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Formerly Utilized Sites Remedial Action Program (FUSRAP)

ADMINISTRATIVE RECORD

for Maywood, New Jersey



U.S. Department of Energy



117932

84-388

Department of Energy

Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831—8723

June 30, 1993

Mr. Paul A. Giardina
Radiation Branch Manager
U.S. Environmental Protection Agency,
Region II
Jacob K. Javits Federal Building
New York, New York 10278

Dear Mr. Giardina:

FUSRAP OWNED AND LEASED SITES - 1993 NESHAPS AIR EMISSIONS REPORTS - SUBMITTAL TO EPA REGION II

Please find enclosed the Calendar Year 1993 National Emissions Standards for Hazardous Air Pollutants (NESHAPs) Annual Reports for the U.S. Department of Energy (DOE) Formerly Utilized Sites Remedial Action Program (FUSRAP) sites located in EPA, Region II. The enclosed reports have been prepared in the spirit of a draft Memorandum of Understanding between DOE and EPA. They address among several issues the radionuclide NESHAPs requirements under 40 CFR 61, Subparts H and Q.

The annual reports were prepared based on DOE-Headquarters guidance to fulfill the NESHAPs requirements under 40 CFR 61. Subpart H applies to operations at any facility owned or operated by DOE that may emit any radionuclides, other than radon, into the air. Radionuclide emission rates for non-radon emitters were calculated using the EPA-approved dose model CAP88-PC, as directed in 40 CFR Section 61.93.

The following FUSRAP sites are subject to Subpart H requirements and reports were prepared accordingly:

- Colonie Interim Storage Site (CISS), Colonie, NY
- Maywood Interim Storage Site (MISS), Maywood, NJ
- Middlesex Sampling Plant (MSP), Middlesex, NJ
- New Brunswick Site (NBS), New Brunswick, NJ
- Niagara Falls Storage Site (NFSS), Lewiston, NY
- Wayne Interim Storage Site (WISS), Wayne, NJ

The information in the annual reports has been organized by site and source for ease of review.

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Paul A. Giardina

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June 30, 1994

Subpart Q of 40 CFR 61 applies to sites that store radium-containing material. Results of radon flux monitoring for MISS, MSP, NBS, and NFSS are included in Section IV as supplemental information.

If you have any questions, please contact me at (615) 576-0948 or Steve Oldham at (615) 576-7070.

Sincerely,



Lester K. Price, Director
Former Sites Restoration Division

Enclosure

cc w/enclosure:
Michael Shapiro, PO-63
Andrew Wallo, EH-232
Weldon Dillow, SE-31
Steven Oldham, EW-93

Paul A. Giardina

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June 30, 1994

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Sincerely,

Lester K. Price

Lester K. Price, Director
Former Sites Restoration Division

EW-93

Kirk

Enclosure

cc w/enclosure:

Michael Shapiro, PO-63

Andrew Wallo, EH-232

Weldon Dillow, SE-31

Steven Oldham, EW-93

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N:?SK0?NESH93R2.FNL

Paul A. Giardina

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bcc w/enclosures for NY sites only:
Mr. William T. Varcasio, NYSDEC
Bureau of Radiation
Hazardous Substance Regulations
50 Wolf Road
Albany, New York 12233-7255

Mr. John Zeh, NYSDEC
Bureau of Radiation
Environmental Analysis II, Room 442
50 Wolf Road
Albany, New York 12233-7255

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U.S. Department of Energy
Air Emissions Annual Report
(under Subpart H, 40 CFR Section 61.94)
Calendar Year 1993

Site Name: Maywood Interim Storage Site (MISS), Maywood, New Jersey

Operations Office Information

Office: Oak Ridge Operations - Former Sites Restoration Division

Address: P.O. Box 2001

Oak Ridge, TN 37831-8723

Contact: Susan M. Cange Phone: (615) 576-5724

Site Information

Operator: Bechtel National, Inc.

