The Boeing Company
[illegible]
6633 Canoga Park Road
Canoga Park, CA 91304-1148

June 19, 2008
In reply refer to SHEA-107452

Mr. Thomas Johnson, Jr.
Department of Energy
Energy Technology Engineering Center
P. O. Box 10300
Canoga Park, CA 91309

Subject: NESHAPs Report for 2007

Dear Mr. Johnson:

Enclosed is the National Emission Standards for Hazardous Air Pollutants (NESHAPs) Report for 2007 for the Department of Energy's (DOE) facility at the Santa Susana Field Laboratory (SSFL). The U.S. Environment Protection Agency (EPA) regulates airborne releases of radioactivity from DOE facilities under 40 CFR 61, Subpart H. This document reports the radiochemical analysis results of the effluent samples from all applicable emission sources. It also includes the off-site dose assessment results, which are compared against the EPA standards for compliance demonstration.

During 2007, the only applicable emission source at the DOE facility at SSFL was the operating exhaust stack at the Radioactive Materials Handling Facility (RMHF). The Decontamination and Decommissioning (D&D) operations at the RMHF were suspended in May 2007 until DOE completes the SSFL Area IV Environmental Impact Statement (EIS). As a result, no effluents have been released to the atmosphere through the stack since May 2007.

The EPA limit for a DOE site is 10 mrem/yr, as specified in 40 CFR 61, Subpart H. The regulation also specifies that radiation exposure dose to the Maximally Exposed Individual (MEI) be calculated using the EPA's CAP88PC computer model. Using the EPA's methodology, the Effective Dose Equivalent to the MEI from the RMHF exhaust in 2007 was calculated to be 2.6×10^{-7} mrem (2.6×10^{-9} mSv) per year. Compared to the 10 mrem/yr regulatory limit, the potential dose due to this release was negligible.

T. Johnson, Jr.
SHEA-107452
6/19/08

This report includes the Certification Statement to be signed by R. Amar for The Boeing Company, Santa Susana Field Laboratory and by you for the DOE Oakland Projects Office. The Certification Statements are required for the final report.

If you have any questions or comments on this report, please contact Ning Liu at (818) 466-8762.

BOEING

Sincerely,

Ravnesh C. Amar

R. Amar, Program Manager
DOE Site Closure

RA:NL:je

Enclosure: Radionuclide Air Emissions Annual Report

c.c. P. Berry, DOE-OAK

T. Johnson, Jr.
SHEA-107452
6/19/08

DOEAIR07

U. S. Department of Energy
Radionuclide Air Emissions Annual Report
(under Subpart H of 40 CFR Part 61)
Calendar Year 2007

Site Name: Santa Susana Field Laboratory
(Prepared on June 4, 2008)

Operations Office Information

Office:	Department of Energy
Address:	Energy Technology Engineering Center
	P. O. Box 10300
	Canoga Park, CA 91309
Contact:	Thomas Johnson, Jr.
Phone:	(818) 466-8959

Site Information

Operator:	The Boeing Company
	Santa Susana Field Laboratory
Address:	5800 Woolsey Canyon Road
	Canoga Park, CA 91304-1148
Contact:	Ning Liu
Phone:	(818) 466-8762

Section I. Facility Information

Site Description

The Santa Susana Field Laboratory (SSFL) is located at the boundary of Ventura and Los Angeles Counties in southern California, as shown in Figure 1. The site consists of four administrative areas and undeveloped land, with a total area of approximately 2,850 acres. A broad range of energy related research and development (R&D) projects, including nuclear technologies, were conducted in Area IV of the site. All the nuclear R&D operations in Area IV ceased in 1988, and the subsequent efforts have been directed toward decontamination and decommissioning (D&D) of the former nuclear facilities. Area IV has an area of about 290 acres, and Figure 2 shows the arrangement of the site.

The climate at SSFL is generally dry, with variable winds. The site is situated between Simi Valley and San Fernando Valley, and there is no significant agricultural land use within 30 km (19 miles) radius. While the land immediately surrounding Area IV is undeveloped, suburban residential areas are at greater distances.

Source Description

There are two radiological facilities or buildings remaining in Area IV of the SSFL, as shown in Figure 3. The Radioactive Materials Handling Facility (RMHF) is currently used for processing, packaging, and temporary storage of radioactive waste materials, which are eventually shipped off-site to DOE approved disposal facilities. As a result of the waste handling operations at the RMHF, radioactive effluents were released to the atmosphere through a stack in 2007. The effluents were filtered and monitored before released into the atmosphere to ensure compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP) requirements. No radioactive liquid effluents were released from the facility. The Decontamination and Decommissioning (D&D) operations at the RMHF were suspended in May 2007 until DOE completes the SSFL Area IV Environmental Impact Statement (EIS). As a result, no effluents have been released to the atmosphere through the stack since May 2007.

Building 4024 housed two experimental reactor systems during the 1960s. After the project was terminated, all equipment and fuel were removed from the facility. In 2005, portions of the building were demolished following release for unrestricted use by the State of California, Department of Health Services (DHS). During 2007, no operations in this building resulted in the release of effluents to the atmosphere.

In 2007, the only applicable radiological emission source for the DOE facility at SSFL was the operating exhaust stack at the RMHF during the 1st half of the year. Air samples from the

ventilation stack were analyzed for specific radionuclides, and the results were used for the dose assessment in this report.

