Commonwealth Edison
72 West Adams Street, Chicago, Illinois
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April 1, 1982

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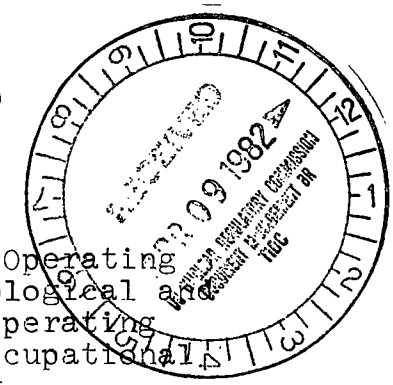
Mr. James G. Keppler
Regional Director
Office of Inspection and Enforcement
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137



Subject: Dresden Station Operating Report
NRC Dockets 50-010, 50-237 and 50-249

Dear Mr. Keppler:

Enclosed is Part 3 of the Dresden Station Operating Report reporting results of environmental radiological and meteorological monitoring. Parts 1, Facility Operating Experience, and 2, Radioactive Effluents and Occupational Radiation Exposures, were submitted in February.

One copy of this report is provided for your use and 39 copies are being submitted directly to Mr. Edson G. Case, Deputy Director of the office of Nuclear Reactor Regulation.

Sincerely yours,

for D. J. Scott
Superintendent
Dresden Nuclear Power Station

JCG/DJS/pap

Enclosure

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Commonwealth Edison
72 West Adam Street, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

March 29, 1982

Mr. James G. Keppler
Regional Director
Office of Inspection and Enforcement
Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60131

Subject: 10CRF50 AIRBORNE AND LIQUID DOSE TABLES

Dear Mr. Keppler:

The attached tables of maximum doses resulting airborne effluents and liquid effluents are submitted as attachments to this report. These data were not available at the time the report was printed.

Sincerely yours,

R.A. Flessner
Supervisor of
Radioecology and
Emergency Planning

RAF/LAL/vls

#5992A

DRESDEN UNIT TWO AND UNIT THREE
MAXIMUM DOSES RESULTING FROM AIRBORNE RELEASES
PERIOD OF RELEASE - 1/ 1/81 TO 12/31/81 CALCULATED 03/19/82

TYPE	CURRENT PERIOD 10/81-12/81	1ST PREV QUARTER 7/81- 9/81	2ND PREV QUARTER 4/81- 6/81	3RD PREV QUARTER 1/81- 3/81	4TH PREV QUARTER	ANNUAL
GAMMA AIR	0.0	0.37E+00	0.24E+00	0.46E+00	0.42E+00	0.15E+01
(MRAD)	( )	(NNE)	(NNE)	(NNE)	(NNE)	(NNE)
BETA AIR	0.0	0.12E+00	0.20E+00	0.15E+00	0.28E+00	0.75E+00
(MRAD)	( )	(NNE)	(NNE)	(NNE)	(NNE)	(NNE)
TOT. BODY	0.0	0.20E+00	0.12E+00	0.25E+00	0.22E+00	0.79E+00
(MREM)	( )	(NNE)	(NNE)	(NNE)	(NNE)	(NNE)
SKIN	0.0	0.38E+00	0.33E+00	0.46E+00	0.51E+00	0.17E+01
(MREM)	( )	(NNE)	(NNE)	(NNE)	(NNE)	(NNE)
ORGAN	0.0	0.63E+00	0.21E+01	0.47E+01	0.35E+00	0.78E+01
(MREM)	( )	(N)	(NNE)	(N)	(NNE)	(NNE)
		THYROID	THYROID	THYROID	THYROID	THYROID

THIS IS A REPORT OF THE PREVIOUS FOUR QUARTERS
THIS REPORT CONTAINS RELEASES FOR THE CURRENT QUARTER ONLY

COMPLIANCE STATUS - 10 CFR 50 APP. I FOR EITHER UNIT 2 OR UNIT 3

	QTRLY OBJ	% of APP. I CURR QTR 10/81- 12/81	1ST PREV 07/81- 09/81	2ND PREV 04/81- 06/81	3RD PREV 01/81- 03/81	YRLY OBJ	% OF APP. I
GAMMA AIR (MRAD)	5.0	3.67	2.35	4.56	4.19	10.0	7.38
BETA AIR (MRAD)	10.0	0.61	0.99	0.73	1.42	20.0	1.87
TOT. BODY (MREM)	2.5	4.00	2.43	4.94	4.37	5.0	7.87
SKIN (MREM)	7.5	2.55	2.21	3.05	3.41	15.0	5.61
ORGAN (MREM)	7.5	4.16	13.73	31.60	2.34	15.0	25.90
		THYROID	THYROID	THYROID	THYROID		THYROID

DRESDEN UNIT TWO AND UNIT THREE

MAXIMUM DOSES (MREM) RESULTING FROM LIQUID EFFLUENTS

PERIOD OF RELEASE - 1/ 1/81 TO 12/31/81 CALCULATED 03/19/82 *

DOSE TYPE	CURRENT PERIOD	1ST PREV QUARTER	2ND PREV QUARTER	3RD PREV QUARTER	4TH PREV QUARTER	ANNUAL
		10/81-12/81	7/81- 9/81	4/81- 6/81	1/81- 3/81	
TOTAL BODY	0.0	0.96E-05	0.11E-03	0.44E-05	0.25E-03	0.38E-03
INTERNAL ORGAN	0.0	0.16E-04	0.16E-03	0.83E-05	0.69E-03	0.70E-03
		GI-LLI	LIVER	BONE	THYROID	THYROID

* THIS IS A REPORT BASED ON FOUR PREVIOUS QUARTERS

COMPLIANCE STATUS - 10 CFR 50 APP. I FOR EITHER UNIT 2 OR UNIT 3

	QTRLY OBJ	CURR QTR 10/81-12/81	1ST PREV 07/81-09/81	2ND PREV 04/81-06/81	3RD PREV 01/81-03/81	YRLY OBJ	% OF APP. I
		---------- % of APP. I ----------					
TOTAL BODY (MREM)	1.5	0.00	0.01	0.00	0.02	3.0	0.01
CRIT. ORGAN (MREM)	5.0	0.00	0.00	0.00	0.00	10.0	0.01
		GI-LLI	LIVER	BONE	THYROID		THYROID

DRESDEN STATION

RADIOACTIVE WASTE AND ENVIRONMENTAL MONITORING

Annual Report 1981

HAZLETON ENVIRONMENTAL SCIENCES

Northbrook, Illinois

MARCH 1982

DRESDEN NUCLEAR POWER STATION

RADIOACTIVE WASTE AND ENVIRONMENTAL MONITORING

ANNUAL REPORT 1981

MARCH 1982

TABLE OF CONTENTS

INTRODUCTION

The Dresden Station is located approximately twelve miles southwest of Joliet, Illinois, at the confluence of the Des Plaines and Kankakee Rivers where they form the Illinois River. This station uses three boiling water reactors (GE design) to generate electricity. Unit 1 began operating in 1960 and has a rated power output of 200 megawatts electrical (MWe). Units 2 and 3 began operating in 1970 and 1971, respectively, each with a rated power output of 800 MWe. The General Electric Morris Operation Plant (GEMo) is located adjacent to Dresden.

Liquid effluents from Dresden are released to the Illinois River in controlled batches after radioassay of each batch. Gaseous effluents are released to the atmosphere after delay to permit decay of short half-life gases. Releases to the atmosphere are calculated on the basis of analyses of daily grab samples of noble gases and continuously collected composite samples of iodine and particulate matter. The results of effluent analyses are summarized on a monthly basis and reported semiannually to the Nuclear Regulatory Commission as required per Technical Specifications. Airborne concentrations of noble gases, I-131 and particulate radioactivity in off-site areas are calculated using effluent and meteorological data and data on isotopic composition of effluents.

Environmental monitoring is conducted by sampling at indicator and reference (background) locations in the vicinity of the Dresden plant to measure changes in radiation or radioactivity levels that may be attributable to plant operation. If significant changes attributable to Dresden are measured, these changes are correlated with effluent releases. External gamma radiaton exposure from noble gases and I-131 in milk are the critical pathways at this site; however, a comprehensive environmental monitoring program is conducted which includes many other pathways of less importance.

SUMMARY

Gaseous and liquid effluents for the period remained below the Technical Specification limits. Calculations of environmental concentrations based on effluent, Illinois River flow, and meterological data for the period indicate that consumption by the public of radioactive materials attributable to the plant are unlikely to exceed regulatory limits. Gamma radiation exposure from noble gases released to the atmosphere represented the critical pathway for the period with a maximum individual dose estimated to be * mrem for the year, when a shielding and occupancy factor of 0.7 is assumed. Environmental monitoring results confirm that dose via other pathways was not significant.

* Datum will be provided

1.0 Effluents

1.1 Gaseous Effluents to the Atmosphere

Measured concentrations and isotopic composition of noble gases, radioiodine, and particulate radioactivity released to the atmosphere during the year, are listed in Table 1.1-1. A non-detectable amount of noble gases was released from Dresden Unit 1 and a total of 3.96E+04 curies of noble gases with a maximum release rate of 4.7E+04 µCi/sec was released from Dresden Units 2 and 3.

A total of 2.76 curies of I-131 was released during the year.

A total of 8.09 curies of beta-gamma emitters and non-detectable amounts of alpha emitters were released as airborne particulate matter.

1.2 Liquids Released to Illinois River

A total of 1.4E+06 liters of radioactive liquid wastes containing 0.03 curies (excluding tritium) were discharged from the station. These wastes were released at a maximum monthly average concentration of 1.2E-09 µCi/ml from Units 2 and 3 which is 1.2% of the Technical Specification release limits for unidentified radioactivity. There was no discharge from Unit 1. During the same period, 5.2 curies of tritium and 7.5E-06 curies of alpha radioactivity were released. Monthly release estimates and principal radionuclides in liquid effluents are given in Table 1.2-1.

2.0 Solid Radioactive Waste

Solid radioactive wastes were shipped to Richland, Washington and Barnwell Nuclear Center, South Carolina. The record of waste shipments is summarized in Table 2.0-1.

3.0 Dose to Man

3.1 Gaseous Effluent Pathways

Gamma Dose Rates

Gamma air and whole body dose rates off-site were calculated based on measured release rates, isotopic composition of the noble gases, and meteorological data for the period (Table 3.1-1). Isodose contours of whole body dose are shown in Figure 3.1-1 for the year. Based on measured effluents and meteorological data, the maximum dose to an individual would be * mrem for the year, with an occupancy or shielding factor of 0.7 included. The maximum gamma air dose was * mrad.

* Data will be provided

Beta Air and Skin Rates

The range of beta particles in air is relatively small (on the order of a few meters or less): consequently, plumes of gaseous effluents may be considered "infinite" for purpose of calculating the dose from beta radiation incident on the skin. However, the actual dose to sensitive skin tissues is difficult to calculate because this depends on the beta particle energies, thickness of inert skin, and clothing covering sensitive tissues. For purposes of this report the skin is taken to have a thicknes of 7.0 mg/cm^2 and an occupancy factor of 1.0 is used. The skin dose from beta and gamma radiation for the year was * mrem.

The air concentrations of radioactive noble gases at the off-site receptor locations are given in Figure 3.1-2. The maximum off-site beta air dose for the year was * mrad.

Radioactive Iodine

The human thyroid exhibits a significant capacity to concentrate ingested or inhaled iodine, and the radioiodine, I-131, released during routine operation of the plant, may be made available to man thus resulting in a dose to the thyroid. The principal pathway of interest for this radionuclide is ingestion of radioiodine in milk by an infant. Calculations made in previous years indicate that contributions to doses from inhalation of I-131 and I-133, and I-133 in milk are negligible.

Iodine-131 Concentrations in Air

The calculated concentration contours for I-131 in air are shown in Figure 3.1-3. Included in these calculations is an iodine cloud depletion factor which accounts for the phenomenon of elemental iodine deposition on the ground. The maximum off-site average concentration is estimated to be * pCi/m^3 for the year.

Dose to Infants Thyroid

The hypothetical thyroid dose to an infant living near the plant via ingestion of milk was calculated. The radionuclide considered was I-131 and the source of milk was taken to be the nearest dairy farm with the cows pastured from May to October. The maximum infants's thyroid dose was * mrem during the year (Table 3.1-1).

Concentrations of Particulates in Air

Concentration contours of radioactive airborne particulates are shown in Figure 3.1-4. The maximum off-site average level is estimated to be * pCi/m^3.

* Data will be provided

Summary of Doses

Table 3.1-1 summarizes the doses resulting from releases of airborne radioactivity via the different exposure pathways.

3.2 Liquid Effluent Pathways

The three principal pathways through the aquatic environment for potential doses to man from liquid waste are ingestion of potable water, eating aquatic foods, and exposure while walking on the shoreline. Not all of these pathways are applicable at a given time or station but a reasonable approximation of the dose can be made by adjusting the dose formula for season of the year or type and degree of use of the aquatic environment. NRC* developed equations were used to calculate the doses to the whole body, lower GI tract, thyroid, bone and skin; specific parameters for use in the equations are given in the Commonwealth Edison Off-site Dose Calculation Manual. The maximum whole body dose for the year was ** mrem and no organ dose exceeded ** mrem.

4.0 Site Meteorology

A summary of the site meteorological measurements taken during each calendar quarter of the year is given in Appendix II. The data are presented as cumulative joint frequency distributions of 300' level wind direction and wind speed class by atmospheric stability class determined from the temperature difference between the 300' and 35' levels. Data recovery for these measurements was nearly 99.1%.

5.0 Environmental Monitoring

Table 5.0-1 provides an outline of the radiological environmental monitoring program as required in current Technical Specifications. This program went into effect in November 1977 and differs from previous programs in the number and types of analyses performed. Tables 5.0-2 to 5.0-5 summarize data for the year.

Except for tables of special interest, tables listing all data are no longer included in the annual report. All data tables are available for inspection at the Station or in the Corporate Offices.

Specific findings for various environmental media are discussed below.

5.1 Gamma Radiation

External radiation dose from on-site sources and noble gases released to the atmosphere was measured at eight indicator and nine reference

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* Nuclear Regulatory Commission, Regulatory Guide 1.109 (Rev. 1).
** Data will be provided.

(background) locations using solid lithium fluoride thermoluminescent dosimeters (TLD). A comparison of the TLD results for reference stations with on-site and off-site indicator stations is included in Table 5.1-1. An additional 52 TLD's were installed at both five miles and the site boundary, beginning on June 1, 1980. Table 5.1-1 lists the results.

5.2 Airborne I-131 and Particulate Radioactivity

Concentrations of airborne I-131 and particulate radioactivity at monitoring locations are summarized in Tables 5.0-2 through 5.0-5. Locations of the samplers are shown in Figure 5.0-1. Airborne I-131 remained below the LLD of 0.10 pCi/m^3 throughout the year.

Gross beta concentrations ranged from 0.01 to 0.54 pCi/m^3 for the indicator locations with an average concentration of 0.11 pCi/m^3 for the year. No radioactivity attributable to plant operation was detected in any sample.

5.3 Aquatic Radioactivity

Cooling water samples were collected daily and composited for analysis weekly for the Unit 1 Inlet canal and Units 1 and 2/3 Discharge Canals. Analytical results did not indicate any measurable radioactivity attributable to plant operation.

Surface water samples were collected weekly from the Illinois River at the EJ and E Railroad Bridge and composited monthly to analyze for gamma emitters. The gamma emitters were below the detection limit of 10 pCi/l in all samples collected during the year.

Well water samples were collected monthly beginning October 1980 and analyzed for gross alpha, gross beta, and tritium. The levels of activity detected were generally in the range to be expected in this medium in the environment and were not attributable to station operation.

Levels of gamma radioactivity in fish samples were measured and found in all cases to be below the lower limits of detection for the program.

A sediment sample was analyzed by gamma spectroscopy. Gamma-emitters were either below the limits of detection or at the level usually encountered in the environment (Cs-137, 0.30 pCi/g dry weight) indicating the presence of no radioactivity due to station operation.

5.4 Milk

Milk samples were collected weekly during the grazing season and monthly during the balance of the year from three farms; the Corbin

Farm located about 10 miles south, the Mather Farm (background location) located about 16 miles northeast, and the Yunker Farm, five miles north-northwest. I-131 was determined for each sample by a gamma spectrometry or chemical separation of I^- and beta counting.

I-131 remained below the detection limits of 0.5 pCi/l during the grazing period (May to October) and 5.0 pCi/l during the non-grazing period (November to April).

5.5 Special Collections

Service water contaminated by leaks in the LPCI heat exchanger was released into the cooling lake early in 1978. To monitor effects on the concentrations of radioactivity in the cooling canal a program was begun in October 1978 of collecting weekly grab samples of water at the Dresden Road and County Line Road crossings of the canal. Concentrations of both gross beta and gamma activities have not indicated the presence of detectable concentrations of radioactivity due to the station. Data are listed on page 8.

6.0 Analytical Procedures

A summary of the procedures used for analyzing radioactivity in environmental samples is given in Appendix III of the report for the period January through June 1975. Procedures used during the period covered by this report remain unchanged.

7.0 Milch Animal Census Within Five (5) Miles of Station

Name of Farm or Farmer	Distance and Direction from Station	Number and Type
Larry Yunker Minooka	4.8 miles NNW	45 cows

Survey conducted by Alan Lewis in September 1981. "Door-to-door" census.