Address: 100 North Hunter Avenue

Maywood, NJ 076076

Contact: Mike Redmon Phone: (615) 576-4718

Mailing Address: P.O. Box 350

Oak Ridge, TN 37831-0350

Section I. Facility Information - MISS

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Site Description

The Maywood Interim Storage Site (MISS) is located in a highly developed area in the Borough of Maywood and the Township of Rochelle Park in Bergen County, New Jersey. MISS is located approximately 19 km (12 mi) north-northwest of New York City and 21 km (13 mi) northeast of Newark, New Jersey. The site consists of a woodframe building used for the storage of investigation-derived waste; a storage pile covered by an impermeable geotextile membrane that contains approximately 35,000 yd³ of low-level radioactive soil; and an office trailer. MISS is bounded by New Jersey Route 17 on the west; a railroad line on the north; and commercial/industrial areas on the south and east. Residential areas are located north of the railroad and within 274 m (300 yd) to the west. The site is a fenced lot occupying approximately 4.7 ha (11.7 acres).

MISS was established to provide storage for low-level radioactive soils found in the vicinity of the former Maywood Chemical Works. From 1916 through 1959, the Maywood Chemical Works processed monazite sand for industrial uses. Process wastes were placed in surface impoundments onsite. Some of these process wastes were later used as mulch and fill on nearby properties, contaminating them with radioactive thorium.

In 1954, after the enactment of the Atomic Energy Act, the U.S. Atomic Energy Commission (AEC) issued a license to the Maywood Chemical Works for the processing and manufacture of radioactive material. The Maywood Chemical Works stopped processing thorium 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 to consolidate some of the radioactively contaminated soil.

From 1980 to 1984, subsequent radiological surveys identified additional areas of contamination, both onsite and offsite. In 1984, the U.S. Department of Energy negotiated a lease for Stepan company land on which MISS would be established. In 1985, the land was transferred to DOE ownership and currently provides interim storage for contaminated materials removed from vicinity properties.

MISS is surrounded by commercial and residential properties. Residential properties border MISS on the northeast and southwest, while commercial properties form the southeast and western boundaries. The nearest school lies within 400 m (0.25 mile) of the MISS site. There is no farm land in the vicinity of the site.

Based on historical weather data, the mean monthly temperature ranges from a low of -2.6°C (27.4°F) in January to a high of 22.9°C (73.2°F) in July. The mean annual precipitation is about 123.8 cm (48.3 in.). The wind blows predominantly from the southwest at approximately 16.4 km/h (10.2 mph).

Source Description

Airborne emissions contributing to offsite exposure can only occur from areas where the soil is exposed to the elements. The majority of the MISS site is either covered with a geomembrane liner or with construction (buildings, parking lot). Therefore, the exposed source area applicable to this calculation consists of two vegetative-covered areas. The total source area is 63,118 m² (687,355 ft²).

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Section II. Air Emissions Data - MISS

<u>Point Source</u>	<u>Type Control</u>	<u>Efficiency</u>	<u>Distance to Nearest Receptor</u>
None	N.A.	N.A.	N.A.
<u>Grouped Source</u>	<u>Type Control</u>	<u>Efficiency</u>	<u>Distance to Nearest Receptor</u>
None	N.A.	N.A.	N.A.
<u>Non-Point Source</u>	<u>Type Control</u>	<u>Efficiency</u>	<u>Distance to Nearest Receptor</u>
63,118 m ²	Clay, topsoil, and vegetative cover	99 percent	45 m

Non-Point Source
Radionuclide

Annual Quantity Released (Ci)

U-238	4.0 x 10 ⁻⁶
Th-234	4.0 x 10 ⁻⁶
Pa-234	4.0 x 10 ⁻⁶
U-234	4.2 x 10 ⁻⁶
Th-230	4.2 x 10 ⁻⁶
Ra-226	1.9 x 10 ⁻⁶
U-235	1.8 x 10 ⁻⁷
Th-231	1.8 x 10 ⁻⁷
Pa-231	1.8 x 10 ⁻⁷
Ac-227	1.8 x 10 ⁻⁷
Th-227	1.8 x 10 ⁻⁷
Ra-223	1.8 x 10 ⁻⁷
Th-232	8.4 x 10 ⁻⁶
Ra-228	8.4 x 10 ⁻⁶
Ac-228	8.4 x 10 ⁻⁶
Th-228	8.4 x 10 ⁻⁶
Ra-224	8.4 x 10 ⁻⁶

