MMSC-EM-95040
UC-707

Radionuclide Air Emissions Annual Report for Calendar Year 1994

RECEIVED
AUG 30 1995
OSTI

April 4, 1995

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

LOCKHEED MARTIN

Martin Marietta Specialty Components, Inc., is the Management and Operating Contractor for the Pinellas Plant Under U.S. Department of Energy Contract No. DE-AC04-92AL73000.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Title: Radionuclide Air Emissions Annual Report for Calendar Year 1994

Number: MMSC-EM-95040

Issue Date: April 4, 1995

DOCUMENT CONTROL

This document will be maintained in accordance with the sitewide document control procedures. Document control elements include unique issue numbers, document identification, numbered pages, document distribution records, revision tracking, a document MASTER filing and retrieval system, and a document archiving system.

The Pinellas Plant
P.O. Box 2908
Largo, Florida 34649-2908

Martin Marietta Specialty Components, Inc., is the Management and Operating contractor for the Pinellas Plant under U.S. Department of Energy Contract No. DE-AC04-92AL73000.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

LEW

DISTRIBUTION OF THIS DOCUMENT IS LIMITED
TO DOE OFFICES AND DOE CONTRACTORS

MASTER

This page left blank intentionally.

DOCUMENT APPROVALS

D.W. Brown

D.W. Brown, Senior Specialist
Environmental Protection

4/3/95
Date

Charles A. Biedermann

C.A. Biedermann, Manager
Environmental Restoration and Permitting

4/5/95
Date

E. Mayer

E.E. Mayer, Director
Environmental, Safety and Health

4/5/95
Date

Reviewed and Accepted By: PAO/DOE

Sarah E. Hartson

Sarah Hartson, Environmental Compliance Specialist
Environmental Programs

4/6/95
Date

REVIEWED FOR CLASSIFICATION:

TE Wagner

Classification Officer/Analyst/Derivative Classifier

4/4/95
Date

UNCLASSIFIED

Classification Level

This page left blank intentionally.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 Facility Information	1
1.1 Site Description	1
1.2 Source Description	1
2.0 Air Emissions Data	3
3.0 Dose Assessments	4
3.1 Description of Dose Model	4
3.2 Summary of Input Parameters	4
4.0 Additional Information	8
4.1 Unplanned Releases	8
4.2 Diffuse Emissions	8
4.3 Supplemental Information	8
5.0 Distribution	11

Listing of Attachments

Attachment A - CAP88-PC Non-Radon Individual Assessment	A-1
Attachment B - CAP88-PC Non-Radon Population Assessment	B-1
Attachment C -Summary of Stack Flow Rate Measurements Conducted August 1994 and December 1994	C-1
Attachment D- Pinellas Plant 1994 Annual Windrose and Pinellas Plant Meteorological Station Wind Frequency Distribution, 1994, by Windspeed, Stability Class, and Origin	D-1
Attachment E - HOTSPOT Computer Model Run	E-1

Listing of Tables

<u>Table</u>		
1	Summary of Agricultural Data Inputs	5
2	Summary of Pinellas Plant Radiological Emissions Sources	5
3	Summary of Pinellas Plant Receptors	6

This page left blank intentionally.

U. S. Department of Energy
Air Emissions Annual Report
(under Subpart H, 40 CFR 61.94)
Calendar Year 1994
for the
United States Department of Energy - Pinellas Plant

Site Name: U. S. Department of Energy - Pinellas Plant

Operations Office Information

Office: U. S. Department of Energy, Pinellas Area Office

Address: 7887 Bryan Dairy Road,
Largo, Florida 34643

Contact: Sarah Hartson, DOE-PAO Phone: (813) 545-6139
Environmental Compliance Specialist

Site Information

Operator: Martin Marietta Specialty Components, Inc.

Address: 7887 Bryan Dairy Road
Largo, Florida 34643

Contact: E.E. Mayer, Director
Environmental, Safety and Health

Phone: (813) 541-8616

This page left blank intentionally.

1.0 FACILITY INFORMATION

1.1 Site Description

The Pinellas Plant is located on a 99-acre site in the center of Pinellas County, Florida. The plant site is bordered on the east by Belcher Road, on the south by Bryan Dairy Road, and on the west by the CSX Railroad. The county is a peninsula bordered on the west by the Gulf of Mexico and on the east and south by Tampa Bay. The plant site is centrally located between the county's major municipalities of Clearwater and St. Petersburg. The coordinates of the southwest corner of the plant site are 27 degrees 52.5 minutes north latitude and 82 degrees 45 minutes west longitude.

The Pinellas Plant is located near the geographic center of Pinellas County, Florida. With a land area of 252 square miles and a resident population of 882,982, based on the 1990 census estimate, Pinellas County is the most densely populated county in Florida with approximately 3,100 persons per square mile. The total 1990 population within a 50-mile radius of the Pinellas Plant is 2,529,869. The climate of Pinellas County is subtropical with a mean annual temperature of 72.2 Degrees Fahrenheit (F) (22.6 Degrees Centigrade [C]). The 1994 annual precipitation at the Pinellas Plant was 47.2 inches (120.0 cm) as measured by the on-site meteorological station. Prevailing winds are from the east to northeast. The topography of the area surrounding the Pinellas Plant is flat.

The Pinellas Plant is operated by Martin Marietta Specialty Components, Inc., (Specialty Components) for the United States Department of Energy (DOE). The primary Defense Programs (DP) mission ended on October 1, 1994. The Pinellas Plant previously manufactured components for the nation's nuclear weapons complex. The Plant's products included neutron generators and detectors, vacuum switch tubes, electromagnetic devices, capacitors, thermal batteries, frequency control devices, quartz digital accelerometers, lightning arrester connectors, ceramics, and foam support pads.

The plant's new mission is to clean up the facility from the past DOE mission and transition the plant to alternate use. New commercial businesses will produce components similar to those previously manufactured by the DOE as well as new products. Tritium may continue to be used in the production processes for these new products; therefore, tritium emissions could continue at very low levels through a new exhaust stack. As the plant's radiological processing equipment is cleaned up from past DOE operations, emissions will continue to be monitored and documented in this annual report. As all radiological sources are removed, the exhaust ducts and stacks will be removed and EPA will be notified through routine reporting.

1.2 Source Description

The manufacture and testing of neutron generators involves handling small quantities of tritium and krypton-85 (Kr-85). There are six point sources of radiological emissions at the Pinellas Plant: the Building 100 Main Stack, the Building 100 Laboratory Stack, the Building 200 Stack, the Building 800 Stack, and two chemistry laboratory stacks located on Building 100 (Roof Openings 378 and 413). The Building 100 Main Stack exhausts tritium gas and oxide from high vacuum production equipment and Kr-85 gas from leak check operations. Prior to being exhausted from the Main Stack, the un-used process tritium enters the Tritium Recovery System (TRS), an emission control device, where approximately 99% of the tritium is removed from the process exhaust stream and collected on molecular sieve columns. These columns are disposed of at an approved DOE facility as solid radioactive waste. The room air from tritium operations areas is exhausted directly to the Main Stack. The Building 100 Laboratory Stack exhausts tritium gas and oxide from high vacuum engineering equipment. The Building 200 Stack exhausts tritium gas and oxide from destructive testing of neutron generators. A High Efficiency Particulate Accumulator (HEPA) filtration system removes particulates prior to exhausting through the Building 200 Stack. The Building 800 Stack exhausts tritium gas and oxide emissions from linear accelerator operations. The Building 100 Roof Opening 378 exhausts extremely small quantities of tritium from chemical analytical processes, and Roof Opening 413 exhausts tritium from environmental analytical processes.

2.0 AIR EMISSIONS DATA

<u>Point Source</u>	<u>Type Control</u>	<u>Efficiency</u>	<u>Distance to Nearest Receptor*</u>
Building 100 Main Stack	TRS	99%	620 Meters
Building 100 Lab Stack	TRS	99%	500 Meters
Building 200 Stack	Uncontrolled	0%	475 Meters
Building 800 Stack	Uncontrolled	0%	475 Meters
Building 100 Roof Opening 378	Uncontrolled	0%	490 Meters
Building 100 Roof Opening 413	Uncontrolled	0%	460 Meters

- * Distance Provided is the distance to the nearest off-site residence.
All sources are monitored for radionuclide release.

Grouped Source:

None

<u>Point Source Radionuclide</u>	<u>CY 1994 Annual Quantity Curies (Ci)</u>	<u>Becquerels (Bq)</u>
Tritium Gas	13.58	5.02E+11
Tritium Oxide	11.38	4.21E+11
Krypton-85 Gas	<u>12.90</u>	4.77E+11
Total 1994 Emissions	37.86	1.40E+12

Non-Point Source:

None

3.0 DOSE ASSESSMENTS

3.1 Description of Dose Model

CAP88-PC Version 1.0 was used to determine the Effective Dose Equivalent (EDE) to the most exposed member of the public and to calculate the collective population dose. This model received the Environmental Protection Agency's (EPA) approval for DOE's use in demonstrating compliance with radiological dose standards. CAP88-PC assumes a most conservative case scenario where all tritium emissions are in the oxide form, which is approximately 25,000 times more biologically reactive than tritium gas. There are no area sources of emissions at the Pinellas Plant; therefore, all emissions modeled are stack emissions. Actual distances to the nearest off-site residences were used because doses for the Maximally Exposed Individual (MEI), estimated by CAP88-PC for the location of highest risk, is not where an individual actually resides. Local residences are where an individual could potentially be exposed 24 hours a day, 365 days a year, and ingest locally grown vegetables and meat.

3.2 Summary of Input Parameters

Meteorological data collected at the Pinellas Plant during 1994 were used to prepare a standard Stability Array (STAR) meteorological input file (Attachment E). This input file was transformed into a native *.WND file by using the CAP88-PC's GETWIND utility to generate the site specific meteorological input file for the model run. Specific input values for 1994 were a mean annual temperature of 22.63 Degrees C and a total annual rainfall of 120.0 centimeters. A mean mixing height of 1500 meters was used in both individual and cumulative modeling scenarios. CAP88-PC default input values were used as source inputs, where prescribed.

Input file parameters for the agricultural data, radiological emission point sources, and Pinellas Plant receptor inputs are provided in the following tables.

Table 1. Summary of Agricultural Data Inputs

	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

Table 2. Summary of Pinellas Plant Radiological Emission Sources

Source	Total Tritium* (Curies)	Kr-85 (Curies)	Stack Height (Meters)	Stack Diameter (Meters)	Stack Velocity (Meters/sec)
Building 100 Main Stack	22.80	12.9	21.34	2.44	4.43
Building 100 Lab Stack	2.08	N/A	30.48	1.52	5.83
Building 200 Stack	BDL	N/A	17.38	0.3	7.65
Building 800 Stack	0.081	N/A	9.14	0.51	4.97
Building 100 Roof opening #413	2.16 E -04	N/A	9.14	0.28	12.0
Building 100 Roof Opening #378	1.49E -03	N/A	13.13	0.63	9.05

* Tritium Oxide plus Tritium Gas

BDL - emissions from this point source are below detection limits

N/A - Kr-85 is not emitted from this source

Table 3. Summary of Pinellas Plant Receptors

Receptor	Direction	Distance, meters	Effective Dose (mrem/yr)	Effective Dose (mSv/yr)
Apartment	WSW	620	4.8E-03	4.8E-05
House	NW	1040	3.9E-03	3.9E-05
Apartment	NNE	730	3.9E-03	3.9E-05
Calculated Most Exposed Individual	W	450	5.6E-03	5.6E-05

Effective Dose Equivalent: 5.65E-03 mrem /yr

Location of MEI:

As determined by the model, the location of the MEI is 450 meters west of the Building 100 Main Stack; however, there are no full time residents at this location. The individual EDEs listed in Table 2 were taken from page five of the CAP88-PC Dose and Risk Equivalent Summary Report (Attachment A). The doses listed in the table include all radionuclides and all pathways.

