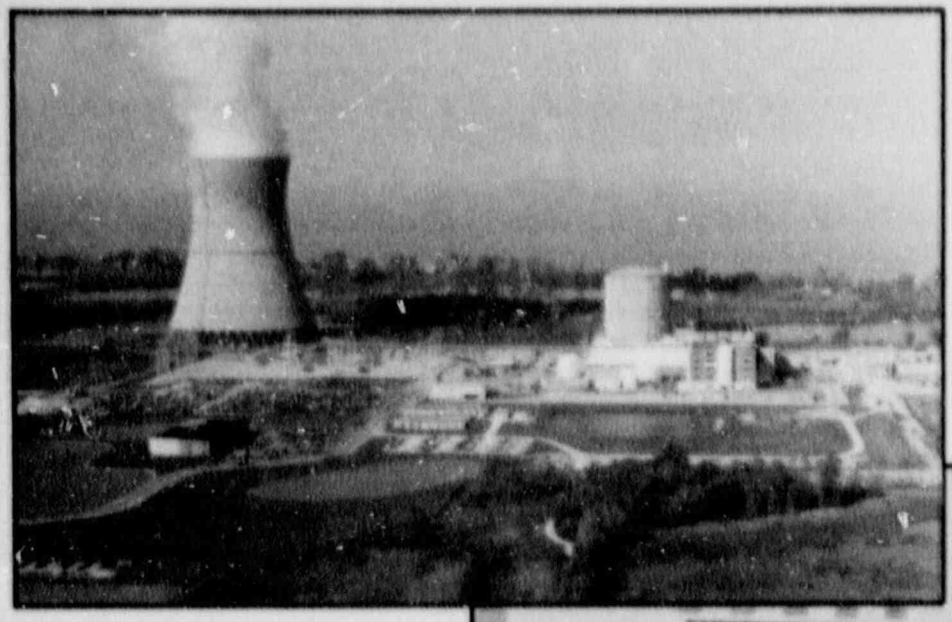
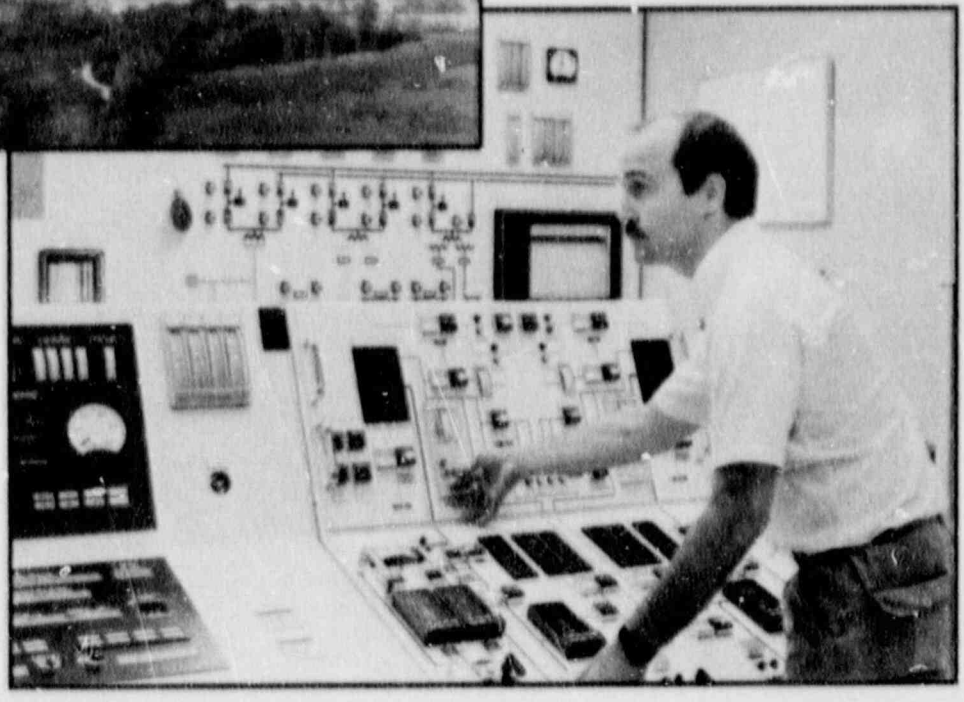
The Davis-Besse Nuclear Power Station
Revision to the
Semiannual Report:
Effluent and Waste Disposal January 1-June 30, 1989





TOLEDO EDISON

Environmental Compliance
DAVIS-BESSE NUCLEAR POWER STATION

*DAVIS-BESSE NUCLEAR POWER STATION
Environmental Compliance Department

Revision 1 to The Semiannual Report: Effluent and Waste Disposal

Davis-Besse
Nuclear Power Station
Unit No. 1
January 1, 1989 through June 30, 1989

Docket Number 50-346
License Number NPF-3

Toledo Edison Company
300 Madison Avenue
Toledo, Ohio 43652

October 1989

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Summary

The Semiannual Effluent and Waste Disposal Report is a detailed listing of radioactivity released from the Davis-Besse Nuclear Power Station within a six month period. This report, for the January 1 - June 30, 1989 period, differs from previous semiannual reports in that it was prepared primarily for technically-oriented readers (specifically, the Nuclear Regulatory Commission and fellow industry members), and does not include basic background information found in reports from the past two semiannual periods. Generic information about topics discussed in this and future semiannual reports will be presented in less technical language in future Annual Environmental Operating Reports. These reports are available to the public in many local and university libraries.

This report provides the following information for the period January 1 through June 30, 1989:

- Summation of the quantities of radioactivity released in gaseous and liquid effluents.
- Summation of the quantities of radioactivity contained in solid waste packaged and shipped for offsite disposal at federally approved sites.
- Listing of all radioactive effluent monitoring instrumentation that is required by Technical Specifications, but was inoperable for more than 30 days.
- Changes to the Offsite Dose Calculation Manual (ODCM).
- Changes to Radiological Environmental Monitoring Program sample collection locations listed in the ODCM.

Most of the radioactivity associated with an operating nuclear power station is contained within the station itself. However, during normal operation, a small amount of radioactivity is found in gaseous and liquid wastes. The station's waste processing systems provide for the storage and recycling of wastes, and removal of most of the radioactivity present. The U.S. Nuclear Regulatory Commission (NRC) requires nuclear power stations to be designed, constructed and operated so that the amount of radioactivity released to unrestricted areas (areas outside

the site boundary) is kept "as low as reasonably achievable," or ALARA. To ensure this objective is met, both the NRC and Davis-Besse have established limits governing the release of radioactivity.

The radiation dose to the public is calculated for each release using the concentration of radioactivity and the weather conditions present at the time of the release. During the period of January 1 through June 30, 1989, the maximum individual offsite dose due to radioactivity released in effluents was approximately:

Liquid Effluents:

- 0.03 mrem, whole body
- 0.04 mrem, liver

Gaseous Effluents:

Noble Gas:

- 0.003 mrem, whole body
- 0.008 mrem, skin

Iodine-131, tritium, and particulates with half-lives greater than 8 days:

- 0.002 mrem, whole body
- 0.05 mrem, thyroid

These doses are only a small fraction of the limits set by the Davis-Besse Technical Specifications (see Table 1). The highest whole body dose to the public during this semiannual period was approximately 0.03 mrem from liquid releases. This represents approximately 1% of the Technical Specifications limit.

Table 1: Dose limits to members of the public imposed by Davis-Besse's Technical Specifications

Source	Limit
Liquid Effluents	
Any source	less than or equal to 3 mrem/year to the whole body and less than or equal to 10 mrem/year to any organ
Gaseous Effluents	
Noble Gas	
gamma	less than or equal to 10 mrem/year
beta	less than or equal to 20 mrem/year
Iodine-131, tritium, and particulates with half-lives greater than 8 days	less than or equal to 15 mrem/year to any organ

The maximum hypothetical whole body dose received by any individual from effluents from the Davis-Besse Nuclear Power Station for the latest reporting period is 1400 times lower than the dose the average individual in the Oak Harbor, Ohio area received from natural background sources during the same time period. Whole body dose due to natural background sources (cosmic and terrestrial) averages about 13 mrem per quarter in the Oak Harbor area. The average equivalent dose in the United States from natural radon is about 50 mrem per quarter, for a total of approximately 252 mrem per year from background sources.

Figure 1 presents a comparison of the Davis-Besse Technical Specifications dose limits and the doses due to effluents released from Davis-Besse since operation began in August, 1977 through the end of the second quarter of 1989.

In 1981, mechanical damage to two steam generator tubes resulted in a small amount of radioactive water leaking into the secondary system. Some of this

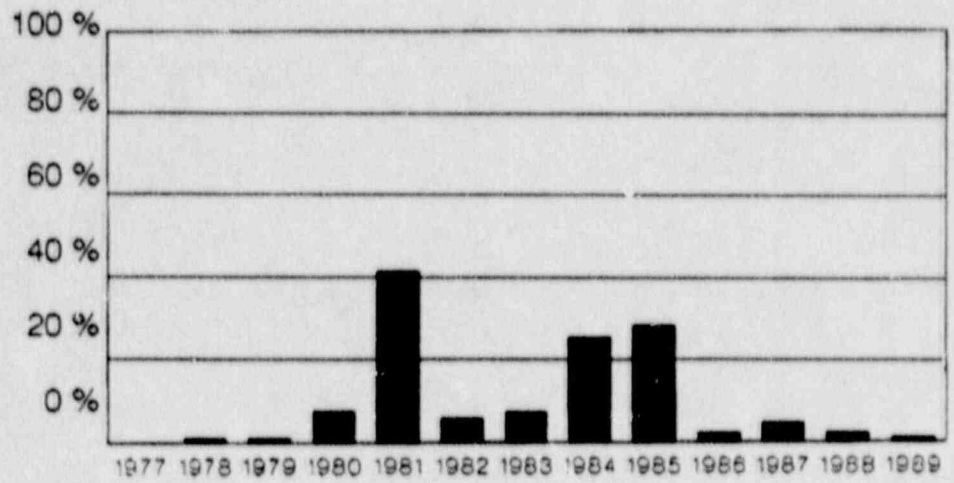

Figure 1: Comparison of the maximum individual dose to members of the public since Davis-Besse began operation versus the maximum individual dose allowed by the Davis-Besse Technical Specifications.

water from the secondary side was released in station effluents. This caused an increase in the radioactivity released in effluents. However, the resulting dose to the public was less than 50% of the Technical Specifications dose limits. The increased offsite doses in 1984 and 1985 were associated with the liquid radioactive waste processing methods. As in 1981, the resultant doses were substantially less than the Technical Specifications limits.

Prior to January 1, 1989, a small leak appeared in one of the two steam generators, and continued throughout the reporting period. Although the steam generator leak occurred before January 1, 1989, it had no significant impact on effluent releases during earlier reporting periods, and therefore was not discussed in previous Semiannual Effluent and Waste Disposal Reports.

The steam generator leak is specifically identified in this report because attempts to locate the leak during the previous refueling outage were unsuccessful due to the small size of the leak. Despite its small size, the leak allowed a small fraction of the radioactivity present in the primary coolant to be transferred to the secondary loop.

Although the steam generator leak has contributed to the total whole body dose to the public during this six-month period, the whole body dose has remained less than 3 % of the quarterly Technical Specifications limits. At all times the water in the tertiary loop (leaving the cooling tower) has remained non-radioactive.

Effluent Results for the Period January 1 - June 30, 1989

Gaseous Effluents

Radioactivity released in gaseous effluents from Davis-Besse is classified into two categories:

- Noble gas
- Iodine-131, tritium, and particulates with half-lives greater than eight days

During the first six months of 1989, 162 curies of noble gas and 9.1 curies of iodine-131, tritium, and particulates with half-lives greater than eight days were released in gaseous effluents. The resulting whole body dose from these releases was less than 0.5% of the Davis-Besse Technical Specifications dose limits for gaseous effluents during the first two quarters of 1989 (See Table 2).

Liquid Effluents

Radioactivity in liquid effluents consists of dissolved and/or suspended radioactive fission and activation products, tritium, and entrained gasses. During the first and second quarters of 1989, approximately 0.16 curies of fission and activation products, 78.5 curies of tritium, and 0.09 curies of dissolved and entrained gases were released in liquid effluents. The resultant whole body dose due to the radioactivity present in liquid effluents was approximately 1% of the limits set by the Davis-Besse Technical Specifications. Table 3 summarizes the doses due to radioactivity released in liquid effluents during the the first two quarters of 1989.