N.A. = Not applicable

1 Curie (Ci) = 3.7 x 10¹⁰ Becquerels

Section III. Dose Assessments - MISS

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Description of Dose Model

The effective dose equivalent for a maximally exposed individual and for the collective population was calculated in a two-step process. The first step consisted of modeling the release of particulates from the site using the methodology given in EPA's "Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites (EPA/600/8-85/002)". The second step consisted of inputting these particulate release rates, along with local population and meteorological data, into EPA's CAP88-PC computer model.

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 80 km (50 mi) around the site. The location of the nearest receptor is one of the distances for which this assessment is performed. The model reports receptor dose rates based on the distances used as input parameters. These receptor dose rates are based on a continuous exposure scenario. Therefore, in reporting the dose rate to the maximally exposed individual, the computed dose rate is adjusted for an appropriate occupancy scenario.

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. Estimates of the radionuclide concentrations in produce, leafy vegetables, milk and meat consumed by humans, are made by coupling the output of the atmospheric transport models with the U.S. Nuclear Regulatory Commission Regulatory Guide 1.109 terrestrial food chain models. The population density used in the model was based on known land use surrounding the site and 1990 census figures. The effective dose equivalent is calculated by combining the inhalation and ingestion intake rates and the air and ground surface concentrations with dose conversion factors, using the weighting factors in the International Commission on Radiological Protection (ICRP) Publication 26.

Summary of Input Parameters

Average Annual Temperature: 14°C (57°F)
Total Annual Precipitation: 108 cm (43 in)
Wind Speed and Direction: CAP88-PC file LEA0189

Population Density: 6.47×10^4 people/m²
Location and Distance of Maximally Exposed Individual: 45 m North-Northeast
Maximally Exposed Individual Occupancy Factor: 100%

Compliance Assessment (Calculated on the basis of distance of maximally exposed individual from source and adjusted for a reasonable occupancy scenario.)

Effective Dose Equivalent of Maximally Exposed Individual: 4.6×10^{-1} mrem/yr

Section III. (continued)

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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: See Lester K. Price, Director, Former Sites Restoration Division

Signature: John K. Price Date: 6/20/94
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Section IV. Supplemental Information - MISS

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This section is not required by the NESHAPs regulations as part of the annual reporting requirements. The supplemental information is included to provide information for DOE guidance development and for future interactions with EPA. The bullet format of this sections follows the guidance received from DOE-HQ for the preparation of the calendar year 1993 air emissions annual reports for DOE sites.

- The total collective population dose is the sum of the doses from all exposure pathways. Because the only pathway with a significant potential contribution to the collective population dose is airborne contamination, the total population dose is equal to that calculated by CAP88-PC, Version 1.0, namely 3.18×10^{-1} person-rem/yr (3.18×10^{-3} person-Sv/yr). CAP88-PC output for MISS emissions in 1993 is provided in Appendices A and B.
- 40 CFR Part 61 Subpart T, "National Emission Standards for Radon Emissions from the Disposal of Uranium Mill Tailings," is not applicable to FUSRAP sites. Radon flux rate information and monitoring locations demonstrating compliance with the 20 pCi/m²/s (0.74 Bq/m²/s) limit of 40 CFR Part 61 Subpart Q, "National Emission Standards for Radon Emissions from Department of Energy Facilities," is provided in Appendix C.
- Information on Radon-220 (thoron) emissions from MISS is provided in Appendix D.
- MISS is an interim storage site with no known non-disposal/non-storage sources of Rn-222 (radon) emissions. Average annual concentrations of radon in the air for MISS are provided in Appendix E.
- MISS is not subject to 40 CFR Part 61 Subpart H Section 61.93(b) continuous monitoring requirements.