National Emission Standards for Hazardous Air Pollutants (NESHAP) compliance was determined through dispersion modeling of radionuclide emissions with EPA's CAP88-PC computer model Version 1.0. The results of the modeling confirm that the facility is in compliance with the EPA's 10 millirem per year exposure limit.

Certifications

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: Dawn Gillas, Team Leader, Environmental Programs
Pinellas Area Office, U.S. DOE

Signature:

A handwritten signature in black ink, appearing to read "Dawn L. Gillas", is written over a horizontal line.

Date:

A handwritten date "4/7/95" in black ink is written over a horizontal line.

4.0 ADDITIONAL INFORMATION

As part of the Department of Energy's nonnuclear reconfiguration initiative, the Pinellas Plant completed its Defense Programs (DP) role. The plant is actively undergoing a formalized transition process that involves the transfer of equipment historically associated with the DP mission to other DOE sites. To effectively and safely conduct this activity, a partial plant cleanup effort, involving the consolidation of radiological processing equipment and the removal of the laboratory stack, is planned in 1995.

Upon completion of the consolidation effort, radiological emissions will be restricted to the Building 100 Main Stack, Roof Opening 489, and Building 200 and 800 Stacks. Roof Opening 413 emissions were relocated and are now exhausted through Roof Opening 489. Roof Opening 378 emissions were relocated and are now exhausted through the Building 100 Main Stack. This consolidation effort is not anticipated to result in an increase in annual radiological emissions or resultant dose to the public, and the Pinellas Plant compliance status, with respect to 1% of the 10 mrem/yr standard, will not be affected. Roof Opening 489 emissions will be sampled for a one-month period during 1995 to verify the low estimated emissions.

A new, higher horsepower fan motor was installed in the Building 100 Main Stack to increase ventilation in the radiological processing Area 108. This caused the stack flowrate to increase to 43,863 cubic feet per minute, which was measured on August 18, 1994, using EPA Method 1 and Method 2 requirements. (Attachment C) This higher flowrate and corresponding velocity were used in the CAP88-PC modeling run.

4.1 Unplanned Releases

On July 22, 1994, approximately 4 curies of tritium gas were released to the Main Stack during leak checking of tritium processing equipment. The release was quantified by both the stack flow through ionization chamber and the daily and monthly silica gel columns. Specialty Components used the HOTSPOT computer model for dispersion modeling and the total committed EDE at the fence line was estimated at 1.2E-02 mrem (see Attachment E). Administrative controls for the leak checking operation were put in place to prevent this release from recurring.

4.2 Diffuse Emissions

The Pinellas Plant has no known sources of diffuse emissions.

4.3 Supplemental Information

1994 Collective Effective Dose Equivalent (Person-rem/year)

The plant estimated the 1994 collective population dose to be 9.71E-02 person-rem/year, based on the CAP88-C modeling results using 1994 emissions data.

The CAP88-C cumulative population dose calculation modeling output file is included as Attachment B of this report. The population distribution within a 50-mile radius of the Pinellas Plant was obtained from a study entitled "Population Density Within A Fifty-Mile Radius Of The Department Of Energy Pinellas Plant," Dr. W.E. Bolch, April 1992.

Status of Compliance with Subpart Q and T of 40 CFR 61

Subpart Q and T do not apply because the Pinellas Plant does not store or dispose byproduct material or uranium mill tailings.

Information on Rn-220 Emissions from Sources Containing U-232 and Th-232

There are no Rn-220 sources at the Pinellas Plant.

Information on Rn-222 Emissions

There are no Rn-222 sources at the Pinellas Plant.

Status of Compliance with NESHAPS Monitoring Requirements

On March 24, 1992, the EPA documented their review and approval of a COMPLY computer model run using a most conservative case emissions scenario, which projected the EDE of 0.082 mrem/yr to the MEI and classified the Building 100 Main Stack as a "minor" radionuclide release point. In December 1992, the Pinellas Plant submitted a radionuclide emissions minor source certification report for 1992 to the EPA. It included an EPA-approved COMPLY computer model run using a most conservative case emissions scenario; i.e., the TRS is assumed to be nonoperational and subsequently all tritium processed is released uncontrolled. The TRS normally removes 99% of all tritium prior to discharge through the Building 100 Main Stack. In 1993, the COMPLY computer model estimated an EDE of 0.096 mrem/yr.

For 1994, another COMPLY modeling run was conducted using the same scenario and Pinellas Plant meteorological data. The report documented that even under this most conservative case simulation, the dose would be 0.051 mrem/yr, which is below the 0.1 mrem/yr EPA standard. This verifies that the plant is a minor source of radionuclide emissions and is not required to continuously monitor and sample the radiological exhaust stacks. As a best management practice, the plant continuously monitors the Main Laboratory, Building 200 and Building 800 exhaust stacks and samples Roof Openings 378 and 413 on a periodic basis.

The Pinellas Plant annually measures radiological stack flowrate using EPA Standard Method 2 procedures to verify stack flowrates. The plant measured flowrates of the Main Stack and Laboratory Stack on Building 100 in 1994. The measurements were comparable to previous measurements. These flow measurements are provided in Attachment C.

5.0 DISTRIBUTION

DOE

D. L. Gillas MS 015

S. Hartson (3) MS 015

OSTI, Oak Ridge (2)

Pinellas Plant

C. A. Biedermann MS 001

E. E. Mayer (2) MS 001

T. J. Pharo MS 040

A. S. Weaver MS 040

Technical Support (MASTER) MS 039

This page left blank intentionally.

ATTACHMENT A

CAP88-PC Non-Radon Individual Assessment

This page left blank intentionally.

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

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL Zip: 34649-2908

Effective Dose Equivalent
(mrem/year)

5.65E-03

At This Location: 450 Meters West

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: INDIVIDUAL RUN

Dataset Name: 1994INDIV

Dataset Date: Mar 29, 1995 10:44 am

Wind File: WNDFILES\1994.WND

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 450 Meters West
Lifetime Fatal Cancer Risk: 1.53E-07

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Dose Equivalent (mrem/y)
GONADS	5.35E-03
BREAST	5.35E-03
R MAR	5.31E-03
LUNGS	5.38E-03
THYROID	5.32E-03
ENDOST	4.22E-03
RMNDR	6.47E-03
EFFEC	5.65E-03

Mar 29, 1995 10:55 am

SYNOPSIS

Page 2

RADIONUCLIDE EMISSIONS DURING THE YEAR 1994

Nuclide	Class	Size	Source	Source	Source	Source	Source	Source	TOTAL
			#1	#2	#3	#4	#5	#6	
			Ci/y	Ci/y	Ci/y	Ci/y	Ci/y	Ci/y	Ci/y
H-3	*	0.00	2.3E+01	2.1E+00	0.0E+00	8.1E-02	2.2E-04	1.5E-03	2.5E+01
KR-85	*	0.00	1.3E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+01

SITE INFORMATION

Temperature: 23 degrees C
Precipitation: 120 cm/y
Mixing Height: 1500 m

SOURCE INFORMATION

Source Number:	1	2	3	4	5	6
Stack Height (m):	21.34	30.48	17.38	9.14	9.14	13.13
Diameter (m):	2.44	1.52	0.30	0.51	0.28	0.63
Plume Rise						
Momentum (m/s):	4.43E+00	5.83E+00	7.65E+00	4.97E+00	1.20E+01	9.05E+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

130	200	230	240	400	450	480	620	730	890
1040	2000	3000	4000	5000	6000	7000	8000	9000	10000

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

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL Zip: 34649-2908

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: INDIVIDUAL RUN

Dataset Name: 1994INDIV

Dataset Date: Mar 29, 1995 10:44 am

Wind File: WNDFILES\1994.WND

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)
GONADS	5.35E-03
BREAST	5.35E-03
R MAR	5.31E-03
LUNGS	5.38E-03
THYROID	5.32E-03
ENDOST	4.22E-03
RMNDR	6.47E-03
EFFEC	5.65E-03

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)
INGESTION	3.65E-03
INHALATION	1.99E-03
AIR IMMERSION	1.16E-05
GROUND SURFACE	0.00E+00
INTERNAL	5.64E-03
EXTERNAL	1.16E-05
TOTAL	5.65E-03

Mar 29, 1995 10:55 am

SUMMARY
Page 2

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclide	Selected Individual (mrem/y)
H-3	5.63E-03
KR-85	1.72E-05
TOTAL	5.65E-03

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk
LEUKEMIA	1.68E-08
BONE	7.47E-10
THYROID	2.42E-09
BREAST	2.09E-08
LUNG	2.67E-08
STOMACH	2.07E-08
BOWEL	1.12E-08
LIVER	1.86E-08
PANCREAS	1.27E-08
URINARY	6.92E-09
OTHER	1.55E-08
TOTAL	1.53E-07

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk
INGESTION	9.85E-08
INHALATION	5.45E-08
AIR IMMERSION	2.77E-10
GROUND SURFACE	0.00E+00
INTERNAL	1.53E-07
EXTERNAL	2.77E-10
TOTAL	1.53E-07

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual
	Total Lifetime Fatal Cancer Risk
H-3	1.53E-07
KR-85	4.85E-10
TOTAL	1.53E-07

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

Direction	Distance (m)						
	130	200	230	240	400	450	480
N	3.8E-03	4.2E-03	4.4E-03	4.5E-03	4.8E-03	4.7E-03	4.7E-03
NNW	3.4E-03	3.6E-03	3.7E-03	3.8E-03	4.1E-03	4.1E-03	4.1E-03
NW	3.4E-03	3.6E-03	3.8E-03	3.8E-03	4.2E-03	4.3E-03	4.3E-03
WNW	3.5E-03	3.9E-03	4.0E-03	4.0E-03	4.5E-03	4.5E-03	4.5E-03
W	3.9E-03	4.6E-03	4.9E-03	4.9E-03	5.6E-03	5.6E-03	5.6E-03
WSW	3.4E-03	3.9E-03	4.1E-03	4.2E-03	4.9E-03	4.9E-03	4.9E-03
SW	3.7E-03	4.3E-03	4.6E-03	4.7E-03	5.1E-03	5.0E-03	5.0E-03
SSW	3.3E-03	3.6E-03	3.7E-03	3.8E-03	4.1E-03	4.1E-03	4.1E-03
S	3.5E-03	3.8E-03	4.0E-03	4.0E-03	4.5E-03	4.6E-03	4.6E-03
SSE	3.5E-03	4.1E-03	4.3E-03	4.3E-03	4.5E-03	4.4E-03	4.4E-03
SE	3.6E-03	4.3E-03	4.5E-03	4.6E-03	4.7E-03	4.6E-03	4.6E-03
ESE	3.4E-03	3.8E-03	4.0E-03	4.0E-03	4.4E-03	4.3E-03	4.3E-03
E	3.3E-03	3.6E-03	3.7E-03	3.8E-03	4.1E-03	4.1E-03	4.1E-03
ENE	3.2E-03	3.4E-03	3.5E-03	3.5E-03	3.7E-03	3.7E-03	3.7E-03
NE	3.4E-03	3.6E-03	3.7E-03	3.7E-03	3.9E-03	3.9E-03	3.8E-03
NNE	3.4E-03	3.8E-03	4.0E-03	4.1E-03	4.4E-03	4.3E-03	4.3E-03