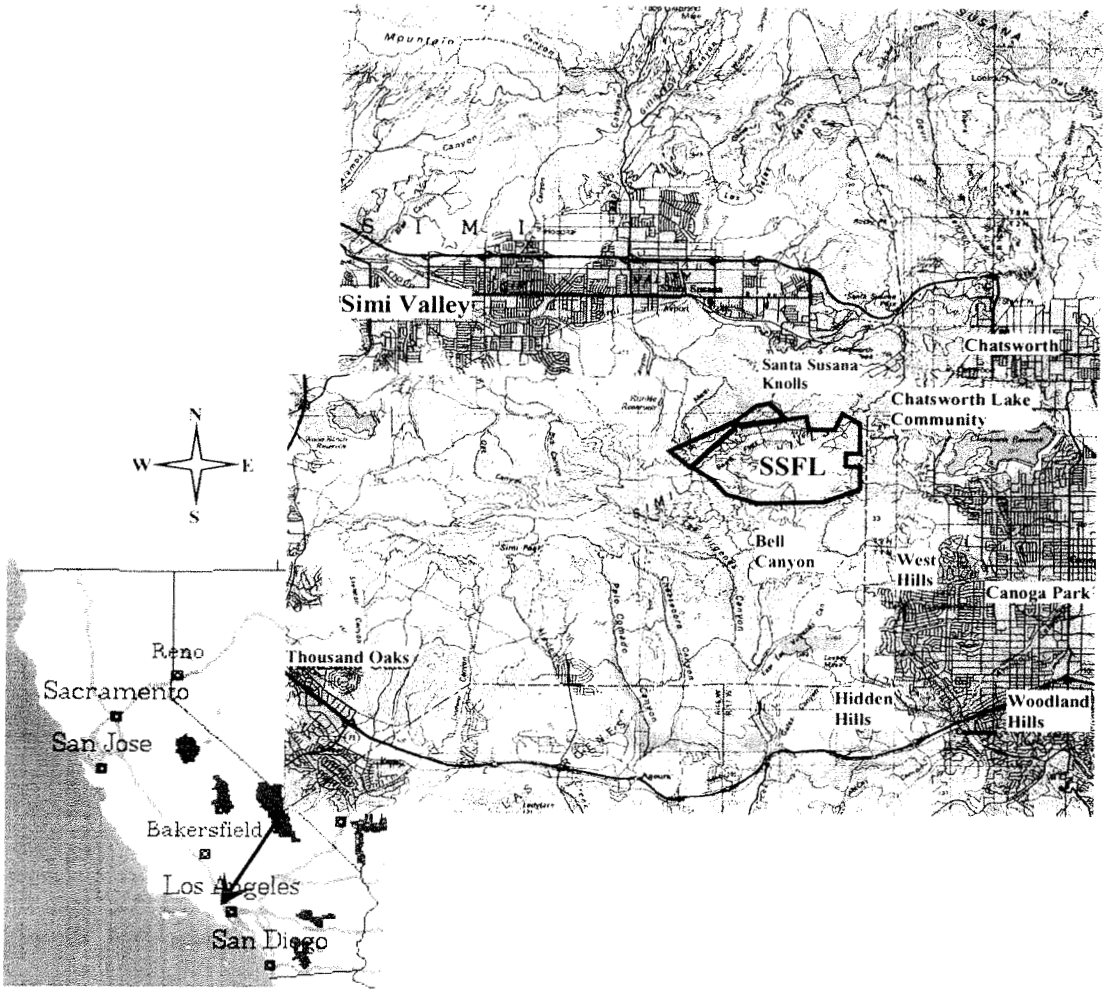

Figure 1. Location of Santa Susana Field Laboratory

Subdivisions			
Owner	**Jurisdiction**	**Acres**	**Subtotals**
The Boeing Co.	Area IV	289.9	
	Area I and III	784.8	
	Undeveloped land	1,324.6	2,399.3
Government	NASA (former AFP 57)	409.5	
	NASA (former AFP 64)	41.7	451.2
Total Acres			2,850.5