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APPENDIX A
CAP88-PC OUTPUT
(Non-Radon Population Assessment)

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

S Y N O P S I S R E P O R T

Non-Radon Population Assessment
Apr 25, 1994 3:28 pm

Facility: Maywood Interim Storage Site
Address: 100 West Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Effective Dose Equivalent
(mrem/year)

3.76E-02

At This Location: 250 Meters North Northeast
Source Category: Airborne Radiological Particulates
Source Type: Area
Emission Year: 1993

Comments: Bechtel National, Inc.
Calculation No. 14501-138-CV-60

Dataset Name: MISS93
Dataset Date: Mar 18, 1994 2:02 pm
Wind File: WNDFILES\LEA0189.WND
Population File: POPFILES\MISS.POP

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RADIONUCLIDE EMISSIONS DURING THE YEAR 1993

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Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
U-238	Y	1.00	4.0E-06	4.0E-06
TH-234	Y	1.00	4.0E-06	4.0E-06
PA-234	Y	1.00	4.0E-06	4.0E-06
U-234	Y	1.00	4.2E-06	4.2E-06
TH-230	Y	1.00	4.2E-06	4.2E-06
RA-226	W	1.00	1.9E-06	1.9E-06
U-235	Y	1.00	1.8E-07	1.8E-07
TH-231	Y	1.00	1.8E-07	1.8E-07
PA-231	Y	1.00	1.8E-07	1.8E-07
AC-227	Y	1.00	1.8E-07	1.8E-07
TH-227	Y	1.00	1.8E-07	1.8E-07
RA-223	W	1.00	1.8E-07	1.8E-07
TH-232	Y	1.00	8.4E-06	8.4E-06
RA-228	W	1.00	8.4E-06	8.4E-06
AC-228	Y	1.00	8.4E-06	8.4E-06
PH-228	Y	1.00	8.4E-06	8.4E-06
RA-224	W	1.00	8.4E-06	8.4E-06

SITE INFORMATION

Temperature: 14 degrees C
Precipitation: 108 cm/y
Mixing Height: 1000 m

SOURCE INFORMATION

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Source Number: 1

Source Height (m): 0.00
Area (sq m): 6.31E+04

Plume Rise

Pasquill Cat:	A	B	C	D	E	F	G
Fixed (m): (Fixed Rise)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.076	0.000	0.008
Fraction From Assessment Area:	0.924	1.000	0.992
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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	67	201	802	1337	1872	2407	20057
NNW	67	201	802	1337	1872	2407	20057
NW	67	201	802	1337	1872	2407	20057
WNW	67	201	802	1337	1872	2407	18015
W	67	201	802	1337	1872	2407	15973
WSW	67	201	802	1337	1872	2407	15973
SW	67	201	802	1337	1872	2407	16228
SSW	67	201	802	1337	1872	2407	20057
S	67	201	802	1337	1872	2407	20057
SSE	67	201	802	1337	1872	2407	25914
SE	67	201	802	1337	1872	2407	20057
ESE	67	201	802	1337	1872	2407	20057
E	67	201	802	1337	1872	2407	20057
ENE	67	201	802	1337	1872	2407	20057
NE	67	201	802	1337	1872	2407	20057
NNE	67	201	802	1337	1872	2407	20057

Direction	Distance (m)						
	15000	25000	35000	45000	55000	65000	75000
N	74537	60196	70814	29909	28375	32864	31652
NNW	80228	100151	38356	25800	31534	37267	40828
NW	78697	106487	126587	47978	25581	31795	32885
WNW	56704	65308	91431	43632	20850	24760	25044
W	64114	84087	47693	59939	47949	40968	30281
WSW	112233	167453	56447	59420	70303	59251	29756
SW	120063	227594	237745	147380	112163	79165	127971
SSW	142152	249194	283497	211897	153403	180380	385790
S	236424	356896	290094	27391	48812	100953	91523
SSE	537391	974408	1119592	38176	0	0	0
SE	813384	678682	772130	363126	35070	0	0
ESE	837313	483781	278841	306070	279511	103569	51542
E	566935	290745	57469	146563	75595	89339	103084
ENE	84525	76576	79890	60083	55076	65090	75104
NE	65381	57432	102568	129885	161178	126989	143397
NNE	65457	30109	80543	125688	76315	38109	40796

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C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Population Assessment