Direction	Distance (m)						
	620	730	890	1040	2000	3000	4000
N	4.5E-03	4.3E-03	4.0E-03	3.9E-03	3.4E-03	3.3E-03	3.2E-03
NNW	4.0E-03	3.9E-03	3.8E-03	3.7E-03	3.3E-03	3.2E-03	3.2E-03
NW	4.3E-03	4.2E-03	4.0E-03	3.9E-03	3.5E-03	3.3E-03	3.2E-03
WNW	4.5E-03	4.4E-03	4.2E-03	4.0E-03	3.6E-03	3.4E-03	3.3E-03
W	5.4E-03	5.2E-03	4.8E-03	4.6E-03	3.8E-03	3.5E-03	3.4E-03
WSW	4.8E-03	4.6E-03	4.4E-03	4.2E-03	3.7E-03	3.4E-03	3.3E-03
SW	4.7E-03	4.5E-03	4.2E-03	4.0E-03	3.6E-03	3.4E-03	3.3E-03
SSW	4.0E-03	3.9E-03	3.8E-03	3.7E-03	3.5E-03	3.3E-03	3.2E-03
S	4.5E-03	4.3E-03	4.2E-03	4.1E-03	3.6E-03	3.4E-03	3.3E-03
SSE	4.2E-03	4.0E-03	3.9E-03	3.7E-03	3.4E-03	3.2E-03	3.2E-03
SE	4.3E-03	4.1E-03	3.9E-03	3.8E-03	3.4E-03	3.2E-03	3.2E-03
ESE	4.1E-03	4.0E-03	3.8E-03	3.7E-03	3.3E-03	3.2E-03	3.2E-03
E	4.0E-03	3.9E-03	3.8E-03	3.7E-03	3.4E-03	3.3E-03	3.2E-03
ENE	3.6E-03	3.5E-03	3.4E-03	3.4E-03	3.2E-03	3.2E-03	3.1E-03
NE	3.7E-03	3.7E-03	3.5E-03	3.5E-03	3.2E-03	3.2E-03	3.1E-03
NNE	4.1E-03	3.9E-03	3.7E-03	3.6E-03	3.3E-03	3.2E-03	3.1E-03

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

Direction	Distance (m)					
	5000	6000	7000	8000	9000	10000
N	3.2E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
NNW	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
NW	3.2E-03	3.2E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
WNW	3.2E-03	3.2E-03	3.2E-03	3.1E-03	3.1E-03	3.1E-03
W	3.3E-03	3.3E-03	3.2E-03	3.2E-03	3.2E-03	3.2E-03
WSW	3.3E-03	3.2E-03	3.2E-03	3.2E-03	3.1E-03	3.1E-03
SW	3.2E-03	3.2E-03	3.2E-03	3.1E-03	3.1E-03	3.1E-03
SSW	3.2E-03	3.2E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
S	3.3E-03	3.2E-03	3.2E-03	3.2E-03	3.1E-03	3.1E-03
SSE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
SE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
ESE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
E	3.2E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
ENE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
NE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03
NNE	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03	3.1E-03

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

Direction	Distance (m)						
	130	200	230	240	400	450	480
N	1.0E-07	1.1E-07	1.2E-07	1.2E-07	1.3E-07	1.3E-07	1.3E-07
NNW	9.1E-08	9.8E-08	1.0E-07	1.0E-07	1.1E-07	1.1E-07	1.1E-07
NW	9.1E-08	9.8E-08	1.0E-07	1.0E-07	1.1E-07	1.2E-07	1.2E-07
WNW	9.6E-08	1.0E-07	1.1E-07	1.1E-07	1.2E-07	1.2E-07	1.2E-07
W	1.1E-07	1.2E-07	1.3E-07	1.3E-07	1.5E-07	1.5E-07	1.5E-07
WSW	9.1E-08	1.1E-07	1.1E-07	1.1E-07	1.3E-07	1.3E-07	1.3E-07
SW	1.0E-07	1.2E-07	1.2E-07	1.3E-07	1.4E-07	1.4E-07	1.4E-07
SSW	8.9E-08	9.7E-08	1.0E-07	1.0E-07	1.1E-07	1.1E-07	1.1E-07
S	9.4E-08	1.0E-07	1.1E-07	1.1E-07	1.2E-07	1.2E-07	1.2E-07
SSE	9.5E-08	1.1E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07
SE	9.7E-08	1.2E-07	1.2E-07	1.2E-07	1.3E-07	1.3E-07	1.2E-07
ESE	9.1E-08	1.0E-07	1.1E-07	1.1E-07	1.2E-07	1.2E-07	1.2E-07
E	8.9E-08	9.7E-08	1.0E-07	1.0E-07	1.1E-07	1.1E-07	1.1E-07
ENE	8.5E-08	9.2E-08	9.4E-08	9.5E-08	9.9E-08	9.9E-08	9.9E-08
NE	9.1E-08	9.7E-08	1.0E-07	1.0E-07	1.1E-07	1.0E-07	1.0E-07
NNE	9.2E-08	1.0E-07	1.1E-07	1.1E-07	1.2E-07	1.2E-07	1.2E-07

Direction	Distance (m)						
	620	730	890	1040	2000	3000	4000
N	1.2E-07	1.2E-07	1.1E-07	1.1E-07	9.2E-08	8.8E-08	8.6E-08
NNW	1.1E-07	1.1E-07	1.0E-07	1.0E-07	9.0E-08	8.7E-08	8.5E-08
NW	1.2E-07	1.1E-07	1.1E-07	1.1E-07	9.4E-08	8.9E-08	8.7E-08
WNW	1.2E-07	1.2E-07	1.1E-07	1.1E-07	9.6E-08	9.1E-08	8.8E-08
W	1.5E-07	1.4E-07	1.3E-07	1.2E-07	1.0E-07	9.6E-08	9.2E-08
WSW	1.3E-07	1.2E-07	1.2E-07	1.1E-07	9.9E-08	9.3E-08	9.0E-08
SW	1.3E-07	1.2E-07	1.1E-07	1.1E-07	9.6E-08	9.1E-08	8.9E-08
SSW	1.1E-07	1.1E-07	1.0E-07	1.0E-07	9.4E-08	9.0E-08	8.8E-08
S	1.2E-07	1.2E-07	1.1E-07	1.1E-07	9.8E-08	9.3E-08	9.0E-08
SSE	1.1E-07	1.1E-07	1.0E-07	1.0E-07	9.1E-08	8.8E-08	8.6E-08
SE	1.2E-07	1.1E-07	1.1E-07	1.0E-07	9.1E-08	8.7E-08	8.6E-08
ESE	1.1E-07	1.1E-07	1.0E-07	1.0E-07	9.0E-08	8.7E-08	8.6E-08
E	1.1E-07	1.1E-07	1.0E-07	9.9E-08	9.1E-08	8.8E-08	8.6E-08
ENE	9.7E-08	9.5E-08	9.3E-08	9.2E-08	8.7E-08	8.5E-08	8.4E-08
NE	1.0E-07	9.9E-08	9.6E-08	9.4E-08	8.8E-08	8.5E-08	8.4E-08
NNE	1.1E-07	1.1E-07	1.0E-07	9.8E-08	8.9E-08	8.6E-08	8.5E-08

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

Direction	Distance (m)					
	5000	6000	7000	8000	9000	10000
N	8.5E-08	8.4E-08	8.4E-08	8.4E-08	8.3E-08	8.3E-08
NNW	8.4E-08	8.4E-08	8.4E-08	8.3E-08	8.3E-08	8.3E-08
NW	8.6E-08	8.5E-08	8.5E-08	8.4E-08	8.4E-08	8.4E-08
WNW	8.7E-08	8.6E-08	8.5E-08	8.5E-08	8.4E-08	8.4E-08
W	9.0E-08	8.8E-08	8.7E-08	8.6E-08	8.6E-08	8.5E-08
WSW	8.8E-08	8.7E-08	8.6E-08	8.5E-08	8.5E-08	8.5E-08
SW	8.7E-08	8.6E-08	8.5E-08	8.5E-08	8.4E-08	8.4E-08
SSW	8.7E-08	8.6E-08	8.5E-08	8.5E-08	8.4E-08	8.4E-08
S	8.8E-08	8.7E-08	8.6E-08	8.5E-08	8.5E-08	8.5E-08
SSE	8.5E-08	8.4E-08	8.4E-08	8.4E-08	8.3E-08	8.3E-08
SE	8.5E-08	8.4E-08	8.4E-08	8.4E-08	8.3E-08	8.3E-08
ESE	8.5E-08	8.4E-08	8.4E-08	8.3E-08	8.3E-08	8.3E-08
E	8.5E-08	8.5E-08	8.4E-08	8.4E-08	8.4E-08	8.3E-08
ENE	8.4E-08	8.3E-08	8.3E-08	8.3E-08	8.3E-08	8.3E-08
NE	8.4E-08	8.3E-08	8.3E-08	8.3E-08	8.3E-08	8.3E-08
NNE	8.4E-08	8.4E-08	8.3E-08	8.3E-08	8.3E-08	8.3E-08

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

G E N E R A L D A T A

Non-Radon Individual Assessment

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL

Zip: 34649-2908

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: INDIVIDUAL RUN

Dataset Name: 1994INDIV

Dataset Date: Mar 29, 1995 10:44 am

Wind File: WNDFILES\1994.WND

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	Clearance Class	Particle Size (microns)	Scavenging Coefficient (per second)	Dry Deposition Velocity (m/s)
H-3	*	0.0	0.00E+00	0.00E+00
KR-85	*	0.0	0.00E+00	0.00E+00

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	DECAY CONSTANT (PER DAY)			TRANSFER COEFFICIENT	
	Radio- active (1)	Surface	Water	Milk (2)	Meat (3)
H-3	0.00E+00	5.48E-05	0.00E+00	0.00E+00	0.00E+00
KR-85	0.00E+00	5.48E-05	0.00E+00	0.00E+00	0.00E+00

FOOTNOTES: (1) Effective radioactive decay constant in plume;
set to zero if less than 1.0E-2

(2) Fraction of animal's daily intake of nuclide
which appears in each L of milk (days/L)