Solid Waste Shipments

For the six month period of January 1 through June 30, 1989, there were 2 shipments of solid waste to Barnwell, South Carolina, a licensed low-level radioactive

Table 2: Dose to a Member of the Public: Percent of Gaseous Effluent Technical Specifications Limits

	Limit	January -June 1989 Releases	Percent of limit
Noble Gas -- Gamma			
First Quarter	5.0 mrem/qtr	0.002 mrem/qtr	0.04%
Second Quarter	5.0 mrem/qtr	0.001mrem/qtr	0.02%
Noble Gas -- Beta			
First Quarter	10.0 mrem/qtr	0.006 mrem/qtr	0.06%
Second Quarter	10.0 mrem/qtr	0.004 mrem/qtr	0.04%
Iodine, tritium and particulates with half-lives greater than eight days			
First Quarter	7.5 mrem/qtr	0.025 mrem/qtr	0.33%
Second Quarter	7.5 mrem/qtr	0.023 mrem/qtr	0.31%

Table 3: Dose to a Member of the Public: Percent of Liquid Effluent Technical Specifications Limits

	Limit	January-June 1989 Releases	Percent of Limit
Whole Body			
First Quarter	1.5 mrem/qtr	0.012 mrem/qtr	0.80%
Second Quarter	1.5 mrem/qtr	0.018 mrem/qtr	1.20%
Any Organ			
First Quarter	5.0 mrem/qtr	0.016 mrem/qtr	0.32%
Second Quarter	5.0 mrem/qtr	0.025 mrem/qtr	0.50%

waste storage facility. The shipments consisted of 23.3 cubic meters of waste such as spent resins, filter sludges, and evaporator bottoms; and 26.1 cubic meters of dry compressible waste, such as cotton work gloves and paper coveralls, and contaminated equipment. The total activity of the shipments combined was 1.37 curies. Table 6 of Appendix B provides greater detail of the solid waste shipments during the first and second quarters of 1989.

Radiological Impact of Davis-Besse

Routine nuclear power station operation normally results in releases of small concentrations of radioactivity in liquid and gaseous effluents. These effluents are closely monitored before and during release, and are limited by federal regulations. Over time, the small concentrations of radioactive materials in the effluents naturally decay into non-radioactive substances.

The annual dose to the public due to operation of Davis-Besse is typically several orders of magnitude less than the annual dose the average American receives from background sources. In fact, even if Davis-Besse reached 100% of the federal limits for radioactive releases, the dose to the public would still be less than the average dose due to background sources.

For the period January 1 through June 30, 1989, the maximum whole body dose to the public was less than 3% of the quarterly limits set by the Davis-Besse Technical Specifications. Since operation began in 1977, Davis-Besse has had no significant radiological impact on the surrounding environment.

Sources of Further Information

If you would like additional information on the material discussed in this report, or information on the Davis-Besse Nuclear Power Station or the Annual Environmental Operating Report, contact:

Davis-Besse Environmental Compliance
M.S. 3360
300 Madison Avenue
Toledo, Ohio 43652
(419) 321-7146

Appendices

Appendix A

Supplemental Information

1. REGULATORY LIMITS

A. Gaseous Effluents

1. Dose rates due to radioactivity released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:

   a. Noble gases - Less than or equal to 500 mrem/year to the total body

      - Less than or equal to 3000 mrem/year to the skin.

   b. Iodine-131, tritium, and all radionuclides in particulate form with half-lives greater than 8 days.

      - Less than or equal to 1500 mrem/year to any organ.

2. Air dose due to noble gases released in gaseous effluents to areas at and beyond the site boundary shall be limited to the following:

   a. Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation during any calendar quarter.

   b. Less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation during any calendar year.

3. Dose to a member of the public (from iodine-131, tritium, and all radionuclides in particulate form with half-lives greater than 8 days) in gaseous effluents released to areas at and beyond the site boundary shall be limited to the following:

   a. Less than or equal to 7.5 mrem to any organ during any calendar quarter.

   b. Less than or equal to 15 mrem to any organ during any calendar year.

B. Liquid Effluents

1. The concentration of radioactivity released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in Title 10 of the Code of Federal Regulations, Part 20 (Standards for Protection Against Radiation), Appendix B, Table II, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.0E-04 (0.0002) microcurie/milliliter (μCi/ml) total activity.

2. The dose or dose commitment to a member of the public from radioactivity in liquid effluents released to unrestricted areas shall be limited to:

   a. Less than or equal to 1.5 mrem to the total body and less than or equal to 5 mrem to any organ during any calendar quarter.

   b. Less than or equal to 3 mrem to the total body and less than or equal to 10 mrem to any organ during any calendar year.

2. MAXIMUM PERMISSIBLE CONCENTRATION

A. Liquids

1. The maximum permissible concentrations (MPC) for liquids are those listed in 10 CFR 20, Appendix B, Table II, Column 2, with the most restrictive MPC being used in all cases. For dissolved and entrained gases the MPC of 2.0E-4 μCi/ml is applied. This MPC is based on the Xe-135 MPC in air (submersion dose) converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP), Publication 2.

B. Gaseous

1. The maximum permissible dose rates for gaseous releases are defined in plant Technical Specifications.

   a. Technical Specification 3.11.2.1.a (Dose rate at site boundary from gaseous effluents in the form of noble gases)

      - Less than or equal to 500 mrem/year to the total body.
      - Less than or equal to 3000 mrem/year to skin.

   b. Technical Specification 3.11.2.1.b (iodine-131, tritium, and particulates with half-lives greater than 8 days)

      - Less than or equal to 1500 mrem/year to any organ.

3. AVERAGE ENERGY

The Davis-Besse Technical Specifications limit the dose equivalent rates due to the release of fission and activation products to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin. Therefore, the average beta and gamma energies (E) for gaseous effluents as described in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous effluents from Light-Water-Cooled Nuclear Power Plants," is not applicable.

4. MEASUREMENTS AND APPROXIMATIONS OF TOTAL ACTIVITY

A. Fission and Activation Gases:

1. These gases, excluding tritium, are collected in a marinelli beaker specially modified for gas sampling, steel bombs, or glass vials and counted on a germanium detector for principal gamma emitters. Detected radionuclides are quantified via computerized gamma spectroscopy.

2. Tritium gas is collected using a bubbler apparatus and counted by liquid scintillation.

B. Iodines are collected on a charcoal cartridge filter, and counted on a germanium detector. Specific quantification of each radioiodine radionuclide is made by computerized gamma spectroscopy.

C. Particulates are collected on filter paper and counted on a germanium detector. Specific quantification of each radionuclide present on the filter paper is made by computerized gamma spectroscopy.

D. Liquid Effluents are collected in a marinelli beaker and counted on a germanium detector. Specific quantification of each radionuclide present in liquid samples is made by computerized gamma spectroscopy.

5. **BATCH RELEASES**

A. Liquid

1. Number of batch releases: 85

2. Total time period for the batch releases: 1.35E+02 hours

3. Maximum time period for a batch release: 2.45E+02 minutes

4. Minimum time period for a batch release: 5.70E+01 minutes

5. Average time period for batch releases: 9.56E+01 minutes

B. Gaseous

1. Number of batch releases: 7

a. Number of containment purges: 0

b. Number of waste gas decay tank releases: 7

c. Number of containment pressure releases: 0

2. Total time period for the batch releases: 2.55E+01 hours

3. Maximum time period for a batch release: 2.75E+02 minutes

4. Minimum time period for a batch release: 1.78E+02 minutes

5. Average time period for batch releases: 2.18E+02 minutes

6. ABNORMAL RELEASES

There were nine abnormal releases during the semiannual period of January through June, 1989. The activity released, as well as the projected doses are maximum calculated values.

Each release is summarized below. The concentrations of radioactivity released and the meteorological data for these releases have been included in the appropriate tables in this report. The projected doses for these releases were well below the Davis-Besse Technical Specifications limits.

A. First Quarter Auxiliary Feed Pump

During the first quarter of 1989, steam containing radioactivity from the secondary cooling system was released through the auxiliary feed pump exhaust. During periodic testing of these pumps, the steam used for their power source is emitted through the vents. The total activity released was 5.66E+01 mCi. The highest projected offsite dose is 3.56E-06 millirem to the thyroid of an adult at the receptor location for the duration of the testing for a quarter year. This is less than one thousandth of one percent of the Davis-Besse quarterly Technical Specifications limit.

B. January Main Steam Safety and Atmospheric Vent Valve Systems

In January 1989, steam containing radioactivity was released through the main steam safety system and through the atmospheric vent valve system during pressure reduction in the secondary cooling system. The total activity released was 1.10E+01 mCi. The highest projected offsite dose is 5.93E-04 millirem to the thyroid of a child at the most restrictive receptor location in the NE sector, which is well below the Technical Specifications limit.

C. March Atmospheric Vent Valve System

In March 1989, steam containing radioactivity was released through the atmospheric vent valve system during pressure reduction in the secondary cooling system. The total radioactivity released was 7.07E+01 mCi. The highest projected average dose rate was 4.71E-01 millirem per year at the site boundary (inhalation dose rate to a child thyroid in the WNW sector). This is less than 0.1 percent of the Davis-Besse Quarterly Technical Specifications limit. The highest cumulative total body dose was 9.0E-04 millirem to an adult in the N sector at 870 meters from the release point. This dose is less than 1.4E-02% of the Davis-Besse quarterly Technical Specifications limit for this pathway. The highest organ dose for this release was 1.39E-02 millirem, which is approximately 1.9E-04% of the quarterly Technical Specifications limit.

D. First Quarter Atmospheric Vent Valve System

During the first quarter of 1989, steam containing radioactivity was released through the atmospheric vent valve system due to leakage from

the secondary cooling system. During normal operations a small fraction of the steam produced in the steam generators is lost due to leaking atmospheric vent valves and emitted through the vents. The total activity released was 4.66E+02 mCi. The highest projected offsite dose is 3.91E-05 millirem to the thyroid of a child. This is less than one thousandth of one percent of the quarterly Technical Specifications limit.

E. Second Quarter Atmospheric Vent Valve System

During the second quarter of 1989, steam containing radioactivity was released through the atmospheric vent valve system due to leakage from the secondary cooling system. During the second quarter, a total activity of 8.99E+02 mCi was released via the leakage.

The highest projected offsite dose is 1.98E-04 millirem to the thyroid of a child. This is less than 3.0E-03 percent of the quarterly Technical Specifications limit.

F. Second Quarter Auxiliary Feed Pump

During periodic testing of the auxiliary feed pumps in the second quarter of 1989, steam containing radioactivity from the secondary cooling system was released through the auxiliary feed pump exhaust. A total activity of 9.12E+01 mCi was released. The highest offsite dose projection was 2.4E-05 millirem to a child. This is less than 3.0E-03 percent of the quarterly Technical Specifications limit.

G. June Seal Injection Filter Leakage

On June 1, 1989, a buildup of noble gas in the fuel handling building, as a result of leakage from the seal injection filter, was discovered. The noble gas was released via the station vent. The total activity released was 1.49E+03 mCi. The highest projected offsite whole body dose is 3.61E-03 millirem, which is less than one thousandth of one percent of the Technical Specifications limit.

H. Second Quarter Liquid Release Via the South Settling Basin

During the second quarter of 1989, water containing radioactivity from the secondary cooling system was released to the south settling basin and subsequently to Lake Erie. A total activity released was 7.21E+03 mCi. The calculated dose is extremely small when compared to the dose limits for the liquid release pathway. The highest dose to any organ was calculated to be 1.63E-03 millirem to the thyroid. This dose is approximately 3.3E-02 percent of the quarterly Technical Specifications limit.

I. Second Quarter Liquid Release via the Training Center Pond

During the first and second quarters of 1989, water containing radioactivity was released to the onsite Training Center Pond. In the second quarter, the Training Center Pond water flowed to Pool #3 of the

Davis-Besse Marsh and then was released to the Toussaint River. This water was from a normal flow path from the turbine building sump and drainage from the auxiliary boiler system. The low activity concentration detected in this water was due to minor leakage from the primary to the secondary system that existed during this period.