DRESDEN NUCLEAR POWER STATION

Radioactivity in Water Samples from Dresden Cooling Lake

(Weekly Collections)
(pCi/l)

	Dresden Road Crossing D-34A		Country Line Road Crossing D-34B			Dresden Road Crossing D-34A		Country Line Road Crossing D-34B	
Collection Date	Gross Beta	Gamma Emitters	Gross Beta	Gamma Emitters	Collection Date	Gross Beta	Gamma Emitters	Gross Beta	Gamma Emitters
01/03/81	5±2	<10	6±3	<10	07/04/81	5.0±0.8	<10	4.4±0.8	<10
01/10/81	8±3	<10	4±2	<10	07/11/81	2.9±0.5	<10	3.2±0.7	<10
01/17/81	4±2	<10	5±2	<10	07/18/81	3.4±0.7	<10	2.4±0.7	<10
01/25/81	5±2	<10	12±2	<10	07/25/81	2.7±0.7	<10	3.0±0.7	<10
01/31/81	3±3	<10	<5	<10	08/01/81	3.0±0.7	<10	4.0±0.8	<10
02/07/81	2.4±0.6	<10	3.0±0.7	<10	08/08/81	4.3±0.8	<10	3.3±0.7	<10
02/15/81	3.8±0.7	<10	2.6±0.7	<10	08/15/81	3.8±0.8	<10	3.5±0.7	<10
02/21/81	3.8±0.7	<10	3.4±0.7	<10	08/22/81	3.2±0.7	<10	3.0±0.7	<10
02/28/81	3.4±0.7	<10	2.8±0.7	<10	08/29/81	3.6±0.7	<10	3.6±0.7	<10
03/07/81	2.7±0.7	<10	9.8±1.0	<10	09/04/81	3.9±0.8	<10	3.8±0.8	<10
03/14/81	3.2±0.7	<10	3.8±0.7	<10	09/12/81	3.6±0.8	<10	3.1±0.7	<10
03/21/81	3.3±0.7	<10	11.0±1.0	<10	09/19/81	3.6±0.7	<10	3.6±0.7	<10
03/28/81	2.8±0.7	<10	4.6±0.8	<10	09/26/81	4.3±0.8	<10	3.4±0.7	<10
04/04/81	3.2±0.7	<10	3.7±0.7	<10	10/03/81	2.5±0.7	<10	2.4±0.7	<10
04/11/81	4.8±0.8	<10	4.3±0.8	<10	10/10/81	3.0±0.8	<10	2.5±0.7	<10
04/18/81	3.8±0.7	<10	4.3±0.8	<10	10/17/81	3.1±0.8	<10	2.0±0.7	<10
04/25/81	6.8±0.9	<10	3.7±0.7	<10	10/24/81	3.5±0.7	<10	3.7±0.7	<10
05/02/81	6.8±0.9	<10	5.2±0.8	<10	11/01/81	2.9±0.7	<10	2.8±0.7	<10
05/09/81	5.9±0.9	<10	4.2±0.8	<10	11/07/81	3.0±0.7	<10	3.4±0.7	<10
05/16/81	5.8±0.6	<10	4.7±0.8	<10	11/14/81	5.5±0.8	<10	2.8±0.7	<10
05/23/81	6.1±0.8	<10	5.4±0.6	<10	11/22/81	2.2±0.6	<11	2.5±0.6	<10
05/30/81	4.8±0.6	<10	5.0±0.9	<10	11/28/81	3.2±0.7	<10	3.4±0.8	<10
06/06/81	4.1±0.8	<10	3.8±0.7	<10	12/05/81	3.4±0.8	<10	3.8±0.8	<10
06/14/81	5.0±0.8	<10	4.3±0.8	<10	12/12/81	3.3±0.7	<10	3.4±0.7	<10
06/20/81	4.2±0.7	<10	3.6±0.7	<10	12/19/82	2.5±0.7	<10	4.0±0.8	<10
06/27/81	4.4±0.8	<10	3.8±0.7	<10	12/26/81	2.5±0.7	<10	3.2±0.7	<10

APPENDIX I

DATA TABLES AND FIGURES

Table 1.1-1

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 DOCKET NOS.: 50 - 10 YEAR: 1981

I. Gaseous Effluents	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity Releases a) Total Release	curies	<LLD	<LLD	<LLD	<LLD	< LLD	<LLD	<LLD	
b) Maximum Release Rate (daily grab sample)	uCi/sec	---	---	---	---	---	---	---	
c) Isotopes Released									
Kr-85m	curies								
Kr-87	curies								
Kr-88	curies								
Xe-133	curies								
Xe-135	curies								
Xe-135m	curies								
Xe-138	curies								
d) Percent of Chimney Limit	%	---	---	---	---	---	---	---	
e) Average Release Rate	uCi/sec	---	---	---	---	---	---	---	
2. Iodine Releases									
a) Isotopes Released									
I-131	curies	2.7E-04	2.4E-04	3.1E-04	4.4E-04	1.1E-03	2.8E-04	2.6E-03	
I-133	curies								
I-135	curies								
b) Percent of Chimney Limit	%	0.01	0.01	0.01	0.01	0.02	0.01	0.01	
c) Average Release Rate	uCi/sec	1.0E-04	1.0E-04	1.2E-04	1.7E-04	4.2E-04	1.1E-04	1.7E-04	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 DOCKET NOS.: 50 - 10 YEAR: 1981

I. Gaseous Effluents	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity Releases									
a) Total Release	curies	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
b) Maximum Release Rate (daily grab sample)	uCi/sec	---	---	---	---	---	---	---	
c) Isotopes Released									
Kr-85m	curies								
Kr-87	curies								
Kr-88	curies								
Xe-133	curies								
Xe-135	curies								
Xe-135m	curies								
Xe-138	curies								
d) Percent of Chimney Limit	%	---	---	---	---	---	---	---	
e) Average Release Rate	uCi/sec	---	---	---	---	---	---	---	
2. Iodine Releases									
a) Isotopes Released									
I-131	curies	1.03E-6	2.56E-7	1.78E-6	2.93E-6	3.15E-6	2.41E-6	1.16E-05	
I-133	curies	---	---	---	---	---	---	---	
I-135	curies	---	---	---	---	---	---	---	
b) Percent of Chimney Limit	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
c) Average Released Rate	uCi/sec	3.84E-07	9.55E-08	6.87E-07	1.09E-06	1.22E-06	8.99E-07	7.29E-07	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 DOCKET NOS.: 50-10 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
3. Particulate Releases a) Gross Radioactivity ($\beta\gamma$)	millicuries	0.63	0.52	0.60	4.25	0.31	0.32	6.63	
b) Gross Alpha Radioactivity	mCi	---	---	---	---	---	---	---	
c) Isotopes Released	mCi	---	---	---	---	---	---	---	
Cr-51	mCi	---	---	---	---	---	---	---	
Mn-54	mCi	.17	.03	---	.59	.05	.00	.84	
Co-58	mCi	---	---	---	---	---	---	---	
Co-60	mCi	.33	.26	.52	1.26	---	.30	2.67	
Sr-89	mCi	.00	.06	.03	.54	.03	.01	.67	
Sr-90	mCi	.00	.00	.00	.04	.00	.00	.04	
Zr-95	mCi	---	---	---	---	---	---	---	
Nb-95	mCi	---	---	---	.84	---	---	.84	
Ru-103	mCi	---	---	---	---	---	---	---	
I-131	mCi	---	---	---	---	---	---	---	
Cs-134	mCi	---	---	---	---	---	---	---	
Cs-137	mCi	.13	.17	.05	.98	.23	.01	1.57	
Ba-140	mCi	---	---	---	---	---	---	---	
Ce-141	mCi	---	---	---	---	---	---	---	
Ce-144	mCi	---	---	---	---	---	---	---	
d) Percent of chimney limit	%	0.01	0.01	0.01	0.07	0.02	0.01	0.02	
e) Average release rate	uCi/sec	2.4E-04	2.1E-04	2.2E-04	1.6E-03	1.2E-04	1.2E-04	4.2E-04	
4. Sum of Iodines & Particulates									
a) Percent of Chimney Limit	%	0.01	0.01	0.01	0.08	0.02	0.01	0.02	
5. Gaseous Tritium									
a) Total Release	curies	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
b) Average Release Rate	uCi/sec	---	---	---	---	---	---	---	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 DOCKET NOS.: 50-10 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
3. Particulate Releases a) Gross Radioactivity ($\beta\gamma$)	millicuries	3.26E-01	5.07E-02	7.52E-02	6.07E-02	8.37E-02	9.99E-02	6.96E-01	
b) Gross Alpha Radioactivity	mCi								
c) Isotopes Released	mCi								
Zn-65/Fe-59	mCi	--- / ---	4.52E-04 / ---	--- / ---	--- / ---	--- / 4.31E-04	--- / ---	4.52E-04 / 4.31E-04	
Mn-54	mCi	6.05E-03	1.07E-03	7.13E-04	5.74E-04	3.44E-03	3.49E-03	1.53E-02	
Co-58	mCi	4.04E-04	---	---	---	---	1.15E-03	1.55E-03	
Co-60	mCi	1.85E-02	1.73E-02	3.45E-02	1.98E-02	3.32E-02	2.72E-02	1.51E-01	
Sr-89	mCi	2.50E-01	1.78E-02	7.48E-04	6.57E-04	6.17E-04	6.77E-04	2.70E-01	
Sr-90	mCi	1.98E-02	8.47E-04	7.48E-04	2.19E-04	2.06E-04	2.26E-04	2.20E-02	
Zr-95	mCi	2.59E-04	---	---	1.20E-03	3.42E-03	---	4.88E-03	
Nb-95	mCi	6.98E-04	6.16E-04	---	---	---	---	1.31E-03	
Ag-110m	mCi	---	2.87E-04	---	---	---	---	2.87E-04	
I-131	mCi	---	---	---	---	1.26E-03	---	1.26E-03	
Cs-134	mCi	2.13E-03	2.41E-03	6.04E-03	5.89E-03	5.70E-03	1.06E-02	3.28E-02	
Cs-137	mCi	1.80E-02	9.98E-03	3.24E-02	3.12E-02	3.54E-02	5.66E-02	1.84E-01	
Ba-140*	mCi	1.29E-03	---	---	---	---	---	1.29E-03	
Ce-141	mCi	4.18E-03	---	---	1.14E-03	---	---	5.32E-03	
Ce-144	mCi	2.87E-03	---	---	---	---	---	2.87E-03	
d) Percent of chimney limit	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
e) Average release rate	uCi/sec	1.22E-04	1.89E-05	2.90E-5	2.26E-5	3.23E-05	3.73E-05	4.43E-05	
4. Sum of Iodines & Particulates									
a) Percent of Chimney Limit	%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
5. Gaseous Tritium									
a) Total Release	curies	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	<LLD	
b) Average Release Rate	uCi/sec	---	---	---	---	---	---	---	

* La-140 Identified but not reported

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station-Units 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity Releases									
a) Total Release 2/3 chimney	curies	5915.8	2338.0	2309.9	5410.2	2932.5	3583.7	22490.1	6.6D.1.f. (1)
b) Maximum Release Rate (daily grab sample)	uCi/sec	4.7E+04	3.0E+03	3.3E+03	2.4E+04	3.4E+03	9.1E+03	4.7E+04	6.6D.1.f. (2)
c) Isotopes Released									6.6D.1.f. (4)
Kr-85m	curies	126.6	65.2	32.3	120.1	85.9	24.0	454.1	
Kr-87	curies	235.4	---	77.2	195.8	71.6	102.9	682.9	
Kr-88	curies	404.0	---	89.9	404.7	119.1	270.9	1288.6	
Xe-133	curies	534.2	324.0	179.5	346.8	155.4	258.0	1797.9	
Xe-135	curies	1503.2	711.0	476.1	1326.0	667.1	733.9	5417.3	
Xe-135m	curies	403.5	188.2	377.2	667.6	362.5	483.1	2482.1	
Xe-138	curies	2708.9	1049.6	1077.7	2349.2	1470.9	1639.6	10295.9	
Xe-133m	curies	---	---	---	---	---	71.3	71.3	
d) Percent of Chimney Limit	%	0.31	0.14	0.12	0.30	0.13	0.16	0.17	6.6D.1.f. (3)
e) Average Release Rate	uCi/sec	2.2E+03	9.7E+02	8.6E+02	2.1E+03	1.1E+03	1.4E+03	1.4E+03	
2. Chimney Iodine Releases									6.6D.1.f. (1)
a) Isotopes Released									
I-131	curies	2.1E-01	1.9E-01	3.9E-01	3.1E-01	3.9E-01	2.9E-01	1.8E00	
I-133	curies	1.1E0	1.1E0	1.6E0	1.7E0	2.1E0	1.5E0	9.1E0	
I-135	curies	2.0E0	2.2E0	1.8E0	3.9E0	3.6E0	2.2E0	1.57E1	
b) Percent of Chimney Limit	%	2.20	2.21	4.11	3.38	3.62	2.69	2.67	6.6D.1.f. (3)
c) Average Release Rate	uCi/sec	7.8E-02	7.7E-02	1.4E-01	1.2E-01	1.4E-01	1.1E-01	1.2E-01	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station-Units 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity Releases									
a) Total Release 2/3 chimney	curies	1.90E+03	2.03E+03	1.20E+03	1.68E+03	2.41E+03	4.28E+03	1.35E+04	6.6D.1.f. (1)
b) Maximum Release Rate (daily grab sample)	uCi/sec	2.51E+03	2.43E+03	3.24E+03	1.73E+03	1.94E+03	8.77E+03	8.77E+03	6.6D.1.f. (2)
c) Isotopes Released									6.6D.1.f. (4)
Kr-85m	curies	4.60E+01	3.69E+01	2.64E+01	3.86E+01	2.89E+01	6.85E+01	2.45E+02	
Kr-87	curies	6.44E+01	-	3.60E+01	8.23E+01	8.44E00	1.76E+02	3.67E+02	
Kr-88	curies	1.26E+02	-	5.28E+01	8.74E+01	4.36E+01	1.26E+02	4.36E+02	
Xe-133	curies	8.74E+01	1.15E+02	3.36E+01	5.38E+01	6.70E+01	8.05E+01	4.17E+02	
Xe-135	curies	4.26E+02	3.57E+02	2.04E+02	2.77E+02	3.01E+02	3.9E+02	1.96E+03	
Xe-135m	curies	4.22E+02	3.92E+02	1.78E+02	2.17E+02	3.20E+02	7.04E+02	2.23E+03	
Xe-138	curies	7.28E+02	1.13E+03	6.70E+02	9.24E+02	1.66E+03	2.73E+03	7.84E+03	
d) Percent of Chimney Limit	%	0.08	0.09	0.06	0.07	0.11	0.19	0.09	6.6D.1.f. (3)
e) Average Release Rate	uCi/sec	7.09E+02	7.59E+02	4.61E+02	6.28E+02	9.31E+02	1.60E+03	8.49E+02	
2. Chimney Iodine Releases									6.6D.1.f. (1)
a) Isotopes Released									
I-131	curies	2.47E-01	2.05E-01	1.68E-01	9.91E-02	8.22E-02	3.29E-02	8.34E-01	
I-133	curies	2.19E00	1.27E00	7.84E-01	7.34E-01	3.85E-01	1.68E-01	5.53E00	
I-135	curies	3.63E00	1.87E00	1.30E00	8.80E-01	6.16E-01	2.72E-01	8.57E00	
b) Percent of Chimney Limit	%	2.14	1.78	1.51	0.86	0.74	0.29	1.22	6.6D.1.f. (3)
c) Average Release Rate	uCi/sec	9.22E-02	7.65E-02	6.48E-02	3.70E-02	3.17E-02	1.23E-02	5.25E-02	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents(continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
3. Chimney Particulate Release a) Gross Radioactivity(β-γ)	milli-curies	973.13	899.08	1192.3	952.16	1196.9	1183.5	6397.07	6.6D.1.f.(1)
b) Gross Alpha Radioactivity	uCi								
c) Isotopes Released									6.6D.1.f.(1)
Ru-103	mCi	---	---	6.3	2.38	2.8	---	11.48	
Mn-54	mCi	6.23	1.35	5.0	0.76	---	---	13.34	
Co-58	mCi	---	---	---	---	---	---	---	
Co-60	mCi	54.88	4.41	45.1	3.90	6.3	9.5	124.09	
Sr-89	mCi	165.53	86.40	77.6	178.72	178.6	197.9	884.75	
Sr-90	mCi	0.78	0.45	0.4	1.05	1.0	1.1	4.78	
I-131	mCi	235.21	245.36	335.5	206.90	221.2	254.4	1498.57	
Cs-134	mCi	---	3.06	5.1	---	---	---	8.16	
Cs-137	mCi	5.25	2.61	10.5	3.43	4.5	4.5	30.79	
Ba-140*	mCi	487.83	539.71	692.1	536.07	748.5	687.8	3692.01	
Ce-141	mCi	17.42	15.73	---	18.76	30.6	28.3	110.81	
Ce-144	mCi	---	---	---	---	---	---	---	
Zr-95 / Nb-95		--- / ---	--- / ---	--- / 14.7	--- / 0.19	3.4 / ---	--- / ---	3.4 / 14.89	
d) Percent of Chimney Limit	%	10.22	10.62	12.72	10.50	11.22	10.78	10.88	6.6D.1.f.(3)
e) Average Release Rate	uCi/sec	3.6E-01	3.7E-01	4.5E-01	3.7E-01	4.5E-01	4.6E-01	4.1E-01	
4. Vent Stack Iodine Release									6.6D.1.f.(1)
a) Isotopes Released									
I-131	curies	8.4E-03	8.6E-03	8.5E-03	1.0E-02	1.3E-02	1.4E-02	6.6E-02	
I-133	curies	2.6E-2	3.7E-2	3.6E-2	3.1E-2	7.2E-2	1.2E-1	3.22E-1	
I-135	curies	3.6E-2	6.7E-2	7.8E-2	6.7E-2	1.3E-1	1.9E-1	5.68E-1	
b) Percent of Vent Stack Limit	%	2.61	2.98	2.64	3.37	4.02	4.64	3.52	6.6D.1.f.(3)
c) Average Release Rate	uCi/sec	3.1E-03	3.6E-03	3.2E-03	4.0E-03	4.8E-03	5.8E-03	4.2E-03	

*La-140 Identified but not reported

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents(continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
3. Chimney Particulate Release a) Gross Radioactivity(β-γ)	curies	2.40E-01	1.50E-01	9.55E-02	9.94E-02	8.62E-02	6.21E-02	7.33E-01	6.6D.1.f.(1)
b) Gross Alpha Radioactivity	uCi								
c) Isotopes Released									6.6D.1.f.(1)
Cr-51 / Cs 136	mCi	- / -	- / 5.83E-02	2.24E-01 / -	- / -	- / -	- / -	2.24E-01 / 5.83E-02	
Mn-54	mCi	4.99E-02	-	2.92E-01	9.95E-02	1.94E-01	1.25E-02	6.48E-01	
Co-58	mCi	5.08E-02	-	4.79E-02	-	3.83E-02	3.92E-02	1.76E-01	
Co-60	mCi	1.63E00	3.99E00	1.17E00	2.53E00	1.03E00	9.41E-01	1.13E+01	
Sr-89	mCi	7.93E+01	1.47E+01	3.70E00	6.71E00	7.43E00	7.55E00	1.19E+02	
Sr-90	mCi	4.39E-01	8.40E-02	2.22E-02	7.86E-03	8.70E-03	8.85E-03	5.71E-01	
I-131	mCi	3.65E+01	2.90E+01	1.82E+01	1.52E+01	1.03E+01	6.26E00	1.15E+02	
Cs-134 / Zr 95	mCi	- / -	- / 8.27E-02	- / 1.10E-01	2.24E-02 / -	- / -	- / -	2.24E-02 / 1.93E-01	
Cs-137	mCi	7.86E-01	6.74E-01	6.70E-01	6.79E-01	8.17E-01	6.42E-01	4.27E00	
Ba-140*	mCi	1.15E+02	9.80E-01	6.76E+01	7.12E+01	6.48E+01	4.61E+01	4.63E+02	
Ce-141	mCi	5.36E00	2.98E00	3.01E00	2.18E00	1.34E00	5.71E-01	1.54E+01	
Ce-144	mCi	-	-	-	7.08E-01	1.48E-01	-	8.56E-01	
Ru-103 / Nb 95		5.65E-01 / 2.11E-02	1.77E-01 / -	3.89E-01 / 2.21E-02	4.75E-02 / -	7.23E-02 / -	9.11E-03 / -	1.26E00 / 4.32E-02	
d) Percent of Chimney Limit	%	2.08	1.30	0.86	0.86	0.77	0.54	1.07	6.6D.1.f.(3)
e) Average Release Rate	uCi/sec	8.96E-02	5.60E-02	3.68E-02	3.71E-02	3.33E-02	2.32E-02	4.61E-02	
4. Vent Stack Iodine Release									6.6D.1.f.(1)
a) Isotopes Released									
I-131	curies	1.71E-02	2.22E-02	7.72E-03	3.46E-03	2.23E-03	2.39E-03	5.51E-02	
I-133	curies	1.21E-01	1.55E-01	3.27E-02	1.54E-02	3.65E-03	1.32E-02	3.41E-01	
I-135	curies	190E-01	2.13E-01	5.67E-02	1.87E-02	2.98E-03	1.74E-02	4.99E-01	
b) Percent of Vent Stack Limit	%	5.32	6.91	2.48	1.08	0.72	0.74	2.89	6.6D.1.f.(3)
c) Average Release Rate	uCi/sec	6.38E-03	8.29E-03	2.98E-03	1.29E-03	8.60E-04	8.92E-04	3.47E-03	