(3) Fraction of animal's daily intake of nuclide
which appears in each kg of meat (days/kg)

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	CONCENTRATION UPTAKE FACTOR		GI UPTAKE FRACTION	
	Forage (1)	Edible (2)	Inhalation	Ingestion

H-3	0.00E+00	0.00E+00	9.50E-01	9.50E-01
KR-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOOTNOTES: (1) Concentration factor for uptake of nuclide from soil for pasture and forage (in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide from soil by edible parts of crops (in pCi/kg wet weight per pCi/kg dry soil)

H-3 DOSE CONVERSION FACTOR FOR WATER INGESTION (rem-cc/pCi-y): 5.70E-02

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

HUMAN INHALATION RATE

Cubic centimeters/hr	9.17E+05
----------------------	----------

SOIL PARAMETERS

Effective surface density (kg/sq m, dry weight) (Assumes 15 cm plow layer)	2.15E+02
---	----------

BUILDUP TIMES

For activity in soil (years)	1.00E+02
For radionuclides deposited on ground/water (days)	3.65E+04

DELAY TIMES

Ingestion of pasture grass by animals (hr)	0.00E+00
Ingestion of stored feed by animals (hr)	2.16E+03
Ingestion of leafy vegetables by man (hr)	3.36E+02
Ingestion of produce by man (hr)	3.36E+02
Transport time from animal feed-milk-man (day)	2.00E+00
Time from slaughter to consumption (day)	2.00E+01

WEATHERING

Removal rate constant for physical loss (per hr)	2.90E-03
--	----------

CROP EXPOSURE DURATION

Pasture grass (hr)	7.20E+02
Crops/leafy vegetables (hr)	1.44E+03

AGRICULTURAL PRODUCTIVITY

Grass-cow-milk-man pathway (kg/sq m)	2.80E-01
Produce/leafy veg for human consumption (kg/sq m)	7.16E-01

FALLOUT INTERCEPTION FRACTIONS

Vegetables	2.00E-01
Pasture	5.70E-01

GRAZING PARAMETERS

Fraction of year animals graze on pasture	4.00E-01
Fraction of daily feed that is pasture grass when animal grazes on pasture	4.30E-01

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight)	1.56E+01
---	----------

DAIRY PRODUCTIVITY

Milk production of cow (L/day)	1.10E+01
--------------------------------	----------

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg)	2.00E+02
---	----------

Fraction of herd slaughtered (per day)	3.81E-03
--	----------

DECONTAMINATION

Fraction of radioactivity retained after washing for leafy vegetables and produce	5.00E-01
--	----------

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested	1.00E+00
------------------	----------

Leafy vegetables ingested	1.00E+00
---------------------------	----------

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables	7.60E-02
------------	----------

Meat	8.00E-03
------	----------

Milk	0.00E+00
------	----------

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Minimum fractions of food types from outside
area listed below are actual fixed values.)

Vegetables	0.00E+00
------------	----------

Meat	0.00E+00
------	----------

Milk	0.00E+00
------	----------

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y)	1.76E+02
--------------------------	----------

Milk ingestion (L/y)	1.12E+02
----------------------	----------

Meat ingestion (kg/y)	8.50E+01
-----------------------	----------

Leafy vegetable ingestion (kg/y)	1.80E+01
----------------------------------	----------

SWIMMING PARAMETERS

Fraction of time spent swimming	0.00E+00
---------------------------------	----------

Dilution factor for water (cm)	1.00E+00
--------------------------------	----------

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

W E A T H E R D A T A

Non-Radon Individual Assessment

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL

Zip: 34649-2908

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: INDIVIDUAL RUN

Dataset Name: 1994INDIV

Dataset Date: Mar 29, 1995 10:44 am

Wind File: WNDFILES\1994.WND

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

Pasquill Stability Class								Wind Frequency
Dir	A	B	C	D	E	F	G	
N	1.295	1.935	3.010	3.659	1.688	0.897	0.000	0.066
NNW	1.935	2.001	2.354	3.078	1.825	0.826	0.000	0.042
NW	2.572	2.092	2.532	3.134	1.742	0.851	0.000	0.056
WNW	1.620	2.023	3.268	3.499	1.863	0.911	0.000	0.069
W	1.221	2.050	2.452	3.137	1.804	0.934	0.000	0.109
WSW	1.859	1.859	3.004	3.540	2.156	1.042	0.000	0.090
SW	1.133	2.644	2.621	4.213	2.231	0.929	0.000	0.095
SSW	1.935	1.637	2.759	3.590	2.539	1.004	0.000	0.059
S	1.511	2.731	2.934	3.075	2.169	1.156	0.000	0.076
SSE	2.572	2.572	3.439	3.299	1.299	0.848	0.000	0.055
SE	0.772	2.709	3.984	3.092	1.124	0.801	0.000	0.061
ESE	1.187	2.572	3.301	3.288	1.931	0.941	0.000	0.052
E	1.187	1.187	2.542	3.860	2.103	0.936	0.000	0.053
ENE	0.772	2.572	2.657	3.822	2.447	0.958	0.000	0.030
NE	1.631	1.738	3.597	3.503	1.654	0.961	0.000	0.035
NNE	2.572	1.637	3.886	3.728	1.361	0.920	0.000	0.053

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

Pasquill Stability Class							
Dir	A	B	C	D	E	F	G
N	1.812	2.318	3.208	5.147	2.233	1.131	0.000
NNW	2.318	2.352	2.683	4.021	2.445	0.940	0.000
NW	2.572	2.395	3.054	3.888	2.311	1.011	0.000
WNW	2.119	2.572	3.503	4.506	2.532	1.165	0.000
W	1.719	2.376	3.060	4.097	2.353	1.218	0.000
WSW	2.276	2.276	3.200	4.397	2.594	1.439	0.000
SW	1.591	2.690	3.046	4.897	2.572	1.208	0.000
SSW	2.318	2.131	2.868	4.480	2.926	1.366	0.000
S	2.031	2.826	3.111	4.010	2.482	1.627	0.000
SSE	2.572	2.572	4.059	4.092	1.816	1.002	0.000
SE	0.772	2.793	4.238	3.901	1.578	0.867	0.000
ESE	1.672	2.572	3.824	3.924	2.316	1.234	0.000
E	1.672	1.672	2.934	4.482	2.529	1.222	0.000
ENE	0.772	2.572	3.147	4.432	2.858	1.271	0.000
NE	2.127	2.572	3.818	4.166	2.188	1.278	0.000
NNE	2.572	2.131	4.081	4.566	1.967	1.186	0.000

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

Pasquill Stability Class							
Dir	A	B	C	D	E	F	G
N	0.0350	0.0128	0.0628	0.7067	0.1274	0.0552	0.0000
NNW	0.0202	0.0233	0.0463	0.6002	0.2493	0.0607	0.0000
NW	0.0177	0.0220	0.0330	0.4935	0.3347	0.0991	0.0000
WNW	0.0213	0.0123	0.0549	0.4779	0.3204	0.1132	0.0000
W	0.0213	0.0101	0.0540	0.5703	0.2126	0.1317	0.0000
WSW	0.0081	0.0081	0.0312	0.5816	0.2242	0.1467	0.0000
SW	0.0141	0.0192	0.0539	0.6895	0.0962	0.1271	0.0000
SSW	0.0144	0.0083	0.0247	0.5157	0.2112	0.2256	0.0000
S	0.0162	0.0112	0.0321	0.4879	0.2255	0.2271	0.0000
SSE	0.0089	0.0179	0.2404	0.5344	0.1115	0.0869	0.0000
SE	0.0039	0.0161	0.3046	0.5431	0.0582	0.0741	0.0000
ESE	0.0092	0.0141	0.0940	0.7015	0.0988	0.0824	0.0000
E	0.0091	0.0046	0.0463	0.6033	0.1881	0.1486	0.0000
ENE	0.0039	0.0122	0.0762	0.5623	0.2008	0.1446	0.0000
NE	0.0281	0.0139	0.0920	0.6611	0.1165	0.0885	0.0000
NNE	0.0164	0.0093	0.1231	0.7490	0.0419	0.0603	0.0000
TOT	0.0157	0.0132	0.0805	0.5901	0.1788	0.1217	0.0000

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 22.6 degrees C
 295.8 K
 Precipitation: 120.0 cm/y
 Lid Height: 1500 meters
 Surface Roughness Length: 0.010 meters
 Height Of Wind Measurements: 10.0 meters
 Average Wind Speed: 3.527 m/s

Vertical Temperature Gradients:

STABILITY E 0.073 k/m
 STABILITY F 0.109 k/m
 STABILITY G 0.146 k/m

ATTACHMENT B

CAP88-PC Non-Radon Population Assessment

This page left blank intentionally.

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

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL Zip: 34649-2908

Effective Dose Equivalent

(mrem/year)

6.26E-04

At This Location: 1500 Meters West Northwest

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: POPULATION RUN

Dataset Name: 1994POP

Dataset Date: Mar 29, 1995 10:46 am

Wind File: WNDFILES\1994.WND

Population File: POPFILES\PINELLAS.POP

MAXIMALLY EXPOSED INDIVIDUAL

Location Of The Individual: 1500 Meters West Northwest
 Lifetime Fatal Cancer Risk: 1.71E-08

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
GONADS	6.14E-04	9.28E-02
BREAST	6.14E-04	9.28E-02
R MAR	6.09E-04	9.22E-02
LUNGS	6.17E-04	9.34E-02
THYROID	6.09E-04	9.23E-02
ENDOST	4.85E-04	7.33E-02
RMNDR	6.70E-04	1.09E-01
EFFEC	6.26E-04	9.71E-02

FREQUENCY DISTRIBUTION OF LIFETIME FATAL CANCER RISKS

Risk Range	Number of People	Number 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	1935868	1935868	3.73E-05	3.73E-05

RADIONUCLIDE EMISSIONS DURING THE YEAR 1994

Nuclide	Class	Size	Source	Source	Source	Source	Source	Source	TOTAL
			#1	#2	#3	#4	#5	#6	
			Ci/y	Ci/y	Ci/y	Ci/y	Ci/y	Ci/y	Ci/y
H-3	*	0.00	2.3E+01	2.1E+00	0.0E+00	8.1E-02	2.2E-04	1.5E-03	2.5E+01
KR-85	*	0.00	1.3E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E+01

SITE INFORMATION

Temperature: 23 degrees C
Precipitation: 120 cm/y
Mixing Height: 1500 m

SOURCE INFORMATION

Source Number:	1	2	3	4	5	6
Stack Height (m):	21.34	30.48	17.38	9.14	9.14	13.13
Diameter (m):	2.44	1.52	0.30	0.51	0.28	0.63

Plume Rise

Momentum (m/s):	4.43E+00	5.83E+00	7.65E+00	4.97E+00	1.20E+01	9.05E+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

Beef Cattle Density:	1.28E-01
Milk Cattle Density:	1.37E-02
Land Fraction Cultivated for Vegetable Crops:	6.92E-03