A total volume of 1.73E+07 gallons was conservatively estimated to have been released to the Toussaint River. This estimation was based on the assumption that pumps at the release point were operating at maximum output during the entire release period of 288 hours between June 16 and June 28, 1989. The estimated activity released was 5.44E+01 mCi. The highest projected offsite whole body dose was 1.86E-04 millirem, which is 1.2E-02% of the quarterly Technical Specifications limit.

Activity concentrations and the corresponding dose for each of the radionuclides identified by analysis were calculated in accordance with the methodology of the Offsite Dose Calculation Manual (ODCM). To determine the activity concentration of Pool #3, a sample was taken from the auxiliary boiler and applied to a mathematical model based on compartmental flow from the auxiliary boiler. Neither physical settling, bioaccumulation, or evaporation were considered; it was assumed that all tritium and iodine remained in solution with the initial activity concentration of each pool equal to zero. The activity was decay-corrected in the model to account for both hold up and flow duration from pond to pond. The calculated activity concentration values, along with volume estimates and a release duration were then entered into ODCM equation 2-10, and a conservative offsite dose value was calculated.

7. PERCENT OF TECHNICAL SPECIFICATIONS LIMITS

The following table presents the Technical Specifications limits and the amount of radioactivity, in percent of limits, released during January through June, 1989 (including abnormal releases).

SPECIFICATION	LIMIT	PERCENT OF LIMITS
A. Quarterly: Gaseous First Quarter, 1989		
Noble gases (gamma)	5.0 mrad/qtr	4.29E-02
Noble gases (beta)	10.0 mrad/qtr	6.34E-02
I-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days	7.5 mrem/qtr	3.28E-01
B. Quarterly: Gaseous Second Quarter, 1989		
Noble gases (gamma)	5.0 mrad/qtr	2.61E-02
Noble gases (beta)	10.0 mrad/qtr	3.81E-02
I-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days	7.5 mrem/qtr	3.13E-01

SPECIFICATION	LIMIT	PERCENT OF LIMITS
C. Calendar year: Gaseous		
Noble gases (gamma)	10.0 mrad/year	3.45E-02
Noble gases (beta)	20.0 mrad/year	5.08E-02
I-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days	15.0 mrem/year	3.21E-01
D. Quarterly: Liquid First Quarter, 1989		
Total body	1.5 mrem/qtr	7.95E-01
Any organ (liver)	5.0 mrem/qtr	3.24E-01
E. Quarterly: Liquid Second Quarter, 1989		
Total body	1.5 mrem/qtr	1.22E+00
Any organ (liver)	5.0 mrem/qtr	5.04E-01
F. Calendar year: Liquid		
Total body:	3.0 mrem/year	1.00E+00
Any organ (liver)	10.0 mrem/year	4.17E-01

8. **DOSE ASSESSMENT**

Sources of input data include:

A. Water Usage: Appendix I analysis, NRC Docket 50-346, "Evaluation of Compliance with Appendix I to 10 CFR 50, June 4, 1976, Davis-Besse Nuclear Power Station."

B. 0-50 mile meat, milk, vegetable production, and population data: 1982 Annual Environmental Operating Report, report entitled, "Evaluation of Compliance with Appendix I to 10 CFR 50: Updated Population, Agricultural, Meat - Animal, and Milk Production Data Tables for 1982." This evaluation was based on the 1980 census; the Agricultural Ministry of Ontario 1980 report entitled, "Agricultural Statistics and Livestock Marketing Account, 1980"; the Agricultural Ministry of Ontario 1980 report entitled, "Agricultural Statistics for Ontario - 1980 Publication 21, 1980"; the Michigan Department of Agriculture, July, 1981 report entitled, "Michigan Agricultural Statistics, 1981"; the Ohio Crop Reporting Service, 1981 report entitled, "Ohio Agricultural Statistics, 1981."

C. Gaseous and liquid source terms: Appendix B of this report, Tables 1, 3, 4, and 5.

D. Location of the nearest individuals and pathways by sector out to 5 miles: Report entitled, "1988 Land Use Census," included in the 1988 Annual Environmental Operating Report.

Appendix B (of this report) Table 7, Section A, presents the maximum dose computed from the noble gas effluents for each quarter and the dose resulting from gaseous iodine, tritium, and particulate effluents. Doses resulting from liquid releases are presented in Appendix B, Table 7, Section B.

9. DOSE TO PUBLIC DUE TO ACTIVITIES INSIDE THE SITE BOUNDARY

In accordance with Technical Specification 6.9.1.11, the Semiannual Effluent and Waste Disposal Report submitted within 60 days after January 1 of each year shall include an assessment of radiation doses from radioactivity released in liquid and gaseous effluents to members of the public due to their activities inside the site boundary.

In special instances, members of the public are permitted access to the radiologically controlled area within the Davis-Besse station. Tours for the public are conducted with the assurance that no individual will receive an appreciable dose (i.e., not more than a small fraction of the 40 CFR 190 dose standards).

The Visitor Center located inside the Davis-Besse Administration Building (DBAB) is also accessible to members of the public. Considering the frequency and duration of the visits, the resultant dose would be a small fraction of the calculated maximum site boundary dose. The dose from gaseous effluents as modeled for the DBAB Visitor Center is considered the controlling factor when evaluating doses to members of the public from activities inside the site boundary. For purposes of assessing the dose to members of the public in accordance with Technical Specification 6.9.1.11, the following exposure assumptions may be used:

- Exposure time for maximum exposed visitor of 20 hours (4 visits, 5 hours per visit).*

- Annual average meteorological dispersion (conservative, default use of maximum site boundary dispersion).

The equations in the ODCM may be used for calculating the potential dose to a member of the public for activities inside the site boundary. Based on these assumptions, this dose would be at least a factor of 400 less than the maximum site boundary air dose as calculated in the ODCM.

There are no areas onsite accessible to the public where exposure to liquid effluents could occur. Therefore, the modeling of the ODCM conservatively estimates the maximum potential dose to members of the public.

10. INOPERABLE RADIOACTIVE EFFLUENT MONITORING EQUIPMENT

There was no radioactive effluent monitoring equipment, required to be operable by Davis-Besse's Technical Specifications Sections 3.3.3.9 and 3.3.3.10, inoperable for more than 30 days.

* Based on a maximum conservative estimate

Appendix B

Effluent Data Tables

TABLE 1

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

	TYPE	UNIT	FIRST QUARTER	SECOND QUARTER	EST. TOTAL PERCENT ERROR
A.	Fission and Activation Gases				
	1. Total Release	Ci	1.02E+02	6.03E+01	2.50E+01
	2. Average Release Rate for Period	uCi/sec	1.31E+01	7.75E+00	
	3. Percent of Technical Specifications Limits	%	See App. A, Section 7		
B.	Iodines				
	1. Total Iodine	Ci	1.56E-03	1.68E-03	2.50E+01
	2. Average Release Rate for Period	uCi/sec	2.01E-04	2.16E-04	
	3. Percent of Technical Specifications Limits	%	See App. A, Section 7		
C.	Particulates				
	1. Particulates with half-lives greater than 8 days	Ci	8.74E-05	2.15E-01	2.50E+01
	2. Average Release Rate for Period	uCi/sec	1.12E-05	2.76E-02	
	3. Percent of Technical Specifications Limits	%	See App. A, Section 7		
	4. Gross Alpha Activity	Ci	1.96E-07	1.31E-07	2.50E+01
D.	Tritium				
	1. Total Release	Ci	4.71E+00	4.20E+00	2.50E+01
	2. Average Release Rate for Period	uCi/sec	6.06E-01	5.40E-01	
	3. Percent of Technical Specifications Limits	%	See App. A, Section 7		

TABLE 2

GASEOUS EFFLUENTS - ELEVATED RELEASE*

			CONTINUOUS MODE		BATCH MODE	
	NUCLIDES	UNIT	FIRST QUARTER	SECOND QUARTER	FIRST QUARTER	SECOND QUARTER
1.	Fission Gases	Ci	N/A	N/A	N/A	N/A
2.	Iodines	Ci	N/A	N/A	N/A	N/A
3.	Tritium	Ci	N/A	N/A	N/A	N/A
4.	Particulates	Ci	N/A	N/A	N/A	N/A

* Not applicable, all releases are classified as mixed mode releases.

TABLE 3

GASEOUS EFFLUENTS - MIXED MODE RELEASES

NUCLIDES	UNIT	CONTINUOUS MODE FIRST QUARTER	CONTINUOUS MODE SECOND QUARTER	BATCH MODE FIRST QUARTER	BATCH MODE SECOND QUARTER	ABNORMAL FIRST QUARTER	ABNORMAL SECOND QUARTER
1. Fission Gases	Ci						
Ar-41		N/A	N/A	N/A	N/A	1.52E-06	1.52E-06
Kr-85		N/A	N/A	6.01E-01	7.09E-01	N/A	N/A
Kr-85m		N/A	N/A	N/A	N/A	2.85E-03	2.70E-03
Kr-87		N/A	N/A	N/A	N/A	1.56E-03	1.56E-03
Kr-88		N/A	N/A	N/A	N/A	3.42E-03	3.42E-03
Xe-131m		N/A	N/A	2.82E-02	1.35E-01	2.34E-03	2.34E-03
Xe-133		9.43E+01	5.44E+01	6.52E+00	2.96E+00	2.63E-01	1.52E+00
Xe-133m		N/A	N/A	1.97E-01	1.20E-02	2.58E-03	2.58E-03
Xe-135		3.10E-01	5.32E-01	N/A	4.26E-03	1.83E-02	1.61E-02
Xe-135m		N/A	N/A	N/A	N/A	6.29E-03	5.63E-03
Xe-138		N/A	N/A	N/A	N/A	2.33E-03	2.33E-03
Total for period:		9.46E+01	5.49E+01	7.35E+00	3.82E+00	3.03E-01	1.55E+00
2. Iodines	Ci						
I-131		4.52E-04	1.07E-03	N/A	N/A	4.19E-04	3.39E-06
I-132		N/A	1.42E-04	N/A	N/A	6.38E-05	N/A
I-133		2.73E-04	2.08E-04	N/A	N/A	1.71E-04	1.62E-06
I-135		7.92E-05	2.51E-04	N/A	N/A	1.02E-04	N/A
Total for period:		8.04E-04	1.67E-03	N/A	N/A	7.56E-04	5.01E-06
3. Tritium	Ci	4.39E+00	3.46E+00	1.67E-02	2.90E-02	3.00E-01	7.10E-01
4. Particulate	Ci						
Na-24		N/A	N/A	N/A	N/A	2.93E-06	N/A
Rb-88		N/A	N/A	N/A	N/A	N/A	2.11E-01
Tc-99m		N/A	N/A	N/A	N/A	1.88E-06	N/A
Cs-134		N/A	N/A	N/A	N/A	2.53E-05	N/A
Cs-136		N/A	N/A	N/A	N/A	7.40E-06	N/A
Cs-137		N/A	N/A	N/A	N/A	4.79E-05	N/A
Cs-138		N/A	N/A	N/A	N/A	N/A	3.62E-03
Ba-140		N/A	N/A	N/A	N/A	1.94E-06	N/A
Total for period:		N/A	N/A	N/A	N/A	8.74E-05	2.15E-01

TABLE 3 (continued)

GASEOUS EFFLUENTS - MIXED MODE RELEASES

NUCLIDES	UNIT	FIRST QUARTER	SECOND QUARTER
3. Strontium	Ci		
Quarterly composite From station vent			
Sr-89		<2.95E-07	<2.00E-07
Sr-90		<7.37E-08	≤3.61E-08