* La-140 identified but not reported

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (Continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
5. Vent Stack Particulate Release (a) Gross Radioactivity (B-γ)	millicuries	116.25	133.06	151.10	138.15	152.11	154.74	845.41	
(b) Gross Alpha Radioactivity	mCi								6.6D.1.f.(1)
(c) Isotopes Released									
Cr-51	mCi	11.83	19.93	17.98	15.57	19.43	22.77	107.51	6.6D.1.f(1)
Mn-54	mCi	3.94	2.47	3.16	6.26	2.12	2.32	20.27	
Co-58	mCi	1.18	1.97	1.41	.87	1.59	1.61	8.63	
Fe-59	mCi	.77	1.21	---	1.74	---	.92	4.64	
Co-60	mCi	31.15	32.00	25.48	36.21	15.41	16.43	156.68	
Zn-65	mCi	.70	---	---	1.16	.63	.92	3.41	
Sr-89	mCi	2.21	2.70	1.74	8.13	4.19	4.41	23.38	
Sr-90	mCi	.04	.05	.03	.11	.07	.06	.36	
Zr-95	mCi	.84	1.88	1.93	.89	.45	.33	6.32	
Nb-95	mCi	.73	.97	1.54	1.14	.54	.57	5.49	
Ru-103	mCi	.70	.41	.49	.84	.58	.58	3.60	
(continued on next page)									
(d) Percent Vent Stack Limit	%	36.17	45.83	47.01	44.42	47.33	49.75	45.05	6.6D.1.f.(3)
(e) Average Release Rate	uCi/sec	4.3E-02	5.5E-02	5.6E-02	5.3E-02	5.7E-02	6.0E-02	5.4E-02	
6. Sum of Iodine and Particulate									
a) Percent of Chimney Limit	%	12.42	12.83	16.83	13.88	14.84	13.47	13.55	6.6D.1.f.(3)
b) Percent of Vent Stack Limit	%	38.78	48.81	49.66	47.78	51.35	54.39	48.57	
7. Gaseous Tritium									
a) Release	curies	5.9E+01	4.0E+01	3.7E+01	9.9E00	3.9E+01	1.6E+01	2.0E+02	
b) Average Release Rate	uCi/sec	2.2E+01	1.6E+01	1.4E+01	3.8E00	1.5E+01	6.3E00	1.3E+01	
c) Percent Tech Spec Limit	%	NA	NA	NA	NA	NA	NA	NA	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (Continued)	UNITS	JUL	AUG	SEP	OCT	NOV	DEC	6 MO. TOTAL	TECH. SPEC. REF.
5. Vent Stack Particulate Release (a) Gross Radioactivity (B-γ)	curies	3.62E-02	4.14E-02	1.77E-02	6.82E-03	4.04E-03	4.91E-03	1.11E-01	
(b) Gross Alpha Radioactivity	mCi								6.6D.1.f.(1)
(c) Isotopes Released									
Cr-51	mCi	5.16EØØ	8.03EØØ	1.72EØØ	1.10EØØ	7.30E-01	6.28E-01	1.74E+01	6.6D.1.f(1)
Mn-54	mCi	4.40E-01	2.21E-01	2.78E-01	1.94E-01	1.31E-01	1.37E-01	1.40EØØ	
Co-58	mCi	3.77E-01	3.48E-01	1.96E-01	1.40E-01	1.23E-01	1.14E-01	1.30EØØ	
Fe-59	mCi	2.18E-01	3.20E-02	1.25E-01	4.87E-02	1.35E-02	2.92E-02	4.66E-01	
Co-60	mCi	2.86EØØ	2.19EØØ	2.14EØØ	1.50EØØ	9.92E-01	1.03EØØ	1.07E+01	
Zn-65	mCi	3.10E-01	2.91E-02	8.45E-02	7.57E-02	3.05E-02	1.45E-02	5.44E-01	
Sr-89	mCi	2.44EØØ	1.63EØØ	3.28EØØ	4.86E-02	4.70E-02	4.91E-02	7.49EØØ	
Sr-90	mCi	3.92E-02	2.28E-02	6.19E-03	9.73E-03	9.42E-03	9.73E-03	9.71E-02	
Zr-95	mCi	8.77E-02	3.00E-03	3.58E-02	3.07E-02	1.72E-02	8.76E-03	1.83E-01	
Nb-95	mCi	1.10EØØ	2.46E-02	5.08E-02	2.76E-02	1.19E-02	2.29E-02	1.24E00	
Ru-103	mCi	1.78E-01	6.47E-02	6.76E-02	2.91E-02	1.15E-02	7.02E-03	3.58E-01	
(continued on next page)									
(d) Percent Vent Stack Limit	%	11.26	12.88	5.69	2.12	1.30	1.53	5.82	6.6D.1.f.(3)
(e) Average Release Rate	uCi/sec	1.35E-02	1.55E-02	6.83E-03	2.55E-03	1.56E-03	1.83E-03	6.98E-03	
6. Sum of Iodine and Particulate									
a) Percent of Chimney Limit	%	4.23	3.08	2.36	1.72	1.51	0.83	2.29	6.6D.1.f.(3)
b) Percent of Vent Stack Limit	%	16.57	19.83	8.18	3.20	2.02	2.27	8.71	
7. Gaseous Tritium									
a) Release	curies	4.53E+01	2.27E+01	2.66E+01	6.05E00	6.12E00	9.70E00	1.16E+02	
b) Average Release Rate	uCi/sec	1.69E+01	8.46E00	1.03E+01	2.26E00	2.36E00	3.62E00	7.30E00	
c) Percent Tech Spec Limit	%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION-UNITS 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 NO. TOTAL	TECH. SPEC. REF.
5: Vent Stack Particulate									
(c) -Isotopes released									
Ar-110m	mCi								
Sb-124	mCi	---	---	---	.15	---	.14	.29	
I-131	mCi	45.59	31.58	47.53	35.66	40.19	27.67	228.22	
Cs-134	mCi	.71	1.07	---	.12	---	.06	1.96	
Cs-136	mCi	.77	1.05	1.20	---	1.26	1.68	5.96	
Cs-137	mCi	1.28	.35	2.36	1.50	.81	.50	6.80	
Ba-140 *	mCi	12.90	34.01	44.97	26.48	63.29	69.12	250.77	
Ce-144	mCi	---	---	---	---	---	2.85	2.85	
Ce-141	mCi	.91	1.41	1.28	1.32	1.55	1.80	8.27	

*La-140 identified but not reported

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION-UNITS 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REP.
5. Vent Stack Particulate									
(c) -Isotopes released									
Ag-110m	mCi	5.57E-03	1.56E-02	7.07E-03	1.61E-02	4.03E-03	3.64E-03	5.20E-02	
Sb-124	mCi	1.12E-02	---	5.52E-03	---	1.48E-03	3.78E-03	2.20E-02	
I-131	mCi	6.77E+00	6.76E+00	3.01E+00	2.90E+00	1.37E+00	2.02E+00	2.28E+01	
Cs-134	mCi	1.65E-02	4.10E-03	2.26E-02	6.12E-03	1.29E-02	1.17E-02	7.41E-02	
Cs-136	mCi	3.58E-01	4.68E-01	1.31E-01	2.22E-02	8.48E-03	2.40E-02	1.01E+00	
Cs-137	mCi	1.33E-01	9.90E-02	7.58E-02	7.21E-02	5.12E-02	4.30E-02	4.74E-01	
Ba-140	mCi	1.53E+01	2.10E+01	6.26E+00	5.13E-01	4.22E-01	7.26E-01	4.42E+01	
La-140*	mCi	---	---	---	---	---	---	---	
Ce-141	mCi	3.72E-01	4.48E-01	1.26E-01	5.19E-02	3.26E-02	2.26E-02	1.05E+00	
Ce-144	mCi	2.12E-02	---	3.17E-02	3.47E-02	2.04E-02	3.45E-03	1.11E-01	

* La-140 identified but not reported

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station-Units 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
8. Gross Radioactivity Release Units 2/3 Vent Stack									
a) Total Release	curies	412.66	306.57	753.09	278.73	194.53	226.20	2171.78	6.6D.1.f.(1)
b) Maximum Release Rate (daily grab sample)	uCi/sec	3.6E+02	2.8E+02	5.0E+02	2.0E+02	1.3E+02	1.6E+02	5.0E+02	6.6D.1.f. (2)
c) Isotopes Released									6.6D.1.f. (4)
Kr-85m	curies	---	---	---	---	---	---	---	
Kr-87	curies	---	---	---	---	---	---	---	
Kr-88	curies	---	---	---	---	---	---	---	
Xe-133	curies	146.02	49.21	451.63	261.25	15.68	5.63	929.42	
Xe-135	curies	266.64	257.36	105.10	11.20	178.85	62.03	881.18	
Xe-135m	curies	---	---	196.36	6.28	---	158.54	361.18	
Xe-138	curies	---	---	---	---	---	---	---	
d) Percent of Vent Stack Limit	%	0.17	0.14	0.31	0.12	0.08	0.10	0.15	6.6D.1.f. (3)
e) Average Release Rate	uCi/sec	1.5E+02	1.3E+02	2.8E+02	1.1E+02	7.3E+01	8.7E+01	1.4E+02	

Table 1.1-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station-Units 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

I. Gaseous Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
8. Gross Radioactivity (Release Units 2/3 Vent Stack									
a) Total Release	curies	2.61E+02	3.09E+02	2.70E+02	2.55E+02	1.45E+02	1.68E+02	1.41E+03	6.6D.1.f.(1)
b) Maximum Release Rate (daily grab sample)	uCi/sec	2.21E+02	1.50E+02	1.24E+02	1.17E+02	1.58E+02	1.40E+02	2.21E+02	6.6D.1.f. (2)
c) Isotopes Released									6.6D.1.f. (4)
Kr-85m	curies	---	1.17E+01	---	---	1.32E+00	---	1.30E+01	
Kr-87	curies	---	---	---	---	---	---	---	
Kr-88	curies	9.29E+00	---	---	1.74E+01	---	---	2.67E+01	
Xe-133	curies	2.43E+01	3.81E+01	5.15E+00	6.5E+00	2.03E+01	1.96E+01	1.14E+02	
Xe-135	curies	2.28E+02	2.59E+02	1.26E+02	6.59E+01	1.23E+02	4.65E+01	8.48E+02	
Xe-135m	curies	---	---	1.39E+02	1.65E+02	---	1.02E+02	4.06E+02	
Xe-130	curies	---	---	---	---	---	---	---	
Xe-133m	curies	---	---	---	---	---	---	---	
d) Percent of Vent Stack Limit	%	0.11	0.13	0.12	0.11	0.06	0.07	0.10	6.6D.1.f. (3)
e) Average Release Rate	uCi/sec	9.74E+01	1.15E+02	1.04E+02	9.53E+01	5.61E+01	6.28E+01	8.86E+01	

Table 1.2-1

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 DOCKET NOS.: 50-10 YEAR: 1981

II. Liquid Effluents	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity (β-γ) a) Total Release	Curies	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
b) Average Concentration Released	uci/ml								6.6D.1.e.(1)
c) Maximum Concentration Released	uci/ml								6.6D.1.e.(4)
d) Percent of Tech Spec Limit	%								6.6D.1.e.(5)
based on average conc. released									6.6D.1.e.(6)
2. Tritium									
a) Total Release	Curies								6.6D.1.e.(8)
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
3. Dissolved Noble Gases									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
4. Gross Alpha Radioactivity									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
5. Volume of Liquid Waste to Discharge Canal	Liters								6.6D.1.e.(2)
6. Volume of Dilution Water	Liters								6.6D.1.e.(3)

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 1 **DOCKET NOS.:** 50-10 **YEAR:** 1981

II. Liquid Effluents	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity (β-γ) a) Total Release	Curies	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
b) Average Concentration Released	uci/ml								6.6D.1.e.(1)
c) Maximum Concentration Released	uci/ml								6.6D.1.e.(4)
d) Percent of Tech Spec Limit	%								6.6D.1.e.(5)
based on average conc. released									6.6D.1.e.(6)
2. Tritium									
a) Total Release	Curies								6.6D.1.e.(8)
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
3. Dissolved Noble Gases									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
4. Gross Alpha Radioactivity									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
5. Volume of Liquid Waste to Discharge Canal	Liters								6.6D.1.e.(2)
6. Volume of Dilution Water	Liters								6.6D.1.e.(3)

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station ↳ Unit 1 DOCKET NOS.: 50 - 10 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
7. Isotopes Released	milli-curies	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
Mn-54	mCi								
Co-58	mCi								
Fe-59	mCi								
Co-60	mCi								
Zn-65	mCi								
Sr-89	mCi								
Sr-90	mCi								
Zr-95	mCi								
Nb-95	mCi								
Ru-103	mCi								
I-131	mCi								
Cs-134	mCi								
Cs-137	mCi								
Ba-140	mCi								
La-140	mCi								
Ce-141	mCi								
Ce-144	mCi								

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station Unit 1 DOCKET NOS.: 50 - 10 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
7. Isotopes Released	milli-curies	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
Mn-54	mCi								
Co-58	mCi								
Fe-59	mCi								
Co-60	mCi								
Zn-65	mCi								
Sr-89	mCi								
Sr-90	mCi								
Zr-95	mCi								
Nb-95	mCi								
Ru-103	mCi								
I-131	mCi								
Cs-134	mCi								
Cs-137	mCi								
Ba-140	mCi								
La-140	mCi								
Ce-141	mCi								
Ce-144	mCi								

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity (β-γ) a) Total Release (2/3 Radwaste)	Milli-Curies	5.45	20.49	3.23	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	29.17	
b) Average Concentration Released	uci/ml	6.5E-10	2.7E-09	3.8E-10				1.2E-09	
c) Maximum Concentration Released	uci/ml	3.8E-08	4.4E-08	4.5E-08				4.5E-08	
d) Percent of Tech Spec Limit based on average conc. released	%	0.65	2.70	0.38				1.20	
2. Tritium									
a) Total Release	Curies	9.8E-01	3.9E00	3.2E-01				5.2E00	
b) Average Concentration Released	uci/ml	1.2E-07	5.1E-07	3.8E-08				2.1E-07	
c) Percent of Tech Spec Limit	%	NA	NA	NA				NA	
3. Dissolved Noble Gases									
a) Total Release	Curies	NONE	NONE	NONE				NONE	
b) Average Concentration Released	uci/ml	---	---	---				---	
c) Percent of Tech Spec Limit	%	---	---	---				---	
4. Gross Alpha Radioactivity									
a) Total Release	Curies	9.5E-07	2.8E-06	3.7E-06				7.5E-06	
b) Average Concentration Released	uci/ml	1.1E-13	3.7E-13	4.4E-13				3.1E-13	
5. Volume of Liquid Waste to Discharge Canal	Liters	2.2E+05	1.1E+06	1.2E+05				1.4E+06	
6. Volume of Dilution Water	Liters	8.4E+09	7.6E+09	8.4E+09				2.4E+10	

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: DRESDEN NUCLEAR POWER STATION - UNIT 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
1. Gross Radioactivity (β-γ)									
a) Total Release (2/3 Radwaste)	Curies	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
b) Average Concentration Released	uci/ml								
c) Maximum Concentration Released	uci/ml								
d) Percent of Tech Spec Limit	%								
based on average conc. released									
2. Tritium									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
3. Dissolved Noble Gases									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
c) Percent of Tech Spec Limit	%								
4. Gross Alpha Radioactivity									
a) Total Release	Curies								
b) Average Concentration Released	uci/ml								
5. Volume of Liquid Waste to	Liters								
Discharge Canal									
6. Volume of Dilution Water	Liters								

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
7. Isotopes Released	milli-curies	---	---	---	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	29.17	
Cr-51	mCi	---	---	---				---	
Mn-54	mCi	0.21	0.37	0.09				.67	
Co-58	mCi	---	---	---				---	
Fe-59	mCi	---	---	---				---	
Co-60	mCi	3.63	0.47	1.84				5.94	
Zn-65	mCi	---	---	---				---	
Sr-89	mCi	0.02	0.43	0.02				.47	
Sr-90	mCi	0.01	0.09	0.01				.11	
Zr-95	mCi	---	---	---				---	
Nb-95	mCi	---	---	---				---	
Ru-103	mCi	---	---	---				---	
I-131	mCi	0.40	14.54	0.37				15.31	
Cs-134	mCi	0.06	1.45	0.12				1.63	
Cs-137	mCi	0.52	3.14	0.50				4.16	
Ba-140	mCi	---	---	---				---	
La-140	mCi	---	---	---				---	
Ce-141	mCi	0.60	---	0.28				.88	
Ce-144	mCi	---	---	---				---	

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
7. Isotopes Released	Millicuries	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	NO DISCHARGE	
Cr-51	mCi								
Mn-54	mCi								
Co-58	mCi								
Fe-59	mCi								
Co-60	mCi								
Zn-65	mCi								
Sr-89	mCi								
Sr-90	mCi								
Zr-95	mCi								
Nb-95	mCi								
Ru-103	mCi								
I-131	mCi								
Cs-134	mCi								
Cs-137	mCi								
Ba-140	mCi								
La-140	mCi								
Ce-141	mCi								
Ce-144	mCi								

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Drosden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REP.
8. Gross Radioactivity (β-γ) LPCI Service H_2O Heat Exchanger									
a) Total Release	Milli-Curies	6.10	0.06	0.07	0.06	1.21	0.18	7.68	
b) Average Concentration Released*	uci/ml	6.9E-11	9.5E-13	9.9E-13	4.6E-13	7.9E-12	1.2E-12	1.2E-11	
c) Maximum Concentration Released*	uci/ml	6.7E-07	8.6E-09	5.2E-09	4.9E-09	1.1E-07	8.5E-09	6.7E-07	
d) Percent of Tech Spec Limit based on average conc released	%	0.07	0.01	0.01	0.01	0.01	0.01	0.01	
9. Tritium									
a) Total Release	Curies	3.4E-04	3.4E-04	9.8E-04	8.9E-04	1.2E-02	5.6E-02	7.1E-02	
b) Average Concentration Released	uci/ml	3.8E-12	5.3E-12	1.4E-11	6.9E-12	7.9E-11	3.7E-10	1.1E-10	
c) Percent of Tech Spec Limit	%	NA	NA	NA	NA	NA	NA	NA	
10. Dissolved Noble Gases									
a) Total Release	Curies	NONE	NONE	NONE	NONE	NONE	NONE	NONE	
b) Average Concentration Released	uci/ml	---	---	---	---	---	---	---	
c) Percent of Tech Spec Limit	%	---	---	---	---	---	---	---	
11. Gross Alpha Radioactivity									
a) Total Release	Curies	5.2E-06	3.6E-07	1.8E-06	8.6E-07	2.0E-06	1.6E-06	1.2E-05	
b) Average Concentration Released	uci/ml	5.8E-14	5.7E-15	2.6E-14	6.6E-15	1.3E-14	1.1E-14	1.8E-14	
12. Volume of Liquid Waste to Discharge Canal	Liters	2.8E+05	9.9E+04	3.1E+05	1.5E+05	4.3E+05	3.0E+05	1.6E+06	
13. Volume of Dilution Water	Liters	8.9E+10	6.3E+10	7.1E+10	1.3E+11	1.5E+11	1.5E+11	6.5E+11	

*Prior to dilution by 1275 ac e cooling lake and subsequent discharge to Illinois River.