POPULATION DATA

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0	0	0	0	5349	0	23419
NNW	0	0	0	0	3337	0	24126
NW	0	0	4420	0	0	5299	15019
WNW	0	0	772	0	1723	3633	18250
W	0	0	0	2073	3049	892	13987
WSW	0	0	0	1253	788	2976	19204
SW	0	0	0	0	0	2233	11080
SSW	0	0	0	1594	2051	0	12853
S	0	0	0	9537	0	3431	13762
SSE	0	0	0	0	0	980	24821
SE	0	0	0	0	3512	3789	22519
ESE	0	0	0	0	0	0	14582
E	0	0	1136	0	2361	582	2405
ENE	0	0	0	0	0	0	0
NE	0	0	0	0	0	1727	5950
NNE	0	0	0	0	4653	0	16752

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	67940	28105	61561	52882	22492	2936
NNW	28218	616	0	0	0	0
NW	2272	0	0	0	0	0
WNW	0	0	0	0	0	0
W	0	0	0	0	0	0
WSW	0	0	0	0	0	0
SW	0	0	0	0	0	0
SSW	1566	0	0	0	0	0
S	23485	2956	3764	5416	1957	0
SSE	72904	12297	3117	87593	50840	130507
SE	85745	3026	469	3625	0	197
ESE	47840	0	10656	9190	2661	0
E	6112	52844	26569	43529	12463	36551
ENE	2546	97369	167019	48541	17970	59683
NE	645	50970	51629	13212	4583	28752
NNE	22292	11978	2066	10506	6412	22915

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

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL Zip: 34649-2908

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: POPULATION RUN

Dataset Name: 1994POP

Dataset Date: Mar 29, 1995 10:46 am

Wind File: WNDFILES\1994.WND

Population File: POPFILES\PINELLAS.POP

ORGAN DOSE EQUIVALENT SUMMARY

Organ	Selected Individual (mrem/y)	Collective Population (person-rem/y)
GONADS	6.14E-04	9.28E-02
BREAST	6.14E-04	9.28E-02
R MAR	6.09E-04	9.22E-02
LUNGS	6.17E-04	9.34E-02
THYROID	6.09E-04	9.23E-02
ENDOST	4.85E-04	7.33E-02
RMNDR	6.70E-04	1.09E-01
EFFEC	6.26E-04	9.71E-02

PATHWAY EFFECTIVE DOSE EQUIVALENT SUMMARY

Pathway	Selected Individual (mrem/y)	Collective Population (person-rem/y)
INGESTION	8.95E-05	4.88E-02
INHALATION	5.34E-04	4.80E-02
AIR IMMERSION	3.05E-06	2.72E-04
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	6.23E-04	9.68E-02
EXTERNAL	3.05E-06	2.72E-04
TOTAL	6.27E-04	9.71E-02

NUCLIDE EFFECTIVE DOSE EQUIVALENT SUMMARY

Nuclides	Selected Individual (mrem/y)	Collective Population (person-rem/y)
H-3	6.22E-04	9.67E-02
KR-85	4.54E-06	4.05E-04
TOTAL	6.27E-04	9.71E-02

CANCER RISK SUMMARY

Cancer	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
LEUKEMIA	1.93E-09	4.13E-06
BONE	8.58E-11	1.83E-07
THYROID	2.77E-10	5.94E-07
BREAST	2.40E-09	5.14E-06
LUNG	3.07E-09	6.56E-06
STOMACH	2.07E-09	4.88E-06
BOWEL	1.11E-09	2.65E-06
LIVER	2.13E-09	4.57E-06
PANCREAS	1.45E-09	3.11E-06
URINARY	7.94E-10	1.70E-06
OTHER	1.78E-09	3.80E-06
TOTAL	1.71E-08	3.73E-05

PATHWAY RISK SUMMARY

Pathway	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
INGESTION	2.42E-09	1.86E-05
INHALATION	1.46E-08	1.86E-05
AIR IMMERSION	7.28E-11	9.19E-08
GROUND SURFACE	0.00E+00	0.00E+00
INTERNAL	1.70E-08	3.72E-05
EXTERNAL	7.28E-11	9.19E-08
TOTAL	1.71E-08	3.73E-05

PATHWAY GENETIC RISK SUMMARY
(Collective Population)

Pathway	Genetic Risk (person-rem/y)
INGESTION	4.50E-02
INHALATION	4.73E-02
AIR IMMERSION	2.68E-04
GROUND SURFACE	0.00E+00
INTERNAL	9.23E-02
EXTERNAL	2.68E-04
TOTAL	9.26E-02

NUCLIDE RISK SUMMARY

Nuclide	Selected Individual Total Lifetime Fatal Cancer Risk	Total Collective Population Fatal Cancer Risk (Deaths/y)
H-3	1.70E-08	3.71E-05
KR-85	1.28E-10	1.61E-07
TOTAL	1.71E-08	3.73E-05

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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-04	0.0E+00	8.2E-05
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E-04	0.0E+00	6.9E-05
NW	0.0E+00	0.0E+00	5.4E-04	0.0E+00	0.0E+00	1.7E-04	9.9E-05
WNW	0.0E+00	0.0E+00	6.3E-04	0.0E+00	2.6E-04	2.0E-04	1.2E-04
W	0.0E+00	0.0E+00	0.0E+00	5.7E-04	3.9E-04	3.0E-04	1.7E-04
WSW	0.0E+00	0.0E+00	0.0E+00	4.5E-04	3.1E-04	2.4E-04	1.4E-04
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.1E-04	1.2E-04
SSW	0.0E+00	0.0E+00	0.0E+00	3.3E-04	2.4E-04	0.0E+00	1.1E-04
S	0.0E+00	0.0E+00	0.0E+00	4.4E-04	0.0E+00	2.4E-04	1.4E-04
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-04	7.9E-05
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.6E-04	1.3E-04	7.7E-05
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.3E-05
E	0.0E+00	0.0E+00	4.1E-04	0.0E+00	1.9E-04	1.5E-04	9.0E-05
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	9.0E-05	5.7E-05
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-04	0.0E+00	6.4E-05

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	4.7E-05	3.5E-05	3.1E-05	2.9E-05	2.7E-05	2.6E-05
NNW	4.2E-05	3.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	5.6E-05	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
W	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
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	6.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	7.4E-05	5.1E-05	4.2E-05	3.7E-05	3.4E-05	0.0E+00
SSE	4.7E-05	3.6E-05	3.1E-05	2.9E-05	2.7E-05	2.6E-05
SE	4.5E-05	3.5E-05	3.1E-05	2.8E-05	0.0E+00	2.6E-05
ESE	4.3E-05	0.0E+00	3.0E-05	2.8E-05	2.7E-05	0.0E+00
E	5.2E-05	3.9E-05	3.3E-05	3.1E-05	2.9E-05	2.7E-05
ENE	3.8E-05	3.1E-05	2.8E-05	2.7E-05	2.6E-05	2.5E-05
NE	3.7E-05	3.0E-05	2.8E-05	2.6E-05	2.5E-05	2.5E-05
NNE	3.9E-05	3.1E-05	2.8E-05	2.7E-05	2.6E-05	2.5E-05

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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.8E-04	0.0E+00	1.9E-03
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.9E-04	0.0E+00	1.7E-03
NW	0.0E+00	0.0E+00	2.4E-03	0.0E+00	0.0E+00	8.9E-04	1.5E-03
WNW	0.0E+00	0.0E+00	4.8E-04	0.0E+00	4.4E-04	7.1E-04	2.1E-03
W	0.0E+00	0.0E+00	0.0E+00	1.2E-03	1.2E-03	2.6E-04	2.4E-03
WSW	0.0E+00	0.0E+00	0.0E+00	5.7E-04	2.5E-04	7.1E-04	2.7E-03
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.6E-04	1.4E-03
SSW	0.0E+00	0.0E+00	0.0E+00	5.2E-04	4.9E-04	0.0E+00	1.5E-03
S	0.0E+00	0.0E+00	0.0E+00	4.2E-03	0.0E+00	8.2E-04	1.9E-03
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.3E-04	2.0E-03
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.7E-04	4.8E-04	1.7E-03
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.1E-03
E	0.0E+00	0.0E+00	4.7E-04	0.0E+00	4.4E-04	8.5E-05	2.2E-04
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	1.5E-04	3.4E-04
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	6.3E-04	0.0E+00	1.1E-03

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	3.2E-03	9.9E-04	1.9E-03	1.5E-03	6.1E-04	7.6E-05
NNW	1.2E-03	2.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	1.3E-04	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
W	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
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	9.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	1.7E-03	1.5E-04	1.6E-04	2.0E-04	6.7E-05	0.0E+00
SSE	3.4E-03	4.4E-04	9.7E-05	2.5E-03	1.4E-03	3.4E-03
SE	3.9E-03	1.0E-04	1.4E-05	1.0E-04	0.0E+00	5.1E-06
ESE	2.1E-03	0.0E+00	3.2E-04	2.5E-04	7.1E-05	0.0E+00
E	3.2E-04	2.0E-03	8.9E-04	1.3E-03	3.6E-04	1.0E-03
ENE	9.8E-05	3.0E-03	4.7E-03	1.3E-03	4.6E-04	1.5E-03
NE	2.4E-05	1.5E-03	1.4E-03	3.5E-04	1.2E-04	7.0E-04
NNE	8.8E-04	3.7E-04	5.8E-05	2.8E-04	1.6E-04	5.7E-04

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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.8E-02	0.0E+00	5.5E-02
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-02	0.0E+00	4.8E-02
NW	0.0E+00	0.0E+00	7.0E-02	0.0E+00	0.0E+00	2.6E-02	4.3E-02
WNW	0.0E+00	0.0E+00	1.4E-02	0.0E+00	1.3E-02	2.1E-02	6.1E-02
W	0.0E+00	0.0E+00	0.0E+00	3.4E-02	3.5E-02	7.7E-03	6.9E-02
WSW	0.0E+00	0.0E+00	0.0E+00	1.7E-02	7.2E-03	2.1E-02	7.7E-02
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.4E-02	4.0E-02
SSW	0.0E+00	0.0E+00	0.0E+00	1.5E-02	1.4E-02	0.0E+00	4.2E-02
S	0.0E+00	0.0E+00	0.0E+00	1.2E-01	0.0E+00	2.4E-02	5.6E-02
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E-03	5.7E-02
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.7E-02	1.4E-02	5.0E-02
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-02
E	0.0E+00	0.0E+00	1.4E-02	0.0E+00	1.3E-02	2.5E-03	6.2E-03
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	4.5E-03	9.8E-03
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-02	0.0E+00	3.1E-02

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	9.1E-02	2.8E-02	5.4E-02	4.2E-02	1.7E-02	2.1E-03
NNW	3.4E-02	5.7E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	3.6E-03	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
W	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
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	2.8E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	5.0E-02	4.4E-03	4.5E-03	5.7E-03	1.9E-03	0.0E+00
SSE	9.7E-02	1.2E-02	2.7E-03	7.1E-02	3.9E-02	9.5E-02
SE	1.1E-01	3.0E-03	4.0E-04	2.9E-03	0.0E+00	1.4E-04
ESE	5.9E-02	0.0E+00	8.9E-03	7.1E-03	2.0E-03	0.0E+00
E	9.1E-03	5.8E-02	2.5E-02	3.8E-02	1.0E-02	2.8E-02
ENE	2.8E-03	8.6E-02	1.3E-01	3.6E-02	1.3E-02	4.1E-02
NE	6.8E-04	4.3E-02	4.0E-02	9.6E-03	3.2E-03	2.0E-02
NNE	2.5E-02	1.1E-02	1.6E-03	7.8E-03	4.6E-03	1.6E-02