Apr 25, 1994 3:28 pm

Facility: Maywood Interim Storage Site
Address: 100 West Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Airborne Radiological Particulates
Source Type: Area
Emission Year: 1993

Comments: Bechtel National, Inc.
Calculation No. 14501-138-CV-60

Dataset Name: MISS93
Dataset Date: Mar 18, 1994 2:02 pm
Wind File: WNDFILES\LEA0189.WND
Population File: POPFILES\MISS.POP

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ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
GONADS	1.75E-04	1.61E-03
BREAST	1.37E-04	1.32E-03
R MAR	1.76E-02	1.49E-01
LUNGS	2.39E-01	2.02E+00
THYROID	1.31E-04	1.24E-03
ENDOST	2.18E-01	1.85E+00
RMNDR	4.70E-04	4.43E-03
EFPEC	3.76E-02	3.18E-01

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	6.25E-06	6.77E-04
INHALATION	3.75E-02	3.17E-01
AIR IMMERSION	5.01E-08	3.66E-07
GROUND SURFACE	5.47E-06	8.28E-05
INTERNAL	3.75E-02	3.18E-01
EXTERNAL	5.52E-06	8.32E-05
TOTAL	3.75E-02	3.18E-01

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

<u>Nuclides</u>	<u>Selected Individual (mrem/y)</u>	<u>Collective Population (person-rem/y)</u>
U-238	2.30E-03	1.96E-02
TH-234	7.17E-07	6.65E-06
PA-234	6.19E-08	5.44E-07
U-234	2.76E-03	2.34E-02
TH-230	5.25E-03	4.44E-02
RA-226	8.68E-05	8.02E-04
U-235	1.13E-04	9.78E-04
TH-231	9.22E-10	7.65E-09
PA-231	4.40E-04	3.74E-03
AC-227	5.80E-04	4.92E-03
TH-227	1.07E-05	9.03E-05
RA-223	7.56E-06	6.43E-05
TH-232	1.51E-02	1.28E-01
RA-228	1.04E-04	1.01E-03
AC-228	3.65E-06	2.66E-05
TH-228	1.06E-02	8.97E-02
RA-224	1.48E-04	1.23E-03
TOTAL	3.75E-02	3.18E-01

COLLECTIVE EFFECTIVE DOSE EQUIVALENT (person rem/y)
(All Radionuclides and Pathways)

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Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	2.2E-03	1.3E-03	1.5E-03	1.1E-03	8.7E-04	7.6E-04	2.9E-03
NNW	1.7E-03	3.1E-04	3.6E-04	2.5E-04	2.0E-04	1.8E-04	6.8E-04
NW	7.5E-04	2.8E-04	3.2E-04	2.3E-04	1.8E-04	1.6E-04	6.0E-04
WNW	1.0E-03	2.2E-04	2.6E-04	1.8E-04	1.4E-04	1.3E-04	4.2E-04
W	1.6E-03	6.2E-04	7.2E-04	5.0E-04	4.1E-04	3.5E-04	1.1E-03
WSW	2.2E-03	8.5E-04	9.9E-04	6.9E-04	5.6E-04	4.8E-04	1.5E-03
SW	2.2E-03	8.7E-04	1.0E-03	7.0E-04	5.7E-04	5.0E-04	1.5E-03
SSW	2.1E-03	6.7E-04	7.8E-04	5.4E-04	4.4E-04	3.9E-04	1.5E-03
S	2.0E-03	7.9E-04	9.2E-04	6.4E-04	5.2E-04	4.6E-04	1.7E-03
SSE	2.0E-03	6.4E-04	7.4E-04	5.2E-04	4.2E-04	3.7E-04	1.8E-03
SE	2.1E-03	7.6E-04	8.9E-04	6.2E-04	5.0E-04	4.4E-04	1.7E-03
ESE	2.2E-03	8.6E-04	1.0E-03	7.0E-04	5.7E-04	5.0E-04	1.9E-03
E	2.1E-03	7.2E-04	8.5E-04	5.9E-04	4.8E-04	4.2E-04	1.6E-03
ENE	2.1E-03	7.2E-04	8.4E-04	5.9E-04	4.7E-04	4.1E-04	1.6E-03
NE	2.1E-03	8.2E-04	9.6E-04	6.8E-04	5.5E-04	4.8E-04	1.8E-03
NNE	2.5E-03	6.7E-04	7.8E-04	5.5E-04	4.4E-04	3.9E-04	1.5E-03

