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Rocketdyne Division
Rockwell International Corporation
P.O. Box 7930
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Rockwell
International

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Operator for
U.S. Department of Energy

June 16, 1995

In reply refer to 95ETEC DRF-0556

R. Le Chevalier
Mail Stop T038
DOE-EETEC Site Manager
U. S. Department of Energy
Energy Technology Engineering Center
P. O. Box 7929
Canoga Park, CA 91309-7929

Subject: Final NESHAPs Report for 1994

Dear Mr. Le Chevalier:

Enclosed is the final NESHAPs Report for 1994 for the DOE facilities at SSFL. It is our understanding that your staff and DOE/OAK had no comments for revision. This report reflects the results of detailed analyses of effluent samples for the single radiological exhaust stack in operation at a DOE facility during 1994, and estimates of emissions from two diffuse area sources.

This report includes the Certification Statement signed by D. C. Gibbs for ETEC and yourself for the ETEC Site Office, required for the final report.

If you have any questions or comments on this report, please contact Phil Rutherford, at 818/586-6140.

Very truly yours,

M. E. Jensen, Program Manager
Environmental Programs
Energy Technology Engineering Center

Enclosure: Radionuclide Air Emissions Annual Report
(Individual Dose from Point Sources)

U. S. Department of Energy
Radionuclide Air Emissions Annual Report
(under Subpart H of 40 CFR Part 61)
Calendar Year 1994

Site Name: Santa Susana Field Laboratory
(Prepared April 27, 1995)

Operations Office Information

Office: Oakland Operations Office
Address: 1301 Clay Street Room 700N
Oakland, CA 94612-5208

Contact: Steve Lasell Phone: 510/637-1602

Site Information

Operator: Rocketdyne Division, Rockwell International Corp.
Address: 6633 Canoga Avenue
P. O. Box 7922
Canoga Park, CA 91309-7922

Contact: P. D. Rutherford (T100) Phone: 818/586-6140

Section I. Facility Information

Site Description

The Santa Susana Field Laboratory is located in a mountainous wilderness region between the residential areas of the Simi and San Fernando Valleys, at the boundary of Ventura and Los Angeles Counties, in southern California. The site consists of approximately 2668 acres, but DOE operations are limited to a designated area of about 90 acres. The climate is generally dry, with variable winds.

The facility formerly served as a test site for very low-power experimental nuclear reactors and for developmental fuel fabrication, and fuel decladding. For the past six years, only decontamination and decommissioning operations have been performed and essentially all radioactive material, except for small amounts of residual contamination, has been removed from the site.

Source Description

Potential sources of release of radionuclides at SSFL include both point and area (non-point) sources. The single operating point source consists of a ventilation exhaust stack, while the area sources consist of a slightly contaminated dirt area and a water retention sump bottom. Analytical results from effluent and material sampling, identifying and quantifying radionuclides, have been used in preparing this report.

The RMDF (Radioactive Materials Disposal Facility) is used for storage of waste packages waiting shipment to a DOE waste disposal site, evaporation of radioactively contaminated water generated in decontamination operations, and decontamination, size-reduction, and packaging in support of the decontamination operations. Ventilation from work areas in this facility is exhausted through HEPA filters and released from a stack. In the NESHAPs report, this release point is identified as Point Source #1.

(Building T059, a former low-power reactor test facility, previously used in the development of nuclear reactors in the Systems for Nuclear Auxiliary Power (SNAP) program, where remaining activated steel and concrete structural material has been removed in a decommissioning operation, had been included in prior reports, but no radioactive materials were discharged from this facility in 1994. Ventilation from work areas in this facility is exhausted through HEPA filters and released from a stack, only as needed to provide a breathable atmosphere in the workplace. During operation of the exhaust ventilation, the effluent was sampled. These samples were analyzed for radioactivity and none was found. Therefore, in this NESHAPs report, this stack is not considered to be a release point for radioactivity.)

(Building T023 is a research laboratory in which occasional samples had been analyzed for elemental content. Only very low levels of radioactivity were permitted at this lab. Process air from an inductively coupled plasma analytical unit is exhausted, without filtration, and released from a blower under the outside roof overhang. Since no radioactive materials were analyzed in this lab during 1994, this release point is not considered in this report.)

The RMDF Pond (Sump 614) is a collection sump for rainfall runoff from the RMDF. As it is dry some of the year, sediment may be subject to airborne resuspension by the wind. This presumed release has not been shown in air monitoring samples but is estimated by the methods used in RESRAD, based on laboratory analysis of sediment samples taken during a recent cleanout of the sump bottom. In the NESHAPs report, this area is identified as Area Source Number 1.

The RMDF North Slope is an identified area of low-level soil contamination. Radioactivity in this soil may become airborne by the wind. This presumed release has not been shown in air monitoring samples but is estimated by the methods used in RESRAD, based on analysis of surface soil samples. In the NESHAPs report, this area is identified as Area Source Number 2.