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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.0E-09	0.0E+00	2.2E-09
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.0E-09	0.0E+00	1.9E-09
NW	0.0E+00	0.0E+00	1.5E-08	0.0E+00	0.0E+00	4.6E-09	2.7E-09
WNW	0.0E+00	0.0E+00	1.7E-08	0.0E+00	7.0E-09	5.4E-09	3.1E-09
W	0.0E+00	0.0E+00	0.0E+00	1.5E-08	1.1E-08	8.1E-09	4.6E-09
WSW	0.0E+00	0.0E+00	0.0E+00	1.2E-08	8.6E-09	6.5E-09	3.8E-09
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	5.7E-09	3.4E-09
SSW	0.0E+00	0.0E+00	0.0E+00	8.9E-09	6.5E-09	0.0E+00	3.1E-09
S	0.0E+00	0.0E+00	0.0E+00	1.2E-08	0.0E+00	6.5E-09	3.8E-09
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.5E-09	2.2E-09
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.5E-09	3.4E-09	2.1E-09
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E-09
E	0.0E+00	0.0E+00	1.1E-08	0.0E+00	5.1E-09	4.0E-09	2.4E-09
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	2.4E-09	1.6E-09
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.7E-09	0.0E+00	1.7E-09

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	1.3E-09	9.6E-10	8.4E-10	7.8E-10	7.6E-10	7.0E-10
NNW	1.1E-09	8.9E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	1.5E-09	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
W	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
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	1.7E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	2.0E-09	1.4E-09	1.1E-09	1.0E-09	9.3E-10	0.0E+00
SSE	1.3E-09	9.6E-10	8.5E-10	7.8E-10	7.4E-10	7.1E-10
SE	1.2E-09	9.4E-10	8.3E-10	7.7E-10	0.0E+00	7.0E-10
ESE	1.2E-09	0.0E+00	8.1E-10	7.5E-10	7.2E-10	0.0E+00
E	1.4E-09	1.1E-09	9.1E-10	8.3E-10	7.8E-10	7.4E-10
ENE	1.0E-09	8.5E-10	7.7E-10	7.3E-10	7.0E-10	6.8E-10
NE	1.0E-09	8.2E-10	7.5E-10	7.1E-10	6.8E-10	6.6E-10
NNE	1.1E-09	8.5E-10	7.6E-10	7.2E-10	6.9E-10	6.7E-10

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

Direction	Distance (m)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.8E-07	0.0E+00	7.4E-07
NNW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.9E-07	0.0E+00	6.4E-07
NW	0.0E+00	0.0E+00	9.2E-07	0.0E+00	0.0E+00	3.4E-07	5.7E-07
WNW	0.0E+00	0.0E+00	1.9E-07	0.0E+00	1.7E-07	2.8E-07	8.1E-07
W	0.0E+00	0.0E+00	0.0E+00	4.5E-07	4.6E-07	1.0E-07	9.1E-07
WSW	0.0E+00	0.0E+00	0.0E+00	2.2E-07	9.6E-08	2.7E-07	1.0E-06
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.8E-07	5.3E-07
SSW	0.0E+00	0.0E+00	0.0E+00	2.0E-07	1.9E-07	0.0E+00	5.6E-07
S	0.0E+00	0.0E+00	0.0E+00	1.6E-06	0.0E+00	3.2E-07	7.5E-07
SSE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.9E-08	7.6E-07
SE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.2E-07	1.8E-07	6.7E-07
ESE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.1E-07
E	0.0E+00	0.0E+00	1.8E-07	0.0E+00	1.7E-07	3.3E-08	8.3E-08
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	6.0E-08	1.3E-07
NNE	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.4E-07	0.0E+00	4.1E-07

Direction	Distance (m)					
	15000	25000	35000	45000	55000	70000
N	1.2E-06	3.8E-07	7.3E-07	5.8E-07	2.3E-07	2.9E-08
NNW	4.6E-07	7.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NW	4.9E-08	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
W	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
SW	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
SSW	3.8E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
S	6.7E-07	5.8E-08	6.1E-08	7.7E-08	2.6E-08	0.0E+00
SSE	1.3E-06	1.7E-07	3.7E-08	9.7E-07	5.3E-07	1.3E-06
SE	1.5E-06	4.0E-08	5.5E-09	3.9E-08	0.0E+00	1.9E-09
ESE	8.0E-07	0.0E+00	1.2E-07	9.8E-08	2.7E-08	0.0E+00
E	1.2E-07	7.9E-07	3.4E-07	5.1E-07	1.4E-07	3.8E-07
ENE	3.8E-08	1.2E-06	1.8E-06	5.0E-07	1.8E-07	5.7E-07
NE	9.2E-09	5.9E-07	5.4E-07	1.3E-07	4.4E-08	2.7E-07
NNE	3.4E-07	1.4E-07	2.2E-08	1.1E-07	6.3E-08	2.2E-07

CAP 88 - PC

Version 1.00

Clean Air Act Assessment Package - 1988

GENERAL DATA

Non-Radon Population Assessment
Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT
Address: P.O. Box 2908
7887 Bryan Dairy Road
City: Largo
State: FL Zip: 34649-2908

Source Category: POINT
Source Type: Stack
Emission Year: 1994

Comments: POPULATION RUN

Dataset Name: 1994POP
Dataset Date: Mar 29, 1995 10:46 am
Wind File: WNDFILES\1994.WND
Population File: POPFILES\PINELLAS.POP

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	Clearance Class	Particle Size (microns)	Scavenging Coefficient (per second)	Dry
				Deposition Velocity (m/s)
H-3	*	0.0	0.00E+00	0.00E+00
KR-85	*	0.0	0.00E+00	0.00E+00

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	DECAY CONSTANT (PER DAY)			TRANSFER COEFFICIENT	
	Radio- active (1)	Surface	Water	Milk (2)	Meat (3)
H-3	0.00E+00	5.48E-05	0.00E+00	0.00E+00	0.00E+00
KR-85	0.00E+00	5.48E-05	0.00E+00	0.00E+00	0.00E+00

FOOTNOTES: (1) Effective radioactive decay constant in plume;
set to zero if less than 1.0E-2

(2) Fraction of animal's daily intake of nuclide
which appears in each L of milk (days/L)

(3) Fraction of animal's daily intake of nuclide
which appears in each kg of meat (days/kg)

VALUES FOR RADIONUCLIDE-DEPENDENT PARAMETERS

Nuclide	CONCENTRATION UPTAKE FACTOR		GI UPTAKE FRACTION	
	Forage (1)	Edible (2)	Inhalation	Ingestion
H-3	0.00E+00	0.00E+00	9.50E-01	9.50E-01
KR-85	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOOTNOTES: (1) Concentration factor for uptake of nuclide from soil for
pasture and forage (in pCi/kg dry weight per pCi/kg dry soil)

(2) Concentration factor for uptake of nuclide from soil by edible
parts of crops (in pCi/kg wet weight per pCi/kg dry soil)

H-3 DOSE CONVERSION FACTOR FOR WATER INGESTION (rem-cc/pCi-y): 5.70E-02

NUMBER OF BEEF CATTLE

Direction	Distance (meters)						
	250	750	1500	2500	3500	4500	7500
N	0	2	8	13	18	23	188
NNW	0	2	8	13	18	23	188
NW	0	2	8	13	18	23	188
WNW	0	2	8	13	18	23	188
W	0	2	8	13	18	23	188
WSW	0	2	8	13	18	23	188
SW	0	2	8	13	18	23	188
SSW	0	2	8	13	18	23	188
S	0	2	8	13	18	23	188
SSE	0	2	8	13	18	23	188
SE	0	2	8	13	18	23	188
ESE	0	2	8	13	18	23	188
E	0	2	8	13	18	23	188
ENE	0	2	8	13	18	23	188
NE	0	2	8	13	18	23	188
NNE	0	2	8	13	18	23	188

Direction	Distance (meters)					
	15000	25000	35000	45000	55000	70000
N	754	1257	1759	2262	2765	7037
NNW	754	1257	1759	2262	2765	7037
NW	754	1257	1759	2262	2765	7037
WNW	754	1257	1759	2262	2765	7037
W	754	1257	1759	2262	2765	7037
WSW	754	1257	1759	2262	2765	7037
SW	754	1257	1759	2262	2765	7037
SSW	754	1257	1759	2262	2765	7037
S	754	1257	1759	2262	2765	7037
SSE	754	1257	1759	2262	2765	7037
SE	754	1257	1759	2262	2765	7037
ESE	754	1257	1759	2262	2765	7037
E	754	1257	1759	2262	2765	7037
ENE	754	1257	1759	2262	2765	7037
NE	754	1257	1759	2262	2765	7037
NNE	754	1257	1759	2262	2765	7037

NUMBER OF MILK CATTLE

Direction	Distance (meters)						
	250	750	1500	2500	3500	4500	7500
N	0	0	1	1	2	2	20
NNW	0	0	1	1	2	2	20
NW	0	0	1	1	2	2	20
WNW	0	0	1	1	2	2	20
W	0	0	1	1	2	2	20
WSW	0	0	1	1	2	2	20
SW	0	0	1	1	2	2	20
SSW	0	0	1	1	2	2	20
S	0	0	1	1	2	2	20
SSE	0	0	1	1	2	2	20
SE	0	0	1	1	2	2	20
ESE	0	0	1	1	2	2	20
E	0	0	1	1	2	2	20
ENE	0	0	1	1	2	2	20
NE	0	0	1	1	2	2	20
NNE	0	0	1	1	2	2	20

Direction	Distance (meters)					
	15000	25000	35000	45000	55000	70000
N	81	134	188	242	296	753
NNW	81	134	188	242	296	753
NW	81	134	188	242	296	753
WNW	81	134	188	242	296	753
W	81	134	188	242	296	753
WSW	81	134	188	242	296	753
SW	81	134	188	242	296	753
SSW	81	134	188	242	296	753
S	81	134	188	242	296	753
SSE	81	134	188	242	296	753
SE	81	134	188	242	296	753
ESE	81	134	188	242	296	753
E	81	134	188	242	296	753
ENE	81	134	188	242	296	753
NE	81	134	188	242	296	753
NNE	81	134	188	242	296	753

AREA OF VEGETABLE CROP PRODUCTION (M**2)

Direction	Distance (meters)						
	250	750	1500	2500	3500	4500	7500
N	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
NNW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
NW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
WNW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
W	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
WSW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
SW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
SSW	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
S	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
SSE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
SE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
ESE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
E	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
ENE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
NE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05
NNE	0.0E+00	1.0E+03	4.1E+03	6.8E+03	9.5E+03	1.2E+04	1.0E+05

