installation and the retention pond.



Asphalt installation along the bulk head area.



View showing load-out operations after Miss improvements were completed.

Figure B-9
Cluster No. 12 B - Construction Activities for the MISS Improvements

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Excavating around a gas line in NJ Route 17 southbound ROW.



Excavating above a concrete box culvert; collaboration with other construction projects in the area was essential.



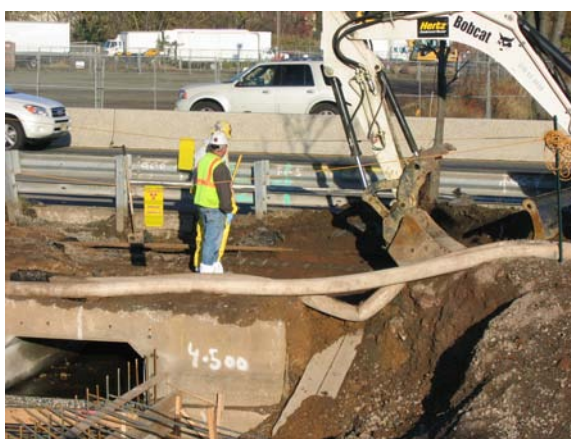
The final status survey crew conducting a radiological survey after completion of the excavation activities.



Additional excavation being performed in the NJ Route 17 southbound ROW.



Completed shallow excavation in the NJ Route 17 ROW.



Excavating around a gas line in a concrete box culvert in the NJ Route 17 southbound ROW.

Figure B-10
Cluster No. 12C Remedial Action

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View showing initial conditions of the pavement on Columbia Lane.



View showing saw cutting of the asphalt pavement on Columbia Lane.



View of area being excavated. Fencing was installed around the excavation.



View of full excavation of damaged water line; repairs were performed by the Passaic Valley Water Company.



After completion of the water line repairs, the excavated area was backfilled with structural fill.



Another view of the excavation after being backfilled with structural fill.

Figure B-11
Construction Activities for the Columbia Lane Water Line Repair

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View of west side of radiochemistry laboratory at the MISS. The exhaust stack for the fume hoods is visible.



Soil Preparation Laboratory. View of the vented drying ovens and muffle furnace (center).



The downdraft table and pulverizer in the Soil Preparation Laboratory.



View of downdraft table and adjacent unit containing the High Efficiency Particulate Air (HEPA) filter.



View of soil digestion microwaves and condenser units.



View of fume hoods with centrifuge on table in the forefront.

Figure B-12
On-Site Radiochemistry Laboratory at the MISS

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APPENDIX C CALCULATIONS

Note: Appendix C also contains an MS-Excel Spreadsheet on CD-ROM.

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CLIENT & PROJECT: U.S. ARMY CORPS OF ENGINEERS – FUSRAP Maywood Superfund Site				PAGE 1 of 199 Total Pages: 216 w/attachments		
CALCULATION TITLE: Annual NESHAP Compliance Report for 2007 – Supporting Calculation				QA CATEGORY (✓) ☐ I ☐ II ☐ III		
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1. OBJECTIVE

To estimate the annual effective dose to nearby residents and workers from airborne releases of radioactive particulates at the Maywood Interim Storage Site (MISS) and vicinity properties generated during calendar year 2007 at the FUSRAP Maywood Superfund Site. The activities generating these potential releases include: in situ wind erosion; soil load-out operations; remedial actions at Cluster Nos. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B, 12C; and construction activities for the MISS improvements and the Columbia Lane water line repair.

2. METHODOLOGY

During the calendar year 2007, the potential sources of airborne emissions of radioactive particulates at MISS and nearby properties were:

1. In situ, contaminated areas totaling approximately 635,000 square feet (ft²) (59,000 square meters [m²]) of the MISS and the adjacent Stepan Company property (within the MISS fence line) were potentially exposed to wind erosion during the year 2007.
2. The performance of soil load-out, transportation, and disposal operations at the MISS during the year 2007. Specifically, twelve (12) soil load-out operations were performed during the year 2007. The various soil stockpiles consisted of soil and debris that had been transported to the MISS from the remedial actions/construction activities performed at the following nine (9) properties: Cluster No. 2C (80 Industrial Road); Cluster No. 2D (8 Mill Road); Cluster 5A (99 Essex Street); Cluster 5B (113 Essex Street); Cluster No. 6C (167 NJ Route 17 North); Cluster No. 6D (239 NJ Route 17 North); Cluster No. 9A (149-151 Maywood Avenue); Cluster No. 12B (100 West Hunter Avenue) and Cluster No. 12C (NJ Route 17 ROW) as well as the construction activities for the MISS improvements and Columbia Lane water line repair. These 12 load-outs involved the movement of approximately 47,884 tons of material, which was placed into rail cars for transport to a disposal facility in Utah. The nearest commercial / residential buildings are located approximately 440 feet (135 meters [m]) west of the MISS soil load-out area.
3. The performance of a remedial action at Cluster No. 2C (80 Industrial Road) which is comprised of a single lot in the Borough of Lodi: Block 205.02, Lot 4.02, occupying an area of about 3.6 acres. The remedial action involved the excavation of a small area adjacent to the building that was previously inaccessible; approximately 768 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m); the nearest residences are located approximately 213 feet (65 m)
4. The performance of a remedial action at Cluster No. 2D (8 Mill Road) which included the New Jersey Department of Motor Vehicles inspection and driver testing areas and additional areas along Hancock Street and the property boundary with 60 Industrial Road. The year 2007 remedial action involved the excavation of approximately 13,635 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 130 feet (40 m) northeast of Cluster No. 2D; the nearest residences are located approximately 295 feet (90 m) northwest of Cluster No. 2D.
5. The performance of a remedial action at Cluster No. 5A (99 Essex Street) which is comprised of a single lot in the Borough of Maywood: Block 125, Lot 1, occupying an area of approximately 1.3 acres. The remedial action involved the excavation of contaminated soil on the northern and southern sides of the building; approximately 4,185 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m) northeast of Cluster No. 5A; the nearest residences are located approximately 885 feet (270 m) north-north-west of Cluster No. 5A.
6. The performance of a remedial action at Cluster No. 5B (113 Essex Street) which is comprised of a single lot in the Borough of Maywood: Block 125, Lot 2, covering an area of approximately 2.1 acres. This

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remedial action involved the excavation of contaminated soil on the northern, eastern and western sides of the building; approximately 9,901 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 33 feet (10 m) south of Cluster No. 5B; the nearest residences are located approximately 575 feet (175 m) north-northwest of Cluster No. 5B. 7. The performance of a remedial action at Cluster 6C (167 NJ Route 17 North), which is comprised of a single lot in the Borough of Maywood: Block 124, Lot 2, occupying an area of approximately 1.7 acres. The property, which was formerly operated by Sunoco, included an inactive gasoline service area (pump islands) and a one-story 800-ft² cinder block building. The building was demolished in October 2005. Over the years, radiologically contaminated soil was transported downstream to the Cluster 6C properties via Lodi Brook. The remedial action involved the excavation of contaminated soil along the utility corridor adjacent to NJ Route 17 northbound; approximately 4,192 tons of soil was loaded into trucks and transported to the fabric structure at the MISS. The nearest commercial buildings are located approximately 197 feet (60 m) west-northwest of Cluster No. 6C; the nearest residences are located approximately 509 feet (155 m) west-northwest of Cluster No. 6C. 8. The performance of a remedial action at Cluster No. 6D (239 NJ Route 17 North) which is comprised of a single lot in the Borough of Maywood: Block 124, Lot 2, occupying an area of about 0.4 acre. The property, which was formerly operated by Gulf, included an inactive gasoline service area (pump islands) and a one-story 800-ft² cinder block building. The building was demolished in 2006 to facilitate future remedial actions. Over the years, radiologically contaminated soil was transported downstream to the Cluster No. 6D property via the Lodi Brook. The remedial action involved the excavation of contaminated soil along the utility corridor adjacent to NJ Route 17 northbound; approximately 5,056 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 130 feet (40 m) west of Cluster No. 6D; the nearest residences are located approximately 410 feet (125 m) west-northwest of Cluster No. 6D. 9. The performance of a remedial action at Cluster No. 9A which is located in both the Borough of Maywood and the Township of Rochelle Park. This property is located at 149-151 Maywood Avenue and occupies Block 124, Lot 30 within the Borough of Maywood and Block 17.02, Lot 1 within the Township of Rochelle Park. The property comprises approximately 27 acres and is occupied by the Sears Logistical Services (SLS). The remedial action involved the excavation of contaminated soil at various locations to support the installation of perimeter lighting and a catch basin and to perform repairs for a broken fire hydrant and water line; approximately 884 tons of soil was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 148 feet (45 m) west of Lodi Brook; the nearest residences are located approximately 330 feet (100 m) west-southwest of the area near Maywood Avenue. 10. The performance of an excavation to support the repair of a broken water line located at the intersection of Columbia Lane and Hancock Street. This effort involved the excavation and transport of 290 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 590 feet (180 m) northeast of the Columbia Lane water line repairs. The nearest residential receptors are located approximately 50 feet (15 m) south, south-southwest, and south-southeast of the Columbia Lane water line repair. 11. The performance of a remedial action at Cluster No. 12B (100 West Hunter Avenue [MISS]) to support the construction of the Stepan haul road. This road will facilitate future remediation of the triangle properties (Cluster Nos. 9A, 10A and 12B) by providing more direct access to the MISS for the disposal of the contaminated soil. The new haul road will also allow the use of off road vehicles which have a much larger capacity and will minimize the need to use public roads for transporting the contaminated soil to the fabric structure. This removal action involved the excavation of approximately 2,037 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 540 feet (165 m) west of Cluster No. 12B; the nearest residences are located approximately 540 feet (165 m) west of Cluster No. 12B.				

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12. The performance of construction activities (MISS improvements) at Cluster No. 12B (100 West Hunter Avenue [MISS]) to improve storm water drainage in the vicinity of the restricted area including the concrete bulkhead adjacent to the rail spur that is used for the soil load-out operations. In addition, an alternate haul road was constructed on the west side of the MISS to facilitate the flow of truck traffic on the roads at the MISS during soil load-outs. This effort involved the excavation of approximately 6,276 tons of soil that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 540 feet (165 m) west of Cluster No. 12B; the nearest residences are located approximately 540 feet (165 m) west of Cluster No. 12B.
13. The performance of a remedial action for a portion of Cluster No. 12C to facilitate a New jersey Department of Transportation (NJDOT) roadway improvement project for the NJ Route 17/Essex Street interchange. The remedial action involved the excavation of approximately 660 tons of soil in the NJ Route 17 ROW adjacent to Cluster Nos. 5A, 5B and 5C that was loaded into trucks for transport to the fabric structure at the MISS. The nearest commercial buildings are located approximately 100 feet (30 m) south of Cluster No. 12C; the nearest residences are located approximately 640 feet (195 m) northwest of Cluster No. 12C.
14. The operation of the exhaust system for the soil sample preparation laboratory located in the on-site radiochemistry laboratory at the MISS. Soil samples collected for the various soil load-outs at the MISS from excavations performed at the vicinity properties were brought to this laboratory to prepare the samples for radiological analysis. The individual soil samples were dried and then ground before placing the soil into sealed containers. The grinding operations were performed on a downdraft table. Air from the downdraft table is routed to a high efficiency particulate air (HEPA) filter and then exhausted into the general room air of the preparation laboratory. The emissions of particulates to the ambient air from the grinding operations in the soil sample preparation laboratory are nil.

The calculation is performed using the U.S. Environmental Protection Agency (EPA) Clean Air Act Assessment Package - 1988 (CAP88-PC), Version 3.0 model (Ref. 9.1) to estimate air doses to the population and hypothetical maximally exposed individuals. The radioactive particulate release rates from in situ wind erosion and the other load-out and remediation/excavation activities are calculated using EPA's Compilation of Air Pollutant Emission Factors - Volume 1: Stationary Point and Area Sources, also known as AP-42 (Ref. 9.2). The AP-42 expressions used to perform these calculations are provided in the "Equations" section of this calculation. The actual calculations are performed using an Excel spreadsheet, the results of which are provided in Attachment A.

Radionuclide emission rates are based on the particulate release rates and average radionuclide source concentrations based on sample measurements. Source concentrations for isotopes of uranium (U_{238}), radium (Ra_{226}), and thorium (Th_{232}) are based on average values for in situ soil (Ref. 9.9) and average values measured during the load-outs. Unknown radionuclide source concentrations are based on the known source concentrations assuming secular equilibrium in the decay chains (Ref. 9.6).

The CAP88-PC computer model is a set of computer programs, databases, and associated utility programs developed by the EPA for estimation of dose and risk from radionuclide emissions to air. CAP88-PC is used for the purpose of demonstrating compliance with Subpart H of the National Emission Standards for Hazardous Air Pollutants (NESHAPS) as codified in 40 CFR 61.93a. CAP88-PC performs dose and risk assessments for both collective populations and maximally-exposed individuals.

This computer code estimates the annual average dispersion of radionuclides released from up to six sources. The sources may be either elevated stacks or uniform area sources. All sources are modeled as if located at the same point. Uniform contamination is assumed for area sources. Plume rise can be calculated assuming either a momentum or buoyancy driven plume. Assessments are done for a circular grid of distances and directions with a radius of 80 kilometers around the facility. The program computes

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radionuclide concentrations in air, rates of deposition on ground surfaces, concentrations in food, and intake rates to people from ingestion of food produced in the assessment area. CAP88-PC uses a modified version of the AIRDOS-EPA (Mo79) program to calculate environmental transport. Plume dispersion is based on the Gaussian plume equation of Pasquill as modified by Gifford, using sector-average concentrations. Plume rise is calculated using either Rupp's equation for momentum dominated plume rise or Briggs equation for buoyancy dominated plume rise. Dry deposition is handled using a proportionality constant applied to the ground-level concentration of the radionuclide and wet deposition is based on a scavenging coefficient related to the rainfall rate. Radionuclides are depleted from the plume by precipitation scavenging, dry deposition, and radioactive decay. CAP88-PC uses a database of dose and risk factors provided in Federal Guidance Report 13 (FGR13, Ref. 9.3) for estimating dose and risk. Dose and risk conversion factors include the effective dose equivalent calculated according to the methods in ICRP Publication Number 72 (Ref. 9.4). Although FGR 13 contains age-dependent dose factors, CAP88-PC only uses the adult factors in order to retain consistency with previous versions of CAP88-PC. The risk factors used are those for lifetime fatal cancer risk (mortality) per FGR 13. Dose and risk factors are provided for the pathways of: ingestion and inhalation intake; ground level immersion; and ground surface irradiation. Factors are further broken down by particle size, clearance category, chemical form, and gut-to-blood transfer factors. These factors are stored in a database for use by the program. For assessments where Rn-222 decay products are not considered, estimates of dose and risk are made by combining the inhalation and ingestion intake rates, air and ground surface concentrations with the appropriate dose and risk conversion factors. CAP88-PC calculates dose to the 23 internal organs modeled in FGR 13, in addition to the 50 year effective dose equivalent. Doses can be tabulated as a function of radionuclide, pathway, location, and organ. For a given distance, the CAP88-PC model computes the annual effective dose equivalent for all compass directions. Specifically, the model computes the annual dose at a user-defined distance for all 22.5-degree compass point sectors (i.e., N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, NNW). The CAP88-PC model computes an average sector concentration; thus, the annual dose computed for receptors at a given distance within a sector will be the same. A review of land use surrounding the site and the prevailing wind directions was performed to select the appropriate receptors for inclusion in the modeling analyses. Analyses were performed separately for the soil load-outs, and Cluster No. 2C, 2D, 5A, 5B, 6C, 6D, 9A, 12B, and 12C remedial actions. The in situ wind erosion emissions and the exhaust hood emissions were found to be negligible and thus, these sources were not included in the modeling analyses. Where individual receptors are affected by more than one emission source, doses caused by those sources are added. The individual (i.e., worker and resident) corresponding to the maximum effective dose equivalent is identified as the hypothetical maximally exposed individual. Because the annual dose received from airborne emissions is dependent on prevailing wind direction in addition to proximity to the site, the hypothetical maximally exposed individual is not necessarily the person nearest the site. The model was used to predict the annual effective dose at numerous receptors resulting from the combined impact of the above sources. Although the model determined the annual effective dose at numerous receptors, only the hypothetical maximally exposed resident and worker are discussed in this report. Based on this information, residences and commercial properties located to the north, northeast and east of the MISS along West Central Avenue were selected as the receptors of most concern for the MISS activities. Receptor locations in other compass directions such as west and west-southwest of the MISS (i.e., west of Route 17) were also selected for the analysis, along with commercial receptors south and southeast of the MISS.				

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The residential receptors relative to Cluster Nos. 2C and 2D are closest in the west, northwest, and southwest directions while commercial receptors are found primarily to the northeast, east and southeast. The residential receptors closest to Clusters 5A and 5B activities are located mainly to the northwest and north of the cluster while commercial receptors are generally to the north of Cluster 5A and south and southwest of the Cluster 5B. The residential receptors near Cluster Nos. 6C, and 6D are generally closest in the northwest direction on the other side of NJ Route 17. The commercial receptors are found in essentially all directions. The residential receptors closest to Cluster 9A activities are also located mainly to the east and southeast of the cluster with some residences in the northwest direction relative to the western portion of the cluster. The commercial receptors are generally located in all directions. The residential receptors relative to Cluster Nos. 12B and 12C are closest in the west and northwest directions while commercial receptors are found in essentially all directions. The residential receptors relative to the Columbia Lane water line repairs are closest in the south, south-southwest, south-southeast, and west directions while commercial receptors are found primarily to the northeast, east and southeast.

These receptor locations were used to establish the downwind distances that were input into the model to capture the maximally exposed individual (see Assumption 3.4 below for specific receptor locations).

3. **ASSUMPTIONS**

- 3.1** The contamination is uniformly distributed over a symmetrical land area with the concentration in respirable particles (PM-10) equaling the bulk contamination concentration in the surface material.
- 3.2** The erodibility classification of the site is "limited reservoir" characterized by a finite availability of erodible particles impregnated with non-erodible elements.
- 3.3** Emissions due to wind erosion and mechanical entrainment processes are continuous and steady state.
- 3.4** The locations of potential maximally exposed individuals (i.e., nearest residents and off-site workers) are based on a central point representative of each of the MISS site and nearby property emission areas (Ref. 9.12) as follows:

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
<u>MISS Soil Load-outs</u>				
Residents:	135	West		
	145	West-southwest		
	155	West-northwest		
	185	Southwest		
	215	East-northeast		
	235	South-southwest		
	235	North-northeast		
	235	Northeast		
	270	East		
Workers:	135	West		
	145	West-southwest		
	155	West-northwest		
	160	North		
	165	Northeast		
	165	East-southeast		
	165	Southeast		
	190	North-northeast		
	225	South-southeast		
	235	North-northwest		
	250	East		
	255	South		
<u>Cluster No. 2C</u>				
Residents:	65	West-northwest		
	70	Northwest		
	90	North-northwest		
	90	North		
	90	West		
	100	West-southwest		
Workers:	10	Northeast		
	10	East-northeast		
	10	East		
	10	East-southeast		
	10	Southeast		
	10	South-southeast		
	10	South		
	10	South-southwest		
	10	Southwest		
<u>Cluster No. 2D</u>				
Residents:	90	Northwest		
	105	West-northwest		
	110	West		
	120	North-northwest		
	135	West-southwest		
	135	North		
	140	Southwest		

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
	140	South-southwest		
	160	South		
Workers:	40	Northeast		
	40	North-northeast		
	50	North		
	75	East-northeast		
	80	East		
	100	East-southeast		
	150	Southeast		
<u>Cluster No. 5A</u>				
Residents:	270	North-northwest		
	280	West-southwest		
	290	Southwest		
	300	East-southeast		
	300	East		
	345	East-northeast		
	345	West		
	345	South-southwest		
Workers:	10	Northeast		
	10	North-northeast		
	10	North		
	10	North-northwest		
	10	Northwest		
	10	West-southwest		
	10	West		
	70	West-southwest		
	70	Southwest		
	90	South-southwest		
	90	East-northeast		
	90	East		
	105	East-southeast		
	105	South		
<u>Cluster No. 5B</u>				
Residents:	175	North-northwest		
	225	Northwest		
	240	North		
	260	West-northwest		
	270	Southwest		
	305	West-southwest		
	325	South-southwest		

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
Workers:	10	South		
	10	South-southwest		
	10	Southwest		
	10	West-southwest		
	10	West		
	15	South-southeast		
	25	Southeast		
	60	North		
	60	North-northwest		
	75	West-northwest		
	135	East		
	145	East-southeast		
<u>Cluster No. 6C</u>				
Residents:	155	West-northwest		
	155	Northwest		
	185	North-northwest		
	290	West		
	340	East		
	340	East-southeast		
	340	Southeast		
Workers:	60	West-northwest		
	60	West		
	60	West-southwest		
	90	Southeast		
	120	South-southwest		
	120	Southwest		
	135	South		
	150	North-northeast		
	150	Northeast		
	165	East-northeast		
	165	North		
<u>Cluster No. 6D</u>				
Residents:	125	West-northwest		
	125	Northwest		
	260	West		
	370	East		
	370	East-southeast		
	375	Southeast		
Workers:	40	West		
	40	West-southwest		
	45	Southwest		
	70	West-northwest		
	70	Northwest		
	125	Southeast		
	125	North-northeast		
	125	Northeast		
	140	North		

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
<u>Cluster No. 9A</u>				
Residents:	100	West-northwest		
	100	East-southeast		
	105	Southeast		
	110	West		
	135	East		
	135	South-southeast		
	150	Northwest		
	165	East-northeast		
Workers:	45	West		
	60	Southwest		
	75	West-southwest		
	75	South		
	75	South-southwest		
	90	West-northwest		
	90	South-southeast		
	105	North-northeast		
	105	Northeast		
	120	East-northeast		
	120	North		
	135	Northeast		
<u>Cluster No. 12B</u>				
Residents:	165	West		
	175	West-southwest		
	185	West-northwest		
	195	Northeast		
	210	East-northeast		
	210	Southwest		
	260	East-northeast		
	260	East		
Workers:	165	West		
	165	North		
	165	North-northeast		
	165	Southeast		
	165	East-southeast		
	175	West-southwest		
	185	West-northwest		
	190	North-northwest		
	210	East		
	225	South-southeast		
235	South			

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
<u>Cluster No. 12C</u>				
Residents:	195	Northwest		
	215	North-northwest		
	315	Southwest		
	315	East		
	315	East-southeast		
	360	East-northeast		
Workers:	30	South		
	30	South-southwest		
	45	West-southwest		
	45	West		
	75	Northeast		
	75	East-northeast		
	75	East		
	75	East-southeast		
	105	Southeast		
<u>Columbia Lane Water Line</u>				
Residents:	15	South		
	15	South-southeast		
	15	South-southwest		
	30	West		
	45	Southeast		
	60	Southwest		
Workers:				
Worker distances are not evaluated as the particulate emissions from the excavations for the Columbia Lane water line repair and their potential impacts to workers are insignificant compared to the much larger releases from the excavations at Cluster 2D.				
3.5 The occupancy factor for the residents is 100 percent while the occupancy factor for workers is 27 percent (i.e., 45-hour work-week x 52 weeks per year = 2340 hours/8760 hours).				
3.6 The number of disturbances relative to wind erosion of in situ soil is 3 times per week for the entire year for a total of 156 disturbances per year (3 x 52 weeks/yr). The highest 2-minute wind speed for a given week is conservatively used for the 3 disturbances per week. A separate calculation is performed for soils covered by vegetation/gravel and for bare soils.				
3.7 Daughters in the decay chain of radionuclides are considered to be in secular equilibrium with their parents until a radionuclide in the chain is encountered with a measured concentration whereupon the measured concentration is used (Ref. 9.6). Although the direct emission of radon gas is not considered in the analysis, the daughters of radon generated by the decay of Ra-226 in dust offsite is accounted for by the model in the computation of the effective dose equivalents for the various internal and external exposure pathways.				

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4. EQUATIONS

4.1 In Situ Wind Erosion Emissions: (Ref. 9.2, Section 13.2.5, "Industrial Wind Erosion")

The wind speed profile in the surface boundary layer is found to follow a logarithmic distribution:

$$u(z) = \frac{u^*}{0.4} \ln \frac{z}{z_o} \quad (z > z_o) \quad (1)$$

where:

- u = wind speed (cm/s)
- u^* = friction velocity (cm/s)
- z = height above test surface (cm)
- z_o = roughness height (cm)
- 0.4 = von Karman's constant (dimensionless)

The friction velocity (u^*) is a measure of wind shear stress on the erodible surface, as determined from the slope of the logarithmic velocity profile. The roughness height (z_o) is a measure of the roughness of the exposed surface as determined from the y intercept of the velocity profile (i.e., the height at which the wind speed is zero).

Emissions generated by wind erosion are also dependent on the frequency of disturbance of the erodible surface because each time that a surface is disturbed, its erosion potential is restored. A disturbance is defined as an action that results in the exposure of fresh surface material. On a storage pile, this would occur whenever aggregate material is either added to or removed from the old surface. A disturbance of an exposed area may also result from the turning of surface material to a depth exceeding the size of the largest pieces of material present.

The emission factor for wind-generated particulate emissions from mixtures of erodible and nonerodible surface material subject to disturbance may be expressed in units of grams per square meter (g/m^2) per year as follows:

$$\text{Emission factor} = k \sum_{i=1}^N P_i \quad (2)$$

where:

- k = particle size multiplier
- N = number of disturbances per year
- P_i = erosion potential corresponding to the observed (or probable) fastest mile of wind for the i th period between disturbances (g/m^2)

The particle size multiplier (k) for Equation 2 varies with aerodynamic particle size as follows:

Aerodynamic Particle Size Multipliers For Equation 2			
30 μm	<15 μm	<10 μm	<2.5 μm
1.0	0.6	0.5	0.075

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This distribution of particle size within the under 30 micrometer (μm) fraction is comparable to the distributions reported for other fugitive dust sources where wind speed is a factor. This is illustrated, for example, in the distributions for batch and continuous drop operations encompassing a number of test aggregate materials (see AP-42 Section 13.2.4).

In calculating emission factors, each area of an erodible surface that is subject to a different frequency of disturbance should be treated separately. For a surface disturbed daily, $N = 365$ per year and for a surface disturbance once every 6 months, $N = 2$ per year.

The erosion potential function for a dry, exposed surface is:

$$P = 58 (u^* - u_t^*)^2 + 25(u^* - u_t^*) \quad (3)$$

$$P = 0 \text{ for } u^* \leq u_t^*$$

where:

u^* = friction velocity (m/s)
 u_t = threshold friction velocity (m/s)

Because of the nonlinear form of the erosion potential function, each erosion event must be treated separately. Equations 2 and 3 apply only to dry, exposed materials with limited erosion potential. The resulting calculation is valid only for a time period as long or longer than the period between disturbances.

Threshold friction velocities for several surface types have been determined by field measurements with a portable wind tunnel. These values are presented below:

THRESHOLD FRICTION VELOCITIES

Material	Threshold Friction Velocity (m/s)	Roughness Height (cm)	Threshold Wind Velocity at 10 m (m/s)	
			$z_o = \text{Act}$	$z_o = 0.5 \text{ cm}$
Overburden ^a	1.02	0.3	21	19
Scoria (roadbed material) ^a	1.33	0.3	27	25
Ground coal (surrounding coal pile) ^a	0.55	0.01	16	10
Uncrusted coal pile ^a	1.12	0.3	23	21
Scraper tracks on coal pile ^{a,b}	0.62	0.06	15	12
Fine coal dust on concrete pad ^c	0.54	0.2	11	10

^a Western surface coal mine.

^b Lightly crusted.

^c Eastern power plant.

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The fastest mile of wind for the periods between disturbances may be obtained from the monthly LCD summaries for the nearest reporting weather station that is representative of the site in question. These summaries report actual fastest mile values for each day of a given month. Because the erosion potential is a highly nonlinear function of the fastest mile, mean values of the fastest mile are inappropriate. The anemometer heights of reporting weather should be corrected to a 10-m reference height using Equation 1.

To convert the fastest mile of wind (u^+) from a reference anemometer height of 10 m to the equivalent friction velocity (u^*), the logarithmic wind speed profile may be used to yield the following equation:

$$u^* = 0.053 u_{10}^+ \quad (4)$$

where:

u^* = friction velocity (m/s)
 u_{10}^+ = fastest mile of reference anemometer for period between disturbances (m/s)

This assumes a typical roughness height of 0.5 cm for open terrain. Equation 4 is restricted to large relatively flat piles or exposed areas with little penetration into the surface wind layer.

Implementation of the above procedure is carried out in the following steps:

1. Determine threshold friction velocity for erodible material of interest (see above table or determine from mode of aggregate size distribution).
2. Divide the exposed surface area into subareas of constant frequency of disturbance (N).
3. Tabulate fastest mile values (u^+) for each frequency of disturbance and correct them to 10 m (u_{10}^+) using Equation 1
4. Convert fastest mile values (u_{10}^+) to equivalent friction velocities (u^*), taking into account (a) the uniform wind exposure of nonelevated surfaces, using Equation 4.
5. Multiply the resulting emission factor for each subarea by the size of the subarea, and add the emission contributions of all subareas. Note that the highest 24-hour (hr) emissions would be expected to occur on the windiest day of the year. Maximum emissions are calculated assuming a single event with the highest fastest mile value for the annual period.

4.2 Drop Operations Emissions: (Ref. 9.2, Section 13.2.4, "Aggregate Handling and Storage Piles")

$$E = k (0.0032)[U/5]^{1.3} / [M/2]^{1.4} \quad (5)$$

where:

E = emission factor (lb/ton)
 k = particle size multiplier (dimensionless)
 U = mean wind speed, meters per second (mps)
 M = material moisture content (%)

The particle size multiplier in Equation 5, k , varies with aerodynamic particle size range, as follows:

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Aerodynamic Particle Size Multiplier (k) For Equation 5

< 30 μm	< 15 μm	< 10 μm	< 5 μm	< 2.5 μm
0.74	0.48	0.35	0.20	0.053

4.3 Radionuclide Emission Rates

The radionuclide source concentrations (S) for isotopes of uranium (U_{238}), radium (Ra_{226}), and thorium (Th_{232}) are based on average values for in situ soil (Ref. 9.9) and average values measured for the excavated soil from the vicinity properties. These values are as follows:

<u>Emission Source</u>	$S_{\text{U}_{238}}$ (pCi/g)	$S_{\text{Ra}_{226}}$ (pCi/g)	$S_{\text{Th}_{232}}$ (pCi/g)
• In situ soil	27.5	4.30	24.80
• MISS Soil Load-outs			
- No. 1	0.99	0.76	4.20
- No. 2	0.88	0.63	2.38
- No. 3	0.73	0.50	2.07
- No. 4	1.22	0.82	3.39
- No. 5	1.52	1.08	5.25
- No. 6	1.05	0.68	3.16
- No. 7	0.86	0.52	1.60
- No. 8	1.22	1.10	3.50
- No. 9	1.29	1.20	6.10
- No. 10	1.11	0.57	1.75
- No. 11	1.08	0.91	3.66
- No. 12	1.39	1.18	4.41
• Cluster No. 2C	0.88	0.63	2.38
• Cluster No. 2D	1.04	0.71	3.15
• Cluster No. 5A	1.19	0.89	3.27
• Cluster No. 5B	1.12	0.86	3.55
• Cluster No. 6C	1.11	0.81	3.22
• Cluster No. 6D	1.07	0.76	3.46
• Cluster No. 9A	1.19	1.06	4.88
• Cluster No. 12B	1.22	0.99	3.88
• Cluster No. 12C	1.39	1.18	4.41
• Columbia Lane Repair	10.89	2.27	4.14

Ratios of uranium isotopes are calculated from the percentage of activity of U_{238} , U_{234} , and U_{235} in natural uranium as these components make up total uranium. The percentage (P) of each isotope comprising total uranium activity (Ref. 9.10) is:

<u>Emission Source</u>	$P_{\text{U}_{238}}$	$P_{\text{U}_{234}}$	$P_{\text{U}_{235}}$
All sources (%)	47.249	50.539	2.212

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The source concentrations (S) of total uranium, U_{234} , and U_{235} are then given by:

$$S_{U_{tot}} = (S_{U_{238}} / P_{U_{238}}) = (27.5 / 0.47249) = \underline{58.2 \text{ pCi/g}} \text{ (In situ soil)}$$

$$S_{U_{234}} = (S_{U_{tot}} \times P_{U_{234}}) = (58.2 \text{ pCi/g}) \times 0.50539 = \underline{29.4 \text{ pCi/g}} \text{ (In situ soil)}$$

$$S_{U_{235}} = (S_{U_{tot}} \times P_{U_{235}}) = (58.2 \text{ pCi/g}) \times 0.02212 = \underline{1.29 \text{ pCi/g}} \text{ (In situ soil)}$$

The annual radionuclide emissions (R) are then the individual radionuclide source concentrations (S) multiplied by the annual particulate emissions rate (E) for the in situ wind erosion and the other load-out and remediation/excavation activities ($R = S \times E$). Unknown radionuclide source emission rates are based on the known source emission rates assuming secular equilibrium in the five decay chains (Ref. 9.6) as follows:

U_{238}	U_{234}	Ra_{226}	U_{235}	Th_{232}
$R_{Th234} = R_{U238}$	$R_{Th230} = R_{U234}$	$R_{Po218} = R_{Ra226}$	$R_{Th231} = R_{U235}$	$R_{Ra228} = R_{Th232}$
$R_{Pa234m} = R_{U238}$		$R_{Pb214} = 0.9998R_{Po218}$	$R_{Pa231} = R_{Th231}$	$R_{Ac228} = R_{Ra228}$
$R_{Pa234} = 0.0013R_{Pa234m}$		$R_{Bi214} = R_{Po218}$	$R_{Ac227} = R_{Pa231}$	$R_{Th228} = R_{Ac228}$
		$R_{Po214} = 0.99979R_{Bi214}$	$R_{Th227} = 0.9862R_{Ac227}$	$R_{Ra224} = R_{Th228}$
		$R_{Pb210} = R_{Bi214}$	$R_{Fr223} = 0.0138R_{Ac227}$	$R_{Po216} = R_{Ra224}$
		$R_{Bi210} = R_{Pb210}$	$R_{Ra223} = R_{Ac227}$	$R_{Pb212} = R_{Po216}$
		$R_{Po210} = 0.9999987R_{Bi210}$	$R_{Po215} = R_{Ra223}$	$R_{Bi212} = R_{Pb212}$
			$R_{Pb211} = 0.9999977R_{Po215}$	$R_{Po212} = 0.6407R_{Bi212}$
			$R_{Bi211} = R_{Po215}$	$R_{Tl208} = 0.3593R_{Bi212}$
			$R_{Po211} = 0.00273R_{Bi211}$	
			$R_{Tl207} = 0.99727R_{Bi211}$	

Secular equilibrium is a condition in which the parent species in a radioactive series has a much longer half-life than its succeeding species, such that there is no significant change in its concentration during the time interval over which the shorter-lived species attain their equilibria, whereupon all species appear to decay at the same rate.

Although the direct emission of radon gas is not considered in this analysis, the daughters of radon generated by the decay of Ra-226 in dust offsite is accounted for by the model in the computation of the effective dose equivalents for the various internal and external exposure pathways.

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5. INPUT DATA

5.1 In Situ Soil Wind Erosion Emissions:

- $k = 0.50$ (PM-10) - (Ref. 9.2, Section 13.2.5)
- No. of Disturbances = 156 per year (See Assumption 3.6)
- Surface Area of MISS vegetative soil = 22,111 m² (Ref. 9.12)
- Surface Area of MISS bare soil = 2,137 m² (Ref. 9.12)
- Surface Area of gravel/crushed stone = 22,761 m² (Ref. 9.12)
- $u^* = 1.02$ m/sec - (Ref. 9.2, Section 13.2.5 – value for “overburden” from page 13.2.5-5)
- Anemometer Height = 10 m (Ref. 9.5)

Month	Week	Maximum 2-Minute Wind Speed (mph) ¹
Jan.	1	23
	2	25
	3	32
	4	28
Feb.	1	26
	2	26
	3	26
	4	26
Mar.	1	32
	2	24
	3	25
	4	23
	5	23
Apr.	1	26
	2	25
	3	22
	4	28
May	1	22
	2	22
	3	25
	4	18
	5	18
Jun.	1	26
	2	17
	3	25
	4	26
Jul.	1	18
	2	23
	3	28
	4	17
	5	17
Aug.	1	21
	2	18
	3	26
	4	31
	5	31

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Sep.	1	18
	2	21
	3	23
	4	24
Oct.	1	17
	2	26
	3	26
	4	26
Nov.	1	21
	2	16
	3	30
	4	29
Dec.	1	32
	2	22
	3	32
	4	33

1. Fastest mile wind speed required by the AP-42 methodology is represented by the maximum 2-minute wind speed from Ref. 9.5.

5.2 Drop Operations Emissions:

- $k = 0.35$ (PM-10) - (Ref. 9.2, Section 13.2.4)
- $U = 7.2$ mph - (Ref. 9.5)
- $M = 12.0\%$ - (Ref. 9.2, Section 13.2.4, Municipal Solid Waste Landfill Cover)

	<u>Soil Moved</u> (tons)	<u>No. Times</u> <u>Dropped</u>	<u>Soil Handled</u> (tons)	<u>Surface Area</u> (m ²)
• MISS Soil Load-outs				
- No. 1	4,264	3	12,792	163.5
- No. 2	4,264	3	12,792	163.5
- No. 3	2,666	3	7,998	163.5
- No. 4	4,693	3	14,079	163.5
- No. 5	5,759	3	17,277	163.5
- No. 6	5,117	3	15,351	163.5
- No. 7	4,159	3	12,477	163.5
- No. 8	3,521	3	10,563	163.5
- No. 9	4,909	3	14,727	163.5
- No. 10	2,133	3	6,399	163.5
- No. 11	3,197	3	9,591	163.5
- No. 12	3,202	3	9,606	163.5

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	<u>Soil Moved</u> (tons)	<u>No. Times</u> <u>Dropped</u>	<u>Soil Handled</u> (tons)	<u>Surface Area</u> (Ref. 9.12) (m ²)
• Cluster No. 2C	768	1	768	147
• Cluster No. 2D	13,635	1	13,635	3,415
• Cluster No. 5A	4,185	1	4,185	2,115
• Cluster No. 5B	9,901	1	9,901	3,384
• Cluster No. 6C	4,192	1	4,192	629
• Cluster No. 6D	5,056	1	5,056	731
• Cluster No. 9A	884	1	884	201
• Cluster No. 12B	8,313	1	8,313	6,952
• Cluster No. 12C	660	1	660	328
• Columbia Lane Repair	290	1	290	417

The "soil-handled" amounts account for the total tonnage of soil that is moved and the number of times that it is dropped. For example, the total amount of soil moved during the MISS soil load-out No. 1 was 4,264 tons but it was handled or dropped 3 times for a total amount handled of 3 x 4,264 tons or 12,792 tons.

Upon arrival at the MISS, the soil in the dump trucks was emptied on the ground (first drop) near the fabric structure and then placed inside the fabric structure using a front end loader (second drop). The soil inside the fabric structure was then placed directly into the lined rail cars for offsite disposal (third drop). Thus, the soil load-out activities were represented by three drops to account for the entire soil transfer process at the MISS.

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5.3 CAP88-PC Input Data

- Meteorological Data (1998-2007 Teterboro, NJ data, Ref. 9.11):

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

Pasquill Stability Class

Dir	A	B	C	D	E	F	G
N	1.161	2.812	4.147	4.414	3.643	1.582	0.000
NNW	1.132	2.903	4.212	4.317	3.472	1.452	0.000
NW	1.151	2.686	3.764	3.713	3.433	1.398	0.000
WNW	1.105	2.915	3.796	3.408	2.998	1.286	0.000
W	1.157	2.672	3.772	3.528	3.110	1.350	0.000
WSW	1.099	2.630	3.396	3.288	2.991	1.295	0.000
SW	1.105	2.579	3.508	3.274	3.152	1.321	0.000
SSW	1.181	2.468	3.371	3.893	3.583	1.471	0.000
S	1.162	2.588	3.579	4.166	3.696	1.411	0.000
SSE	1.208	2.873	4.081	5.847	4.041	1.559	0.000
SE	1.105	2.942	4.214	6.172	4.051	1.726	0.000
ESE	1.172	3.168	4.170	5.931	3.991	1.866	0.000
E	1.105	3.078	4.370	5.458	3.828	1.793	0.000
ENE	1.190	2.927	4.439	5.233	4.006	1.751	0.000
NE	1.190	2.724	3.915	4.469	3.708	1.575	0.000
NNE	1.076	2.511	3.825	4.103	3.616	1.440	0.000

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

Pasquill Stability Class

Dir	A	B	C	D	E	F	G
N	0.0097	0.0489	0.1305	0.4242	0.1341	0.2525	0.0000
NNW	0.0256	0.0622	0.1315	0.5258	0.0788	0.1761	0.0000
NW	0.0208	0.0779	0.1295	0.5590	0.0757	0.1371	0.0000
WNW	0.0316	0.0982	0.1198	0.6002	0.0643	0.0859	0.0000
W	0.0157	0.0647	0.0899	0.7095	0.0452	0.0749	0.0000
WSW	0.0119	0.0509	0.0813	0.6756	0.0431	0.1371	0.0000
SW	0.0053	0.0508	0.1017	0.5492	0.0678	0.2252	0.0000
SSW	0.0031	0.0461	0.1038	0.5244	0.0845	0.2382	0.0000
S	0.0054	0.0422	0.1097	0.3773	0.1009	0.3645	0.0000
SSE	0.0032	0.0379	0.1040	0.4410	0.1462	0.2677	0.0000
SE	0.0032	0.0361	0.1227	0.5045	0.1438	0.1898	0.0000
ESE	0.0053	0.0543	0.1386	0.5003	0.1333	0.1682	0.0000
E	0.0038	0.0551	0.1359	0.4349	0.1520	0.2183	0.0000
ENE	0.0088	0.0532	0.1291	0.4221	0.1974	0.1894	0.0000
NE	0.0053	0.0523	0.1130	0.3452	0.1471	0.3372	0.0000
NNE	0.0077	0.0594	0.1339	0.3003	0.1213	0.3775	0.0000
TOTAL	0.0074	0.0504	0.1172	0.4587	0.1189	0.2473	0.0000

- Annual average temperature = 55.0 °F (12.8 °C) – Ref. 9.5
- Annual precipitation = 55.9 inches (142.0 cm) – Ref. 9.5

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- Radionuclide Emission Rates:

- See Attachment A (Excel spreadsheet)

- Population Data based on 2000 Census (Ref. 9.13):

- 1990 population distribution adjusted for the 8.4 percent increase from 1990 to 2000 for the New York-Northern New Jersey-Long Island, NY-NJ-CT-PA Metropolitan Statistical Area/Consolidated Metropolitan Statistical Area (see page 95)

- Individual Receptors:

<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>
<u>MISS Soil Load-outs</u>		
Residents:	135	West
	145	West-southwest
	155	West-northwest
	185	Southwest
	215	East-northeast
	235	South-southwest
	235	North-northeast
	235	Northeast
	270	East
Workers:	135	West
	145	West-southwest
	155	West-northwest
	160	North
	165	Northeast
	165	East-southeast
	165	Southeast
	190	North-northeast
	225	South-southeast
	235	North-northwest
	250	East
	255	South
<u>Cluster No. 2C</u>		
Residents:	65	West-northwest
	70	Northwest
	90	North-northwest
	90	North
	90	West
	100	West-southwest

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
Workers:	10	Northeast		
	10	East-northeast		
	10	East		
	10	East-southeast		
	10	Southeast		
	10	South-southeast		
	10	South		
	10	South-southwest		
	10	Southwest		
<u>Cluster No. 2D</u>				
Residents:	90	Northwest		
	105	West-northwest		
	110	West		
	120	North-northwest		
	135	West-southwest		
	135	North		
	140	Southwest		
	140	South-southwest		
	160	South		
Workers:	40	Northeast		
	40	North-northeast		
	50	North		
	75	East-northeast		
	80	East		
	100	East-southeast		
	150	Southeast		
<u>Cluster No. 5A</u>				
Residents:	270	North-northwest		
	280	West-southwest		
	290	Southwest		
	300	East-southeast		
	300	East		
	345	East-northeast		
	345	West		
	345	South-southwest		
Workers:	10	Northeast		
	10	North-northeast		
	10	North		
	10	North-northwest		
	10	Northwest		
	10	West-southwest		
	10	West		
	70	West-southwest		
	70	Southwest		
	90	South-southwest		
	90	East-northeast		

CALCULATION IDENTIFICATION NUMBER				
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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
	90	East		
	105	East-southeast		
	105	South		
<u>Cluster No. 5B</u>				
Residents:	175	North-northwest		
	225	Northwest		
	240	North		
	260	West-northwest		
	270	Southwest		
	305	West-southwest		
	325	South-southwest		
Workers:	10	South		
	10	South-southwest		
	10	Southwest		
	10	West-southwest		
	10	West		
	15	South-southeast		
	25	Southeast		
	60	North		
	60	North-northwest		
	75	West-northwest		
	135	East		
	145	East-southeast		
<u>Cluster No. 6C</u>				
Residents:	155	West-northwest		
	155	Northwest		
	185	North-northwest		
	290	West		
	340	East		
	340	East-southeast		
	340	Southeast		
Workers:	60	West-northwest		
	60	West		
	60	West-southwest		
	90	Southeast		
	120	South-southwest		
	120	Southwest		
	135	South		
	150	North-northeast		
	150	Northeast		
	165	East-northeast		
	165	North		

CALCULATION IDENTIFICATION NUMBER				
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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>		
<u>Cluster No. 6D</u>				
Residents:	125	West-northwest		
	125	Northwest		
	260	West		
	370	East		
	370	East-southeast		
	375	Southeast		
Workers:	40	West		
	40	West-southwest		
	45	Southwest		
	70	West-northwest		
	70	Northwest		
	125	Southeast		
	125	North-northeast		
	125	Northeast		
	140	North		
<u>Cluster No. 9A</u>				
Residents:	100	West-northwest		
	100	East-southeast		
	105	Southeast		
	110	West		
	135	East		
	135	South-southeast		
	150	Northwest		
	165	East-northeast		
Workers:	45	West		
	60	Southwest		
	75	West-southwest		
	75	South		
	75	South-southwest		
	90	West-northwest		
	90	South-southeast		
	105	North-northeast		
	105	Northeast		
	120	East-northeast		
	120	North		
	135	Northeast		
<u>Cluster No. 12B</u>				
Residents:	165	West		
	175	West-southwest		
	185	West-northwest		
	195	Northeast		
	210	East-northeast		
	210	Southwest		
	260	East-northeast		
	260	East		

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<u>Area</u>	<u>Distance</u> (meters)	<u>Direction</u>
Workers:	165	West
	165	North
	165	North-northeast
	165	Southeast
	165	East-southeast
	175	West-southwest
	185	West-northwest
	190	North-northwest
	210	East
	225	South-southeast
	235	South
<u>Cluster No. 12C</u>		
Residents:	195	Northwest
	215	North-northwest
	315	Southwest
	315	East
	315	East-southeast
	360	East-northeast
Workers:	30	South
	30	South-southwest
	45	West-southwest
	45	West
	75	Northeast
	75	East-northeast
	75	East
	75	East-southeast
	105	Southeast
<u>Columbia Lane Water Line</u>		
Residents:	15	South
	15	South-southeast
	15	South-southwest
	30	West
	45	Southeast
	60	Southwest
Workers:		

Worker distances are not evaluated as the particulate emissions from the excavations for the Columbia Lane water line repair and their potential impacts to workers are insignificant compared to the much larger releases from the excavations at Cluster 2D.