TABLE 4

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A.	Fission and Activation Products				
	1. Total Release (without Tritium, Gases, Alpha)	Ci	1.48E-01	2.45E-02	1.00E+01
	2. Average Diluted Concentration During Period	uCi/ml	7.36E-07	5.92E-08	
	3. Percent of Technical Specifications Limit	%	see App. A, Section 7		
	4. Percent of 10CFR20 Limit	%	2.39E+00	8.84E-01	
B.	Tritium				
	1. Total Release	Ci	2.38E+01	5.47E+01	1.00E+01
	2. Average Diluted Concentration During Period	uCi/ml	1.19E-04	1.18E-04	
	3. Percent of 10CFR20 Limit	%	3.96E+00	4.50E+00	
C.	Dissolved and Entrained Gases				
	1. Total Release	Ci	8.43E-03	8.34E-02	1.00E+01
	2. Average Diluted Concentration During Period	uCi/ml	4.20E-08	2.07E-07	
	3. Percent of Limit (2.0E-04 uCi/ml)	%	2.10E-02	1.03E-01	
D.	Gross Alpha				
	1. Total Release	Ci	1.03E-05	1.46E-05	1.00E+01
E.	Volume of Waste Released (prior to dilution)	liters	7.63E+05	1.61E+06	1.00E+01
F.	Volume of Dilution Water (used during period)	liters	2.01E+08	4.04E+08	1.00E+01

TABLE 5

LIQUID EFFLUENTS - NUCLIDES RELEASED

NUCLIDES	CONTINUOUS MODE* FIRST QUARTER	CONTINUOUS MODE* SECOND QUARTER	BATCH MODE (Ci)*** FIRST QUARTER	BATCH MODE (Ci)*** SECOND QUARTER
Na-24			N/A	4.99E-06
Mn-54			4.97E-04	2.27E-05
Fe-55**			2.67E-02	1.11E-02
Co-57			4.93E-04	N/A
Co-58			2.11E-02	6.10E-04
Co-60			4.69E-02	3.65E-03
Sr-89**			<3.81E-05	<4.83E-05
Sr-90**			9.92E-06	<1.29E-05
Zr-95			4.88E-05	N/A
Zr-97			2.27E-03	1.96E-04
Nb-97			N/A	1.97E-06
Mo-99			3.50E-04	1.63E-05
Tc-99m			9.35E-04	1.93E-04
Ru-106			N/A	2.35E-05
Ag-110m			4.38E-02	4.68E-03
Sb-125			2.92E-03	4.35E-04
Sn-113			1.06E-04	4.09E-05
I-131			3.56E-04	1.50E-03
I-133			3.14E-05	2.13E-04
I-135			N/A	9.83E-06
Ba-133			N/A	2.00E-06
Cs-134			1.95E-04	4.88E-04
Cs-137			8.83E-04	1.30E-03
Ce-144			5.46E-04	9.79E-06
W-187			N/A	6.98E-06
Total for period:			1.48E-01	2.45E-02

*Not applicable, all radioactivity in liquid effluents is released by batch mode
** Quarterly composite
***Includes abnormal releases

TABLE 6

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal (not irradiated fuel.)

1. Type of Waste	UNIT	SIX MONTH PERIOD	EST. TOTAL ERROR PERCENT
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	2.33E+01	2.5E+01
	Ci	9.56E-04	
b. Dry compressible waste, contaminated equipment, etc.	m^3	2.61E+01	2.5E+01
	Ci	1.37E+00	
c. Irradiated components, control rods, etc.	m^3	N/A	N/A
	Ci		
d. Other (describe)	m^3	N/A	N/A
	Ci		

2. Estimate of Major Nuclide Composition (by type of waste)

	PERCENT ABUNDANCE
a. Cs-137	5.06E+01
b. Fe-55	5.03E+01
c. N/A	N/A
d. N/A	N/A

3. Solid Waste Disposition

Number of Shipments: 2
Mode of Transportation: Truck
Destination: Barnwell, S.C
Type of Container: Strong tight steel containers

B. Irradiated Fuel Shipments

There were no shipments of irradiated fuel.

TABLE 7

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

A. GASEOUS

1. Maximum Individual Doses

a. Dose due to I-131, H-3, and particulates with half-lives greater than 8 days:

1) Whole Body Dose

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	WSW	1640	child	W/body	1.34E-03
Quarter 2	W	980	child	W/body	4.67E-04
Semiannual Total	WSW	1640	child	W/body	1.68E-03

2) Significant Organ Dose

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	WSW	4250	infant	thyroid	5.21E-02
Quarter 2	NE	900	adult	thyroid	5.02E-02
Semiannual Total	NE	900	adult	thyroid	5.11E-02

* The sector, distance, age, organ, and dose indicated provide the most conservative estimate of dose to the general public for the organ of concern indicated.

TABLE 7 (Continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

b. Dose Due to Noble Gas

1) Whole Body Dose

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	N	870	N/A	W/body	2.13E-03
Quarter 2	N	870	N/A	W/body	7.29E-04
Semiannual Total	N	870	N/A	W/body	2.86E-03

2) Skin Dose

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	N	870	NA	skin	6.34E-03
Quarter 2	NE	900	NA	skin	2.06E-03
Semiannual Total	N	870	NA	skin	8.38E-03

* The sector, distance, organ, and dose indicated provide the most conservative estimate of dose to the general public for the organ of concern indicated.

TABLE 7 (Continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

2. Population Doses

a. Dose due to I-131, H-3, and particulates with half-lives greater than 8 days.

	TOTAL INTEGRATED POPULATION DOSE (manrem)	AVERAGE DOSE TO INDIVIDUALS IN POPULATION (mrem)
	WHOLE BODY	WHOLE BODY
Quarter 1	1.56E-03	7.00E-07
Quarter 2	1.00E-03	4.50E-07
Semiannual Total	2.56E-03	1.15E-06

b. Dose Due to Noble Gas

	TOTAL INTEGRATED POPULATION DOSE (manrem)	AVERAGE DOSE TO INDIVIDUALS IN POPULATION (mrem)
	WHOLE BODY	WHOLE BODY
Quarter 1	2.58E-03	1.16E-06
Quarter 2	1.97E-03	8.86E-07
Semiannual Total	4.55E-03	2.05E-06

TABLE 7 (Continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

B. LIQUID

1. Maximum Individual Dose

a. Whole Body Dose

	*SECTOR	DISTANCE (MILES)	AGE	ORGAN	DOSE (mrem)
Quarter 1	NW	0.6	Adult	W/body	1.19E-02
Quarter 2	NW	0.6	Adult	W/body	1.79E-02
Semiannual Total	NW	0.6	Adult	W/body	2.98E-02

b. Significant Organ Dose

	*SECTOR	DISTANCE (MILES)	AGE	ORGAN	DOSE (mrem)
Quarter 1	NW	0.6	Teen	Liver	1.65E-02
Quarter 2	NW	0.6	Teen	Liver	2.47E-02
Semiannual Total	NW	0.6	Teen	Liver	4.12E-02

2. Population Dose

	TOTAL INTEGRATED POPULATION DOSE (manrem)	AVERAGE DOSE TO INDIVIDUALS IN POPULATION (mrem)
	WHOLE BODY	WHOLE BODY
Quarter 1	2.06E+00	9.25E-04
Quarter 2	3.06E-01	1.38E-04
Semiannual Total	2.36E+00	1.06E-03

* The sector, distance, age, organ, and dose indicated provide the most conservative estimate of dose to the general public for the organ of concern indicated.

TABLE 7 (continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

C. **ABNORMAL RELEASES**

Highest Calculated dose for any age group in all pathways

1. First Quarter Auxiliary Feed Pump

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NE	900	Child	Bone	3.25E-09
NNE	870	Teen	Liver	2.91E-06
NE	900	Adult	Thyroid	3.45E-06
NNE	870	Teen	Kidney	2.91E-06
NNE	870	Teen	Lung	2.91E-06
NNE	870	Teen	GI-LLI	2.91E-06
NNE	870	Teen	W/body	2.91E-06

2. January Main Steam Safety and Atmospheric Vent Valve Systems

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NE	900	Child	Bone	3.78E-05
NE	900	Child	Liver	4.14E-05
NE	900	Child	Thyroid	5.93E-04
NE	900	Child	Kidney	2.79E-05
NE	900	Child	Lung	2.05E-05
NE	900	Adult	GI-LLI	1.87E-05
NE	900	Adult	W/body	2.52E-05

3. March Atmospheric Vent Valve System

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
N	870	Child	Bone	1.44E-03
N	870	Child	Liver	1.55E-03
WSW	4250	Infant	Thyroid	1.39E-02
N	870	Child	Kidney	9.83E-04
N	870	Child	Lung	7.57E-04
N	870	Adult	GI-LLI	6.72E-04
N	870	Adult	W/body	9.19E-04

* The sector, distance, age, organ, and dose indicated provide the most conservative estimate of dose to the general public for the organ of concern indicated.

TABLE 7 (continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

4. First Quarter Atmospheric Vent Valve System

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NE	900	Child	Bone	2.04E-08
NNE	870	Teen	Liver	3.64E-05
NNE	870	Adult	Thyroid	3.91E-05
NNE	870	Teen	Kidney	3.64E-05
NNE	870	Teen	Lung	3.64E-05
NNE	870	Teen	GI-LLI	3.64E-05
NNE	870	Teen	W/body	3.64E-05

5. Second Quarter Atmospheric Vent Valve System

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NE	900	Child	Bone	3.82E-07
N	870	Teen	Liver	1.23E-04
NE	900	Child	Thyroid	1.98E-04
N	870	Teen	Kidney	1.23E-04
N	870	Teen	Lung	1.22E-04
N	870	Teen	GI-LLI	1.22E-04
N	870	Teen	W/body	1.22E-04

6. Second Quarter Auxiliary Feed Pump

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NE	900	Child	Bone	6.10E-08
N	870	Teen	Liver	9.81E-06
NE	900	Child	Thyroid	2.40E-05
N	870	Teen	Kidney	9.83E-06
N	870	Teen	Lung	9.79E-06
N	870	Teen	GI-LLI	9.79E-06
N	870	Teen	W/body	9.80E-06

TABLE 7 (continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

7. June Seal Injection Filter Leakage

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NNE	870	Child	Bone	1.22E-07
NNE	870	Child	Liver	6.47E-06
NNE	870	Child	Thyroid	0.00E+00
NNE	870	Child	Kidney	1.20E-07
NNE	870	Child	Lung	1.31E-08
NNE	870	Child	GI-LLI	2.45E-07
NNE	870	Child	W/body	4.21E-06

8. Summary - Whole Body and Significant Organ Dose for Gaseous Releases

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	N	870	Adult	W/body	9.70E-04
Quarter 2	N	870	Teen	W/body	1.34E-04
Semiannual Total	N	870	Adult	W/body	1.10E-03
Quarter 1	WSW	4250	Infant	Thyroid	1.40E-02
Quarter 2	NE	900	Child	Thyroid	2.22E-04
Semiannual Total	WSW	4250	Infant	Thyroid	1.41E-02

9. Second Quarter Liquid Release via the South Settling Basin

*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
NW	966	Adult	Bone	2.87E-06
NW	966	Adult	Liver	2.84E-04
NW	966	Adult	Thyroid	1.63E-03
NW	966	Adult	Kidney	2.87E-04
NW	966	Adult	Lung	2.80E-04
NW	966	Adult	GI-LLI	2.81E-04
NW	966	Adult	W/body	2.82E-04

TABLE 7 (continued)

SEMIANNUAL DOSES DUE TO EFFLUENT RELEASES

January 1, 1989 through June 30, 1989

10. Second Quarter Liquid Release via the Training Center Pond

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
	NW	966	Adult	Bone	1.37E-04
	NW	966	Adult	Liver	2.49E-04
	NW	966	Adult	Thyroid	4.42E-05
	NW	966	Adult	Kidney	1.12E-04
	NW	966	Adult	Lung	6.53E-05
	NW	966	Adult	GI-LLI	4.61E-05
	NW	966	Adult	W/body	1.86E-04

11. Summary - Whole Body and Significant Organ Dose for Liquid Releases

	*SECTOR	DISTANCE (METERS)	AGE	ORGAN	DOSE (mrem)
Quarter 1	N/A	N/A	N/A	N/A	N/A
Quarter 2	NW	966	Adult	W/body	4.68E-04
Semiannual Total	NW	966	Adult	W/body	4.68E-04
Quarter 1	N/A	N/A	N/A	N/A	N/A
Quarter 2	NW	966	Adult	Thyroid	1.67E-03
Semiannual Total	NW	966	Adult	Thyroid	1.67E-03

TABLE 8

1989 SEMIANNUAL DOSE TO THE MOST EXPOSED MEMBER OF THE PUBLIC DUE TO THE RELEASES OF GASEOUS AND LIQUID EFFLUENTS

	SEMIANNUAL DOSE (mrem)	40 CFR 190 LIMITS (mrem)	PERCENT OF LIMITS
Whole Body Dose			
- Noble Gas	2.86E-03		
- Iodine, Tritium, Particulates	1.68E-03		
- Liquid	2.98E-02		
Total Dose to Whole Body	3.43E-02	25	1.37E-01
Thyroid			
- Iodine, Tritium, Particulates	5.11E-02	75	6.81E-02
OTHER ORGANS			
Skin			
- Noble Gas	8.38E-03	25	3.35E-02
Liver			
- Liquid	4.12E-02	25	1.65E-01
Abnormal Releases			
- Whole Body Dose	1.57E-03	25	6.27E-03
- Thyroid	1.43E-02	75	1.90E-02
- Skin	5.98E-02	25	2.39E-01

Appendix C

Meteorological Data

Meteorological Monitoring

Meteorological data collected onsite for the period of January 1, 1989 through June 30, 1989 were reduced, validated, summarized for analysis, and included in the appropriate dose calculations. The Meteorological Monitoring System is instrumented for wind speed, wind direction, and temperature at 340 feet (100 meters), 250 feet (75 meters) and 35 feet (10 meters). Dew point temperatures are measured at 340 and 35 feet. Precipitation is gathered at ground level. In addition, differential temperatures (Delta T) are measured between 340 to 35 feet and 250 to 35 feet. Delta T's are classified into Pasquill stability classifications using the following table.