Direction	Distance (meters)					
	15000	25000	35000	45000	55000	70000
N	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
NNW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
NW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
WNW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
W	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
WSW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
SW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
SSW	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
S	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
SSE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
SE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
ESE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
E	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
ENE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
NE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06
NNE	4.1E+05	6.8E+05	9.5E+05	1.2E+06	1.5E+06	3.8E+06

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

HUMAN INHALATION RATE

Cubic centimeters/hr	9.17E+05
----------------------	----------

SOIL PARAMETERS

Effective surface density (kg/sq m, dry weight) (Assumes 15 cm plow layer)	2.15E+02
---	----------

BUILDUP TIMES

For activity in soil (years)	1.00E+02
For radionuclides deposited on ground/water (days)	3.65E+04

DELAY TIMES

Ingestion of pasture grass by animals (hr)	0.00E+00
Ingestion of stored feed by animals (hr)	2.16E+03
Ingestion of leafy vegetables by man (hr)	3.36E+02
Ingestion of produce by man (hr)	3.36E+02
Transport time from animal feed-milk-man (day)	2.00E+00
Time from slaughter to consumption (day)	2.00E+01

WEATHERING

Removal rate constant for physical loss (per hr)	2.90E-03
--	----------

CROP EXPOSURE DURATION

Pasture grass (hr)	7.20E+02
Crops/leafy vegetables (hr)	1.44E+03

AGRICULTURAL PRODUCTIVITY

Grass-cow-milk-man pathway (kg/sq m)	2.80E-01
Produce/leafy veg for human consumption (kg/sq m)	7.16E-01

FALLOUT INTERCEPTION FRACTIONS

Vegetables	2.00E-01
Pasture	5.70E-01

GRAZING PARAMETERS

Fraction of year animals graze on pasture	4.00E-01
Fraction of daily feed that is pasture grass when animal grazes on pasture	4.30E-01

VALUES FOR RADIONUCLIDE-INDEPENDENT PARAMETERS

ANIMAL FEED CONSUMPTION FACTORS

Contaminated feed/forage (kg/day, dry weight)	1.56E+01
---	----------

DAIRY PRODUCTIVITY

Milk production of cow (L/day)	1.10E+01
--------------------------------	----------

MEAT ANIMAL SLAUGHTER PARAMETERS

Muscle mass of animal at slaughter (kg)	2.00E+02
Fraction of herd slaughtered (per day)	3.81E-03

DECONTAMINATION

Fraction of radioactivity retained after washing for leafy vegetables and produce	5.00E-01
--	----------

FRACTIONS GROWN IN GARDEN OF INTEREST

Produce ingested	1.00E+00
Leafy vegetables ingested	1.00E+00

INGESTION RATIOS:

IMMEDIATE SURROUNDING AREA/TOTAL WITHIN AREA

Vegetables	7.60E-02
Meat	8.00E-03
Milk	0.00E+00

MINIMUM INGESTION FRACTIONS FROM OUTSIDE AREA

(Actual fractions of food types from outside area can
be greater than the minimum fractions listed below.)

Vegetables	0.00E+00
Meat	0.00E+00
Milk	0.00E+00

HUMAN FOOD UTILIZATION FACTORS

Produce ingestion (kg/y)	1.76E+02
Milk ingestion (L/y)	1.12E+02
Meat ingestion (kg/y)	8.50E+01
Leafy vegetable ingestion (kg/y)	1.80E+01

SWIMMING PARAMETERS

Fraction of time spent swimming	0.00E+00
Dilution factor for water (cm)	1.00E+00

C A P 8 8 - P C

Version 1.00

Clean Air Act Assessment Package - 1988

WEATHER DATA

Non-Radon Population Assessment

Mar 29, 1995 10:55 am

Facility: US DEPARTMENT OF ENERGY PINELLAS PLANT

Address: P.O. Box 2908

7887 Bryan Dairy Road

City: Largo

State: FL

Zip: 34649-2908

Source Category: POINT

Source Type: Stack

Emission Year: 1994

Comments: POPULATION RUN

Dataset Name: 1994POP

Dataset Date: Mar 29, 1995 10:46 am

Wind File: WNDFILES\1994.WND

Population File: POPFILES\PINELLAS.POP

HARMONIC AVERAGE WIND SPEEDS (WIND TOWARDS)

Pasquill Stability Class								Wind Frequency
Dir	A	B	C	D	E	F	G	
N	1.295	1.935	3.010	3.659	1.688	0.897	0.000	0.066
NNW	1.935	2.001	2.354	3.078	1.825	0.826	0.000	0.042
NW	2.572	2.092	2.532	3.134	1.742	0.851	0.000	0.056
WNW	1.620	2.023	3.268	3.499	1.863	0.911	0.000	0.069
W	1.221	2.050	2.452	3.137	1.804	0.934	0.000	0.109
WSW	1.859	1.859	3.004	3.540	2.156	1.042	0.000	0.090
SW	1.133	2.644	2.621	4.213	2.231	0.929	0.000	0.095
SSW	1.935	1.637	2.759	3.590	2.539	1.004	0.000	0.059
S	1.511	2.731	2.934	3.075	2.169	1.156	0.000	0.076
SSE	2.572	2.572	3.439	3.299	1.299	0.848	0.000	0.055
SE	0.772	2.709	3.984	3.092	1.124	0.801	0.000	0.061
ESE	1.187	2.572	3.301	3.288	1.931	0.941	0.000	0.052
E	1.187	1.187	2.542	3.860	2.103	0.936	0.000	0.053
ENE	0.772	2.572	2.657	3.822	2.447	0.958	0.000	0.030
NE	1.631	1.738	3.597	3.503	1.654	0.961	0.000	0.035
NNE	2.572	1.637	3.886	3.728	1.361	0.920	0.000	0.053

ARITHMETIC AVERAGE WIND SPEEDS (WIND TOWARDS)

Pasquill Stability Class							
Dir	A	B	C	D	E	F	G
N	1.812	2.318	3.208	5.147	2.233	1.131	0.000
NNW	2.318	2.352	2.683	4.021	2.445	0.940	0.000
NW	2.572	2.395	3.054	3.888	2.311	1.011	0.000
WNW	2.119	2.572	3.503	4.506	2.532	1.165	0.000
W	1.719	2.376	3.060	4.097	2.353	1.218	0.000
WSW	2.276	2.276	3.200	4.397	2.594	1.439	0.000
SW	1.591	2.690	3.046	4.897	2.572	1.208	0.000
SSW	2.318	2.131	2.868	4.480	2.926	1.366	0.000
S	2.031	2.826	3.111	4.010	2.482	1.627	0.000
SSE	2.572	2.572	4.059	4.092	1.816	1.002	0.000
SE	0.772	2.793	4.238	3.901	1.578	0.867	0.000
ESE	1.672	2.572	3.824	3.924	2.316	1.234	0.000
E	1.672	1.672	2.934	4.482	2.529	1.222	0.000
ENE	0.772	2.572	3.147	4.432	2.858	1.271	0.000
NE	2.127	2.572	3.818	4.166	2.188	1.278	0.000
NNE	2.572	2.131	4.081	4.566	1.967	1.186	0.000

FREQUENCIES OF STABILITY CLASSES (WIND TOWARDS)

Pasquill Stability Class							
Dir	A	B	C	D	E	F	G
N	0.0350	0.0128	0.0628	0.7067	0.1274	0.0552	0.0000
NNW	0.0202	0.0233	0.0463	0.6002	0.2493	0.0607	0.0000
NW	0.0177	0.0220	0.0330	0.4935	0.3347	0.0991	0.0000
WNW	0.0213	0.0123	0.0549	0.4779	0.3204	0.1132	0.0000
W	0.0213	0.0101	0.0540	0.5703	0.2126	0.1317	0.0000
WSW	0.0081	0.0081	0.0312	0.5816	0.2242	0.1467	0.0000
SW	0.0141	0.0192	0.0539	0.6895	0.0962	0.1271	0.0000
SSW	0.0144	0.0083	0.0247	0.5157	0.2112	0.2256	0.0000
S	0.0162	0.0112	0.0321	0.4879	0.2255	0.2271	0.0000
SSE	0.0089	0.0179	0.2404	0.5344	0.1115	0.0869	0.0000
SE	0.0039	0.0161	0.3046	0.5431	0.0582	0.0741	0.0000
ESE	0.0092	0.0141	0.0940	0.7015	0.0988	0.0824	0.0000
E	0.0091	0.0046	0.0463	0.6033	0.1881	0.1486	0.0000
ENE	0.0039	0.0122	0.0762	0.5623	0.2008	0.1446	0.0000
NE	0.0281	0.0139	0.0920	0.6611	0.1165	0.0885	0.0000
NNE	0.0164	0.0093	0.1231	0.7490	0.0419	0.0603	0.0000
TOT	0.0157	0.0132	0.0805	0.5901	0.1788	0.1217	0.0000

ADDITIONAL WEATHER INFORMATION

Average Air Temperature: 22.6 degrees C
 295.8 K
 Precipitation: 120.0 cm/y
 Lid Height: 1500 meters
 Surface Roughness Length: 0.010 meters
 Height Of Wind Measurements: 10.0 meters
 Average Wind Speed: 3.527 m/s

Vertical Temperature Gradients:

STABILITY E 0.073 k/m
 STABILITY F 0.109 k/m
 STABILITY G 0.146 k/m

ATTACHMENT C

Summary of Stack Flow Rate Measurements Conducted August 1994 and December 1994

This page left blank intentionally.

Summary of Average Main Stack Gas Flow Measurements for DOE Pinellas Plant

Stack ID	Test Run Number	Average Stack Gas Temperature (°F)	Stack Gas Moisture (a)	Stack Flow Rate		Actual Velocity (ft/sec)
				(dscfm)	(acfm)	
Main (RO82)	1	73.9	1.3%	42,945	43,883	14.55
	2	72.8	1.3%	42,989	43,838	14.54
	3	73.8	1.3%	42,949	43,867	14.55
	Average	73.5	1.3%	42,961	43,863	14.55

Summary of Average Laboratory Stack Gas Flow Measurements for DOE Pinellas Plant

Stack ID	Test Run Number	Average Stack Gas Temperature (°F)	Stack Gas Moisture (a)	Stack Flow Rate		Velocity (ft/sec)
				(dscfm)	(acfm)	
Lab (RO89)	1	78.3	1.3%	22,146	22,817	19.37
	2	78.1	1.3%	21,502	22,145	18.80
	3	78.5	1.3%	21,948	22,621	19.20
	Average	78.3	1.3%	21,715	22,527	19.12

This page left blank intentionally.

ATTACHMENT D

Pinellas Plant 1994 Annual Windrose and Pinellas Plant Meteorological Station Wind Frequency Distribution, 1994, by Windspeed, Stability Class and Origin

This page left blank intentionally.