Direction	Distance (m)						
	15000	25000	35000	45000	55000	65000	75000
N	3.9E-03	1.4E-03	1.0E-03	2.9E-04	1.9E-04	1.5E-04	1.2E-04
NNW	9.7E-04	5.4E-04	1.3E-04	5.8E-05	5.1E-05	4.1E-05	3.6E-05
NW	8.4E-04	4.9E-04	3.6E-04	9.2E-05	3.4E-05	2.9E-05	2.3E-05
WNW	4.6E-04	2.3E-04	1.9E-04	6.1E-05	2.0E-05	1.6E-05	1.3E-05
W	1.5E-03	8.6E-04	3.0E-04	2.5E-04	1.4E-04	7.9E-05	4.6E-05
WSW	3.6E-03	2.4E-03	5.0E-04	3.6E-04	3.0E-04	1.7E-04	6.9E-05
SW	4.0E-03	3.3E-03	2.1E-03	9.0E-04	4.9E-04	2.3E-04	2.9E-04
SSW	3.8E-03	3.0E-03	2.1E-03	1.1E-03	5.5E-04	4.3E-04	7.3E-04
S	7.4E-03	5.1E-03	2.6E-03	1.7E-04	2.1E-04	3.0E-04	2.2E-04
SSE	1.3E-02	1.1E-02	7.9E-03	1.8E-04	0.0E+00	0.0E+00	0.0E+00
SE	2.4E-02	9.2E-03	6.5E-03	2.1E-03	1.5E-04	0.0E+00	0.0E+00
ESE	2.9E-02	7.7E-03	2.7E-03	2.1E-03	1.4E-03	3.6E-04	1.4E-04
E	1.6E-02	3.8E-03	4.6E-04	8.0E-04	3.0E-04	2.5E-04	2.3E-04
ENE	2.4E-03	9.5E-04	6.1E-04	3.1E-04	2.0E-04	1.6E-04	1.5E-04
NE	2.2E-03	8.8E-04	9.8E-04	8.6E-04	7.7E-04	4.2E-04	3.8E-04
NNE	1.8E-03	3.6E-04	6.0E-04	6.4E-04	2.7E-04	9.0E-05	7.6E-05

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APPENDIX B
CAP88-PC OUTPUT
(Non-Radon Individual Assessment)

17932

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

D O S E A N D R I S K E Q U I V A L E N T S U M M A R I E S

Non-Radon Individual Assessment

Apr 25, 1994 3:33 pm

Facility: Maywood Interim Storage Site
Address: 100 West Hunter Avenue
City: Maywood
State: NJ Zip: 07607

Source Category: Airborne Radiological Particulates
Source Type: Area
Emission Year: 1993

Comments: Bechtel National, Inc.
Calculation No. 14501-138-CV-60

Dataset Name: MISS93I
Dataset Date: Apr 25, 1994 3:28 pm
Wind File: WNDFILES\LEA0189.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	4.04E-03
BREAST	3.50E-03
R MAR	2.29E-01
LUNGS	2.87E+00
THYROID	3.43E-03
ENDOST	2.84E+00
RMNDR	1.43E-02
EFFEC	4.63E-01

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	1.27E-02
INHALATION	4.50E-01
AIR IMMERSION	6.02E-07
GROUND SURFACE	6.30E-05
INTERNAL	4.63E-01
EXTERNAL	6.36E-05
TOTAL	4.63E-01

Apr 25, 1994 3:33 pm

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NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
U-238	2.95E-02
TH-234	2.01E-05
PA-234	7.36E-07
U-234	3.53E-02
TH-230	6.39E-02
RA-226	2.28E-03
U-235	1.45E-03
TH-231	1.10E-08
PA-231	5.68E-03
AC-227	7.31E-03
TH-227	1.30E-04
RA-223	1.05E-04
TH-232	1.83E-01
RA-228	4.04E-03
AC-228	4.39E-05
TH-228	1.28E-01
RA-224	1.80E-03
TOTAL	4.63E-01