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
8. Gross Radioactivity (β-γ) LPCI Service H_2O Heat Exchanger									
a) Total Release	Milli-Curies	6.62E00	1.53E00	6.30E00	1.82E00	2.87E00	5.19E00	2.43E+01	
b) Average Concentration Released*	uci/ml	3.85E-11	8.88E-12	3.83E-11	1.18E-11	1.93E-11	3.69E-11	2.55E-11	
c) Maximum Concentration Released*	uci/ml	5.83E-07	1.00E-07	2.75E-07	2.58E-07	2.57E-07	3.62E-07	5.83E-07	
d) Percent of Tech Spec Limit based on average conc released	%	0.04	0.01	0.04	0.01	0.02	0.04	0.03	
9. Tritium									
a) Total Release	Curies	2.20E-02	3.42E-02	3.28E-01	5.57E-02	1.48E-01	1.86E-01	7.74E-01	
b) Average Concentration Released	uci/ml	1.28E-10	1.99E-10	2.00E-09	3.62E-10	9.93E-10	1.32E-09	8.13E-10	
c) Percent of Tech Spec Limit	%	NA	NA	NA	NA	NA	NA	NA	
10. Dissolved Noble Gases									
a) Total Release	Curies	NONE	NONE	NONE	NONE	NONE	NONE	NONE	
b) Average Concentration Released	uci/ml	---	---	---	---	---	---	---	
c) Percent of Tech Spec Limit	%	---	---	---	---	---	---	---	
11. Gross Alpha Radioactivity									
a) Total Release	Curies	6.36E-06	2.60E-07	2.82E-06	3.26E-07	1.21E-06	1.98E-06	1.30E-05	
b) Average Concentration Released	uci/ml	3.70E-14	1.51E-15	1.72E-14	2.12E-15	8.13E-15	1.41E-14	1.36E-14	
12. Volume of Liquid Waste to Discharge Canal	Liters	2.30E+05	9.86E+04	4.11E+05	9.86E+04	2.63E+05	3.29E+05	1.43E+06	
13. Volume of Dilution Water	Liters	1.72E+11	1.72E+11	1.64E+11	1.54E+11	1.49E+11	1.41E+11	9.52E+11	

*Prior to dilution by 1275 acre cooling lake and subsequent discharge to Illinois River.

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
14. Isotopes Released (LPCI Service H_2O Heat Exchanger)	Milli-Curies	6.10	.06	.07	.06	1.21	.18	7.68	
Mn-54	mCi	.60	.00	.00	.00	.09	.02	.71	
Co-58	mCi	.81	---	---	---	.05	.01	.87	
Co-60	mCi	4.66	.05	.04	.04	.57	.10	5.46	
Sr-89	mCi	.01	.00	.00	.02	.40	.05	.48	
Sr-90	mCi	.00	.00	.00	.00	.00	.00	.00	
Cs-134	mCi	---	.00	.00	.00	.03	.00	.03	
Cs-137	mCi	.02	.01	.03	.00	.07	.00	.13	
~~(Jan. 4, 1981~~									
15. Unit 2 Isolation Condenser Release									
a) Total Release	Milli-Curies	.52							
b) Isotopes Released									
Sr-89	mCi	---							
Sr-90	mCi	---							
Co-60	mCi	.45							
Cs-137	mCi	.02							
Mn-54	mCi	.05							
c) Tritium - Total Release	mCi	1.61							

Table 1.2-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station - Unit 2/3 DOCKET NOS.: 50-237, 50-249 YEAR: 1981

II. Liquid Effluents (continued)	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
14. Isotopes Released (LPCI Service H_2O Heat Exchanger)	Millicuries	6.63E00	1.53E00	6.30E00	1.82E00	2.88E00	5.20E00	2.44E01	
Mn-54	mCi	5.47E-01	5.90E-02	4.82E-01	2.03E-01	3.32E-01	8.85E-01	2.51E00	
Co-58	mCi	---	---	4.08E-02	7.01E-03	6.08E-03	5.09E-02	1.05E-01	
Co-60	mCi	3.78E00	1.26E00	4.70E00	1.52E00	2.22E00	3.51E00	1.70E01	
Sr-89	mCi	3.82E-02	9.40E-03	2.32E-02	1.58E-02	1.17E-02	4.67E-02	1.45E-01	
Sr-90	mCi	1.91E-02	2.01E-03	7.25E-03	5.41E-03	4.41E-03	1.75E-02	5.63E-02	
Cs-134	mCi	---	9.32E-02	7.06E-02	---	3.23E-02	---	1.96E-01	
Cs-137	mCi	2.15E00	1.10E-01	7.22E-01	6.76E-02	2.71E-01	6.87E-01	4.01E00	
Zr-95	mCi	---	---	2.56E-01	---	---	---	2.56E-01	
Ce-141	mCi	9.61E-02	---	---	---	---	---	9.61E-02	

Table 2.0-1

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station DOCKET NOS.: 50-10, 50-237, 50-549 YEAR: 1981

I. Solid Waste Shipped Offsite For Burial or Disposal	UNITS	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	6 MO. TOTAL	TECH. SPEC. REF.
1. Spent Resins, Filter Sludges, Evaporator Bottoms, etc.									
a) Quantity Shipped	cubic meters	46.6	26.2	30.5	31.2	29.8	39.4	203.7	6.5.D.g.(1)
b) Radioactivity	curies	419.2	392.2	645.3	84.1	232.1	141.9	1914.8	6.5.D.g.(2)
2. Dry compressible waste, contaminated equipment, etc.									
a) Quantity Shipped	cubic meters	61.6	22.5	46.2	96.1	118.4	46.0	390.8	6.5.D.g.(1)
b) Radioactivity	curies	4.8	3.6	23.0	13.0	19.2	4.3	67.9	6.5.D.g.(2)
II. Solid Waste Shipped Offsite For Burial or Disposal (Processed by contractor)									
1. Spent Resins, Filter Sludges, evaporator bottoms, etc.									
a) Quantity Shipped	cubic meters	0	0	0	0	0	0	0	6.5.D.g.(1)
b) Radioactivity	curies	0	0	0	0	0	0	0	6.5.D.g.(2)
2. Dry Compressible Waste, contaminated equipment, etc.									
a) Quantity	cubic meters	0	0	0	0	0	0	0	6.5.D.g.(1)
b) Radioactivity	curies	0	0	0	0	0	0	0	6.5.D.g.(2)

Table 2.0-1 (continued)

REPORT OF RADIOACTIVE EFFLUENTS

FACILITY: Dresden Nuclear Power Station DOCKET NOS.: 50-10, 50-237, 50-549 YEAR: 1981

I. Solid Waste Shipped Offsite For Burial or Disposal	UNITS	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	6 MO. TOTAL	TECH. SPEC. REF.
1. Spent Resins, Filter Sludges, Evaporator Bottoms, etc.									
a) Quantity Shipped	cubic meters	3.47E+01	4.21E+01	3.75E+01	3.25E+01	4.03E+01	2.79E+01	2.15E+02	6.5.D.g.(1)
b) Radioactivity	curies	4.57E+02	1.90E+02	4.01E+02	4.75E+02	6.04E+02	4.55E+02	2.58E+03	6.5.D.g.(2)
2. Dry compressible waste,									
contaminated equipment, etc.									
a) Quantity Shipped	cubic meters	1.09E+01	3.72E+01	1.92E+01	1.18E+02	4.94E+01	9.45E+01	3.29E+02	6.5.D.g.(1)
b) Radioactivity	curies	1.31E+01	8.79E00	5.00E-01	2.99E00	1.27E00	2.39E00	2.90E+01	6.5.D.g.(2)
II. Solid Waste Shipped Offsite For									
Burial or Disposal (Processed by									
contractor)									
1. Spent Resins, Filter Sludges,									
evaporator bottoms, etc.									
a) Quantity Shipped	cubic meters	0	0	0	0	0	0	0	6.5.D.g.(1)
b) Radioactivity	curies	0	0	0	0	0	0	0	6.5.D.g.(2)
2. Dry Compressible Waste,									
contaminated equipment, etc.									
a) Quantity	cubic meters	0	0	0	0	0	0	0	6.5.D.g.(1)
b) Radioactivity	curies	0	0	0	0	0	0	0	6.5.D.g.(2)

DRESDEN NUCLEAR POWER STATION

Table 2.0-1 (continued)

SOLID WASTE DISPOSITION

YEAR 1981

MONTH	NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
JAN	22	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
JAN	3	Motor Freight (Exclusive Use Only)	Richland, WA
FEB	14	Motor Freight (Exclusive Use Only)	Barnwelll, S.C.
FEB	1	Motor Freight (Exclusive Use Only)	Richland, WA
MAR	21	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
MAR	3	Motor Freight (Exclusive Use Only)	Richland, WA
APR	15	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
APR	5	Motor Freight (Exclusive Use Only)	Richland, WA
MAY	17	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
MAY	5	Motor Freight (Exclusive Use Only)	Richland, WA
JUNE	15	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
JUNE	2	Motor Freight (Exclusive Use Only)	Richland, WA

DRESDEN NUCLEAR POWER STATION

Table 2.0-1 (continued)

SOLID WASTE DISPOSITION

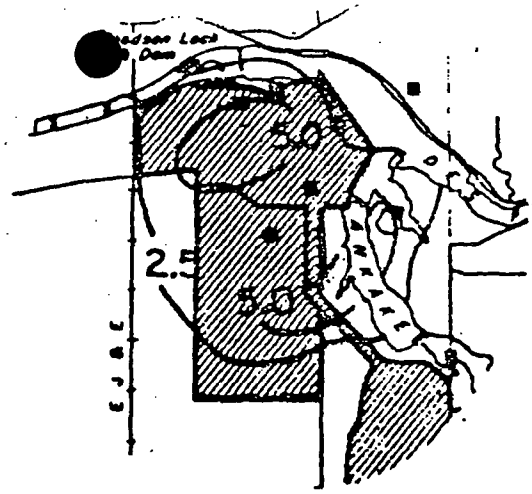
YEAR 1981

MONTH	NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
JULY	18	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
AUG	16	Motor Freight (Exclusive Use Only)	Barnwelll, S.C.
AUG	2	Motor Freight (Exclusive Use Only)	Richland, WA
SEP	15	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
SEP	1	Motor Freight (Exclusive Use Only)	Richland, WA
OCT	14	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
OCT	5	Motor Freight (Exclusive Use Only)	Richland, WA
NOV	17	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
NOV	2	Motor Freight (Exclusive Use Only)	Richland, WA
DEC	13	Motor Freight (Exclusive Use Only)	Barnwell, S.C.
DEC	4	Motor Freight (Exclusive Use Only)	Richland, WA

Figure 3.1-1

Estimated Cumulative Gamma Dose (mrem)
from the Dresden Station for the
peroid January - December 1981.

Isopleth Labels
Small figure - multiply by 10^{-1}
Large figure - multiply by 10^{-2}



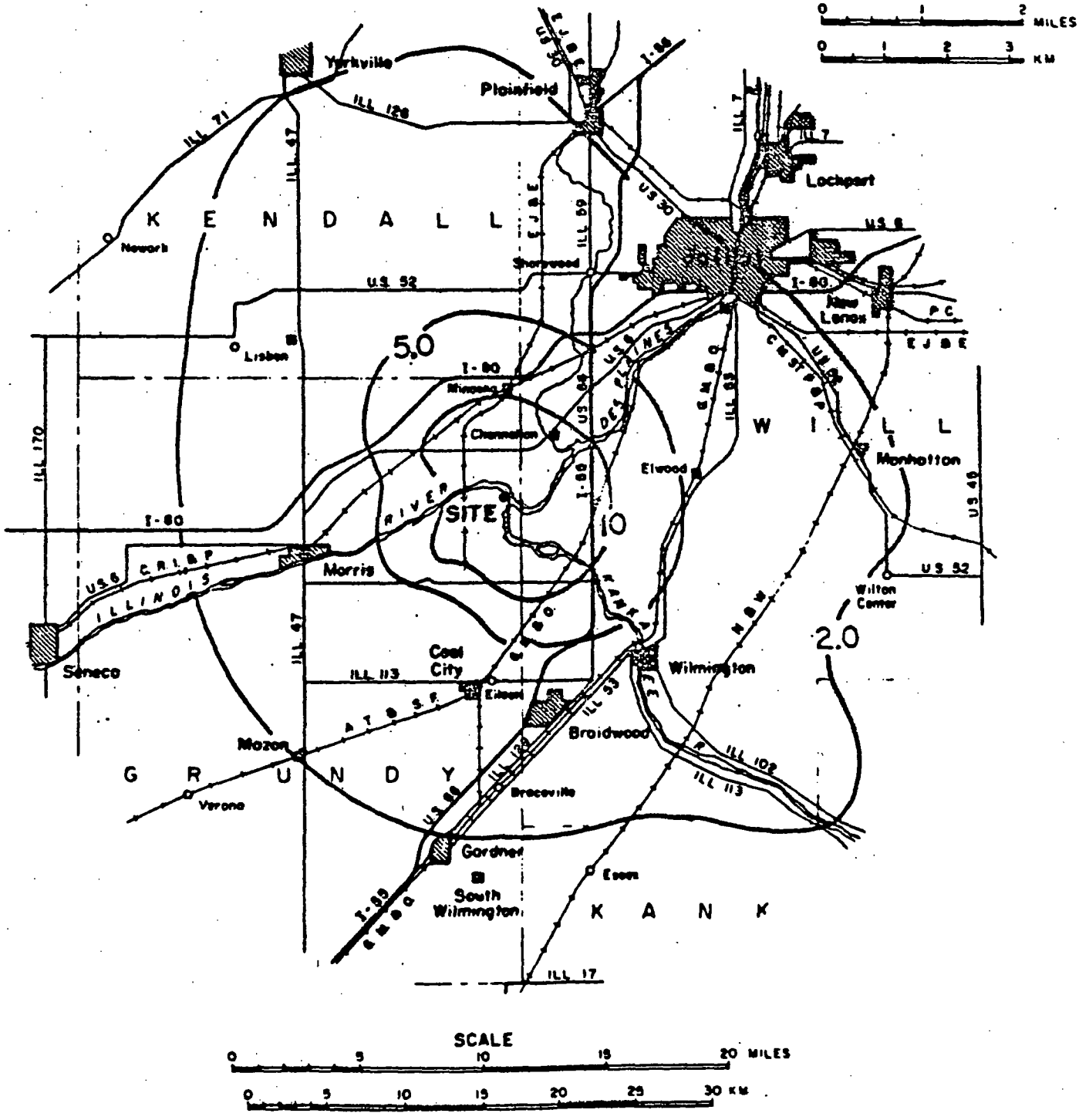
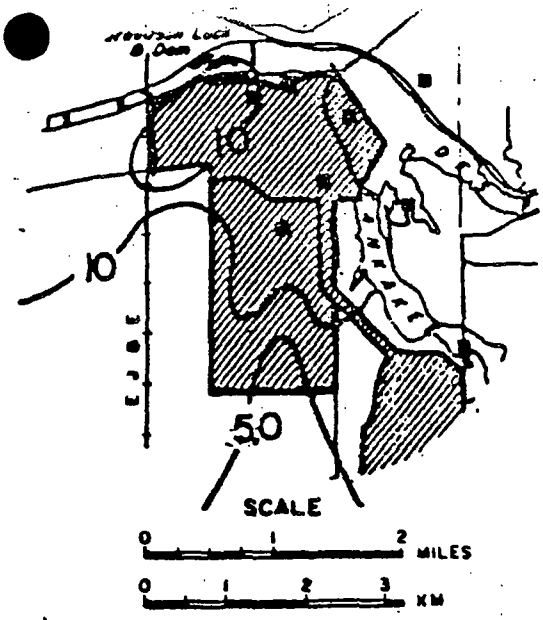


Figure 3.1-2

Estimated Total Concentration (pCi/m^3) of Noble Gases from the Dresden Station for the period January - December 1981.