SCALE (KNOTS)

1-3 4-6 7-10 11-16 17-21 >21

DOE PINELLAS PLANT
12-M LEVEL WINDROSE
ANNUAL 1994

Pinellas Plant 1994 Annual Windrose

Wind Frequency Distribution at the 12.5 Meter Tower Pinellas Plant Calendar Year 1994

WIND ORIGIN	PASQUILL-GIFFORD STABILITY CLASS	WIND SPEEDS IN KNOTS					
		1-3	4-6	7-10	11-16	17-21	>21
N	A	0.0004	0.0009	0.0000	0.0000	0.0000	0.0000
NNE	A	0.0001	0.0007	0.0000	0.0000	0.0000	0.0000
NE	A	0.0007	0.0006	0.0000	0.0000	0.0000	0.0000
ENE	A	0.0001	0.0006	0.0000	0.0000	0.0000	0.0000
E	A	0.0011	0.0012	0.0000	0.0000	0.0000	0.0000
ESE	A	0.0004	0.0011	0.0000	0.0000	0.0000	0.0000
SE	A	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000
SSE	A	0.0001	0.0007	0.0000	0.0000	0.0000	0.0000
S	A	0.0010	0.0013	0.0000	0.0000	0.0000	0.0000
SSW	A	0.0000	0.0009	0.0000	0.0000	0.0000	0.0000
SW	A	0.0002	0.0007	0.0000	0.0000	0.0000	0.0000
WSW	A	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
W	A	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000
WNW	A	0.0002	0.0002	0.0000	0.0000	0.0000	0.0000
NW	A	0.0002	0.0000	0.0000	0.0000	0.0000	0.0000
NNW	A	0.0000	0.0005	0.0000	0.0000	0.0000	0.0000
N	B	0.0000	0.0007	0.0001	0.0000	0.0000	0.0000
NNE	B	0.0001	0.0004	0.0000	0.0000	0.0000	0.0000
NE	B	0.0000	0.0017	0.0001	0.0000	0.0000	0.0000
ENE	B	0.0001	0.0006	0.0000	0.0000	0.0000	0.0000
E	B	0.0001	0.0010	0.0000	0.0000	0.0000	0.0000
ESE	B	0.0001	0.0006	0.0001	0.0000	0.0000	0.0000
SE	B	0.0001	0.0011	0.0000	0.0000	0.0000	0.0000
SSE	B	0.0001	0.0009	0.0000	0.0000	0.0000	0.0000
S	B	0.0001	0.0007	0.0000	0.0000	0.0000	0.0000
SSW	B	0.0001	0.0004	0.0000	0.0000	0.0000	0.0000
SW	B	0.0001	0.0002	0.0001	0.0000	0.0000	0.0000
WSW	B	0.0000	0.0004	0.0000	0.0000	0.0000	0.0000
W	B	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
WNW	B	0.0000	0.0007	0.0000	0.0000	0.0000	0.0000
NW	B	0.0000	0.0009	0.0001	0.0000	0.0000	0.0000
NNW	B	0.0000	0.0010	0.0000	0.0000	0.0000	0.0000
N	C	0.0000	0.0017	0.0007	0.0000	0.0000	0.0000
NNE	C	0.0000	0.0012	0.0002	0.0000	0.0000	0.0000
NE	C	0.0002	0.0033	0.0016	0.0000	0.0000	0.0000
ENE	C	0.0000	0.0018	0.0010	0.0000	0.0000	0.0000
E	C	0.0005	0.0033	0.0021	0.0000	0.0000	0.0000
ESE	C	0.0000	0.0018	0.0020	0.0000	0.0000	0.0000
SE	C	0.0001	0.0011	0.0006	0.0000	0.0000	0.0000
SSE	C	0.0001	0.0016	0.0002	0.0000	0.0000	0.0000
S	C	0.0000	0.0027	0.0015	0.0000	0.0000	0.0000
SSW	C	0.0000	0.0012	0.0051	0.0001	0.0000	0.0000
SW	C	0.0000	0.0010	0.0022	0.0000	0.0000	0.0000
WSW	C	0.0001	0.0013	0.0009	0.0000	0.0000	0.0000
W	C	0.0001	0.0017	0.0006	0.0000	0.0000	0.0000
WNW	C	0.0001	0.0016	0.0029	0.0002	0.0000	0.0000
NW	C	0.0000	0.0033	0.0139	0.0013	0.0000	0.0000
NNW	C	0.0004	0.0033	0.0083	0.0012	0.0000	0.0000
N	D	0.0022	0.0104	0.0193	0.0051	0.0000	0.0000
NNE	D	0.0012	0.0047	0.0183	0.0062	0.0000	0.0000
NE	D	0.0010	0.0075	0.0377	0.0192	0.0004	0.0000

Wind Frequency Distribution at the 12.5 Meter Tower Pinellas Plant Calendar Year 1994 (Continued)

WIND ORIGIN	PASQUILL-GIFFORD STABILITY CLASS	WIND SPEEDS IN KNOTS					
		1-3	4-6	7-10	11-16	17-21	>21
ENE	D	0 0017	0 0119	0 0284	0 0097	0 0007	0 0000
E	D	0 0036	0 0164	0 0323	0 0098	0 0000	0 0000
ESE	D	0 0013	0 0075	0 0155	0 0086	0 0001	0 0000
SE	D	0 0010	0 0110	0 0115	0 0039	0 0000	0 0000
SSE	D	0 0013	0 0086	0 0111	0 0042	0 0001	0 0000
S	D	0 0023	0 0086	0 0172	0 0147	0 0038	0 0002
SSW	D	0 0009	0 0098	0 0179	0 0108	0 0001	0 0000
SW	D	0 0005	0 0067	0 0121	0 0036	0 0000	0 0000
WSW	D	0 0002	0 0037	0 0099	0 0033	0 0000	0 0000
W	D	0 0004	0 0069	0 0187	0 0051	0 0007	0 0000
WNW	D	0 0007	0 0144	0 0179	0 0022	0 0012	0 0000
NW	D	0 0012	0 0141	0 0135	0 0034	0 0010	0 0000
NNW	D	0 0009	0 0109	0 0120	0 0056	0 0000	0 0000
N	E	0 0015	0 0150	0 0006	0 0000	0 0000	0 0000
NNE	E	0 0006	0 0088	0 0031	0 0000	0 0000	0 0000
NE	E	0 0007	0 0077	0 0007	0 0000	0 0000	0 0000
ENE	E	0 0021	0 0158	0 0023	0 0000	0 0000	0 0000
E	E	0 0045	0 0169	0 0017	0 0000	0 0000	0 0000
ESE	E	0 0043	0 0141	0 0038	0 0000	0 0000	0 0000
SE	E	0 0040	0 0132	0 0013	0 0000	0 0000	0 0000
SSE	E	0 0021	0 0071	0 0013	0 0000	0 0000	0 0000
S	F	0 0020	0 0061	0 0004	0 0000	0 0000	0 0000
SSW	E	0 0009	0 0012	0 0001	0 0000	0 0000	0 0000
SW	E	0 0010	0 0029	0 0001	0 0000	0 0000	0 0000
WSW	E	0 0004	0 0044	0 0013	0 0000	0 0000	0 0000
W	E	0 0011	0 0080	0 0009	0 0000	0 0000	0 0000
WNW	E	0 0007	0 0044	0 0000	0 0000	0 0000	0 0000
NW	E	0 0020	0 0016	0 0000	0 0000	0 0000	0 0000
NNW	E	0 0026	0 0036	0 0000	0 0000	0 0000	0 0000
N	F	0 0091	0 0082	0 0000	0 0000	0 0000	0 0000
NNE	F	0 0089	0 0044	0 0000	0 0000	0 0000	0 0000
NE	F	0 0032	0 0029	0 0000	0 0000	0 0000	0 0000
ENE	F	0 0083	0 0049	0 0000	0 0000	0 0000	0 0000
E	F	0 0108	0 0036	0 0000	0 0000	0 0000	0 0000
ESE	F	0 0061	0 0017	0 0000	0 0000	0 0000	0 0000
SE	F	0 0048	0 0007	0 0000	0 0000	0 0000	0 0000
SSE	F	0 0023	0 0002	0 0000	0 0000	0 0000	0 0000
S	F	0 0029	0 0007	0 0000	0 0000	0 0000	0 0000
SSW	F	0 0024	0 0007	0 0000	0 0000	0 0000	0 0000
SW	F	0 0022	0 0009	0 0000	0 0000	0 0000	0 0000
WSW	F	0 0032	0 0012	0 0000	0 0000	0 0000	0 0000
W	F	0 0059	0 0020	0 0000	0 0000	0 0000	0 0000
WNW	F	0 0032	0 0011	0 0000	0 0000	0 0000	0 0000
NW	F	0 0043	0 0002	0 0000	0 0000	0 0000	0 0000
NNW	F	0 0042	0 0006	0 0000	0 0000	0 0000	0 0000
TOTAL		0 14628	0 3716	0 35534	0 11819	0 00818	0 00024

N=8760 HOURS=1 00

This page left blank intentionally.

ATTACHMENT E
HOTSPOT Computer Model Run

This page left blank intentionally.

HOTSPOT Computer Model Run

```

HOTSPOT 6.0 TRITIUM RELEASE
TOTAL TRITIUM RELEASE : 4.0E+00 curies    100.000 % TRITIUM OXIDE
Dose Results Include Skin Absorption
EFFECTIVE RELEASE HEIGHT : 21.34 m
WIND SPEED (h = 2 m) : 2.4 m/s
WIND SPEED (h = H-eff) : 3.4 m/s
STABILITY CLASS : D DEPOSITION VELOCITY : 0.0E+00 cm/s
RECEPTOR HEIGHT : 0.0 m INVERSION LAYER HEIGHT : 5000.0 m
SAMPLE TIME : 10.000 min
MAXIMUM DOSE DISTANCE : 0.28 km MAXIMUM CEDE : 1.2E-05 rem
Plume Centerline

D = 0.10 km D = 0.20 km D = 0.50 km
CHI = 5.8E-06 (Ci-s)/m^3 CHI = 2.9E-04 (Ci-s)/m^3 CHI = 2.7E-04 (Ci-s)/m^3

50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT:
-----
EFFECTIVE DOSE EFFECTIVE DOSE EFFECTIVE DOSE
EQUIVALENT 1.8E-07 rem EQUIVALENT 8.9E-06 rem EQUIVALENT 8.4E-06 rem

Plume Centerline

D = 1.00 km D = 2.00 km D = 5.00 km
CHI = 1.1E-04 (Ci-s)/m^3 CHI = 4.0E-05 (Ci-s)/m^3 CHI = 1.1E-05 (Ci-s)/m^3

50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT:
-----
EFFECTIVE DOSE EFFECTIVE DOSE EFFECTIVE DOSE
EQUIVALENT 3.4E-06 rem EQUIVALENT 1.2E-06 rem EQUIVALENT 3.4E-07 rem

Plume Centerline

D = 10.00 km D = 20.00 km D = 50.00 km
CHI = 4.3E-06 (Ci-s)/m^3 CHI = 1.9E-06 (Ci-s)/m^3 CHI = 6.6E-07 (Ci-s)/m^3

50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT: 50-YR DOSE COMMITMENT:
-----
EFFECTIVE DOSE EFFECTIVE DOSE EFFECTIVE DOSE
EQUIVALENT 1.3E-07 rem EQUIVALENT 5.8E-08 rem EQUIVALENT 2.0E-08 rem

```

m
s

This page left blank intentionally.