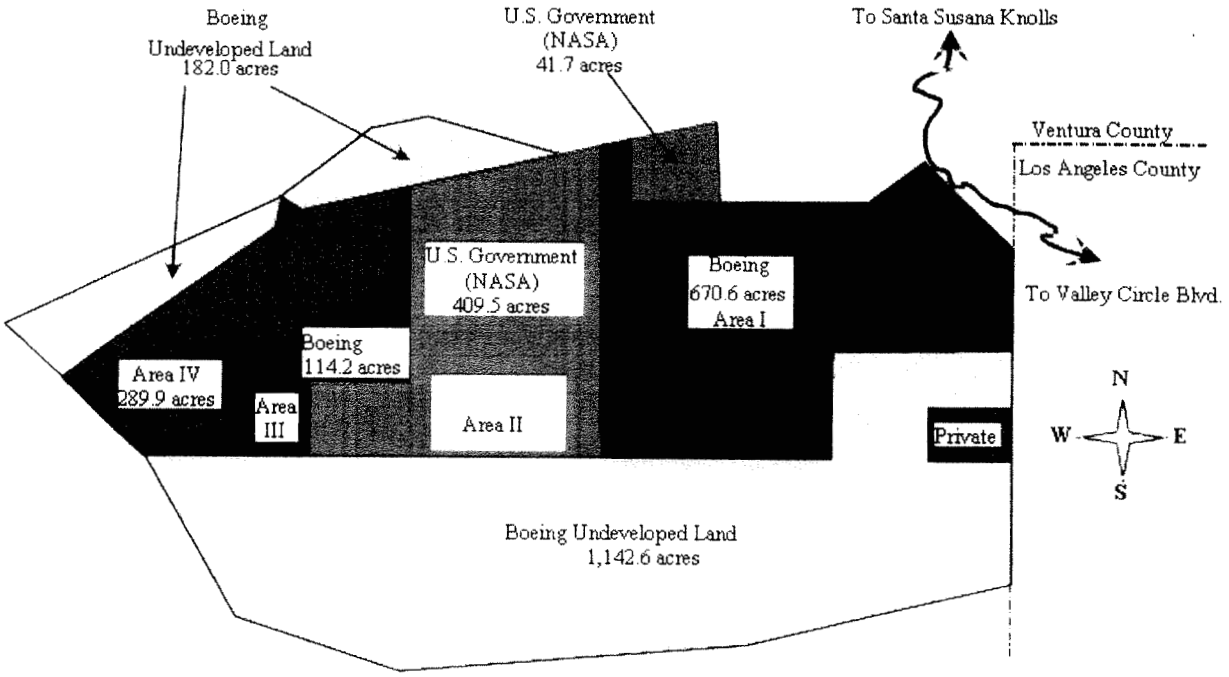

Figure 2. Santa Susana Field Laboratory Site Arrangement

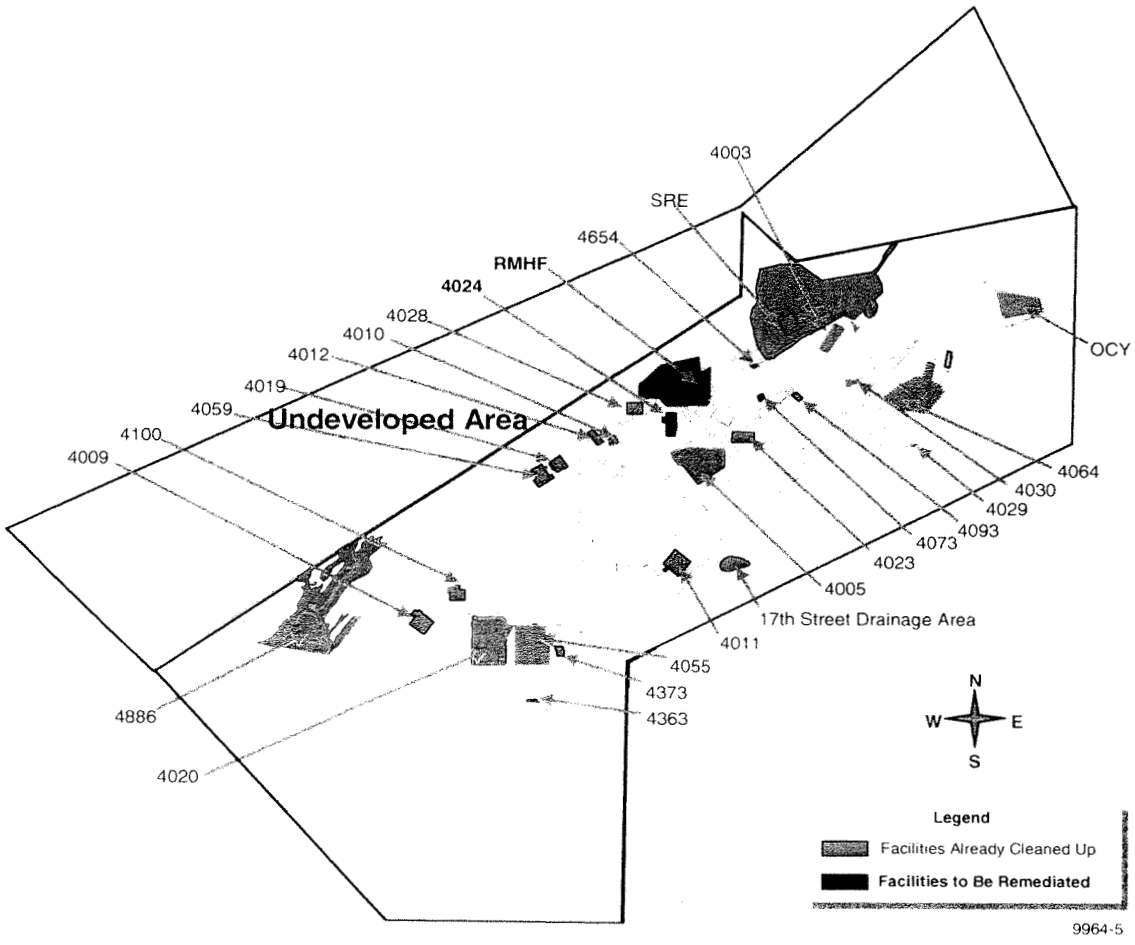

Figure 3. Potential Source Locations in Area IV at Santa Susana Field Laboratory

T. Johnson, Jr.
SHEA-107452
6/19/08

Section II. Air Emission Data

Point Source

Point Source	Type Control	Efficiency	Location of MEI
RMHF	Pre- and HEPA filters	99.97+%	2,675 m, NW

Point Source Radionuclides	Annual Release Quantity (Ci)	(Bq)
Cs-137	2.14E-07	7.90E+03
Ba-137m	2.02E-07	7.47E+03
Th-230	7.51E-09	2.78E+02
H-3	2.06E-05	7.61E+05

Area (Non-Point) Source

N/A

Section III. Dose Assessments

Description of Dose Model

Radiation doses to the Maximally Exposed Individual (MEI) as well as the population in the surrounding area resulting from the emissions of the DOE facility at SSFL during 2007 were calculated using the EPA's CAP88-PC computer code. Site-specific meteorological data, such as wind speed, direction frequency, were used for the atmospheric dispersion calculation in CAP88-PC. Other input data, such as release terms, stack height, and exhaust air velocity, were physically measured to represent the site-specific situation for dose calculations.

Demonstration of compliance with the NESHAPs standard is based on the calculation of the maximum radiation exposure dose to an offsite individual located at a residence, school, business, or office in the vicinity of the SSFL. For this purpose, the nearest such locations have been identified by review of maps, aerial photographs, and direct observations. They are the residential area of Simi Valley, the Brandeis-Bardin Institute, the Santa Monica Mountains Conservancy Sage Ranch office, the residential area in Black Canyon, and the residential area in Bell Canyon. The location with the highest estimated annual dose is considered the location of the Maximally Exposed Individual (MEI).

The RMHF stack was the only emission source in 2007. The Effective Dose Equivalent to the MEI resulting from the emission was compared against the NESHAPs standard for the demonstration of compliance. The dose was calculated using CAP88-PC with site-specific input data.

Compliance Assessment

Based on demographic survey and aerial photographs, three potential locations for the Maximally Exposed Individual (MEI) are identified at 2,096 m south, 2,726 m southeast, or 2,675 m northwest of the RMHF. Calculated exposure dose also depends on meteorological conditions, mostly the predominant wind directions throughout the year. In this analysis, the MEI location is a residence in Simi Valley, 2,675 m NW of the RMHF.

The Effective Dose Equivalent to the MEI from the RMHF exhaust during 2007 was 2.6×10^{-7} mrem (2.6×10^{-9} mSv) per year. The EPA limit for a DOE site is 10 mrem/yr, as specified in 40 CFR 61, Subpart H. This result indicates that the release from the RMHF is negligible when compared to the regulatory limit.

T. Johnson, Jr.
SHEA-107452
6/19/08

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).

Ravnesh C. Amar Date: 6/19/08

R. Amar
Program Manager
DOE Site Closure
Santa Susana Field Laboratory
The Boeing Company

Date: 6/23/08

T. Johnson, Jr.
Federal Project Director
Energy Technology Engineering Center
U. S. Department of Energy

T. Johnson, Jr.
SHEA-107452
6/19/08

Supplemental Information

The collective Effective Dose Equivalent resulting from the DOE operations at SSFL during 2007 was calculated to be 6.0×10^{-5} person-rem (6.0×10^{-7} person-Sv).

The population doses were calculated using CAP88-PC in the "POPULATION" mode. The site-specific population distribution was estimated from the demographic survey performed by Claritas Inc. Claritas Inc, a leading demographic survey company, developed the demographic data around SSFL in 2000 based on the census data and modified by direct observations of nearby residential areas around the SSFL site.

No operations regulated by Subparts Q and T were conducted in 2007, nor were there any emissions of Rn-220 from sources containing U-232 and Th-232. There were no non-disposal/non-storage sources of Rn-222 emission.

Potential releases from the RMHF are so low that, even assuming the absence of the HEPA filters, estimated doses would be below the level that requires continuous monitoring as prescribed in 40CFR61.93(b). However, as a good practice, continuous monitoring is still being performed in accordance with ANSI N13.1 standard. The stack effluent at RMHF is continuously sampled, counted for gross alpha and beta activities weekly, and combined annually for radiochemical analysis.