6. CALCULATION

The actual radionuclide emission rate calculations for the soil handling activities are performed using an Excel spreadsheet, a printout of which is provided in Attachment A. The dose calculations to identify the maximally exposed individual for the off-site transport of radioactive particulates are performed by the CAP88-PC model, the output of which is provided on pages 32-199.

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7. RESULTS

The CAP88-PC output for the annual doses to the maximally exposed individuals (MEI) and population (POP) within 80 km of MISS is provided on pages 32-199 as follows:

Release Area

Page Numbers

	<u>MEI</u>	<u>POP</u>
MISS Soil Load-outs	33 - 39	110 - 118
Cluster No. 2C	40 - 46	119 - 127
Cluster No. 2D	47 - 53	128 - 136
Cluster No. 5A	54 - 60	137 - 145
Cluster No. 5B	61 - 67	146 - 154
Cluster No. 6C	68 - 74	155 - 163
Cluster No. 6D	75 - 81	164 - 173
Cluster No. 9A	82 - 88	174 - 182
Cluster No. 12B	89 - 95	183 - 191
Cluster No. 12C	96 - 102	192 - 200
Columbia Lane Water Line	103 - 109	N/A

As stated earlier, analyses are performed separately for the various release areas given the differences in receptor locations most affected by each of these areas. Where individual receptors are affected by more than one emission source, doses caused by those sources are added. The individual receptor locations (i.e., nearest residences and workers) are highlighted in yellow in the CAP88-PC output in the tables labeled INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y).

The maximum annual effective doses are summarized below first by individual activities and then for all activities combined. The maximum total site doses are the result of the combination of doses from the individual activities causing the highest dose at a particular receptor.

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Receptor	Location	Annual Dose Rate ¹ (mrem/yr)	Occupancy Factor (%)	Annual Effective Dose (mrem/yr)
MISS Soil Load-outs:				
• Population (person-rem/yr)	N/A	9.29E-04	N/A	9.29E-04
• Maximally Exposed Resident	235 m NNE	2.0E-04	100	2.0E-04
• Maximally Exposed Worker	160 m N	3.6E-04	27	9.72E-05
Cluster No. 2C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 2D				
• Population (person-rem/yr)	N/A	7.55E-05	N/A	7.55E-05
• Maximally Exposed Resident	160 m S	4.5E-05	100	4.5E-05
• Maximally Exposed Worker	40 m NNE	4.7E-04	27	1.27E-04
Cluster No. 5A				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 5B				
• Population (person-rem/yr)	N/A	5.56E-05	N/A	5.56E-05
• Maximally Exposed Resident	240 m N	9.8E-06	100	9.8E-06
• Maximally Exposed Worker	10 m S	1.4E-03	27	3.78E-04
Cluster No. 6C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 6D				
• Population (person-rem/yr)	N/A	2.77E-05	N/A	2.77E-05
• Maximally Exposed Resident	125 m NW	2.5E-06	100	2.5E-06
• Maximally Exposed Worker	45 m SW	6.8E-05	27	1.84E-05
Cluster No. 9A				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Cluster No. 12B/MISS improvements				
• Population (person-rem/yr)	N/A	5.11E-05	N/A	5.11E-05
• Maximally Exposed Resident	195 m NE	1.3E-05	100	1.3E-05
• Maximally Exposed Worker	165 m NNE	2.2E-05	27	5.94E-06
Cluster No. 12C				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Columbia Lane Water Line				
• Population (person-rem/yr)	N/A	Negligible	N/A	Negligible
• Maximally Exposed Resident	N/A	Negligible	100	Negligible
• Maximally Exposed Worker	N/A	Negligible	27	Negligible
Total Site				
• Population (person-rem/yr)	N/A	1.14E-03	N/A	1.14E-03
• Maximally Exposed Resident	235 m NNE of MISS Soil Load	2.1E-04	100	2.1E-04
• Maximally Exposed Worker	10 m S of Cluster 5B	1.4E-03	27	3.78E-04

1. Note that the Annual Dose Rate values reported in the table for the maximally exposed resident and worker are taken from the CAP88-PC Summary output, page 5, which is reported to one decimal place.

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2. Negligible refers to the fact that the radionuclide emission rates are so small that CAP88-PC reports the resulting doses as zero.

The maximum annual effective doses are almost entirely the result of the internal doses from the inhalation of dust particles and the ingestion of plant borne dust. The air immersion in the dust plume and ground surface irradiation from dust deposition pathways contribute a negligible amount to the total dose. As an illustration, the percent contribution of the various pathways to the total effective dose, based on the dose calculated at the closest distance from the MISS Soil Load-outs analyzed (no actual receptor at this location), is as follows:

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	7.75E-04
AIR IMMERSION	5.43E-09
GROUND SURFACE	0.00E+00
INTERNAL	7.75E-04
EXTERNAL	5.43E-09
TOTAL	7.75E-04

The "Internal" dose is the sum of the "Ingestion" and "Inhalation" pathways while the "External" dose is the sum of the "Air Immersion" and "Ground Surface" pathways.

8. CONCLUSIONS

The annual effective dose to the public within 80 km of MISS from airborne particulate releases during 2007 was **1.14E-03 person-rem/yr**. The annual effective dose to the maximally exposed resident (located north-northeast of the MISS site) was **2.1E-04 mrem/yr** while the annual effective dose to the maximally exposed worker (located south of Cluster 5B) was **3.78E-04 mrem/yr** during 2007. These annual effective doses are due primarily to inhalation of airborne particulate releases.

These doses are well below the NESHAPS standard of 10 mrem/yr (40 CFR 61.92).

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9. REFERENCES

- 9.1 Shroff, Behram, "CAP88-PC Version 3.0 User Guide". Prepared for the U.S. Environmental Protection Agency, Office of Radiation and Indoor Air, Washington, D.C by Trinity Engineering Associates, Inc., April 2006.
- 9.2 U. S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources", 5th Edition, AP-42, November, 2006 (Sections 13.2.4 and 13.2.5).
- 9.3 U. S. Environmental Protection Agency, Federal Guidance Report 13, "Cancer Risk Coefficients for Environmental Exposure to Radionuclides", EPA-402-R-99-001, Office of Radiation and Indoor Air, Washington, D.C, 1999.
- 9.4 ICRP72 International Commission on Radiological Protection, "Age Dependent Doses to Members of the Public from Intake of Radionuclides, Part 5. Compilation of Ingestion and Inhalation Dose Coefficients" ICRP Publication 72, Pergamon Press, Oxford, 1996.
- 9.5 National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, National Climatic Data Center. Unedited Local Climatological Data for January - December, 2007, Teterboro, NJ.
- 9.6 Shlein, "The Health Physics and Radiological Health Handbook", Revised Edition, Scinta, Inc. Silver Springs, MD, 1992.
- 9.7 U.S. Environmental Protection Agency, "Rapid Assessment of Exposure to Particulate Emissions from Surface Contaminated Sites". EPA Report No. EPA-600/8-85/002, Office of Health and Environmental Assessment, Washington, D.C., February, 1985.
- 9.8 U.S. Environmental Protection Agency, "Estimation of Impacts from Area Sources of Particulate Matter Emissions at Superfund Sites". EPA Report No. EPA-451/R-93/004, Office of Air Quality Planning and Standards, Research Triangle Park, NC, April, 1993.
- 9.9 Bechtel National, Inc. (BNI), "Characterization Report for the Maywood Interim Storage Site, Maywood, New Jersey". DOE/OR/20722-139, Oak Ridge, TN, June, 1987.
- 9.10 Bechtel National, Inc. (BNI), "Natural Uranium Specific Activity", 14501-191-CV-005, Rev. 2, Oak Ridge, TN, 1995.
- 9.11 1998-2007 Stability Array (STAR) data for Teterboro, NJ supplied by the National Oceanic and Atmospheric Administration, National Climatic Data Center, Asheville, NC.
- 9.12 Figure A5 - Site Location Plan, FUSRAP Maywood Superfund Site - Maywood, Lodi and Rochelle Park. Prepared by Shaw Environmental, Inc., January 2008.
- 9.13 U.S. Census Bureau, Census 2000 Redistricting Data (P.L. 94-171) Summary File and 1990 Census. Census 2000 PHC-T-3, Ranking Table for Metropolitan Areas: 1990 and 2000, Table 1: Metropolitan Areas and their Geographic Components in Alphabetical Sort, 1990 and 2000 Population and Numeric and Percent Population Change: 1990 to 2000.

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10. CAP88-PC OUTPUT (Maximally Exposed Individual)

C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
Mar 6, 2008 02:08 pmmFacility: Maywood Interim Storage Site - MISS Soil Load
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Army Corps of EngineersEffective Dose Equivalent
(mrem/year)

7.75E-04

At This Location: 135 Meters South

Dataset Name:
Dataset Date: 3/5/2008 11:14:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 135 Meters South
Lifetime Fatal Cancer Risk: 5.37E-10

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	6.44E-07
B Surfac	6.45E-07
Breasts	2.30E-04
St Wall	6.45E-07
ULI Wall	6.46E-07
Kidneys	6.44E-07
Lungs	6.46E-07
Ovaries	6.47E-07
R Marrow	7.19E-07
Spleen	8.58E-07
Thymus	5.10E-06
Uterus	5.23E-06
Bld Wall	2.83E-04
Brain	6.45E-07
Esophagu	2.05E-06
SI Wall	6.44E-07
LLI Wall	1.14E-05
Liver	6.50E-07
Muscle	1.10E-06
Pancreas	2.08E-06
Skin	6.45E-07
Testes	6.45E-07
Thyroid	6.44E-07
EFFEC	7.75E-04

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	1.1E-08	1.1E-08
Th-234	S	1	1.1E-08	1.1E-08
Pa-234m	M	1	1.1E-08	1.1E-08
Pa-234	M	1	1.4E-11	1.4E-11
U-234	M	1	1.2E-08	1.2E-08
Th-230	S	1	1.2E-08	1.2E-08
Ra-226	M	1	8.1E-09	8.1E-09
Po-218	M	1	8.1E-09	8.1E-09
Pb-214	M	1	8.1E-09	8.1E-09
Bi-214	M	1	8.1E-09	8.1E-09
Po-214	M	1	8.1E-09	8.1E-09
Pb-210	M	1	8.1E-09	8.1E-09
Bi-210	M	1	8.1E-09	8.1E-09
Po-210	M	1	8.1E-09	8.1E-09
U-235	M	1	5.1E-10	5.1E-10
Th-231	S	1	5.1E-10	5.1E-10
Pa-231	M	1	5.1E-10	5.1E-10
Ac-227	M	1	5.1E-10	5.1E-10
Th-227	S	1	5.0E-10	5.0E-10
Fr-223	M	1	7.0E-12	7.0E-12
Ra-223	M	1	5.1E-10	5.1E-10
Po-215	M	1	5.1E-10	5.1E-10
Pb-211	M	1	5.1E-10	5.1E-10
Bi-211	M	1	5.1E-10	5.1E-10
Tl-207	M	1	5.0E-10	5.0E-10
Po-211	M	1	1.4E-12	1.4E-12
Th-232	S	1	3.5E-08	3.5E-08
Ra-228	M	1	3.5E-08	3.5E-08
Ac-228	M	1	3.5E-08	3.5E-08
Th-228	S	1	3.5E-08	3.5E-08
Ra-224	M	1	3.5E-08	3.5E-08
Po-216	M	1	3.5E-08	3.5E-08
Pb-212	M	1	3.5E-08	3.5E-08
Bi-212	M	1	3.5E-08	3.5E-08
Po-212	M	1	2.2E-08	2.2E-08
Tl-208	M	1	1.3E-08	1.3E-08

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 163.50

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

135	145	155	160	165	185	190
215	225	235	250	255	270	

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SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	6.44E-07
B Surfac	6.45E-07
Breasts	2.30E-04
St Wall	6.45E-07
ULI Wall	6.46E-07
Kidneys	6.44E-07
Lungs	6.46E-07
Ovaries	6.47E-07
R Marrow	7.19E-07
Spleen	8.58E-07
Thymus	5.10E-06
Uterus	5.23E-06
Bld Wall	2.83E-04
Brain	6.45E-07
Esophagu	2.05E-06
SI Wall	6.44E-07
LLI Wall	1.14E-05
Liver	6.50E-07
Muscle	1.10E-06
Pancreas	2.08E-06
Skin	6.45E-07
Testes	6.45E-07
Thyroid	6.44E-07
EFFEC	7.75E-04

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	7.75E-04
AIR IMMERSION	5.43E-09
GROUND SURFACE	0.00E+00
INTERNAL	7.75E-04
EXTERNAL	5.43E-09
TOTAL	7.75E-04

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SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	8.74E-06
Th-234	2.35E-08
Pa-234m	1.45E-11
Pa-234	0.00E+00
U-234	1.14E-05
Th-230	4.59E-05
Ra-226	7.94E-06
Rn-222	0.00E+00
Po-218	5.72E-16
Pb-214	2.78E-08
Bi-214	3.37E-08
Po-214	3.39E-14
Pb-210	2.53E-06
Bi-210	2.13E-07
Po-210	7.50E-06
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	2.44E-04
Ra-228	2.59E-05
Ac-228	1.19E-07
Th-228	3.90E-04
Ra-224	2.92E-05
Rn-220	7.10E-13
Po-216	2.98E-14
Pb-212	1.69E-06
Bi-212	3.03E-07
Po-212	0.00E+00
Tl-208	2.34E-09
TOTAL	7.75E-04

CALCULATION IDENTIFICATION NUMBER

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	135	145	155	160	165	185	190
N	5.0E-04	4.3E-04	3.8E-04	3.6E-04	3.4E-04	2.7E-04	2.6E-04
NNW	1.1E-04	9.3E-05	8.2E-05	7.7E-05	7.2E-05	5.8E-05	5.5E-05
NW	7.2E-05	6.3E-05	5.5E-05	5.2E-05	4.9E-05	3.9E-05	3.7E-05
WNW	5.7E-05	5.0E-05	4.4E-05	4.1E-05	3.9E-05	3.1E-05	3.0E-05
W	1.4E-04	1.3E-04	1.1E-04	1.0E-04	9.8E-05	7.9E-05	7.5E-05
WSW	1.6E-04	1.4E-04	1.2E-04	1.2E-04	1.1E-04	8.7E-05	8.3E-05
SW	2.8E-04	2.5E-04	2.2E-04	2.0E-04	1.9E-04	1.5E-04	1.5E-04
SSW	3.7E-04	3.2E-04	2.8E-04	2.7E-04	2.5E-04	2.0E-04	1.9E-04
S	7.8E-04	6.7E-04	5.9E-04	5.6E-04	5.2E-04	4.2E-04	4.0E-04
SSE	5.1E-04	4.5E-04	3.9E-04	3.7E-04	3.5E-04	2.8E-04	2.6E-04
SE	3.1E-04	2.7E-04	2.4E-04	2.2E-04	2.1E-04	1.7E-04	1.6E-04
ESE	1.6E-04	1.4E-04	1.2E-04	1.2E-04	1.1E-04	8.9E-05	8.4E-05
E	2.8E-04	2.5E-04	2.2E-04	2.1E-04	1.9E-04	1.6E-04	1.5E-04
ENE	1.8E-04	1.6E-04	1.4E-04	1.3E-04	1.2E-04	1.0E-04	9.5E-05
NE	5.0E-04	4.3E-04	3.8E-04	3.6E-04	3.4E-04	2.7E-04	2.6E-04
NNE	6.0E-04	5.2E-04	4.6E-04	4.3E-04	4.0E-04	3.2E-04	3.1E-04

Distance (m)

Direction	215	225	235	250	255	270
N	2.0E-04	1.9E-04	1.7E-04	1.5E-04	1.5E-04	1.3E-04
NNW	4.3E-05	4.0E-05	3.7E-05	3.2E-05	3.1E-05	2.8E-05
NW	2.9E-05	2.7E-05	2.5E-05	2.2E-05	2.1E-05	1.9E-05
WNW	2.4E-05	2.2E-05	2.0E-05	1.8E-05	1.7E-05	1.5E-05
W	5.9E-05	5.5E-05	5.0E-05	4.5E-05	4.3E-05	3.9E-05
WSW	6.6E-05	6.0E-05	5.5E-05	4.9E-05	4.7E-05	4.2E-05
SW	1.1E-04	1.1E-04	9.7E-05	8.6E-05	8.3E-05	7.4E-05
SSW	1.5E-04	1.4E-04	1.3E-04	1.1E-04	1.1E-04	9.7E-05
S	3.1E-04	2.9E-04	2.6E-04	2.3E-04	2.2E-04	2.0E-04
SSE	2.1E-04	1.9E-04	1.8E-04	1.6E-04	1.5E-04	1.3E-04
SE	1.3E-04	1.2E-04	1.1E-04	9.4E-05	9.1E-05	8.1E-05
ESE	6.7E-05	6.1E-05	5.6E-05	5.0E-05	4.8E-05	4.3E-05
E	1.2E-04	1.1E-04	9.8E-05	8.7E-05	8.4E-05	7.5E-05
ENE	7.5E-05	6.9E-05	6.3E-05	5.6E-05	5.4E-05	4.8E-05
NE	2.0E-04	1.8E-04	1.7E-04	1.5E-04	1.4E-04	1.3E-04
NNE	2.4E-04	2.2E-04	2.0E-04	1.8E-04	1.7E-04	1.5E-04

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Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
Mar 6, 2008 03:15 pmmFacility: Maywood Interim Storage Site - Cluster 2C
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Army Corps of EngineersEffective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 100 Meters North Northeast

Dataset Name:
Dataset Date: 3/5/2008 1:31:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 100 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source #1	TOTAL
			Ci/y	Ci/y
U-238	M	1	4.5E-11	4.5E-11
Th-234	S	1	4.5E-11	4.5E-11
Pa-234m	M	1	4.5E-11	4.5E-11
Pa-234	M	1	5.8E-14	5.8E-14
U-234	M	1	4.8E-11	4.8E-11
Th-230	S	1	4.8E-11	4.8E-11
Ra-226	M	1	3.2E-11	3.2E-11
Po-218	M	1	3.2E-11	3.2E-11
Pb-214	M	1	3.2E-11	3.2E-11
Bi-214	M	1	3.2E-11	3.2E-11
Po-214	M	1	3.2E-11	3.2E-11
Pb-210	M	1	3.2E-11	3.2E-11
Bi-210	M	1	3.2E-11	3.2E-11
Po-210	M	1	3.2E-11	3.2E-11
U-235	M	1	2.1E-12	2.1E-12
Th-231	S	1	2.1E-12	2.1E-12
Pa-231	M	1	2.1E-12	2.1E-12
Ac-227	M	1	2.1E-12	2.1E-12
Th-227	S	1	2.1E-12	2.1E-12
Fr-223	M	1	2.9E-14	2.9E-14
Ra-223	M	1	2.1E-12	2.1E-12
Po-215	M	1	2.1E-12	2.1E-12
Pb-211	M	1	2.1E-12	2.1E-12
Bi-211	M	1	2.1E-12	2.1E-12
Tl-207	M	1	2.1E-12	2.1E-12
Po-211	M	1	5.7E-15	5.7E-15
Th-232	S	1	1.2E-10	1.2E-10
Ra-228	M	1	1.2E-10	1.2E-10
Ac-228	M	1	1.2E-10	1.2E-10
Th-228	S	1	1.2E-10	1.2E-10
Ra-224	M	1	1.2E-10	1.2E-10
Po-216	M	1	1.2E-10	1.2E-10
Pb-212	M	1	1.2E-10	1.2E-10
Bi-212	M	1	1.2E-10	1.2E-10
Po-212	M	1	7.8E-11	7.8E-11
Tl-208	M	1	4.4E-11	4.4E-11

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 147.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

10 65 70 90 100

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	10	65	70	90	100
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

CALCULATION IDENTIFICATION NUMBER

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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
Mar 6, 2008 02:08 pmmFacility: Maywood Interim Storage Site - Cluster 2D
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Corp of EngineersEffective Dose Equivalent
(mrem/year)

5.03E-04

At This Location: 40 Meters South

Dataset Name: CLUSTER 2D
Dataset Date: 3/5/2008 2:48:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 40 Meters South
Lifetime Fatal Cancer Risk: 3.46E-10

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	4.11E-07
B Surfac	4.11E-07
Breasts	1.54E-04
St Wall	4.11E-07
ULI Wall	4.11E-07
Kidneys	4.11E-07
Lungs	4.12E-07
Ovaries	4.13E-07
R Marrow	4.59E-07
Spleen	5.49E-07
Thymus	2.93E-06
Uterus	3.28E-06
Bld Wall	1.83E-04
Brain	4.11E-07
Esophagu	1.36E-06
SI Wall	4.11E-07
LLI Wall	7.47E-06
Liver	4.13E-07
Muscle	4.12E-07
Pancreas	1.38E-06
Skin	4.11E-07
Testes	4.11E-07
Thyroid	4.10E-07
EFFEC	5.03E-04

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	9.6E-10	9.6E-10
Th-234	S	1	9.6E-10	9.6E-10
Pa-234m	M	1	9.6E-10	9.6E-10
Pa-234	M	1	1.2E-12	1.2E-12
U-234	M	1	1.0E-09	1.0E-09
Th-230	S	1	1.0E-09	1.0E-09
Ra-226	M	1	6.6E-10	6.6E-10
Po-218	M	1	6.6E-10	6.6E-10
Pb-214	M	1	6.6E-10	6.6E-10
Bi-214	M	1	6.6E-10	6.6E-10
Po-214	M	1	6.6E-10	6.6E-10
Pb-210	M	1	6.6E-10	6.6E-10
Bi-210	M	1	6.6E-10	6.6E-10
Po-210	M	1	6.6E-10	6.6E-10
U-235	M	1	4.5E-11	4.5E-11
Th-231	S	1	4.5E-11	4.5E-11
Pa-231	M	1	4.5E-11	4.5E-11
Ac-227	M	1	4.5E-11	4.5E-11
Th-227	S	1	4.4E-11	4.4E-11
Fr-223	M	1	6.2E-13	6.2E-13
Ra-223	M	1	4.5E-11	4.5E-11
Po-215	M	1	4.5E-11	4.5E-11
Pb-211	M	1	4.5E-11	4.5E-11
Bi-211	M	1	4.5E-11	4.5E-11
Tl-207	M	1	4.5E-11	4.5E-11
Po-211	M	1	1.2E-13	1.2E-13
Th-232	S	1	2.9E-09	2.9E-09
Ra-228	M	1	2.9E-09	2.9E-09
Ac-228	M	1	2.9E-09	2.9E-09
Th-228	S	1	2.9E-09	2.9E-09
Ra-224	M	1	2.9E-09	2.9E-09
Po-216	M	1	2.9E-09	2.9E-09
Pb-212	M	1	2.9E-09	2.9E-09
Bi-212	M	1	2.9E-09	2.9E-09
Po-212	M	1	1.9E-09	1.9E-09
Tl-208	M	1	1.0E-09	1.0E-09

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 1600.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

40	50	75	80	90	100	105
110	120	135	140	150	160	

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	4.11E-07
B Surfac	4.11E-07
Breasts	1.54E-04
St Wall	4.11E-07
ULI Wall	4.11E-07
Kidneys	4.11E-07
Lungs	4.12E-07
Ovaries	4.13E-07
R Marrow	4.59E-07
Spleen	5.49E-07
Thymus	2.93E-06
Uterus	3.28E-06
Bld Wall	1.83E-04
Brain	4.11E-07
Esophagu	1.36E-06
SI Wall	4.11E-07
LLI Wall	7.47E-06
Liver	4.13E-07
Muscle	4.12E-07
Pancreas	1.38E-06
Skin	4.11E-07
Testes	4.11E-07
Thyroid	4.10E-07
EFFEC	5.03E-04

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	5.03E-04
AIR IMMERSION	3.13E-09
GROUND SURFACE	0.00E+00
INTERNAL	5.03E-04
EXTERNAL	3.13E-09
TOTAL	5.03E-04

CALCULATION IDENTIFICATION NUMBER

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	8.10E-06
Th-230	3.25E-05
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	1.63E-04
Ra-228	1.74E-05
Ac-228	7.94E-08
Th-228	2.61E-04
Ra-224	1.96E-05
Rn-220	4.47E-13
Po-216	1.99E-14
Pb-212	1.13E-06
Bi-212	2.03E-07
Po-212	0.00E+00
Tl-208	1.57E-09
TOTAL	5.03E-04

CALCULATION IDENTIFICATION NUMBER

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	40	50	75	80	90	100	105
N	3.6E-04	2.4E-04	1.2E-04	1.0E-04	8.6E-05	7.2E-05	6.6E-05
NNW	1.9E-04	1.1E-04	3.9E-05	3.2E-05	2.3E-05	1.6E-05	1.4E-05
NW	6.7E-05	4.3E-05	1.9E-05	1.7E-05	1.3E-05	1.0E-05	9.5E-06
WNW	7.4E-05	4.5E-05	1.8E-05	1.5E-05	1.1E-05	8.4E-06	7.5E-06
W	1.0E-04	6.8E-05	3.3E-05	3.0E-05	2.5E-05	2.1E-05	1.9E-05
WSW	1.6E-04	1.0E-04	4.4E-05	3.8E-05	2.9E-05	2.3E-05	2.1E-05
SW	2.3E-04	1.5E-04	7.0E-05	6.2E-05	5.0E-05	4.1E-05	3.7E-05
SSW	4.1E-04	2.5E-04	1.0E-04	9.1E-05	6.9E-05	5.4E-05	4.9E-05
S	5.0E-04	3.4E-04	1.8E-04	1.6E-04	1.3E-04	1.1E-04	1.0E-04
SSE	4.7E-04	3.0E-04	1.3E-04	1.2E-04	9.3E-05	7.5E-05	6.8E-05
SE	2.8E-04	1.8E-04	8.0E-05	7.1E-05	5.6E-05	4.5E-05	4.1E-05
ESE	2.1E-04	1.3E-04	5.0E-05	4.3E-05	3.2E-05	2.4E-05	2.1E-05
E	1.9E-04	1.3E-04	6.5E-05	5.8E-05	4.8E-05	4.1E-05	3.8E-05
ENE	2.7E-04	1.6E-04	6.1E-05	5.1E-05	3.7E-05	2.7E-05	2.4E-05
NE	3.8E-04	2.5E-04	1.2E-04	1.1E-04	8.7E-05	7.2E-05	6.6E-05
NNE	4.7E-04	3.1E-04	1.5E-04	1.3E-04	1.1E-04	8.7E-05	8.0E-05

Distance (m)

Direction	110	120	135	140	150	160
N	6.0E-05	5.1E-05	4.0E-05	3.8E-05	3.3E-05	2.9E-05
NNW	1.3E-05	1.1E-05	8.7E-06	8.1E-06	7.1E-06	6.2E-06
NW	8.7E-06	7.3E-06	5.8E-06	5.4E-06	4.8E-06	4.2E-06
WNW	6.9E-06	5.8E-06	4.7E-06	4.3E-06	3.8E-06	3.4E-06
W	1.7E-05	1.5E-05	1.2E-05	1.1E-05	9.5E-06	8.4E-06
WSW	1.9E-05	1.6E-05	1.3E-05	1.2E-05	1.1E-05	9.4E-06
SW	3.4E-05	2.9E-05	2.3E-05	2.1E-05	1.9E-05	1.6E-05
SSW	4.5E-05	3.8E-05	3.0E-05	2.8E-05	2.4E-05	2.2E-05
S	9.4E-05	7.9E-05	6.3E-05	5.9E-05	5.1E-05	4.5E-05
SSE	6.2E-05	5.2E-05	4.2E-05	3.9E-05	3.4E-05	3.0E-05
SE	3.7E-05	3.1E-05	2.5E-05	2.3E-05	2.0E-05	1.8E-05
ESE	2.0E-05	1.7E-05	1.3E-05	1.2E-05	1.1E-05	9.5E-06
E	3.4E-05	2.9E-05	2.3E-05	2.2E-05	1.9E-05	1.7E-05
ENE	2.2E-05	1.9E-05	1.5E-05	1.4E-05	1.2E-05	1.1E-05
NE	6.0E-05	5.1E-05	4.0E-05	3.8E-05	3.3E-05	2.9E-05
NNE	7.3E-05	6.1E-05	4.9E-05	4.5E-05	4.0E-05	3.5E-05

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Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 02:08 pmm

Facility: Maywood Interim Storage Site - Cluster 5A
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 345 Meters North Northeast

Dataset Name: CLUSTER 5A
Dataset Date: 3/6/2008 8:58:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 345 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source #1	TOTAL
			Ci/y	Ci/y
U-238	M	1	3.3E-10	3.3E-10
Th-234	S	1	3.3E-10	3.3E-10
Pa-234m	M	1	3.3E-10	3.3E-10
Pa-234	M	1	4.3E-13	4.3E-13
U-234	M	1	3.5E-10	3.5E-10
Th-230	S	1	3.5E-10	3.5E-10
Ra-226	M	1	2.5E-10	2.5E-10
Po-218	M	1	2.5E-10	2.5E-10
Pb-214	M	1	2.5E-10	2.5E-10
Bi-214	M	1	2.5E-10	2.5E-10
Po-214	M	1	2.5E-10	2.5E-10
Pb-210	M	1	2.5E-10	2.5E-10
Bi-210	M	1	2.5E-10	2.5E-10
Po-210	M	1	2.5E-10	2.5E-10
U-235	M	1	1.6E-11	1.6E-11
Th-231	S	1	1.6E-11	1.6E-11
Pa-231	M	1	1.6E-11	1.6E-11
Ac-227	M	1	1.6E-11	1.6E-11
Th-227	S	1	1.5E-11	1.5E-11
Fr-223	M	1	2.1E-13	2.1E-13
Ra-223	M	1	1.6E-11	1.6E-11
Po-215	M	1	1.6E-11	1.6E-11
Pb-211	M	1	1.6E-11	1.6E-11
Bi-211	M	1	1.6E-11	1.6E-11
Tl-207	M	1	1.5E-11	1.5E-11
Po-211	M	1	4.2E-14	4.2E-14
Th-232	S	1	9.1E-10	9.1E-10
Ra-228	M	1	9.1E-10	9.1E-10
Ac-228	M	1	9.1E-10	9.1E-10
Th-228	S	1	9.1E-10	9.1E-10
Ra-224	M	1	9.1E-10	9.1E-10
Po-216	M	1	9.1E-10	9.1E-10
Pb-212	M	1	9.1E-10	9.1E-10
Bi-212	M	1	9.1E-10	9.1E-10
Po-212	M	1	5.8E-10	5.8E-10
Tl-208	M	1	3.3E-10	3.3E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 2115.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

10	70	90	105	270	280	290
300	345					

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	10	70	90	105	270	280	290
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Distance (m)

Direction	300	345
N	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 02:08 pmm

Facility: Maywood Interim Storage Site - Cluster 5B
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

1.38E-03

At This Location: 10 Meters North

Dataset Name: CLUSTER5B
Dataset Date: 3/6/2008 7:58:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 10 Meters North
Lifetime Fatal Cancer Risk: 9.60E-10

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	1.07E-06
B Surfac	1.07E-06
Breasts	3.60E-04
St Wall	1.07E-06
ULI Wall	1.07E-06
Kidneys	1.07E-06
Lungs	1.07E-06
Ovaries	1.07E-06
R Marrow	1.21E-06
Spleen	1.47E-06
Thymus	6.73E-06
Uterus	8.30E-06
Bld Wall	5.11E-04
Brain	1.07E-06
Esophagu	3.23E-06
SI Wall	1.07E-06
LLI Wall	1.86E-05
Liver	1.07E-06
Muscle	1.07E-06
Pancreas	3.27E-06
Skin	1.07E-06
Testes	1.07E-06
Thyroid	1.07E-06
EFFEC	1.38E-03

CALCULATION IDENTIFICATION NUMBER

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	7.4E-10	7.4E-10
Th-234	S	1	7.4E-10	7.4E-10
Pa-234m	M	1	7.4E-10	7.4E-10
Pa-234	M	1	9.6E-13	9.6E-13
U-234	M	1	7.9E-10	7.9E-10
Th-230	S	1	7.9E-10	7.9E-10
Ra-226	M	1	5.7E-10	5.7E-10
Po-218	M	1	5.7E-10	5.7E-10
Pb-214	M	1	5.7E-10	5.7E-10
Bi-214	M	1	5.7E-10	5.7E-10
Po-214	M	1	5.7E-10	5.7E-10
Pb-210	M	1	5.7E-10	5.7E-10
Bi-210	M	1	5.7E-10	5.7E-10
Po-210	M	1	5.7E-10	5.7E-10
U-235	M	1	3.5E-11	3.5E-11
Th-231	S	1	3.5E-11	3.5E-11
Pa-231	M	1	3.5E-11	3.5E-11
Ac-227	M	1	3.5E-11	3.5E-11
Th-227	S	1	3.4E-11	3.4E-11
Fr-223	M	1	4.8E-13	4.8E-13
Ra-223	M	1	3.5E-11	3.5E-11
Po-215	M	1	3.5E-11	3.5E-11
Pb-211	M	1	3.5E-11	3.5E-11
Bi-211	M	1	3.5E-11	3.5E-11
Tl-207	M	1	3.4E-11	3.4E-11
Po-211	M	1	9.4E-14	9.4E-14
Th-232	S	1	2.3E-09	2.3E-09
Ra-228	M	1	2.3E-09	2.3E-09
Ac-228	M	1	2.3E-09	2.3E-09
Th-228	S	1	2.3E-09	2.3E-09
Ra-224	M	1	2.3E-09	2.3E-09
Po-216	M	1	2.3E-09	2.3E-09
Pb-212	M	1	2.3E-09	2.3E-09
Bi-212	M	1	2.3E-09	2.3E-09
Po-212	M	1	1.5E-09	1.5E-09
Tl-208	M	1	8.4E-10	8.4E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 3384.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

10	15	25	60	75	135	145
175	225	240	260	270	305	325
360	375					

CALCULATION IDENTIFICATION NUMBER

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	1.07E-06
B Surfac	1.07E-06
Breasts	3.60E-04
St Wall	1.07E-06
ULI Wall	1.07E-06
Kidneys	1.07E-06
Lungs	1.07E-06
Ovaries	1.07E-06
R Marrow	1.21E-06
Spleen	1.47E-06
Thymus	6.73E-06
Uterus	8.30E-06
Bld Wall	5.11E-04
Brain	1.07E-06
Esophagu	3.23E-06
SI Wall	1.07E-06
LLI Wall	1.86E-05
Liver	1.07E-06
Muscle	1.07E-06
Pancreas	3.27E-06
Skin	1.07E-06
Testes	1.07E-06
Thyroid	1.07E-06
EFFEC	1.38E-03

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	1.38E-03
AIR IMMERSION	4.66E-09
GROUND SURFACE	0.00E+00
INTERNAL	1.38E-03
EXTERNAL	4.66E-09
TOTAL	1.38E-03

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	4.86E-04
Ra-228	5.17E-05
Ac-228	2.37E-07
Th-228	7.78E-04
Ra-224	5.83E-05
Rn-220	1.53E-12
Po-216	5.94E-14
Pb-212	3.36E-06
Bi-212	6.05E-07
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	1.38E-03

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	10	15	25	60	75	135	145
N	1.4E-03	1.4E-03	6.2E-04	1.2E-04	8.1E-05	2.9E-05	2.6E-05
NNW	1.4E-03	1.4E-03	6.0E-04	6.3E-05	3.7E-05	7.4E-06	5.8E-06
NW	1.4E-03	1.4E-03	4.9E-04	2.3E-05	1.4E-05	4.4E-06	3.8E-06
WNW	1.4E-03	1.4E-03	3.9E-04	2.5E-05	1.5E-05	3.7E-06	3.1E-06
W	1.4E-03	1.4E-03	3.5E-04	3.5E-05	2.4E-05	8.4E-06	7.5E-06
WSW	1.4E-03	1.4E-03	5.5E-04	5.6E-05	3.5E-05	9.9E-06	8.4E-06
SW	1.4E-03	1.4E-03	6.9E-04	8.0E-05	5.2E-05	1.7E-05	1.5E-05
SSW	1.4E-03	1.4E-03	7.7E-04	1.4E-04	8.5E-05	2.3E-05	2.0E-05
S	1.4E-03	1.4E-03	7.8E-04	1.7E-04	1.2E-04	4.5E-05	4.0E-05
SSE	1.4E-03	1.4E-03	8.2E-04	1.6E-04	1.0E-04	3.1E-05	2.7E-05
SE	1.4E-03	1.4E-03	7.9E-04	9.6E-05	6.1E-05	1.9E-05	1.6E-05
ESE	1.4E-03	1.4E-03	8.2E-04	7.1E-05	4.3E-05	1.1E-05	8.7E-06
E	1.4E-03	1.4E-03	7.7E-04	6.4E-05	4.3E-05	1.7E-05	1.5E-05
ENE	1.4E-03	1.4E-03	7.7E-04	9.1E-05	5.4E-05	1.2E-05	9.8E-06
NE	1.4E-03	1.4E-03	7.2E-04	1.3E-04	8.5E-05	2.9E-05	2.6E-05
NNE	1.4E-03	1.4E-03	6.9E-04	1.6E-04	1.0E-04	3.5E-05	3.1E-05

Distance (m)

Direction	175	225	240	260	270	305	325
N	1.8E-05	1.1E-05	9.8E-06	8.4E-06	7.8E-06	6.1E-06	5.4E-06
NNW	3.9E-06	2.4E-06	2.1E-06	1.8E-06	1.7E-06	1.3E-06	1.2E-06
NW	2.6E-06	1.6E-06	1.4E-06	1.2E-06	1.1E-06	9.0E-07	8.0E-07
WNW	2.1E-06	1.3E-06	1.1E-06	9.8E-07	9.1E-07	7.2E-07	6.4E-07
W	5.2E-06	3.3E-06	2.9E-06	2.5E-06	2.3E-06	1.8E-06	1.6E-06
WSW	5.8E-06	3.6E-06	3.2E-06	2.7E-06	2.5E-06	2.0E-06	1.8E-06
SW	1.0E-05	6.3E-06	5.6E-06	4.8E-06	4.4E-06	3.5E-06	3.1E-06
SSW	1.3E-05	8.2E-06	7.3E-06	6.2E-06	5.8E-06	4.6E-06	4.0E-06
S	2.8E-05	1.7E-05	1.5E-05	1.3E-05	1.2E-05	9.5E-06	8.4E-06
SSE	1.9E-05	1.1E-05	1.0E-05	8.6E-06	8.0E-06	6.3E-06	5.6E-06
SE	1.1E-05	6.9E-06	6.1E-06	5.2E-06	4.9E-06	3.8E-06	3.4E-06
ESE	5.9E-06	3.6E-06	3.2E-06	2.8E-06	2.6E-06	2.0E-06	1.8E-06
E	1.0E-05	6.4E-06	5.6E-06	4.8E-06	4.5E-06	3.5E-06	3.1E-06
ENE	6.7E-06	4.1E-06	3.6E-06	3.1E-06	2.9E-06	2.3E-06	2.0E-06
NE	1.8E-05	1.1E-05	9.8E-06	8.4E-06	7.8E-06	6.1E-06	5.4E-06
NNE	2.2E-05	1.3E-05	1.2E-05	1.0E-05	9.2E-06	7.3E-06	6.4E-06

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 02:08 pmm

Facility: Maywood Interim Storage Site - Cluster 6C
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 340 Meters North Northeast

Dataset Name: CLUSTER6C
Dataset Date: 3/6/2008 10:27:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 340 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source #1	TOTAL
			Ci/y	Ci/y
U-238	M	1	3.1E-10	3.1E-10
Th-234	S	1	3.1E-10	3.1E-10
Pa-234m	M	1	3.1E-10	3.1E-10
Pa-234	M	1	4.0E-13	4.0E-13
U-234	M	1	3.3E-10	3.3E-10
Th-230	S	1	3.3E-10	3.3E-10
Ra-226	M	1	2.3E-10	2.3E-10
Po-218	M	1	2.3E-10	2.3E-10
Pb-214	M	1	2.3E-10	2.3E-10
Bi-214	M	1	2.3E-10	2.3E-10
Po-214	M	1	2.3E-10	2.3E-10
Pb-210	M	1	2.3E-10	2.3E-10
Bi-210	M	1	2.3E-10	2.3E-10
Po-210	M	1	2.3E-10	2.3E-10
U-235	M	1	1.5E-11	1.5E-11
Th-231	S	1	1.5E-11	1.5E-11
Pa-231	M	1	1.5E-11	1.5E-11
Ac-227	M	1	1.5E-11	1.5E-11
Th-227	S	1	1.4E-11	1.4E-11
Fr-223	M	1	2.0E-13	2.0E-13
Ra-223	M	1	1.5E-11	1.5E-11
Po-215	M	1	1.5E-11	1.5E-11
Pb-211	M	1	1.5E-11	1.5E-11
Bi-211	M	1	1.5E-11	1.5E-11
Tl-207	M	1	1.4E-11	1.4E-11
Po-211	M	1	3.9E-14	3.9E-14
Th-232	S	1	9.0E-10	9.0E-10
Ra-228	M	1	9.0E-10	9.0E-10
Ac-228	M	1	9.0E-10	9.0E-10
Th-228	S	1	9.0E-10	9.0E-10
Ra-224	M	1	9.0E-10	9.0E-10
Po-216	M	1	9.0E-10	9.0E-10
Pb-212	M	1	9.0E-10	9.0E-10
Bi-212	M	1	9.0E-10	9.0E-10
Po-212	M	1	5.7E-10	5.7E-10
Tl-208	M	1	3.2E-10	3.2E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 629.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