Stability Class	Pasquill Classification	Delta T (°F) 340 - 35 feet	Delta T (°F) 250 - 35 feet
Extremely Unstable	A	$\Delta T \leq -3.2$	$\Delta T \leq -2.2$
Moderately Unstable	B	$-3.2 < \Delta T \leq -2.8$	$-2.2 < \Delta T \leq -2.0$
Slightly Unstable	C	$-2.8 < \Delta T \leq -2.5$	$-2.0 < \Delta T \leq -1.8$
Neutral	D	$-2.5 < \Delta T \leq -0.8$	$-1.8 < \Delta T \leq -0.6$
Slightly Stable	E	$-0.8 < \Delta T \leq 2.5$	$-0.6 < \Delta T \leq 1.8$
Moderately Stable	F	$2.5 < \Delta T \leq 6.7$	$1.8 < \Delta T \leq 4.7$
Extremely Stable	G	$6.7 < \Delta T$	$4.7 < \Delta T$

Meteorological Statistics

The following tables present meteorological statistics for the period January 1 through June 30, 1989.

Data Recovery Statistics (in percent)

	Jan	Feb	Mar	Apr	May	Jun	Jan-Jun
35 ft. Dew Point Temperature	99.6	86.9	97.6	71.8	99.3	100.0	92.7
35 ft. Ambient Temperature	99.9	99.6	100.0	98.9	99.2	100.0	99.6
35 ft. Wind Speed	100.0	99.6	100.0	98.9	99.3	100.0	99.8
35 ft. Wind Direction	100.0	99.6	100.0	98.9	99.3	100.0	99.8
250 ft. Wind Speed	100.0	99.6	96.8	100.0	99.3	95.3	98.5
250 ft. Wind Direction	100.0	99.6	100.0	100.0	99.3	100.0	99.8
340 ft. Wind Speed	100.0	99.6	94.0	100.0	99.3	100.0	99.8
340 ft. Wind Direction	100.0	99.6	100.0	100.0	99.3	100.0	99.8
250-350 ft. Delta T	99.2	99.6	100.0	98.9	98.9	100.0	99.4
340-35 ft. Delta T	98.3	88.1	100.0	97.4	96.2	100.0	96.4
250 ft. JFD*	99.2	99.6	96.8	98.9	98.9	95.3	98.1
35 ft. JFD*	99.2	99.6	100.0	98.8	98.9	100.0	99.4

* JFD is Joint Frequency Distribution which represents the frequency of occurrence, in number of observations, that a particular wind speed, wind direction, and Pasquill atmospheric stability classification occurred simultaneously.

Predominant Wind Directions and Percent of Occurrence

	35 Foot Level		250 Foot Level		340 Foot Level	
Jan	WSW	18.6%	WSW	20.0%	WSW	21.2%
Feb	WSW	17.2%	WSW	17.8%	WSW	15.4%
Mar	ENE	16.8%	ENE	18.6%	ENE	17.9%
Apr	ENE	14.9%	ENE	13.3%	ENE	12.6%
May	NNE	8.7%	NE	9.1%	ENE	8.9%
Jun	SW	11.9%	E	11.4%	SW	12.1%
Jan-Jun	SW	11.1%	WSW	11.2%	WSW	11.4%

Mean Wind Speeds

	35 Foot Level	250 Foot Level	340 Foot Level
Jan	12.2 MPH	18.5 MPH	20.2 MPH
Feb	11.5 MPH	15.0 MPH	15.9 MPH
Mar	11.7 MPH	16.4 MPH	17.9 MPH
Apr	9.8 MPH	14.0 MPH	15.3 MPH
May	9.9 MPH	14.2 MPH	15.6 MPH
Jun	7.3 MPH	11.2 MPH	12.3 MPH
Jan-Jun	10.4 MPH	14.9 MPH	16.2 MPH

Maximum Hourly Wind Speeds and Day of Occurrence

	35 Foot Level	250 Foot Level	340 Foot Level
Jan	36.4 MPH / 8	43.7 MPH / 8	46.6 MPH / 7
Feb	27.5 MPH / 8	34.2 MPH / 8	35.7 MPH / 8
Mar	34.9 MPH / 15	42.5 MPH / 15	44.5 MPH / 15
Apr	23.6 MPH / 12	30.5 MPH / 12	33.0 MPH / 4
May	26.3 MPH / 30	33.6 MPH / 30	35.2 MPH / 30
Jun	21.5 MPH / 17	29.0 MPH / 17	30.9 MPH / 17
Jan-Jun	36.4 MPH / Jan 8	43.7 MPH / Jan 8	46.6 MPH / Jan 7

35 Foot Ambient Temperatures (Degrees Fahrenheit)

	Mean Average Hourly	Average Daily Maximum	Average Daily Minimum	Maximum and Date	Minimum and Date
Jan	33.2	40.4	27.1	60.9 / 31	14.3 / 9
Feb	24.7	29.2	20.1	53.1 / 1	5.0 / 6
Mar	35.1	42.7	28.9	75.9 / 27	12.3 / 7
Apr	44.8	51.0	38.8	66.3 / 17	20.6 / 10
May	57.6	63.9	51.2	82.9 / 31	34.3 / 6
Jun	68.0	73.4	62.0	89.6 / 26	52.5 / 11
Jan-Jun	44.1	50.3	38.2	89.6 / Jun 26	5.0 / Feb 6

Precipitation (Inches)

	Total Amount	Maximum Daily Total and Date	Maximum Hourly Total and Date
Jan	1.41	0.30 / 26	0.15 / 26
Feb	0.47	0.17 / 21	0.05 / 21
Mar	2.50	1.04 / 27	0.45 / 27
Apr	3.09	0.75 / 4	0.29 / 25
May	6.25	1.41 / 30	1.12 / 30
Jun	4.34	1.00 / 21	0.76 / 21
Jan-Jun	18.06	1.41 / May 30	1.12 / May 30

Atmospheric Stability Based on Delta T 250 - 35 feet (in percent)

	Pasquill Stability Classification						
	A	B	C	D	E	F	G
Jan	0.00	0.54	1.63	53.39	36.31	7.18	0.95
Feb	0.15	0.00	2.24	74.14	22.42	1.05	0.00
Mar	0.40	1.88	5.51	60.75	20.30	7.39	3.76
Apr	0.00	1.69	7.72	56.18	26.12	6.74	1.54
May	0.00	0.27	3.67	63.32	21.60	7.07	4.08
Jun	1.25	1.94	7.08	50.97	27.36	9.31	2.08
Jan-Jun	0.30	1.07	4.65	59.62	25.72	6.53	2.11

Atmospheric Stability Based on Delta T 340 - 35 feet (in percent)

	Pasquill Stability Classification						
	A	B	C	D	E	F	G
Jan	0.00	0.00	1.09	55.68	34.88	7.93	0.41
Feb	0.00	0.00	2.53	76.86	20.27	0.34	0.00
Mar	0.13	0.94	4.70	60.62	22.18	6.45	4.97
Apr	0.00	0.71	2.71	62.62	24.54	7.85	1.57
May	0.00	0.14	1.40	64.94	22.77	6.42	4.33
Jun	0.43	1.99	3.70	55.62	26.88	10.10	1.28
Jan-Jun	0.10	0.64	2.70	62.29	25.41	6.69	2.17

Meteorological Tables

The following tables are the results obtained from processing hourly meteorological data collected at the Davis-Besse Nuclear Power Station. The joint frequency distribution (JFD) tables represent the frequency of occurrence, in number of observations, that a particular wind speed, wind direction, and Pasquill atmospheric stability classification occurred simultaneously. Tables 9-12 present JFDs for 1989 for 250 - 35 foot delta temperatures, and 35 and 250 foot winds, respectively, as follows:

- First Quarter - Tables 9 and 10
- Second Quarter - Tables 11 and 12

Tables 13-14 present JFDs for batch releases during the two quarters of the first semiannual period of 1989 for 250 - 35 foot delta temperatures and 35 foot and 250 foot winds. Table 15 presents hourly meteorological data during batch releases for 1989.

Table 9

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: A
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	1	0	2
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	1	0	0	1
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	2	1	0	4

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: B
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	3	0	0	0	0	3
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	3	0	3
ENE	0	0	0	2	2	0	4
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	3	0	1	0	4
SW	0	0	1	0	1	0	2
WSW	0	1	0	1	0	0	2
W	0	0	0	1	0	0	1
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	4	4	4	7	0	19

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: C
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	1	1	0	0	0	2
NNE	0	4	2	3	0	0	9
NE	0	1	1	2	0	1	5
ENE	0	1	4	6	2	0	13
E	0	0	0	5	0	0	5
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	2	3	1	0	0	6
SW	0	0	4	5	1	0	10
WSW	0	0	1	2	1	0	4
W	0	0	0	3	1	0	4
WNW	0	0	1	0	0	0	1
NW	0	1	2	0	0	0	3
NNW	0	0	0	4	0	0	4
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	10	19	32	5	1	67

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: D
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	11	27	20	6	0	64
NNE	4	16	28	53	9	0	110
NE	2	14	28	37	34	16	131
ENE	3	20	47	30	7	4	111
E	1	18	35	21	8	0	83
ESE	1	17	17	1	0	0	36
SE	2	18	6	0	0	0	26
SSE	4	17	10	2	0	0	33
S	1	18	2	1	0	0	22
SSW	1	20	24	12	1	0	58
SW	1	12	23	58	41	1	136
WSW	2	4	35	82	51	23	197
W	1	7	38	64	21	5	136
WNW	0	6	32	34	2	0	74
NW	0	3	22	21	11	0	57
NNW	2	8	26	27	6	0	69
VARIABLE	0	0	0	0	0	0	0
TOTAL	25	209	400	463	197	49	1343

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: E
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	3	3	0	0	0	6
NNE	0	5	2	2	0	0	9
NE	1	3	7	2	0	0	13
ENE	1	7	12	0	0	0	20
E	1	14	11	0	0	0	26
ESE	2	20	13	0	0	0	35
SE	5	12	9	0	0	0	26
SSE	5	13	11	1	0	0	30
S	8	25	5	6	2	0	46
SSW	1	27	39	21	4	0	92
SW	5	24	34	38	9	5	115
WSW	1	10	31	21	10	4	77
W	3	13	14	5	0	0	35
WNW	1	4	11	3	0	0	19
NW	0	3	5	2	0	0	10
NNW	0	2	7	0	0	0	9
VARIABLE	0	0	0	0	0	0	0
TOTAL	34	185	214	101	25	9	568

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: F
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	1	1	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	0	1	0	0	1
ENE	1	2	2	1	0	0	6
E	3	9	3	0	0	0	15
ESE	0	6	3	0	0	0	9
SE	0	6	1	0	0	0	7
SSE	1	8	2	0	0	0	11
S	0	14	3	0	0	0	17
SSW	1	16	7	0	0	0	24
SW	3	5	3	0	0	0	11
WSW	1	3	3	0	0	0	7
W	1	2	0	0	0	0	3
WNW	0	0	0	0	0	0	0
NW	0	0	1	0	0	0	1
NNW	0	0	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	11	72	30	2	0	0	115