Isopleth Labels
Small figure - multiply by 10^1
Large figure - multiply by 10^1



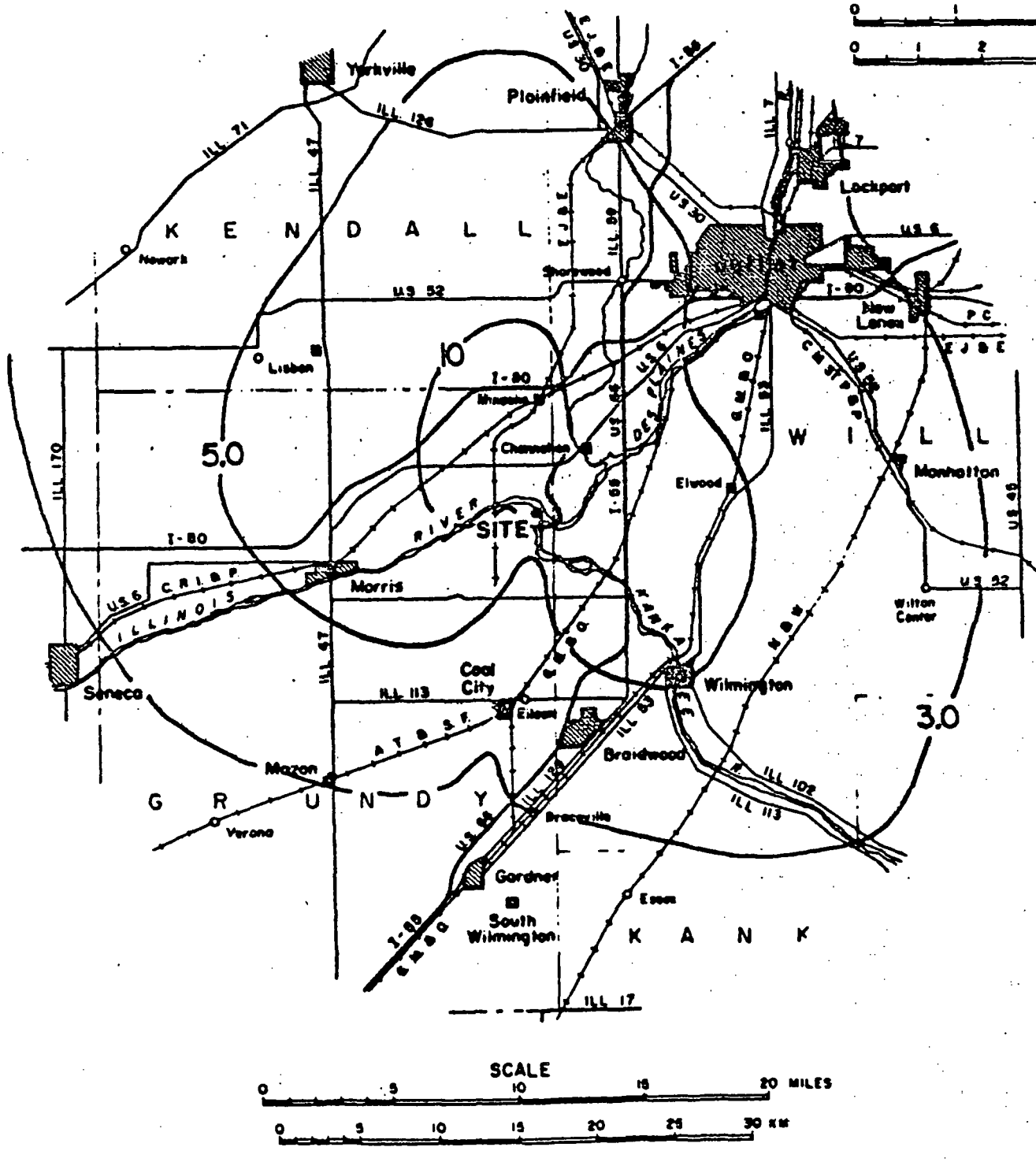
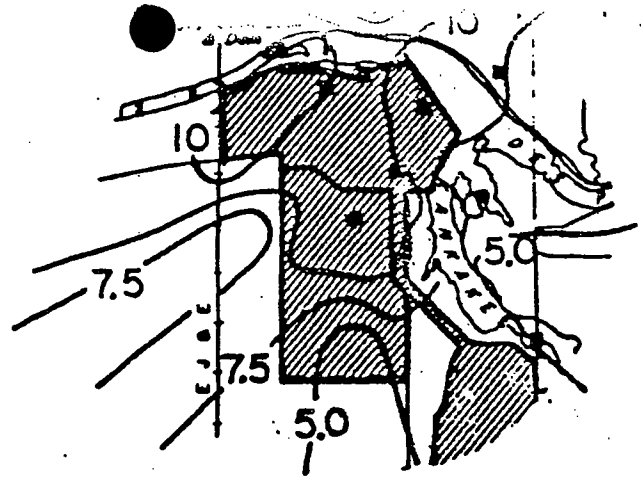


Figure 3.1-3

Estimated Total Concentration (pCi/m^3) of Iodine from the Dresden Station for the period January - December 1981.

Isopleth Labels
Small figure - multiply by 10^{-2}
Large figure - multiply by 10^{-2}



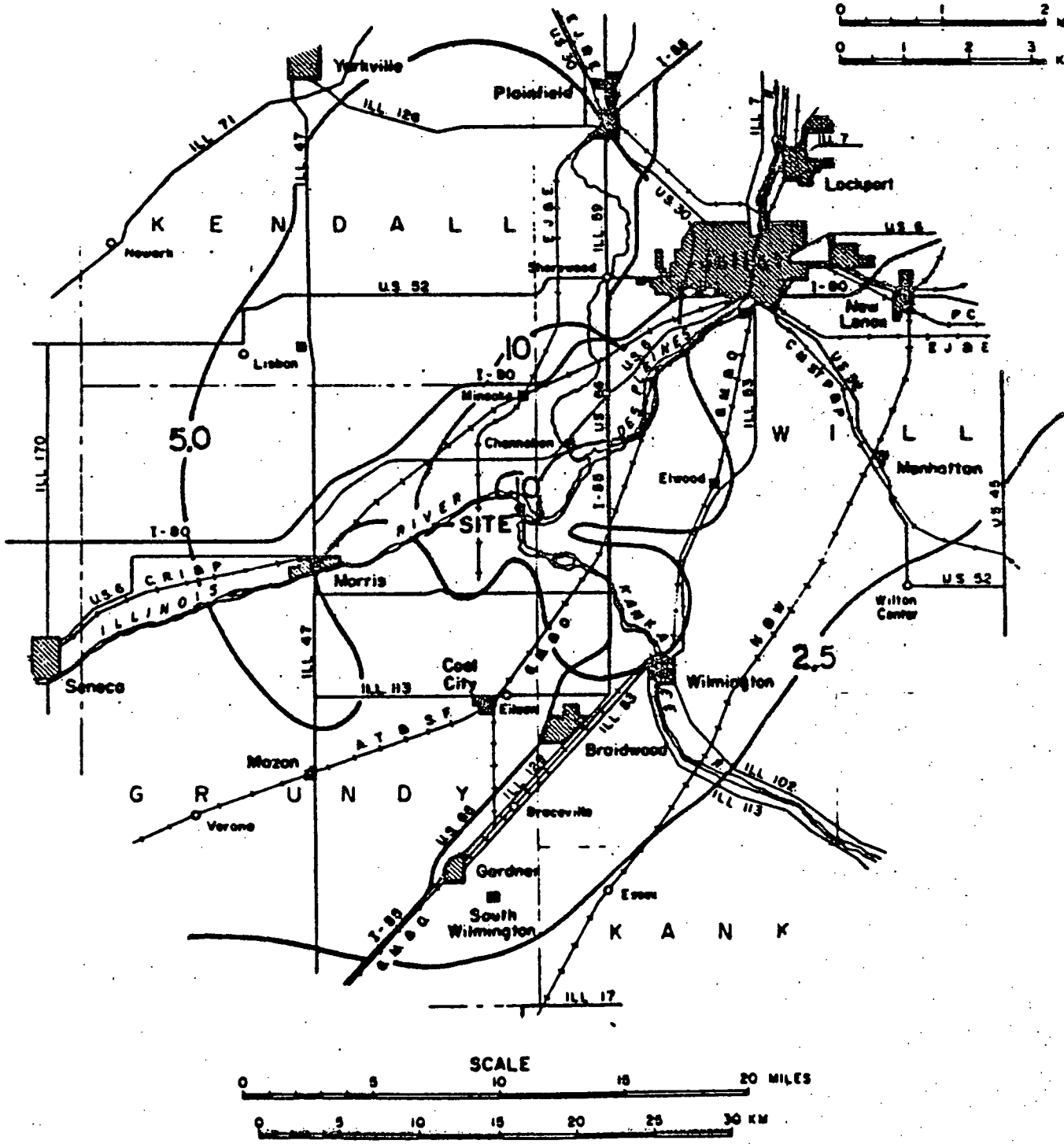
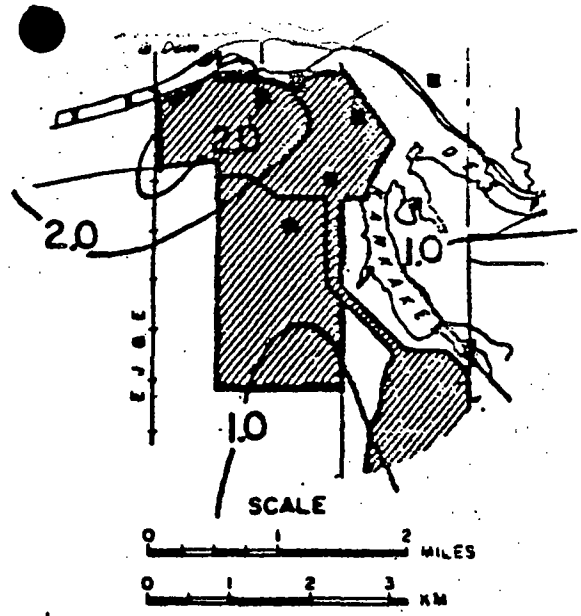


Figure 3.1-4

Estimated Total Concentration (pCi/m^3) of Particulate Matter from the Dresden Station for the period January - December 1981.

Isopleth Labels
Small figure - multiply by 10^{-2}
Large figire - multiply by 10^{-3}



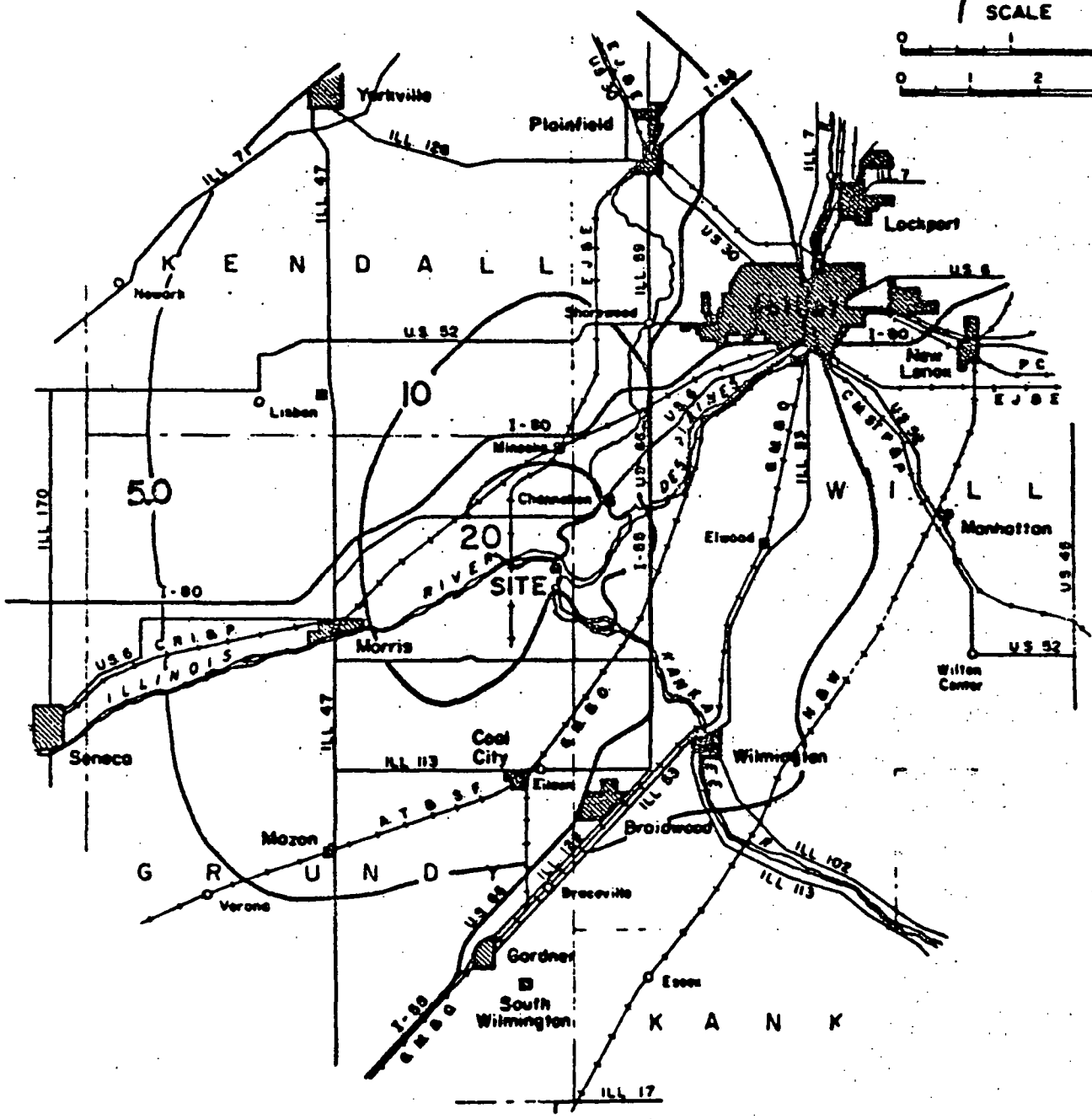


Table 3.1-1

Doses Resulting from Airborne Releases

THIS TABLE WILL BE PROVIDED

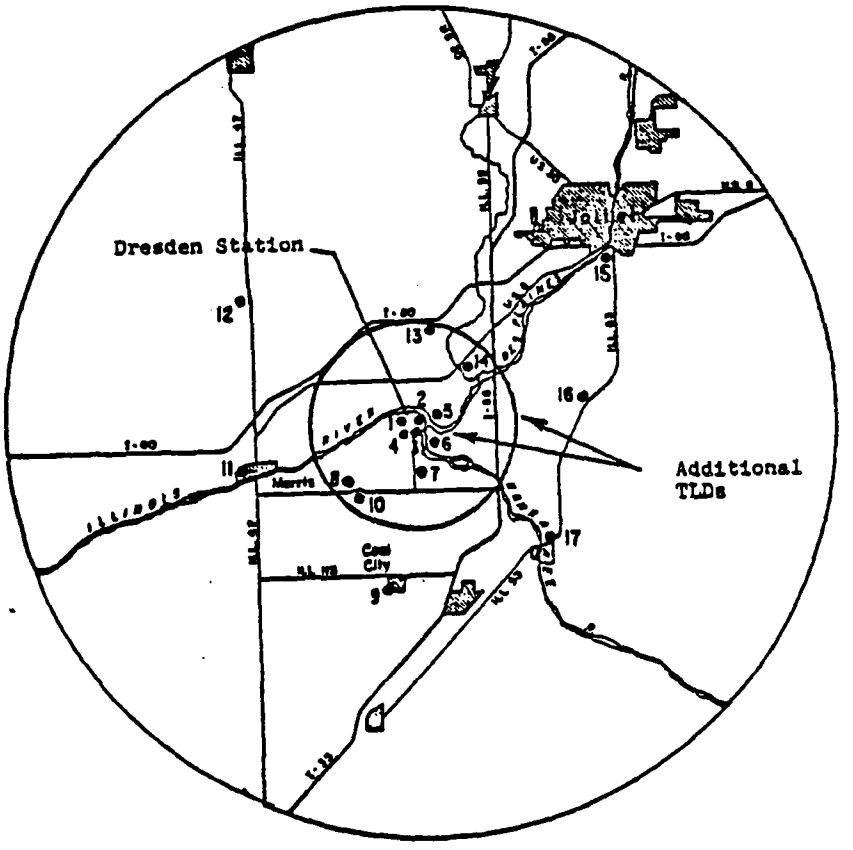
Table 3.1-1 (continued)

LOCATIONS OF FIXED ENVIRONMENTAL RADIOLOGICAL MONITORING STATIONS

Figure 5.0-1

Air Samplers

1 - Onsite Station 1
2 - Onsite Station 2
3 - Onsite Station 3
4 - Collins Road
5 - Bennitt Farm
6 - Pheasant Trail
7 - Clay Products
8 - Prairie Park
9 - Coal City
10 - Goose Lake Village
11 - Morris
12 - Lisbon
13 - Minooka
14 - Channahon
15 - Joliet
16 - Elwood
17 - Wilmington



TLD

Same as air samplers plus a sufficient number of additional dosimeters placed near the site and near 5 miles to assure, to the extent practical, that one dosimeter is located at each range in each of the 16 meteorological sectors.

DRESDEN NUCLEAR POWER STATION

Standard Radiological Sampling Program

Loc. Code	Type[a]	Location Description	Media								
			Air Samples	TLDs	Fish	Milk	Surface Water	Cooling Water	Sediments	Temp. Charts	Well Water
D-01		Onsite Station 1 (Behind house at Dam)	X	X							
D-02		Onsite Station 2 (Behind Station)	X	X							
D-03		Onsite Station 3 (In-coming Road)	X	X							
D-04		Collins Road	X	X							
D-05		Bennitt Farm	X	X							
D-06		Pheasant Trail	X	X							
D-07		Clay Products (In-coming Road)	X	X							
D-08		Prairie Park	X	X							
D-09	C	Coal City	X	X							
D-10		Goose Lake Village	X	X							
D-11	C	Morris	X	X							
D-12	C	Lisbon	X	X							
D-13	C	Minooka	X	X							
D-14		Channahon	X	X							
D-15	C	Joliet Brandon Road	X	X							
D-16	C	Elwood	X	X							
D-17	C	Wilmington	X	X							
D-18	C	Inlet Canal						X			
D-19		Discharge Canal						X			
D-20		Discharge Canal						X			
D-21		Illinois River at EJ&E RR Bridge					X			X	
D-22		Illinois River at Morris (Morris Water Works)					X				
D-23		Thorsen Well - GE									X
D-24		Yunker Dairy Farm				X					
D-25		Dorin Dairy Farm				X					
D-26	C	Mather Dairy Farm				X					
D-27		Dresden Lock & Dam							X		
D-28		Dresden Pool of Illinois River			X						
D-29		Sanitary Lagoon - GE						X			
D-30		Evaporator Pond - GE						X			
D-31		Goose Lake Corp. of Eng. - GE						X			
D-32		L.A.W. Well - GE						X			
D-33		Pond West of MFRP - GE						X			
D-34		Evaporation Pond - GE						X			
D-34A		Dresden Cooling Lake at Dresden Road Crossing						X			
D-34B		Dresden Cooling Lake at County Line Road Crossing						X			

[a] Control (background) locations are indicated by a "C" in this column. All other locations are indicator.

TABLE 5.0-1

DRESDEN STANDARD RADIOLOGICAL MONITORING PROGRAM

Sample Media	Collection Site[a]	Type of Analysis	Frequency	Non-Routine Reporting Levels[b]
1. Air Monitoring	(a) Onsite and near Field	*1. Filter - gross beta[c]	1. Weekly	Cs-134 10, Cs-137 20 pCi/m^3
	(1) Onsite Station # 1 (2) Onsite Station # 2 (3) Onsite Station # 3 *(4) Collins Road *(5) Bennitt Farm *(6) Pheasant Trail	2. Charcoal - I-131 *3. Sampling Train - Test and Maintenance	2. Bi-weekly[d] 3. Weekly	0.9 pCi/m^3
	(b) Far Field			
	*(1) Clay Products *(2) Prairie Park *(3) Coal City *(4) Goose Lake Village *(5) Morris (6) Lisbon *(7) Minooka *(8) Channahon *(9) Joliet (10) Elmwood (11) Wilmington	*1. Filter Exchange 2. Charcoal Exchange *3. Sampling Train - Test and Maintenance	1. Weekly 2. Bi-weekly 3. Weekly	Same as 1(a) when analyses are made
2. TLD	*Same as 1	Gamma Radiation	Quarterly	
3. Fish	Dresden Pool of Illinois River	Gamma isotopic	Semi-annually	Mn-54 $3x10^4$, Fe-59 $1x10^4$ Co-58 $3x10^4$, Co-60 $1x10^4$ Zn-65 $2x10^4$, Cs-134 $1x10^3$ Cs-137 $2x10^3$ pCi/Kg wet weight
4. Milk	(a) Yunker Farm (b) Dorin Farm (c) Mather Farm	I-131	1. Weekly - Grazing Season - May to Oct 2. Monthly - Nov to Apr	I-131 3 pCi/l Cs-134 60 pCi/l Cs-137 70 pCi/l Ba-La-140 300 pCi/l
5. Surface Water	Illinois River at EJ&E RR Bridge	Gamma Isotopic	1. Monthly Analysis of Weekly Composites	(See footnote e)

TABLE 5.0-1 (continued)

DRESDEN STANDARD RADIOLOGICAL MONITORING PROGRAM

	Sample Media	Collection Site	Type of Analysis	Frequency	Non-Routine Reporting Levels[b]
6.	Cooling Water[f]	(a) Inlet (1) Unit 1 (b) Discharge (1) Unit 1 (2) Unit 2	Gross Beta	1. Weekly	(See footnote e)
7.	Sediment	(a) Dresden Lock and Dam	Gamma Isotopic	Annually	
8.	Temperature Charts	EJ&E RR Bridge	Given to station personnel	Monthly	
9.	Dairy Census	(a) Site Boundary to 2 miles	(a) Enumeration by a door-to-door or equivalent counting technique	Annually, during grazing season	
		(b) 2 miles to 5 miles	(b) Enumeration by using referenced information from county agricultural agents or other reliable sources.		
		(c) At dairies listed in item 4.	(c) Inquire as to feeding practices. (1) pasture only (2) feed and chop only (3) pasture and feed; if both, ask farmer to estimate fraction of food from pasture: < 25% 25-50% 50-75% ≥ 75%		

* Analytical costs shared with G. E.