INDIVIDUAL EFFECTIVE DOSE EQUIVALENT RATE (mrem/y)
(All Radionuclides and Pathways)

Direction	Distance (m)	
	45	50
N	4.6E-01	4.6E-01
NNW	4.6E-01	4.6E-01
NW	4.6E-01	4.6E-01
WNW	4.6E-01	4.6E-01
W	4.6E-01	4.6E-01
WSW	4.6E-01	4.6E-01
SW	4.6E-01	4.6E-01
SSW	4.6E-01	4.6E-01
S	4.6E-01	4.6E-01
SSE	4.6E-01	4.6E-01
SE	4.6E-01	4.6E-01
ESE	4.6E-01	4.6E-01
E	4.6E-01	4.6E-01
ENE	4.6E-01	4.6E-01
NE	4.6E-01	4.6E-01
NNE	4.6E-01	4.6E-01

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APPENDIX C
RADON FLUX RATES

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Semiannual Radon Flux Monitoring Results

Data for 7/14-15/93		Data for 11/21-22/93	
Sample Id	Radon Flux (pCi/m ² /s)	Sample Id	Radon Flux (pCi/m ² /s)
138-RF-M1	0.20 ± 0.07	138-RF-01	0.24 ± 0.02
138-RF-M2	0.19 ± 0.07	138-RF-02	0.27 ± 0.02
138-RF-M3	0.22 ± 0.07	138-RF-03	0.22 ± 0.02
138-RF-M4	0.18 ± 0.07	138-RF-04	0.22 ± 0.02
138-RF-M5	0.17 ± 0.07	138-RF-05	0.23 ± 0.02
138-RF-M6	0.21 ± 0.07	138-RF-06	0.23 ± 0.02
138-RF-M7	0.19 ± 0.07	138-RF-07	0.24 ± 0.02
138-RF-M8	0.21 ± 0.07	138-RF-08	0.24 ± 0.02
138-RF-M9	0.20 ± 0.07	138-RF-09	0.26 ± 0.02
138-RF-M10	0.15 ± 0.07	138-RF-10	0.22 ± 0.02
138-RF-M11	0.08 ± 0.06	138-RF-11	0.26 ± 0.02
138-RF-M12	0.17 ± 0.07	138-RF-12	0.25 ± 0.02
138-RF-M13	0.17 ± 0.07	138-RF-13	0.23 ± 0.02
138-RF-M14	0.22 ± 0.07	138-RF-14	0.19 ± 0.02
*138-RF-M14	0.19 ± 0.07	138-RF-15	0.25 ± 0.02
138-RF-M15	0.17 ± 0.07	138-RF-16	0.24 ± 0.02
138-RF-M16	0.14 ± 0.07	138-RF-17	0.23 ± 0.02
138-RF-M17	0.15 ± 0.07	138-RF-18	0.23 ± 0.02
138-RF-M18	0.11 ± 0.07	138-RF-19	0.22 ± 0.02
138-RF-M19	0.18 ± 0.07	138-RF-20	0.21 ± 0.02
138-RF-M20	0.10 ± 0.07	138-RF-21	0.23 ± 0.02
*138-RF-M20	0.10 ± 0.07	138-RF-22	0.22 ± 0.02
138-RF-M21	0.15 ± 0.07	138-RF-23	0.23 ± 0.02
138-RF-M22	0.14 ± 0.07	138-RF-24	0.23 ± 0.02
138-RF-M23	0.16 ± 0.07	138-RF-BLANK	0.23 ± 0.02
138-RF-M24	0.16 ± 0.07	138-RF-25	0.22 ± 0.02
138-RF-M25	0.15 ± 0.07	138-RF-26	0.25 ± 0.02
138-RF-M26	0.17 ± 0.07	*138-RF-26	0.23 ± 0.02
138-RF-M27	0.18 ± 0.07	138-RF-27	0.25 ± 0.02
138-RF-M28	0.13 ± 0.07	*138-RF-27	0.26 ± 0.02
*138-RF-M28	0.14 ± 0.07	138-RF-28	0.23 ± 0.02
138-RF-M29	0.15 ± 0.07	138-RF-29	0.23 ± 0.02
138-RF-M30	0.17 ± 0.07	138-RF-BLANK	0.23 ± 0.02

*Denotes duplicate QC samples.