(The T886 Sodium Disposal Facility includes approximately 3 acres of land, small portions of which were contaminated with low levels of radioactivity. It has been remediated under DOE funding and is awaiting final soil sampling. All contaminated soil was removed and packaged for disposal, during 1993. No radioactive contamination remains at this facility and so this source is no longer considered in the NESHAPs report.)

Section II. Air Emissions Data

<u>Point Source</u>	<u>Type Control</u>	<u>Efficiency</u>	<u>Distance to Nearest Receptor</u>
RMDF (#1)	Pre- and HEPA filters	99.9%	2320 m SSE

<u>Point Source Radionuclides</u>	<u>Annual Quantity</u>	
	(Ci)	(Bq)
H-3	2.0E-05	740000
Co-60	6.2E-07	22940
Sr-90	1.9E-07	7030
Cs-137	1.7E-06	62900
Th-228	2.4E-09	89
Th-230	1.4E-09	52
U-234	8.9E-10	33
U-235	3.5E-11	1
U-238	3.0E-10	11
Pu-239	5.0E-09	185

Area (Non-Point) Source

RMDF Pond (Number 1)
 RMDF North Slope (Number 2)

<u>Area (Non-Point) Source Radionuclides</u>	<u>Annual Quantity</u>	
	(Ci)	(Bq)
Co-60	1.0E-07	3700
Sr-90	2.7E-07	9990
Cs-137	2.5E-06	92500
Eu-152	8.4E-09	311
Eu-154	1.2E-09	44

Section III. Dose Assessments

Description of Dose Model

The EPA computer program CAP88-PC is used.

Dose calculations performed to demonstrate compliance with the NESHAPs standard are based on determining the maximum estimated dose to an offsite individual located at a residence, school, business or office. For this purpose, the nearest such locations have been identified by review of maps, aerial photographs, and direct observation. The locations selected are in the nearest residential area of Simi Valley, the Brandeis-Bardin Institute, the Santa Monica Mountains Conservancy Sage Ranch office, the closest residence in Black Canyon, and the closest residence in Bell Canyon. The location with the greatest estimated annual dose calculated for these locations is considered to be the location of the Maximally Exposed Individual (MEI). The dose at this location differs from the dose to the MEI selected by CAP88-PC, and printed on the CAP88-PC Synopsis Report cover sheet, since the CAP88-PC selected maximum dose is at an unoccupied location.

The RMDF stack is used for the emission point location, and the resulting estimate of the facility Effective Dose Equivalent is compared with the NESHAPs standard to demonstrate compliance. The CAP88-PC calculation is based on laboratory analysis of an annual composite sample of the effluent, and analysis of evaporator water for tritium, which is assumed to pass through the filters, undiminished.

A dose estimate for the area sources is also calculated. The CAP88-PC calculation uses conservative estimates for the presumed, but unmeasurable, releases from the area sources. The area (non-point) source contribution to the facility dose is not included in the total facility dose estimate.

Compliance Assessment

Effective Dose Equivalent: 1.8E-06 (mrem) (1.8E-11 Sv)

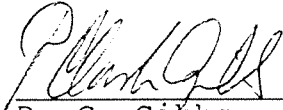
Location of Maximally Exposed Individual: residence in Simi Valley
(2867 m NW)

This estimated dose is well below the NESHAPs standard of 10 mrem (1.0E-04 Sv).

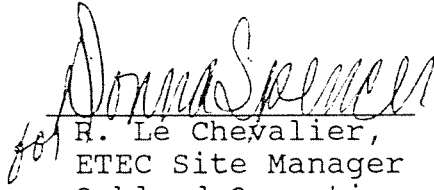
The estimated dose due to the area (non-point) sources is 8.0E-06 mrem (8.0E-11 Sv).

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).



Date: _____
D. C. Gibbs,
ETEC General Manager
Rocketdyne Division
Rockwell International



Date: _____
for R. Le Chevalier,
ETEC Site Manager
Oakland Operations Office
U. S. Department of Energy

Section IV. Additional Information

There were no unplanned releases in 1994.

The maximum estimated dose due to potential releases from the area sources in 1994 is $8.0E-06$ mrem/year ($8.0E-11$ Sv/year). Since releases from the area sources are too small and diffuse to permit accurate measurements, potential releases were estimated using the same method used in the RESRAD computer program (ANL/ES-160), for calculation of airborne radioactivity due to resuspension of soil by the wind. These estimated releases were used as input in the CAP88-PC program to perform the area source dose assessments. Releases from these sources have not been detectable by onsite continuous ambient air sampling.