There are four continuous ambient air samplers throughout the SSFL site. The purpose of this monitoring is to ensure that there is no airborne radioactivity resulted from the ongoing decontamination and decommissioning (D&D) activities at the site. Air sampling filters are collected and counted for gross alpha and beta activities on a weekly basis. The weekly samples are combined (separately by location) annually for radiochemical analysis. As usual, the ambient air samples collected in 2007 have radionuclide concentrations far below the Derived Concentration Guide (DCG) values and are generally indistinguishable from offsite background levels. Because the quantities are so close to the detection limits, the variability in the measurements is primarily due to analytical and background variations.

C A P 8 8 - P C

Version 2.10

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
Jun 4, 2008 04:51 pm

Facility: RMHF
Address: Santa Susana Field Laboratory
5800 Woolsey Canyon Road
City: Canoga Park
State: CA Zip: 91304

Source Category: DOE facility
Source Type: Stack
Emission Year: 2007

Comments: Individual Dose from RMHF Releases
CY 2007

Dataset Name: RMF_07IN
Dataset Date: 6/4/2008 4:50:00 PM
Wind File: C:\CAP88_21\Wndfiles\SSFL2007.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	2.22E-09
BREAST	2.37E-09
R MAR	2.53E-07
LUNGS	1.10E-06
THYROID	2.39E-09
ENDOST	3.13E-06
RMNDR	3.41E-09
EFFEC	2.59E-07

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	4.57E-10
INHALATION	2.58E-07
AIR IMMERSION	2.70E-13
GROUND SURFACE	1.74E-11
INTERNAL	2.59E-07
EXTERNAL	1.76E-11
TOTAL	2.59E-07

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
CS-137	1.21E-09
BA-137M	2.72E-13
TH-230	2.57E-07
H-3	4.06E-10
TOTAL	2.59E-07

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	2.16E-13
BONE	1.39E-13
THYROID	8.88E-16
BREAST	7.49E-15
LUNG	1.77E-12
STOMACH	4.99E-15
BOWEL	2.31E-15
LIVER	1.20E-14
PANCREAS	4.28E-15
URINARY	2.43E-15
OTHER	5.24E-15
TOTAL	2.17E-12

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	9.68E-15
INHALATION	2.16E-12
AIR IMMERSION	6.47E-18
GROUND SURFACE	3.78E-16
INTERNAL	2.17E-12
EXTERNAL	3.85E-16
TOTAL	2.17E-12

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
CS-137	3.19E-14
BA-137M	6.52E-18
TH-230	2.13E-12
H-3	1.11E-14
TOTAL	2.17E-12

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

	Distance (m)
Direction	2675
N	3.1E-08
NNW	1.1E-07
NW	2.6E-07
WNW	1.4E-07
W	2.9E-08
WSW	2.2E-08
SW	4.2E-08
SSW	6.4E-08
S	5.9E-08
SSE	1.1E-07
SE	2.1E-07
ESE	1.8E-07
E	1.2E-07
ENE	2.6E-08
NE	1.8E-08
NNE	1.8E-08

INDIVIDUAL LIFETIME RISK (deaths)
(All Radionuclides and Pathways)

	Distance (m)
Direction	2675
N	2.6E-13
NNW	9.2E-13
NW	2.2E-12
WNW	1.2E-12
W	2.4E-13
WSW	1.8E-13
SW	3.6E-13
SSW	5.3E-13
S	4.9E-13
SSE	9.6E-13
SE	1.7E-12
ESE	1.5E-12
E	1.0E-12
ENE	2.2E-13
NE	1.5E-13
NNE	1.5E-13

C A P 8 8 - P C

Version 2.10

Clean Air Act Assessment Package - 1988

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

Non-Radon Individual Assessment
Jun 4, 2008 04:51 pm

Facility: RMHF
Address: Santa Susana Field Laboratory
5800 Woolsey Canyon Road
City: Canoga Park
State: CA Zip: 91304

Source Category: DOE facility
Source Type: Stack
Emission Year: 2007

Comments: Individual Dose from RMHF Releases
CY 2007

Effective Dose Equivalent (mrem/year)
2.59E-07

At This Location: 2675 Meters Northwest

Dataset Name: RMF_07IN
Dataset Date: 6/4/2008 4:50:00 PM
Wind File: C:\CAP88_21\Wndfiles\SSFL2007.WND

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2675 Meters Northwest
Lifetime Fatal Cancer Risk: 2.17E-12

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	2.22E-09
BREAST	2.37E-09
R MAR	2.53E-07
LUNGS	1.10E-06
THYROID	2.39E-09
ENDOST	3.13E-06
RMNDR	3.41E-09
EFFEC	2.59E-07

RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
CS-137	D	1.00	2.1E-07	2.1E-07
BA-137M	D	1.00	2.0E-07	2.0E-07
TH-230	Y	1.00	7.5E-09	7.5E-09
H-3	*	0.00	2.1E-05	2.1E-05

SITE INFORMATION

Temperature:	14 degrees C
Precipitation:	29 cm/y
Humidity:	7 g/cu m
Mixing Height:	746 m

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 40.00
Diameter (m): 1.00

Plume Rise Momentum (m/s): 15.00
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.020	0.000	0.000
Fraction From Assessment Area:	0.000	0.000	0.000
Fraction Imported:	0.980	1.000	1.000

Food Arrays were not generated for this run.
Default Values used.

DISTANCES (M) USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

2675

C A P 8 8 - P C

Version 2.10

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
Jun 4, 2008 04:55 pm

Facility: RMHF
Address: Santa Susana Field Laboratory
5800 Woolsey Canyon Road
City: Canoga Park
State: CA Zip: 91304

Source Category: DOE facility
Source Type: Stack
Emission Year: 2007

Comments: Population Dose from RMHF Releases
CY 2007

Dataset Name: RMF_07PO
Dataset Date: 6/4/2008 4:55:00 PM
Wind File: C:\CAP88_21\WndFiles\SSFL2007.WND
Population File: C:\CAP88_21\Popfiles\SSFL2000.POP

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
GONADS	2.48E-09	5.71E-07
BREAST	2.65E-09	6.07E-07
R MAR	2.83E-07	5.88E-05
LUNGS	1.23E-06	2.56E-04
THYROID	2.67E-09	6.11E-07
ENDOST	3.50E-06	7.27E-04
RMNDR	3.82E-09	8.53E-07
EFFEC	2.90E-07	6.01E-05