60	90	120	135	150	155	165
185	290	340				

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	60	90	120	135	150	155	165
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Distance (m)

Direction	185	290	340
N	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment
Mar 6, 2008 02:08 pmmFacility: Maywood Interim Storage Site - Cluster 6D
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Corp of EngineersEffective Dose Equivalent
(mrem/year)

2.00E-04

At This Location: 40 Meters South

Dataset Name: clust6d
Dataset Date: 3/6/2008 11:53:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	75 OF 199

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 40 Meters South
Lifetime Fatal Cancer Risk: 1.39E-10

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	1.55E-07
B Surfac	1.55E-07
Breasts	5.22E-05
St Wall	1.55E-07
ULI Wall	1.55E-07
Kidneys	1.55E-07
Lungs	1.55E-07
Ovaries	1.56E-07
R Marrow	1.75E-07
Spleen	2.13E-07
Thymus	9.77E-07
Uterus	1.20E-06
Bld Wall	7.41E-05
Brain	1.55E-07
Esophagu	4.68E-07
SI Wall	1.55E-07
LLI Wall	2.70E-06
Liver	1.56E-07
Muscle	1.55E-07
Pancreas	4.75E-07
Skin	1.55E-07
Testes	1.55E-07
Thyroid	1.55E-07
EFFEC	2.00E-04

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	76 OF 199

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SYNOPSIS
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	3.6E-10	3.6E-10
Th-234	S	1	3.6E-10	3.6E-10
Pa-234m	M	1	3.6E-10	3.6E-10
Pa-234	M	1	4.7E-13	4.7E-13
U-234	M	1	3.8E-10	3.8E-10
Th-230	S	1	3.8E-10	3.8E-10
Ra-226	M	1	2.5E-10	2.5E-10
Po-218	M	1	2.5E-10	2.5E-10
Pb-214	M	1	2.5E-10	2.5E-10
Bi-214	M	1	2.5E-10	2.5E-10
Po-214	M	1	2.5E-10	2.5E-10
Pb-210	M	1	2.5E-10	2.5E-10
Bi-210	M	1	2.5E-10	2.5E-10
Po-210	M	1	2.5E-10	2.5E-10
U-235	M	1	1.7E-11	1.7E-11
Th-231	S	1	1.7E-11	1.7E-11
Pa-231	M	1	1.7E-11	1.7E-11
Ac-227	M	1	1.7E-11	1.7E-11
Th-227	S	1	1.7E-11	1.7E-11
Fr-223	M	1	2.3E-13	2.3E-13
Ra-223	M	1	1.7E-11	1.7E-11
Po-215	M	1	1.7E-11	1.7E-11
Pb-211	M	1	1.7E-11	1.7E-11
Bi-211	M	1	1.7E-11	1.7E-11
Tl-207	M	1	1.7E-11	1.7E-11
Po-211	M	1	4.6E-14	4.6E-14
Th-232	S	1	1.2E-09	1.2E-09
Ra-228	M	1	1.2E-09	1.2E-09
Ac-228	M	1	1.2E-09	1.2E-09
Th-228	S	1	1.2E-09	1.2E-09
Ra-224	M	1	1.2E-09	1.2E-09
Po-216	M	1	1.2E-09	1.2E-09
Pb-212	M	1	1.2E-09	1.2E-09
Bi-212	M	1	1.2E-09	1.2E-09
Po-212	M	1	7.5E-10	7.5E-10
Tl-208	M	1	4.2E-10	4.2E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	77 OF 199

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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 731.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

40	45	70	125	140	260	370
375						

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	1.55E-07
B Surfac	1.55E-07
Breasts	5.22E-05
St Wall	1.55E-07
ULI Wall	1.55E-07
Kidneys	1.55E-07
Lungs	1.55E-07
Ovaries	1.56E-07
R Marrow	1.75E-07
Spleen	2.13E-07
Thymus	9.77E-07
Uterus	1.20E-06
Bld Wall	7.41E-05
Brain	1.55E-07
Esophagu	4.68E-07
SI Wall	1.55E-07
LLI Wall	2.70E-06
Liver	1.56E-07
Muscle	1.55E-07
Pancreas	4.75E-07
Skin	1.55E-07
Testes	1.55E-07
Thyroid	1.55E-07
EFFEC	2.00E-04

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	2.00E-04
AIR IMMERSION	6.76E-10
GROUND SURFACE	0.00E+00
INTERNAL	2.00E-04
EXTERNAL	6.76E-10
TOTAL	2.00E-04

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	79 OF 199

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SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	7.05E-05
Ra-228	7.50E-06
Ac-228	3.43E-08
Th-228	1.13E-04
Ra-224	8.46E-06
Rn-220	1.94E-13
Po-216	8.63E-15
Pb-212	4.88E-07
Bi-212	8.78E-08
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	2.00E-04

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO. 102682-0307	DISCIPLINE E(B)	CALCULATION NO. 15	REVISION NUMBER 0	PAGE 80 OF 199

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SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	40	45	70	125	140	260	370
N	1.4E-04	1.1E-04	5.3E-05	1.7E-05	1.4E-05	4.2E-06	2.1E-06
NNW	5.6E-05	4.2E-05	1.1E-05	3.7E-06	3.0E-06	9.0E-07	4.5E-07
NW	2.3E-05	1.8E-05	7.5E-06	2.5E-06	2.0E-06	6.1E-07	3.1E-07
WNW	2.4E-05	1.8E-05	6.0E-06	2.0E-06	1.6E-06	4.9E-07	2.5E-07
W	3.9E-05	3.1E-05	1.5E-05	4.9E-06	4.0E-06	1.2E-06	6.3E-07
WSW	5.6E-05	4.3E-05	1.7E-05	5.5E-06	4.4E-06	1.4E-06	6.9E-07
SW	8.5E-05	6.8E-05	3.0E-05	9.7E-06	7.8E-06	2.4E-06	1.2E-06
SSW	1.4E-04	1.1E-04	3.9E-05	1.3E-05	1.0E-05	3.1E-06	1.6E-06
S	2.0E-04	1.7E-04	8.3E-05	2.7E-05	2.2E-05	6.4E-06	3.2E-06
SSE	1.6E-04	1.3E-04	5.4E-05	1.8E-05	1.4E-05	4.3E-06	2.2E-06
SE	1.0E-04	7.9E-05	3.3E-05	1.1E-05	8.6E-06	2.6E-06	1.3E-06
ESE	6.7E-05	5.1E-05	1.7E-05	5.6E-06	4.5E-06	1.4E-06	7.0E-07
E	7.4E-05	6.1E-05	3.0E-05	9.8E-06	7.9E-06	2.4E-06	1.2E-06
ENE	8.4E-05	6.3E-05	1.9E-05	6.3E-06	5.1E-06	1.5E-06	7.8E-07
NE	1.4E-04	1.2E-04	5.3E-05	1.7E-05	1.4E-05	4.2E-06	2.1E-06
NNE	1.8E-04	1.4E-04	6.4E-05	2.1E-05	1.7E-05	5.0E-06	2.5E-06

Distance (m)

Direction 375

N	2.0E-06
NNW	4.4E-07
NW	3.0E-07
WNW	2.4E-07
W	6.2E-07
WSW	6.7E-07
SW	1.2E-06
SSW	1.5E-06
S	3.1E-06
SSE	2.1E-06
SE	1.3E-06
ESE	6.8E-07
E	1.2E-06
ENE	7.6E-07
NE	2.0E-06
NNE	2.4E-06

CALCULATION IDENTIFICATION NUMBER

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Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 04:26 pmm

Facility: Maywood Interim Storage Site - Cluster9A
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 165 Meters North Northeast

Dataset Name: CLUSTER9A
Dataset Date: 3/6/2008 1:14:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	82 OF 199

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 165 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	83 OF 199

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SYNOPSIS
Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	7.0E-11	7.0E-11
Th-234	S	1	7.0E-11	7.0E-11
Pa-234m	M	1	7.0E-11	7.0E-11
Pa-234	M	1	9.1E-14	9.1E-14
U-234	M	1	7.5E-11	7.5E-11
Th-230	S	1	7.5E-11	7.5E-11
Ra-226	M	1	6.2E-11	6.2E-11
Po-218	M	1	6.2E-11	6.2E-11
Pb-214	M	1	6.2E-11	6.2E-11
Bi-214	M	1	6.2E-11	6.2E-11
Po-214	M	1	6.2E-11	6.2E-11
Pb-210	M	1	6.2E-11	6.2E-11
Bi-210	M	1	6.2E-11	6.2E-11
Po-210	M	1	6.2E-11	6.2E-11
U-235	M	1	3.3E-12	3.3E-12
Th-231	S	1	3.3E-12	3.3E-12
Pa-231	M	1	3.3E-12	3.3E-12
Ac-227	M	1	3.3E-12	3.3E-12
Th-227	S	1	3.2E-12	3.2E-12
Fr-223	M	1	4.5E-14	4.5E-14
Ra-223	M	1	3.3E-12	3.3E-12
Po-215	M	1	3.3E-12	3.3E-12
Pb-211	M	1	3.3E-12	3.3E-12
Bi-211	M	1	3.3E-12	3.3E-12
Tl-207	M	1	3.3E-12	3.3E-12
Po-211	M	1	8.9E-15	8.9E-15
Th-232	S	1	2.9E-10	2.9E-10
Ra-228	M	1	2.9E-10	2.9E-10
Ac-228	M	1	2.9E-10	2.9E-10
Th-228	S	1	2.9E-10	2.9E-10
Ra-224	M	1	2.9E-10	2.9E-10
Po-216	M	1	2.9E-10	2.9E-10
Pb-212	M	1	2.9E-10	2.9E-10
Bi-212	M	1	2.9E-10	2.9E-10
Po-212	M	1	1.8E-10	1.8E-10
Tl-208	M	1	1.0E-10	1.0E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	84 OF 199

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SYNOPSIS
Page 3

SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 201.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

45	60	75	90	100	105	110
120	135	150	165			

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	85 OF 199

Mar 6, 2008 04:26 pmm

SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	86 OF 199

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SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO. 102682-0307	DISCIPLINE E(B)	CALCULATION NO. 15	REVISION NUMBER 0	PAGE 87 OF 199

Mar 6, 2008 04:26 pmm

SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	45	60	75	90	100	105	110
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Distance (m)

Direction	120	135	150	165
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 04:26 pmm

Facility: Maywood Interim Storage Site - Cluster 12B
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Army Corps of Engineers

Effective Dose Equivalent
(mrem/year)

2.63E-05

At This Location: 165 Meters South

Dataset Name: CLUSTER12B
Dataset Date: 3/6/2008 2:19:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 165 Meters South
Lifetime Fatal Cancer Risk: 1.84E-11

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	2.04E-08
B Surfac	2.04E-08
Breasts	6.87E-06
St Wall	2.04E-08
ULI Wall	2.04E-08
Kidneys	2.04E-08
Lungs	2.04E-08
Ovaries	2.05E-08
R Marrow	2.31E-08
Spleen	2.81E-08
Thymus	1.29E-07
Uterus	1.59E-07
Bld Wall	9.76E-06
Brain	2.04E-08
Esophagu	6.17E-08
SI Wall	2.04E-08
LLI Wall	3.56E-07
Liver	2.05E-08
Muscle	2.04E-08
Pancreas	6.26E-08
Skin	2.04E-08
Testes	2.04E-08
Thyroid	2.04E-08
EFFEC	2.63E-05

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	6.7E-10	6.7E-10
Th-234	S	1	6.7E-10	6.7E-10
Pa-234m	M	1	6.7E-10	6.7E-10
Pa-234	M	1	8.8E-13	8.8E-13
U-234	M	1	7.2E-10	7.2E-10
Th-230	S	1	7.2E-10	7.2E-10
Ra-226	M	1	5.5E-10	5.5E-10
Po-218	M	1	5.5E-10	5.5E-10
Pb-214	M	1	5.5E-10	5.5E-10
Bi-214	M	1	5.5E-10	5.5E-10
Po-214	M	1	5.5E-10	5.5E-10
Pb-210	M	1	5.5E-10	5.5E-10
Bi-210	M	1	5.5E-10	5.5E-10
Po-210	M	1	5.5E-10	5.5E-10
U-235	M	1	3.2E-11	3.2E-11
Th-231	S	1	3.2E-11	3.2E-11
Pa-231	M	1	3.2E-11	3.2E-11
Ac-227	M	1	3.2E-11	3.2E-11
Th-227	S	1	3.1E-11	3.1E-11
Fr-223	M	1	4.5E-13	4.5E-13
Ra-223	M	1	3.2E-11	3.2E-11
Po-215	M	1	3.2E-11	3.2E-11
Pb-211	M	1	3.2E-11	3.2E-11
Bi-211	M	1	3.2E-11	3.2E-11
Tl-207	M	1	3.2E-11	3.2E-11
Po-211	M	1	8.6E-14	8.6E-14
Th-232	S	1	2.1E-09	2.1E-09
Ra-228	M	1	2.1E-09	2.1E-09
Ac-228	M	1	2.1E-09	2.1E-09
Th-228	S	1	2.1E-09	2.1E-09
Ra-224	M	1	2.1E-09	2.1E-09
Po-216	M	1	2.1E-09	2.1E-09
Pb-212	M	1	2.1E-09	2.1E-09
Bi-212	M	1	2.1E-09	2.1E-09
Po-212	M	1	1.4E-09	1.4E-09
Tl-208	M	1	7.7E-10	7.7E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 6952.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

165	175	185	190	195	210	225
235	260					

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	2.04E-08
B Surfac	2.04E-08
Breasts	6.87E-06
St Wall	2.04E-08
ULI Wall	2.04E-08
Kidneys	2.04E-08
Lungs	2.04E-08
Ovaries	2.05E-08
R Marrow	2.31E-08
Spleen	2.81E-08
Thymus	1.29E-07
Uterus	1.59E-07
Bld Wall	9.76E-06
Brain	2.04E-08
Esophagu	6.17E-08
SI Wall	2.04E-08
LLI Wall	3.56E-07
Liver	2.05E-08
Muscle	2.04E-08
Pancreas	6.26E-08
Skin	2.04E-08
Testes	2.04E-08
Thyroid	2.04E-08
EFFEC	2.63E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	2.63E-05
AIR IMMERSION	8.91E-11
GROUND SURFACE	0.00E+00
INTERNAL	2.63E-05
EXTERNAL	8.91E-11
TOTAL	2.63E-05

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	9.29E-06
Ra-228	9.88E-07
Ac-228	4.53E-09
Th-228	1.49E-05
Ra-224	1.11E-06
Rn-220	2.74E-14
Po-216	1.14E-15
Pb-212	6.43E-08
Bi-212	1.16E-08
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	2.63E-05

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
Page 5

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	165	175	185	190	195	210	225
N	1.7E-05	1.6E-05	1.4E-05	1.4E-05	1.3E-05	1.2E-05	1.0E-05
NNW	5.5E-06	4.6E-06	3.9E-06	3.6E-06	3.3E-06	2.6E-06	2.2E-06
NW	2.8E-06	2.5E-06	2.2E-06	2.1E-06	2.0E-06	1.7E-06	1.5E-06
WNW	2.6E-06	2.2E-06	1.9E-06	1.8E-06	1.7E-06	1.4E-06	1.2E-06
W	5.1E-06	4.7E-06	4.2E-06	4.0E-06	3.9E-06	3.4E-06	3.0E-06
WSW	6.5E-06	5.7E-06	5.0E-06	4.8E-06	4.5E-06	3.8E-06	3.3E-06
SW	1.0E-05	9.4E-06	8.4E-06	8.0E-06	7.6E-06	6.6E-06	5.8E-06
SSW	1.5E-05	1.3E-05	1.2E-05	1.1E-05	1.0E-05	8.7E-06	7.6E-06
S	2.6E-05	2.4E-05	2.2E-05	2.1E-05	2.0E-05	1.8E-05	1.6E-05
SSE	2.0E-05	1.7E-05	1.6E-05	1.5E-05	1.4E-05	1.2E-05	1.1E-05
SE	1.2E-05	1.1E-05	9.4E-06	8.9E-06	8.5E-06	7.3E-06	6.4E-06
ESE	7.3E-06	6.3E-06	5.4E-06	5.1E-06	4.7E-06	3.9E-06	3.4E-06
E	9.8E-06	8.9E-06	8.2E-06	7.8E-06	7.5E-06	6.7E-06	5.9E-06
ENE	8.7E-06	7.4E-06	6.3E-06	5.9E-06	5.5E-06	4.4E-06	3.8E-06
NE	1.8E-05	1.6E-05	1.5E-05	1.4E-05	1.3E-05	1.2E-05	1.0E-05
NNE	2.2E-05	1.9E-05	1.8E-05	1.7E-05	1.6E-05	1.4E-05	1.2E-05

Distance (m)

Direction	235	260
N	9.4E-06	7.7E-06
NNW	2.0E-06	1.7E-06
NW	1.4E-06	1.1E-06
WNW	1.1E-06	9.0E-07
W	2.8E-06	2.3E-06
WSW	3.1E-06	2.5E-06
SW	5.3E-06	4.4E-06
SSW	7.0E-06	5.7E-06
S	1.5E-05	1.2E-05
SSE	9.7E-06	7.9E-06
SE	5.9E-06	4.8E-06
ESE	3.1E-06	2.5E-06
E	5.4E-06	4.4E-06
ENE	3.5E-06	2.9E-06
NE	9.4E-06	7.7E-06
NNE	1.1E-05	9.1E-06

CALCULATION IDENTIFICATION NUMBER

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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 6, 2008 04:26 pmm

Facility: Maywood Interim Storage Site - Cluster 12C
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Army Corps of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 360 Meters North Northeast

Dataset Name: CLUSTER12C
Dataset Date: 3/6/2008 3:24:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	96 OF 199

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 360 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	97 OF 199

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SYNOPSIS
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	6.1E-11	6.1E-11
Th-234	S	1	6.1E-11	6.1E-11
Pa-234m	M	1	6.1E-11	6.1E-11
Pa-234	M	1	7.9E-14	7.9E-14
U-234	M	1	6.5E-11	6.5E-11
Th-230	S	1	6.5E-11	6.5E-11
Ra-226	M	1	5.2E-11	5.2E-11
Po-218	M	1	5.2E-11	5.2E-11
Pb-214	M	1	5.2E-11	5.2E-11
Bi-214	M	1	5.2E-11	5.2E-11
Po-214	M	1	5.2E-11	5.2E-11
Pb-210	M	1	5.2E-11	5.2E-11
Bi-210	M	1	5.2E-11	5.2E-11
Po-210	M	1	5.2E-11	5.2E-11
U-235	M	1	2.8E-12	2.8E-12
Th-231	S	1	2.8E-12	2.8E-12
Pa-231	M	1	2.8E-12	2.8E-12
Ac-227	M	1	2.8E-12	2.8E-12
Th-227	S	1	2.8E-12	2.8E-12
Fr-223	M	1	3.9E-14	3.9E-14
Ra-223	M	1	2.8E-12	2.8E-12
Po-215	M	1	2.8E-12	2.8E-12
Pb-211	M	1	2.8E-12	2.8E-12
Bi-211	M	1	2.8E-12	2.8E-12
Tl-207	M	1	2.8E-12	2.8E-12
Po-211	M	1	7.8E-15	7.8E-15
Th-232	S	1	1.9E-10	1.9E-10
Ra-228	M	1	1.9E-10	1.9E-10
Ac-228	M	1	1.9E-10	1.9E-10
Th-228	S	1	1.9E-10	1.9E-10
Ra-224	M	1	1.9E-10	1.9E-10
Po-216	M	1	1.9E-10	1.9E-10
Pb-212	M	1	1.9E-10	1.9E-10
Bi-212	M	1	1.9E-10	1.9E-10
Po-212	M	1	1.2E-10	1.2E-10
Tl-208	M	1	7.0E-11	7.0E-11

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	98 OF 199

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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 328.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
	<u> </u>	<u> </u>	<u> </u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

30	45	75	105	195	215	315
360						

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	99 OF 199

Mar 6, 2008 04:26 pmm

SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	100 OF 199

Mar 6, 2008 04:26 pmm

SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	30	45	75	105	195	215	315
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Distance (m)

Direction 360

N	0.0E+00
NNW	0.0E+00
NW	0.0E+00
WNW	0.0E+00
W	0.0E+00
WSW	0.0E+00
SW	0.0E+00
SSW	0.0E+00
S	0.0E+00
SSE	0.0E+00
SE	0.0E+00
ESE	0.0E+00
E	0.0E+00
ENE	0.0E+00
NE	0.0E+00
NNE	0.0E+00

CALCULATION IDENTIFICATION NUMBER

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Individual Assessment

Mar 17, 2008 10:14 am

Facility: Maywood Interim Storage Site - Water Line
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 60 Meters North Northeast

Dataset Name: MISSWATER
Dataset Date: 3/17/2008 9:18:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 60 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	2.1E-10	2.1E-10
Th-234	S	1	2.1E-10	2.1E-10
Pa-234m	M	1	2.1E-10	2.1E-10
Pa-234	M	1	2.7E-13	2.7E-13
U-234	M	1	2.2E-10	2.2E-10
Th-230	S	1	2.2E-10	2.2E-10
Ra-226	M	1	4.4E-11	4.4E-11
Po-218	M	1	4.4E-11	4.4E-11
Pb-214	M	1	4.4E-11	4.4E-11
Bi-214	M	1	4.4E-11	4.4E-11
Po-214	M	1	4.4E-11	4.4E-11
Pb-210	M	1	4.4E-11	4.4E-11
Bi-210	M	1	4.4E-11	4.4E-11
Po-210	M	1	4.4E-11	4.4E-11
U-235	M	1	9.8E-12	9.8E-12
Th-231	S	1	9.8E-12	9.8E-12
Pa-231	M	1	9.8E-12	9.8E-12
Ac-227	M	1	9.8E-12	9.8E-12
Th-227	S	1	9.7E-12	9.7E-12
Fr-223	M	1	1.4E-13	1.4E-13
Ra-223	M	1	9.8E-12	9.8E-12
Po-215	M	1	9.8E-12	9.8E-12
Pb-211	M	1	9.8E-12	9.8E-12
Bi-211	M	1	9.8E-12	9.8E-12
Tl-207	M	1	9.8E-12	9.8E-12
Po-211	M	1	2.7E-14	2.7E-14
Th-232	S	1	8.0E-11	8.0E-11
Ra-228	M	1	8.0E-11	8.0E-11
Ac-228	M	1	8.0E-11	8.0E-11
Th-228	S	1	8.0E-11	8.0E-11
Ra-224	M	1	8.0E-11	8.0E-11
Po-216	M	1	8.0E-11	8.0E-11
Pb-212	M	1	8.0E-11	8.0E-11
Bi-212	M	1	8.0E-11	8.0E-11
Po-212	M	1	5.1E-11	5.1E-11
Tl-208	M	1	2.9E-11	2.9E-11

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 1600.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

15 30 45 60

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
Adrenals	0.00E+00
B Surfac	0.00E+00
Breasts	0.00E+00
St Wall	0.00E+00
ULI Wall	0.00E+00
Kidneys	0.00E+00
Lungs	0.00E+00
Ovaries	0.00E+00
R Marrow	0.00E+00
Spleen	0.00E+00
Thymus	0.00E+00
Uterus	0.00E+00
Bld Wall	0.00E+00
Brain	0.00E+00
Esophagu	0.00E+00
SI Wall	0.00E+00
LLI Wall	0.00E+00
Liver	0.00E+00
Muscle	0.00E+00
Pancreas	0.00E+00
Skin	0.00E+00
Testes	0.00E+00
Thyroid	0.00E+00
EFFEC	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	0.00E+00
INHALATION	0.00E+00
AIR IMMERSION	0.00E+00
GROUND SURFACE	0.00E+00
INTERNAL	0.00E+00
EXTERNAL	0.00E+00
TOTAL	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
102682-0307	E(B)	15	0	107 OF 199

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SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	0.00E+00
Th-234	0.00E+00
Pa-234m	0.00E+00
Pa-234	0.00E+00
U-234	0.00E+00
Th-230	0.00E+00
Ra-226	0.00E+00
Rn-222	0.00E+00
Po-218	0.00E+00
Pb-214	0.00E+00
Bi-214	0.00E+00
Po-214	0.00E+00
Pb-210	0.00E+00
Bi-210	0.00E+00
Po-210	0.00E+00
At-218	0.00E+00
U-235	0.00E+00
Th-231	0.00E+00
Pa-231	0.00E+00
Ac-227	0.00E+00
Th-227	0.00E+00
Ra-223	0.00E+00
Rn-219	0.00E+00
Po-215	0.00E+00
Pb-211	0.00E+00
Bi-211	0.00E+00
Tl-207	0.00E+00
Po-211	0.00E+00
Fr-223	0.00E+00
Th-232	0.00E+00
Ra-228	0.00E+00
Ac-228	0.00E+00
Th-228	0.00E+00
Ra-224	0.00E+00
Rn-220	0.00E+00
Po-216	0.00E+00
Pb-212	0.00E+00
Bi-212	0.00E+00
Po-212	0.00E+00
Tl-208	0.00E+00
TOTAL	0.00E+00

CALCULATION TITLE PAGE

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y) (All Radionuclides and Pathways)

Distance (m)

Direction	15	30	45	60
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
W	0.0E+00	0.0E+00	0.0E+00	0.0E+00
WSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
E	0.0E+00	0.0E+00	0.0E+00	0.0E+00
ENE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NE	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00

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11. CAP88-PC OUTPUT (Population)

C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment
Mar 13, 2008 09:09 amFacility: Maywood Interim Storage Site - MISS Soil Load
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Army Corps of EngineersEffective Dose Equivalent
(mrem/year)

2.34E-04

At This Location: 250 Meters South

Dataset Name: MISSLDPPOP
Dataset Date: 3/12/2008 6:17:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 250 Meters South
Lifetime Fatal Cancer Risk: 1.62E-10

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.94E-07	7.72E-07
B Surfac	1.94E-07	7.73E-07
Breasts	6.92E-05	2.75E-04
St Wall	1.94E-07	7.73E-07
ULI Wall	1.94E-07	7.73E-07
Kidneys	1.94E-07	7.72E-07
Lungs	1.95E-07	7.74E-07
Ovaries	1.95E-07	7.75E-07
R Marrow	2.17E-07	8.62E-07
Spleen	2.59E-07	1.03E-06
Thymus	1.54E-06	6.11E-06
Uterus	1.58E-06	6.27E-06
Bld Wall	8.53E-05	3.39E-04
Brain	1.94E-07	7.72E-07
Esophagu	6.18E-07	2.46E-06
SI Wall	1.94E-07	7.71E-07
LLI Wall	3.44E-06	1.37E-05
Liver	1.96E-07	7.79E-07
Muscle	3.32E-07	1.32E-06
Pancreas	6.27E-07	2.49E-06
Skin	1.94E-07	7.72E-07
Testes	1.94E-07	7.73E-07
Thyroid	1.94E-07	7.71E-07
EFFEC	2.34E-04	9.29E-04

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	1.1E-08	1.1E-08
Th-234	S	1	1.1E-08	1.1E-08
Pa-234m	M	1	1.1E-08	1.1E-08
Pa-234	M	1	1.4E-11	1.4E-11
U-234	M	1	1.2E-08	1.2E-08
Th-230	S	1	1.2E-08	1.2E-08
Ra-226	M	1	8.1E-09	8.1E-09
Po-218	M	1	8.1E-09	8.1E-09
Pb-214	M	1	8.1E-09	8.1E-09
Bi-214	M	1	8.1E-09	8.1E-09
Po-214	M	1	8.1E-09	8.1E-09
Pb-210	M	1	8.1E-09	8.1E-09
Bi-210	M	1	8.1E-09	8.1E-09
Po-210	M	1	8.1E-09	8.1E-09
U-235	M	1	5.1E-10	5.1E-10
Th-231	S	1	5.1E-10	5.1E-10
Pa-231	M	1	5.1E-10	5.1E-10
Ac-227	M	1	5.1E-10	5.1E-10
Th-227	S	1	5.0E-10	5.0E-10
Fr-223	M	1	7.0E-12	7.0E-12
Ra-223	M	1	5.1E-10	5.1E-10
Po-215	M	1	5.1E-10	5.1E-10
Pb-211	M	1	5.1E-10	5.1E-10
Bi-211	M	1	5.1E-10	5.1E-10
Tl-207	M	1	5.0E-10	5.0E-10
Po-211	M	1	1.4E-12	1.4E-12
Th-232	S	1	3.5E-08	3.5E-08
Ra-228	M	1	3.5E-08	3.5E-08
Ac-228	M	1	3.5E-08	3.5E-08
Th-228	S	1	3.5E-08	3.5E-08
Ra-224	M	1	3.5E-08	3.5E-08
Po-216	M	1	3.5E-08	3.5E-08
Pb-212	M	1	3.5E-08	3.5E-08
Bi-212	M	1	3.5E-08	3.5E-08
Po-212	M	1	2.2E-08	2.2E-08
Tl-208	M	1	1.3E-08	1.3E-08

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 163.50

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000
Beef Cattle Density:	4.25E-02		
Milk Cattle Density:	3.29E-02		
Land Fraction Cultivated			
for Vegetable Crops:	1.82E-02		

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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SYNOPSIS
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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.94E-07	7.72E-07
B Surfac	1.94E-07	7.73E-07
Breasts	6.92E-05	2.75E-04
St Wall	1.94E-07	7.73E-07
ULI Wall	1.94E-07	7.73E-07
Kidneys	1.94E-07	7.72E-07
Lungs	1.95E-07	7.74E-07
Ovaries	1.95E-07	7.75E-07
R Marrow	2.17E-07	8.62E-07
Spleen	2.59E-07	1.03E-06
Thymus	1.54E-06	6.11E-06
Uterus	1.58E-06	6.27E-06
Bld Wall	8.53E-05	3.39E-04
Brain	1.94E-07	7.72E-07
Esophagu	6.18E-07	2.46E-06
SI Wall	1.94E-07	7.71E-07
LLI Wall	3.44E-06	1.37E-05
Liver	1.96E-07	7.79E-07
Muscle	3.32E-07	1.32E-06
Pancreas	6.27E-07	2.49E-06
Skin	1.94E-07	7.72E-07
Testes	1.94E-07	7.73E-07
Thyroid	1.94E-07	7.71E-07
EFFEC	2.34E-04	9.29E-04

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	2.34E-04	9.29E-04
AIR IMMERSION	1.64E-09	6.51E-09
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	2.34E-04	9.29E-04
EXTERNAL	1.64E-09	6.51E-09
TOTAL	2.34E-04	9.29E-04

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	2.63E-06	1.05E-05
Th-234	7.09E-09	2.82E-08
Pa-234m	4.36E-12	1.74E-11
Pa-234	0.00E+00	0.00E+00
U-234	3.44E-06	1.37E-05
Th-230	1.38E-05	5.50E-05
Ra-226	2.39E-06	9.51E-06
Rn-222	0.00E+00	0.00E+00
Po-218	1.72E-16	6.86E-16
Pb-214	8.37E-09	3.33E-08
Bi-214	1.01E-08	4.03E-08
Po-214	1.02E-14	4.06E-14
Pb-210	7.63E-07	3.03E-06
Bi-210	6.43E-08	2.56E-07
Po-210	2.26E-06	8.99E-06
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	7.34E-05	2.92E-04
Ra-228	7.81E-06	3.11E-05
Ac-228	3.58E-08	1.42E-07
Th-228	1.17E-04	4.67E-04
Ra-224	8.80E-06	3.50E-05
Rn-220	2.23E-13	1.69E-12
Po-216	8.98E-15	3.57E-14
Pb-212	5.08E-07	2.02E-06
Bi-212	9.14E-08	3.63E-07
Po-212	0.00E+00	0.00E+00
Tl-208	7.05E-10	2.80E-09
TOTAL	2.34E-04	9.29E-04

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	1.5E-04	1.8E-05	5.0E-06	2.1E-06	1.2E-06	7.9E-07	3.4E-07
NNW	3.2E-05	3.9E-06	1.1E-06	4.5E-07	2.5E-07	1.7E-07	7.3E-08
NW	2.2E-05	2.7E-06	7.5E-07	3.1E-07	1.8E-07	1.2E-07	5.1E-08
WNW	1.8E-05	2.2E-06	6.2E-07	2.5E-07	1.4E-07	9.6E-08	4.2E-08
W	4.5E-05	5.6E-06	1.6E-06	6.6E-07	3.8E-07	2.5E-07	1.1E-07
WSW	4.9E-05	6.0E-06	1.7E-06	7.0E-07	4.0E-07	2.6E-07	1.1E-07
SW	8.6E-05	1.0E-05	2.8E-06	1.2E-06	6.6E-07	4.4E-07	1.9E-07
SSW	1.1E-04	1.3E-05	3.7E-06	1.5E-06	8.7E-07	5.8E-07	2.5E-07
S	2.3E-04	2.7E-05	7.5E-06	3.0E-06	1.7E-06	1.2E-06	4.9E-07
SSE	1.6E-04	1.8E-05	5.1E-06	2.1E-06	1.2E-06	8.0E-07	3.4E-07
SE	9.4E-05	1.1E-05	3.2E-06	1.3E-06	7.6E-07	5.1E-07	2.2E-07
ESE	5.0E-05	6.0E-06	1.7E-06	7.1E-07	4.1E-07	2.8E-07	1.2E-07
E	8.7E-05	1.0E-05	2.9E-06	1.2E-06	7.0E-07	4.7E-07	2.1E-07
ENE	5.6E-05	6.7E-06	1.9E-06	7.9E-07	4.5E-07	3.0E-07	1.3E-07
NE	1.5E-04	1.8E-05	4.9E-06	2.0E-06	1.1E-06	7.7E-07	3.3E-07
NNE	1.8E-04	2.1E-05	5.8E-06	2.3E-06	1.3E-06	8.8E-07	3.8E-07

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	1.2E-07	4.4E-08	2.6E-08	1.7E-08	1.1E-08	6.2E-09	4.7E-09
NNW	2.5E-08	9.4E-09	5.5E-09	3.5E-09	2.3E-09	1.3E-09	1.0E-09
NW	1.7E-08	6.5E-09	3.8E-09	2.4E-09	1.6E-09	9.8E-10	7.4E-10
WNW	1.4E-08	5.5E-09	3.2E-09	2.0E-09	1.4E-09	8.8E-10	6.7E-10
W	3.6E-08	1.4E-08	8.3E-09	5.3E-09	3.5E-09	2.3E-09	1.8E-09
WSW	3.7E-08	1.4E-08	8.0E-09	5.0E-09	3.2E-09	2.0E-09	1.5E-09
SW	6.1E-08	2.2E-08	1.3E-08	8.0E-09	5.1E-09	2.9E-09	2.1E-09
SSW	8.4E-08	3.1E-08	1.8E-08	1.1E-08	7.4E-09	4.1E-09	3.1E-09
S	1.6E-07	5.8E-08	3.3E-08	2.1E-08	1.3E-08	6.7E-09	5.0E-09
SSE	1.2E-07	4.5E-08	2.6E-08	1.7E-08	0.0E+00	0.0E+00	0.0E+00
SE	7.8E-08	3.1E-08	1.9E-08	1.2E-08	8.3E-09	0.0E+00	0.0E+00
ESE	4.3E-08	1.8E-08	1.1E-08	7.1E-09	4.8E-09	2.9E-09	2.3E-09
E	7.3E-08	2.9E-08	1.8E-08	1.2E-08	7.7E-09	4.5E-09	3.5E-09
ENE	4.7E-08	1.9E-08	1.2E-08	7.7E-09	5.2E-09	3.1E-09	2.4E-09
NE	1.1E-07	4.2E-08	2.5E-08	1.6E-08	1.0E-08	5.4E-09	4.1E-09
NNE	1.3E-07	4.5E-08	2.6E-08	1.6E-08	1.0E-08	5.2E-09	3.9E-09

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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	1.1E-05	3.9E-06	4.4E-06	3.0E-06	2.4E-06	2.1E-06	7.4E-06
NNW	2.4E-06	8.4E-07	9.5E-07	6.5E-07	5.1E-07	4.4E-07	1.6E-06
NW	1.6E-06	5.8E-07	6.5E-07	4.5E-07	3.6E-07	3.1E-07	1.1E-06
WNW	1.3E-06	4.7E-07	5.4E-07	3.7E-07	2.9E-07	2.5E-07	8.1E-07
W	3.3E-06	1.2E-06	1.4E-06	9.6E-07	7.6E-07	6.6E-07	1.9E-06
WSW	3.6E-06	1.3E-06	1.5E-06	1.0E-06	8.0E-07	6.9E-07	2.0E-06
SW	6.3E-06	2.2E-06	2.5E-06	1.7E-06	1.3E-06	1.1E-06	3.3E-06
SSW	8.2E-06	2.9E-06	3.2E-06	2.2E-06	1.8E-06	1.5E-06	5.4E-06
S	1.7E-05	5.9E-06	6.5E-06	4.4E-06	3.5E-06	3.0E-06	1.1E-05
SSE	1.1E-05	4.0E-06	4.4E-06	3.0E-06	2.4E-06	2.1E-06	9.7E-06
SE	6.9E-06	2.5E-06	2.8E-06	1.9E-06	1.5E-06	1.3E-06	4.9E-06
ESE	3.6E-06	1.3E-06	1.5E-06	1.0E-06	8.3E-07	7.2E-07	2.6E-06
E	6.4E-06	2.3E-06	2.6E-06	1.8E-06	1.4E-06	1.2E-06	4.5E-06
ENE	4.1E-06	1.5E-06	1.7E-06	1.1E-06	9.2E-07	8.0E-07	2.9E-06
NE	1.1E-05	3.8E-06	4.3E-06	2.9E-06	2.3E-06	2.0E-06	7.2E-06
NNE	1.3E-05	4.5E-06	5.0E-06	3.4E-06	2.7E-06	2.3E-06	8.2E-06

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	9.4E-06	2.9E-06	2.0E-06	5.5E-07	3.4E-07	2.2E-07	1.6E-07
NNW	2.1E-06	1.0E-06	2.3E-07	9.8E-08	7.8E-08	5.5E-08	4.5E-08
NW	1.4E-06	5.6E-07	4.4E-07	3.3E-07	8.3E-08	2.7E-08	2.6E-08
WNW	8.5E-07	3.9E-07	3.1E-07	9.6E-08	3.1E-08	2.4E-08	1.8E-08
W	2.5E-06	1.3E-06	4.3E-07	3.4E-07	1.8E-07	1.0E-07	5.8E-08
WSW	4.5E-06	2.6E-06	4.9E-07	3.2E-07	2.5E-07	1.3E-06	4.8E-08
SW	8.0E-06	5.5E-06	3.3E-06	1.3E-06	6.2E-07	2.5E-07	3.0E-07
SSW	1.3E-05	8.4E-06	5.5E-06	2.6E-06	1.2E-06	8.1E-07	1.3E-06
S	4.2E-05	2.2E-05	1.1E-05	6.2E-07	7.0E-07	7.3E-07	4.9E-07
SSE	6.9E-05	4.7E-05	3.2E-05	7.0E-07	0.0E+00	0.0E+00	0.0E+00
SE	6.9E-05	2.3E-05	1.6E-05	4.9E-06	3.1E-07	0.0E+00	0.0E+00
ESE	3.9E-05	9.3E-06	3.2E-06	2.4E-06	1.5E-06	3.3E-07	1.3E-07
E	4.5E-05	9.2E-06	1.1E-06	1.8E-06	6.3E-07	4.4E-07	3.9E-07
ENE	4.3E-06	1.6E-06	1.0E-06	5.0E-07	3.1E-07	2.2E-07	2.0E-07
NE	8.0E-06	2.6E-06	2.8E-06	2.2E-06	1.8E-06	7.5E-07	6.3E-07
NNE	8.9E-06	1.5E-06	2.3E-06	2.2E-06	8.6E-07	2.2E-07	1.7E-07

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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 10, 2008 01:27 pm

Facility: Maywood Interim Storage Site - Cluster 2C
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Army Corps of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 75000 Meters North Northeast

Dataset Name: CLUST2CPOP
Dataset Date: 3/7/2008 8:48:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 75000 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	4.5E-11	4.5E-11
Th-234	S	1	4.5E-11	4.5E-11
Pa-234m	M	1	4.5E-11	4.5E-11
Pa-234	M	1	5.8E-14	5.8E-14
U-234	M	1	4.8E-11	4.8E-11
Th-230	S	1	4.8E-11	4.8E-11
Ra-226	M	1	3.2E-11	3.2E-11
Po-218	M	1	3.2E-11	3.2E-11
Pb-214	M	1	3.2E-11	3.2E-11
Bi-214	M	1	3.2E-11	3.2E-11
Po-214	M	1	3.2E-11	3.2E-11
Pb-210	M	1	3.2E-11	3.2E-11
Bi-210	M	1	3.2E-11	3.2E-11
Po-210	M	1	3.2E-11	3.2E-11
U-235	M	1	2.1E-12	2.1E-12
Th-231	S	1	2.1E-12	2.1E-12
Pa-231	M	1	2.1E-12	2.1E-12
Ac-227	M	1	2.1E-12	2.1E-12
Th-227	S	1	2.1E-12	2.1E-12
Fr-223	M	1	2.9E-14	2.9E-14
Ra-223	M	1	2.1E-12	2.1E-12
Po-215	M	1	2.1E-12	2.1E-12
Pb-211	M	1	2.1E-12	2.1E-12
Bi-211	M	1	2.1E-12	2.1E-12
Tl-207	M	1	2.1E-12	2.1E-12
Po-211	M	1	5.7E-15	5.7E-15
Th-232	S	1	1.2E-10	1.2E-10
Ra-228	M	1	1.2E-10	1.2E-10
Ac-228	M	1	1.2E-10	1.2E-10
Th-228	S	1	1.2E-10	1.2E-10
Ra-224	M	1	1.2E-10	1.2E-10
Po-216	M	1	1.2E-10	1.2E-10
Pb-212	M	1	1.2E-10	1.2E-10
Bi-212	M	1	1.2E-10	1.2E-10
Po-212	M	1	7.8E-11	7.8E-11
Tl-208	M	1	4.4E-11	4.4E-11

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SYNOPSIS
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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 147.00

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000
Beef Cattle Density:	4.25E-02		
Milk Cattle Density:	3.29E-02		
Land Fraction Cultivated for Vegetable Crops:	1.82E-02		

CALCULATION TITLE PAGE

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	0.00E+00	0.00E+00
AIR IMMERSION	0.00E+00	0.00E+00
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	0.00E+00	0.00E+00
EXTERNAL	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ac-228	0.00E+00	0.00E+00
Th-228	0.00E+00	0.00E+00
Ra-224	0.00E+00	0.00E+00
Rn-220	0.00E+00	0.00E+00
Po-216	0.00E+00	0.00E+00
Pb-212	0.00E+00	0.00E+00
Bi-212	0.00E+00	0.00E+00
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

[illegible]

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 14, 2008 07:01 am

Facility: Maywood Interim Storage Site - Cluster 2D
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

1.90E-05

At This Location: 250 Meters South

Dataset Name: CLUST2DP
Dataset Date: 3/14/2008 5:41:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 250 Meters South
Lifetime Fatal Cancer Risk: 1.31E-11