[a] Additional information giving the distance and direction of individual sampling locations may be found in Appendix III of the 1978 Annual Report.

[b] Average concentration over calendar quarter.

[c] A gamma isotopic analysis shall be performed whenever the gross beta concentration in a sample exceeds by five times (5x) the average concentration of the preceding calendar quarter for the sample location.

[d] Bi-weekly shall mean that the frequency is once every other week.

[e] H-3 2×10^4, Mn-54 1×10^3, Fe-59 2×10^2, Co-58 6×10^2, Co-60 2×10^2, Zn-65 2×10^2, Zr-Nb-95 4×10^2, I-131 2, Cs-134 30, Cs-137 50, Ba-La-140 1×10^2 pCi/l.

[f] Provided by station personnel.

Table 5.0-2

Environmental Radiological Monitoring Program Quarterly Summary

Name of facility Dresden Nuclear Power Station Docket No. 50-10, 50-237, 50-549
Location of facility Grundy, Illinois (County, State) Reporting Period 1st Quarter 1981

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean[a] Range	Location with Highest Annual Mean		Control Locations Mean[a] Range	Number of non-routine Results
				Location	Mean Range		
Air Particulates (pCi/m^3)	Gross Beta 78	1.0	0.14 (78/78) (0.04-0.28)	D-02, Onsite 2 0.3 mi @ 50°	0.16 (13/13) (0.06-0.24)	None	0
Airborne Iodine (pCi/m^3)	I-131 36	0.10	<LLD	-	-	-	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 17	3.0	13.3 (8/8) (11.7-14.3)	4 Locations equal	14.3 (4/4)	12.7 (9/9) (11.7-13.0)	0
Milk (pCi/l)	I-131 9	5.0	<LLD	-	-	<LLD	0
Cooling Water (pCi/l)	Gross Beta 42	5.0	4.4 (26/28) (0.7-15.0)	D-19-1, Discharge Canal at Station	4.8 (12/14) (2.7-15.0)	4.1 (13/14) (2.4-8.0)	0
Surface Water (pCi/l)	Gamma Spec. 3	10.0	<LLD	-	-	None	0

[a] Mean and range based on detectable measurements only. Fractions indicated in parentheses.

Table 5.0-3

Environmental Radiological Monitoring Program Quarterly Summary

Name of facility Dresden Nuclear Power Station Docket No. 50-10, 50-237, 50-549

Location of facility Grundy, Illinois (County, State) Reporting Period 2nd Quarter 1981

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean[a] Range	Location with Highest Annual Mean		Control Locations Mean[a] Range	Number of non-routine Results
				Location	Mean Range		
Air Particulates (pCi/m^3)	Gross Beta 77	1.0	0.21 (77/77) (0.07-0.54)	D-03, Onsite (in coming Road 0.4 mi @ 180°	0.26 (13/13) (0.12-0.54)	None	0
Airborne Iodine (pCi/m^3)	I-131 42	0.10	<LLD	-	-	None	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 17	3.0	13.6 (8/8) (12.9-15.0)	D-05, Bennitt Farm 0.9 mi @ 60°	15.0 (1/1) -	12.7 (9/9) (11.4-13.4)	0
Milk (pCi/l)	I-131 30	5.0/0.5*	<LLD	-	-	None	0
Cooling Water (pCi/l)	Gross Beta 39	2.0	4.8 (25/26) (3.4-7.5)	D-18, Inlet Canal at Station	5.6 (13/13) (4.0-10.1)	5.6 (13/13) (4.0-10.1)	0
Surface Water (pCi/l)	Gamma Spec. 3	10.0	<LLD	-	-	None	0
Fish (pCi/g wet)	Gamma Spec. 9						
	Cs-137	0.1	<LLD	-	-	None	0
	Other gammas	0.2	<LLD	-	-	None	0

[a] Mean and range based on detectable measurements only. Fractions indicated in parentheses.

* Movember - April LLD = 5.0; May - October LLD = 0.5.

Table 5.0-4

Environmental Radiological Monitoring Program Quarterly Summary

Name of facility Dresden Nuclear Power Station Docket No. 50-10, 50-237, 50-549
Location of facility Grundy, Illinois (County, State) Reporting Period 3rd Quarter 1981

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean[a] Range	Location with Highest Annual Mean		Control Locations Mean[a] Range	Number of non-routine Results
				Location	Mean Range		
Air Particulates (pCi/m^3)	Gross Beta 78	1.0	0.07 (75/78) (0.02-0.16)	D-02, Onsite 2 (behind Station) 0.3 mi @ 50°	0.08 (13/13) (0.02-0.16)	None	0
Airborne Iodine (pCi/m^3)	I-131 42	0.10	<LLD	-	-	None	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 17	3.0	9.5 (8/8) (7.8-10.5)	D-05, Bennitt Farm 0.9 mi @ 60°	10.5 (1/1)	8.0 (9/9) (6.6-8.4)	0
Milk (pCi/l)	I-131 39	0.5	<LLD	-	-	None	0
Cooling Water (pCi/l)	Gross Beta 39	2.0	3.6 (24/26) (2.4-6.0)	D-19-1, Discharge Canal at Station	3.8 (11/13) (2.7-6.0)	3.6 (11/13) (2.2-4.7)	0
Surface Water (pCi/l)	Gamma Spec. 3	10.0	<LLD	-	-	None	0
Bottom Sediments (pCi/g dry)	Gamma Spec. 9						
	Cs-137	0.1	0.30 (1/1)	D-27, Dresden Lock & Dam 0.5 mi @ 270°	0.30 (1/1)	None	0
	Other gammas	0.2	<LLD	-	-	None	0

[a] Mean and range based on detectable measurements only. Fractions indicated in parentheses.

Table 5.0-5

Environmental Radiological Monitoring Program Quarterly Summary

Name of facility Dresden Nuclear Power Station Docket No. 50-10, 50-237, 50-549
Location of facility Grundy, Illinois (County, State) Reporting Period 4th Quarter 1981

Sample Type (Units)	Type and Number of Analyses	LLD	Indicator Locations Mean[a] Range	Location with Highest Annual Mean: Location	Location with Highest Annual Mean: Mean Range	Control Locations Mean[a] Range	Number of non-routine Results
Air Particulates (pCi/m^3)	Gross Beta 84	1.0	0.03 (82/84) (0.01-0.07)	D-05, Benitt Farm 0.9 mi @ 60°	0.04 (14/14) (0.02-0.07)	None	0
Airborne Iodine (pCi/m^3)	I-131 42	0.10	<LLD	-	-	None	0
Gamma Background (TLDs) (mR/Qtr.)	Gamma Dose 17	3.0	13.1 (8/8) (10.7-14.2)	2 Locations equal	14.2 (2/2) -	11.7 (9/9) (10.6-13.3)	0
Milk (pCi/l)	I-131 17	0.5/5.0*	<LLD	-	-	<LLD	0
Cooling Water (pCi/l)	Gross Beta 36	2.0	3.4 (24/24) (2.1-5.0)	D-19-1, Discharge Canal at Station	3.6 (12/12) (2.2-5.0)	3.5 (12/12) (2.1-4.6)	0
Surface Water (pCi/l)	Gamma Spec. 3	10.0	<LLD	-	-	None	0
Fish (pCi/g wet)	Gamma Spec. 8						
	Cs-137	0.1	<LLD	-	-	None	0
	Other gammas	0.2	<LLD	-	-	None	0

[a] Mean and range based on detectable measurements only. Fractions indicated in parentheses.
* May - October LLD = 0.5; November - April LLD = 5.0.

Table 5.1-1

Gamma Radiation as Measured by Thermoluminescent Dosimeters (TLD).

Standard Radiological Monitoring Program

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:		03/28/81	06/27/81	10/03/81
Date Removed:	03/28/81	06/27/81	10/03/81	01/12/82
Location	Average mR/Quarter			
On Site Indicator Locations				
D-01 On-Site 1	13.0±1.3	14.1±1.1	9.8±0.7	14.2±0.7
D-02 On-Site 2	11.7±1.3	13.0±1.2	9.9±0.5	12.6±0.7
D-03 On-Site 3	14.3±2.6	13.9±1.1	9.4±0.8	14.2±1.0
*D-04 Collins Road	14.3±2.6	14.9±1.2	10.0±.06	12.7±0.5
Mean ± s.d.	13.3±1.2	14.0±0.8	9.8±0.3	13.4±0.9
Off-Site Indicator Locations				
*D-05 Bennitt Farm	11.7±1.3	15.0±1.6	10.5±0.6	13.9±0.7
*D-06 Pheasant Trail	14.3±1.3	11.7±1.0	7.8±1.0	10.7±0.8
*D-07 Clay Products	13.0±1.3	14.1±1.8	9.2±0.8	12.6±0.5
*D-08 Prairie Park	14.3±2.6	14.0±1.0	9.4±0.8	13.9±0.9
Mean ± s.d.	13.3±1.2	13.7±1.4	9.2±1.1	12.8±1.5
Background Locations				
*D-09 Goal City	11.7±1.3	11.4±1.2	6.6±0.5	10.9±0.4
*D-10 Goose Lake Village	13.0±2.6	13.0±1.3	8.2±0.6	12.0±0.8
*D-11 Morris	13.0±1.3	12.9±1.0	8.2±0.9	12.3±0.6
D-12 Lisbon	13.0±2.6	13.4±1.1	8.4±0.5	11.6±0.5
*D-13 Minooka	13.0±1.3	11.7±1.1	8.1±0.5	10.6±0.7
*D-14 Channahon	13.0±2.6	12.9±1.1	7.9±0.4	11.7±0.6
*D-15 Joliet Brandon Rd.	13.0±1.3	13.3±1.0	8.4±0.4	13.3±0.9
D-16 Elwood	11.7±1.3	13.2±1.3	8.4±0.4	11.6±0.7
D-17 Wilmington	13.0±2.6	12.3±1.2	7.9±0.9	11.4±0.7
Mean ± s.d.	12.7±0.6	12.7±0.7	8.0±0.6	11.7±0.8

* Locations shared by Dresden and G.E.

Table 5.1-1 (continued)

Gamma Radiation as Measured by Thermoluminescent Dosimeters (TLD)

Special Program

Inner Ring, Near Site Boundary, Indicator Locations

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:		03-28-81	06/27/81	10/03/81
Date Removed:	03/28/81	06/27/81	10/03/81	01/02/82
Location	Average mR/Quarter			
D-101-1	14.3±2.6	14.4±1.4	10.7±0.4	13.5±0.8
D-101-2	15.6±2.6	16.1±1.2	11.6±0.4	15.4±0.6
D-102-1	15.6±1.3	19.0±1.1	13.1±0.6	16.1±0.6
D-102-2	13.0±1.3	17.2±1.0	15.2±0.7	16.3±0.5
D-105-1	15.6±2.6	12.9±1.2	10.9±0.9	12.8±0.5
D-105-2	13.0±1.3	14.7±1.4	9.9±0.4	12.9±0.5
D-109-1	13.0±2.6	15.8±1.2	11.8±0.5	15.1±0.6
D-109-2	14.3±1.3	14.4±1.0	11.9±0.7	14.1±0.6
D-110-1	15.6±1.3	15.4±1.2	12.1±0.8	15.8±1.3
D-110-2	14.3±1.3	12.6±1.3	9.4±0.8	11.8±0.8
D-111-1	13.0±2.6	14.8±1.2	11.6±0.9	14.7±0.6
D-111-2	13.0±2.6	14.9±1.1	11.4±0.7	13.7±0.7
D-112-1	13.0±1.3	13.6±1.3	8.6±0.8	11.4±0.7
D-112-2	13.0±1.3	11.6±1.2	8.9±0.4	11.4±0.7
D-113-1	13.0±1.3	14.9±1.2	12.8±0.5	14.1±0.9
D-113-2	13.0±1.3	13.6±1.1	11.2±0.8	13.1±1.1
D-114-1	13.0±1.3	15.3±1.0	9.6±0.4	14.0±0.7
D-114-2	13.0±1.3	14.3±1.1	10.5±0.7	13.2±0.7
D-115-1	13.0±1.3	17.1±1.2	13.1±0.9	16.6±0.6
D-115-2	14.3±2.6	15.8±1.1	13.7±1.2	16.1±0.7
Mean ± s.d.	13.8±1.1	14.9±1.7	11.4±1.7	14.1±1.6

Table 5.1-1

Gamma Radiation as Measured by Thermoluminescent Dosimeters (TLD).

Special Program

Outer Ring, Near 5 Mile Radius, Indicator Locations

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Date Placed:		03/28/81	06/27/81	10/03/81
Date Removed:	03/28/81	06/27/81	10/03/81	01/02/82
Location	Average mR/Quarter			
D-201-1	13.0±1.3	17.4±1.2	15.0±1.0	17.4±0.4
D-201-2	14.3±1.3	17.7±1.4	15.6±0.5	17.3±0.5
D-202-1	14.3±1.3	15.4±2.0	9.7±0.8	13.4±0.8
D-202-2	14.3±1.3	14.7±1.1	12.6±0.9	13.5±0.6
D-203-1	13.0±1.3	15.2±1.2	11.6±0.7	14.7±0.7
D-203-2	15.6±1.3	13.0±1.2	8.8±0.7	11.9±0.9
D-204-1	13.0±1.3	14.8±1.4	11.4±0.6	15.2±0.9
D-204-2	14.3±1.3	12.9±1.1	9.4±0.4	12.6±0.7
D-205-1	15.6±1.3	NS[a]	12.4±0.5	14.4±0.6
D-205-2	16.9±1.3	14.9±1.0	10.6±0.6	13.9±0.6
D-206-1	15.6±3.9	14.2±1.1	10.0±0.9	14.5±0.9
D-206-2	15.6±1.3	13.3±1.0	9.2±0.5	13.9±0.5
D-207-1	14.3±2.6	13.7±1.0	8.9±0.8	12.6±0.4
D-207-2	13.0±2.6	12.3±1.0	9.4±0.6	12.2±0.5
D-208-1	16.0±2.6	12.0±1.0	8.4±1.0	12.9±0.8
D-208-2	13.0±1.3	14.2±1.2	9.1±0.5	12.6±0.6
D-209-1	11.7±1.3	11.0±1.2	7.4±0.8	10.6±0.6
D-209-2	11.7±1.3	10.8±1.1	8.0±0.8	10.7±0.4
D-210-1	16.9±1.3	14.9±1.1	11.9±1.0	13.8±0.8
D-210-2	14.3±1.3	15.1±1.9	11.6±1.1	12.7±0.4
D-211-1	13.0±1.3	15.4±1.2	13.1±1.2	14.5±0.5
D-211-2	15.6±2.6	14.8±1.2	11.2±0.8	14.1±0.8
D-212-1	15.6±2.6	15.5±1.6	12.6±0.5	15.0±0.7
D-212-2	15.6±1.3	14.9±1.1	12.6±1.0	14.6±0.6
D-213-1	14.3±1.3	13.5±1.4	9.3±0.8	13.1±0.7
D-213-2	11.7±2.6	13.2±1.2	11.2±0.8	12.5±0.4
D-214-1	14.3±1.3	18.6±1.4	13.4±0.6	17.1±0.5
D-214-2	15.6±1.3	18.0±1.6	14.1±0.7	17.2±0.6
D-215-1	14.3±1.3	16.7±1.1	13.1±0.4	15.7±0.5
D-215-2	14.3±2.6	16.6±1.1	13.2±0.9	16.1±0.6
D-216-1	14.3±2.6	16.9±1.1	14.1±0.5	15.6±0.8
D-216-2	14.6±3.9	15.9±1.0	13.9±0.7	18.2±0.8
Mean ± s.d.	14.4±1.4	14.8±1.4	11.3±2.2	14.2±1.9

[a] NS = No sample. TLD's from this location were lost in the field due to vandalism.