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: G
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	2	0	0	0	0	0	2
NE	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	2	0	0	0	0	2
ESE	2	6	1	0	0	0	9
SE	0	7	0	0	0	0	7
SSE	1	2	1	0	0	0	4
S	0	4	0	0	0	0	4
SSW	0	2	0	0	0	0	2
SW	0	2	0	0	0	0	2
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	2	0	0	0	0	2
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	6	27	2	0	0	0	35

PERIODS OF CALM (HOURS): 0

Table 9 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: Total
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	19	32	20	6	0	77
NNE	6	25	32	58	9	0	130
NE	4	18	36	42	37	17	154
ENE	5	30	65	40	12	4	156
E	5	43	49	26	8	0	131
ESE	5	49	34	2	0	0	90
SE	7	43	16	0	0	0	66
SSE	11	40	24	3	0	0	78
S	9	61	10	7	2	0	89
SSW	3	67	76	34	6	0	186
SW	9	43	65	102	52	6	277
WSW	4	18	70	106	62	27	287
W	5	22	52	73	22	5	179
WNW	1	10	44	37	2	0	94
NW	0	9	31	23	11	0	74
NNW	2	10	34	31	6	0	83
VARIABLE	0	0	0	0	0	0	0
TOTAL	76	507	620	604	235	59	2151

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 9

Table 10

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: A
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	1	2
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	1	0	1
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	2	1	4

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: B
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	2	0	0	0	0	2
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	3	3
ENE	0	0	0	2	0	2	4
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	1	2	0	2	5
SW	0	0	0	1	0	0	1
WSW	0	1	0	1	0	0	2
W	0	0	0	0	1	0	1
WNW	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0
NNW	0	1	0	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	4	1	6	1	7	19

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: C
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	0	4	3	2	1	0	10
NE	0	1	0	1	0	1	3
ENE	0	2	3	4	2	1	12
E	0	0	0	5	3	1	9
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	4	3	0	0	8
SW	0	0	0	5	1	1	7
WSW	0	0	0	3	1	0	4
W	0	0	0	1	3	1	5
WNW	0	0	1	0	0	0	1
NW	0	1	2	0	0	0	3
NNW	0	1	0	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	10	13	24	11	5	63

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: D
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	1	7	26	17	18	2	71
NNE	3	12	20	51	20	1	107
NE	2	10	16	18	30	28	104
ENE	1	19	28	40	32	14	134
E	2	8	22	20	26	11	79
ESE	1	11	21	8	1	0	42
SE	3	13	10	2	1	0	29
SSE	1	8	9	9	2	0	29
S	0	7	10	3	0	1	21
SSW	0	9	14	18	13	3	57
SW	1	7	11	20	49	32	120
WSW	0	2	21	45	77	61	206
W	1	3	7	52	51	21	135
WNW	0	2	18	31	22	5	78
NW	0	5	12	10	16	11	54
NNW	1	5	12	21	13	5	57
VARIABLE	0	0	0	0	0	0	0
TOTAL	17	128	257	365	361	195	1323

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: E
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	1	2	1	0	4
NNE	0	3	3	2	2	0	10
NE	0	2	2	3	1	0	8
ENE	1	6	2	10	3	1	23
E	2	6	7	9	2	0	26
ESE	0	3	9	17	4	0	33
SE	1	4	8	6	2	0	21
SSE	1	3	6	19	3	0	32
S	0	3	10	13	6	10	42
SSW	1	1	12	18	35	13	80
SW	0	6	9	19	47	30	111
WSW	1	1	14	31	26	16	89
W	0	3	8	12	7	0	30
WNW	0	4	9	13	6	0	32
NW	1	2	3	3	2	1	12
NNW	2	3	2	6	2	0	15
VARIABLE	0	0	0	0	0	0	0
TOTAL	10	50	105	183	149	71	568

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: F
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	1	0	1	0	2
NNE	1	0	0	0	0	0	1
NE	0	0	0	0	1	0	1
ENE	0	0	0	1	0	3	4
E	0	0	3	5	1	0	9
ESE	0	0	5	4	0	0	9
SE	0	0	5	5	0	0	10
SSE	0	0	3	2	1	0	6
S	0	0	2	4	9	0	15
SSW	0	1	5	7	7	1	21
SW	0	1	3	8	9	0	21
WSW	0	0	4	5	0	0	9
W	0	0	0	3	0	0	3
WNW	0	0	0	1	0	0	1
NW	0	0	0	1	0	0	1
NNW	1	0	0	0	1	0	2
VARIABLE	0	0	0	0	0	0	0
TOTAL	2	2	31	46	30	4	115

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: G
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	2	0	0	3
SE	0	0	0	0	1	0	1
SSE	0	0	0	1	0	0	1
S	0	0	2	6	4	0	12
SSW	0	0	3	4	1	0	8
SW	0	0	4	1	0	0	5
WSW	0	0	0	3	0	0	3
W	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	2	0	0	2
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	10	19	5	0	35

PERIODS OF CALM (HOURS): 0

Table 10 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 1/01/89 to 3/31/89
Stability Class: Total
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	1	9	28	19	20	2	79
NNE	4	19	26	55	23	1	128
NE	2	13	18	22	32	32	119
ENE	2	27	33	57	38	22	179
E	4	14	32	39	22	12	123
ESE	1	14	36	31	5	0	87
SE	4	17	23	13	4	0	61
SSE	2	11	13	31	6	0	68
S	0	10	24	26	19	11	90
SSW	1	12	39	52	57	19	180
SW	1	14	27	54	106	63	265
WSW	1	4	39	88	104	77	313
W	1	6	15	68	62	22	174
WNW	0	6	28	45	28	5	112
NW	1	8	18	16	18	12	73
NNW	4	10	14	27	16	5	76
VARIABLE	0	0	0	0	0	0	0
TOTAL	29	194	418	643	560	283	2127

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 33

Table 11

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: A
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0
NE	0	0	1	0	0	0	1
ENE	0	0	3	0	0	0	3
E	0	3	2	0	0	0	5
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	3	6	0	0	0	9

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: B
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	1	0	0	1
NE	0	1	1	1	0	0	3
ENE	0	1	6	6	0	0	13
E	0	0	2	1	0	0	3
ESE	0	1	0	0	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	2	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	2	0	0	0	2
W	0	0	0	0	1	0	1
WNW	0	0	1	0	0	0	1
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	4	13	11	1	0	29

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Join. Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: C
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	3	0	3	1	0	7
NNE	0	2	0	0	0	0	2
NE	0	2	3	5	1	0	11
ENE	0	2	12	2	0	0	16
E	0	4	12	2	0	0	18
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	1	0	0	0	0	1
SSW	0	2	0	3	0	0	5
SW	0	0	3	10	0	0	13
WSW	0	2	8	10	3	0	23
W	0	1	1	1	3	0	6
WNW	0	0	3	3	0	0	6
NW	0	2	5	9	0	0	16
NNW	0	3	2	2	0	0	7
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	24	49	51	8	0	132

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: D
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	18	18	20	3	0	59
NNE	2	21	23	21	14	0	81
NE	3	35	43	42	6	0	129
ENE	2	52	65	21	0	0	140
E	4	56	51	4	0	0	115
ESE	2	32	20	2	0	0	56
SE	1	20	9	3	0	0	33
SSE	3	6	14	1	0	0	24
S	1	18	17	2	0	0	38
SSW	2	22	29	13	2	0	68
SW	1	18	45	30	10	0	104
WSW	2	13	45	40	12	2	114
W	3	7	44	31	5	0	90
WNW	4	6	27	25	3	0	65
NW	1	12	22	23	2	0	60
NNW	2	10	24	18	2	0	56
VARIABLE	0	0	0	0	0	0	0
TOTAL	33	346	496	296	59	2	1232

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: E
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	5	3	1	0	0	0	9
NNE	1	4	3	1	1	0	10
NE	3	7	2	1	0	0	13
ENE	2	12	4	0	0	0	18
E	7	13	14	2	0	0	36
ESE	5	23	16	2	0	0	46
SE	9	27	7	3	0	0	46
SSE	11	36	3	0	0	0	50
S	12	29	6	1	0	0	48
SSW	4	26	25	6	0	0	61
SW	4	32	17	2	0	0	55
WSW	6	20	8	6	1	0	41
W	0	24	22	3	0	0	49
WNW	3	7	16	4	0	0	30
NW	3	7	14	3	0	0	27
NNW	2	0	1	0	0	0	3
VARIABLE	0	0	0	0	0	0	0
TOTAL	77	270	159	34	2	0	542

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: F
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	1	0	0	0	1
NNE	2	0	1	0	0	0	3
NE	0	1	1	1	0	0	3
ENE	0	1	2	0	0	0	3
E	1	5	7	1	0	0	14
ESE	1	4	0	0	0	0	5
SE	6	5	0	0	0	0	11
SSE	9	6	0	0	0	0	15
S	12	26	0	0	0	0	38
SSW	6	23	0	0	0	0	29
SW	2	14	1	0	0	0	17
WSW	2	7	0	0	0	0	9
W	2	8	0	0	0	0	10
WNW	1	1	0	0	0	0	2
NW	2	2	0	0	0	0	4
NNW	1	0	2	0	0	0	3
VARIABLE	0	0	0	0	0	0	0
TOTAL	47	103	15	2	0	0	167

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: G
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	1	0	0	0	0	0	1
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	3	1	0	0	0	4
SE	3	2	0	0	0	0	5
SSE	3	6	0	0	0	0	9
S	3	5	0	0	0	0	8
SSW	4	8	0	0	0	0	12
SW	2	9	0	0	0	0	11
WSW	0	1	0	0	0	0	1
W	2	1	0	0	0	0	3
WNW	0	0	0	0	0	0	0
NW	1	0	0	0	0	0	1
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	19	35	2	0	0	0	56

PERIODS OF CALM (HOURS): 0

Table 11 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: Total
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	5	25	20	23	4	0	77
NNE	6	27	27	23	15	0	98
NE	6	46	51	50	7	0	160
ENE	4	68	92	29	0	0	193
E	12	81	89	10	0	0	192
ESE	8	63	37	5	0	0	113
SE	19	54	16	6	0	0	95
SSE	26	54	17	1	0	0	98
S	28	79	23	3	0	0	133
SSW	16	81	54	24	2	0	177
SW	9	73	66	42	10	0	200
WSW	10	43	63	56	16	2	190
W	7	41	67	35	9	0	159
WNW	8	14	47	32	3	0	104
NW	7	23	42	35	2	0	109
NNW	5	13	29	20	2	0	69
VARIABLE	0	0	0	0	0	0	0
TOTAL	176	785	740	394	70	2	2167

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 17

Table 12

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: A
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	2	2	0	0	4
E	0	1	2	2	0	0	5
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	1	4	4	0	0	9

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: B
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	1	0	0	0	0	1
NNE	0	0	0	0	1	0	1
NE	0	0	1	0	0	0	1
ENE	0	2	3	8	1	0	14
E	0	0	1	3	0	0	4
ESE	0	0	1	0	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	2	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	1	0	0	1
W	0	0	1	1	1	0	3
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	3	8	13	5	0	29

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: C
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	1	3	0	1	4	0	9
NNE	0	0	0	0	0	0	0
NE	0	3	1	3	3	0	10
ENE	0	3	6	4	2	0	15
E	0	3	8	9	1	0	21
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	1	0	0	0	0	1
SSW	0	1	1	0	2	1	5
SW	0	0	0	5	2	0	7
WSW	0	1	8	9	8	1	27
W	0	0	1	3	1	2	7
WNW	0	1	3	2	0	0	6
NW	0	2	6	6	3	0	17
NNW	0	1	3	2	0	0	6
VARIABLE	0	0	0	0	0	0	0
TOTAL	1	19	37	45	26	4	132