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.55E-08	6.16E-08
B Surfac	1.55E-08	6.18E-08
Breasts	5.80E-06	2.31E-05
St Wall	1.55E-08	6.18E-08
ULI Wall	1.55E-08	6.18E-08
Kidneys	1.55E-08	6.17E-08
Lungs	1.55E-08	6.18E-08
Ovaries	1.56E-08	6.19E-08
R Marrow	1.73E-08	6.90E-08
Spleen	2.07E-08	8.25E-08
Thymus	1.11E-07	4.40E-07
Uterus	1.24E-07	4.92E-07
Bld Wall	6.92E-06	2.75E-05
Brain	1.55E-08	6.17E-08
Esophagu	5.15E-08	2.05E-07
SI Wall	1.55E-08	6.16E-08
LLI Wall	2.82E-07	1.12E-06
Liver	1.56E-08	6.21E-08
Muscle	1.55E-08	6.18E-08
Pancreas	5.23E-08	2.08E-07
Skin	1.55E-08	6.17E-08
Testes	1.55E-08	6.17E-08
Thyroid	1.55E-08	6.16E-08
EFFEC	1.90E-05	7.55E-05

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	6.73E-10	6.73E-10

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	9.6E-10	9.6E-10
Th-234	S	1	9.6E-10	9.6E-10
Pa-234m	M	1	9.6E-10	9.6E-10
Pa-234	M	1	1.2E-12	1.2E-12
U-234	M	1	1.0E-09	1.0E-09
Th-230	S	1	1.0E-09	1.0E-09
Ra-226	M	1	6.6E-10	6.6E-10
Po-218	M	1	6.6E-10	6.6E-10
Pb-214	M	1	6.6E-10	6.6E-10
Bi-214	M	1	6.6E-10	6.6E-10
Po-214	M	1	6.6E-10	6.6E-10
Pb-210	M	1	6.6E-10	6.6E-10
Bi-210	M	1	6.6E-10	6.6E-10
Po-210	M	1	6.6E-10	6.6E-10
U-235	M	1	4.5E-11	4.5E-11
Th-231	S	1	4.5E-11	4.5E-11
Pa-231	M	1	4.5E-11	4.5E-11
Ac-227	M	1	4.5E-11	4.5E-11
Th-227	S	1	4.4E-11	4.4E-11
Fr-223	M	1	6.2E-13	6.2E-13
Ra-223	M	1	4.5E-11	4.5E-11
Po-215	M	1	4.5E-11	4.5E-11
Pb-211	M	1	4.5E-11	4.5E-11
Bi-211	M	1	4.5E-11	4.5E-11
Tl-207	M	1	4.5E-11	4.5E-11
Po-211	M	1	1.2E-13	1.2E-13
Th-232	S	1	2.9E-09	2.9E-09
Ra-228	M	1	2.9E-09	2.9E-09
Ac-228	M	1	2.9E-09	2.9E-09
Th-228	S	1	2.9E-09	2.9E-09
Ra-224	M	1	2.9E-09	2.9E-09
Po-216	M	1	2.9E-09	2.9E-09
Pb-212	M	1	2.9E-09	2.9E-09
Bi-212	M	1	2.9E-09	2.9E-09
Po-212	M	1	1.9E-09	1.9E-09
Tl-208	M	1	1.0E-09	1.0E-09

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 1600.00

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density: 4.25E-02
Milk Cattle Density: 3.29E-02
Land Fraction Cultivated
for Vegetable Crops: 1.82E-02

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.55E-08	6.16E-08
B Surfac	1.55E-08	6.18E-08
Breasts	5.80E-06	2.31E-05
St Wall	1.55E-08	6.18E-08
ULI Wall	1.55E-08	6.18E-08
Kidneys	1.55E-08	6.17E-08
Lungs	1.55E-08	6.18E-08
Ovaries	1.56E-08	6.19E-08
R Marrow	1.73E-08	6.90E-08
Spleen	2.07E-08	8.25E-08
Thymus	1.11E-07	4.40E-07
Uterus	1.24E-07	4.92E-07
Bld Wall	6.92E-06	2.75E-05
Brain	1.55E-08	6.17E-08
Esophagu	5.15E-08	2.05E-07
SI Wall	1.55E-08	6.16E-08
LLI Wall	2.82E-07	1.12E-06
Liver	1.56E-08	6.21E-08
Muscle	1.55E-08	6.18E-08
Pancreas	5.23E-08	2.08E-07
Skin	1.55E-08	6.17E-08
Testes	1.55E-08	6.17E-08
Thyroid	1.55E-08	6.16E-08
EFFEC	1.90E-05	7.55E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	1.90E-05	7.55E-05
AIR IMMERSION	1.18E-10	4.70E-10
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	1.90E-05	7.55E-05
EXTERNAL	1.18E-10	4.70E-10
TOTAL	1.90E-05	7.55E-05

CALCULATION IDENTIFICATION NUMBER

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	3.06E-07	1.22E-06
Th-230	1.23E-06	4.89E-06
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	6.16E-06	2.45E-05
Ra-228	6.55E-07	2.61E-06
Ac-228	3.00E-09	1.19E-08
Th-228	9.85E-06	3.92E-05
Ra-224	7.38E-07	2.94E-06
Rn-220	1.87E-14	1.42E-13
Po-216	7.53E-16	2.99E-15
Pb-212	4.26E-08	1.69E-07
Bi-212	7.66E-09	3.05E-08
Po-212	0.00E+00	0.00E+00
Tl-208	5.91E-11	2.35E-10
TOTAL	1.90E-05	7.55E-05

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	1.2E-05	1.5E-06	4.1E-07	1.7E-07	9.5E-08	6.4E-08	2.8E-08
NNW	2.6E-06	3.2E-07	8.9E-08	3.6E-08	2.1E-08	1.4E-08	5.9E-09
NW	1.8E-06	2.2E-07	6.1E-08	2.5E-08	1.4E-08	9.5E-09	4.1E-09
WNW	1.4E-06	1.8E-07	5.0E-08	2.1E-08	1.2E-08	7.8E-09	3.4E-09
W	3.6E-06	4.5E-07	1.3E-07	5.4E-08	3.1E-08	2.0E-08	8.9E-09
WSW	4.0E-06	4.9E-07	1.4E-07	5.7E-08	3.2E-08	2.1E-08	9.2E-09
SW	7.0E-06	8.3E-07	2.3E-07	9.4E-08	5.4E-08	3.6E-08	1.5E-08
SSW	9.1E-06	1.1E-06	3.0E-07	1.2E-07	7.1E-08	4.7E-08	2.0E-08
S	1.9E-05	2.2E-06	6.1E-07	2.5E-07	1.4E-07	9.4E-08	4.0E-08
SSE	1.3E-05	1.5E-06	4.1E-07	1.7E-07	9.7E-08	6.5E-08	2.8E-08
SE	7.7E-06	9.2E-07	2.6E-07	1.1E-07	6.2E-08	4.1E-08	1.8E-08
ESE	4.1E-06	4.9E-07	1.4E-07	5.8E-08	3.3E-08	2.2E-08	9.9E-09
E	7.1E-06	8.5E-07	2.4E-07	9.9E-08	5.7E-08	3.8E-08	1.7E-08
ENE	4.6E-06	5.5E-07	1.6E-07	6.4E-08	3.7E-08	2.5E-08	1.1E-08
NE	1.2E-05	1.4E-06	4.0E-07	1.6E-07	9.3E-08	6.2E-08	2.7E-08
NNE	1.5E-05	1.7E-06	4.7E-07	1.9E-07	1.1E-07	7.2E-08	3.1E-08

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	9.5E-09	3.6E-09	2.1E-09	1.4E-09	9.0E-10	5.0E-10	3.8E-10
NNW	2.0E-09	7.6E-10	4.4E-10	2.8E-10	1.9E-10	1.1E-10	8.3E-11
NW	1.4E-09	5.3E-10	3.1E-10	2.0E-10	1.3E-10	8.0E-11	6.1E-11
WNW	1.1E-09	4.5E-10	2.6E-10	1.6E-10	1.1E-10	7.2E-11	5.4E-11
W	3.0E-09	1.2E-09	6.7E-10	4.3E-10	2.9E-10	1.9E-10	1.4E-10
WSW	3.0E-09	1.1E-09	6.5E-10	4.1E-10	2.6E-10	1.6E-10	1.2E-10
SW	5.0E-09	1.8E-09	1.0E-09	6.5E-10	4.1E-10	2.3E-10	1.7E-10
SSW	6.8E-09	2.5E-09	1.5E-09	9.3E-10	6.0E-10	3.4E-10	2.5E-10
S	1.3E-08	4.7E-09	2.7E-09	1.7E-09	1.1E-09	5.4E-10	4.0E-10
SSE	9.6E-09	3.6E-09	2.1E-09	1.4E-09	0.0E+00	0.0E+00	0.0E+00
SE	6.4E-09	2.5E-09	1.5E-09	1.0E-09	6.7E-10	0.0E+00	0.0E+00
ESE	3.5E-09	1.4E-09	8.7E-10	5.8E-10	3.9E-10	2.4E-10	1.8E-10
E	5.9E-09	2.4E-09	1.4E-09	9.4E-10	6.3E-10	3.7E-10	2.8E-10
ENE	3.9E-09	1.6E-09	9.4E-10	6.2E-10	4.2E-10	2.5E-10	2.0E-10
NE	9.2E-09	3.4E-09	2.0E-09	1.3E-09	8.3E-10	4.4E-10	3.3E-10
NNE	1.0E-08	3.7E-09	2.1E-09	1.3E-09	8.4E-10	4.3E-10	3.2E-10

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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	9.0E-07	3.2E-07	3.5E-07	2.4E-07	1.9E-07	1.7E-07	6.0E-07
NNW	1.9E-07	6.9E-08	7.7E-08	5.2E-08	4.2E-08	3.6E-08	1.3E-07
NW	1.3E-07	4.7E-08	5.3E-08	3.6E-08	2.9E-08	2.5E-08	8.9E-08
WNW	1.1E-07	3.9E-08	4.4E-08	3.0E-08	2.4E-08	2.0E-08	6.6E-08
W	2.7E-07	9.9E-08	1.1E-07	7.8E-08	6.2E-08	5.3E-08	1.5E-07
WSW	2.9E-07	1.1E-07	1.2E-07	8.2E-08	6.5E-08	5.6E-08	1.6E-07
SW	5.1E-07	1.8E-07	2.0E-07	1.4E-07	1.1E-07	9.3E-08	2.7E-07
SSW	6.7E-07	2.4E-07	2.6E-07	1.8E-07	1.4E-07	1.2E-07	4.4E-07
S	1.4E-06	4.8E-07	5.3E-07	3.6E-07	2.9E-07	2.4E-07	8.6E-07
SSE	9.2E-07	3.2E-07	3.6E-07	2.5E-07	2.0E-07	1.7E-07	7.9E-07
SE	5.6E-07	2.0E-07	2.3E-07	1.6E-07	1.2E-07	1.1E-07	4.0E-07
ESE	3.0E-07	1.1E-07	1.2E-07	8.4E-08	6.7E-08	5.8E-08	2.2E-07
E	5.2E-07	1.8E-07	2.1E-07	1.4E-07	1.2E-07	1.0E-07	3.7E-07
ENE	3.3E-07	1.2E-07	1.3E-07	9.3E-08	7.5E-08	6.5E-08	2.4E-07
NE	8.9E-07	3.1E-07	3.5E-07	2.4E-07	1.9E-07	1.6E-07	5.8E-07
NNE	1.1E-06	3.7E-07	4.1E-07	2.8E-07	2.2E-07	1.9E-07	6.6E-07

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	7.7E-07	2.4E-07	1.6E-07	4.4E-08	2.8E-08	1.8E-08	1.3E-08
NNW	1.7E-07	8.3E-08	1.8E-08	7.9E-09	6.4E-09	4.4E-09	3.7E-09
NW	1.1E-07	4.5E-08	3.5E-08	2.7E-08	6.7E-09	2.2E-09	2.1E-09
WNW	6.9E-08	3.2E-08	2.5E-08	7.8E-09	2.5E-09	1.9E-09	1.5E-09
W	2.1E-07	1.1E-07	3.5E-08	2.8E-08	1.5E-08	8.4E-09	4.7E-09
WSW	3.7E-07	2.1E-07	4.0E-08	2.6E-08	2.0E-08	1.0E-07	3.9E-09
SW	6.5E-07	4.5E-07	2.7E-07	1.0E-07	5.0E-08	2.0E-08	2.4E-08
SSW	1.0E-06	6.8E-07	4.5E-07	2.1E-07	1.0E-07	6.6E-08	1.1E-07
S	3.4E-06	1.8E-06	8.5E-07	5.1E-08	5.7E-08	5.9E-08	4.0E-08
SSE	5.6E-06	3.8E-06	2.6E-06	5.7E-08	0.0E+00	0.0E+00	0.0E+00
SE	5.6E-06	1.9E-06	1.3E-06	4.0E-07	2.6E-08	0.0E+00	0.0E+00
ESE	3.2E-06	7.5E-07	2.6E-07	1.9E-07	1.2E-07	2.7E-08	1.0E-08
E	3.6E-06	7.5E-07	8.9E-08	1.5E-07	5.1E-08	3.5E-08	3.1E-08
ENE	3.5E-07	1.3E-07	8.2E-08	4.1E-08	2.5E-08	1.8E-08	1.6E-08
NE	6.5E-07	2.1E-07	2.2E-07	1.8E-07	1.5E-07	6.1E-08	5.2E-08
NNE	7.3E-07	1.2E-07	1.9E-07	1.8E-07	7.0E-08	1.8E-08	1.4E-08

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment
Mar 10, 2008 01:29 pmFacility: Maywood Interim Storage Site - Cluster 5A
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007Comments: Shaw E&I for
U.S. Corp of EngineersEffective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 75000 Meters North Northeast

Dataset Name: CLUSTR5AP
Dataset Date: 3/7/2008 1:24:00 PM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 75000 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	0.00E+00	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	3.3E-10	3.3E-10
Th-234	S	1	3.3E-10	3.3E-10
Pa-234m	M	1	3.3E-10	3.3E-10
Pa-234	M	1	4.3E-13	4.3E-13
U-234	M	1	3.5E-10	3.5E-10
Th-230	S	1	3.5E-10	3.5E-10
Ra-226	M	1	2.5E-10	2.5E-10
Po-218	M	1	2.5E-10	2.5E-10
Pb-214	M	1	2.5E-10	2.5E-10
Bi-214	M	1	2.5E-10	2.5E-10
Po-214	M	1	2.5E-10	2.5E-10
Pb-210	M	1	2.5E-10	2.5E-10
Bi-210	M	1	2.5E-10	2.5E-10
Po-210	M	1	2.5E-10	2.5E-10
U-235	M	1	1.6E-11	1.6E-11
Th-231	S	1	1.6E-11	1.6E-11
Pa-231	M	1	1.6E-11	1.6E-11
Ac-227	M	1	1.6E-11	1.6E-11
Th-227	S	1	1.5E-11	1.5E-11
Fr-223	M	1	2.1E-13	2.1E-13
Ra-223	M	1	1.6E-11	1.6E-11
Po-215	M	1	1.6E-11	1.6E-11
Pb-211	M	1	1.6E-11	1.6E-11
Bi-211	M	1	1.6E-11	1.6E-11
Tl-207	M	1	1.5E-11	1.5E-11
Po-211	M	1	4.2E-14	4.2E-14
Th-232	S	1	9.1E-10	9.1E-10
Ra-228	M	1	9.1E-10	9.1E-10
Ac-228	M	1	9.1E-10	9.1E-10
Th-228	S	1	9.1E-10	9.1E-10
Ra-224	M	1	9.1E-10	9.1E-10
Po-216	M	1	9.1E-10	9.1E-10
Pb-212	M	1	9.1E-10	9.1E-10
Bi-212	M	1	9.1E-10	9.1E-10
Po-212	M	1	5.8E-10	5.8E-10
Tl-208	M	1	3.3E-10	3.3E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 2115.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density:	4.25E-02
Milk Cattle Density:	3.29E-02
Land Fraction Cultivated for Vegetable Crops:	1.82E-02

CALCULATION TITLE PAGE

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	0.00E+00	0.00E+00
AIR IMMERSION	0.00E+00	0.00E+00
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	0.00E+00	0.00E+00
EXTERNAL	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ac-228	0.00E+00	0.00E+00
Th-228	0.00E+00	0.00E+00
Ra-224	0.00E+00	0.00E+00
Rn-220	0.00E+00	0.00E+00
Po-216	0.00E+00	0.00E+00
Pb-212	0.00E+00	0.00E+00
Bi-212	0.00E+00	0.00E+00
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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Distance (m)

Distance (m)[illegible]

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Distance (m)

Distance (m)[illegible]

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 14, 2008 08:20 am

Facility: Maywood Interim Storage Site - Cluster 5B
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

1.40E-05

At This Location: 250 Meters South

Dataset Name: CLUST5BP
Dataset Date: 3/14/2008 7:03:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 250 Meters South
Lifetime Fatal Cancer Risk: 9.74E-12

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.08E-08	4.30E-08
B Surfac	1.08E-08	4.31E-08
Breasts	3.65E-06	1.45E-05
St Wall	1.08E-08	4.31E-08
ULI Wall	1.08E-08	4.31E-08
Kidneys	1.08E-08	4.30E-08
Lungs	1.09E-08	4.32E-08
Ovaries	1.09E-08	4.33E-08
R Marrow	1.23E-08	4.88E-08
Spleen	1.49E-08	5.93E-08
Thymus	6.83E-08	2.71E-07
Uterus	8.41E-08	3.35E-07
Bld Wall	5.18E-06	2.06E-05
Brain	1.08E-08	4.31E-08
Esophagu	3.27E-08	1.30E-07
SI Wall	1.08E-08	4.30E-08
LLI Wall	1.89E-07	7.52E-07
Liver	1.09E-08	4.33E-08
Muscle	1.08E-08	4.31E-08
Pancreas	3.32E-08	1.32E-07
Skin	1.08E-08	4.31E-08
Testes	1.08E-08	4.31E-08
Thyroid	1.08E-08	4.30E-08
EFFEC	1.40E-05	5.56E-05

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	5.02E-10	5.02E-10

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	7.4E-10	7.4E-10
Th-234	S	1	7.4E-10	7.4E-10
Pa-234m	M	1	7.4E-10	7.4E-10
Pa-234	M	1	9.6E-13	9.6E-13
U-234	M	1	7.9E-10	7.9E-10
Th-230	S	1	7.9E-10	7.9E-10
Ra-226	M	1	5.7E-10	5.7E-10
Po-218	M	1	5.7E-10	5.7E-10
Pb-214	M	1	5.7E-10	5.7E-10
Bi-214	M	1	5.7E-10	5.7E-10
Po-214	M	1	5.7E-10	5.7E-10
Pb-210	M	1	5.7E-10	5.7E-10
Bi-210	M	1	5.7E-10	5.7E-10
Po-210	M	1	5.7E-10	5.7E-10
U-235	M	1	3.5E-11	3.5E-11
Th-231	S	1	3.5E-11	3.5E-11
Pa-231	M	1	3.5E-11	3.5E-11
Ac-227	M	1	3.5E-11	3.5E-11
Th-227	S	1	3.4E-11	3.4E-11
Fr-223	M	1	4.8E-13	4.8E-13
Ra-223	M	1	3.5E-11	3.5E-11
Po-215	M	1	3.5E-11	3.5E-11
Pb-211	M	1	3.5E-11	3.5E-11
Bi-211	M	1	3.5E-11	3.5E-11
Tl-207	M	1	3.4E-11	3.4E-11
Po-211	M	1	9.4E-14	9.4E-14
Th-232	S	1	2.3E-09	2.3E-09
Ra-228	M	1	2.3E-09	2.3E-09
Ac-228	M	1	2.3E-09	2.3E-09
Th-228	S	1	2.3E-09	2.3E-09
Ra-224	M	1	2.3E-09	2.3E-09
Po-216	M	1	2.3E-09	2.3E-09
Pb-212	M	1	2.3E-09	2.3E-09
Bi-212	M	1	2.3E-09	2.3E-09
Po-212	M	1	1.5E-09	1.5E-09
Tl-208	M	1	8.4E-10	8.4E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 3384.00

Plume Rise Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000
Beef Cattle Density:	4.25E-02		
Milk Cattle Density:	3.29E-02		
Land Fraction Cultivated for Vegetable Crops:	1.82E-02		

CALCULATION TITLE PAGE

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	1.08E-08	4.30E-08
B Surfac	1.08E-08	4.31E-08
Breasts	3.65E-06	1.45E-05
St Wall	1.08E-08	4.31E-08
ULI Wall	1.08E-08	4.31E-08
Kidneys	1.08E-08	4.30E-08
Lungs	1.09E-08	4.32E-08
Ovaries	1.09E-08	4.33E-08
R Marrow	1.23E-08	4.88E-08
Spleen	1.49E-08	5.93E-08
Thymus	6.83E-08	2.71E-07
Uterus	8.41E-08	3.35E-07
Bld Wall	5.18E-06	2.06E-05
Brain	1.08E-08	4.31E-08
Esophagu	3.27E-08	1.30E-07
SI Wall	1.08E-08	4.30E-08
LLI Wall	1.89E-07	7.52E-07
Liver	1.09E-08	4.33E-08
Muscle	1.08E-08	4.31E-08
Pancreas	3.32E-08	1.32E-07
Skin	1.08E-08	4.31E-08
Testes	1.08E-08	4.31E-08
Thyroid	1.08E-08	4.30E-08
EFFEC	1.40E-05	5.56E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	1.40E-05	5.56E-05
AIR IMMERSION	4.73E-11	1.88E-10
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	1.40E-05	5.56E-05
EXTERNAL	4.73E-11	1.88E-10
TOTAL	1.40E-05	5.56E-05

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	4.93E-06	1.96E-05
Ra-228	5.25E-07	2.09E-06
Ac-228	2.40E-09	9.55E-09
Th-228	7.89E-06	3.14E-05
Ra-224	5.91E-07	2.35E-06
Rn-220	1.50E-14	1.14E-13
Po-216	6.03E-16	2.40E-15
Pb-212	3.41E-08	1.36E-07
Bi-212	6.14E-09	2.44E-08
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	1.40E-05	5.56E-05

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	9.0E-06	1.1E-06	3.0E-07	1.2E-07	7.0E-08	4.7E-08	2.0E-08
NNW	1.9E-06	2.3E-07	6.5E-08	2.7E-08	1.5E-08	1.0E-08	4.4E-09
NW	1.3E-06	1.6E-07	4.5E-08	1.8E-08	1.0E-08	7.0E-09	3.0E-09
WNW	1.1E-06	1.3E-07	3.7E-08	1.5E-08	8.6E-09	5.7E-09	2.5E-09
W	2.7E-06	3.3E-07	9.6E-08	3.9E-08	2.3E-08	1.5E-08	6.6E-09
WSW	2.9E-06	3.6E-07	1.0E-07	4.2E-08	2.4E-08	1.6E-08	6.8E-09
SW	5.1E-06	6.1E-07	1.7E-07	6.9E-08	3.9E-08	2.6E-08	1.1E-08
SSW	6.7E-06	8.0E-07	2.2E-07	9.1E-08	5.2E-08	3.5E-08	1.5E-08
S	1.4E-05	1.6E-06	4.5E-07	1.8E-07	1.0E-07	6.9E-08	2.9E-08
SSE	9.3E-06	1.1E-06	3.1E-07	1.2E-07	7.1E-08	4.8E-08	2.1E-08
SE	5.6E-06	6.8E-07	1.9E-07	7.9E-08	4.5E-08	3.1E-08	1.3E-08
ESE	3.0E-06	3.6E-07	1.0E-07	4.2E-08	2.4E-08	1.6E-08	7.3E-09
E	5.2E-06	6.2E-07	1.8E-07	7.3E-08	4.2E-08	2.8E-08	1.2E-08
ENE	3.4E-06	4.0E-07	1.1E-07	4.7E-08	2.7E-08	1.8E-08	8.0E-09
NE	9.0E-06	1.1E-06	2.9E-07	1.2E-07	6.9E-08	4.6E-08	2.0E-08
NNE	1.1E-05	1.2E-06	3.4E-07	1.4E-07	7.9E-08	5.3E-08	2.2E-08

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	7.0E-09	2.7E-09	1.6E-09	1.0E-09	6.6E-10	3.7E-10	2.8E-10
NNW	1.5E-09	5.6E-10	3.3E-10	2.1E-10	1.4E-10	8.1E-11	6.1E-11
NW	1.0E-09	3.9E-10	2.3E-10	1.4E-10	9.5E-11	5.9E-11	4.5E-11
WNW	8.3E-10	3.3E-10	1.9E-10	1.2E-10	8.1E-11	5.3E-11	4.0E-11
W	2.2E-09	8.6E-10	4.9E-10	3.2E-10	2.1E-10	1.4E-10	1.1E-10
WSW	2.2E-09	8.4E-10	4.8E-10	3.0E-10	1.9E-10	1.2E-10	8.9E-11
SW	3.7E-09	1.3E-09	7.6E-10	4.8E-10	3.1E-10	1.7E-10	1.3E-10
SSW	5.0E-09	1.9E-09	1.1E-09	6.9E-10	4.4E-10	2.5E-10	1.9E-10
S	9.8E-09	3.5E-09	2.0E-09	1.3E-09	7.9E-10	4.0E-10	3.0E-10
SSE	7.1E-09	2.7E-09	1.6E-09	1.0E-09	0.0E+00	0.0E+00	0.0E+00
SE	4.7E-09	1.9E-09	1.1E-09	7.4E-10	5.0E-10	0.0E+00	0.0E+00
ESE	2.6E-09	1.1E-09	6.4E-10	4.2E-10	2.9E-10	1.7E-10	1.3E-10
E	4.4E-09	1.7E-09	1.1E-09	6.9E-10	4.6E-10	2.7E-10	2.1E-10
ENE	2.8E-09	1.2E-09	6.9E-10	4.6E-10	3.1E-10	1.9E-10	1.4E-10
NE	6.8E-09	2.5E-09	1.5E-09	9.5E-10	6.1E-10	3.2E-10	2.4E-10
NNE	7.5E-09	2.7E-09	1.6E-09	9.9E-10	6.2E-10	3.1E-10	2.3E-10

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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	6.6E-07	2.3E-07	2.6E-07	1.8E-07	1.4E-07	1.2E-07	4.4E-07
NNW	1.4E-07	5.1E-08	5.7E-08	3.9E-08	3.1E-08	2.6E-08	9.5E-08
NW	9.6E-08	3.5E-08	3.9E-08	2.7E-08	2.1E-08	1.8E-08	6.6E-08
WNW	7.7E-08	2.8E-08	3.2E-08	2.2E-08	1.7E-08	1.5E-08	4.9E-08
W	2.0E-07	7.3E-08	8.3E-08	5.7E-08	4.6E-08	3.9E-08	1.1E-07
WSW	2.1E-07	7.8E-08	8.8E-08	6.0E-08	4.8E-08	4.1E-08	1.2E-07
SW	3.7E-07	1.3E-07	1.5E-07	1.0E-07	8.0E-08	6.8E-08	2.0E-07
SSW	4.9E-07	1.7E-07	1.9E-07	1.3E-07	1.1E-07	9.1E-08	3.2E-07
S	1.0E-06	3.5E-07	3.9E-07	2.6E-07	2.1E-07	1.8E-07	6.4E-07
SSE	6.8E-07	2.4E-07	2.7E-07	1.8E-07	1.4E-07	1.2E-07	5.8E-07
SE	4.1E-07	1.5E-07	1.7E-07	1.1E-07	9.2E-08	8.0E-08	2.9E-07
ESE	2.2E-07	7.9E-08	8.9E-08	6.2E-08	5.0E-08	4.3E-08	1.6E-07
E	3.8E-07	1.4E-07	1.5E-07	1.1E-07	8.5E-08	7.3E-08	2.7E-07
ENE	2.5E-07	8.8E-08	9.9E-08	6.8E-08	5.5E-08	4.8E-08	1.7E-07
NE	6.6E-07	2.3E-07	2.6E-07	1.7E-07	1.4E-07	1.2E-07	4.3E-07
NNE	7.9E-07	2.7E-07	3.0E-07	2.0E-07	1.6E-07	1.4E-07	4.9E-07

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	5.6E-07	1.7E-07	1.2E-07	3.3E-08	2.0E-08	1.3E-08	9.6E-09
NNW	1.3E-07	6.1E-08	1.4E-08	5.8E-09	4.7E-09	3.3E-09	2.7E-09
NW	8.2E-08	3.3E-08	2.6E-08	2.0E-08	5.0E-09	1.6E-09	1.5E-09
WNW	5.1E-08	2.3E-08	1.9E-08	5.7E-09	1.8E-09	1.4E-09	1.1E-09
W	1.5E-07	7.9E-08	2.6E-08	2.0E-08	1.1E-08	6.2E-09	3.5E-09
WSW	2.7E-07	1.5E-07	2.9E-08	1.9E-08	1.5E-08	7.7E-08	2.9E-09
SW	4.8E-07	3.3E-07	2.0E-07	7.6E-08	3.7E-08	1.5E-08	1.8E-08
SSW	7.7E-07	5.0E-07	3.3E-07	1.6E-07	7.4E-08	4.8E-08	7.8E-08
S	2.5E-06	1.3E-06	6.3E-07	3.7E-08	4.2E-08	4.4E-08	2.9E-08
SSE	4.1E-06	2.8E-06	1.9E-06	4.2E-08	0.0E+00	0.0E+00	0.0E+00
SE	4.1E-06	1.4E-06	9.4E-07	2.9E-07	1.9E-08	0.0E+00	0.0E+00
ESE	2.3E-06	5.6E-07	1.9E-07	1.4E-07	8.7E-08	2.0E-08	7.5E-09
E	2.7E-06	5.5E-07	6.5E-08	1.1E-07	3.8E-08	2.6E-08	2.3E-08
ENE	2.6E-07	9.6E-08	6.0E-08	3.0E-08	1.9E-08	1.3E-08	1.2E-08
NE	4.8E-07	1.6E-07	1.7E-07	1.3E-07	1.1E-07	4.5E-08	3.8E-08
NNE	5.3E-07	8.8E-08	1.4E-07	1.3E-07	5.1E-08	1.3E-08	1.0E-08

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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 17, 2008 11:45 am

Facility: Maywood Interim Storage Site - Cluster 6C
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 75000 Meters North Northeast

Dataset Name: CLUST6CPOP
Dataset Date: 3/17/2008 10:44:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\PopLib\Maywood-2

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 75000 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	0.00E+00	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	3.1E-10	3.1E-10
Th-234	S	1	3.1E-10	3.1E-10
Pa-234m	M	1	3.1E-10	3.1E-10
Pa-234	M	1	4.0E-13	4.0E-13
U-234	M	1	3.3E-10	3.3E-10
Th-230	S	1	3.3E-10	3.3E-10
Ra-226	M	1	2.3E-10	2.3E-10
Po-218	M	1	2.3E-10	2.3E-10
Pb-214	M	1	2.3E-10	2.3E-10
Bi-214	M	1	2.3E-10	2.3E-10
Po-214	M	1	2.3E-10	2.3E-10
Pb-210	M	1	2.3E-10	2.3E-10
Bi-210	M	1	2.3E-10	2.3E-10
Po-210	M	1	2.3E-10	2.3E-10
U-235	M	1	1.5E-11	1.5E-11
Th-231	S	1	1.5E-11	1.5E-11
Pa-231	M	1	1.5E-11	1.5E-11
Ac-227	M	1	1.5E-11	1.5E-11
Th-227	S	1	1.4E-11	1.4E-11
Fr-223	M	1	2.0E-13	2.0E-13
Ra-223	M	1	1.5E-11	1.5E-11
Po-215	M	1	1.5E-11	1.5E-11
Pb-211	M	1	1.5E-11	1.5E-11
Bi-211	M	1	1.5E-11	1.5E-11
Tl-207	M	1	1.4E-11	1.4E-11
Po-211	M	1	3.9E-14	3.9E-14
Th-232	S	1	9.0E-10	9.0E-10
Ra-228	M	1	9.0E-10	9.0E-10
Ac-228	M	1	9.0E-10	9.0E-10
Th-228	S	1	9.0E-10	9.0E-10
Ra-224	M	1	9.0E-10	9.0E-10
Po-216	M	1	9.0E-10	9.0E-10
Pb-212	M	1	9.0E-10	9.0E-10
Bi-212	M	1	9.0E-10	9.0E-10
Po-212	M	1	5.7E-10	5.7E-10
Tl-208	M	1	3.2E-10	3.2E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 629.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density:	4.25E-02
Milk Cattle Density:	3.29E-02
Land Fraction Cultivated for Vegetable Crops:	1.82E-02

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POPULATION DATA

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	0.00E+00	0.00E+00
AIR IMMERSION	0.00E+00	0.00E+00
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	0.00E+00	0.00E+00
EXTERNAL	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ac-228	0.00E+00	0.00E+00
Th-228	0.00E+00	0.00E+00
Ra-224	0.00E+00	0.00E+00
Rn-220	0.00E+00	0.00E+00
Po-216	0.00E+00	0.00E+00
Pb-212	0.00E+00	0.00E+00
Bi-212	0.00E+00	0.00E+00
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

[illegible]

Distance (m)

[illegible]

[illegible]

CALCULATION IDENTIFICATION NUMBER

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 17, 2008 12:46 pm

Facility: Maywood Interim Storage Site - Cluster 6D
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

6.96E-06

At This Location: 250 Meters South

Dataset Name: CLUST6DPOP
Dataset Date: 3/17/2008 11:46:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\PopLib\Maywood-2

CALCULATION IDENTIFICATION NUMBER

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SYNOPSIS
Page 1

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 250 Meters South
Lifetime Fatal Cancer Risk: 4.85E-12

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	5.39E-09	2.14E-08
B Surfac	5.40E-09	2.15E-08
Breasts	1.82E-06	7.22E-06
St Wall	5.39E-09	2.15E-08
ULI Wall	5.40E-09	2.15E-08
Kidneys	5.39E-09	2.14E-08
Lungs	5.40E-09	2.15E-08
Ovaries	5.42E-09	2.15E-08
R Marrow	6.11E-09	2.43E-08
Spleen	7.43E-09	2.95E-08
Thymus	3.40E-08	1.35E-07
Uterus	4.19E-08	1.67E-07
Bld Wall	2.58E-06	1.03E-05
Brain	5.39E-09	2.14E-08
Esophagu	1.63E-08	6.48E-08
SI Wall	5.39E-09	2.14E-08
LLI Wall	9.41E-08	3.74E-07
Liver	5.42E-09	2.16E-08
Muscle	5.40E-09	2.15E-08
Pancreas	1.65E-08	6.57E-08
Skin	5.39E-09	2.14E-08
Testes	5.39E-09	2.14E-08
Thyroid	5.39E-09	2.14E-08
EFFEC	6.96E-06	2.77E-05

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00



CALCULATION TITLE PAGE

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LESS THAN 1.0E-0619444635 19444635 2.50E-10 2.50E-10				

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	
			#1 Ci/y	TOTAL Ci/y
U-238	M	1	3.6E-10	3.6E-10
Th-234	S	1	3.6E-10	3.6E-10
Pa-234m	M	1	3.6E-10	3.6E-10
Pa-234	M	1	4.7E-13	4.7E-13
U-234	M	1	3.8E-10	3.8E-10
Th-230	S	1	3.8E-10	3.8E-10
Ra-226	M	1	2.5E-10	2.5E-10
Po-218	M	1	2.5E-10	2.5E-10
Pb-214	M	1	2.5E-10	2.5E-10
Bi-214	M	1	2.5E-10	2.5E-10
Po-214	M	1	2.5E-10	2.5E-10
Pb-210	M	1	2.5E-10	2.5E-10
Bi-210	M	1	2.5E-10	2.5E-10
Po-210	M	1	2.5E-10	2.5E-10
U-235	M	1	1.7E-11	1.7E-11
Th-231	S	1	1.7E-11	1.7E-11
Pa-231	M	1	1.7E-11	1.7E-11
Ac-227	M	1	1.7E-11	1.7E-11
Th-227	S	1	1.7E-11	1.7E-11
Fr-223	M	1	2.3E-13	2.3E-13
Ra-223	M	1	1.7E-11	1.7E-11
Po-215	M	1	1.7E-11	1.7E-11
Pb-211	M	1	1.7E-11	1.7E-11
Bi-211	M	1	1.7E-11	1.7E-11
Tl-207	M	1	1.7E-11	1.7E-11
Po-211	M	1	4.6E-14	4.6E-14
Th-232	S	1	1.2E-09	1.2E-09
Ra-228	M	1	1.2E-09	1.2E-09
Ac-228	M	1	1.2E-09	1.2E-09
Th-228	S	1	1.2E-09	1.2E-09
Ra-224	M	1	1.2E-09	1.2E-09
Po-216	M	1	1.2E-09	1.2E-09
Pb-212	M	1	1.2E-09	1.2E-09
Bi-212	M	1	1.2E-09	1.2E-09
Po-212	M	1	7.5E-10	7.5E-10
Tl-208	M	1	4.2E-10	4.2E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 731.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density:	4.25E-02
Milk Cattle Density:	3.29E-02
Land Fraction Cultivated	
for Vegetable Crops:	1.82E-02

CALCULATION TITLE PAGE

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	5.39E-09	2.14E-08
B Surfac	5.40E-09	2.15E-08
Breasts	1.82E-06	7.22E-06
St Wall	5.39E-09	2.15E-08
ULI Wall	5.40E-09	2.15E-08
Kidneys	5.39E-09	2.14E-08
Lungs	5.40E-09	2.15E-08
Ovaries	5.42E-09	2.15E-08
R Marrow	6.11E-09	2.43E-08
Spleen	7.43E-09	2.95E-08
Thymus	3.40E-08	1.35E-07
Uterus	4.19E-08	1.67E-07
Bld Wall	2.58E-06	1.03E-05
Brain	5.39E-09	2.14E-08
Esophagu	1.63E-08	6.48E-08
SI Wall	5.39E-09	2.14E-08
LLI Wall	9.41E-08	3.74E-07
Liver	5.42E-09	2.16E-08
Muscle	5.40E-09	2.15E-08
Pancreas	1.65E-08	6.57E-08
Skin	5.39E-09	2.14E-08
Testes	5.39E-09	2.14E-08
Thyroid	5.39E-09	2.14E-08
EFFEC	6.96E-06	2.77E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	6.96E-06	2.77E-05
AIR IMMERSION	2.35E-11	9.36E-11
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	6.96E-06	2.77E-05
EXTERNAL	2.35E-11	9.36E-11
TOTAL	6.96E-06	2.77E-05

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	2.45E-06	9.76E-06
Ra-228	2.61E-07	1.04E-06
Ac-228	1.20E-09	4.75E-09
Th-228	3.93E-06	1.56E-05
Ra-224	2.94E-07	1.17E-06
Rn-220	7.47E-15	5.67E-14
Po-216	3.00E-16	1.19E-15
Pb-212	1.70E-08	6.75E-08
Bi-212	3.06E-09	1.22E-08
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	6.96E-06	2.77E-05

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	4.5E-06	5.3E-07	1.5E-07	6.1E-08	3.5E-08	2.3E-08	1.0E-08
NNW	9.7E-07	1.2E-07	3.2E-08	1.3E-08	7.6E-09	5.0E-09	2.2E-09
NW	6.6E-07	7.9E-08	2.2E-08	9.2E-09	5.2E-09	3.5E-09	1.5E-09
WNW	5.3E-07	6.5E-08	1.8E-08	7.5E-09	4.3E-09	2.9E-09	1.2E-09
W	1.3E-06	1.7E-07	4.8E-08	2.0E-08	1.1E-08	7.5E-09	3.3E-09
WSW	1.5E-06	1.8E-07	5.1E-08	2.1E-08	1.2E-08	7.9E-09	3.4E-09
SW	2.6E-06	3.0E-07	8.5E-08	3.5E-08	2.0E-08	1.3E-08	5.6E-09
SSW	3.3E-06	4.0E-07	1.1E-07	4.5E-08	2.6E-08	1.7E-08	7.4E-09
S	7.0E-06	8.1E-07	2.2E-07	9.1E-08	5.2E-08	3.4E-08	1.5E-08
SSE	4.6E-06	5.4E-07	1.5E-07	6.2E-08	3.6E-08	2.4E-08	1.0E-08
SE	2.8E-06	3.4E-07	9.5E-08	3.9E-08	2.3E-08	1.5E-08	6.7E-09
ESE	1.5E-06	1.8E-07	5.1E-08	2.1E-08	1.2E-08	8.2E-09	3.6E-09
E	2.6E-06	3.1E-07	8.8E-08	3.6E-08	2.1E-08	1.4E-08	6.2E-09
ENE	1.7E-06	2.0E-07	5.7E-08	2.3E-08	1.3E-08	9.1E-09	4.0E-09
NE	4.5E-06	5.3E-07	1.5E-07	6.0E-08	3.4E-08	2.3E-08	9.9E-09
NNE	5.4E-06	6.2E-07	1.7E-07	7.0E-08	3.9E-08	2.6E-08	1.1E-08

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	3.5E-09	1.3E-09	7.8E-10	5.0E-10	3.3E-10	1.8E-10	1.4E-10
NNW	7.3E-10	2.8E-10	1.6E-10	1.0E-10	6.8E-11	4.0E-11	3.0E-11
NW	5.0E-10	1.9E-10	1.1E-10	7.2E-11	4.7E-11	2.9E-11	2.2E-11
WNW	4.1E-10	1.6E-10	9.4E-11	6.0E-11	4.0E-11	2.6E-11	2.0E-11
W	1.1E-09	4.3E-10	2.5E-10	1.6E-10	1.0E-10	6.9E-11	5.2E-11
WSW	1.1E-09	4.2E-10	2.4E-10	1.5E-10	9.7E-11	5.9E-11	4.4E-11
SW	1.8E-09	6.7E-10	3.8E-10	2.4E-10	1.5E-10	8.6E-11	6.4E-11
SSW	2.5E-09	9.3E-10	5.4E-10	3.4E-10	2.2E-10	1.2E-10	9.3E-11
S	4.9E-09	1.7E-09	1.0E-09	6.2E-10	3.9E-10	2.0E-10	1.5E-10
SSE	3.5E-09	1.3E-09	7.8E-10	5.1E-10	0.0E+00	0.0E+00	0.0E+00
SE	2.3E-09	9.3E-10	5.6E-10	3.7E-10	2.5E-10	0.0E+00	0.0E+00
ESE	1.3E-09	5.3E-10	3.2E-10	2.1E-10	1.4E-10	8.7E-11	6.7E-11
E	2.2E-09	8.7E-10	5.2E-10	3.4E-10	2.3E-10	1.3E-10	1.0E-10
ENE	1.4E-09	5.7E-10	3.5E-10	2.3E-10	1.5E-10	9.3E-11	7.2E-11
NE	3.4E-09	1.3E-09	7.4E-10	4.7E-10	3.0E-10	1.6E-10	1.2E-10
NNE	3.8E-09	1.3E-09	7.8E-10	4.9E-10	3.1E-10	1.6E-10	1.2E-10

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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	3.3E-07	1.2E-07	1.3E-07	8.9E-08	7.1E-08	6.1E-08	2.2E-07
NNW	7.1E-08	2.5E-08	2.8E-08	1.9E-08	1.5E-08	1.3E-08	4.7E-08
NW	4.8E-08	1.7E-08	2.0E-08	1.3E-08	1.1E-08	9.1E-09	3.3E-08
WNW	3.9E-08	1.4E-08	1.6E-08	1.1E-08	8.7E-09	7.5E-09	2.4E-08
W	9.7E-08	3.6E-08	4.1E-08	2.8E-08	2.3E-08	2.0E-08	5.7E-08
WSW	1.1E-07	3.9E-08	4.4E-08	3.0E-08	2.4E-08	2.1E-08	5.9E-08
SW	1.9E-07	6.6E-08	7.4E-08	5.0E-08	4.0E-08	3.4E-08	9.8E-08
SSW	2.4E-07	8.6E-08	9.7E-08	6.6E-08	5.3E-08	4.5E-08	1.6E-07
S	5.1E-07	1.8E-07	1.9E-07	1.3E-07	1.0E-07	9.0E-08	3.2E-07
SSE	3.4E-07	1.2E-07	1.3E-07	9.0E-08	7.2E-08	6.2E-08	2.9E-07
SE	2.1E-07	7.3E-08	8.3E-08	5.7E-08	4.6E-08	4.0E-08	1.4E-07
ESE	1.1E-07	3.9E-08	4.4E-08	3.1E-08	2.5E-08	2.1E-08	7.9E-08
E	1.9E-07	6.8E-08	7.6E-08	5.2E-08	4.2E-08	3.7E-08	1.3E-07
ENE	1.2E-07	4.4E-08	4.9E-08	3.4E-08	2.7E-08	2.4E-08	8.7E-08
NE	3.3E-07	1.1E-07	1.3E-07	8.7E-08	6.9E-08	6.0E-08	2.1E-07
NNE	3.9E-07	1.3E-07	1.5E-07	1.0E-07	8.0E-08	6.9E-08	2.4E-07