APPENDIX II

METEOROGICAL DATA

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - EXTREMELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	2	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	1	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	0	1
NW	0	0	2	2	1	0	5
NNW	0	0	0	1	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	4	5	1	0	10

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - MODERATELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	2	0	0	0	2
NNE	0	0	0	3	1	0	4
NE	0	0	0	3	1	0	4
ENE	0	0	0	1	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	1	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	1	2	0	3
W	0	0	0	0	12	2	14
WNW	0	0	1	3	3	0	7
NW	0	2	3	4	0	0	9
NNW	0	0	4	6	2	0	12
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	2	10	22	21	2	57

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - SLIGHTLY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	1	3	0	0	0	4
NNE	0	0	3	0	0	0	3
NE	0	0	0	2	0	0	2
ENE	0	0	3	1	0	0	4
E	0	0	1	2	0	0	3
ESE	0	0	0	2	0	0	2
SE	0	0	0	1	0	0	1
SSE	0	0	0	0	2	2	4
S	0	0	0	0	1	1	2
SSW	0	0	2	2	1	1	6
SW	0	0	0	0	0	0	0
WSW	0	1	0	5	1	0	7
W	0	1	0	8	11	3	23
WNW	0	3	2	2	2	0	9
NW	0	0	3	8	4	0	15
NNW	0	0	7	12	7	0	26
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	6	24	45	29	7	111

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 1

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - NEUTRAL (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	1	7	6	3	13	7	37
NNE	0	14	7	12	9	2	44
NE	0	12	22	19	4	0	57
ENE	1	4	15	19	2	0	41
E	2	6	16	7	2	0	33
ESE	3	11	13	7	1	0	35
SE	0	5	0	4	10	0	19
SSE	0	3	3	4	9	7	26
S	1	6	14	14	13	17	65
SSW	0	7	10	8	24	2	51
SW	0	7	10	32	8	2	59
WSW	0	3	9	26	16	7	61
W	0	5	22	54	62	36	179
WNW	0	2	20	35	26	4	87
NW	1	9	18	38	31	4	101
NNW	3	6	17	56	32	3	117
VARIABLE	0	0	0	0	0	0	0
TOTAL	12	107	202	338	262	91	1012

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 27

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - SLIGHTLY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	1	7	6	2	1	0	17
NNE	3	4	2	5	6	0	20
NE	0	7	3	10	2	0	22
ENE	2	3	9	5	0	0	19
E	0	3	7	7	0	0	17
ESE	2	1	0	2	12	8	25
SE	0	3	2	6	9	8	28
SSE	1	3	1	7	8	5	25
S	1	2	12	39	35	29	118
SSW	0	2	12	21	16	13	64
SW	0	6	5	28	22	5	66
WSW	0	2	13	24	14	12	65
W	1	2	7	39	19	7	75
WNW	1	1	9	23	17	3	54
NW	0	4	9	24	5	0	42
NNW	2	2	9	36	2	0	51
VARIABLE	0	0	0	0	0	0	0
TOTAL	14	52	106	278	168	90	708

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 8

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - MODERATELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	1	2	2	1	0	6
NNE	1	2	1	1	4	0	9
NE	0	0	0	1	0	0	1
ENE	1	2	1	0	0	0	4
E	0	0	2	0	0	0	2
ESE	0	0	6	0	0	0	6
SE	1	0	1	6	1	0	9
SSE	0	0	0	1	3	0	4
S	0	0	1	4	2	2	9
SSW	0	0	1	10	2	0	13
SW	1	2	2	8	4	2	19
WSW	0	2	11	17	6	0	36
W	0	3	6	5	6	0	20
WNW	0	3	2	3	8	0	16
NW	0	2	9	6	1	0	18
NNW	0	1	0	9	2	0	12
VARIABLE	0	0	0	0	0	0	0
TOTAL	4	18	45	73	40	4	184

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 5

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JANUARY - MARCH 1981
STABILITY CLASS - EXTREMELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	1	0	0	1
NNE	0	1	2	2	0	0	5
NE	0	0	1	2	0	0	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	1	1	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	2	5	0	0	7
WSW	0	0	2	5	0	0	7
W	0	0	0	0	0	0	0
WNW	0	0	0	1	2	3	6
NW	0	0	0	1	1	0	2
NNW	0	0	0	2	1	0	3
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	1	7	20	5	3	36

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 1

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - EXTREMELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	3	0	3
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	0	0	3	0	3

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - MODERATELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	1	0	1
NNE	0	0	0	0	3	0	3
NE	0	0	0	3	4	0	7
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	1	1	0	2
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	1	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	4	4
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	1	0	1
NNW	0	0	2	0	0	0	2
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	3	4	10	5	22

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - SLIGHTLY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	4	0	0	0	4
NNE	0	0	2	3	3	1	9
NE	0	0	0	3	2	0	5
ENE	0	0	0	0	0	0	0
E	0	0	1	2	0	0	3
ESE	0	0	0	4	0	0	4
SE	0	0	0	4	1	0	5
SSE	0	0	0	1	0	0	1
S	0	0	0	0	1	3	4
SSW	0	0	0	0	0	1	1
SW	0	1	0	0	0	1	2
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	1	1
NW	0	2	2	1	6	1	12
NNW	0	2	5	0	0	0	7
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	5	14	18	13	8	58

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - NEUTRAL (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	4	7	14	12	8	5	50
NNE	1	12	11	14	22	46	106
NE	0	15	32	25	7	9	88
ENE	1	13	41	5	6	1	67
E	0	11	18	15	0	0	44
ESE	0	14	9	11	1	0	35
SE	0	9	18	21	3	0	51
SSE	2	13	17	10	4	1	47
S	0	13	18	27	18	19	95
SSW	0	10	18	22	20	15	85
SW	2	10	16	15	10	8	61
WSW	4	6	10	19	15	5	59
W	1	6	4	11	18	25	65
WNW	2	1	6	9	14	6	38
NW	1	13	6	16	24	3	63
NNW	0	12	12	7	1	8	40
VARIABLE	0	0	0	0	0	0	0
TOTAL	18	165	250	239	171	151	994

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - SLIGHTLY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	5	4	3	6	0	18
NNE	0	5	12	17	8	7	49
NE	1	10	30	20	7	1	69
ENE	1	6	21	19	1	0	48
E	1	7	13	17	1	0	39
ESE	0	4	19	22	3	0	48
SE	0	3	20	36	8	0	67
SSE	1	4	11	31	32	3	82
S	1	3	6	21	52	31	114
SSW	2	3	12	25	32	28	102
SW	2	4	8	21	5	12	52
WSW	0	2	5	18	5	5	35
W	0	2	6	9	4	3	24
WNW	2	3	13	12	6	2	38
NW	0	3	20	24	7	0	54
NNW	1	4	6	18	2	1	32
VARIABLE	0	0	0	0	0	0	0
TOTAL	12	68	206	313	179	93	871

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - MODERATELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	5	7	10	0	0	22
NNE	0	3	6	4	2	0	15
NE	0	2	3	4	1	0	10
ENE	0	0	3	0	0	0	3
E	0	0	1	1	0	0	2
ESE	0	0	0	10	2	0	12
SE	0	0	2	4	0	0	6
SSE	0	1	1	2	1	0	5
S	0	0	0	6	10	1	17
SSW	0	0	1	16	4	1	22
SW	0	0	1	9	0	0	10
WSW	0	0	7	6	0	0	13
W	0	2	9	1	0	0	12
WNW	0	5	7	6	5	0	23
NW	0	0	7	6	1	0	14
NNW	0	2	3	4	0	0	9
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	20	58	89	26	2	195

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - APRIL - JUNE 1981
STABILITY CLASS - EXTREMELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	2	2	1	0	0	5
NNE	0	0	3	3	0	0	6
NE	0	0	1	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	1	0	0	1
S	0	1	1	0	0	0	2
SSW	0	0	2	5	1	0	8
SW	0	1	3	0	1	0	5
WSW	1	0	2	0	0	0	3
W	0	2	4	0	0	0	6
WNW	0	1	0	1	0	0	2
NW	0	0	1	1	0	0	2
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	1	7	19	12	2	0	41

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - EXTREMELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	1	0	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	1

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - MODERATELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	1	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	1	1	0	0	2

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - SLIGHTLY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	1	5	0	0	0	6
NNE	0	0	2	5	0	0	7
NE	0	2	2	0	0	0	4
ENE	0	1	2	1	0	0	4
E	0	0	0	1	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	2	4	0	0	6
NNW	0	0	6	3	0	0	9
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	4	19	14	0	0	37

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 1

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - NEUTRAL (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	1	15	31	20	3	0	70
NNE	1	20	17	18	9	0	65
NE	3	13	47	33	1	0	97
ENE	1	18	40	4	0	0	63
E	1	11	19	10	0	0	41
ESE	1	20	15	12	0	0	48
SE	2	18	24	11	1	0	56
SSE	3	23	35	13	2	2	78
S	3	14	33	16	1	0	67
SSW	0	14	28	14	2	0	58
SW	1	6	18	22	10	1	58
WSW	3	14	24	24	11	1	77
W	1	9	13	13	5	2	43
WNW	1	4	4	3	0	0	12
NW	1	5	11	15	0	0	32
NNW	0	7	20	17	1	0	45
VARIABLE	0	0	0	0	0	0	0
TOTAL	23	211	379	245	46	6	910

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 6

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - SLIGHTLY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	2	7	25	7	2	0	43
NNE	0	3	17	22	3	0	45
NE	0	8	32	15	1	0	56
ENE	2	6	39	11	0	0	58
E	1	8	19	27	3	0	58
ESE	1	10	19	17	1	0	48
SE	0	8	29	14	2	0	53
SSE	1	7	27	23	1	2	61
S	0	15	31	21	9	0	76
SSW	0	7	22	31	12	2	74
SW	0	6	20	21	11	2	60
WSW	0	8	16	15	5	0	44
W	3	6	13	13	2	0	37
WNW	0	5	4	11	1	0	21
NW	0	0	4	23	3	0	30
NNW	0	6	9	25	4	0	44
VARIABLE	0	0	0	0	0	0	0
TOTAL	10	110	326	296	60	6	808

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 9

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - MODERATELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	1	3	4	9	0	0	17
NNE	0	4	6	11	3	0	24
NE	0	3	12	16	5	0	36
ENE	0	1	8	0	0	0	9
E	1	2	5	2	2	0	12
ESE	0	0	7	7	1	0	15
SE	0	1	19	13	0	0	33
SSE	1	4	24	8	0	0	37
S	0	4	10	13	0	0	27
SSW	1	1	6	11	3	1	23
SW	0	2	10	22	10	0	44
WSW	1	7	9	37	0	0	54
W	1	2	11	5	0	0	19
WNW	0	1	2	3	0	0	6
NW	0	0	0	3	0	0	3
NNW	0	2	1	9	2	0	14
VARIABLE	0	0	0	0	0	0	0
TOTAL	6	37	134	169	26	1	373

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 5

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - JULY - SEPTEMBER 1981
STABILITY CLASS - EXTREMELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	3	0	1	1	0	0	5
NNE	0	0	4	0	5	0	9
NE	0	0	1	6	2	0	9
ENE	1	0	1	0	0	0	2
E	0	0	0	0	0	0	0
ESE	0	0	0	2	0	0	2
SE	0	0	2	2	0	0	4
SSE	0	0	2	3	0	0	5
S	0	0	0	1	0	0	1
SSW	0	0	0	4	0	0	4
SW	0	0	0	1	1	0	2
WSW	0	1	0	0	0	0	1
W	0	0	0	0	0	0	0
WNW	0	1	0	0	0	0	1
NW	1	1	1	0	0	0	3
NNW	0	1	0	4	2	0	7
VARIABLE	0	0	0	0	0	0	0
TOTAL	5	4	12	24	10	0	55

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 1

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - EXTREMELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - MODERATELY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	1	0	0	0	1
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	1	0	0	0	1

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - SLIGHTLY UNSTABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	1	0	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	1	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	0	4	2	0	0	6
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	1	4	2	0	1	8

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - NEUTRAL (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	1	14	15	8	2	2	42
NNE	1	8	16	13	7	0	45
NE	0	10	14	5	1	0	30
ENE	0	6	9	2	0	0	17
E	0	8	8	6	1	1	24
ESE	0	14	9	11	5	3	42
SE	1	17	12	18	3	2	53
SSE	1	14	14	8	12	3	52
S	0	16	5	6	16	9	52
SSW	3	5	10	14	12	3	47
SW	0	6	9	10	10	1	36
WSW	1	9	14	18	10	1	53
W	2	4	18	20	7	24	75
WNW	1	11	14	28	30	21	105
NW	1	6	36	45	37	5	130
NNW	0	5	16	29	9	3	62
VARIABLE	0	0	0	0	0	0	0
TOTAL	12	153	219	241	162	78	865

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - SLIGHTLY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	3	13	8	8	0	32
NNE	1	0	10	13	1	0	25
NE	0	4	9	22	0	0	35
ENE	4	11	40	7	0	0	62
E	5	3	24	25	6	0	63
ESE	3	9	17	19	26	4	78
SE	1	11	13	40	19	6	90
SSE	2	6	23	20	34	8	93
S	1	5	22	18	22	11	79
SSW	2	4	16	21	9	2	54
SW	0	5	8	16	22	2	53
WSW	2	7	8	6	3	3	29
W	1	4	16	8	7	12	48
WNW	1	3	13	43	30	3	93
NW	2	2	6	43	16	8	77
NNW	0	3	8	35	14	1	61
VARIABLE	0	0	0	0	0	0	0
TOTAL	25	80	246	344	217	60	972

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - MODERATELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	5	8	4	0	0	17
NNE	1	3	0	3	4	0	11
NE	0	1	0	1	0	0	2
ENE	0	1	2	0	0	0	3
E	0	4	5	0	0	0	9
ESE	0	2	9	12	8	0	31
SE	0	2	15	36	12	0	65
SSE	3	3	10	7	0	0	23
S	2	1	10	9	2	0	24
SSW	0	0	5	7	2	0	14
SW	1	2	5	8	0	0	16
WSW	0	2	7	9	0	0	18
W	1	6	7	7	0	0	21
WNW	1	2	1	5	3	0	12
NW	2	2	5	13	0	0	22
NNW	1	0	3	1	0	0	5
VARIABLE	0	0	0	0	0	0	0
TOTAL	12	36	92	122	31	0	293

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

DRESDEN NUCLEAR POWER STATION
PERIOD OF RECORD - OCTOBER - DECEMBER 1981
STABILITY CLASS - EXTREMELY STABLE (DELTA T 300-35 FT)
WINDS MEASURED AT 300 FEET

WIND DIRECTION	WIND SPEED (IN MPH) .9-3	4- 7	8-12	13-18	19-24	GT 24	TOTAL
N	0	0	2	2	0	0	4
NNE	0	0	1	0	0	0	1
NE	0	0	0	0	0	0	0
ENE	0	1	1	0	0	0	2
E	0	0	0	0	0	0	0
ESE	0	2	0	0	0	0	2
SE	0	4	1	4	0	0	9
SSE	0	0	0	2	0	0	2
S	0	0	3	6	0	0	9
SSW	0	0	1	2	0	0	3
SW	1	1	0	7	0	0	9
WSW	0	3	7	0	0	0	10
W	1	3	5	0	0	0	9
WNW	1	0	2	0	1	0	4
NW	0	1	2	0	1	0	4
NNW	0	0	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	3	15	26	23	2	0	69

HOURS OF CALM IN THIS STABILITY CLASS - 0
HOURS OF MISSING WIND MEASUREMENTS IN THIS STABILITY CLASS - 0

HOURS OF MISSING STABILITY MEASUREMENTS IN ALL STABILITY CLASSES - 0

APPENDIX III

ANALYTICAL PROCEDURES

SAMPLE PREPARATION

Different classes of samples require different preparations. In general, food products are prepared as for home use, while others are dried and ashed as received.

1.1 Fish

1. Wash the fish.

2. Fillet and place the flesh immediately (to prevent moisture loss) in a 450 cc plastic container. Add a few cc of formaldehyde. Seal and record wet weight.

   NOTE: If bones are to be analyzed, boil remaining fish in water for about 1 hour. Clean the bones. Air dry, weigh and record as wet weight. Dry at 125° C. Record dry weight. Ash at 800° C, cook, weigh, and record the ash weight. Grind to a homogeneous sample. The sample is ready for analysis.

3. Gamma scan fillet without delay or store in a freezer.

4. After gamma spectroscopic analysis is completed transfer the sample to a drying pan and dry at 125° C.

5. Cook, weigh, and record dry weight.

6. Ash by gradually increasing the temperature to 450° C. If considerable amounts of carbon remain after overnight ashing, the sample should be brushed and placed back in the muffle furnace until ashing is completed. Record ash weight. Grind to pass 30 mesh. The sample is now ready for analysis.

   NOTE: If in sufficient quantity, use surplus flesh for drying and ashing, instead of waiting for gamma scanning to be completed.

1.2 Bottom Sediments and Soil

1. Air dry the entire sample. Grind or pulverize the sample and sieve through a #20 mesh screen.

2. For gamma-spectroscopic analysis seal 450 cc of the ground sample in a Marinnelli beaker. Record dry weight.

3. Seal the remaining sample (up to 1 kg0 in a plastic container and save for other analyses or for possible future rechecking.

1.3 Drinking (clear) water (EPA Method 900.0)

A representative sample must be collected from a free-flowing source of drinking water, and should be large enough so that adequate aliquots can be taken to obtain the required sensitivity.

It is recommended that samples be preserved at the time of collection by adding enough 1N HNO_3 to the sample to bring it to pH 2 (15 ml 1N HNO_3 per liter of sample is usually sufficient) If samples are to be collected without preservation, they should be brought to the laboratory within 5 days, then preserved and held in the original container for a minimum of 16 hours before analysis or transfer of the sample.

The container choice should be plastic over glass to prevent loss due to breakage during transportation and handling.

If the sample was not acidified at the time of collection, use the following procedure:

Procedure

1. Remove 100 ml of sample for tritium analysis, if required.

   NOTE: Water should not be acidified for tritium analysis. If samples are acidified in the field, an additional aliquot should be collected.

2. Add 15 ml of 1N HNO_3 per liter of sample in the original container.

3. Hold the sample in the original container for a minimum of 16 hours before analysis or transfer of the sample.

4. When taking an aliquot for analysis, take acid addition into account. For example:

Sample volume to be analyzed	Volume of aliquot required
200 ml	203 ml
400 ml	406 ml
600 ml	609 ml
800 ml	812 ml
1000 ml	1015 ml
2000 ml	2030 ml
3000 ml	3045 ml
3500 ml	3552 ml

For other volumes, adjust adliquots correspondingly, at the rate of 1.5 ml per 100 ml of sample.

PROCEDURES

2.1 Airborne Particulates

2.1.1. Gross Alpha and/or Gross Beta Activity

Procedure

1. Store the sample for 5 days from the day of collection to allow for decay of short-lived radon and thoron daughters.

2. Place a 47 mm filter on a stainless steel planchet and count the samples on a proportional counter.

3. Calculate the activity in pCi/m^3 using computer program RADIO.

Calculations

Gross alpha (beta) activity:

$$(pCi/m^3) = \frac{A}{B \times C \times 2.22} \pm \frac{2\sqrt{E_{sb}^2 + E_b^2}}{B \times C \times 2.22}$$

Where:

A = net alpha (beta) count rate (cpm)
B = efficiency for counting alpha (beta) activity (cpm/dpm)
C = volume of sample (m^3)
E_{sb} = counting error of sample plus background
E_b = counting error of background

2.2 Water

2.2.1 Gross Alpha and/or Gross Beta Activity in Suspended Solids

Principle of Method

The sample is filtered through a tared membrane filter. The filter containing the solids is transferred to a metal planchet, dried and is fixed to the planchet. The gross alpha and/or gross beta activities are measured in low background internal proportional counter.

Reagents

Acetone

Apparatus

Filters; Millipore, membrane Type AA 0.8 μ
Filtration equipment
Planchets (Standard 2" X 1/8" Beckman planchet)
Proportional counter

Procedure

1. Filter one liter of sample through a TARED membrane filter. Wash the non-filterable solids on the filter with distilled water.

2. Place the filter in a planchet and air dry.

3. Dry in an oven for 30 minutes. Dessicate to constant weight and weigh.

4. Fix the filter to the planchet at four peripheral points using acetone (1 drop). Air dry.

5. Count for gross alpha and gross beta activity using a proportional counter.

6. Calculate the activity in pCi/l using computer program OWATAB.

2.2.1 Calculations

Gross alpha (beta) activity:

$$(\text{pCi/liter}) = \frac{A}{B \times C \times D \times 2.22} \pm \frac{2\sqrt{E_{sb}^2 + E_b^2}}{B \times C \times D \times 2.22}$$

Where:

A = net alpha (beta) count (cpm)
B = efficiency for counting alpha (beta) activity (cpm/dpm)
C = volume of sample (liters)
D = correction factor for self-absorption in the sample
E_{sb} = counting error of sample plus background
E_b = counting error of background

Reference: Radioassay Procedures for Environmental Samples, U.S. Department of Health, Education and Welfare. Environmental Health Series, January 1967.

2.2.2 Gross Alpha and/or Gross Beta Activity in Dissolved Solids (see note)

Principle of Method

Water samples containing suspended matter are filtered through a membrane filter and the filtrate is analyzed. The filtered water sample is evaporated and the residue is transferred to a tared planchet for counting gross alpha and/or gross beta activity.