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	5.10E-10	1.23E-07
INHALATION	2.89E-07	6.00E-05
AIR IMMERSION	4.08E-13	1.09E-12
GROUND SURFACE	1.94E-11	4.53E-09
INTERNAL	2.89E-07	6.01E-05
EXTERNAL	1.98E-11	4.53E-09
TOTAL	2.89E-07	6.01E-05

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
CS-137	1.35E-09	2.90E-07
BA-137M	4.11E-13	1.04E-12
TH-230	2.88E-07	5.97E-05
H-3	4.53E-10	1.42E-07
TOTAL	2.89E-07	6.01E-05

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
LEUKEMIA	2.42E-13	7.12E-10
BONE	1.56E-13	4.57E-10
THYROID	9.92E-16	3.27E-12
BREAST	8.37E-15	2.77E-11
LUNG	1.98E-12	5.82E-09
STOMACH	5.57E-15	1.89E-11
BOWEL	2.58E-15	8.91E-12
LIVER	1.34E-14	4.20E-11
PANCREAS	4.78E-15	1.59E-11
URINARY	2.71E-15	9.00E-12
OTHER	5.85E-15	1.94E-11
TOTAL	2.43E-12	7.13E-09

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
INGESTION	1.08E-14	3.72E-11
INHALATION	2.41E-12	7.10E-09
AIR IMMERSION	9.78E-18	3.66E-16
GROUND SURFACE	4.23E-16	1.40E-12
INTERNAL	2.43E-12	7.13E-09
EXTERNAL	4.33E-16	1.40E-12
TOTAL	2.43E-12	7.13E-09

PATHWAY GENETIC RISK SUMMARY
(Collective Population)

Pathway	Genetic Risk (person-rem/y)
INGESTION	9.09E-08
INHALATION	3.32E-07
AIR IMMERSION	1.07E-12
GROUND SURFACE	2.92E-09
INTERNAL	4.23E-07
EXTERNAL	2.92E-09
TOTAL	4.26E-07

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
CS-137	3.57E-14	1.08E-10
BA-137M	9.86E-18	3.52E-16
TH-230	2.38E-12	6.97E-09
H-3	1.24E-14	5.48E-11
TOTAL	2.43E-12	7.13E-09

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

	Distance (m)						
Direction	800	2400	4000	5600	7200	8800	11200
N	0.0E+00	3.3E-08	2.4E-08	1.9E-08	1.5E-08	1.3E-08	1.0E-08
NNW	0.0E+00	0.0E+00	7.3E-08	5.2E-08	4.0E-08	3.2E-08	0.0E+00
NW	0.0E+00	2.9E-07	1.7E-07	1.1E-07	8.5E-08	6.7E-08	4.9E-08
WNW	0.0E+00	0.0E+00	0.0E+00	6.2E-08	4.7E-08	3.7E-08	2.8E-08
W	0.0E+00	0.0E+00	0.0E+00	1.2E-08	9.5E-09	7.8E-09	6.0E-09
WSW	0.0E+00	0.0E+00	0.0E+00	9.9E-09	7.7E-09	6.3E-09	4.8E-09
SW	0.0E+00	0.0E+00	0.0E+00	1.7E-08	1.3E-08	1.0E-08	7.5E-09
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-08	1.6E-08	1.2E-08
S	0.0E+00	6.6E-08	3.8E-08	0.0E+00	2.1E-08	1.7E-08	1.3E-08
SSE	0.0E+00	0.0E+00	6.5E-08	0.0E+00	3.2E-08	2.6E-08	1.9E-08
SE	0.0E+00	2.4E-07	1.3E-07	8.2E-08	6.0E-08	4.7E-08	3.4E-08
ESE	0.0E+00	1.9E-07	0.0E+00	8.3E-08	6.3E-08	5.0E-08	3.7E-08
E	0.0E+00	0.0E+00	0.0E+00	5.9E-08	4.6E-08	3.7E-08	2.8E-08
ENE	0.0E+00	0.0E+00	0.0E+00	1.5E-08	1.3E-08	1.1E-08	8.4E-09
NE	0.0E+00	1.9E-08	1.5E-08	1.2E-08	9.5E-09	0.0E+00	6.3E-09
NNE	0.0E+00	0.0E+00	1.4E-08	1.1E-08	8.7E-09	0.0E+00	5.8E-09

	Distance (m)					
Direction	14400	19200	25600	34400	48000	68000
N	0.0E+00	5.6E-09	3.8E-09	2.6E-09	1.6E-09	7.9E-10
NNW	0.0E+00	1.2E-08	8.4E-09	0.0E+00	0.0E+00	1.9E-09
NW	3.6E-08	2.5E-08	1.6E-08	1.1E-08	6.8E-09	3.5E-09
WNW	2.0E-08	1.4E-08	9.5E-09	6.5E-09	4.0E-09	2.1E-09
W	4.5E-09	3.2E-09	2.2E-09	1.6E-09	9.9E-10	5.5E-10
WSW	3.6E-09	2.6E-09	1.8E-09	1.2E-09	7.8E-10	4.2E-10
SW	5.5E-09	3.8E-09	2.6E-09	1.8E-09	0.0E+00	0.0E+00
SSW	8.5E-09	5.9E-09	4.0E-09	0.0E+00	0.0E+00	0.0E+00
S	9.5E-09	6.8E-09	4.6E-09	0.0E+00	0.0E+00	0.0E+00
SSE	1.4E-08	1.0E-08	7.1E-09	0.0E+00	3.2E-09	1.9E-09
SE	2.5E-08	1.7E-08	1.1E-08	7.7E-09	4.7E-09	2.5E-09
ESE	2.7E-08	1.9E-08	1.2E-08	8.3E-09	5.0E-09	2.4E-09
E	2.1E-08	1.4E-08	9.4E-09	6.4E-09	3.8E-09	1.9E-09
ENE	6.3E-09	4.5E-09	3.0E-09	2.1E-09	1.3E-09	6.3E-10
NE	4.8E-09	3.4E-09	2.3E-09	1.6E-09	9.6E-10	4.6E-10
NNE	0.0E+00	3.1E-09	2.1E-09	1.5E-09	9.0E-10	4.5E-10