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	2.8E-07	8.6E-08	6.0E-08	1.6E-08	1.0E-08	6.6E-09	4.8E-09
NNW	6.4E-08	3.0E-08	6.8E-09	2.9E-09	2.3E-09	1.6E-09	1.3E-09
NW	4.1E-08	1.7E-08	1.3E-08	9.9E-09	2.5E-09	8.1E-10	7.6E-10
WNW	2.5E-08	1.2E-08	9.3E-09	2.9E-09	9.1E-10	7.1E-10	5.4E-10
W	7.5E-08	3.9E-08	1.3E-08	1.0E-08	5.5E-09	3.1E-09	1.7E-09
WSW	1.3E-07	7.6E-08	1.5E-08	9.6E-09	7.4E-09	3.8E-08	1.4E-09
SW	2.4E-07	1.6E-07	9.8E-08	3.8E-08	1.8E-08	7.4E-09	8.9E-09
SSW	3.8E-07	2.5E-07	1.7E-07	7.8E-08	3.7E-08	2.4E-08	3.9E-08
S	1.2E-06	6.7E-07	3.1E-07	1.9E-08	2.1E-08	2.2E-08	1.5E-08
SSE	2.1E-06	1.4E-06	9.5E-07	2.1E-08	0.0E+00	0.0E+00	0.0E+00
SE	2.1E-06	6.9E-07	4.7E-07	1.4E-07	9.4E-09	0.0E+00	0.0E+00
ESE	1.2E-06	2.8E-07	9.6E-08	7.0E-08	4.3E-08	9.8E-09	3.8E-09
E	1.3E-06	2.7E-07	3.3E-08	5.5E-08	1.9E-08	1.3E-08	1.1E-08
ENE	1.3E-07	4.8E-08	3.0E-08	1.5E-08	9.2E-09	6.6E-09	5.9E-09
NE	2.4E-07	7.8E-08	8.2E-08	6.7E-08	5.3E-08	2.2E-08	1.9E-08
NNE	2.7E-07	4.4E-08	6.8E-08	6.7E-08	2.6E-08	6.4E-09	5.1E-09

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Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 14, 2008 09:40 am

Facility: Maywood Interim Storage Site - Cluster9A
Address: 113 Essex Street
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Corp of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 75000 Meters North Northeast

Dataset Name: CLUST9AP
Dataset Date: 3/14/2008 8:23:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 75000 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	0.00E+00	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	7.0E-11	7.0E-11
Th-234	S	1	7.0E-11	7.0E-11
Pa-234m	M	1	7.0E-11	7.0E-11
Pa-234	M	1	9.1E-14	9.1E-14
U-234	M	1	7.5E-11	7.5E-11
Th-230	S	1	7.5E-11	7.5E-11
Ra-226	M	1	6.2E-11	6.2E-11
Po-218	M	1	6.2E-11	6.2E-11
Pb-214	M	1	6.2E-11	6.2E-11
Bi-214	M	1	6.2E-11	6.2E-11
Po-214	M	1	6.2E-11	6.2E-11
Pb-210	M	1	6.2E-11	6.2E-11
Bi-210	M	1	6.2E-11	6.2E-11
Po-210	M	1	6.2E-11	6.2E-11
U-235	M	1	3.3E-12	3.3E-12
Th-231	S	1	3.3E-12	3.3E-12
Pa-231	M	1	3.3E-12	3.3E-12
Ac-227	M	1	3.3E-12	3.3E-12
Th-227	S	1	3.2E-12	3.2E-12
Fr-223	M	1	4.5E-14	4.5E-14
Ra-223	M	1	3.3E-12	3.3E-12
Po-215	M	1	3.3E-12	3.3E-12
Pb-211	M	1	3.3E-12	3.3E-12
Bi-211	M	1	3.3E-12	3.3E-12
Tl-207	M	1	3.3E-12	3.3E-12
Po-211	M	1	8.9E-15	8.9E-15
Th-232	S	1	2.9E-10	2.9E-10
Ra-228	M	1	2.9E-10	2.9E-10
Ac-228	M	1	2.9E-10	2.9E-10
Th-228	S	1	2.9E-10	2.9E-10
Ra-224	M	1	2.9E-10	2.9E-10
Po-216	M	1	2.9E-10	2.9E-10
Pb-212	M	1	2.9E-10	2.9E-10
Bi-212	M	1	2.9E-10	2.9E-10
Po-212	M	1	1.8E-10	1.8E-10
Tl-208	M	1	1.0E-10	1.0E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 201.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density:	4.25E-02
Milk Cattle Density:	3.29E-02
Land Fraction Cultivated for Vegetable Crops:	1.82E-02

CALCULATION TITLE PAGE

CALCULATION IDENTIFICATION NUMBER

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

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SUMMARY
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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	0.00E+00	0.00E+00
AIR IMMERSION	0.00E+00	0.00E+00
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	0.00E+00	0.00E+00
EXTERNAL	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ac-228	0.00E+00	0.00E+00
Th-228	0.00E+00	0.00E+00
Ra-224	0.00E+00	0.00E+00
Rn-220	0.00E+00	0.00E+00
Po-216	0.00E+00	0.00E+00
Pb-212	0.00E+00	0.00E+00
Bi-212	0.00E+00	0.00E+00
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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SUMMARY
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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

[illegible]

Distance (m)

[illegible]

[illegible]

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

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Facility: Maywood Interim Storage Site - Cluster 12B
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Army Corps of Engineers

Effective Dose Equivalent
(mrem/year)

1.28E-05

At This Location: 250 Meters South

Dataset Name: CLUST12AP
Dataset Date: 3/14/2008 9:41:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 250 Meters South
Lifetime Fatal Cancer Risk: 8.95E-12

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	9.94E-09	3.95E-08
B Surfac	9.96E-09	3.96E-08
Breasts	3.35E-06	1.33E-05
St Wall	9.95E-09	3.96E-08
ULI Wall	9.95E-09	3.96E-08
Kidneys	9.94E-09	3.95E-08
Lungs	9.97E-09	3.96E-08
Ovaries	9.99E-09	3.97E-08
R Marrow	1.13E-08	4.48E-08
Spleen	1.37E-08	5.45E-08
Thymus	6.27E-08	2.49E-07
Uterus	7.73E-08	3.07E-07
Bld Wall	4.76E-06	1.89E-05
Brain	9.95E-09	3.96E-08
Esophagu	3.01E-08	1.20E-07
SI Wall	9.94E-09	3.95E-08
LLI Wall	1.74E-07	6.90E-07
Liver	1.00E-08	3.98E-08
Muscle	9.97E-09	3.96E-08
Pancreas	3.05E-08	1.21E-07
Skin	9.95E-09	3.96E-08
Testes	9.95E-09	3.96E-08
Thyroid	9.94E-09	3.95E-08
EFFEC	1.28E-05	5.11E-05

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	4.61E-10	4.61E-10

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	6.7E-10	6.7E-10
Th-234	S	1	6.7E-10	6.7E-10
Pa-234m	M	1	6.7E-10	6.7E-10
Pa-234	M	1	8.8E-13	8.8E-13
U-234	M	1	7.2E-10	7.2E-10
Th-230	S	1	7.2E-10	7.2E-10
Ra-226	M	1	5.5E-10	5.5E-10
Po-218	M	1	5.5E-10	5.5E-10
Pb-214	M	1	5.5E-10	5.5E-10
Bi-214	M	1	5.5E-10	5.5E-10
Po-214	M	1	5.5E-10	5.5E-10
Pb-210	M	1	5.5E-10	5.5E-10
Bi-210	M	1	5.5E-10	5.5E-10
Po-210	M	1	5.5E-10	5.5E-10
U-235	M	1	3.2E-11	3.2E-11
Th-231	S	1	3.2E-11	3.2E-11
Pa-231	M	1	3.2E-11	3.2E-11
Ac-227	M	1	3.2E-11	3.2E-11
Th-227	S	1	3.1E-11	3.1E-11
Fr-223	M	1	4.5E-13	4.5E-13
Ra-223	M	1	3.2E-11	3.2E-11
Po-215	M	1	3.2E-11	3.2E-11
Pb-211	M	1	3.2E-11	3.2E-11
Bi-211	M	1	3.2E-11	3.2E-11
Tl-207	M	1	3.2E-11	3.2E-11
Po-211	M	1	8.6E-14	8.6E-14
Th-232	S	1	2.1E-09	2.1E-09
Ra-228	M	1	2.1E-09	2.1E-09
Ac-228	M	1	2.1E-09	2.1E-09
Th-228	S	1	2.1E-09	2.1E-09
Ra-224	M	1	2.1E-09	2.1E-09
Po-216	M	1	2.1E-09	2.1E-09
Pb-212	M	1	2.1E-09	2.1E-09
Bi-212	M	1	2.1E-09	2.1E-09
Po-212	M	1	1.4E-09	1.4E-09
Tl-208	M	1	7.7E-10	7.7E-10

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

CALCULATION IDENTIFICATION NUMBER

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 6952.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000
Beef Cattle Density:	4.25E-02		
Milk Cattle Density:	3.29E-02		
Land Fraction Cultivated			
for Vegetable Crops:	1.82E-02		

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

CALCULATION IDENTIFICATION NUMBER

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SUMMARY
Page 1

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	9.94E-09	3.95E-08
B Surfac	9.96E-09	3.96E-08
Breasts	3.35E-06	1.33E-05
St Wall	9.95E-09	3.96E-08
ULI Wall	9.95E-09	3.96E-08
Kidneys	9.94E-09	3.95E-08
Lungs	9.97E-09	3.96E-08
Ovaries	9.99E-09	3.97E-08
R Marrow	1.13E-08	4.48E-08
Spleen	1.37E-08	5.45E-08
Thymus	6.27E-08	2.49E-07
Uterus	7.73E-08	3.07E-07
Bld Wall	4.76E-06	1.89E-05
Brain	9.95E-09	3.96E-08
Esophagu	3.01E-08	1.20E-07
SI Wall	9.94E-09	3.95E-08
LLI Wall	1.74E-07	6.90E-07
Liver	1.00E-08	3.98E-08
Muscle	9.97E-09	3.96E-08
Pancreas	3.05E-08	1.21E-07
Skin	9.95E-09	3.96E-08
Testes	9.95E-09	3.96E-08
Thyroid	9.94E-09	3.95E-08
EFFEC	1.28E-05	5.11E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	1.28E-05	5.11E-05
AIR IMMERSION	4.34E-11	1.73E-10
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	1.28E-05	5.11E-05
EXTERNAL	4.34E-11	1.73E-10
TOTAL	1.28E-05	5.11E-05

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	4.53E-06	1.80E-05
Ra-228	4.82E-07	1.92E-06
Ac-228	2.21E-09	8.77E-09
Th-228	7.25E-06	2.88E-05
Ra-224	5.43E-07	2.16E-06
Rn-220	1.38E-14	1.05E-13
Po-216	5.54E-16	2.20E-15
Pb-212	3.13E-08	1.25E-07
Bi-212	5.64E-09	2.24E-08
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	1.28E-05	5.11E-05

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INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	8.3E-06	9.8E-07	2.8E-07	1.1E-07	6.5E-08	4.3E-08	1.9E-08
NNW	1.8E-06	2.1E-07	6.0E-08	2.4E-08	1.4E-08	9.3E-09	4.0E-09
NW	1.2E-06	1.5E-07	4.1E-08	1.7E-08	9.6E-09	6.4E-09	2.8E-09
WNW	9.7E-07	1.2E-07	3.4E-08	1.4E-08	7.9E-09	5.3E-09	2.3E-09
W	2.5E-06	3.1E-07	8.8E-08	3.6E-08	2.1E-08	1.4E-08	6.0E-09
WSW	2.7E-06	3.3E-07	9.3E-08	3.8E-08	2.2E-08	1.4E-08	6.2E-09
SW	4.7E-06	5.6E-07	1.6E-07	6.4E-08	3.6E-08	2.4E-08	1.0E-08
SSW	6.2E-06	7.3E-07	2.1E-07	8.4E-08	4.8E-08	3.2E-08	1.4E-08
S	1.3E-05	1.5E-06	4.1E-07	1.7E-07	9.5E-08	6.3E-08	2.7E-08
SSE	8.5E-06	1.0E-06	2.8E-07	1.1E-07	6.6E-08	4.4E-08	1.9E-08
SE	5.2E-06	6.2E-07	1.8E-07	7.2E-08	4.2E-08	2.8E-08	1.2E-08
ESE	2.7E-06	3.3E-07	9.4E-08	3.9E-08	2.2E-08	1.5E-08	6.7E-09
E	4.8E-06	5.7E-07	1.6E-07	6.7E-08	3.8E-08	2.6E-08	1.1E-08
ENE	3.1E-06	3.7E-07	1.0E-07	4.3E-08	2.5E-08	1.7E-08	7.4E-09
NE	8.3E-06	9.7E-07	2.7E-07	1.1E-07	6.3E-08	4.2E-08	1.8E-08
NNE	9.9E-06	1.1E-06	3.2E-07	1.3E-07	7.3E-08	4.9E-08	2.1E-08

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	6.4E-09	2.4E-09	1.4E-09	9.3E-10	6.1E-10	3.4E-10	2.6E-10
NNW	1.4E-09	5.2E-10	3.0E-10	1.9E-10	1.3E-10	7.4E-11	5.6E-11
NW	9.3E-10	3.6E-10	2.1E-10	1.3E-10	8.7E-11	5.4E-11	4.1E-11
WNW	7.6E-10	3.0E-10	1.7E-10	1.1E-10	7.4E-11	4.8E-11	3.7E-11
W	2.0E-09	7.9E-10	4.5E-10	2.9E-10	1.9E-10	1.3E-10	9.7E-11
WSW	2.0E-09	7.7E-10	4.4E-10	2.7E-10	1.8E-10	1.1E-10	8.2E-11
SW	3.4E-09	1.2E-09	7.0E-10	4.4E-10	2.8E-10	1.6E-10	1.2E-10
SSW	4.6E-09	1.7E-09	9.9E-10	6.3E-10	4.1E-10	2.3E-10	1.7E-10
S	9.0E-09	3.2E-09	1.8E-09	1.2E-09	7.2E-10	3.7E-10	2.7E-10
SSE	6.5E-09	2.4E-09	1.4E-09	9.3E-10	6.1E-10	3.4E-10	2.6E-10
SE	4.3E-09	1.7E-09	1.0E-09	6.8E-10	4.6E-10	2.8E-10	2.0E-10
ESE	2.4E-09	9.7E-10	5.9E-10	3.9E-10	2.6E-10	1.6E-10	1.2E-10
E	4.0E-09	1.6E-09	9.6E-10	6.3E-10	4.2E-10	2.5E-10	1.9E-10
ENE	2.6E-09	1.1E-09	6.4E-10	4.2E-10	2.8E-10	1.7E-10	1.3E-10
NE	6.2E-09	2.3E-09	1.4E-09	8.7E-10	5.6E-10	3.0E-10	2.2E-10
NNE	6.9E-09	2.5E-09	1.4E-09	9.1E-10	5.7E-10	2.9E-10	2.1E-10

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COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

Distance (m)

Direction	250	750	1500	2500	3500	4500	7500
N	6.1E-07	2.1E-07	2.4E-07	1.6E-07	1.3E-07	1.1E-07	4.1E-07
NNW	1.3E-07	4.6E-08	5.2E-08	3.5E-08	2.8E-08	2.4E-08	8.7E-08
NW	8.9E-08	3.2E-08	3.6E-08	2.5E-08	2.0E-08	1.7E-08	6.0E-08
WNW	7.1E-08	2.6E-08	3.0E-08	2.0E-08	1.6E-08	1.4E-08	4.5E-08
W	1.8E-07	6.7E-08	7.6E-08	5.2E-08	4.2E-08	3.6E-08	1.0E-07
WSW	2.0E-07	7.2E-08	8.1E-08	5.5E-08	4.4E-08	3.8E-08	1.1E-07
SW	3.4E-07	1.2E-07	1.4E-07	9.2E-08	7.3E-08	6.3E-08	1.8E-07
SSW	4.5E-07	1.6E-07	1.8E-07	1.2E-07	9.7E-08	8.3E-08	3.0E-07
S	9.4E-07	3.2E-07	3.6E-07	2.4E-07	1.9E-07	1.7E-07	5.8E-07
SSE	6.2E-07	2.2E-07	2.4E-07	1.7E-07	1.3E-07	1.1E-07	5.3E-07
SE	3.8E-07	1.4E-07	1.5E-07	1.1E-07	8.4E-08	7.3E-08	2.7E-07
ESE	2.0E-07	7.2E-08	8.2E-08	5.7E-08	4.6E-08	4.0E-08	1.5E-07
E	3.5E-07	1.2E-07	1.4E-07	9.7E-08	7.8E-08	6.7E-08	2.5E-07
ENE	2.3E-07	8.1E-08	9.1E-08	6.3E-08	5.0E-08	4.4E-08	1.6E-07
NE	6.0E-07	2.1E-07	2.4E-07	1.6E-07	1.3E-07	1.1E-07	4.0E-07
NNE	7.2E-07	2.5E-07	2.7E-07	1.9E-07	1.5E-07	1.3E-07	4.5E-07

Distance (m)

Direction	15000	25000	35000	45000	55000	65000	75000
N	5.2E-07	1.6E-07	1.1E-07	3.0E-08	1.9E-08	1.2E-08	8.8E-09
NNW	1.2E-07	5.6E-08	1.2E-08	5.4E-09	4.3E-09	3.0E-09	2.5E-09
NW	7.5E-08	3.1E-08	2.4E-08	1.8E-08	4.5E-09	1.5E-09	1.4E-09
WNW	4.7E-08	2.1E-08	1.7E-08	5.3E-09	1.7E-09	1.3E-09	1.0E-09
W	1.4E-07	7.2E-08	2.3E-08	1.9E-08	1.0E-08	5.7E-09	3.2E-09
WSW	2.5E-07	1.4E-07	2.7E-08	1.8E-08	1.4E-08	7.0E-08	2.6E-09
SW	4.4E-07	3.0E-07	1.8E-07	7.0E-08	3.4E-08	1.4E-08	1.6E-08
SSW	7.1E-07	4.6E-07	3.0E-07	1.4E-07	6.8E-08	4.5E-08	7.2E-08
S	2.3E-06	1.2E-06	5.8E-07	3.4E-08	3.8E-08	4.0E-08	2.7E-08
SSE	3.8E-06	2.6E-06	1.8E-06	3.9E-08	0.0E+00	0.0E+00	0.0E+00
SE	3.8E-06	1.3E-06	8.6E-07	2.7E-07	1.7E-08	0.0E+00	0.0E+00
ESE	2.1E-06	5.1E-07	1.8E-07	1.3E-07	8.0E-08	1.8E-08	6.9E-09
E	2.5E-06	5.1E-07	6.0E-08	1.0E-07	3.5E-08	2.4E-08	2.1E-08
ENE	2.4E-07	8.8E-08	5.5E-08	2.7E-08	1.7E-08	1.2E-08	1.1E-08
NE	4.4E-07	1.4E-07	1.5E-07	1.2E-07	9.8E-08	4.1E-08	3.5E-08
NNE	4.9E-07	8.1E-08	1.3E-07	1.2E-07	4.7E-08	1.2E-08	9.5E-09

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C A P 8 8 - P C

Version 3.0

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment

Mar 14, 2008 12:16 pm

Facility: Maywood Interim Storage Site - Cluster 12C
Address: 100 W. Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Particulate Emission w radon daughters
Source Type: Area
Emission Year: 2007

Comments: Shaw E&I for
U.S. Army Corps of Engineers

Effective Dose Equivalent
(mrem/year)

0.00E+00

At This Location: 75000 Meters North Northeast

Dataset Name: CLUST12CPOP
Dataset Date: 3/14/2008 10:51:00 AM
Wind File: C:\Program Files\CAP88-PC30\WindLib\TET98-07
Population File: C:\Program Files\CAP88-PC30\Poplib\Maywood-2

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MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 75000 Meters North Northeast
Lifetime Fatal Cancer Risk: 0.00E+00

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	# of People	# of People in This Risk Range or Higher	Deaths/Year in This Risk Range	Deaths/Year in This Risk Range or Higher
1.0E+00 TO 1.0E-01	0	0	0.00E+00	0.00E+00
1.0E-01 TO 1.0E-02	0	0	0.00E+00	0.00E+00
1.0E-02 TO 1.0E-03	0	0	0.00E+00	0.00E+00
1.0E-03 TO 1.0E-04	0	0	0.00E+00	0.00E+00
1.0E-04 TO 1.0E-05	0	0	0.00E+00	0.00E+00
1.0E-05 TO 1.0E-06	0	0	0.00E+00	0.00E+00
LESS THAN 1.0E-06	19444635	19444635	0.00E+00	0.00E+00

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RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Type	Size	Source	TOTAL
			#1 Ci/y	Ci/y
U-238	M	1	6.1E-11	6.1E-11
Th-234	S	1	6.1E-11	6.1E-11
Pa-234m	M	1	6.1E-11	6.1E-11
Pa-234	M	1	7.9E-14	7.9E-14
U-234	M	1	6.5E-11	6.5E-11
Th-230	S	1	6.5E-11	6.5E-11
Ra-226	M	1	5.2E-11	5.2E-11
Po-218	M	1	5.2E-11	5.2E-11
Pb-214	M	1	5.2E-11	5.2E-11
Bi-214	M	1	5.2E-11	5.2E-11
Po-214	M	1	5.2E-11	5.2E-11
Pb-210	M	1	5.2E-11	5.2E-11
Bi-210	M	1	5.2E-11	5.2E-11
Po-210	M	1	5.2E-11	5.2E-11
U-235	M	1	2.8E-12	2.8E-12
Th-231	S	1	2.8E-12	2.8E-12
Pa-231	M	1	2.8E-12	2.8E-12
Ac-227	M	1	2.8E-12	2.8E-12
Th-227	S	1	2.8E-12	2.8E-12
Fr-223	M	1	3.9E-14	3.9E-14
Ra-223	M	1	2.8E-12	2.8E-12
Po-215	M	1	2.8E-12	2.8E-12
Pb-211	M	1	2.8E-12	2.8E-12
Bi-211	M	1	2.8E-12	2.8E-12
Tl-207	M	1	2.8E-12	2.8E-12
Po-211	M	1	7.8E-15	7.8E-15
Th-232	S	1	1.9E-10	1.9E-10
Ra-228	M	1	1.9E-10	1.9E-10
Ac-228	M	1	1.9E-10	1.9E-10
Th-228	S	1	1.9E-10	1.9E-10
Ra-224	M	1	1.9E-10	1.9E-10
Po-216	M	1	1.9E-10	1.9E-10
Pb-212	M	1	1.9E-10	1.9E-10
Bi-212	M	1	1.9E-10	1.9E-10
Po-212	M	1	1.2E-10	1.2E-10
Tl-208	M	1	7.0E-11	7.0E-11

SITE INFORMATION

Temperature: 13 degrees C
Precipitation: 142 cm/y
Humidity: 8 g/cu m
Mixing Height: 1000 m

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SOURCE INFORMATION

Source Number: 1

Source Height (m): 0.00
Area (sq m): 328.00

Plume Rise							
Pasquill Cat:	A	B	C	D	E	F	G
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
Zero:	0.00	0.00	0.00	0.00	0.00	0.00	0.00

AGRICULTURAL DATA

	<u>Vegetable</u>	<u>Milk</u>	<u>Meat</u>
Fraction Home Produced:	0.080	0.000	0.010
Fraction From Assessment Area:	0.920	1.000	0.990
Fraction Imported:	0.000	0.000	0.000

Beef Cattle Density:	4.25E-02
Milk Cattle Density:	3.29E-02
Land Fraction Cultivated for Vegetable Crops:	1.82E-02

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POPULATION DATA

Distance (m)							
Direction	250	750	1500	2500	3500	4500	7500
N	73	218	869	1449	2029	2609	21742
NNW	73	218	869	1449	2029	2609	21742
NW	73	218	869	1449	2029	2609	21742
WNW	73	218	869	1449	2029	2609	19528
W	73	218	869	1449	2029	2609	17315
WSW	73	218	869	1449	2029	2609	17315
SW	73	218	869	1449	2029	2609	17591
SSW	73	218	869	1449	2029	2609	21742
S	73	218	869	1449	2029	2609	21742
SSE	73	218	869	1449	2029	2609	28091
SE	73	218	869	1449	2029	2609	21742
ESE	73	218	869	1449	2029	2609	21742
E	73	218	869	1449	2029	2609	21742
ENE	73	218	869	1449	2029	2609	21742
NE	73	218	869	1449	2029	2609	21742
NNE	73	218	869	1449	2029	2609	21742

Distance (m)							
Direction	15000	25000	35000	45000	55000	65000	75000
N	80798	65252	76762	32421	30759	35625	34311
NNW	86967	108564	41578	27967	34183	40397	44258
NW	80798	85308	115432	137220	52008	27730	34466
WNW	61467	70794	99111	47297	22710	26840	27148
W	69500	91150	51699	64974	51977	44409	32825
WSW	121661	181519	61189	64411	76208	642285	32256
SW	130148	246712	257716	159760	121585	85815	138721
SSW	154093	270126	307311	229696	166289	195532	418196
S	256284	386875	314462	29692	52912	109433	99211
SSE	582532	1056258	1213638	41383	0	0	0
SE	881708	735691	836989	393629	38016	0	0
ESE	907647	524419	302264	331780	302990	112269	55872
E	614558	315168	62296	158874	81945	96843	111743
ENE	91625	83008	86601	65130	59702	70558	81413
NE	70873	62256	111184	140795	174717	137656	155442
NNE	70955	32638	87309	136246	82725	41310	44223

CALCULATION IDENTIFICATION NUMBER

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
Adrenals	0.00E+00	0.00E+00
B Surfac	0.00E+00	0.00E+00
Breasts	0.00E+00	0.00E+00
St Wall	0.00E+00	0.00E+00
ULI Wall	0.00E+00	0.00E+00
Kidneys	0.00E+00	0.00E+00
Lungs	0.00E+00	0.00E+00
Ovaries	0.00E+00	0.00E+00
R Marrow	0.00E+00	0.00E+00
Spleen	0.00E+00	0.00E+00
Thymus	0.00E+00	0.00E+00
Uterus	0.00E+00	0.00E+00
Bld Wall	0.00E+00	0.00E+00
Brain	0.00E+00	0.00E+00
Esophagu	0.00E+00	0.00E+00
SI Wall	0.00E+00	0.00E+00
LLI Wall	0.00E+00	0.00E+00
Liver	0.00E+00	0.00E+00
Muscle	0.00E+00	0.00E+00
Pancreas	0.00E+00	0.00E+00
Skin	0.00E+00	0.00E+00
Testes	0.00E+00	0.00E+00
Thyroid	0.00E+00	0.00E+00
EFFEC	0.00E+00	0.00E+00

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	0.00E+00	0.00E+00
INHALATION	0.00E+00	0.00E+00
AIR IMMERSION	0.00E+00	0.00E+00
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	0.00E+00	0.00E+00
EXTERNAL	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	REVISION NUMBER	PAGE
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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
U-238	0.00E+00	0.00E+00
Th-234	0.00E+00	0.00E+00
Pa-234m	0.00E+00	0.00E+00
Pa-234	0.00E+00	0.00E+00
U-234	0.00E+00	0.00E+00
Th-230	0.00E+00	0.00E+00
Ra-226	0.00E+00	0.00E+00
Rn-222	0.00E+00	0.00E+00
Po-218	0.00E+00	0.00E+00
Pb-214	0.00E+00	0.00E+00
Bi-214	0.00E+00	0.00E+00
Po-214	0.00E+00	0.00E+00
Pb-210	0.00E+00	0.00E+00
Bi-210	0.00E+00	0.00E+00
Po-210	0.00E+00	0.00E+00
At-218	0.00E+00	0.00E+00
U-235	0.00E+00	0.00E+00
Th-231	0.00E+00	0.00E+00
Pa-231	0.00E+00	0.00E+00
Ac-227	0.00E+00	0.00E+00
Th-227	0.00E+00	0.00E+00
Ra-223	0.00E+00	0.00E+00
Rn-219	0.00E+00	0.00E+00
Po-215	0.00E+00	0.00E+00
Pb-211	0.00E+00	0.00E+00
Bi-211	0.00E+00	0.00E+00
Tl-207	0.00E+00	0.00E+00
Po-211	0.00E+00	0.00E+00
Fr-223	0.00E+00	0.00E+00
Th-232	0.00E+00	0.00E+00
Ra-228	0.00E+00	0.00E+00
Ac-228	0.00E+00	0.00E+00
Th-228	0.00E+00	0.00E+00
Ra-224	0.00E+00	0.00E+00
Rn-220	0.00E+00	0.00E+00
Po-216	0.00E+00	0.00E+00
Pb-212	0.00E+00	0.00E+00
Bi-212	0.00E+00	0.00E+00
Po-212	0.00E+00	0.00E+00
Tl-208	0.00E+00	0.00E+00
TOTAL	0.00E+00	0.00E+00

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ATTACHMENT A

**RADIONUCLIDE SOURCE TERM EMISSIONS CALCULATIONS
FUSRAP - MISS
YEAR 2007**

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IN SITU SOIL		(AP-42, Chapter 13.2.5, "Industrial Wind Erosion", 11/2006)			
WIND EROSION					
EMISSIONS	INPUT PARAMETERS:	<u>Vegetative Cover/Gravel</u>		<u>Bare Soil</u>	
		<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>
	Particle Size Multiplier (k)	1	0.5	1	0.5
	Number of Disturbances per Period (Assumption)	3	3	3	3
	Surface Area of Soil (m^2) (Assumption)	56853	56853	2137	2137
	Threshold Friction Velocity (m/s) (Table 13.2.5-2) Overburden	1.02	1.02	1.02	1.02
	Anemometer Height (m) (Teterboro LCD)	10.0	10.0	10.0	10.0
	Roughness Height (m) (Table 13.2.5-2) Overburden	0.003	0.003	0.003	0.003
	Highest 2-Minute Wind Speed (mph) (Teterboro LCD)	<u>Week</u>			
	January	1	23	23	23
		2	25	25	25
		3	32	32	32
		4	28	28	28
	February	1	26	26	26
		2	26	26	26
		3	26	26	26
		4	26	26	26
	March	1	32	32	32
		2	24	24	24
		3	25	25	25
		4	23	23	23
		5	23	23	23
	April	1	26	26	26
		2	25	25	25
		3	22	22	22
		4	28	28	28
	May	1	22	22	22
		2	22	22	22
		3	25	25	25
		4	18	18	18
		5	18	18	18
	June	1	26	26	26
		2	17	17	17
		3	25	25	25
		4	26	26	26
	July	1	18	18	18
		2	23	23	23
		3	28	28	28
		4	17	17	17
		5	17	17	17
	August	1	21	21	21
		2	18	18	18
		3	26	26	26
		4	31	31	31
		5	31	31	31
	September	1	18	18	18
		2	21	21	21

October	3	23	23	23	23
	4	24	24	24	24
	1	17	17	17	17
	2	26	26	26	26
November	3	26	26	26	26
	4	26	26	26	26
	1	21	21	21	21
	2	16	16	16	16
December	3	30	30	30	30
	4	29	29	29	29
	1	32	32	32	32
	2	22	22	22	22
Friction Velocity (m/s)	3	32	32	32	32
	4	33	33	33	33
January	1	0.54	0.54	0.54	0.54
	2	0.59	0.59	0.59	0.59
	3	0.76	0.76	0.76	0.76
	4	0.66	0.66	0.66	0.66
February	1	0.62	0.62	0.62	0.62
	2	0.62	0.62	0.62	0.62
	3	0.62	0.62	0.62	0.62
	4	0.62	0.62	0.62	0.62
March	1	0.76	0.76	0.76	0.76
	2	0.57	0.57	0.57	0.57
	3	0.59	0.59	0.59	0.59
	4	0.54	0.54	0.54	0.54
April	5	0.54	0.54	0.54	0.54
	1	0.62	0.62	0.62	0.62
	2	0.59	0.59	0.59	0.59
	3	0.52	0.52	0.52	0.52
May	4	0.66	0.66	0.66	0.66
	1	0.52	0.52	0.52	0.52
	2	0.52	0.52	0.52	0.52
	3	0.59	0.59	0.59	0.59
June	4	0.43	0.43	0.43	0.43
	5	0.43	0.43	0.43	0.43
	1	0.62	0.62	0.62	0.62
	2	0.40	0.40	0.40	0.40
July	3	0.59	0.59	0.59	0.59
	4	0.62	0.62	0.62	0.62
	1	0.43	0.43	0.43	0.43
	2	0.54	0.54	0.54	0.54
August	3	0.66	0.66	0.66	0.66
	4	0.40	0.40	0.40	0.40
	5	0.40	0.40	0.40	0.40
	1	0.50	0.50	0.50	0.50
September	2	0.43	0.43	0.43	0.43
	3	0.62	0.62	0.62	0.62
	4	0.73	0.73	0.73	0.73
	5	0.73	0.73	0.73	0.73
	1	0.43	0.43	0.43	0.43
	2	0.50	0.50	0.50	0.50
	3	0.54	0.54	0.54	0.54
	4	0.57	0.57	0.57	0.57

October	1	0.40	0.40	0.40	0.40
	2	0.62	0.62	0.62	0.62
	3	0.62	0.62	0.62	0.62
	4	0.62	0.62	0.62	0.62
November	1	0.50	0.50	0.50	0.50
	2	0.38	0.38	0.38	0.38
	3	0.71	0.71	0.71	0.71
	4	0.69	0.69	0.69	0.69
December	1	0.76	0.76	0.76	0.76
	2	0.52	0.52	0.52	0.52
	3	0.76	0.76	0.76	0.76
	4	0.78	0.78	0.78	0.78
<u>Vegetative Cover</u>		<u>Bare Soil</u>			
CONTROL EFFICIENCY (%)	99	0			
EROSION POTENTIAL -E (g/m^2):					
January	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
February	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
March	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00
April	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
May	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00
June	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
July	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00
August	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00
September	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00

October	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
November	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
December	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00
	1	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00

ANNUAL EMISSIONS (grams/year): Vegetative Cover/Gravel Bare Soil Total Emissions

E (TSP) =	0.00	0.00	0.00
E (PM-10) =	0.00	0.00	0.00

RADIONUCLIDE SOURCE AVERAGE DETECTED ACTIVITY (MEASURED)

CONCENTRATION	INPUT PARAMETERS:	<u>U238</u>	<u>U234</u>	<u>U235</u>	<u>Ra226</u>	<u>Th232</u>
	Activity Concentration (S) - pCi/g	27.5	N/A	N/A	4.3	24.8
	Isotope Contribution to Total Uranium (P) - %	47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr)

U238	0.00E+00
Th234	0.00E+00
Pa234m	0.00E+00
Pa234	0.00E+00
U234	0.00E+00
Th230	0.00E+00
Ra226	0.00E+00
Po218	0.00E+00
Pb214	0.00E+00
Bi214	0.00E+00
Po214	0.00E+00
Pb210	0.00E+00
Bi210	0.00E+00
Po210	0.00E+00
U235	0.00E+00
Th231	0.00E+00
Pa231	0.00E+00
Ac227	0.00E+00
Th227	0.00E+00
Fr-223	0.00E+00
Ra223	0.00E+00
Po215	0.00E+00
Pb211	0.00E+00
Bi211	0.00E+00
Po211	0.00E+00
Tl207	0.00E+00

Th232	0.00E+00
Ra228	0.00E+00
Ac228	0.00E+00
Th228	0.00E+00
Ra224	0.00E+00
Po216	0.00E+00
Pb212	0.00E+00
Bi212	0.00E+00
Po212	0.00E+00
Tl208	0.00E+00

(AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)

		<u>Load-out No. 1</u>		<u>Load-out No. 2</u>		<u>Load-out No. 3</u>		<u>Load-out No. 4</u>		<u>Load-out No. 5</u>	
INPUT PARAMETERS:		<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>
Particle Size Multiplier (k)		0.74	0.35	0.74	0.35	0.74	0.35	0.74	0.35	0.74	0.35
Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Material Moisture Content - M (%)		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Tons of Material Dropped		12792	12792	12792	12792	7998	7998	14079	14079	17277	17277
		<u>Load-out No. 6</u>		<u>Load-out No. 7</u>		<u>Load-out No. 8</u>		<u>Load-out No. 9</u>		<u>Load-out No. 10</u>	
INPUT PARAMETERS:		<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>
Particle Size Multiplier (k)		0.74	0.35	0.74	0.35	0.74	0.35	0.74	0.35	0.74	0.35
Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Material Moisture Content - M (%)		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Tons of Material Dropped		15351	15351	12477	12477	10563	10563	14727	14727	6399	6399
		<u>Load-out No. 11</u>		<u>Load-out No. 12</u>							
		<u>TSP</u>	<u>PM-10</u>	<u>TSP</u>	<u>PM-10</u>						
Particle Size Multiplier (k)		0.74	0.35	0.74	0.35						
Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2	7.2	7.2						
Material Moisture Content - M (%)		12.0	12.0	12.0	12.0						
Tons of Material Dropped		9591	9591	9606	9606						
EMISSION FACTOR -E (lb/ton):		<u>Load-out No. 1</u>	<u>Load-out No. 2</u>	<u>Load-out No. 3</u>	<u>Load-out No. 4</u>	<u>Load-out No. 5</u>	<u>Load-out No. 6</u>	<u>Load-out No. 7</u>	<u>Load-out No.8</u>	<u>Load-out No. 9</u>	<u>Load-out No. 10</u>
E (TSP) =		3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04	3.10E-04
E (PM-10) =		1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04	1.46E-04
CONTROL EFFICIENCY (%)-	0	0	0	0	0	0	0	0	0	0	0
ANNUAL EMISSIONS (grams/year):											
E (TSP) =		1796.6	1796.6	1123.3	1977.4	2426.5	2156.0	1752.4	1483.5	2068.4	898.7
E (PM-10) =		849.7	849.7	531.3	935.2	1147.7	1019.7	828.8	701.7	978.3	425.1
EMISSION FACTOR -E (lb/ton):		<u>Load-out No. 11</u>	<u>Load-out No. 12</u>								
E (TSP) =		3.10E-04	3.10E-04								
E (PM-10) =		1.46E-04	1.46E-04								
CONTROL EFFICIENCY (%)-	0	0									

E (TSP) = 1347.0 1349.1
E (PM-10) = 637.1 638.1

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RADIONUCLIDE AVERAGE DETECTED ACTIVITY (MEASURED)
SOURCE

CONCENTRATIONS	INPUT PARAMETERS:		<u>U238</u>	<u>U234</u>	<u>U235</u>	<u>Ra226</u>	<u>Th232</u>
	Activity Concentration (S) - pCi/g	(Load-out No. 1)	0.99	N/A	N/A	0.76	4.20
	Activity Concentration (S) - pCi/g	(Load-out No. 2)	0.88	N/A	N/A	0.63	2.38
	Activity Concentration (S) - pCi/g	(Load-out No. 3)	0.73	N/A	N/A	0.50	2.07
	Activity Concentration (S) - pCi/g	(Load-out No. 4)	1.22	N/A	N/A	0.82	3.39
	Activity Concentration (S) - pCi/g	(Load-out No. 5)	1.52	N/A	N/A	1.08	5.25
	Activity Concentration (S) - pCi/g	(Load-out No. 6)	1.05	N/A	N/A	0.68	3.16
	Activity Concentration (S) - pCi/g	(Load-out No. 7)	0.86	N/A	N/A	0.52	1.60
	Activity Concentration (S) - pCi/g	(Load-out No. 8)	1.22	N/A	N/A	1.10	3.50
	Activity Concentration (S) - pCi/g	(Load-out No. 9)	1.29	N/A	N/A	1.20	6.10
	Activity Concentration (S) - pCi/g	(Load-out No. 10)	1.11	N/A	N/A	0.57	1.75
	Activity Concentration (S) - pCi/g	(Load-out No. 11)	1.08	N/A	N/A	0.91	3.66
	Activity Concentration (S) - pCi/g	(Load-out No. 12)	1.39	N/A	N/A	1.18	4.41
	Isotope Contribution to Total Uranium (P) - %		47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr)	<u>Load-out No. 1</u>	<u>Load-out No. 2</u>	<u>Load-out No. 3</u>	<u>Load-out No. 4</u>	<u>Load-out No. 5</u>	<u>Load-out No. 6</u>	<u>Load-out No. 7</u>	<u>Load-out No. 8</u>	<u>Load-out No. 9</u>	<u>Load-out No. 10</u>
U238	8.41E-10	7.48E-10	3.88E-10	1.14E-09	1.74E-09	1.07E-09	7.13E-10	8.56E-10	1.26E-09	4.72E-10
Th234	8.41E-10	7.48E-10	3.88E-10	1.14E-09	1.74E-09	1.07E-09	7.13E-10	8.56E-10	1.26E-09	4.72E-10
Pa234m	8.41E-10	7.48E-10	3.88E-10	1.14E-09	1.74E-09	1.07E-09	7.13E-10	8.56E-10	1.26E-09	4.72E-10
Pa234	1.09E-12	9.72E-13	5.04E-13	1.48E-12	2.27E-12	1.39E-12	9.27E-13	1.11E-12	1.64E-12	6.13E-13
U234	9.00E-10	8.00E-10	4.15E-10	1.22E-09	1.87E-09	1.15E-09	7.62E-10	9.16E-10	1.35E-09	5.05E-10
Th230	9.00E-10	8.00E-10	4.15E-10	1.22E-09	1.87E-09	1.15E-09	7.62E-10	9.16E-10	1.35E-09	5.05E-10
Ra226	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Po218	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Pb214	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Bi214	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Po214	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Pb210	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Bi210	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
Po210	6.46E-10	5.35E-10	2.66E-10	7.67E-10	1.24E-09	6.93E-10	4.31E-10	7.72E-10	1.17E-09	2.42E-10
U235	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Th231	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Pa231	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Ac227	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Th227	3.88E-11	3.45E-11	1.79E-11	5.27E-11	8.05E-11	4.94E-11	3.29E-11	3.95E-11	5.83E-11	2.18E-11
Fr-223	5.43E-13	4.83E-13	2.51E-13	7.37E-13	1.13E-12	6.92E-13	4.61E-13	5.53E-13	8.15E-13	3.05E-13
Ra223	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Po215	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Pb211	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Bi211	3.94E-11	3.50E-11	1.82E-11	5.34E-11	8.17E-11	5.01E-11	3.34E-11	4.01E-11	5.91E-11	2.21E-11
Po211	1.08E-13	9.56E-14	4.96E-14	1.46E-13	2.23E-13	1.37E-13	9.11E-14	1.09E-13	1.61E-13	6.03E-14
Tl207	3.93E-11	3.49E-11	1.81E-11	5.33E-11	8.14E-11	5.00E-11	3.33E-11	4.00E-11	5.89E-11	2.20E-11
Th232	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10
Ra228	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10
Ac228	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10
Th228	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10
Ra224	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10
Po216	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10

Pb212	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10	P. A-7
Bi212	3.57E-09	2.02E-09	1.10E-09	3.17E-09	6.03E-09	3.22E-09	1.33E-09	2.46E-09	5.97E-09	7.44E-10	102682.0307
Po212	2.29E-09	1.30E-09	7.05E-10	2.03E-09	3.86E-09	2.06E-09	8.50E-10	1.57E-09	3.82E-09	4.77E-10	E(B)-15
Tl208	1.28E-09	7.27E-10	3.95E-10	1.14E-09	2.16E-09	1.16E-09	4.76E-10	8.82E-10	2.14E-09	2.67E-10	Rev. 0

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr) Load-out No. 11 Load-out No. 12 Load-out Total