Supplemental Information

The collective Effective Dose Equivalent estimated from DOE operations for releases from the monitored exhaust stack during 1994 is $4.5E-04$ person-rem ($4.5E-06$ person-Sv). The presumed releases estimated for the area sources implies an additional collective dose of approximately $4.8E-04$ person-rem ($4.8E-06$ person-Sv).

These estimates were calculated by using CAP88-PC in the "POPULATION" mode with a site-specific population distribution, based on 1990 census data, supplemented by estimates of personnel onsite. The population distribution is presented in a structure utilizing 16 directions, coinciding with the wind directions, and 20 radial zones, with the distances chosen to represent the center-of-area for each zone. These zones include the population within 80 km of the site. Doses due to both point and area sources are included, as described above.

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

Based on evaluation of each source with the assumption of no pollution control equipment installed, none of the sources requires monitoring as prescribed in 40CFR61.93(b). The stack effluent at RMDF is continuously sampled, counted for gross alpha and beta activity weekly, and composited annually for detailed radiochemical analysis. In addition, the evaporator feedwater is analyzed for tritium, and this measured concentration is used to calculate the release. Ambient air is continuously sampled on a daily basis, with weekly determination of gross alpha and beta activity, and these samples are composited (separately by location) annually for detailed radiochemical analysis. Aspects of the QA program described by Appendix B, Method 114 are implemented as appropriate for the low level of this surveillance effort.

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 Individual Assessment
Apr 27, 1995 1:11 pm

Facility: RMDF
Address: SSFL, Top of Woolsey Canyon Road, Simi Hills
City: Chatsworth
State: CA Zip: 91311

Effective Dose Equivalent
(mrem/year)

2.11E-06

At This Location: 2318 Meters Northwest
Source Category: DOE facility
Source Type: Stack
Emission Year: 1994

Comments: CAP88PC calculation for 1994 Annual Environmental
Report, maximum exposed individual.

Dataset Name: RMDF94IND
Dataset Date: Apr 27, 1995 1:11 pm
Wind File: WNDFILES\SSFLNRC.WND

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 2318 Meters Northwest
Lifetime Fatal Cancer Risk: 4.73E-11

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	2.10E-06
BREAST	1.91E-06
R MAR	2.00E-06
LUNGS	2.89E-06
THYROID	1.99E-06
ENDOST	4.38E-06
RMNDR	1.72E-06
EFFEC	2.11E-06

RADIONUCLIDE EMISSIONS DURING THE YEAR 1994

Nuclide	Class	Size	Source #1 Ci/y	TOTAL Ci/y
CO-60	Y	1.00	6.2E-07	6.2E-07
SR-90	D	1.00	1.9E-07	1.9E-07
Y-90	Y	1.00	1.9E-07	1.9E-07
CS-137	D	1.00	1.7E-06	1.7E-06
BA-137M	D	1.00	1.4E-06	1.4E-06
TH-228	Y	1.00	2.4E-09	2.4E-09
TH-230	Y	1.00	1.4E-09	1.4E-09
U-234	Y	1.00	8.9E-10	8.9E-10
U-235	Y	1.00	3.5E-11	3.5E-11
U-238	Y	1.00	3.0E-10	3.0E-10
TH-234	Y	1.00	3.0E-10	3.0E-10
PA-234M	Y	1.00	3.0E-10	3.0E-10
PU-239	Y	1.00	5.0E-09	5.0E-09
H-3	*	0.00	2.0E-05	2.0E-05

SITE INFORMATION

Temperature: 17 degrees C
Precipitation: 30 cm/y
Mixing Height: 366 m

SOURCE INFORMATION

Source Number: 1

Stack Height (m): 39.60
Diameter (m): 0.92

Plume Rise
Momentum (m/s): 9.25E+00
(Exit Velocity)

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

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

DISTANCES USED FOR MAXIMUM INDIVIDUAL ASSESSMENT

2318 2370 2867 3393 4167

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 27, 1995 1:11 pm

Facility: RMDF
Address: SSFL, Top of Woolsey Canyon Road, Simi Hills
City: Chatsworth
State: CA Zip: 91311

Source Category: DOE facility
Source Type: Stack
Emission Year: 1994

Comments: CAP88PC calculation for 1994 Annual Environmental
Report, maximum exposed individual.