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APPENDIX D
THORON CONCENTRATIONS

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Average Concentrations^a of Thoron at MISS, 1993

Sampling Location ^b	Quarter			
	1	2	3	4
(Concentrations are in pCi/L)				
Onsite				
1	<0.3	0.5	<0.5	<0.3
2	<0.3	0.6	<0.5	<0.3
Fenceline				
3	<0.3	0.5	<0.5	<0.3
4	<0.3	1.2	<0.5	<0.3
5	2.0	4.2	3.9	2.3
6	<0.3	1.2	0.8	<0.3
7	<0.3	0.4	<0.5	<0.3
8	<0.3	0.4	<0.5	<0.3
9	<0.3	0.9	<0.5	<0.3
10	<0.3	--	0.6	<0.3
11	<0.3	0.9	1.0	<0.3
12	<0.3	1.0	0.6	<0.3
20	<0.3	1.6	0.9	<0.3
21	0.7	1.8	2.1	<0.3
22	2.5	10.3	11.4	4.6
23	0.6	3.4	3.3	<0.3
24	0.7	3.7	3.6	1.2
25	0.5	2.2	1.3	0.8
Quality Control				
13 ^c	<0.3	0.4	<0.5	<0.3
15 ^d	<0.3	1.1	<0.5	<0.3
Background				
18 ^e	<0.3	<0.3	<0.5	<0.3
19 ^f	<0.3	<0.3	<0.5	<0.3
26 ^g	<0.3	<0.3	<0.5	<0.3

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APPENDIX E
RADON CONCENTRATIONS

117932

Average Concentrations^a of Radon at MISS, 1993

Sampling Location ^b	Quarter			
	1	2	3	4
(Concentrations are in pCi/L)				
Onsite				
1	<0.3	<0.3	<0.5	0.4
2	<0.3	<0.3	<0.5	0.3
Fenceline				
3	<0.3	<0.3	<0.5	0.3
4	<0.3	<0.3	<0.5	0.3
5	<0.3	<0.3	<0.5	0.6
6	<0.3	0.4	<0.5	0.3
7	<0.3	<0.3	<0.5	0.3
8	<0.3	<0.3	<0.5	0.3
9	<0.3	<0.3	<0.5	0.4
10	<0.3	<0.3	<0.5	0.3
11	<0.3	<0.3	<0.5	0.3
12	<0.3	<0.3	<0.5	0.5
20	<0.3	0.4	0.6	0.3
21	<0.3	<0.3	<0.5	0.7
22	<0.3	2.1	1.1	0.5
23	<0.3	<0.3	0.6	1.6
24	<0.3	<0.3	<0.5	0.6
25	<0.3	<0.3	0.6	0.5
Quality Control				
13 ^c	<0.3	<0.3	<0.5	0.3
15 ^d	<0.3	<0.3	<0.5	0.4
Background				
18 ^e	<0.3	<0.3	<0.5	0.4
19 ^f	<0.3	<0.3	<0.5	0.3
26 ^g	<0.3	<0.3	<0.5	0.3

^aMeasured background has not been subtracted from the fenceline and onsite concentrations.

(continued)

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^bSampling locations are shown in Figure 1.

^cQuality control for station 1.

^dQuality control for station 2.

^eLocated at the Rochelle Park Fire Station, approximately 0.8 km (0.5 mi) northwest of MISS.

^fLocated at the Rochelle Park Post Office, approximately 0.8 km (0.5 mi) northwest of MISS.

^gLocated at 100 Fair St., Paterson, N.J., approximately 8 km (0.5 mi) northwest of MISS; established on June 30, 1992.

^hLocated at the Department of health in Paterson, N.J., approximately 8.8 km (5.5 mi) west of MISS; deleted in 1992.