Reagents

Lucite: 0.5 mg/ml in acetone
Nitric acid, HNO_3: 3N
Nitric acid, HNO_3: concentrated

Apparatus

Filters; Millipore, membrane Type AA, 0.8 μ
Filtration equipment
Planchets=(Standard 2" x 1/8" Beckman planchet)
Proportional counter

Procedure

1. Filter a volume of sample containing not more than 100 mg of dissolved solids for alpha assay, or not more than 200 mg of dissolved solids for beta assay.

   Note: For gross alpha and gross beta assay in the same sample limit amount of solids to 100 mg.

2. Wash the non-filterable solids on the filter. (Save the filters with suspended matter for separate analyses. See Section 2.2.1).

3. Evaporate the filtrate to NEAR dryness on a hot plate. Add 25 ml concentrated HNO_3 and evaporate to NEAR dryness.

Note: For analysis of total residue (for clear water) proceed as described above but do not fiter the water. Measure out the appropriate amount and proceed with step 3.

Section 2.2.2.(continued)

4. With distilled water and a few drops of 3N HNO_3, transfer the residue to a 50 ml beaker. Evaporate to NEAR dryness.

5. Transfer quantitatively the residue to a TARED PLANCHET, using an eye dropper.

6. Wash the beaker with distilled water and combine the washing and the residue in the planchet. Evaporate to dryness.

7. Bake in muffle furnace at 600° C for 45 min., cool and weigh.

8. Add a few drops (6-7 drops) of lucite solution and dry under the infrared lamp for 10-20 minutes.

9. Store the sample in a desiccator until it is to be counted.

10. Count the gross alpha and/or the gross beta activity in a low background proportional counter.

11. Calculate the activity in pCi/l using computer program OWATAB.

Calculations:

Gross alpha (beta) activity:

$$(\text{pCi/liter}) = \frac{A}{B \times C \times D \times 2.22} \pm \frac{2\sqrt{E_{sb}^2 + E_b^2}}{B \times C \times D \times 2.22}$$

Where:

A = net alpha (beta) count (cpm)
B = efficiency for counting alpha (beta) activity (cpm/dpm)
C = volume of sample (liters)
D = correction factor for self-absorption in the sample
E_{sb} = counting error of sample plus background
E_b = counting error of background

Reference: Radioassay Procedures for Environmental Samples, U.S. Department of Health, Education and Welfare. Environmental Health Series, January 1967.

3.1 Airborne Particulates - Gamma Spectroscopic analyses by Ge(Li) Detector

1. Put the air filter in a filter cup container.
2. Place the filter cup on a Ge(Li) detector.
3. Determine the gamma spectrum using 4096 or 8192 channel of gamma spectrometer with a setting of 0.5 KeV or 0.25 KeV per channel.
4. Identify gamma emitters (if present) by their respective energy peaks.

Calculations

1. Calculate the gamma activities using the computer program GAMMA 1 or GAMMA 2.

3.2 Airborne Iodine

3.2 Spectroscopic Analyses by Automatic Gamma Counter

Transfer charcoal to a plastic scintillation vial. Place the vial in the Automatic Gamma Counter (Packard Instrument Co. Model 5975) and count. Record the time.

Calculations

$$\text{I-131 activity } (pCi/m^3) = \frac{A}{B \times C \times 2.22}$$

Where:

A = net count rate of I-131 in the 0.36 MeV peak
B = efficiency for counting I-131 activity in 0.36 MeV peak (cpm/dpm)
C = volume of sample (m^3)

Correction for decay

$$A_o = \frac{A_1 \, e^{\lambda t_2}}{F \, (1 - e^{-\lambda t_1})} \approx \frac{A_1 \, e^{\lambda t_2}}{F \times t_1} \quad \text{when } t_1 << 1$$

Where:

A_o = activity of I-131 at the time of collection (pCi/m3)
A_1 = activity of I-131 at the time of counting
e = 2.71828
λ = 0.693/half life (days) = 0.693/8.08 = 0.09576/day
t_1 = duration of collection (in days)
t_2 = elapsed time between collection and counting (in days)
$F = M^3$/day

3.2 Spectroscopic Analysis by Ge(Li) Detector

1. Transfer charcoal to a small plastic bag.

2. Label the plastic bag with the corresponding project, location and date of collection and seal it.

3. Place packed charcoal in a 450 ml. NC (black) container (all locations) and seal with a tape.

4. Place it on the Ge(Li) Detector and count. Record time.

Calculations

Calculation is done by the computer by running the Program GAMMA 2.

3.3 Water - Gamma Spectroscopic Analyses by Ge (Li) Detector

Procedure

1. Measure 3.5 liters of water into a Marinelli beaker.
2. Place the beaker inside the shield on a Ge(Li) detector.
3. Count long enough to meet LLD requirements.
4. After counting, identify gamma emitters (if present) by their respective energy peaks.
5. Store the spectrum on a disc using computer by executing "RUN STORE."
6. After storing, calculate gamma activities, using computer program GAMMA 1 or GAMMA 2.
7. Transfer the sample back to the original container for further analyses.

3.4 Soils and Bottom Sediments - Gamma Spectroscopic Analyses by Ge(Li) Detector

Procedure

1. Transfer the portion of the ground sample set aside for gamma scanning into a 450 ml Marinelli container.

2. Record the dry weight.

3. Place the container inside the shield on a Ge(Li) detector.

4. Count the gamma activity long enough to meet the minimum sensitivity requirements.

5. After counting, identify gamma emitters (if present) by their respective energy peaks.

6. Store the spectrum on a disc using the computer by executing "RUN STORE."

7. After storing, calculate gamma activities using computer Program GAMMA 1 or GAMMA 2.

8. Transfer the sample back to the original container for further analyses.

3.5 Fish and Wildlife - Gamma Spectroscopic Analyses by Ge(Li) Detector

Procedure

1. Transfer a portion of the clean wet flesh of fish or animal into 450 ml Marinelli container.
2. Record wet weight.
3. Add a few cc of formaldehyde and seal the container.
4. Place the container inside the shield on a Ge(Li) detector.
5. Count long enough to meet the minimum sensitivity requirements.
6. After counting, identify gamma emitters (if present) by their respective energy peaks.
7. Store the spectrum on a disc using computer by executing "RUN STORE."
8. After storing, calculate gamma activities using computer program GAMMA 1 or GAMMA 2.
9. Transfer the sample back to the original container for further analyses.

3.6 Ambient Gamma Radiation

A. Thermoluminescent Dosimeters (TLD) - Light Response (Efficiency)

Harshaw Lithium Fluoride TLD-100 chips, 1/8" x 1/8" x 0.035".

Procedure

1. Rinse the chips with warm trichloroethylene followed by the methanol rinse. Dry.
2. Place the chips in a platinum crucible.
3. Anneal for 1 hour at 400°C.
4. Cool quickly by placing the crucible on a metal plate.
5. Anneal for 2 hours at 100°C.

   Note: Avoid exposing the chips to the fluorescent light.
6. Seal 5 chips each in black plastic.
7. Mount the packs on the turntable.
8. Position the Ra-226 needle in the middle of the turntable and start rotation (appr. 60 revolutions per minute). Record the time.
9. Irradiate the chips for 2-6 hrs.
10. Remove the packages from the turntable. Return the Ra-226 needle to the lead container. Record the time.
11. Take the chips out of the plastic bag and place them in the vial.
12. Postanneal the chips for 10 minutes at 100°C.
13. Read each chip twice in the TLD Reader (For test procedure see "Performance Test Procedure for TLD Reader").
14. Subtract second reading from the first to obtain net reading in nanocoulombs.
15. Calculate mean $\pm$ one sigma deviation of five chips.
16. Calculate light response of TLD's (correction factor) by the following equation:

Section 3.6 (continued)

Calculations

$$C.F.\ (\text{nanocoulombs/mrem}) = \frac{A}{B}$$

Where:

C.F = correction factor to be applied in calculating exposure of field TLD's
A = Net reading in nanocoulombs
B = known exposure to TLD's

The exposure to the TLD's (B) is calculated as follows:

$$\text{mrem/hr} = \frac{8400 \times \text{mg Ra-226}}{r^2}$$

For our setup use the following parameters:

Ra-226 = 0.0922 $\pm$ 1.5%

r = 19.6 cm

Thus:

$$\text{mrem/hr} = \frac{8400 \times 0.0933}{384.16} = 2.040$$

The total exposure (B) is equal to:

B (mrem) = 2.040 x hours

3.7 Procedure for Preparation and Readout of TLD Chips

Materials

Harshaw Lithium Fluoride TLD-100 chips, 1/8" x 1/8" x 0.035".
Black plastic bags or boxes
Plastic sealer
Vacuum needle (for handling the chips)
TLD reader

Note: Never handle the chips with bare hands. Use plastic-covered forceps or vacuum needle. Handle them gently, e.g. do not drop them into the vial or on the table. They chip off easily, resulting in efficiency change.

Procedure

1. Rinse the chips with warm trichloroethylene followed by the methanol rinse. Dry.
2. Place the chips in a platinum crucible.
3. Anneal for 1 hour at 400°C.
4. Cool quickly by placing the crucible on a metal plate.
5. Anneal for 2 hours at 100°C.
6. Seal 3 to 5 chips (depending on the specifications) in black plastic or plastic boxes.
7. Label and send out by U.S. Mail.
8. Upon arrival at the lab, store TLDs in the big shield until readout day. Do not store longer than a few days.
9. Connect chips reader one day prior to readout.
10. Turn on gas for a few minutes before readout. Adjust to the mark.
11. Set parameter on the 2000P as follows:

    HV - 470 V (It is 970 V, internal volts = 5000).
    Readout time: 20"
    T_1 - 140° C (Preset)
    T_2 - 250° C (Preset)
    Rise time: -12°/sec (Present)
    Preheat - 100° C (Present)
    Start reading - 90° C

Section 3.7 (continued)

12. Prepare the chips as follows (do this before proceding to the next step).

    12.1 Turn on small muffler furnace or drying oven and adjust to 80°C. Use glass thermometer. Muffler's indicator is not accurate. Let furnace stabilize.

    12.2 Unpack the chips (under reduced incandescent light) and gently place them in the glass vials marked with appropriate location numbers.

    12.3 Place the vials in the furnace. Preanneal for 10 min. at 80°C.

13. Open the drawer and read the standard. It should read 8.34±0.04. Adjust HV, if needed. Take 3 readings after final adjustment. Record.

14. Close the drawer.

15. Check bkg. It should read about 0.7-0.8 in 20". If it is higher, adjust the knob in the back of 2000 P (on left side when facing the instrument).

    Note: Adjust bkg as low as possible but do not let the needle hit zero. The instrument will not record below zero.

16. Make 10 bkg readings (no chip in). Record. Read (do not record) at least 2 dummies to stabilize the temperature.

17. Place the chip in, wait until temperature goes down to 90° C and press "read" button. Make sure the chip is in the cavity of the heating plate.

18. After readout is completed, record the reading, open the drawer, and place next chip.

19. Repeat Steps 16 and 17 until all chips are read out.

    Note: If reading will last longer than 1.5-2.0 hrs., check the standard and bkg about every 2.0 hrs.

20. After readout is completed, turn off the gas.

21. For calculations, use computer program OGTLD.PUB.

3.8 Tritium in Water (Direct Method)

Principle of Method

The water sample is purified by distillation, and portion of the distillate is transferred to a counting vial containing a scintillation fluid. The contents of the vial are then mixed and counted in a liquid scintillation counter.

Reagents

Scintillation medium, insta-gel scintillator
Tritium standard solution

Apparatus

Condenser
Distillation flask, 250-ml capacity
Liquid scintillation counter
Liquid scintillation counting vials

Procedure

1. Distill a 30 ml aliquot of the sample in a 250-ml distillation flask. Add a boiling chip to the flask. Connect a side arm adapter and a condenser to the outlet of the flask. Place a glass vial at the outlet of the condenser. Heat the sample to 100 - 150° C to distill, just to dryness. Collect the distillate for tritium analysis.

2. Dispense 13 ml of the distillate to a low potassium glass vial.

3. Prepare background and standard tritium-water solutions for counting, using the same amount as the sample. Use low tritium background distilled water for these preparations (distillate of most deep well water sources is acceptable, but each source should be checked for tritium activity before using).

4. Dark-adapt all samples, backgrounds, and standards. Add 10 ml of insta-gel scintillator. Count the samples, backgrounds and standards. Count samples containing less than 200 pCi/ml for 300 minutes and samples containing more than 200 pCi/ml for 200 minutes.

Section 3.8 (continued)

5. Counting efficiency:

$$Eff = \frac{\text{cpm of Standard-cpm of background}}{\text{dpm Standard}}$$

$$pCi/ml = \frac{A}{2.22 \times E \times V}$$

Where:

A = net count rate (cpm)
E = efficiency (cpm/dpm)
V = volume

6. Calculate tritium activity using computer program OH3.

3.9 Iodine-131 Milk by Ion Exchange on Anion Exchange Column

After samples have been treated to convert all iodine in the sample to a common oxidation state, the iodine is isolated by solvent extraction or a combination of ion exchange and solvent extraction steps.

Iodine, as the iodine, is concentrated by adsorption on an anion exchanged column. Following a NaCl wash, the iodine is eluted with sodium hypochlorite. Iodine in the iodate form is reduced to I_2 and the elemental iodine extracted into CCl_4, back-extracted into water the finnally precipated as palladium iodide.

Chemical recovery of the added carrier is determined gravimetrically from the PdI_2 precipitate. ^{131}I is determined by beta counting the PdI_2.

Reagents

Anion exchange resin, Dowex 1 x 8 (50-100 mesh) chloride form.

Carbon tetrachloride, CCl_4 - reagent grade.

Hydrochloric acid, HCl, 1N.

Hydrochloric acid, HCl, 3N..

H_2O - HNO_3 - HN_2OH HCL wash solution (50 ml H_2O); 10 ml 1M - NH_2OH-HCl; (10 ml conc. HNO_3).

Hydroxylamine hydrochloride, NH_2OH HCl - 1 M.

Nitric acid, HNO_3 - concentrated.

Palladium chloride, PdI_2, 20 mg Pd^{++}/ml. 1.2 g Pd Cl_2/100 ml 6N HCl).

Sodium bisulfite, $NaHSO_3$ - 1 M

Sodium chloride, NaCl - 2M

Sodium hypochlorite, NaOCl - 5% (clorox).

Section 3.9 (continued)

Special Apparatus

Chromatographic column, 20 mm x 150 mm (Fisher & Porter Cat. #274-457).

Vacuum filter holder, 2.5 cm^2 filter area

Filter paper, Whatman #42, 24 mm

Mylar

Polyester gummed tape, 1 1/2", Scotch #853

Drying oven

A. Ion Exchange Procedure

1. Set up an ion exchange column of 20 mm diameter and 150 mm length.

2. Pour 20 ml of a slurry of Dowex 1 x 8, Cl^- form (50-100 mesh) into the column and wash down sides with water. Add 2 ml of I^- carrier to 2 liters milk, stir for 20 minutes.

3. Pass the sample through the ion exchange column at a flow rate of 20 ml/min. Save the effluent for other analyses and label it "iodine effluent".

4. Wash column with 500 ml of hot distilled water for milk samples or 200 ml of distilled water for water samples. Discard wash.

5. Wash column with 100 ml of 2 M NaCl at a flow rate of 4 ml/min. Discard wash.

6. Drain the solution from the column.

7. Measure 50 ml 5% sodium hypochlorite in a graduated cylinder. Add sodium hypochlorite to column in 10-20 ml increments, stirring resin as needed to eliminate gas bubbles and maintain flow rate of 2 ml/min. Collect eluate in 250-ml beaker and discard the resin.

B. Iodine Extraction Procedure

1. Acidify the eluate from step 7 using concentrated HNO_3 to make the sample 2-3 N in HNO_3, and transfer to 250 ml separatory funnel. (Add the acid slowly with stirring until the vigorous reaction subsides.) Volume of concetrated HNO_3 required will depend on eluate volume as follows):

Section 3.9 (continued)

B. Iodine Extraction Procedure (continued)

eluate volume (ml)	concentrated HNO_3 (ml)
50-60	10
60-70	12
70-80	14
80-90	16

2. Add 50 ml of CCl_4 and 10 ml of 1 M hydroxylamine hydrochloride (freshly prepared). Extract iodine into organic phase (about 2 minutes equilibration). Draw off the organic phase (lower phase) into another separatory funnel

3. Add 25 ml of CCl_4 and 5 ml of 1 M hydroxylamine hydrochloride to the first separatory funnel and again equilibrate for 2 minutes. Combine the organic phases. Discard the aqueous phase (Upper phase) if not other analyses are required. If Pu, U or Sr is required on the same sample aliquot, submit the aqueous phase and data sheet to the approprate laboratory section.

4. Add 20 ml H_2O-HNO_3-NH_2OH HCl wash solution to the separatory funnel containing the CCl_4. Equilibrate 2 minutes. Allow phases to separate and transfer CCl_4 (lower phase) to a clean separatory funnel. Discard the wash solution.

5. Add 25 ml H_2O and 10 drops of 1 M sodium bisulfite (freshley prepared) to the separatory funnel containing the CCl_4. Equilibrate for 2 minutes. Discard the organic phase (lower phase). Drain aqueous phase (upper phase) into a 100-ml beaker. Proceed to the Precipitation of PdI_2.

C. Precipitation of Palladium Iodide

CAUTION: AMMONIUM HYDROXIDE INTERFERES WITH THIS PROCEDURE

1. Add 10 ml of 3 N HCl to the aqueous phase from the iodine extraction procedure in step 5.

2. Place the beaker on a stirrer-hot plate. Using the magnetic stirrer, boil and stir the sample until it evaporates to 30 ml or begins to turn yellow.

3. Add 1.0 ml of 20 mg Pd^{++}/ml palladium chloride per liter of milk, used dropwise, to the solution.

Section 3.9 (continued)

C. Precipitation of Palladium Iodide (continued)

4. Turn the heat off, but continue to stir the sample until it cools to room temperature. Place the beaker in a stainless steel tray and put in the refrigerator overnight.

5. Weigh a clean 24 mm Whatman #42 filter which has been stored over silica gel in a desiccator.

6. Place the weighed filter in the filter holder. Filter the sample and wash the residue with 1 N HI1 and then with absolute alcohol.

7. Remove filter from filter holder and place it on a watch glass.

8. Dry under the lamp for 20 minutes.

9. Cut a 1 1/2" strip of polyester tape and lay it on a clean surface, gummed side up. Place the filter, precipitate side up, in the center of the tape.

10. Cut a 1 1/2" wide piece of mylar. Using a spatula to press it in place, put it directly over the precipitate and seal the edges to the polyester tape. Trim to about 5 mm from the edge of the filter with scissors.

11. Mount the sample on the plastic disc and write the sample number on the back side of the disc.

12. Count the sample on a proportional beta counter.

Calculations

Calculate the sample activity using computer program OIOD131.

Reference: "Determination of 1-131 by Beta-Gamma coincidence Counting of PdI_2". Radiological Science Laboratory. Division of Laboratories and Research, New York State Department of Health, March 1975, Revised February 1977.