U238	6.88E-10	8.87E-10	1.08E-08
Th234	6.88E-10	8.87E-10	1.08E-08
Pa234m	6.88E-10	8.87E-10	1.08E-08
Pa234	8.95E-13	1.15E-12	1.41E-11
U234	7.36E-10	9.49E-10	1.16E-08
Th230	7.36E-10	9.49E-10	1.16E-08
Ra226	5.80E-10	7.53E-10	8.10E-09
Po218	5.80E-10	7.53E-10	8.10E-09
Pb214	5.80E-10	7.53E-10	8.10E-09
Bi214	5.80E-10	7.53E-10	8.10E-09
Po214	5.80E-10	7.53E-10	8.10E-09
Pb210	5.80E-10	7.53E-10	8.10E-09
Bi210	5.80E-10	7.53E-10	8.10E-09
Po210	5.80E-10	7.53E-10	8.10E-09
U235	3.22E-11	4.15E-11	5.06E-10
Th231	3.22E-11	4.15E-11	5.06E-10
Pa231	3.22E-11	4.15E-11	5.06E-10
Ac227	3.22E-11	4.15E-11	5.06E-10
Th227	3.18E-11	4.10E-11	4.99E-10
Fr-223	4.45E-13	5.73E-13	6.98E-12
Ra223	3.22E-11	4.15E-11	5.06E-10
Po215	3.22E-11	4.15E-11	5.06E-10
Pb211	3.22E-11	4.15E-11	5.06E-10
Bi211	3.22E-11	4.15E-11	5.06E-10
Po211	8.79E-14	1.13E-13	1.38E-12
Tl207	3.21E-11	4.14E-11	5.05E-10
Th232	2.33E-09	2.81E-09	3.47E-08
Ra228	2.33E-09	2.81E-09	3.47E-08
Ac228	2.33E-09	2.81E-09	3.47E-08
Th228	2.33E-09	2.81E-09	3.47E-08
Ra224	2.33E-09	2.81E-09	3.47E-08
Po216	2.33E-09	2.81E-09	3.47E-08
Pb212	2.33E-09	2.81E-09	3.47E-08
Bi212	2.33E-09	2.81E-09	3.47E-08
Po212	1.49E-09	1.80E-09	2.23E-08
Tl208	8.38E-10	1.01E-09	1.25E-08

CLUSTER NO. 2C EQUATION: $E = k(0.0032)(U/5)^{1.3}(M/2)^{1.4}$ (AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)

EXCAVATION

EMISSIONS

		<u>Cluster No. 2C</u>	
INPUT PARAMETERS:		<u>TSP</u>	<u>PM-10</u>
Particle Size Multiplier (k)		0.74	0.35
Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2
Material Moisture Content - M (%)		12.0	12.0
Tons of Material Dropped		768	768

EMISSION FACTOR -E (lb/ton): Cluster No. 2C

E (TSP) = 3.10E-04
E (PM-10) = 1.46E-04

CONTROL EFFICIENCY (%)= 0

ANNUAL EMISSIONS (grams/year):

E (TSP) = 107.9
E (PM-10) = 51.0

RADIONUCLIDE AVERAGE DETECTED ACTIVITY (MEASURED)
SOURCE

CONCENTRATIONS	INPUT PARAMETERS:	<u>U238</u>	<u>U234</u>	<u>U235</u>	<u>Ra226</u>	<u>Th232</u>
	Activity Concentration (S) - pCi/g Cluster 2C	0.88	N/A	N/A	0.63	2.38
	Isotope Contribution to Total Uranium (P) - %	47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr) Cluster No. 2C

U238	4.49E-11
Th234	4.49E-11
Pa234m	4.49E-11
Pa234	5.84E-14
U234	4.80E-11
Th230	4.80E-11
Ra226	3.21E-11
Po218	3.21E-11
Pb214	3.21E-11
Bi214	3.21E-11
Po214	3.21E-11
Pb210	3.21E-11
Bi210	3.21E-11
Po210	3.21E-11
U235	2.10E-12
Th231	2.10E-12
Pa231	2.10E-12
Ac227	2.10E-12
Th227	2.07E-12
Fr-223	2.90E-14
Ra223	2.10E-12
Po215	2.10E-12
Pb211	2.10E-12
Bi211	2.10E-12
Po211	5.74E-15
Tl207	2.10E-12
Th232	1.21E-10
Ra228	1.21E-10
Ac228	1.21E-10
Th228	1.21E-10
Ra224	1.21E-10
Po216	1.21E-10
Pb212	1.21E-10
Bi212	1.21E-10
Po212	7.78E-11
Tl208	4.36E-11

CLUSTER NO. 2D	EQUATION: E = k(0.0032)(U/5)^1.3/(M/2)^1.4		(AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)		
EXCAVATION	Cluster No. 2D				
EMISSIONS	INPUT PARAMETERS:		TSP	PM-10	
	Particle Size Multiplier (k)		0.74	0.35	
	Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2	
	Material Moisture Content - M (%)		12.0	12.0	
	Tons of Material Dropped		13925	13925	
	EMISSION FACTOR -E (lb/ton):	Cluster No. 2D			
	E (TSP) =	3.10E-04			
	E (PM-10) =	1.46E-04			
	CONTROL EFFICIENCY (%) -	0			
	ANNUAL EMISSIONS (grams/year):				
	E (TSP) =	1955.7			
	E (PM-10) =	925.0			
RADIONUCLIDE	AVERAGE DETECTED ACTIVITY	(MEASURED)			
SOURCE					
CONCENTRATIONS	INPUT PARAMETERS:		U238	U234	U235
	Activity Concentration (S) - pCi/g	Cluster 2D	1.04	N/A	N/A
	Isotope Contribution to Total Uranium (P) - %		47.249	50.539	2.212
	ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr)		Cluster No. 2D		
	U238		9.62E-10		
	Th234		9.62E-10		
	Pa234m		9.62E-10		
	Pa234		1.25E-12		
	U234		1.03E-09		
	Th230		1.03E-09		
	Ra226		6.57E-10		
	Po218		6.57E-10		
	Pb214		6.57E-10		
	Bi214		6.57E-10		
	Po214		6.57E-10		
	Pb210		6.57E-10		
	Bi210		6.57E-10		
	Po210		6.57E-10		
	U235		4.50E-11		
	Th231		4.50E-11		
	Pa231		4.50E-11		
	Ac227		4.50E-11		
	Th227		4.44E-11		
	Fr-223		6.22E-13		
	Ra223		4.50E-11		
	Po215		4.50E-11		
	Pb211		4.50E-11		
	Bi211		4.50E-11		

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Po211	1.23E-13
Tl207	4.49E-11
Th232	2.91E-09
Ra228	2.91E-09
Ac228	2.91E-09
Th228	2.91E-09
Ra224	2.91E-09
Po216	2.91E-09
Pb212	2.91E-09
Bi212	2.91E-09
Po212	1.87E-09
Tl208	1.05E-09

CLUSTER NO. 5A EQUATION: E = k(0.0032)(U/5)^1.3(M/2)^1.4 (AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)

EXCAVATION

EMISSIONS

INPUT PARAMETERS:		TSP	PM-10
Particle Size Multiplier (k)		0.74	0.35
Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2
Material Moisture Content - M (%)		12.0	12.0
Tons of Material Dropped		4185	4185

EMISSION FACTOR -E (lb/ton): Cluster No. 5A

E (TSP) = 3.10E-04
E (PM-10) = 1.46E-04

CONTROL EFFICIENCY (%) - 0

ANNUAL EMISSIONS (grams/year):

E (TSP) = 587.8
E (PM-10) = 278.0

RADIONUCLIDE AVERAGE DETECTED ACTIVITY (MEASURED)
SOURCE

CONCENTRATIONS

INPUT PARAMETERS:		U238	U234	U235	Ra226	Th232
Activity Concentration (S) - pCi/g	Cluster 5A	1.19	N/A	N/A	0.89	3.27
Isotope Contribution to Total Uranium (P) - %		47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr) Cluster No. 5A

U238	3.31E-10
Th234	3.31E-10
Pa234m	3.31E-10
Pa234	4.30E-13
U234	3.54E-10
Th230	3.54E-10
Ra226	2.47E-10
Po218	2.47E-10
Pb214	2.47E-10
Bi214	2.47E-10
Po214	2.47E-10
Pb210	2.47E-10

Bi210	2.47E-10
Po210	2.47E-10
U235	1.55E-11
Th231	1.55E-11
Pa231	1.55E-11
Ac227	1.55E-11
Th227	1.53E-11
Fr-223	2.14E-13
Ra223	1.55E-11
Po215	1.55E-11
Pb211	1.55E-11
Bi211	1.55E-11
Po211	4.23E-14
Tl207	1.54E-11
Th232	9.09E-10
Ra228	2.33E-09
Ac228	2.33E-09
Th228	2.33E-09
Ra224	2.33E-09
Po216	2.33E-09
Pb212	2.33E-09
Bi212	2.33E-09
Po212	1.50E-09
Tl208	8.39E-10

CLUSTER NO. 5B EQUATION: E = k(0.0032)(U/5)^1.3(M/2)^1.4 (AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)

EXCAVATION

EMISSIONS	INPUT PARAMETERS:	TSP	PM-10
	Particle Size Multiplier (k)	0.74	0.35
	Mean Wind Speed - U (mph) (Teterboro, LCD)	7.2	7.2
	Material Moisture Content - M (%)	12.0	12.0
	Tons of Material Dropped	9901	9901

EMISSION FACTOR -E (lb/ton): Cluster No. 5B

E (TSP) = 3.10E-04
E (PM-10) = 1.46E-04

CONTROL EFFICIENCY (%) - 0

ANNUAL EMISSIONS (grams/year):

E (TSP) = 1390.6
E (PM-10) = 657.7

RADIONUCLIDE AVERAGE DETECTED ACTIVITY (MEASURED)
SOURCE

CONCENTRATIONS	INPUT PARAMETERS:	U238	U234	U235	Ra226	Th232
	Activity Concentration (S) - pCi/g Cluster 2D	1.12	N/A	N/A	0.86	3.55
	Isotope Contribution to Total Uranium (P) - %	47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr) Cluster No. 5B

U238	7.37E-10
Th234	7.37E-10
Pa234m	7.37E-10
Pa234	9.58E-13
U234	7.88E-10
Th230	7.88E-10
Ra226	5.66E-10
Po218	5.66E-10
Pb214	5.66E-10
Bi214	5.66E-10
Po214	5.66E-10
Pb210	5.66E-10
Bi210	5.66E-10
Po210	5.66E-10
U235	3.45E-11
Th231	3.45E-11
Pa231	3.45E-11
Ac227	3.45E-11
Th227	3.40E-11
Fr-223	4.76E-13
Ra223	3.45E-11
Po215	3.45E-11
Pb211	3.45E-11
Bi211	3.45E-11
Po211	9.41E-14
Tl207	3.44E-11
Th232	2.33E-09
Ra228	2.33E-09
Ac228	2.33E-09
Th228	2.33E-09
Ra224	2.33E-09
Po216	2.33E-09
Pb212	2.33E-09
Bi212	2.33E-09
Po212	1.50E-09
Tl208	8.39E-10

CLUSTER NO. 6		EQUATION: E = k(0.0032)(U/5)^1.3(M/2)^1.4		(AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)	
EXCAVATION					
EMISSIONS		Cluster No. 6C		Cluster No. 6D	
INPUT PARAMETERS:		TSP	PM-10	TSP	PM-10
Particle Size Multiplier (k)		0.74	0.35	0.74	0.35
Mean Wind Speed - U (mph)		(Teterboro, LCD)		7.2	7.2
Material Moisture Content - M (%)		12.0	12.0	12.0	12.0
Tons of Material Dropped		4192	4192	5056	5056
EMISSION FACTOR -E (lb/ton):		Cluster No. 6C	Cluster No. 6D		
E (TSP) =		3.10E-04	3.10E-04		
E (PM-10) =		1.46E-04	1.46E-04		
CONTROL EFFICIENCY (%)		0	0		
ANNUAL EMISSIONS (grams/year):					

E (TSP) =	588.8	710.1	0.0
E (PM-10) =	278.5	335.9	0.0

RADIONUCLIDE SOURCE

AVERAGE DETECTED ACTIVITY (MEASURED)

CONCENTRATIONS	INPUT PARAMETERS:		<u>U238</u>	<u>U234</u>	<u>U235</u>	<u>Ra226</u>	<u>Th232</u>
	Activity Concentration (S) - pCi/g	Cluster 6C	1.11	N/A	N/A	0.81	3.22
	Activity Concentration (S) - pCi/g	Cluster 6D	1.07	N/A	N/A	0.76	3.46
	Isotope Contribution to Total Uranium (P) - %		47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr)

Cluster No. 6C Cluster No. 6D

U238	3.09E-10	3.59E-10
Th234	3.09E-10	3.59E-10
Pa234m	3.09E-10	3.59E-10
Pa234	4.02E-13	4.67E-13
U234	3.31E-10	3.84E-10
Th230	3.31E-10	3.84E-10
Ra226	2.26E-10	2.55E-10
Po218	2.26E-10	2.55E-10
Pb214	2.26E-10	2.55E-10
Bi214	2.26E-10	2.55E-10
Po214	2.26E-10	2.55E-10
Pb210	2.26E-10	2.55E-10
Bi210	2.26E-10	2.55E-10
Po210	2.26E-10	2.55E-10
U235	1.45E-11	1.68E-11
Th231	1.45E-11	1.68E-11
Pa231	1.45E-11	1.68E-11
Ac227	1.45E-11	1.68E-11
Th227	1.43E-11	1.66E-11
Fr-223	2.00E-13	2.32E-13
Ra223	1.45E-11	1.68E-11
Po215	1.45E-11	1.68E-11
Pb211	1.45E-11	1.68E-11
Bi211	1.45E-11	1.68E-11
Po211	3.95E-14	4.59E-14
Tl207	1.44E-11	1.68E-11
Th232	8.97E-10	1.16E-09
Ra228	8.97E-10	1.16E-09
Ac228	8.97E-10	1.16E-09
Th228	8.97E-10	1.16E-09
Ra224	8.97E-10	1.16E-09
Po216	8.97E-10	1.16E-09
Pb212	8.97E-10	1.16E-09
Bi212	8.97E-10	1.16E-09
Po212	5.74E-10	7.45E-10
Tl208	3.22E-10	4.18E-10

CLUSTER NO.9A EQUATION: E = k(0.0032)(U/5)^1.3(M/2)^1.4 (AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)

EXCAVATION

Cluster No. 9A

EMISSIONS	INPUT PARAMETERS:	<u>TSP</u>	<u>PM-10</u>
	Particle Size Multiplier (k)	0.74	0.35

Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2
Material Moisture Content - M (%)		12.0	12.0
Tons of Material Dropped		884	884

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EMISSION FACTOR -E (lb/ton): Cluster No. 9A

E (TSP) =	3.10E-04
E (PM-10) =	1.46E-04
CONTROL EFFICIENCY (%)	0

ANNUAL EMISSIONS (grams/year):

E (TSP) =	124.2
E (PM-10) =	58.7

RADIONUCLIDE AVERAGE DETECTED ACTIVITY (MEASURED)
SOURCE

CONCENTRATIONS	INPUT PARAMETERS:	<u>U238</u>	<u>U234</u>	<u>U235</u>	<u>Ra226</u>	<u>Th232</u>
	Activity Concentration (S) - pCi/g	1.19	N/A	N/A	1.06	4.88
	Isotope Contribution to Total Uranium (P) - %	47.249	50.539	2.212	N/A	N/A

ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr) Cluster No. 9A

U238	6.99E-11
Th234	6.99E-11
Pa234m	6.99E-11
Pa234	9.08E-14
U234	7.47E-11
Th230	7.47E-11
Ra226	6.22E-11
Po218	6.22E-11
Pb214	6.22E-11
Bi214	6.22E-11
Po214	6.22E-11
Pb210	6.22E-11
Bi210	6.22E-11
Po210	6.22E-11
U235	3.27E-12
Th231	3.27E-12
Pa231	3.27E-12
Ac227	3.27E-12
Th227	3.23E-12
Fr-223	4.51E-14
Ra223	3.27E-12
Po215	3.27E-12
Pb211	3.27E-12
Bi211	3.27E-12
Po211	8.93E-15
Tl207	3.26E-12
Th232	2.87E-10
Ra228	2.87E-10
Ac228	2.87E-10
Th228	2.87E-10
Ra224	2.87E-10

	Po216		2.87E-10			
	Pb212		2.87E-10			
	Bi212		2.87E-10			
	Po212		1.84E-10			
	Tl208		1.03E-10			
CLUSTER NO. 12	EQUATION: E = k(0.0032)(U/5)^1.3/(M/2)^1.4		(AP-42, Chapter 13.2.4, "Aggregate Handling and Storage Piles", 11/2006)			
EXCAVATION						
EMISSIONS	INPUT PARAMETERS:		Cluster No. 12B		Cluster No. 12C	
			TSP	PM-10	TSP	PM-10
	Particle Size Multiplier (k)		0.74	0.35	0.74	0.35
	Mean Wind Speed - U (mph)	(Teterboro, LCD)	7.2	7.2	7.2	7.2
	Material Moisture Content - M (%)		12.0	12.0	12.0	12.0
	Tons of Material Dropped		8313	8313	660	660
	EMISSION FACTOR -E (lb/ton):		Cluster No. 12B	Cluster No. 12C		
	E (TSP) =	3.10E-04	3.10E-04			
	E (PM-10) =	1.46E-04	1.46E-04			
	CONTROL EFFICIENCY (%)	0				
ANNUAL EMISSIONS (grams/year):						
E (TSP) =	1167.5	92.7				
E (PM-10) =	552.2	43.8				
RADIONUCLIDE	AVERAGE DETECTED ACTIVITY	(MEASURED)				
SOURCE						
CONCENTRATIONS	INPUT PARAMETERS:		U238	U234	U235	Ra226
						Th232
Activity Concentration (S) - pCi/g	Cluster No. 12B	1.22	N/A	N/A	0.99	3.88
Activity Concentration (S) - pCi/g	Cluster No. 12C	1.39	N/A	N/A	1.18	4.41
Isotope Contribution to Total Uranium (P) - %		47.249	50.539	2.212	N/A	N/A
ANNUAL RADIOACTIVITY EMISSION RATES (Ci/yr)		Cluster No. 12B	Cluster No. 12C			
	U238	6.74E-10	6.09E-11			
	Th234	6.74E-10	6.09E-11			
	Pa234m	6.74E-10	6.09E-11			
	Pa234	8.76E-13	7.92E-14			
	U234	7.21E-10	6.52E-11			
	Th230	7.21E-10	6.52E-11			
	Ra226	5.47E-10	5.17E-11			
	Po218	5.47E-10	5.17E-11			
	Pb214	5.47E-10	5.17E-11			
	Bi214	5.47E-10	5.17E-11			
	Po214	5.47E-10	5.17E-11			
	Pb210	5.47E-10	5.17E-11			
	Bi210	5.47E-10	5.17E-11			
	Po210	5.47E-10	5.17E-11			
	U235	3.15E-11	2.85E-12			
	Th231	3.15E-11	2.85E-12			
	Pa231	3.15E-11	2.85E-12			
	Ac227	3.15E-11	2.85E-12			

Th227	3.11E-11	2.81E-12
Fr-223	4.35E-13	3.94E-14
Ra223	3.15E-11	2.85E-12
Po215	3.15E-11	2.85E-12
Pb211	3.15E-11	2.85E-12
Bi211	3.15E-11	2.85E-12
Po211	8.61E-14	7.79E-15
Tl207	3.15E-11	2.85E-12
Th232	2.14E-09	1.93E-10
Ra228	2.14E-09	1.93E-10
Ac228	2.14E-09	1.93E-10
Th228	2.14E-09	1.93E-10
Ra224	2.14E-09	1.93E-10
Po216	2.14E-09	1.93E-10
Pb212	2.14E-09	1.93E-10
Bi212	2.14E-09	1.93E-10
Po212	1.37E-09	1.24E-10
Tl208	7.70E-10	6.95E-11

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APPENDIX F

GAMMA RADIATION CALCULATION DOSE FOR THE YEAR 2007

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CALCULATION SHEET

CALC. NO.: 102682-0307-004 REV.: 0
 ORIGINATOR: M. Ciminera DATE: 5/22/08 CHECKED: J. McLaughlin DATE: 5/23/08
 PROJECT: FUSRAP Maywood Superfund Site JOB NO.: 102682-03070000 SHEET: 3 of 6
 SUBJECT: MISS 2007 Hypothetical Maximum Gamma Radiation Dose

PURPOSE

This calculation estimates the dose to the hypothetical maximally exposed individual (resident and worker) from direct gamma radiation at the Maywood Interim Storage Site (MISS) in 2007.

SCOPE

This calculation models the site fence line as a line source to determine the dose to a hypothetical individual at a postulated distance from the fence line.

REFERENCE

Cember, H., 1989. Introduction to Health Physics, Pergamon Press, Elmford, NY.

ASSUMPTION

The dose rate to a given distance from the site fence line can be approximated by a dose rate at a distance from a line source. The line source dose rate is represented by the average of the Tissue Equivalent Thermoluminescent Dosimeter (TETLD) results from locations on the fence line facing the individual. The length of the line source is represented by the length of the fence line facing the individual. The dose rate calculation for gamma radiation is based on the assumption that a resident with 100% occupancy and a worker with 27% occupancy are located 50 feet from the maximum measured source (location 21). This is a conservative approach since the nearest receptor is located over 200 feet from location 21.

TETLD results are corrected for time, fade, housing attenuation, and background. The exposure time starts with the date of installation at the site and ends with the date of removal from the site. The fade factor is approximately one indicating that fade is not a major factor for the radiation levels measured on FUSRAP. The housing attenuation factor is estimated to be 1.075. Background is estimated as the average of the offsite TETLD results.

CALCULATIONS

The TETLD results shown in the attached table are converted to gamma radiation dose rates (d) using the following equation:

$$d = (mrem / yr) = \left(TETLDresult \cdot \frac{number\ of\ days\ per\ year}{number\ of\ days\ exposed} \cdot fade \cdot attenuation \right) - background$$

CALCULATION SHEET

CALC. NO.: 102682-0307-004 REV.: 0
 ORIGINATOR: M. Ciminera DATE: 5/22/08 CHECKED: J. McLaughlin DATE: 5/23/08
 PROJECT: FUSRAP Maywood Superfund Site JOB NO.: 102682-03070000 SHEET: 4 of 6
 SUBJECT: MISS 2007 Hypothetical Maximum Gamma Radiation Dose

The average of the dose rates at the TETLD location on the west side of the site as shown in the attached figures (i.e., location 21) is:

$$d_1 = \frac{599.6 + 610 + 580.5 + 580.5}{4} \text{ mrem / yr} = 592.7 \text{ mrem / yr}$$

The dose rate at any distance from a line source (Cember 1989) is:

$$\frac{d_2}{d_1} = \frac{h_1}{h_2} \frac{\tan^{-1} \frac{l}{h_2}}{\tan^{-1} \frac{l}{h_1}}$$

Where:

- h_1 = distance of the TETLDs from the fence line (3 ft)
- h_2 = distance of the individual from the fence line (50 ft)
- l = half the length of the line source (133 ft)
- d_1 = dose rate at the TETLDs location (592.7 mrem/yr.)
- d_2 = dose rate at the individual's location

Substituting known values into the equation and solving for the dose rate at the resident's location (d_2) assuming 100% occupancy is:

$$d_2 = 592.7 \text{ mrem / yr} \frac{3}{50} \frac{\tan^{-1} \frac{133}{50}}{\tan^{-1} \frac{133}{3}} = 27.82 \text{ mrem / yr}$$

Multiplying the dose rate by the time the worker occupied the location during 2007, the dose (D) is:

$$D_{\text{worker}} = 27.82 \text{ mrem / yr} \bullet 27\% \bullet 1 \text{ yr} = 7.51 \text{ mrem}$$

SUMMARY OF RESULTS

The calculated doses to the hypothetical maximally exposed resident and worker from direct gamma radiation at MISS in 2007 are 27.82 mrem/yr and 7.51 mrem/yr, respectively.

CALCULATION SHEET

CALC. NO.: 102682-0307-004 REV.: 0
 ORIGINATOR: M. Ciminera DATE: 5/22/08 CHECKED: J. McLaughlin DATE: 5/23/08
 PROJECT: FUSRAP Maywood Superfund Site JOB NO.: 102682-03070000 SHEET: 5 of 6
 SUBJECT: MISS 2007 Hypothetical Maximum Gamma Radiation Dose

TABLE 2
2007 External Gamma Radiation Dose Rates
Maywood Interim Storage Site

2/1/2007 to 8/1/2007 TETLD ^a			2/1/2007 to 1/30/2008 TETLD ^a		
Monitoring Location ^b	Readings (mrem)	Corrected ^c (mrem/yr)	Monitoring Location ^b	Readings (mrem)	Corrected ^c (mrem/yr)
MISS Perimeter					
4	61.0 60.0	69.4 68.5	4	114 113	59.5 58.4
5	70.0 72.0	89.3 93.2	5	130 140	76.7 87.6
10	100.0 100.0	153.9 153.9	10	198 198	150.2 150.2
12	51.0 50.0	48.6 46.0	12	97 102	41.1 46.5
20	38.0 41.0	20.8 26.0	20	71 69	13.0 10.8
21	305.0 310.0	599.6 610.0	21	596 596	580.5 580.5
22	60.0 60.0	68.9 68.5	22	108 109	53.0 54.0
23	71.0 67.0	91.9 84.1	23	131 123	77.8 69.2
24	155.0 158.0	274.4 280.9	24	286 287	245.4 246.5
25	281.0 289.0	546.3 564.9	25	532 526	511.3 504.8
30	43.0 42.0	31.7 28.6	30	78 75	20.5 17.3
31	65.0 65.0	78.0 78.0	31	122 124	68.1 70.3
32	27.0 26.0	0.0 0.0	32	54 52	0.0 0.0
33	29.0 29.0	0.4 0.0	33	60 59	1.1 0.0
Background	28.0	Avg. Background	Background	60	Avg. Background
19	29.0	62.0	19	58	63.8

^a TETLD = Tissue-equivalent thermoluminescent dosimeter. There are two TETLDs per station.

^b Monitoring locations are shown on Figure D-2.

^c TETLD readings are corrected for shelter/absorption factor (s/a = 1.075) and are normalized to exactly one year's exposure. The average corrected background is then subtracted from all other corrected readings.

CALCULATION SHEET

CALC. NO.: <u>102682-0307-004</u>		REV.: <u>0</u>
ORIGINATOR: <u>M. Ciminera</u>	DATE: <u>5/22/08</u>	CHECKED: <u>J. McLaughlin</u> DATE: <u>5/23/08</u>
PROJECT: <u>FUSRAP Maywood Superfund Site</u>		JOB NO.: <u>102682-03070000</u> SHEET: <u>6 of 6</u>
SUBJECT: <u>MISS 2007 Hypothetical Maximum Gamma Radiation Dose</u>		

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APPENDIX G

QUALITY CONTROL SUMMARY REPORT FOR THE YEAR 2007

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**QUALITY CONTROL SUMMARY REPORT FOR THE
ANNUAL ENVIRONMENTAL MONITORING REPORT, 2007**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

**SITE-SPECIFIC ENVIRONMENTAL RESTORATION
CONTRACT NO. DACW41-99-D-9001
TASK ORDER 0003
WAD 03, WBS 07**

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:

Shaw Environmental, Inc.
100 West Hunter Avenue
Maywood, New Jersey 07607

June 2008
Revision 0

Issued to: _____

Date: _____

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**QUALITY CONTROL SUMMARY REPORT FOR THE
ANNUAL ENVIRONMENTAL MONITORING REPORT, 2007**

**FUSRAP MAYWOOD SUPERFUND SITE
MAYWOOD, NEW JERSEY**

SITE-SPECIFIC ENVIRONMENTAL RESTORATION

CONTRACT NO. DACW41-99-D-9001

TASK ORDER 0003

WAD 03, WBS 07

Submitted to:

Department of the Army
U.S. Army Engineer District, New York
Corps of Engineers
FUSRAP Project Office
26 Federal Plaza
New York, New York 10278

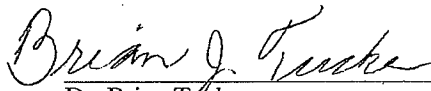
Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106

Submitted by:

Shaw Environmental, Inc.
100 West Hunter Avenue
Maywood, New Jersey 07607

June 2008
Revision 0

Prepared by:


Dr. Brian Tucker
Project Chemist

Date:

6/23/08

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ABBREVIATIONS AND ACRONYMS

aq	aqueous
°C	Degrees Celsius
CCAL	continuing calibration
CCC	calibration check compound
CDQMP	Chemical Data Quality Management Plan
COC	chain-of-custody
CRI	reporting limit check standard
%D	percent difference
DOE	U.S. Department of Energy
DUP	duplicate
EPA	U.S. Environmental Protection Agency
FMSS	FUSRAP Maywood Superfund Site
FUSRAP	Formerly Utilized Sites Remedial Action Program
ICP	inductively-coupled plasma
ICSAB	Interference check standard containing both interfering elements (Al, Ca, Mg, and Fe) and target elements
ID	identification
IDL	instrument detection limit
J	estimated value
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MDA	minimum detectable activity
MDC	minimum detectable concentration
MDL	minimum detection limit
MISS	Maywood Interim Storage Site
MS	matrix spike
MSD	matrix spike duplicate
NAD	normalized absolute difference
NAS	National Academy of Sciences
ND	non-detect
PCE	tetrachloroethene
pCi/L	picocuries per liter
PQL	practical quantitation limit
QAPP	Quality Assurance Project Plan
QC	quality control
QCSR	Quality Control Summary Report
R	rejected data
%R	percent recovery
Ra-226	radium-226
Ra-228	radium-228
ROC	radionuclide of concern
ROI	radionuclides of interest
RPD	relative percent difference
%RSD	percent relative standard deviation
RRF	relative response factor

SDG	sample delivery group
SEC	Safety and Ecology Corporation
Shaw	Shaw Environmental, Inc.
SPCC	system performance check compounds
STL	Severn Trent Laboratories, Inc.
TAL	target analyte list
TCE	trichlorethene
TDS	total dissolved solids
Th-228	thorium-228
Th-230	thorium-230
Th-232	thorium-232
U	undetected
U-234	uranium-234
U-235	uranium-235
U-238	uranium-238
UJ	estimated non-detect
USACE	U.S. Army Corps of Engineers
VOA	volatile organics analysis
VOC	volatile organic compound

1.0 INTRODUCTION

Shaw Environmental, Inc. (Shaw) conducted environmental monitoring of the groundwater, surface water, and sediment for year 2007 during May of 2007.

This *Quality Control Summary Report (QCSR) for the Annual Environmental Monitoring Report for the Year 2007* addresses data collected from analysis of groundwater, surface water, and sediment samples collected between May 2 and May 24, 2007. The samples were tested for radium-226 (Ra-226), radium-228 (Ra-228), thorium-228 (Th-228), thorium-230 (Th-230), thorium-232 (Th-232), uranium-234 (U-234), uranium-235 (U-235) and uranium-238 (U-238), gross alpha, gross beta, target analyte list (TAL) metals, boron, lithium, and thallium, and volatile organic compounds (VOC). This QCSR will only discuss deviations in quality control (QC) criteria for these Formerly Utilized Sites Remedial Action Program (FUSRAP) Maywood Superfund Site (FMSS) parameters. A project QCSR will be prepared at the conclusion of the project. This QCSR for the 2007 Environmental Monitoring Program will support preparation of the project QCSR.

The QCSR for the 2007 Environmental Monitoring Program is organized into seven sections as follows:

- Section 1.0, Introduction
- Section 2.0, Data Collection
- Section 3.0, Data Analysis and Validation
- Section 4.0, Data Summaries
- Section 5.0, System Audits
- Section 6.0, Analytical and Quality Assurance / Quality Control Problems Encountered at Laboratories
- Section 7.0, References

2.0 DATA COLLECTION

Environmental monitoring data collection procedures were evaluated for any deviations or modifications that may have occurred in the areas of sample handling and custody, equipment calibration and maintenance, and analytical methods. Within this report, the terms batch, package, and Sample Delivery Group (SDG) are synonymous. A SDG is a data report that contains the various test results of one or more sample batches plus associated QC data such as calibrations, blank and matrix spike results, blanks, etc.

The following sample collection anomalies are noted:

- For sediment sample SWSD004, there was no sediment to collect.
- For groundwater sample location MISS01B - an obstruction in the well prevented sampling below the top of well screen.

2.1 SAMPLE HANDLING AND CUSTODY

There were no sample handling discrepancies noted by the off-site chemical laboratory. All chains of custody (COCs) received by the off-site laboratory were properly signed and dated.

All samples were received in good condition. Custody seals were present on all sample coolers shipped to the offsite laboratory.

The following sample handling and custody concerns are noted for offsite laboratory chemical data packages.

- For package 705024, the laboratory incorrectly labeled sample 22a-025187 as 23a-025187, 22a-025196 as 23a-025196 and 22a-025198 as 23a-025198. Shaw Group and GPL were notified of this error on 06/15/2007 and 06/18/2007. The correct IDs are 22a-025187, 22a-025196 and 23a-025198. The sample IDs have been corrected on the EDD by Kestrel.
- For package 705024, sample 22a-025196 is reported with a % moisture of 79.3%. The lab prepped 1.7 grams resulting in a solid sample mass of 0.35 grams. All results were therefore qualified estimated J due to the possibility of non-representativeness.

Custody seals were not provided on samples provided to the onsite laboratory since they were hand-delivered to the laboratory on the sampling date. All onsite laboratory COCs were properly signed and dated, and all indicate that aqueous (aq) sample pHs were less than 2. For SDG 07G-0189, etc., the laboratory noted in the sample preparation section that all samples associated with STF 07-5018, including field samples 12B-025139, 12B-025139 LREP, 12B-025173, 12B-025205, 12B-025146, 12B-025175, 12B-025148, 12B-025150, 12B-025151 and 12B-025177, were filtered through 0.45 micron filters prior to preparation for thorium isotope analyses. This was not noted in the case narrative. These sample IDs were tagged with a F (filtered) on the EDD by the data validator. For the offsite split sample laboratory, the COC for sample 22a-025189 failed to include GA and GB analyses.

2.2 EQUIPMENT CALIBRATION AND MAINTENANCE

2.2.1 Field Instrument Measurement and Calibration

Field measurements were made for dissolved oxygen, Eh, turbidity, temperature, specific conductivity, and pH in the 27 groundwater and 11 surface water samples. There were no discrepancies observed in the area of field equipment calibration and measurement for the 2007 Environmental Monitoring Program except for the two noted in the two bullets of Section 2.0 of this QCSR describing the sample collection difficulties.

2.2.2 Off-Site Laboratory – Chemical Analysis

For chemical analysis, only data packages for which quality control problems were identified are discussed below. For VOC, all system performance check compound (SPCC) and calibration check compound (CCC) results are within the method acceptance criteria for initial and continuing calibrations. For thallium analyses, all initial and continuing calibration inductively-coupled plasma (ICP)-MS results were within acceptance criteria.

Data Package 705014 (elements only)

All initial and continuing calibration acceptance criteria were met for ICP, ICP-MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80-120%.

Data Package 705024 (elements only)

For elements in SDG 705024, all initial and continuing calibration acceptance criteria were met for ICP, ICP-MS, and mercury analyses. The laboratory analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80-120%.

Data Package 705036

For VOAs, the following table summarizes percent relative standard deviation (% RSD) that exceed 15% for initial calibrations and lists the affected samples. It is recommended to estimate all results for these compounds (J positive, UJ non-detects) in the affected samples.

Date of ICAL	Matrix	Compound	% RSD	RRF	Samples Affected
05/14/07	Aq	Chloromethane	20.8	0.304	BLK98318, BKS98318, 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154, 12b-025156 TB
		Vinyl Chloride	20.7	0.273	
		Bromomethane	17.9	0.109	
		Methylene Chloride	20.5	0.208	
		Acetone	49.4	0.033	
		Tert-butyl methyl ether	52.3	0.166	
		Carbon tetrachloride	38.8	0.189	
		cis-1,3-Dichloropropene	15.1	0.298	
		1,1,2-Trichloroethane	99.2	0.046	
		4-Methyl-2-pentanone	33.4	0.215	

		2-Hexanone	39.5	0.177	
		Ethylbenzene	15.2	6.747	
		Styrene	16.9	3.320	
		Bromoform	17.2	0.240	

The acetone and 1,1,2-trichloroethane results are reported as rejected (R). The mean relative response factors are less than 0.050. The LCS results for these compounds confirm analytical problems.

The chloromethane, vinyl chloride, tert-butyl-methyl ether, cis-1,3-dichloropropene, 4-methyl-2-pentanone, 2-hexanone, ethylbenzene, bromoform and styrene results for 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154 and 12b-025156 TB are reported as non-detected estimated (UJ). The initial calibration % RSDs exceed 15%. Bromomethane and carbon tetrachloride results are reported as rejected (R) due to low continuing calibration RRFs.

Based upon the initial calibration % RSD and 12b-025156 TB results, the methylene chloride results for 20a-025136, 12b-025155 EB and 20a-025154 are reported as non-detected estimated (UJ) at the reported concentration. The methylene chloride result for 12b-025156 TB is reported as estimated (J) and the methylene chloride result for 20a-025135 is reported as non-detected estimated (UJ).

For the 5/18/07 continuing calibration, there were several compounds for which the percent difference (%D) between the initial calibration mean response factor and the continuing calibration response factor is greater than 20%. All SPCC results and CCC results were within method acceptance criteria, except for vinyl chloride and 1,1-dichloroethene. The only data qualifications in addition to those noted above for the initial calibration are non-detected estimated (UJ) for 1,1-dichloroethene, 1,1,1-trichloroethane, dibromochloromethane in samples 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154 and 12b-025156 TB.

For elements in SDG 705036, all initial and continuing calibration acceptance criteria were met. The laboratory analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80-120%.

Data Package 705048

For VOC, fifteen and two compounds exceeded 15% RSD in the 5/21/07 and 5/25/07 initial calibrations, respectively. The chloromethane and 1,1,2-trichloroethane results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB are qualified rejected (R) due to %RSD exceedances, LCS recoveries below laboratory acceptance criteria, and the fact that their sample results are non-detects. No corrective actions were taken. The bromomethane, acetone, carbon tetrachloride and 1,1,2-trichloroethane results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB are also qualified rejected (R) because the mean relative response factors are less than 0.050.

The 1,1,1-trichloroethane, bromodichloromethane, cis-1,3-dichloropropene, 2-hexanone, dibromochloromethane, total xylenes, styrene and bromoform results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB are reported as non-detected estimated (UJ) due to initial calibration % RSDs greater than 15%. Similarly, the tetrachloroethylene results for 20a-025133, 20a-025134 and 20a-025152 are reported as estimated (J) and the tetrachloroethylene results for 12b-025158 TB and 12b-025157 EB are reported as non-detected estimated (UJ) due to initial calibration % RSDs greater than 15%. The tetrachloroethylene results for 20a-025133 DL and 20A-025152 DL are qualified estimated (J) since the initial calibration % RSD is greater than 15%.

For the 5/21/07 and 6/10/07 continuing calibrations, six and one % Ds, respectively, exceed the QC limit of 20% and/or have RRF values < 0.05. Therefore, the following qualifications have been made:

- The 2-hexanone results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB are qualified non-detected estimated (UJ).
- The bromomethane results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB, and the acetone, tert-butyl methyl ether, carbon tetrachloride and 1,1,2-trichloroethane results for 20a-025133, 20a-025134, 12b-025157 EB, 20a-025152 and 12b-025158 TB are qualified rejected (R) because the initial calibration mean relative response factor is less than 0.050.
- The tetrachloroethylene result for 20a-025133 DL is qualified estimated (J).

For elements, all initial and continuing calibration acceptance criteria were met. The laboratory also analyzed a reporting limit check standard (CRI) and all CRI recoveries were between 80-120%.

Data Package 705061

For VOC, fifteen analytes had %RSD > 15 and/or RRF values < 0.05 in the 5/22/07 initial calibration. In the 5/30/07 initial calibration, there were no exceedances, however, only tetrachloroethylene, trichloroethene and cis-1,2-dichloroethene results were evaluated for the 5/30/07 calibration. The qualifications made due to the 5/22 calibration exceedances are as follows:

- All acetone, tert-butyl methyl ether, bromoform and bromomethane results for samples 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are qualified rejected (R) based upon the non-compliant initial calibration and LCS results.
- The carbon tetrachloride and 1,1,2-trichloroethane results for 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are already qualified rejected (R) due to low (<0.05) initial calibration relative response factors (RRF).
- Due to high initial calibration %RSD values, the chloromethane, bromodichloromethane, cis-1,3-dichloropropene, 2-hexanone, total xylenes, 1,1,1-trichloroethane, dibromochloromethane, and styrene results for 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are qualified non-detected estimated (UJ), the tetrachloroethene results for 19a-025131 and 19a-025132 are qualified estimated (J) and the tetrachloroethene results for 12b-025159 and 12b-025160 are reported as non-detected estimated (UJ).

In the 5/23/07 continuing calibration, twelve analytes had %D > 20 and/or RRF values < 0.05. In the 5/31/07 continuing calibration, there were no exceedances, however, only tetrachloroethylene, trichloroethene and cis-1,2-dichloroethene results were evaluated. The qualifications made due to the 5/23 calibration exceedances are as follows:

- All acetone, tert-butyl methyl ether, bromoform and bromomethane results for samples 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are qualified rejected (R) due to extremely high %D values (all approximately 100%), extremely low RRF values (all approximately 0.00) and non-compliant LCS results.
- The carbon tetrachloride and 1,1,2-trichloroethane results for 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are already qualified rejected (R) since the initial calibration relative response factors (RRF) are less than 0.050. In addition, the %Ds are high for both compounds, and the RRF for carbon tetrachloride is 0.007 in the continuing calibration.

For the remaining compounds with continuing calibration exceedances, there are no qualifications in addition to those noted in the third bullet under the initial calibration discussion above.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, cyanide, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705077

For VOC, there are fifteen compounds with %RSD > 15% in the 5/21/07 initial calibration. In addition, the RRFs for bromomethane, acetone, carbon tetrachloride and 1,1,2-trichloroethane RRFs are less than 0.05, so the results for 12a-025128, 12a-025129, 12b-025161 EB and 12b-025162 TB are reported as rejected (R). Due to high %RSD values, the chloromethane, 1,1,1-trichloroethane, bromodichloromethane, cis-1,3-dichloropropene, 2-hexanone, tetrachloroethylene, dibromochloromethane, total xylenes, styrene and bromoform results for 12a-025128, 12a-025129, 12b-025161 EB and 12b-025162 TB are reported as non-detected estimated (UJ).

For the VOC 5/23/07 continuing calibration, seven compounds had %Ds >20%, and one of the seven, tert-butyl methyl ether, had a RRF <0.05 (0.04). In addition, acetone has a RRF of 0.008. Due to the low RRF values, the acetone and tert-butyl methyl ether results for samples 12a-025128, 12a-025129, 12b-025161 EB and 12b-025162 TB are reported as rejected (R). Two other compounds among the seven, bromomethane and 1,1,2-trichloroethane are already rejected due to low initial calibration RRF values. For the remaining compounds, the 2-hexanone, tetrachloroethylene, bromoform and 1,1,2,2-tetrachloroethane results for 12b-025128, 12a-025129, 12b-025161 EB and 12b-025162 TB are reported as non-detected estimated (UJ).

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705089

For volatiles, the chloromethane, vinyl chloride and 1,1,2,2-tetrachloroethane 5/10/07 initial calibration results yielded %RSD > 15%. Thus, the results for these compounds are qualified non-detected estimated (UJ) for samples 10a-025141, 12b-025163 EB, 12b-025164 TB, 10a-025140, 12b-025163 EB RE, 10a-025141 RE and 12b-025164 TB RE. The laboratory reporting limit may be unrealistically low.