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

	Distance (m)						
Direction	800	2400	4000	5600	7200	8800	11200
N	0.0E+00	1.3E-09	4.9E-08	1.3E-07	1.2E-07	6.6E-11	1.5E-10
NNW	0.0E+00	0.0E+00	2.2E-07	4.4E-07	2.7E-07	1.1E-08	0.0E+00
NW	0.0E+00	1.6E-07	1.0E-06	1.1E-06	8.6E-07	1.6E-08	2.5E-10
WNW	0.0E+00	0.0E+00	0.0E+00	5.1E-07	3.5E-07	2.8E-07	2.9E-08
W	0.0E+00	0.0E+00	0.0E+00	3.9E-09	1.1E-08	1.5E-09	7.2E-08
WSW	0.0E+00	0.0E+00	0.0E+00	5.9E-11	6.6E-09	4.6E-09	4.6E-08
SW	0.0E+00	0.0E+00	0.0E+00	6.1E-08	3.9E-08	3.1E-08	8.5E-08
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	8.3E-08	8.9E-08	7.4E-08
S	0.0E+00	2.0E-08	1.1E-10	0.0E+00	3.0E-08	3.9E-08	4.6E-08
SSE	0.0E+00	0.0E+00	3.7E-08	0.0E+00	5.2E-10	7.7E-08	8.9E-08
SE	0.0E+00	4.5E-08	1.0E-07	1.1E-07	4.9E-07	4.2E-07	7.6E-07
ESE	0.0E+00	3.9E-08	0.0E+00	1.9E-07	5.9E-07	6.6E-07	1.9E-06
E	0.0E+00	0.0E+00	0.0E+00	9.4E-08	1.6E-07	2.1E-07	1.1E-06
ENE	0.0E+00	0.0E+00	0.0E+00	4.3E-09	4.9E-09	2.5E-08	1.6E-07
NE	0.0E+00	2.1E-09	5.1E-09	1.0E-07	2.1E-08	0.0E+00	8.2E-10
NNE	0.0E+00	0.0E+00	1.1E-08	8.8E-08	2.6E-08	0.0E+00	3.7E-10

	Distance (m)					
Direction	14400	19200	25600	34400	48000	68000
N	0.0E+00	1.1E-09	3.9E-09	1.3E-08	7.0E-10	6.9E-10
NNW	0.0E+00	2.1E-08	5.4E-10	0.0E+00	0.0E+00	1.1E-08
NW	1.6E-08	3.5E-09	2.3E-07	8.3E-09	1.7E-09	1.2E-09
WNW	2.7E-07	2.2E-07	7.6E-09	1.9E-07	5.8E-08	7.3E-08
W	8.5E-08	4.5E-08	7.2E-08	7.2E-08	2.7E-07	2.9E-10
WSW	7.6E-08	7.4E-08	2.1E-08	5.2E-09	1.5E-08	8.4E-13
SW	7.5E-08	1.5E-08	2.4E-09	1.9E-10	0.0E+00	0.0E+00
SSW	1.2E-08	3.7E-09	2.9E-08	0.0E+00	0.0E+00	0.0E+00
S	6.5E-09	3.6E-08	1.6E-09	0.0E+00	0.0E+00	0.0E+00
SSE	1.4E-08	4.3E-08	2.1E-08	0.0E+00	4.4E-08	1.3E-07
SE	3.8E-07	9.8E-08	4.5E-07	3.8E-06	5.2E-06	3.7E-06
ESE	1.2E-06	1.7E-06	1.5E-06	3.8E-06	8.0E-06	4.2E-06
E	9.0E-07	1.9E-06	2.7E-06	1.7E-06	1.0E-06	5.3E-07
ENE	9.6E-08	2.0E-07	3.1E-07	1.4E-08	4.5E-09	4.6E-08
NE	3.0E-10	5.4E-08	1.0E-07	1.1E-07	6.6E-09	9.7E-08
NNE	0.0E+00	2.6E-09	3.7E-08	1.7E-08	3.0E-09	1.2E-09

AVERAGE COLLECTIVE GENETIC DOSE EQUIVALENT
(person rem)
(All Radionuclides and Pathways)

Direction	Distance (m) 800	2400	4000	5600	7200	8800	11200
N	0.0E+00	3.0E-10	1.2E-08	3.2E-08	2.9E-08	1.6E-11	3.5E-11
NNW	0.0E+00	0.0E+00	5.2E-08	1.1E-07	6.4E-08	2.7E-09	0.0E+00
NW	0.0E+00	3.8E-08	2.5E-07	2.6E-07	2.0E-07	3.9E-09	6.0E-11
WNW	0.0E+00	0.0E+00	0.0E+00	1.2E-07	8.5E-08	6.7E-08	7.1E-09
W	0.0E+00	0.0E+00	0.0E+00	9.6E-10	2.6E-09	3.7E-10	1.8E-08
WSW	0.0E+00	0.0E+00	0.0E+00	1.4E-11	1.6E-09	1.1E-09	1.1E-08
SW	0.0E+00	0.0E+00	0.0E+00	1.5E-08	9.5E-09	7.4E-09	2.1E-08
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-08	2.1E-08	1.8E-08
S	0.0E+00	4.9E-09	2.7E-11	0.0E+00	7.4E-09	9.4E-09	1.1E-08
SSE	0.0E+00	0.0E+00	8.9E-09	0.0E+00	1.3E-10	1.9E-08	2.2E-08
SE	0.0E+00	1.1E-08	2.5E-08	2.7E-08	1.2E-07	1.0E-07	1.9E-07
ESE	0.0E+00	9.3E-09	0.0E+00	4.6E-08	1.4E-07	1.6E-07	4.7E-07
E	0.0E+00	0.0E+00	0.0E+00	2.3E-08	3.8E-08	5.1E-08	2.6E-07
ENE	0.0E+00	0.0E+00	0.0E+00	1.0E-09	1.2E-09	6.1E-09	3.8E-08
NE	0.0E+00	5.1E-10	1.2E-09	2.5E-08	5.0E-09	0.0E+00	2.0E-10
NNE	0.0E+00	0.0E+00	2.7E-09	2.1E-08	6.2E-09	0.0E+00	9.1E-11

Direction	Distance (m) 14400	19200	25600	34400	48000	68000
N	0.0E+00	2.8E-10	9.8E-10	3.4E-09	1.9E-10	2.1E-10
NNW	0.0E+00	5.2E-09	1.4E-10	0.0E+00	0.0E+00	3.3E-09
NW	4.0E-09	8.6E-10	5.9E-08	2.1E-09	4.6E-10	3.5E-10
WNW	6.5E-08	5.5E-08	1.9E-09	5.0E-08	1.6E-08	2.2E-08
W	2.1E-08	1.1E-08	1.8E-08	1.9E-08	7.4E-08	8.6E-11
WSW	1.9E-08	1.8E-08	5.4E-09	1.3E-09	3.9E-09	2.4E-13
SW	1.8E-08	3.8E-09	6.0E-10	4.9E-11	0.0E+00	0.0E+00
SSW	3.0E-09	9.2E-10	7.3E-09	0.0E+00	0.0E+00	0.0E+00
S	1.6E-09	9.0E-09	4.1E-10	0.0E+00	0.0E+00	0.0E+00
SSE	3.6E-09	1.1E-08	5.5E-09	0.0E+00	1.2E-08	3.6E-08
SE	9.5E-08	2.5E-08	1.2E-07	9.9E-07	1.4E-06	1.1E-06
ESE	2.8E-07	4.2E-07	4.0E-07	1.0E-06	2.2E-06	1.3E-06
E	2.2E-07	4.7E-07	7.0E-07	4.4E-07	2.8E-07	1.6E-07
ENE	2.3E-08	5.0E-08	7.9E-08	3.6E-09	1.2E-09	1.4E-08
NE	7.4E-11	1.3E-08	2.6E-08	2.9E-08	1.8E-09	3.0E-08
NNE	0.0E+00	6.4E-10	9.4E-09	4.4E-09	8.2E-10	3.8E-10