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: D
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	4	12	15	13	17	4	65
NNE	1	15	13	15	26	2	72
NE	2	28	27	42	17	0	116
ENE	1	35	52	40	7	0	135
E	4	36	57	26	8	0	131
ESE	0	20	31	14	1	1	67
SE	1	8	14	4	4	0	31
SSE	2	1	4	7	0	0	14
S	2	2	11	20	9	0	44
SSW	1	5	15	17	15	3	56
SW	0	6	19	35	19	13	92
WSW	2	4	21	42	24	11	104
W	2	5	17	40	15	5	84
WNW	3	2	17	34	21	5	82
NW	1	8	19	19	10	2	59
NNW	0	7	22	16	12	3	60
VARIABLE	0	0	0	0	0	0	0
TOTAL	26	194	354	384	205	49	1212

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: E
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	7	1	2	0	0	10
NNE	3	2	1	1	1	1	9
NE	6	5	5	2	1	0	19
ENE	1	9	6	2	0	0	18
E	1	12	12	7	2	0	34
ESE	2	8	9	22	3	1	45
SE	2	6	17	7	2	1	35
SSE	2	4	17	13	1	0	37
S	1	1	23	26	3	0	54
SSW	0	1	17	20	19	4	61
SW	0	5	10	18	7	1	41
WSW	1	4	14	13	6	2	40
W	1	0	13	14	3	0	31
WNW	0	6	7	34	6	0	53
NW	1	0	6	13	4	1	25
NNW	1	3	1	10	1	0	16
VARIABLE	0	0	0	0	0	0	0
TOTAL	22	73	159	204	59	11	528

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: F
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	2	2	1	0	0	5
NNE	0	1	0	0	0	0	1
NE	0	1	0	2	0	0	3
ENE	0	0	1	1	0	0	2
E	1	2	8	3	1	0	15
ESE	0	5	3	3	2	0	13
SE	0	1	4	1	0	0	6
SSE	0	2	10	3	0	0	15
S	0	1	9	5	3	0	18
SSW	0	5	3	22	8	0	38
SW	1	2	8	9	2	0	22
WSW	0	0	2	4	0	0	6
W	0	0	2	4	0	0	6
WNW	0	0	3	4	0	0	7
NW	1	0	3	1	0	0	5
NNW	0	1	0	4	0	0	5
VARIABLE	0	0	0	0	0	0	0
TOTAL	3	23	58	67	16	0	167

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: G
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	1	0	0	0	1
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	2	0	2
SE	0	0	1	2	1	0	4
SSE	0	4	2	3	0	0	9
S	0	2	3	5	0	0	10
SSW	0	0	4	2	0	0	6
SW	0	0	1	9	0	0	10
WSW	1	0	0	2	0	0	3
W	0	0	2	0	0	0	2
WNW	0	2	2	0	0	0	4
NW	0	0	0	1	0	0	1
NNW	1	3	0	0	0	0	4
VARIABLE	0	0	0	0	0	0	0
TOTAL	2	11	16	24	3	0	56

PERIODS OF CALM (HOURS): 0

Table 12 (continued)

Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: 4/01/89 to 6/30/89
Stability Class: Total
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	5	25	19	17	21	4	91
NNE	4	18	14	16	26	3	83
NE	8	37	34	49	21	0	149
ENE	2	49	70	57	10	0	188
E	6	54	88	50	12	0	210
ESE	2	33	44	40	8	2	129
SE	3	15	36	14	7	1	76
SSE	4	11	33	26	1	0	75
S	3	7	46	56	15	0	127
SSW	1	12	40	61	46	8	168
SW	1	13	38	76	30	14	172
WSW	4	9	45	71	38	14	181
W	3	5	36	62	20	7	133
WNW	3	11	32	74	27	5	152
NW	2	10	35	40	17	3	108
NNW	2	15	26	32	13	3	91
VARIABLE	0	0	0	0	0	0	0
TOTAL	54	324	636	741	314	64	2133

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 51

Table 13

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class

First Quarter

Release Dates

From	1/19/89	19 hr.	through	1/20/89	13 hr.
From	1/23/89	1 hr.	through	1/23/89	5 hr.
From	2/5/89	20 hr.	through	2/5/89	23 hr.
From	2/12/89	22 hr.	through	2/13/89	1 hr.
From	3/11/89	3 hr.	through	3/13/89	17 hr.
From	3/16/89	2 hr.	through	3/16/89	5 hr.

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: A
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: B
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	0	1
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	1	0	0	0	1

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: C
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	1	0	0	1
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	1	1	0	0	2
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	1	2	0	0	3

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: D
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	2	0	0	2
NNE	0	0	0	9	0	0	9
NE	0	0	3	2	0	0	5
ENE	0	5	7	0	0	0	12
E	0	3	0	0	0	0	3
ESE	0	3	2	0	0	0	5
SE	0	4	0	0	0	0	4
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	2	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	2	0	0	2
W	0	0	1	3	0	0	4
WNW	0	0	0	3	0	0	3
NW	0	0	0	1	3	0	4
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	15	15	22	3	0	55

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: E
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	2	0	0	0	2
NNE	0	0	1	1	0	0	2
NE	0	0	0	0	0	0	0
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	0	0	0	0
SSE	0	2	1	0	0	0	3
S	0	1	0	0	0	0	1
SSW	0	0	3	2	0	0	5
SW	0	1	0	4	0	0	5
WSW	0	0	0	1	0	0	1
W	0	1	2	1	0	0	4
WNW	0	0	1	0	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	5	12	9	0	0	26

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: F
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	1	0	0	0	1
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	1	0	0	0	0	1
S	0	1	0	0	0	0	1
SSW	0	0	2	0	0	0	2
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	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	2	5	0	0	0	7

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: G
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	2	0	0	0	0	2
SE	0	2	0	0	0	0	2
SSE	0	1	0	0	0	0	1
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	2	0	0	0	0	2
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	7	0	0	0	0	7

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: Total
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	3	2	0	0	5
NNE	0	0	1	11	0	0	12
NE	0	0	3	2	0	0	5
ENE	0	5	8	0	0	0	13
E	0	3	0	0	0	0	3
ESE	0	5	2	0	0	0	7
SE	0	6	0	0	0	0	6
SSE	0	4	1	0	0	0	5
S	0	2	0	0	0	0	2
SSW	0	0	7	2	0	0	9
SW	0	1	2	5	0	0	8
WSW	0	0	0	3	0	0	3
W	0	1	3	4	0	0	8
WNW	0	0	1	3	0	0	4
NW	0	2	1	1	3	0	7
NNW	0	0	2	0	0	0	2
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	29	34	33	3	0	99

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: A
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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
FSE	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

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: B
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	1
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	1	0	0	1

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: C
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	0	0	0
NNE	0	0	0	1	0	0	1
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	1	0	0	1
SW	0	0	0	1	0	0	1
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	3	0	0	3

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: D
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	2	0	2
NNE	0	0	0	5	4	0	9
NE	0	0	1	4	0	0	5
ENE	0	2	5	2	0	0	9
E	0	0	4	0	0	0	4
ESE	0	3	5	0	0	0	8
SE	0	0	3	0	0	0	3
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	2	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	0	2	0	0	2
W	0	0	0	1	2	0	3
WNW	0	0	0	0	2	0	2
NW	0	0	0	0	3	3	6
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	5	18	16	13	3	55

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: E
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	2	0	0	2
NNE	0	0	0	1	1	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	2	0	0	2
S	0	0	0	1	0	0	1
SSW	0	0	0	1	2	1	4
SW	0	0	0	0	2	3	5
WSW	0	0	1	0	1	1	3
W	0	0	1	2	1	0	4
WNW	0	0	0	1	0	0	1
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	1	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	3	10	8	5	26

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: F
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	0	1	0	1
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	1	1	0	2
SSW	0	0	0	0	1	0	1
SW	0	0	0	0	1	0	1
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	1	0	0	1
NNW	0	0	0	0	1	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	0	2	5	0	7

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: G
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	4	0	0	4
SSW	0	0	0	1	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	0	0
WNW	0	0	0	0	0	0	0
NW	0	0	0	2	0	0	2
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	0	7	0	0	7

PERIODS OF CALM (HOURS): 0

Table 13 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: First Quarter
Stability Class: Total
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	Total
N	0	0	0	2	3	0	5
NNE	0	0	0	7	5	0	12
NE	0	0	1	4	0	0	5
ENE	0	2	5	2	0	0	9
E	0	0	5	0	0	0	5
ESE	0	3	5	0	0	0	8
SE	0	0	3	0	0	0	3
SSE	0	0	0	2	0	0	2
S	0	0	0	6	1	0	7
SSW	0	0	0	5	3	1	9
SW	0	0	0	2	3	3	8
WSW	0	0	1	2	1	1	5
W	0	0	1	3	3	0	7
WNW	0	0	0	1	2	0	3
NW	0	0	0	3	3	3	9
NNW	0	0	0	0	2	0	2
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	5	21	39	26	8	99

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 0

Table 14

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class

Second Quarter

Release Dates

From 4/24/89 2 hr. through 4/24/89 6 hr.
From 6/1/89 10 hr. through 6/3/89 15 hr.
From 6/17/89 15 hr. through 6/17/89 19 hr.

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: A
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: B
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: C
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: D
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	3	0	0	0	3
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	4	1	0	0	0	5
SSW	0	3	0	0	0	0	3
SW	0	1	2	4	1	0	8
WSW	0	0	3	0	0	0	3
W	0	0	8	1	0	0	9
WNW	0	0	7	0	0	0	7
NW	0	0	1	2	0	0	3
NNW	0	0	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	8	26	7	1	0	42

PERIODS OF CA[illegible]RS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: E
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	2	0	0	0	0	2
SW	1	1	0	0	0	0	2
WSW	0	2	0	0	0	0	2
W	0	1	0	0	0	0	1
WNW	0	1	0	0	0	0	1
NW	0	1	0	0	0	0	1
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	1	9	0	0	0	0	10

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: F
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	0	0	1
SSW	0	1	0	0	0	0	1
SW	0	5	0	0	0	0	5
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	7	0	0	0	0	7

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: G
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	2	0	0	0	0	2
SSW	0	3	0	0	0	0	3
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	5	0	0	0	0	5

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
35-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: Total
Elevation: 35 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	3	0	0	0	3
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	1	0	0	0	0	1
SSE	0	0	0	0	0	0	0
S	0	7	1	0	0	0	8
SSW	0	9	0	0	0	0	9
SW	1	7	2	4	1	0	15
WSW	0	2	3	0	0	0	5
W	0	1	6	1	0	0	10
WNW	0	1	7	0	0	0	8
NW	0	1	1	2	0	0	4
NNW	0	0	1	0	0	0	1
VARIABLE	0	0	0	0	0	0	0
TOTAL	1	29	26	7	1	0	64

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: A
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: B
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Wind and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: C
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: D
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	2	0	0	0	2
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	2	2	0	0	4
SSW	0	0	2	0	0	0	2
SW	0	0	0	0	2	3	5
WSW	0	0	1	0	0	0	1
W	0	0	2	2	0	0	4
WNW	0	0	2	1	0	0	3
NW	0	0	0	0	1	0	1
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	0	12	5	3	3	23

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: E
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	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	1	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	1	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	2	0	0	3

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Point Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: F
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	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	1	0	0	1
SW	0	0	[illegible]	4	0	0	4
WSW	0	0	0	1	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	6	0	0	7

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: G
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	1	0	0	1
SW	0	0	0	4	0	0	4
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	5	0	0	5

PERIODS OF CALM (HOURS): 0

Table 14 (continued)

Batch Release Joint Frequency Distribution
Wind Speed and Direction by Atmospheric Stability Class
250-Ft Winds and Delta Temperature (250 Ft-35 Ft)

Period of Record: Second Quarter
Stability Class: Total
Elevation: 250 Feet

Wind Direction:	Wind Speed (MPH) 0.7-3.4	3.5-7.4	7.5-12.4	12.5-18.4	18.5-24.4	>24.4	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	2	0	0	0	2
E	0	0	2	0	0	0	2
ESE	0	1	0	0	0	0	1
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	2	2	0	0	4
SSW	0	0	2	3	0	0	5
SW	0	0	0	8	2	3	13
WSW	0	0	1	2	0	0	3
W	0	0	2	2	0	0	4
WNW	0	0	2	1	0	0	3
NW	0	0	0	0	1	0	1
NNW	0	0	0	0	0	0	0
VARIABLE	0	0	0	0	0	0	0
TOTAL	0	1	13	18	3	3	38