In the continuing calibration, the chloromethane, chloroethane, 1,1-dichloroethene and carbon disulfide results exceeded 20% difference for the 5/21/07 continuing calibration. Thus these compounds are qualified non-detected estimated (UJ) in samples 10a-025141, 12b-025163 EB and 12b-025164 TB. In the 5/23/07 continuing calibration, the chloromethane, tert-butyl methyl ether, acetone and carbon disulfide results have a %D greater than 20. Thus, the chloromethane, tert-butyl methyl ether and carbon disulfide results for 10a-025140 and 12b-025163 EB RE are reported as non-detected estimated (UJ). The acetone result for 10a-025140 is reported as non-detected estimated (UJ) at the reported concentration and the acetone result for 12b-025163 EB RE is reported as estimated (J) due to the 5/23 CCAL results. For the 5/29/07 continuing calibration, the bromomethane, acetone and 2-butanone results have a %D greater than 20. Thus these compounds are qualified non-detected estimated (UJ) for samples 10a-025141 RE and 12b-025164 TB RE. These samples were also analyzed one day beyond the analytical holding time.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705097

For the VOC 5/21/07 initial calibration, fifteen compounds exceeded a RSD of 15%. In addition, the bromomethane, acetone, carbon tetrachloride and 1,1,2-trichloroethane results had mean relative response factors less than 0.050. Thus the results for these four compounds in samples 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153 and 12b-025166 TB are qualified rejected (R). The chloromethane, 1,1,1-trichloroethane, bromodichloromethane, cis-1,3-dichloropropene, 2-hexanone, tetrachloroethylene, dibromochloromethane, total xylenes and styrene results for 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153, 12b-025166 TB are reported as non-detected estimated (UJ) due to high %RSD values.

In the 5/23/07 continuing calibration, all SPCC results and CCC results were within method acceptance criteria except bromoform. Twelve compounds had %D values > 15%. Of these twelve, five (bromomethane, acetone, tert-butyl methyl ether, carbon tetrachloride and bromoform) also have RRFs < 0.05. Therefore, the results for these five compounds in samples 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153, 12b-025166 TB are qualified rejected (R). Due to high %D values, the 1,1,1-trichloroethane, bromodichloromethane, cis-1,3-dichloropropene, 2-hexanone, tetrachloroethene and dibromochloromethane results for 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153, 12b-025166 TB are qualified non-detected estimated (UJ). The 1,1,2-trichloroethane results has already been qualified rejected (R), based upon the initial calibration mean RRF.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705118

For the VOC 5/25/07 initial calibration, seven compounds exceeded the QC acceptance limit of 15% for RSD. In addition, the acetone RRF is 0.025, less than the minimum required value of 0.05. Thus, the acetone results are qualified rejected, R, in all SDG 705118 samples. Due to the high %RSD values in the initial calibration, the bromomethane, methylene chloride, 1,2-dichloroethane, 2-hexanone and bromoform results are qualified non-detected estimated (UJ) in all samples, except for the methylene chloride result for sample 12b-025167 EB, which is qualified estimated (J). Finally, the tetrachloroethylene results for 12b-025142, 12b-025167 EB and 12b-025168 TB are reported as non-detected estimated (UJ) and as estimated (J) for 12b-025143 and 12b-025143 DL as estimated (J).

For the 5/29/07 continuing calibration, all SPCC results and CCC results were within method acceptance criteria. The %D values exceeded 20% for bromomethane and chloromethane. Thus, the bromomethane and chloromethane results for samples 12b-025142, 12b-025143, 12b-025167 EB and 12b-025168 TB are reported as non-detected estimated (UJ). The acetone RRF in the 5/29/07 CCAL is <0.05 (0.02). Acetone results are already rejected due to poor initial calibration results.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705120

For the VOC 5/25/07 initial calibration, seven compounds exceeded the QC acceptance limit of 15% for RSD. In addition, the acetone RRF is 0.025, less than the minimum required value of 0.05. Thus, the acetone results are qualified rejected, R, in all SDG 705120 samples. Due to the high %RSD values in the initial calibration, the bromomethane, 1,2-dichloroethane, 2-hexanone and bromoform results for 12b-025144, 12b-025145, 12b-025169 EB and 12b-025170 TB are reported as non-detected estimated (UJ). The methylene chloride results for 12b-025145, 12b-025169 EB and 12b-025170 TB are reported as non-detected estimated (UJ). The methylene chloride result for 12b-025144 is reported as estimated (J). The tetrachloroethylene results for 12b-025144 and 12b-025145 are reported as non-detected estimated (UJ) and the tetrachloroethylene results for 12b-025171 TB and 12b-025169 EB are reported as estimated (J).

For the VOC 5/25/07 continuing calibration, the bromomethane and chloromethane RRF values were greater than 20% different than the initial calibration RRF. Thus the results for bromomethane and chloromethane in samples 12b-025144, 12b-025145, 12b-025169 EB and 12b-025170 TB are qualified non-detected estimated (UJ). The acetone RRF is 0.02 in the 5/25/07 CCAL. Acetone results are already rejected due to low RRF values in the initial calibration.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705141

For the VOC 5/25/07 initial calibration, seven compounds exceeded the QC acceptance limit of 15% for %RSD. In addition, the acetone RRF is 0.025, less than the minimum required value of 0.05. Thus, the acetone results are qualified rejected, R, in all SDG 705141 samples. Due to the high %RSD values in the initial calibration, the bromomethane, 1,2-dichloroethane, 2-hexanone and bromoform results for 12b-025148, 12b-025149, 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ); the tetrachloroethylene results for 12b-025148, 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ), and the tetrachloroethylene result for 12b-025149 is reported as estimated (J); and the methylene chloride results for 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ), and the methylene chloride results for 12b-025148 and 12b-025149 are reported as non-detected estimated (UJ) at the reported concentrations. The initial calibration % RSD exceeds 15% and the methylene chloride results are less than the blank action concentration.

For the 6/2/07 CCAL, nine compounds had %D values greater than 20%, and one compound had a RRF < 0.05. The acetone results are already qualified rejected in all samples due to low RRF values in the initial calibration. Based upon the continuing calibration results, the bromomethane, chloromethane, carbon disulfide, carbon tetrachloride, 2-butanone, 2-hexanone and bromoform results for 12b-025148, 12b-025149, 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ); the tetrachloroethylene results for 12b-025148, 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ) and the tetrachloroethylene result for 12b-025149 is reported as estimated (J); and the methylene chloride results for 12b-025171 EB and 12b-025172 TB are reported as estimated (J) and the methylene chloride results for 12b-025148 and 12b-025149 are reported as non-detected estimated (UJ).

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705151

For the VOC 5/25/07 initial calibration, seven compounds exceeded the QC acceptance limit of 15% for %RSD. In addition, the acetone RRF is 0.025, less than the minimum required value of 0.05. Thus, the acetone results are qualified rejected, R, in all SDG 705151 samples. Due to the high %RSD values in the initial calibration, the bromomethane, 1,2-dichloroethane, 2-hexanone, tetrachloroethylene and bromoform results for 12b-025138, 12b-025139, 12b-025205, 12b-025173 EB and 12b-025174 TB are reported as non-detected estimated (UJ), and the methylene chloride result for 12b-025173 EB and 12b-025174 TB are qualified as estimated (J). The methylene chloride results for 12b-025138, 12b-025139 and 12b-025205 are qualified as non-detected estimated (UJ) at the reported concentrations since the initial calibration % RSD exceeds 15% and the results are less than the blank action concentration.

For the 6/2/07 CCAL, nine compounds had %D values greater than 20%, and one compound had a RRF < 0.05. The acetone results are already qualified rejected in all samples due to low RRF values in the initial calibration. Based upon the continuing calibration results, the chloromethane, bromomethane, carbon disulfide, carbon tetrachloride, 2-butanone, 2-hexanone, tetrachloroethylene and bromoform results for 12b-025138, 12b-025139, 12b-025205, 12b-025173 EB and 12b-025174 TB are reported as non-detected estimated (UJ), and the methylene chloride result for 12b-025173 EB and 12b-025174 TB are qualified as estimated (J). The methylene chloride results for 12b-025138, 12b-025139 and 12b-025205 are qualified as non-detected estimated (UJ) at the reported concentrations because the continuing calibration % D exceeds 20% and the results are less than the blank action concentration.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%) except thallium, which was 520% for the 0.4 ug/L low level standard. All thallium results were ultimately qualified as non-detected and are not qualified due to the potential for high bias indicated by the low level standard.

Data Package 705160

For the VOC 5/25/07 initial calibration, seven compounds exceeded the QC acceptance limit of 15% for %RSD. In addition, the acetone RRF is 0.025, less than the minimum required value of 0.05. Thus, the acetone results are qualified rejected, R, in all SDG 705160 samples. Due to the high %RSD values in the initial calibration, results for bromomethane, 1,2-dichloroethane, 2-hexanone, tetrachloroethylene and bromoform in samples 12b-025146, 12b-025147, 12b-025175 EB and 12b-025176 TB are qualified non-detected estimated (UJ). For the same reason, the methylene chloride results for 12b-025146, 12b-025147 and 12b-025176 TB are qualified as non-detected estimated (UJ) and the methylene chloride result for 12b-025175 EB is qualified as estimated J.

For the 6/4/07 continuing calibration, nine parameters exceeded the %D limit of 20%. One of these parameters, acetone, also had a RRF of <0.05 (0.019). All acetone results have already been rejected due to low RRF values in the initial calibration. Due to high %D values, the chloromethane, carbon disulfide, carbon tetrachloride, 2-butanone, 1,2-dichloroethane, 2-hexanone and bromoform results for 12b-025146, 12b-025147, 12b-025175 EB and 12b-025176 TB are reported as non-detected estimated (UJ). For the same reason, the methylene chloride results are qualified in the same manner as noted for the initial calibration.

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

Data Package 705167

For the 6/07/06 VOC initial calibration, acetone, methylene chloride, chloromethane and 2-hexanone exceeded the limit of 15% RSD. Based upon the initial calibration results, the chloromethane and 2-hexanone results for 12b-025150, 12b-025151, 12b-025177 EB and 12b-025178 TB are reported as non-detected estimated (UJ); the methylene chloride results for 12b-025151 and 12b-025178 TB are qualified as non-detected estimated (UJ); and the methylene chloride result for 12b-025177 EB is qualified as estimated (J). The methylene chloride result for 12b-025150 is qualified as non-detected estimated (UJ) at the reported concentrations because the initial calibration % RSD exceeds 15% and the result is less than the blank action concentration. Acetone is qualified rejected in all samples due to the CCAL RRF value.

For the 6/8/07 continuing calibrations, acetone has a %D of 37.5%, and a RRF of 0.04. As a result of these exceedances, all acetone results are qualified rejected (R).

For elements, all initial and continuing calibration results were within acceptance criteria. Initial calibration verification results were submitted for ICP, ICP/MS, and mercury analyses. The laboratory also analyzed a reporting limit check standard (CRI). All CRI recoveries were between 80 and 120% (lab limits are 50-150%).

2.2.3 On-Site Laboratory – Radiological Analysis

For radiological analyses, all criteria were met for initial and continuing instrument calibrations.

2.3 ANALYTICAL METHODS

A total of two laboratories were employed, one for radiological analysis and one for chemical analysis.

For radiological analysis, the USACE FUSRAP Maywood Laboratory (UFML, or the onsite laboratory) operated by Safety and Ecology Corporation (SEC), a Subcontractor to Shaw, analyzed routine air filter samples for the radionuclides of concern (ROCs) using a Protean liquid scintillation counter and all groundwater and surface water using alpha spectroscopy and gas proportional counting. UFML analyzed sediments using gamma spectroscopy. They analyzed the groundwater and surface water samples using US EPA Method 903.0 modified for Ra-226, US EPA Method 904.0 modified for Ra-228, isotopic uranium by Alpha Spectroscopy, SM-7500-U, isotopic thorium by HASL-300, and gross alpha/gross beta results by US EPA Method 900.0 Modified and Gross Alpha by GFPC, SM 7100C.

Sediment samples were analyzed for Pb-214 (Ra-226), Ac-228 (Th-232), and Th-234 (U-238) by employing the following methodologies:

- *ASTM C1402-98: Standard for High-Resolution Gamma-Ray Spectrometry for Soil Samples* (ASTM 1998)
- *ANSI N42.14-99; Calibration and Use of Germanium Spectrometers for the Measurement of Gamma-Ray Emissions Rates of Radionuclides* (ANSI, 1999)
- *EPA 600 4-80-032: Prescribed Methods for the Measurement of Radioactivity in Drinking Water, Method 901.1, Gamma Emitting Radionuclide* (EPA 1980)
- *HASL-300, 28th Ed., Feb. 1997, US DOE Environmental Measurements Laboratory, Method Ga-01-R, Gamma Radioassay* (DOE 1997)

The off-site chemical laboratory, GPL in Frederick, MD, analyzed all environmental monitoring samples for all chemical parameters. GPL analyzed the samples using EPA Methods 5030 and 8260B for volatiles and 3010/6010B for metals (7470A/7471A for mercury and 6020A for lithium and thallium) from SW-846 (EPA, 1997). The offsite laboratory was provided with regulatory action levels for the parameters of interest. For the 2007 campaign, the laboratory was instructed to use the low level VOC test method (25 ml purge) procedure, to reduce the MDL for all parameters to below regulatory action levels.

However, for SDG 705089 the lab mistakenly employed the standard 8260B method using a 5 ml purge so that the MDL for five of the VOC parameters was higher than the action level. The five compounds are benzene, carbon tetrachloride, trichloroethene (TCE), tetrachloroethene (PCE), and 1,1-dichloroethene. Historically, benzene, TCE, PCE, and 1,1-dichloroethene have been detected in several Maywood environmental monitoring wells. These four compounds were detected at several locations in 2005 and 2006 at levels between the MDL and two to three orders of magnitude above the MDL. Carbon tetrachloride has historically not been detected in any well. However, with the exception of well B38W24D, the wells that historically have detected levels of these compounds were not among the wells from which samples from 705089 were collected. For well B38W24D, false negative results are possible. Low level contamination, less than one to two parts-per-billion (ppb) may go undetected. There were no deviations or modifications in analytical methods from those specified in the *Annual Environmental Monitoring Report, 2007* (U.S. Army Corps of Engineers [USACE] 2008).

2.4 MODIFICATIONS TO THE WORK PLAN

There were no modifications to the radiation measurement techniques described in the *Annual Environmental Monitoring Report, 2007* (USACE 2008).

3.0 DATA ANALYSIS AND VALIDATION

Kestrel Environmental Technologies, Inc. performed data evaluation of chemical and radiological data. They evaluated 100% of the off-site laboratory sample results and all of the onsite results except for air filters. Data was evaluated using the USACE's *Kansas City and St. Louis District Radionuclide Data Evaluation Guidance for Alpha and Gamma Spectroscopy Modified for the Maywood Project* (USACE 2003a) and *CENWK-EC-EF Data Quality Evaluation Guidance* (USACE 1999), as presented in Appendix F of the *Chemical Data Quality Management Plan (CDQMP) Quality Assurance Project Plan (QAPP)* (USACE 2003b). Treatment of outliers was performed in accordance with Section 3.1.3 of the CDQMP QAPP.

4.0 DATA SUMMARIES

Data summaries for the off-site laboratories' radiological and chemical data can be found in several tables within the *Annual Environmental Monitoring Report for the Year 2007* (USACE 2008).

5.0 SYSTEM AUDITS

Shaw audited the off-site laboratory utilized for testing of samples, GPL, in October 2005, and UFML in June 2000, December 2002, December 2003, December 2005, and October 2007. All of the UFML audit findings (except for December 2005 and October 2007) can be found within *Maywood Project Laboratory Audit Compilation* (USACE 2004).

6.0 ANALYTICAL AND QUALITY ASSURANCE / QUALITY CONTROL PROBLEMS ENCOUNTERED AT LABORATORIES

Included in the 27 groundwater, 11 surface water, and 11 sediments were three groundwater field duplicates and one field duplicate each for surface water and sediments. Two groundwater split samples, one surface water split sample, and one sediment split sample were also collected. Eleven rinsate blanks, six smear or wipe samples and twelve trip blanks were also collected. The frequency of chemical split sample collection, 8.3% for groundwater, 10.0% for sediment, and 10.0% for surface water, met the required minimum frequency of 5% for this project (percentage based on total number of non-QC field samples). Radiological testing for isotopic uranium, thorium, and radium, and gross alpha and gross beta were made on the same number of field and QC samples as for chemical, with the obvious exception of trip blanks, which are only collected for volatile organics analysis. Therefore, the minimum QC sample collection frequency was also met for radiological samples.

The offsite laboratories analyzed all of the water, soil and sediment field samples for chemical parameters. Chemical testing of groundwater consisted of measurements for TAL metals, lithium, thallium and VOCs, while chemical tests for surface water and sediment consisted only of TAL metals plus lithium and thallium. Laboratories report results between the minimum detection limit (MDL) and practical quantitation limit (PQL) (organics) or instrument detection limit (IDL) and 2 X IDL (inorganics) as estimated J. Such results are qualified due to uncertainty at these low concentration levels, and not because of QC exceedances. Therefore, qualifications of this type are not specifically mentioned within this document. All samples were analyzed for radiological parameters. The groundwater and surface water radiological samples were analyzed for Ra-226, Ra-228, Th-228, Th-230, and Th-232, U-234, U-235 and U-238, and gross alpha and gross beta. Since the radioisotopes of concern in aqueous matrices at the FMSS are Ra-226, Ra-228, total uranium (all uranium isotopes), and gross alpha and gross beta, this report focuses only on the quality concerns associated with these radiological parameters in groundwater and surface water. The sediment radiological samples were analyzed by gamma spectroscopy for Ra-226, Th-232, and U-238. This report will therefore only focus on the quality concerns associated with these analytes for sediments. All of the results from testing of these samples were validated. The validator noted the following general findings as discussed below.

6.1 BLANK ANALYSES

6.1.1 Radiological Testing

Low-level activities of some or all ROCs were reported for laboratory preparation blanks in some SDGs. In accordance with USACE Radiological Data Evaluation Guidance, the Normalized Absolute Difference (NAD) was calculated for every sample relative to the blank level unless the blank was qualified non-detect (or estimated non-detect) using the USACE Data Evaluation Guidance, in which case calculation of the NAD is unnecessary. Using this Guidance, a given sample result was qualified estimated J if the NAD between a preparation blank result and field sample result, daily blank result and field sample result, or between an equipment rinsate result and a field sample result, was less than 2.58. Daily blanks were analyzed on each day that analyses were performed for gamma spectroscopy analyses and GA/GB analyses. For alpha spectroscopy, there is no daily blank; only a preparation (or method) blank. All daily blank results were within the ± 3 sigma criterion for gamma spectroscopy analyses and GA/GB analyses. All acceptance criteria were also met for all weekly backgrounds. Some results for the radionuclides of interest (ROI) were qualified due to preparation (method) blank contamination, or due to daily blank contamination and using professional judgment, as described below:

Data Package 07G-0152 and -0158

This package contains the test results for sediment samples, which were analyzed by gamma spectroscopy. The laboratory reported 3 preparation method blanks in this package. Method blank results are within ± 3 sigma of the mean blank results. However, based upon the 07-0058 and 07-0059 method blank results, the Th-234 results for 22A-025192, 22A-025198 22A-025198 LREP, 23A-025180, 23A-025184 and 23A-025184 LREP1 are reported as estimated (J). The NADs are less than 2.58.

Smears were collected as equipment blanks on each day that sediment samples were collected. All results were non-detect.

Data Packages 07G-0151 and -0157

This package contains the analysis results for surface water samples. In the 07-03782 method blank, Th-230 was detected at 0.33 ± 0.24 pCi/L. The NAD was calculated between this blank and each sample result associated with the blank. Based upon the blank result, the Th-230 results for 22A-025191, 23a-025179, 23a-025181, 23a-025185, 22a-025195 and 22a-025197 are reported as estimated (J) since the NADs are less than 2.58.

Equipment rinsate blank samples 22a-025201 and 23a-025203 were collected as smear samples rather than aqueous samples. The smear samples were analyzed for Gross Alpha and Gross Beta analytes only ADD TEXT BASED UPON SMEAR RESULTS. No other results for ROC were qualified due to method blank or equipment blank results.

Data Packages 07G-0166, -0170, and -0174

Based upon the aqueous method blank results (Th-230: 0.33 ± 0.24 pCi/L in 07-03782; Th-228: 0.23 ± 0.20 pCi/L in 07-04073), the Th-230 results for 20A-025135, 20A-025154 and 20A-025136 LREP and the Th-228 results for 20A-025134, 19A-025131, 19A-025132 and 12B-025159 are reported as estimated (J). The Normalized Absolute Differences (NADs) are less than 2.58.

Sample 12B-025155 is an equipment rinsate blank collected on 05/07/2007. All results except Th-228, Ra-228 Gross Alpha and Gross Beta are reported as non-detected (U) or non-detected estimated (UJ). Results are summarized below.

Radionuclide	STF Batch	Conc pCi/L	2 sigma uncertainty pCi/L	MDA pCi/L
Gross Alpha	07-1052	0.512	0.382	0.500
Gross Beta	07-1052	1.181	0.716	1.107
Ra-228	07-2007	0.414	0.396	0.340
Th-228	07-5010	0.312	0.231	0.221

The Th-228 results for 20A-025136, 20A-025136 LREP and 20A-025154 are qualified as estimated (J). The Ra-228 results for 20A-025154 and 20A-025136 are qualified as estimated (J). The Gross Alpha result for 20A-025135 is qualified as estimated (J) since the NAD values between blank and sample are less than 2.58.

Sample 12B-025157 is an equipment rinsate blank collected on 05/08/2007. The laboratory reported all results as non-detected (U) or non-detected estimated (UJ). No results are qualified based upon 12B-025157 equipment rinsate blank results.

Sample 12B-025159 is an equipment rinsate blank collected on 05/09/2007. Th-230 is the only detected analyte

Radionuclide	STF Batch	Conc pCi/L	2 sigma uncertainty pCi/L	MDA pCi/L
Th-230	07-5011	0.235	0.218	0.081

The Th-230 result for 19A-025132 is qualified as estimated (J). The NAD value between the Th-230 blank value and the Th-230 value in 19A-025132 is less than 2.58.

Data Package 07G-0177, -0178, -0179, -0184 and -0186

Th-228 (0.23 ± 0.20 pCi/L in 07-04073) is the only positive method blank result associated with this package. Based upon the aqueous method blank results, the Th-228 results for 12A-025128, 12B-025161 RB, 10a-025141, 12b-025163 RB, 12b-025165 RB and 10A-025141 LREP are reported as estimated (J) since the NAD is less than 2.58.

Positive aqueous equipment rinsate blank results are summarized below.

Radionuclide	Lab ID	Conc pCi/L	2 sigma uncertainty pCi/L	MDA pCi/L
Gross Beta	12B-025161 RB	6.162	0.986	1.107
Gross Alpha	12B-025161 RB	4.031	0.888	0.500
Ra-228	12B-025165 RB	0.876	0.656	0.488
Gross Alpha	12B-025169 RB	1.823	0.630	0.542
Gross Beta	12B-025169 RB	1.850	0.716	1.026

Based upon the 12B-025161 RB results, the Gross Alpha result for 12A-025128 is qualified as estimated (J); similarly, based upon the 12B-025165 RB results, the Ra-228 results for 12A-025130 and 12A-025130 LREP are qualified as estimated (J). The NADs are less than 1.96.

No other results were qualified due to method blank or equipment blank results.

Data Packages 07G-0189, -0195 -0199 and -0200

For method blank 07-06737, Th-230 was detected at 0.30 ± 0.23 pCi/L, and for method blank 07-05380, Ra-228 was detected at 0.59 ± 0.58 pCi/L. Based upon the aqueous method blank results, the Ra-228 results for 12B-025149, 12B-025149 LREP, 12B-025171 RB, 12B-025138, 12B-025205 and 12B-025146, and the Th-230 results for 12B-025139, 12B-025173, 12B-025205 FREP, 12B-025146, 12B-025175, 12B-025148 and 12B-025177 are reported as estimated (J). The Normalized Absolute Differences (NADs) are less than 2.58.

The Ra-228 method blank for STF 07-2011 was lost during the sample preparation. The laboratory did not re-process the batch. The Ra-228 method blank result for STF 07-2010 was a positive 0.595 pCi/L. The Ra-228 method blank results for STF 07-2012 was a non-detect, 0.077 pCi/L. Using professional judgment the positive Ra-228 results associated with STF 07-2011 in samples 12B-025148 and 12B-025177 are reported as estimated (J).

Positive aqueous equipment rinsate blank results are summarized below.

Radionuclide	Lab ID	Conc pCi/L	2 sigma uncertainty pCi/L	MDA pCi/L
Ra-228	12B-025171 RB	0.382	0.374	0.296

Th-230	12B-025173 RB	0.543	0.299	0.151
U-238	12B-025175 RB	0.158	0.156	0.085
Th-230	12B-025175 RB	0.900	0.392	0.164
Ra-228	12B-025177 RB	0.321	0.286	0.257
Th-230	12B-025177 RB	0.685	0.332	0.083

Based upon the 12B-025175 RB results, the U-238 result for 12B-025148 is qualified as estimated (J) because the NAD is less than 1.96. The remaining rinsate blank results are qualified as estimated (J) based upon the preparation method blank results, so no field sample results are qualified based upon these remaining equipment rinsate blank results.

6.1.2 Chemical Testing – Organics

All method blank, equipment blank and trip blank results were reported as non-detected in packages 705061 and 705097.

In package 705036, tetrachloroethylene was detected at 0.16 µg/L (action level 0.80 µg/L) and the methylene chloride was detected at 1.1 µg/L (action level 11.0 µg/L) in trip blank sample 12b-025156. Based upon the 12b-025156 TB results, the tetrachloroethylene results for 12b-025155 EB, 20a-025136 and 20a-025154, and the methylene chloride results for 20a-025136, 12b-025155 EB and 20a-025154 are reported as non-detected (U) at the reported concentration. All other blank results were non-detect.

In package 705048, methylene chloride was detected at 1.1 µg/L (action level 11.0 µg/L) in equipment blank sample 12b-025157. Based upon the 12b-025157 EB results, the methylene chloride results for 20a-025133, 20a-025134, 20a-025152 and 12b-025158 TB are reported as non-detected (U) at the reported concentration. All other blank results were non-detect.

In package 705077, methylene chloride was detected in equipment blank sample 12b-025161 at 0.80 µg/L (action level 8.0 µg/L). Based upon the 12b-025161 EB results, the methylene chloride results for 12a-025129 and 12b-025162 TB are reported as non-detected (U) at the reported concentration.

In package 705089, methylene chloride and acetone were detected in equipment blank sample 12b-025163 EB RE at 4.4µg/L (action level 44 µg/L) and 21µg/L (action level 210 µg/L). All acetone results are reported as rejected (R) due to the mean and continuing RRFs.

The methylene chloride results for 12b-025148 and 12b-025149 are reported as non-detected estimated (UJ) at the reported concentrations. The initial calibration % RSD exceeds 15% and the results are less than the blank action concentration). The methylene chloride and acetone results for 10a-025140 are reported as non-detected (U) and estimated non-detect (UJ) at the reported concentration. Due to sample carry-over the results for 12b-025164 TB were not used for data evaluation purposes. The results for 12b-025163 EB RE were used for this data evaluation. All three method blank results are reported as non-detected (U).

In package 705118, methylene chloride was detected in equipment blank sample 12b-025167 at 1.6 µg/L (action level 16 µg/L). All method blank and trip blank results are reported as non-detected (U). Based upon the 12b-025167 EB results, the methylene chloride results for 12b-025142 and 12b-025143 are reported as non-detected (U) at the reported concentration.

In data package 705120, the blank contamination levels and their respective action levels, are summarized below:

Compound	Type of Blank	Max. Conc. (units)	Action Level (units)	Samples Affected
4-methyl-2-pentanone	12b-025169 EB	0.28 ug/L	2.80 ug/L	12b-025144, 12b-025145
Tetrachloroethylene	12b-025169 EB	14 ug/L	70.0 ug/L	
Trichloroethene	12b-025169 EB	3.1 ug/L	15.5 ug/L	
cis-1,2-Dichloroethene	12b-025169 EB	4.0 ug/L	20.0 ug/L	
Tert-butyl methyl ether	12b-025169 EB	0.51 ug/L	2.6 ug/L	
trans-1,2-Dichloroethene	12b-025169 EB	2.5 ug/L	12.5 ug/L	
4-methyl-2-pentanone	12b-025170 TB	0.54 ug/L	2.70 ug/L	
Tetrachloroethylene	12b-025170 TB	14 ug/L	70.0 ug/L	
Trichloroethene	12b-025170 TB	3.1 ug/L	15.5 ug/L	
cis-1,2-Dichloroethene	12b-025170 TB	4.1 ug/L	20.5 ug/L	
Tert-butyl methyl ether	12b-025170 TB	0.50 ug/L	2.50 ug/L	
trans-1,2-Dichloroethene	12b-025170 TB	2.5 ug/L	12.5 ug/L	

All method blank results are reported as non-detected (U). None of the compounds detected in the trip blank sample and the equipment blank sample were detected in field blank samples 12b-025144 and 12b-025145. No results are qualified based upon the equipment blank and trip blank results.

In package 705141, acetone and methylene chloride were detected at 7.1 µg/L and 0.94 µg/L, respectively, in equipment blank sample 12b-025171 (action levels 71 µg/L and 9.4 µg/L) and methylene chloride was detected at 0.56 µg/L (action level 5.6 µg/L) in trip blank 12b-025172. All acetone results are already qualified rejected (R) due to the mean initial and continuing calibration RRFs. The methylene chloride results for 12b-025148 and 12b-025149 are qualified non-detected estimated (UJ) at the reported concentrations because the initial calibration % RSD exceeds 15% and the results are less than the blank action concentration. The methylene chloride result in equipment blank sample 12b-025171 is qualified non-detect, U, due to the trip blank contamination. All method blank results are reported as non-detected (U).

In package 705151, methylene chloride is detected in equipment blank sample 12b-025173 and trip blank sample 12b-025174 at 0.96 µg/L (action level 9.6 µg/L) and 0.47 µg/L (action level 4.7 µg/L) respectively. The methylene chloride results for 12b-025138, 12b-025139 and 12b-025205 are qualified as non-detected estimated (UJ) at the reported concentrations. The initial calibration % RSD exceeds 15% and the results are less than the blank action concentration. The methylene chloride result for 12b-025173 EB is qualified non-detect, and that for 12b-025174 TB is qualified estimated (J).

In package 705160, acetone and methylene chloride are detected in equipment blank sample 12b-025175 at 6.3 µg/L (action level 63 µg/L) and 0.88 µg/L (action level 8.8 µg/L) respectively. All method blank and trip blank results (12b-025176 TB) are reported as non-detected (U). The acetone results are rejected (R) due to RRF results below 0.05. The methylene chloride results for associated samples 12b-025146 and 12b-025147 are reported by the laboratory as non-detected and do not require qualification.

In package 705167, methylene chloride is detected in equipment blank sample 12b-025177 at 0.71 µg/L (action level 7.1 µg/L). Due to this blank contamination, the methylene chloride result for 12b-025150 is qualified as non-detected estimated (UJ) at the reported concentration. All method blank and trip blank results are reported as non-detected (U).

6.1.3 Chemical Testing - Metals

The following table provides a summary of the number of sample results qualified non-detect based upon a given maximum blank level in the data package. If an analyte was detected in one or more blanks, but the associated field sample results exceeded the blank action level, no qualification was made and that blank contamination is not discussed in this report. Blank contamination is also not discussed if the field sample results associated with that blank are all non-detect.

No results were qualified based upon equipment rinsate results in sample data packages 705014, 705024, and 705160

Number of Samples Qualified Non-Detect, Estimated Non-Detect, or Estimated Due to Contamination in Laboratory & Field Blanks											
Metal	Package Number	Number of Samples	Package Number	Number of Samples	Package Number	Number of Samples	Package Number	Number of Samples	Package Number	Number of Samples	Package Number
Al	705014	5	705024	9	705151	2	705077	2	705160	2	705167
As	605068	1									
Ba	705036	1	705089	1	705097	1	705118 705120	1 each	705141 705151	1 each	705160
Be	705036	4	705048	2	705061 705089 705141	3 each	705077	2	705097 705118	3 each	705160 705120
Ca	705014	2	705036	1	605124	1					
Co	705089	2	705118	1	705120	1	705141	1			
Cu	705014 705151	6 4	705024 705167	9 3	705048	2	705077 705089	2 each	705097 705118	1 each	705120 705141
Cr	705036	3	705048	2	705061	2	705077 705151	3 each	705097 705120	1 each	705141 705167
Fe	705014 705160	2 each	705024	3	705036 705077 705151 705167	1 each	705048 705120	2 each	705061 705118	2 each	705089 705097 705141
Hg	705014	4*	705024	5**	705036	1	705048	1	705077 705089 705118	2 each	705097
Li	705036	2	705048	1	705077	1					
Mg	705014	2	705024	2	705036	2	705048 705141 705167	1 each	705061 705120	1 each	705151 705160
Mn	705014	2	705024	2	705036	2	705048 705118	1 each	705061 705089 705160	1 each	705120 705141 705151
Na	705014	7*	705024	6**	705036	2	705048 705061	1 each	705077	1	705151
Pb	705048	1	705061	1	705089	1	705097	2	705141	1	705151

K	705151	1								
Tl	705036	2	705151	4	705167	3				
Zn	705077	2	705151	3	705167	2				

For 705024 sodium, there were two water samples and four sediment samples qualified due to the blank level; for 705024 Hg, there were four water samples and one sediment sample qualified due to the blank level

6.2 SAMPLE SPECIFIC CHEMICAL RECOVERIES (RADIOLOGICAL SAMPLES)

The laboratory did not tabulate the radioisotope quantities on a Form 1. The recoveries were presented on the data summary forms. The USACE acceptance criteria (USACE, 2003a) for chemical tracers and gravimetric tracers are 40-110%. Tracers were used for the isotopic thorium, isotopic uranium, Ra-226, and Ra-228 analyses. No tracer is used for the GA/GB analyses and the gamma spectroscopy analyses. All radiotracer recoveries for the ROC were within the USACE acceptance criteria in all applicable packages with the following exceptions (isotopic thorium in water is not considered since they are not ROC):

Data Packages 07G-0151 and -0157

Tracer recoveries that are not within 40-110% are summarized below.

Sample ID	Tracer	% Recovery	Actions
22A-025191	Th-229	110.6	None Using Professional Judgment
22A-025193	Th-229	110.6	None Using Professional Judgment

Data Packages 07G-0166, -0170, and -0174

Tracer recoveries that are not within 40-110% are summarized below.

Sample ID	Tracer	% Recovery	Actions
20A-025135	U-232	110.9	None Using Professional Judgment
20A-025136	Th-229	110.5	None Using Professional Judgment

Using professional judgment the Ra-226 result for 20A-025152 is qualified as non-detected estimated (UJ). The Ba-133 recovery is 51.9%. Results are summarized below.

Sample ID	Tracer	% Recovery	Actions
20A-025152	Ba-133	51.9	UJ Ra-226

Note that 20A-025152 is the field replicate of 20A-025133. The Ra-226 result for 20A-025133 is qualified as non-detected estimated (UJ). Sample 20A-025133 was also analyzed as a laboratory replicate sample. The Ra-226 result for 20A-025133 LREP is qualified as non-detected (U).

Data Package 07G-0177, -0178, -0179, -0184 and -0186

Tracer recoveries that are not within 40-110% are summarized below.

Sample ID	Tracer	% Recovery	Actions
12B-025143	Th-229	111.3	None Using Professional Judgment
12B-025167	U-232	115.8	None
12B-025145	U-232	112.9	None Using Professional Judgment
10A-025141	Th-229	110.3	None Using Professional Judgment
10A-025141	Th-229	41.1	J Th-228, UJ Th-230, UJ Th-232

The U-232 tracer recovery for 12B-025167 is biased high and the uranium results are reported as non-detected estimated (UJ) by the laboratory.

Using professional judgment, the Th-228 result for 10A-025141 is reported as estimated (J) and the Th-230 and Th-232 results for 10A-025141 are reported as non-detected estimated (UJ). The tracer recovery indicates a potential low bias. False non-detects are possible.

Data Packages 06G-0189, -0195, -0199 and -0200

Tracer recoveries that are not within 40-110% are summarized below.

Sample ID	Tracer	% Recovery	Actions
12B-025173	Th-229	110.5	None Using Professional Judgment
12B-025151	U-232	110.2	None Using Professional Judgment
12B-025151	Ra-228 Ba-133	38.9	UJ Ra-228
12B-025150	U-232	110.1	None Using Professional Judgment

The Ra-228 result for 12B-025151 is reported as non-detected estimated (UJ). The tracer recovery indicates a potential low bias. False non-detects are possible. Sample 12B-025151 was analyzed as a laboratory replicate sample. The Ba-133 recovery for 12B-025151 LREP is 78.8%. The Ra-228 result for 12B-025150 LREP is a positive result, 0.352 pCi/L.

Those instances where no action was taken indicate that the associated results were ND and the percent recovery is greater than 110%. If associated results were positive, then they were qualified estimated J as per the USACE Data Evaluation Guidance.

6.3 MATRIX SPIKE AND MATRIX SPIKE/MATRIX SPIKE DUPLICATE

6.3.1 Radiological Data Packages

For radiological samples, matrix spikes were performed for gross alpha and gross beta samples in all water sample batches. For the ROCs in most batches, matrix problems were determined from tracer recoveries (see Section 6.2).

Gross alpha and gross beta matrix spike recoveries were within laboratory acceptance criteria in all packages.

6.3.2 Chemical Data Packages

For VOC and elements, all target compounds were spiked into the MS and MS/MSD. For elements, spike recovery limits do not apply when sample concentrations exceed the spike concentrations by a factor of four.

Data Packages 705014 and 705024 (elements only)

Maywood sample 22a-025190 was analyzed as the soil matrix spike/matrix spike duplicate (MS/MSD) sample for ICP and ICP/MS analyses for both packages. Recoveries that exceed the 75-125% acceptance criteria are summarized below.

Element	Conc mg/Kg	MS % Recovery	MSD % Recovery	PDS MS %
Aluminum	5085	280	330	50
Barium	234	131	111	84
Calcium	5547	183	187	64
Chromium	31.2	141	102	66
Magnesium	1410	125	133	85

PDS- Post-digestion spike recovery

The aluminum, barium, calcium, chromium and magnesium results for samples 22a-025188, 22a-025190, 22a-025192, 22a-025194 and 22a-025200 in package 705014, and samples 23a-025180, 23a-025182, 23a-025184, 22a-025196 and 22a-025198 in 705024, are qualified estimated (J). Based upon the MS and MSD recoveries, reported results may be biased high.

Maywood sample 22a-025190 was also analyzed as the soil MS/MSD samples for mercury analyses in package 705014. Maywood sample 23a-025182 was analyzed as the soil MS/MSD samples for mercury analyses in package 705024. All recoveries were within the acceptance criteria of 75-125%.

Maywood sample 22a-025189 was analyzed as the aqueous MS/MSD sample for ICP analyses, ICP-MS analyses and mercury analyses in 705014 and for ICP and ICP-MS analyses in 7050124. All recoveries were within the 75-125% acceptance criteria.

Maywood sample 23a-025183 was analyzed as the aqueous MS/MSD samples for mercury analyses in 705024. All recoveries were within the 75-125% acceptance criteria.

Data Packages 705036 and 705048

For elements, Maywood sample 20a-025135 (laboratory data package 705036) was analyzed as the aqueous matrix spike/matrix spike duplicate (MS/MSD) sample for ICP analyses and ICP-MS analyses in both packages. All recoveries were within the 75-125% acceptance criteria for all elements. Maywood sample 20a-025136 (laboratory data package 705036) was analyzed as the aqueous MS/MSD sample for mercury in 705136, and sample 12b-025157 EB was analyzed as the aqueous MS/MSD samples for mercury analyses in 705148. All recoveries were within the 75-125% acceptance criteria for mercury.

For VOCs, non-Maywood sample 704118-001 is the MS/MSD pair in data package 705036. All results are within the laboratory's acceptance criteria.

For VOCs in package 705048, non-Maywood sample 705101-005 is the MS/MSD pair in this laboratory data package. Results that exceed the laboratory's acceptance criteria are summarized below.

Analyte	Spike ug/L	MS %Recovery	MSD %Recovery	MS/MSD Acceptance	% RPD
1,1,2-Trichloroethane	10	7	220	61-146	188
Bromomethane	10	160	150	41-140	6
Chloromethane	10	27	28	39-148	4

No sample results are qualified due to the MS/MSD results. Organic MS/MSD results are applicable to the spike sample only, unless a gross QC failure is evident

Data Packages 705061 and 705077

For elements, Maywood sample 20a-025135 (laboratory data package 705036) was analyzed as the aqueous MS/MSD sample for ICP analyses and ICP-MS analyses in both packages. All recoveries were within the 75-125% acceptance criteria. Maywood samples 19a-025132 and 12b-025161 EB were analyzed as the aqueous MS/MSD samples for mercury analyses in packages 705061 and 705077, respectively. All recoveries were within the 75-125% acceptance criteria.

For VOCs, non-Maywood sample 705101-005 is the MS/MSD pair in this laboratory data package. Results that exceed the laboratory's acceptance criteria are summarized below.

Analyte	Spike ug/L	MS %Recovery	MSD %Recovery	MS/MSD Acceptance	% RPD
1,1,2-Trichloroethane	10	7	220	61-146	188
Bromomethane	10	160	150	41-140	6
Chloromethane	10	27	28	39-148	4

No sample results are qualified due to the MS/MSD results. Organic MS/MSD results are applicable to the spike sample only, unless a gross QC failure is evident.

Data Package 705089 and 705097

Maywood sample 10a-025140 (laboratory data package 705089) was analyzed as the aqueous MS/MSD sample for ICP analyses and ICP-MS analyses for both packages. All recoveries are within the 75-125% acceptance criteria.

Maywood sample 10a-025140 (laboratory data package 705089) and sample 12b-025165 EB (laboratory data package 705097) were analyzed as the aqueous MS/MSD samples for mercury analyses. All acceptance criteria were met. All recoveries were within 75-125%.

For VOCs in package 705089, Maywood sample 10a-025140 is used as the MS/MSD pair. Results that exceed the laboratory's acceptance criteria are summarized below.

Analyte	Spike ug/L	MS %Recovery	MSD %Recovery	MS/MSD Acceptance	% RPD
1,1,1-Trichloroethane	50	124	136	65-130	9
1,2-Dichloroethane	50	122	136	70-120	11
2-Butanone	50	194	190	30-150	2
2-Hexanone	50	124	136	55-130	9
4-Methyl-2-pentanone	50	124	142	60-135	14
Acetone	50	200	200	40-140	0
Bromoform	50	116	132	70-130	13
Carbon Tetrachloride	50	82	112	65-140	31
Chlorobenzene	50	110	130	80-120	17
Chloroform	50	120	136	65-135	13
Ethylbenzene	50	116	130	75-125	11
Toluene	50	112	122	75-120	9
Tert-butyl-methyl ether	50	102	132	65-125	26

The laboratory took no corrective actions. Carbon tetrachloride results are not qualified because the result is a non-detect (U). The acetone result for 10a-025140 is reported as non-detected estimated (UJ) at the reported concentration. The result is less than the blank action concentration and the continuing calibration % difference is greater than 20%. All other results are reported as non-detected (U) or non-detected estimated (UJ) for sample 10a-025140. No results are qualified due to the MS/MSD high biased results.

For VOCs in package 705097, see the discussion under MS/MSD for 705061 and 705077 (in Section 6.3.2), since the same sample was used as the MS/MSD.

Data Package 705118 and 705120

For elements ICP and ICP-MS analyses, the MS/MSD results are already described above for packages 705089 and 705097 since the MS/MSD sample is the same as the one used for those packages. For mercury analyses, Maywood sample 12b-025167 EB (laboratory data package 705118) and non-Maywood sample AQ-051507-EW85 (laboratory data package 705120) were analyzed as the aqueous MS/MSD samples for mercury analyses. All recoveries are within the 75-125% acceptance criteria.

For VOCs, non-Maywood sample 705112-004 is the MS/MSD pair in data packages 705118 and 705120. As noted in the laboratory narrative “forty-six, of one hundred fourteen, spike recoveries were outside the QC limits and thirteen % RPDs, of fifty seven, are above the RPD limits. The field sample contained significant concentrations of the target analytes at concentrations greater than 4X the spike concentration. Therefore, no sample results are qualified due to the MS/MSD results.