INDIVIDUAL LIFETIME RISK (deaths)
(All Radionuclides and Pathways)

	Distance (m)						
Direction	800	2400	4000	5600	7200	8800	11200
N	0.0E+00	2.8E-13	2.0E-13	1.6E-13	1.3E-13	1.1E-13	8.7E-14
NNW	0.0E+00	0.0E+00	6.1E-13	4.3E-13	3.3E-13	2.7E-13	0.0E+00
NW	0.0E+00	2.4E-12	1.4E-12	9.5E-13	7.1E-13	5.6E-13	4.1E-13
WNW	0.0E+00	0.0E+00	0.0E+00	5.2E-13	3.9E-13	3.1E-13	2.3E-13
W	0.0E+00	0.0E+00	0.0E+00	1.0E-13	8.0E-14	6.6E-14	5.0E-14
WSW	0.0E+00	0.0E+00	0.0E+00	8.3E-14	6.5E-14	5.3E-14	4.0E-14
SW	0.0E+00	0.0E+00	0.0E+00	1.4E-13	1.1E-13	8.5E-14	6.3E-14
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.7E-13	1.3E-13	9.7E-14
S	0.0E+00	5.6E-13	3.1E-13	0.0E+00	1.7E-13	1.4E-13	1.1E-13
SSE	0.0E+00	0.0E+00	5.5E-13	0.0E+00	2.7E-13	2.1E-13	1.6E-13
SE	0.0E+00	2.0E-12	1.1E-12	6.9E-13	5.1E-13	3.9E-13	2.9E-13
ESE	0.0E+00	1.6E-12	0.0E+00	7.0E-13	5.3E-13	4.2E-13	3.1E-13
E	0.0E+00	0.0E+00	0.0E+00	5.0E-13	3.8E-13	3.1E-13	2.3E-13
ENE	0.0E+00	0.0E+00	0.0E+00	1.3E-13	1.1E-13	8.9E-14	7.0E-14
NE	0.0E+00	1.6E-13	1.2E-13	9.7E-14	8.0E-14	0.0E+00	5.3E-14
NNE	0.0E+00	0.0E+00	1.1E-13	8.9E-14	7.3E-14	0.0E+00	4.8E-14

	Distance (m)					
Direction	14400	19200	25600	34400	48000	68000
N	0.0E+00	4.7E-14	3.2E-14	2.2E-14	1.3E-14	6.7E-15
NNW	0.0E+00	1.0E-13	7.0E-14	0.0E+00	0.0E+00	1.6E-14
NW	3.0E-13	2.1E-13	1.4E-13	9.3E-14	5.7E-14	2.9E-14
WNW	1.7E-13	1.2E-13	8.0E-14	5.4E-14	3.3E-14	1.7E-14
W	3.8E-14	2.7E-14	1.9E-14	1.3E-14	8.4E-15	4.6E-15
WSW	3.0E-14	2.2E-14	1.5E-14	1.0E-14	6.5E-15	3.6E-15
SW	4.6E-14	3.2E-14	2.2E-14	1.5E-14	0.0E+00	0.0E+00
SSW	7.1E-14	5.0E-14	3.4E-14	0.0E+00	0.0E+00	0.0E+00
S	8.0E-14	5.7E-14	3.9E-14	0.0E+00	0.0E+00	0.0E+00
SSE	1.2E-13	8.6E-14	6.0E-14	0.0E+00	2.7E-14	1.6E-14
SE	2.1E-13	1.4E-13	9.5E-14	6.4E-14	4.0E-14	2.1E-14
ESE	2.3E-13	1.6E-13	1.0E-13	6.9E-14	4.2E-14	2.0E-14
E	1.7E-13	1.2E-13	7.9E-14	5.3E-14	3.2E-14	1.6E-14
ENE	5.3E-14	3.7E-14	2.5E-14	1.8E-14	1.1E-14	5.3E-15
NE	4.0E-14	2.8E-14	1.9E-14	1.3E-14	8.0E-15	3.9E-15
NNE	0.0E+00	2.6E-14	1.8E-14	1.2E-14	7.6E-15	3.8E-15

COLLECTIVE FATAL CANCER RATE (deaths/y)
(All Radionuclides and Pathways)

	Distance (m)						
Direction	800	2400	4000	5600	7200	8800	11200
N	0.0E+00	1.5E-13	5.8E-12	1.6E-11	1.4E-11	7.8E-15	1.7E-14
NNW	0.0E+00	0.0E+00	2.6E-11	5.2E-11	3.2E-11	1.3E-12	0.0E+00
NW	0.0E+00	1.9E-11	1.2E-10	1.3E-10	1.0E-10	1.9E-12	2.9E-14
WNW	0.0E+00	0.0E+00	0.0E+00	6.0E-11	4.2E-11	3.3E-11	3.5E-12
W	0.0E+00	0.0E+00	0.0E+00	4.6E-13	1.3E-12	1.8E-13	8.5E-12
WSW	0.0E+00	0.0E+00	0.0E+00	7.0E-15	7.8E-13	5.4E-13	5.4E-12
SW	0.0E+00	0.0E+00	0.0E+00	7.2E-12	4.7E-12	3.6E-12	1.0E-11
SSW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.8E-12	1.1E-11	8.8E-12
S	0.0E+00	2.4E-12	1.3E-14	0.0E+00	3.6E-12	4.6E-12	5.5E-12
SSE	0.0E+00	0.0E+00	4.3E-12	0.0E+00	6.1E-14	9.1E-12	1.1E-11
SE	0.0E+00	5.3E-12	1.2E-11	1.3E-11	5.8E-11	5.0E-11	9.0E-11
ESE	0.0E+00	4.6E-12	0.0E+00	2.3E-11	7.0E-11	7.8E-11	2.3E-10
E	0.0E+00	0.0E+00	0.0E+00	1.1E-11	1.9E-11	2.5E-11	1.3E-10
ENE	0.0E+00	0.0E+00	0.0E+00	5.1E-13	5.8E-13	3.0E-12	1.9E-11
NE	0.0E+00	2.5E-13	6.0E-13	1.2E-11	2.5E-12	0.0E+00	9.8E-14
NNE	0.0E+00	0.0E+00	1.3E-12	1.0E-11	3.0E-12	0.0E+00	4.4E-14