Dataset Name: RMDF94IND
Dataset Date: Apr 27, 1995 1:11 pm
Wind File: WNDFILES\SSFLNRC.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	2.10E-06
BREAST	1.91E-06
R MAR	2.00E-06
LUNGS	2.89E-06
THYROID	1.99E-06
ENDOST	4.38E-06
RMNDR	1.72E-06
EFFEC	2.11E-06

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	1.69E-07
INHALATION	2.75E-07
AIR IMMERSION	9.06E-11
GROUND SURFACE	1.66E-06
INTERNAL	4.44E-07
EXTERNAL	1.66E-06
TOTAL	2.11E-06

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
CO-60	5.09E-07
SR-90	4.01E-08
Y-90	1.67E-10
CS-137	1.12E-07
BA-137M	1.18E-06
TH-228	5.44E-08
TH-230	3.21E-08
U-234	1.09E-08
U-235	4.14E-10
U-238	3.25E-09
TH-234	1.70E-12
PA-234M	9.18E-19
PU-239	1.63E-07
H-3	7.19E-10
TOTAL	2.11E-06

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	5.82E-12
BONE	4.63E-13
THYROID	9.05E-13
BREAST	7.48E-12
LUNG	1.07E-11
STOMACH	4.78E-12
BOWEL	2.38E-12
LIVER	5.60E-12
PANCREAS	3.22E-12
URINARY	2.00E-12
OTHER	3.94E-12
TOTAL	4.73E-11

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	3.89E-12
INHALATION	3.52E-12
AIR IMMERSION	2.19E-15
GROUND SURFACE	3.99E-11
INTERNAL	7.41E-12
EXTERNAL	3.99E-11
TOTAL	4.73E-11

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk
CO-60	1.26E-11
SR-90	6.76E-13
Y-90	5.80E-15
CS-137	2.92E-12
BA-137M	2.83E-11
TH-228	1.09E-12
TH-230	2.64E-13
U-234	1.43E-13
U-235	5.54E-15
U-238	4.26E-14
TH-234	6.40E-17
PA-234M	2.34E-23
PU-239	1.29E-12
H-3	1.95E-14
TOTAL	4.73E-11

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

Direction	Distance (m)				
	2318	2370	2867	3393	4167
N	5.1E-07	5.0E-07	4.6E-07	4.2E-07	3.8E-07
NNW	1.3E-06	1.3E-06	1.1E-06	1.0E-06	8.9E-07
NW	2.1E-06	2.1E-06	1.8E-06	1.6E-06	1.4E-06
WNW	1.3E-06	1.3E-06	1.1E-06	1.0E-06	8.8E-07
W	4.2E-07	4.2E-07	4.0E-07	3.8E-07	3.5E-07
WSW	5.8E-07	5.7E-07	5.2E-07	4.7E-07	4.2E-07
SW	6.6E-07	6.5E-07	5.6E-07	5.0E-07	4.4E-07
SSW	5.9E-07	5.8E-07	5.2E-07	4.7E-07	4.2E-07
S	5.3E-07	5.2E-07	4.8E-07	4.4E-07	4.0E-07
SSE	1.0E-06	9.9E-07	8.7E-07	7.8E-07	6.7E-07
SE	1.5E-06	1.4E-06	1.2E-06	1.1E-06	9.3E-07
ESE	9.4E-07	9.2E-07	8.1E-07	7.3E-07	6.3E-07
E	3.9E-07	3.8E-07	3.6E-07	3.4E-07	3.1E-07
ENE	4.3E-07	4.3E-07	3.9E-07	3.7E-07	3.3E-07
NE	4.8E-07	4.7E-07	4.3E-07	4.0E-07	3.6E-07
NNE	4.9E-07	4.9E-07	4.4E-07	4.1E-07	3.7E-07

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

Direction	Distance (m)				
	2318	2370	2867	3393	4167
N	1.2E-11	1.1E-11	1.0E-11	9.6E-12	8.7E-12
NNW	3.0E-11	2.9E-11	2.6E-11	2.3E-11	2.0E-11
NW	4.7E-11	4.7E-11	4.1E-11	3.7E-11	3.1E-11
WNW	2.9E-11	2.8E-11	2.5E-11	2.3E-11	2.0E-11
W	9.7E-12	9.6E-12	9.1E-12	8.6E-12	8.0E-12
WSW	1.3E-11	1.3E-11	1.2E-11	1.1E-11	9.5E-12
SW	1.5E-11	1.5E-11	1.3E-11	1.1E-11	1.0E-11
SSW	1.3E-11	1.3E-11	1.2E-11	1.1E-11	9.4E-12
S	1.2E-11	1.2E-11	1.1E-11	1.0E-11	9.0E-12
SSE	2.3E-11	2.2E-11	2.0E-11	1.7E-11	1.5E-11
SE	3.3E-11	3.2E-11	2.8E-11	2.5E-11	2.1E-11
ESE	2.1E-11	2.1E-11	1.8E-11	1.6E-11	1.4E-11
E	8.8E-12	8.7E-12	8.2E-12	7.7E-12	7.1E-12
ENE	9.8E-12	9.7E-12	8.9E-12	8.4E-12	7.6E-12
NE	1.1E-11	1.1E-11	9.8E-12	9.0E-12	8.2E-12
NNE	1.1E-11	1.1E-11	1.0E-11	9.4E-12	8.4E-12