Data Package 705141

For VOC, sample 12b-025149 was specified as the MS/MSD pair. The laboratory did not analyze the requested MS/MSD but did analyze a LCS/LCSD (see LCS discussion).

For elements, Maywood sample 12b-025149 (laboratory data package 705141) was analyzed as the aqueous MS/MSD sample for ICP analyses and ICP-MS analyses. Recoveries that exceed the 75-125% acceptance criteria are summarized below. Spike recovery limits do not apply when sample concentrations exceed the spike concentrations by a factor of four.

Element	Conc ug/L	MS % Recovery	MSD % Recovery	PDS MS %
Calcium	238199	-32	70	NA
Magnesium	76854	58	94	NA
Potassium	46029	73	89	NA
Sodium	1382356	-684	-307	NA
Lithium	5363	-153	-350	NA

PDS- Post-digestion spike recovery

The MS/MSD spike concentrations for these elements are not within 4X the sample concentration. No results are qualified based upon the MS/MSD results. Maywood sample 12b-025149 (laboratory data package 705141) was analyzed as the aqueous MS/MSD samples for mercury analyses. All recoveries were within 75-125%.

Data Package 705151

For VOC, sample 12b-025139 was analyzed as the MS/MSD pair on 6/8/2007, outside of the holding time. The laboratory did not analyze a MS/MSD with the original analysis. All % recoveries and RPDs were within acceptance criteria, except the MS and MSD recoveries for acetone. The acetone recoveries were below the laboratory acceptance criteria (56-152%) for the MS (54%) and the MSD (53%). The acetone result for parent sample 12b-025139 is already rejected (R) due to RRFs for the initial and continuing calibrations that are below 0.05. The acetone result for 12b-025139 was reported by the laboratory as non-detected (U).

For elements, Maywood sample 12b-025138 (laboratory data package 705151) was analyzed as the aqueous MS/MSD sample for ICP analyses and ICP-MS analyses. Recoveries that exceed the 75-125% acceptance criteria are summarized below.

Element	Conc ug/L	MS % Recovery	MSD % Recovery	PDS MS %
Calcium	328604	88	-39	NA
Potassium	383964	151	10	NA
Sodium	260774	194	77	NA
Lithium	2402	193	208	NA

PDS- Post-digestion spike recovery

The MS/MSD spike concentrations for these elements are not within 4X the sample concentration, therefore no results are qualified based upon the MS/MSD results.

Maywood sample 12b-025149 from laboratory data package 705141, was analyzed as the aqueous MS/MSD samples for mercury analyses. All acceptance criteria were met.

Data Package 705160

For elements ICP analyses and ICP-MS analyses, see the MS/MSD discussion within this Section (6.3.2) for data package 705089, since this package used the same sample. For mercury analysis, see the MS/MSD discussion within this Section (6.3.2) for data package 705141, which used the same sample.

Data Package 705167

For elements, Maywood sample 12b-025151 (laboratory data package 705167) was analyzed as the aqueous MS/MSD sample for ICP analyses and ICP-MS analyses. Recoveries that exceed the 75-125% acceptance criteria are summarized below.

Element	Conc ug/L	MS % Recovery	MSD % Recovery	PDS MS %
Calcium	353127	16	-102	NA
Iron	67942	86	68	NA
Manganese	26124	67	-52	NA
Sodium	126245	77	39	NA

PDS- Post-digestion spike recovery

The MS/MSD spike concentrations for these elements are not within 4X the sample concentration, therefore no results are qualified based upon the MS/MSD results. Maywood sample 12b-025149 (laboratory data package 705141) was analyzed as the aqueous MS/MSD samples for mercury analyses. All recoveries were within 75-125%.

For VOC, see the discussion above within this Section for VOCs in data package 705151, since the same sample was used as the MS/MSD.

6.4 LABORATORY CONTROL SAMPLES

6.4.1 Radiological Data Packages

All LCS recoveries for aqueous sample alpha spectrometry and gross alpha/gross beta analyses (groundwater and surface water samples) were within the laboratory's acceptance criteria except for the following:

- Within package 07G-0151 and -0157, the Ra-228 LCS recovery is 1.9% (acceptance limits 50-144.6%) The LCS was reanalyzed and the Ra-228 %R was 63.9%. No results are qualified.
- Within package 07G-0166, -0170 and -0174, the Ra-226 %R is 152.8% (acceptance limits are 55.6%-129.2%). The LCS was reanalyzed and the Ra-226 %R was 99.3%. No results are qualified.

All LCS recoveries were acceptable; i.e., within the laboratory's acceptance criteria, for package 07G-0152 and -0158. There were three LCS analyzed. Package 07G-0152 and -0158 contained sediment results generated using gamma spectroscopy.

For alpha spectroscopy LCS results, Th-228 and Th-232 are not reported because Th-230 is the only thorium isotope in the LCS. This anomaly was discussed with USACE and they indicated that Th-230 LCS recoveries would provide an adequate indication of thorium isotope recoveries.

Due to the low abundance of U-235 present in the LCS spike solution U-235 is not considered in the LCS sample. Evaluation actions taken due to U-234 and U-238 results are applied to U-235 results.

6.4.2 Chemical Data Packages

For all VOC and elements LCS, the laboratory reported the full compound list. All LCS recoveries for VOCs were within acceptance criteria in all packages with the following exceptions:

- In package 705036, the laboratory analyzed one aqueous LCS, BKS98318. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
1,1,2-Trichloroethane	BKS98318	10	6	74-128	NA
Acetone	BKS98318	10	39	66-146	NA
Carbon tetrachloride	BKS98318	10	25	58-150	NA
Tert-butyl-methyl ether	BKS98318	10	42	45-132	NA

The laboratory took no corrective actions for these LCS failures. The 1,1,2-trichloroethane results for 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154 and 12b-025156 TB are qualified rejected (R). The LCS recovery is less than 10% and the initial calibration relative response factor is less than 0.05.

The acetone results for 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154 and 12b-025156 TB are already qualified rejected (R) because the initial calibration relative response factor is less than 0.05.

The tert-butyl-methyl ether (MTBE) results for 20a-025135, 20a-025136, 12b-025155 EB, 20a-025154 and 12b-025156 TB are qualified non-detected estimated (UJ) because the LCS recoveries indicate a low bias. False non-detects are possible.

The carbon tetrachloride results are already qualified rejected (R) because the continuing calibration RRF is less than 0.050.

- For data package 705048, the laboratory analyzed three aqueous LCSs, BKS98531, BKS98532 and BKS98533. Tetrachloroethylene was the only compound evaluated with LCSs BKS98532 and BKS98533. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
1,1,2-Trichloroethane	BKS98531	10	6	74-128	NA
Bromomethane	BKS98531	10	160	37-139	NA
Chloromethane	BKS98531	10	27	50-124	NA

The laboratory took no corrective actions for these LCS failures. These compounds were reported as non-detected (U) for all field samples. The 1,1,2-trichloroethane and chloromethane results for 20a-025133, 20a-025134, 12b-025157, 20a-025152 and 12b-025158 are qualified rejected (R). There is no qualification for bromomethane since the LCS recovery is high and the sample results are ND.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
1,1,1-Trichloroethane	BKS98497	10	42	50-149	NA
1,1,2-Trichloroethane	BKS98497	10	220	74-128	NA
2-Hexanone	BKS98497	10	150	46-135	NA
Acetone	BKS98497	10	0	66-146	NA
Bromodichloromethane	BKS98497	10	320	66-137	NA
Bromoform	BKS98497	10	1	61-143	NA
Bromomethane	BKS98497	10	0	37-139	NA
Carbon tetrachloride	BKS98497	10	26	58-150	NA
Dibromochloromethane	BKS98497	10	450	64-134	NA
Tert-butyl methyl ether	BKS98497	10	0	45-132	NA

- For data package 705061, the laboratory analyzed two aqueous LCSs. LCS BKS98502 was analyzed with sample 19a-025131 DL. Only tetrachloroethylene, trichloroethene and cis-1,2-dichloroethene results were evaluated for this LCS, because the sample was analyzed beyond the analytical holding time. These three compounds were the only positive results. All other results for 19a-025131 DL are reported as rejected (R). LCS results that exceed the laboratory's acceptance criteria are summarized in the above table.

The laboratory took no corrective actions for these LCS failures. The acetone, bromoform, bromomethane and tert-butyl methyl ether results for 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are reported as rejected (R). The 1,1,1-trichloroethane results for 19a-025131, 19a-025132, 12b-025159 and 12b-025160 are reported as non-detected estimated (UJ). False non-detects are possible. Carbon tetrachloride results are reported as rejected based upon the initial calibration RRF. The LCS recoveries indicate a high bias for the remaining compounds and all

sample results for these compounds are reported as non-detected (U). These compound results are reported without qualifications.

- Within package 705077, the laboratory analyzed one aqueous LCS, BKS98476. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
1,1,2,2-Tetrachloroethane	BKS98476	10	130	73-127	Na
1,1,2-Trichloroethane	BKS98476	10	230	74-128	NA
Bromomethane	BKS98476	10	150	37-139	NA

The laboratory took no corrective actions for these LCS failures. These compounds were reported as non-detected (U) for all field samples. No results are qualified the LCS recoveries are high and the sample results are non-detect.

- For package 705089, the laboratory analyzed three aqueous LCSs, BKS98484, BKS98485 and BKS98486. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte	LCS	Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
Chloromethane	BKS98484	50	68	70-125	NA
Chloromethane	BKS98485	50	60	70-125	NA
1,1,1-Trichloroethane	BKS98486	50	132	65-130	NA
1,2-Dichloroethane	BKS98486	50	134	70-130	NA
2-Butanone	BKS98486	50	164	30-150	NA
2-Hexanone	BKS98486	50	156	55-130	NA
4-Methyl-2-pentanone	BKS98486	50	138	60-135	NA
Acetone	BKS98486	50	110	40-140	NA
Benzene	BKS98486	50	128	80-120	NA
Bromomethane	BKS98486	50	172	30-145	NA
Chlorobenzene	BKS98486	50	134	80-120	NA
Ethylbenzene	BKS98486	50	134	75-125	NA
Toluene	BKS98486	50	122	75-120	NA
Trichloroethene	BKS98486	50	134	70-125	NA
cis-1,2-Dichloroethene	BKS98486	50	126	70-125	NA
Tert-butyl-methyl ether	BKS98486	50	162	65-125	NA

The laboratory took no corrective actions for these LCS failures. LCS BKS98484 is associated with samples 10a-025141, 12b-025163 EB and 12b-025164 TB. The chloromethane results for these samples are reported as non-detected estimated (UJ). False non-detects are possible.

LCS BKS98485 is associated with samples 10a-025140 and 12b-025163 EB RE. The chloromethane results for these samples are reported as non-detected estimated (UJ). False non-detects are possible.

LCS BKS98486 is associated with samples 10a-025141 RE and 12b-025164 TB RE. These compounds were reported as non-detected (U) for these samples. No results are qualified based upon the high biased LCS recoveries.

- For data package 705097, the laboratory analyzed one aqueous LCS, BKS98435. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
1,1,1-Trichloroethane	BKS98435	10	42	50-149	NA
1,1,2-Trichloroethane	BKS98435	10	220	74-128	NA
2-Hexanone	BKS98435	10	150	46-135	NA
Acetone	BKS98435	10	0	66-146	NA
Bromodichloromethane	BKS98435	10	320	66-137	NA
Bromoform	BKS98435	10	0	61-143	NA
Bromomethane	BKS98435	10	0	37-139	NA
Carbon Tetrachloride	BKS98435	10	26	58-150	NA
Dibromochloromethane	BKS98435	10	450	64-134	NA
Tert-Butyl Methyl Ether	BKS98435	10	0	45-132	NA

The laboratory took no corrective actions for these LCS failures. Compounds displaying high biases are not qualified. Field sample results for compounds with high biases were reported as non-detected (U).

The bromoform, bromomethane and tert-butyl methyl ether results for 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153 and 12b-025166 TB are reported as rejected (R). The 1,1,1-trichloroethane result is reported as non-detected estimated. False non-detects are possible.

The bromomethane, acetone, carbon tetrachloride and 1,1,2-trichloroethane results for 12a-025130, 12b-025137, 12b-025165 EB, 12b-025153 and 12b-025166 TB were already qualified rejected (R) because their mean relative response factors in the initial calibration are less than 0.050.

- For data package 705118, the laboratory analyzed three aqueous LCSs, BKS98526, BKS98550 and BKS98562. Only tetrachloroethylene and cis-1,2-dichloroethene were evaluated in BKS98550. LCS BKS98562 was not evaluated because the associated sample results were rejected (R), based upon holding time exceedances. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCS Acceptance	% RPD
Acetone	BKS98526	10	31	66-146	NA
Bromomethane	BKS98526	10	140	37-139	NA

The laboratory took no corrective actions for these LCS failures. Compounds displaying high biases are not qualified if the results were reported as non-detected (U) in the field samples, as was the case with bromomethane.

The acetone results for 12b-025142, 12b-025143, 12b-025167 EB and 12b-025168 TB were already qualified rejected (R) since the initial calibration mean RRF and continuing calibration RRFs are less than 0.050.

- For package 705141, the laboratory analyzed one aqueous LCS/LCSD pair, BKS98578. LCS/LCSD results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCSD %Recovery	LCS Acceptance	% RPD
Tetrachloroethylene	BKS98578	10	140	140	66-125	0
1,1,2,2-Tetrachloroethane	BKS98578	10	75	57	73-127	27
1,1,2-Trichloroethane	BKS98578	10	91	3	74-128	187
2-Butanone	BKS98578	10	46	31	25-155	39
Trichloroethene	BKS98578	10	110	130	72-122	17

The % RPD limit is 25%. Based upon the LCS/LCSD recoveries the positive trichloroethene and tetrachloroethylene results for 12b-025149 are qualified estimated (J). The results may be biased high.

Based upon the LCS/LCSD recoveries, the 1,1,2,2-tetrachloroethane and 1,1,2-trichloroethane results for 12b-025148, 12b-025149, 12b-025171 EB and 12b-025172 TB are reported as non-detected estimated (UJ). False non-detects are possible.

The 2-butanone sample results are already qualified estimated non-detect, UJ, due to calibration exceedances. No additional qualification is necessary.

- For package 705160, the laboratory analyzed one aqueous LCS, BKS98645. LCS results that exceed the laboratory's acceptance criteria are summarized below. The % RPD limit is 25%. A LCSD was not analyzed.

Analyte		Spike ug/L	LCS %Recovery	LCSD %Recovery	LCS Acceptance	% RPD
1,1,2-Trichloroethane	BKS98645	10	5	NA	74-128	6

No corrective action was taken. All 1,1,2-trichloroethane results for the samples were reported as non-detected (U) and are qualified rejected (R) due to the potential for significant low bias and false negatives indicated by the LCS recovery.

- For package 705167, the laboratory analyzed one aqueous LCS, BKS98646. LCS results that exceed the laboratory's acceptance criteria are summarized below.

Analyte		Spike ug/L	LCS %Recovery	LCSD %Recovery	LCS Acceptance	% RPD
Acetone	BKS98646	10	60	NA	66-146	NA

The acetone results for 12b-025150, 12b-025151, 12b-025177 EB and 12b-025178 TB are qualified as rejected (R) due to the RRF of the continuing calibration verification standard. No corrective actions were taken.

For elements, all LCS recovery criteria were met for ICP analyses, mercury analyses, and lithium and thallium analyses.

6.5 FIELD REPLICATE

6.5.1 Radiological Data Packages

The following field replicate pairs were submitted.

Field Replicate Pairs Submitted		
22a-025189/ 22a-025199 (aq)	20a-025133/20a-025152 (aq)	12b-025138/12b-025205
22a-025190/22a-025200 (sed.)	12b-025137/12b-025153 (aq)	

All field replicate pair results were within USACE QC limits for the ROC; i.e., within a factor of two for all aqueous replicate pairs and within a factor of four for all soil pairs (this applies to those pairs for which both results were positive, i.e., both greater than the minimum detectable activity [MDA]) or the NAD value is less than 1.96. No data is qualified based upon field replicate results with the following exceptions:

- Within package 07G-0151, -0157, using professional judgment, the U-238 result for 22A-025189 is qualified as estimated (J) and the U-238 result for 22a-025199 is qualified as non-detected estimated (UJ). Similarly, the Ra-228 result for 22A-025189 is qualified as non-detected estimated (UJ) and the Ra-228 result for 22a-025199 is qualified as estimated (J). In both cases, one result was non-detect while the other was detected.
- Within package 07G-0152 and -0158, samples 22A-025190/22A-025200 are the field replicate pair. The Th-234 (U-238) result for sample 22A-025190 is reported as non-detect and the Th-234 (U-238) result for 22A-025200 is reported as a positive result. Using professional judgment the Th-234 (U-238) result for 22A-025190 is reported as non-detected estimated (UJ) and the Th-234 (U-238) result for 22A-025200 is reported as estimated (J).
- Within package 07G-0166, etc., samples 20A-025133 and 20A-025152 are a field replicate pair. All NADs are less than 1.96 except for Gross Beta. The Gross Beta Relative Percent Difference (RPD) is 25% and the NAD is 2.44. Results agree within 2X. Gross Beta results for these samples are therefore not qualified. Using professional judgment, the Th-230 and Th-228 results for 20A-025152 are reported as estimated (J) and the Th-230 and Th-228 results for 20A-025133 are reported as non-detected estimated (UJ). The Th-230 and Th-228 results were reported as non-detect for 20A-025133 and were detected at activities less than two times the MDA in 20A-025133.
- Within package 07G-0177, -0178, etc., samples 12B-025137 and 12B-025153 were analyzed as the field replicate pair. All results agree within a factor of two. The Ra-228 RPD is 52.8% and the NAD is 2.63. Using professional judgment, the Ra-228 results for 12B-025137 and 12B-025153 are qualified estimated (J).
- Within package 07G-0189, -0195, etc., samples 12B-025138 and 12B-025205 were analyzed as the field replicate pair. All results agree within a factor of two except for Th-230 (0.064 in 12B-025138 and 0.425 in 12B-025205). The Th-230 result for 12B-025138 is qualified as non-detected estimated (UJ) and the Th-230 result for 12B-025205 is qualified as estimated (J).

In addition to field replicates, there were four QA split samples collected and sent to an independent laboratory, STL-St. Louis, which performed the same analyses as the samples sent to the Maywood onsite laboratory. The four samples are 22a-025189 (surface water), 22a-025190 (sediment), and 20a-025133 and 12b-025137 (groundwaters).

For radiological analytes in 20a-025133, all results were either both ND or within a factor of two of each other except for Gross Alpha. The GPL Gross Alpha result is 8.9 ± 2.1 pCi/L with a MDA of 2.6 pCi/L, while the STL Gross Alpha result is 10.7 ± 7.1 pCi/L with a MDA of 12 pCi/L. The STL result is ND due to the higher MDA. The STL higher MDA is likely due to an inadequate counting time. They did not meet the maximum MDA requirement of 3 pCi/L for GA. Thus the GPL value is considered the more reliable number. No EM2007 data is qualified based upon these results.

For groundwater split sample 12b-025137, Gross Alpha split sample results and Th-232 split sample results were each greater than a factor of two different from each other. The Gross Alpha and Th-232 results for sample 12b-025137 are thus qualified estimated J. For Ra-226, UFML obtained a ND result for 12b-025137, while STL obtained 4.7 ± 0.7 pCi/L. Please note that the sum of Ra-226 and Ra-228 activities for this sample are approximately 3 times greater for the STL results than for the UFML results (3.83 pCi/L versus 12.1 pCi/L). This shall be discussed within the results section of the main body of the EM2007 report.

Surface water split sample 22a-025189 was analyzed for metals and radionuclides. For radionuclides, all analytes were either both ND for the contract and QA labs, or they were within a factor of two except for Th-230. The Th-230 result was ND for UFML and was detected slightly above the MDA of 0.15 pCi/L by STL (0.230 ± 0.085 pCi/L). No data qualification is required based upon these results. Please note, as indicated in Section 2.1, that GA/GB analyses were not requested on the COC for split sample 22a-025189.

Sediment split sample 22a-025190 was analyzed for metals and radionuclides. The USACE field replicate precision acceptance criteria is that replicate/split sample results must be within a factor of four of each other. All radiological results for Th-232, Ra-226 and U-238 were within a factor of four of each other.

6.5.2 Chemical Data Packages

The sample ID numbers for the chemical field duplicate pairs were the same as those for the radiological sample pairs. Only four of the 14 chemical data packages contained field replicate data. All field duplicate precision criteria (which is the same for chemical as it is for radiological, noted in Section 6.5.1) were met for elements. All field duplicate precision criteria were met for VOC. Please note that within VOC packages 705120 and 705141, analytical precision could not be evaluated due to the absence of applicable MS/MSD results and no field duplicate samples.

There were also four QA split samples with the same sample ID numbers as noted above for the radiological QA split samples. For sample 20a-025133, the contract laboratory (GPL) had lower detection limits for metals, and therefore detected several metals (chromium, cobalt, vanadium, nickel, and zinc) at low levels (between 4 and 80% of the corresponding PQL for the STL method) which were non-detect in the QA split sample analyzed at STL-St. Louis. Conversely, there were two metals, iron and lead that were detected by STL at levels between 20 and 30% of the PQL that were non-detect (ND) at GPL. For VOCs in 20a-025133, acetone was detected by STL at 5.7 ppb but it was ND at GPL. Acetone may be a lab contaminant at STL as it was seen in both groundwater split samples, yet was ND at GPL. In addition, benzene (0.25J ppb) and 1,1,1-trichloroethane (0.24J ppb) were detected by STL at levels below the PQL

while they were ND in the VOC analysis at GPL. All other chemical parameters were either both ND or within a factor of two for detected analytes.

For groundwater split sample 12b-025137, the VOCs were all ND except for acetone and methylene chloride. Similar to 20a-025133, acetone was detected (6.8 ppb) at STL and was ND at GPL. Methylene chloride was detected at 1.1 ppb at GPL and was ND at STL, which has a PQL of 1.0. For metals, all analyte results were well within a factor of two of each other except for vanadium (2.7 ppb at GPL and ND at STL with a PQL of 50 ppb at STL), copper (7.6 ppb at GPL and ND at STL with a PQL of 25 ppb at STL), beryllium (ND at GPL and 1.5J ppb at STL with a PQL of 5.0 ppb at STL), and lead (ND at GPL and 2.7 ppb at STL with a PQL of 10 ppb at STL).

For surface water split sample 22a-025189, there were several metals (potassium, lithium, vanadium, lead, and chromium) for which STL obtained a ND results while GPL obtained a positive result. For vanadium, lead and chromium, the GPL positive result is slightly above its MDL, and less than the STL MDL, so the results are considered comparable. For lithium and potassium, however, the GPL results are greater than two orders of magnitude above the specific MDL values while the STL results are ND. Potassium is not a contaminant of concern at the Maywood site so no qualification is made to potassium data. Lithium, although not specifically regulated as a hazardous substance, is a concern to EPA. To be conservative, the positive lithium result is accepted and qualified estimated J. There are four instances for which the STL lab obtained positive hits for metals and GPL obtained ND results. In every case, the STL result is less than two times the GPL MDL reporting limit. In addition, the STL detected values (Al, 114 ppb; Se, 5.4 ppb; As, 3.2 ppb; and Sb, 6.1 ppb) are all below the NJDEP Specific Ground Water Quality Criteria except for arsenic and antimony, which are slightly above their criteria of 3.0 and 6.0 ppb, respectively.

For sediment split sample 22a-025190, all metals results were either both ND or within a factor of two of each other except for thallium and sodium. The thallium positive result, 0.37 mg/kg by GPL, is only slightly above its MDL. Sodium was detected at 538 mg/kg by STL. This value is less than two times GPL's PQL for sodium. No results are qualified based upon these results.

6.6 LABORATORY REPLICATES

6.6.1 Radiological Data Packages

The NAD was calculated for each replicate pair. If the NAD was less than 1.96 no qualification was made in most cases. If the NAD is greater than 1.96, the relative percent difference (RPD) was then calculated. If the RPD is less than 35% for soils, or 25% for waters, there is no qualification. If the RPD is between 35 and 65% (soils) or 25 to 50% (waters), the results of all samples in the batch of the same matrix are qualified estimated J for that parameter. If the RPD is greater than 65% (soils) or 50% (waters), the results of all samples in the batch of the same matrix are qualified rejected R for that parameter. No evaluation is required if both values are less than the MDA.

Laboratory replicates or duplicates were performed on all sample batches for all isotopes. For all sample results, the laboratory replicate NADs were less than 1.96 or the RPDs were less than the not-to-exceed acceptance criteria value except as noted below.

Data Packages 07G-0152 and -0158 (sediment)

All laboratory replicate NADs are less than 1.96. No results are qualified based upon the laboratory replicate results except as follows: the Th-234 (U-238) result for sample 23A-025182 is reported as non-detected estimated (UJ) and the Th-234 (U-238) result for 23A-025182 LREP is reported as a positive

result. Using professional judgment the Th-234 (U-238) result for 23A-025182 is reported as non-detected estimated (UJ) and the Th-234 (U-238) result for 23A-025182 LREP is reported as estimated (J).

Data Packages 07G-0151, and -0157

Sample 22A-025187 was analyzed as a laboratory replicate sample for Gross Beta, Gross Alpha, Ra-228 and Ra-226 radionuclides. Sample 22A-025189 was analyzed as a laboratory replicate sample for the Gross Alpha radionuclide. Sample 22A-025193 was analyzed as a laboratory replicate sample for U-234, U-235, U-238, Th-228, Th-230 and Th-232 radionuclides. All NAD values are less than 1.96. However, for sample 22A-025193, the Th-230 and Th-228 results are non-detect, while they yielded positive values (less than two times the MDA) in 22A-025193LREP. Therefore, using professional judgment, the Th-228 and Th-230 results for 22A-025193 are qualified as non-detected estimated (UJ) and for 22A-025193 LREP the Th-228 and Th-230 results are qualified as estimated (J).

Data Packages 07G-0166, -0170, and -0174

Sample 20A-025136 was analyzed as a laboratory replicate sample for Gross Beta, Gross Alpha, Ra-228, U-234, U-235, U-238, Th-228, Th-230 and Th-232 radionuclides. All NADs are less than 1.96. However, the Ra-228 results for 20A-025136 and 20A-025136 LREP are slightly greater than a factor of two different and are thus qualified estimated (J). The U-234 results for 20A-025136 and 20A-025136 LREP are positive (less than 2X the MDA) and non-detect, respectively. The U-234 results for 20A-025136 and 20A-025136 LREP are therefore qualified estimated (J) and non-detected estimated (UJ), respectively. For the same reason (one detect and one non-detect), the Th-230 results for 20A-025136 LREP and 20A-025136 are qualified estimated (J) and non-detected estimated (UJ), respectively.

Sample 19A-025132 was analyzed as a laboratory replicate sample for Gross Alpha and Ra-226 radionuclides. The Gross Alpha results for 19A-025132 and 19A-025132LREP are ND and positive (less than two times the MDA) and are thus qualified estimated non-detect (UJ) and estimated (J), respectively.

Sample 20A-025133 was analyzed as a laboratory replicate sample for Ra-226, U-234, U-235, U-238, Th-228, Th-230 and Th-232 radionuclides. The anomaly of one detect and one non-detect was noted for U-235, Th-228, and Th-230. Therefore, the U-235 results for 20A-025133 LREP and 20A-025133 are qualified as estimated (J) and non-detected estimated (UJ), respectively. The Th-228 and Th-230 results for 20A-025133 and 20A-025133 LREP are qualified as non-detected estimated (UJ) and estimated (J), respectively.

Data Package 07G-0177, -0178, etc.

Sample 10A-025141 was analyzed as a laboratory replicate sample for uranium isotopes, thorium isotopes Gross Beta, Gross Alpha, Ra-228 and Ra-226 radionuclides. All NADs are less than 1.96. However, using professional judgment the Ra-228 results for 10A-025141 and 10A-025141 LREP are qualified as estimated (J). The RPD is 60.9% and the NAD is 1.84.

Sample 12A-025130 was analyzed as a laboratory replicate sample for the Gross Alpha and Ra-228 radionuclides. The NAD values are less than 1.96 and no results are qualified.

Sample 12B-025142 was analyzed as a laboratory replicate sample for uranium isotopes. All NADs are less than 1.96. Using professional judgment the U-234 and U-238 results for 12B-025142 and 12B-025142 LREP are qualified as estimated (J) and non-detected estimated (UJ), respectively since one value is a positive detect and one a non-detect for each of these two isotopes.

Data Packages 07G-0189, -0195, etc.

Sample 12B-025149 was analyzed as a laboratory replicate sample for Gross Beta, Gross Alpha and Ra-228 radionuclides. All NADs are less than 1.96. The Gross Beta RPD is 35% however, its NAD is only 1.44. No results are qualified based upon these laboratory replicate results.

Sample 12B-025138 was analyzed as a laboratory replicate sample for isotopic uranium, isotopic thorium and Ra-226 radionuclides. All NADs are less than 1.96. However, U-234 and Th-228 yielded one detect and one non-detect result per replicate pair for each isotope. Thus the U-234 and Th-228 results for 12B-025138 are qualified as non-detected estimated (UJ), and for 12B-025138 LREP, the U-234 and Th-228 results are qualified as estimated (J). Note that 12B-025138 is a field replicate sample of 12B-025205. The U-234 and Th-228 results for 12B-025205 were both reported as non-detected results. Based upon the 12B-025138 LREP results, the Th-228 and U-234 results for 12B-025205 FREP are qualified as non-detected estimated (UJ).

Sample 12B-025139 was analyzed as a laboratory replicate sample for the isotopic uranium radionuclides. The NAD values are less than 1.96 for all three radioisotopes. However, the lab replicate results for U-234 and U-238 each yielded one detect and one non-detect result. Therefore, the U-234 results for 12B-025139 and 12B-025139 LREP are qualified as non-detected estimated (UJ) and estimated (J), respectively; and the U-238 result for 12B-025139 and 12B-025139 LREP are qualified as estimated (J) and non-detected estimated (UJ), respectively.

Sample 12B-025146 was analyzed as a laboratory replicate sample for Gross Alpha analyses, sample 12B-025147 was analyzed as a laboratory replicate sample for Ra-228 analyses, and sample 12B-025148 was analyzed as a laboratory replicate sample for Gross Alpha and Gross Beta analyses. All NAD values are less than 1.96, and replicate results were both positive for each analyte so no results are qualified.

Sample 12B-025150 was analyzed as a laboratory replicate sample for isotopic Uranium and Ra-226 analyses. All NADs are less than 1.96. Using professional judgment the U-238 result for 12B-025150 is qualified as estimated (J) and for 12B-025150 LREP the U-238 result is qualified as non-detected estimated (UJ).

Sample 12B-025151 was analyzed as a laboratory replicate sample for Ra-228 analyses. One result was positive, slightly above the MDA and one was ND. Thus, the Ra-228 results for 12B-025151 LREP and 12B-025151 are qualified as estimated (J) and non-detected estimated (UJ), respectively.

6.6.2 Chemical Data Packages (Metals only)

For all elements, the precision acceptance criteria ($< 20\% \text{RPD}$ for waters, 35% for soils) was applied only if the results were greater than 5 times the MDL. MS/MSD was the QC replicate analyses employed for all ICP, mercury, and ICP/MS analyses. For metals analyses, all lab replicate precision acceptance criteria were met for results in all data packages.

6.7 SURROGATE RECOVERIES (ORGANIC CHEMICAL)

All surrogate recoveries were within acceptance criteria for all samples analyzed for VOC except for the following.

In data report 705048, the 1,2-dichloroethane-d4 %R is 130% (limits are 79-121%) for sample 20a-025133 DL. Using professional judgment no results were qualified based upon this surrogate recovery

deviation. Three of four surrogate recoveries were within the laboratory acceptance criteria. Tetrachloroethylene is the only compound evaluated in this sample.

In package 705077, the 1,2-dichloroethane-d4 %R is 68% (limits are 79-121%) for sample 12a-025129. Using professional judgment no results were qualified based upon this surrogate recovery deviation. Three of four surrogate recoveries were within the laboratory acceptance criteria.

In package 705089, surrogate recoveries that exceed the laboratory's acceptance criteria are summarized below.

Surrogate	4-Bromofluorobenzene	Toluene-D8	1,2-Dichloroethane-D4	1,2-Dichlorobenzene-D4
Limits	75-120	85-120	70-120	64-132
10a-025141	138*	130*	153*	132
12b-025163	87	80*	101	84
BKS98484	76	76*	89	77
12b-025163 RE	79	78*	84	86
BKS98486	123*	114	123*	127

The laboratory re-analyzed 10a-025141 due to the surrogate failures. All surrogate recoveries were within the acceptance criteria for 10a-025141 RE. Sample 10a-025141 RE was analyzed one day outside the analytical holding time due to surrogate failures and potential sample carryover. Using professional judgment all results for 10a-025141 RE are reported as non-detected estimated (UJ). The positive 2-butanone, 4-methyl-2-pentanone, acetone, ethylbenzene, toluene and total xylenes results for 10a-025141 are reported as estimated (J).

Sample 12b-025163 RE had similar surrogate recoveries to the original analysis. Only one of four surrogates was beyond the laboratory's acceptance criteria. No results are qualified based upon the surrogate results.

The "BKS" sample is the LCS, or blank spike. Using professional judgment no results were qualified based upon the surrogate recovery deviations.

In package 705118, VOC surrogate recoveries that exceed the laboratory's acceptance criteria are summarized below.

Surrogate	4-Bromofluorobenzene	Toluene-D8	1,2-Dichloroethane-D4	1,2-Dichlorobenzene-D4
Limits	75-129	80-122	79-121	57-133
12b-025142	95	98	124	102
12b-025143 DL	96	99	130	105
12b-025142 RE	97	96	128	103
12b-025167 EB RE	97	97	138	107
BKS98562	101	99	134	113
BLK98562	98	99	136	108

Using professional judgment no results were qualified based upon the surrogate recovery deviations. Three of four surrogate recoveries were within the laboratory acceptance criteria for each sample listed above. Note that all results for 12b-025142 and 12b-025167 EB RE are qualified rejected (R) due to

holding time exceedances. Also, only tetrachloroethylene and cis-1,2-dichloroethene were evaluated in sample 12b-025143 DL.

In package 705120, the **1,2-Dichloroethane-d4** surrogate recovery is 122% (limits 79-121%) in sample 12b-025170. Since only one surrogate is outside QC limits, no results were qualified.

In packages 705141, 705151, 705160 several field and QC samples had one surrogate recovery, **1,2-Dichloroethane-d4**, outside of QC limits in each package. Since three of the four surrogates had acceptable recoveries, no results are qualified.

6.8 INTERNAL STANDARD RECOVERIES (ORGANIC CHEMICAL)

All internal standard acceptance criteria were met for all samples analyzed for VOC with the following exceptions.

In package 705118, the following internal standard recoveries exceeded the laboratory's acceptance criteria.

Internal Standard	1,4-Difluorobenzene	Chlorobenzene-D5	Fluorobenzene
Limits	3680718-920180	959356-239839	4316462-1079116
12b-025142	551237	146423	636514
12b-025167 EB	862664	229815	989840

Using professional judgment, all results for 12b-025142 and 12b-025167 EB, except acetone are reported as non-detected estimated (UJ). Acetone results are already rejected due to calibration exceedances. The laboratory reanalyze these samples, however the reanalysis was four days outside the analytical holding time so those results were rejected.

6.9 MISCELLANEOUS METALS CRITERIA

All ICP interference check sample acceptance criteria (80-120% for the ICSAB solution and within 2 times of the reporting limit for the ICSA solution) were met for all elements batches.

All ICP serial dilution results were within the acceptance criteria of <10% difference for all results >25X the MDL for all elements.

6.10 RADIONUCLIDE QUANTITATION AND IMPLIED DETECTION LIMITS (RADIOLOGICAL)

The laboratory reported the results with analytical uncertainties. The laboratory noted that the MDCs for the gross alpha and gross beta were elevated in some instances. This is due to the smaller sample aliquot that must be used for gross alpha when the total dissolved solids (TDS) level is elevated.

Sample results that were either less than the associated uncertainty or MDA were evaluated to determine if the MDA values were unrealistically low. If either of those two conditions existed, and the 2 sigma error multiplied by 1.65 was greater than the reported MDA, the isotope was qualified UJ to indicate that the MDA is estimated. The estimated MDA value should be considered as unrealistically low. One or more sample results (see Attachment C for the number of samples qualified for this reason (Reason 2 in Attachment C)) within all of the environmental monitoring 2007 radiological packages were qualified for this reason.

If a net negative result had a 2 sigma uncertainty smaller than the absolute value of the result, the result was qualified R rejected. One result, the U-238 result for sample 22A-025188 in package 07G-0152 and -0158, was qualified rejected. The result and uncertainty are -0.017 ± 0.001 .

If a negative result had a 2 sigma uncertainty larger than the absolute value of the result, the result was qualified non-detect, U (unless the 2 sigma uncertainty times 1.65 was greater than the MDA, in which case the result was qualified UJ). Six results were qualified for this reason (see Reason 5 in Attachment C).

One result, (GB in one of the samples from package 07G-0166, etc.) was qualified estimated J due to blank contamination.

6.11 CHEMICAL SEPARATION SPECIFICITY (RADIONUCLIDES)

The energy of the radionuclide of interest must be within 40 keV of the theoretical energy for that radionuclide for samples analyzed by alpha spectroscopy. This criterion is not applied to results that are less than the MDA. All energies for radionuclides of interest analyzed by alpha spectroscopy were within 40 keV of their theoretical energies.

6.12 TARGET RADIONUCLIDE LIST IDENTIFICATION (RADIONUCLIDES)

This criterion is applied to gamma spectroscopy test results only. Only environmental monitoring sediment samples were analyzed by gamma spectroscopy. All observed peak energies were within 2 keV of the theoretical energy for all results.

6.13 MATRIX DENSITY VARIABILITY (RADIONUCLIDES)

This criterion only applies to sediment samples analyzed by gamma spectroscopy. All matrix density results were between 70-130% of the calibration standard density, except samples 22A-025190, 22A-025200 and 22A-025196 in data package 07G-0152, -0158. The matrix densities are less than 70%. Positive results are reported as estimated (J) and non-detected results are reported as non-detected estimated (UJ).

6.14 HOLDING TIMES

All sample analyses holding time requirements were satisfied with the following exceptions:

- In package 705048, VOA samples 20a-025133DL and 20a-025152DL were reanalyzed outside the fourteen day holding time. Tetrachloroethylene was the only compound evaluated for these re-analyses. The tetrachloroethylene results for 20a-025133DL and 20a-025152DL are reported as estimated (J).
- In data package 705061, holding time requirements were not met for the VOA reanalysis of sample 19a-025131. The sample was reanalyzed 8 days beyond the 14 day holding time. Using professional judgment, all non-detected results for 19a-025131DL are reported as rejected (R), and the positive tetrachloroethylene, trichloroethene and cis-1,2-dichloroethene results are reported as estimated (J).
- In package 705089, VOA samples 10a-025141 and 12b-025164 TB were reanalyzed one day outside of the analytical holding time due to potential laboratory carry-over from a highly contaminated sample, as noted in the laboratory narrative. Using professional judgment, all

results for 10a-025141 RE and 12b-025164 TB RE are reported as non-detected estimated (UJ) due to holding time deviations.

- In package 705118, VOA sample 12b-025143 was analyzed two days beyond the analytical holding time at a 10X dilution. The sample was reanalyzed because the tetrachloroethylene and cis-1,2-dichloroethene results are greater than the highest calibration standard concentrations. Only tetrachloroethylene and cis-1,2-dichloroethene were evaluated for 12b-025143 DL. Using professional judgment, the tetrachloroethylene and cis-1,2-dichloroethene results for 12b-025143 RE are reported as estimated (J).

Also in package 705118, VOA samples 12b-025142 and 12b-025167 EB were reanalyzed 4 days outside of the holding time, on 06/04/2007. These samples were re-analyzed because all internal standard recoveries were low and outside method acceptance criteria. All positive results for 12b-025142 RE and 12b-025167 EB RE are reported as estimated (J) and all non-detected results are reported as rejected (R) due to the holding time exceedances.

- For packages 705141, 705151, and 705160, all sample analyses holding time requirements were met for the initial sample analyses. Due to surrogate recovery anomalies all samples in 705141 were reanalyzed on 06/07/2007, 17 days beyond the sample collection date, and all samples in 705151 and 705160 were reanalyzed on 06/08/2007, 16 days beyond the sample collection date. For both packages, the 1,2-dichloroethane-d4 surrogate recovery was high for all original analyses of the field samples and the QC samples. The results for the reanalyses were not evaluated because of the holding time exceedances. Using professional judgment, no results are qualified based upon the high surrogate recoveries. Only one surrogate, out of four, was beyond the acceptance criteria.
- For package 705167, all sample analyses holding time requirements were not met for the initial sample analyses. The samples were collected on 05/24/2007 and analyzed on 06/08/2007, 15 days after sample collection and one day outside holding time. Using professional judgment all positive results are reported as estimated (J) and all non-detected results are reported as non-detected estimated (UJ), except acetone results that are reported as rejected (R) because the RRF is less than 0.050.

7.0 REFERENCES

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ATTACHMENT A
RADIOLOGICAL AND CHEMICAL DATA PACKAGES

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ATTACHMENT B RADIOLOGICAL AND CHEMICAL DATA VALIDATION REPORTS

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ATTACHMENT C RADIOLOGICAL DATA REASONS FOR QUALIFICATION

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Radiological Data Reasons for Qualification

Please note that the number of samples qualified for a given reason is based upon the assumption that sediment sample qualifications are only counted for Th-232, Ra-226, and U-238, and that groundwater/surface water sample qualifications are only counted for GA, GB, total uranium (all uranium isotopes), Ra-226 and Ra-228. Please also note that one sample result can be qualified for more than one reason.

Table C-1
Number of Samples within a Given SDG Qualified for the Reasons Noted

SDG Number	Analyte	Reasons for Qualification (See reason associated with each number designation below)										
		1	2	3	4	5	6	7	8	9	10	11
07G-0151 and -0157	GA		4									
	GB											
	Ra-228		6			2						
	Ra-226		7									
	Th-232											
	U-234		2									
	U-235		6									
	U-238		1									
07G-0152 and -0158	GA											
	GB											
	Ra-228											
	Ra-226											
	U-234											
	U-235											
	U-238		2				1					
07G-0166, -0170, and -0174	GA		2									
	GB		2		1							
	Ra-228		5			1						
	Ra-226		8									
	U-234		4									
	U-235		8									
	U-238		5									
07G-0177, -0178, etc.	GA		4									
	GB		2									
	Ra-228		4			2						
	Ra-226		7									
	U-234		12									
	U-235		15									
	U-238		12									

SDG Number	Analyte	Reasons for Qualification (See reason associated with each number designation below)										
		1	2	3	4	5	6	7	8	9	10	11
07G-0189, -0195, etc.	GA		2									
	GB											
	Ra-226		7									
	Ra-228		3			1						
	U-234		7									
	U-235		12									
	U-238		8									

Reasons for Qualification

1. Result is qualified non-detect, U, because it is negative and its 2 sigma uncertainty is larger than the absolute value of the result (and the 2 sigma uncertainty times 1.65 is less than the MDA)
2. Result is qualified UJ because the reported activity is < MDA and/or < its uncertainty, and the 2 sigma error X 1.65 > MDA.
3. Result is qualified J because the reported activity is < MDA and the 2 sigma error X 1.65 < MDA.
4. Result is qualified J due to method blank, daily blank or equipment blank results.
5. Result is qualified UJ. The result is negative, its absolute value is less than its uncertainty, and the 2 sigma error X 1.65 > MDA.
6. Result is qualified rejected, R. The result is negative and the absolute value of the result is greater than its 2 sigma error.
7. The result is qualified estimated, J, because the tracer recovery is greater than 110%.
8. Results are estimated J since the matrix density is <70% or >130% of the calibration standard.
9. Qualify the result estimated J using professional judgment. The replicate results differ by more than 2 times.
10. Qualify the result estimated J. The laboratory replicate result for this sample is reported as non-detected estimated, UJ.
11. Qualify the result non-detect estimated UJ. The laboratory replicate result for this sample is reported as estimated, J.