	Distance (m)					
Direction	14400	19200	25600	34400	48000	68000
N	0.0E+00	1.3E-13	4.6E-13	1.6E-12	8.3E-14	8.2E-14
NNW	0.0E+00	2.5E-12	6.4E-14	0.0E+00	0.0E+00	1.4E-12
NW	2.0E-12	4.1E-13	2.8E-11	9.8E-13	2.0E-13	1.4E-13
WNW	3.2E-11	2.6E-11	9.1E-13	2.3E-11	6.9E-12	8.7E-12
W	1.0E-11	5.3E-12	8.5E-12	8.6E-12	3.2E-11	3.5E-14
WSW	9.0E-12	8.8E-12	2.5E-12	6.1E-13	1.7E-12	1.0E-16
SW	8.9E-12	1.8E-12	2.8E-13	2.3E-14	0.0E+00	0.0E+00
SSW	1.4E-12	4.4E-13	3.4E-12	0.0E+00	0.0E+00	0.0E+00
S	7.7E-13	4.2E-12	1.9E-13	0.0E+00	0.0E+00	0.0E+00
SSE	1.7E-12	5.1E-12	2.5E-12	0.0E+00	5.2E-12	1.5E-11
SE	4.5E-11	1.2E-11	5.4E-11	4.5E-10	6.2E-10	4.4E-10
ESE	1.4E-10	2.0E-10	1.8E-10	4.6E-10	9.6E-10	5.0E-10
E	1.1E-10	2.3E-10	3.2E-10	2.0E-10	1.2E-10	6.3E-11
ENE	1.1E-11	2.4E-11	3.6E-11	1.6E-12	5.3E-13	5.5E-12
NE	3.6E-14	6.4E-12	1.2E-11	1.3E-11	7.8E-13	1.2E-11
NNE	0.0E+00	3.0E-13	4.3E-12	2.0E-12	3.6E-13	1.5E-13

C A P 8 8 - P C

Version 2.10

Clean Air Act Assessment Package - 1988

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

Non-Radon Population Assessment
Jun 4, 2008 04:55 pm

Facility: RMHF
Address: Santa Susana Field Laboratory
5800 Woolsey Canyon Road
City: Canoga Park
State: CA Zip: 91304

Source Category: DOE facility
Source Type: Stack
Emission Year: 2007

Comments: Population Dose from RMHF Releases
CY 2007

Effective Dose Equivalent (mrem/year)
2.90E-07

At This Location: 2400 Meters Northwest

Dataset Name: RMF_07PO
Dataset Date: 6/4/2008 4:55:00 PM
Wind File: C:\CAP88_21\WndFiles\SSFL2007.WND
Population File: C:\CAP88_21\Popfiles\SSFL2000.POP

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2400 Meters Northwest
Lifetime Fatal Cancer Risk: 2.43E-12

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
GONADS	2.48E-09	5.71E-07
BREAST	2.65E-09	6.07E-07
R MAR	2.83E-07	5.88E-05
LUNGS	1.23E-06	2.56E-04
THYROID	2.67E-09	6.11E-07
ENDOST	3.50E-06	7.27E-04
RMNDR	3.82E-09	8.53E-07
EFFEC	2.90E-07	6.01E-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	10222462	10222462	7.13E-09	7.13E-09

RADIONUCLIDE EMISSIONS DURING THE YEAR 2007

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
CS-137	D	1.00	2.1E-07	2.1E-07
BA-137M	D	1.00	2.0E-07	2.0E-07
TH-230	Y	1.00	7.5E-09	7.5E-09
H-3	*	0.00	2.1E-05	2.1E-05

SITE INFORMATION

Temperature:	14 degrees C
Precipitation:	29 cm/y
Humidity:	7 g/cu m
Mixing Height:	746 m

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 40.00
Diameter (m): 1.00

Plume Rise Momentum (m/s): 15.00
(Exit Velocity)

AGRICULTURAL DATA

	Vegetable	Milk	Meat
Fraction Home Produced:	0.020	0.000	0.000
Fraction From Assessment Area:	0.000	0.000	0.000
Fraction Imported:	0.980	1.000	1.000

Beef Cattle Density: 8.81E-02
Milk Cattle Density: 2.85E-02
Land Fraction Cultivated for Vegetable Crops: 1.18E-02

POPULATION DATA

Direction	Distance (m) 800	2400	4000	5600	7200	8800	11200
N	0	38	2055	7029	7689	5	14
NNW	0	0	3007	8597	6743	354	0
NW	0	562	6296	9532	10120	244	5
WNW	0	0	0	8175	7549	7392	1050
W	0	0	0	325	1129	193	12026
WSW	0	0	0	6	852	728	9539
SW	0	0	0	3554	3079	3041	11396
SSW	0	0	0	0	4166	5694	6453
S	0	305	3	0	1475	2306	3630
SSE	0	0	560	0	16	2991	4712
SE	0	188	832	1364	8154	9003	22249
ESE	0	201	0	2299	9422	13191	52287
E	0	0	0	1597	3483	5769	38595
ENE	0	0	0	280	387	2380	18881
NE	0	109	347	8915	2187	0	130
NNE	0	0	814	8261	2947	0	65

Direction	Distance (m) 14400	19200	25600	34400	48000	68000
N	0	202	1029	5024	434	873
NNW	0	1702	65	0	0	6131
NW	456	141	14242	748	255	346
WNW	13029	15438	804	30019	14607	35307
W	18841	13897	31911	46004	275199	540
WSW	20912	28943	12132	4209	18643	2
SW	13649	4018	925	108	0	0
SSW	1432	624	7206	0	0	0
S	681	5306	347	0	0	0
SSE	1007	4202	2979	0	13532	67961
SE	15379	5759	39912	493989	1110827	1461829
ESE	42581	90394	125998	465362	1623379	1719302
E	43909	133591	289752	263927	270781	283206
ENE	15185	45485	101785	6592	3517	74108
NE	63	15985	43962	69867	6882	208339
NNE	0	828	17371	11522	3341	2719