PERIODS OF CALM (HOURS): 0

HOURS OF MISSING DATA: 26

Table 15

Hourly Meteorological Data During Batch Releases
Davis-Besse Nuclear Power Station

Yr.	Month	Day	Hour	35' Wind Spd (MPH)	35' Wind Direction	ΔT 250'-35' (°F)
89	1	19	19	15.8	217.0	-0.2
89	1	19	20	15.2	213.0	-0.2
89	1	19	21	14.9	217.0	-0.2
89	1	19	22	15.0	213.0	0.1
89	1	19	23	17.6	227.0	-0.2
89	1	19	24	18.1	236.0	-0.3
89	1	20	1	17.2	244.0	-0.3
89	1	20	2	16.0	260.0	-0.4
89	1	20	3	14.9	269.0	-0.4
89	1	20	4	15.7	274.0	-0.4
89	1	20	5	14.6	280.0	-0.3
89	1	20	6	13.9	283.0	-0.2
89	1	20	7	11.8	285.0	-0.2
89	1	20	8	13.2	302.0	-0.3
89	1	20	9	14.9	301.0	-0.4
89	1	20	10	21.5	320.0	-0.4
89	1	20	11	17.8	315.0	-0.5
89	1	20	12	19.8	316.0	-0.6
89	1	20	13	21.4	319.0	-0.6
89	1	23	1	8.7	201.0	1.0
89	1	23	2	8.9	206.0	0.9
89	1	23	3	8.5	213.0	1.0
89	1	23	4	8.2	205.0	1.1
89	1	23	5	8.4	213.0	0.7
89	2	5	20	6.4	142.0	-0.4
89	2	5	21	7.1	141.0	-0.4
89	2	5	22	6.3	136.0	-0.4
89	2	5	23	6.5	140.0	-0.5
89	2	12	22	4.1	173.0	0.1
89	2	12	23	5.3	168.0	0.8
89	2	12	24	7.3	155.0	0.7
89	2	13	1	8.0	149.0	0.7
89	3	11	3	4.3	120.0	0.1
89	3	11	4	3.8	131.0	0.1
89	3	11	5	4.1	118.0	0.9
89	3	11	6	4.3	143.0	1.3
89	3	11	7	4.2	154.0	1.5
89	3	11	8	5.4	163.0	2.1
89	3	11	9	5.3	173.0	1.0
89	3	11	10	7.5	200.0	-0.2

Table 15 (continued)

Hourly Meteorological Data During Batch Releases
Davis-Besse Nuclear Power Station

Yr.	Month	Day	Hour	35' Wind Spd (MPH)	35' Wind Direction	ΔT 250'-35' (°F)
89	3	11	11	9.3	202.0	-0.6
89	3	11	12	10.7	216.0	-0.6
89	3	11	13	11.8	221.0	-0.6
89	3	11	14	13.7	227.0	-0.6
89	3	11	15	13.4	241.0	-0.6
89	3	11	16	12.8	250.0	-0.6
89	3	11	17	12.3	262.0	-0.6
89	3	11	18	9.2	324.0	0.5
89	3	11	19	6.1	315.0	0.0
89	3	11	20	6.9	316.0	0.1
89	3	11	21	11.9	333.0	0.2
89	3	11	22	12.0	356.0	0.7
89	3	11	23	12.8	22.0	0.5
89	3	11	24	10.4	15.0	0.3
89	3	12	1	7.5	0.0	0.2
89	3	12	2	9.9	349.0	0.2
89	3	12	3	12.0	339.0	0.2
89	3	12	4	14.1	358.0	-0.2
89	3	12	5	15.4	6.0	-0.3
89	3	12	6	16.0	14.0	-0.4
89	3	12	7	18.3	22.0	-0.4
89	3	12	8	17.4	21.0	-0.4
89	3	12	9	16.3	19.0	-0.5
89	3	12	10	17.9	22.0	-0.7
89	3	12	11	14.0	20.0	-0.7
89	3	12	12	14.1	23.0	-0.8
89	3	12	13	14.5	28.0	-0.8
89	3	12	14	13.2	23.0	-0.8
89	3	12	15	13.9	31.0	-0.8
89	3	12	16	13.2	42.0	-0.9
89	3	12	17	14.3	44.0	-0.8
89	3	12	18	11.7	52.0	-0.6
89	3	12	19	10.3	58.0	-0.5
89	3	12	20	12.2	62.0	-0.5
89	3	12	21	10.9	52.0	-0.5
89	3	12	22	10.7	54.0	-0.5
89	3	12	23	8.7	69.0	-0.5
89	3	12	24	6.2	72.0	-0.5
89	3	13	1	8.0	74.0	-0.5
89	3	13	2	7.0	63.0	-0.5
89	3	13	3	5.5	71.0	-0.5
89	3	13	4	4.5	69.0	-0.5
89	3	13	5	5.2	91.0	-0.4
89	3	13	6	6.4	100.0	-0.4

Table 15 (continued)

Hourly Meteorological Data During Batch Releases
Davis-Besse Nuclear Power Station

Yr.	Month	Day	Hour	35' Wind Spd (MPH)	35' Wind Direction	ΔT 250'-35' (°F)
89	3	13	7	7.4	107.0	-0.3
89	3	13	8	8.0	113.0	-0.4
89	3	13	9	7.6	113.0	-0.4
89	3	13	10	6.7	104.0	-0.5
89	3	13	11	5.7	101.0	-0.5
89	3	13	12	5.0	102.0	-0.5
89	3	13	13	7.4	58.0	-0.4
89	3	13	14	8.4	58.0	0.0
89	3	13	15	9.1	76.0	1.0
89	3	13	16	9.0	77.0	1.5
89	3	13	17	7.9	65.0	2.4
89	3	16	2	8.3	274.0	-0.3
89	3	16	3	8.5	265.0	-0.3
89	3	16	4	6.3	267.0	-0.3
89	3	16	5	4.6	220.0	-0.2
89	4	24	2	8.8	68.0	-0.5
89	4	24	3	8.3	72.0	-0.5
89	4	24	4	8.3	75.0	-0.5
89	4	24	5	5.3	125.0	-0.3
89	4	24	6	3.7	215.0	0.1
89	6	1	10	6.1	194.0	-0.5
89	6	1	11	6.2	235.0	-0.4
89	6	1	12	9.7	254.0	-0.8
89	6	1	13	6.2	187.0	-0.3
89	6	1	14	10.2	224.0	-0.5
89	6	1	15	10.2	231.0	-0.5
89	6	1	16	13.0	322.0	-0.4
89	6	1	17	9.6	333.0	0.0
89	6	1	18	10.7	315.0	-0.1
89	6	1	19	7.5	301.0	-0.3
89	6	1	20	4.1	305.0	-0.2
89	6	1	21	3.6	311.0	-0.1
89	6	1	22	4.3	204.0	-0.3
89	6	1	23	3.2	230.0	-0.3
89	6	1	24	4.8	256.0	-0.1
89	6	2	1	5.1	269.0	0.1
89	6	2	2	9.1	269.0	-0.3
89	6	2	3	9.2	280.0	-0.8
89	6	2	4	9.3	264.0	-0.7
89	6	2	5	9.2	272.0	-0.8
89	6	2	6	12.5	281.0	-1.0

Table 15 (continued)

Hourly Meteorological Data During Batch Releases
Davis-Besse Nuclear Power Station

Yr.	Month	Day	Hour	35' Wind Spd (MPH)	35' Wind Direction	ΔT 250'-35' (°F)
89	6	2	7	10.4	282.0	-0.5
89	6	2	8	10.8	280.0	-0.5
89	6	2	9	12.4	286.0	-0.5
89	6	2	10	12.1	290.0	-0.5
89	6	2	11	11.3	295.0	-0.5
89	6	2	12	10.8	288.0	-0.5
89	6	2	13	9.2	271.0	-0.5
89	6	2	14	9.8	286.0	-0.5
89	6	2	15	8.4	285.0	-0.5
89	6	2	16	9.4	269.0	-0.5
89	6	2	17	10.8	265.0	-0.6
89	6	2	18	9.9	258.0	-0.5
89	6	2	19	8.8	238.0	-0.4
89	6	2	20	6.2	220.0	-0.1
89	6	2	21	4.8	213.0	0.0
89	6	2	22	5.0	225.0	0.6
89	6	2	23	3.9	217.0	0.9
89	6	2	24	4.1	222.0	0.4
89	6	3	1	4.1	218.0	1.8
89	6	3	2	3.9	212.0	0.9
89	6	3	3	4.8	199.0	1.1
89	6	3	4	4.9	202.0	1.5
89	6	3	5	4.4	191.0	0.7
89	6	3	6	4.9	183.0	2.4
89	6	3	7	4.9	188.0	3.9
89	6	3	8	5.2	192.0	0.5
89	6	3	9	6.3	195.0	-0.4
89	6	17	15	18.1	222.0	-0.5
89	6	17	16	21.5	226.0	-0.5
89	6	17	17	18.2	223.0	-0.4
89	6	17	18	14.6	223.0	-0.4
89	6	17	19	16.2	225.0	-0.5

Appendix D

Offsite Dose Calculation Manual

Revision 3.1, 1989

NOTE: This appendix contains only those pages of the Offsite Dose Calculation Manual which changed as a result of Revision 3.1.

THE TOLEDO EDISON COMPANY

DAVIS-BESSE NUCLEAR POWER STATION

OFFSITE DOSE CALCULATIONS MANUAL

Revision No.	Reviewed by Station Review Board	Date
0	Stephen M Dunn	2/21/84
1	D. W. Braden	8/29/85
2	D. W. Braden	JUL 1 1986
3		JUL 29 1988
3.1		JAN 24 1989

Table 3-2

Controlling Locations, Pathways and Atmospheric Dispersion for Dose Calculations

Tech Spec	Location	Pathway(s)	Controlling Age Group	Atmospheric χ/Q (sec/m^3)	Dispersion D/Q (m^{-2})
3.11.2.1a	SITE BOUNDARY NNE	Noble Gases direct exposure	N/A	1.83E-06	N/A
3.11.2.1.b	SITE BOUNDARY NNE	inhalation	child	1.68E-06	N/A
3.11.2.2	SITE BOUNDARY NNE	gamma-air beta-air	N/A	1.83E-06	N/A
3.11.2.3	garden 980m,W	leafy vegetables	child	6.21E-07	9.58E-09

NOTES:

1. All meteorological dispersion values have been taken from Stone and Webster report, Handbook for ODCM χ/Q and D/Q Calculations, October 1983.

2. The noble gas, direct exposure χ/Qs are based on the decayed, undepleted values.

3. The inhalation pathway χ/Qs are based on the decayed, depleted values.

Table 3-3

Land-Use Census Summary

Pathway Locations and Atmospheric Dispersion Parameters

Sector	Distance (meters)	Pathways	Age Group	X/Q (sec/m^3)	D/Q (m^{-2})
N	870	inhalation	child	9.34E-07	8.55E-09
NNE	870**	inhalation	child	1.27E-06	1.47E-08
NE	900	inhalation	child	1.26E-06	1.58E-08
ENE*	--	--	--	--	--
E*	--	--	--	--	--
ESE*	--	--	--	--	--
SE*	--	--	--	--	--
SSE	2,830	vegetation	child	6.99E-08	8.31E-10
S	5,860	goat/milk	infant	2.89E-08	1.66E-10
SSW	2,550**	vegetation	child	5.38E-08	8.84E-10
SW	1,360	vegetation	child	2.05E-07	3.85E-09
WSW	4,250	cow/milk	infant	5.74E-08	5.36E-10
W	980	vegetation	child	6.21E-07	9.58E-09
WNW	2,900**	vegetation	child	7.19E-08	6.50E-10
NW	2,290	vegetation	child	7.02E-08	5.84E-10
NNW	1,330	vegetation	child	2.15E-07	1.57E-09

* Since these sectors are located over marsh areas and Lake Erie, no ingestion or inhalation pathways are present.

** These values are a change to this table as a result of the 1988 Land Use Census.

Table 4-1

Recommended Exposure Rates

in Lieu of Site Specific Data*

Exposure Pathway	Maximum Exposed Age Group	Exposure Rates	Table Reference for Dose Factors from RG 1.109
Liquid Releases			
Fish	Adult	21 kg/y	E-11
Drinking Water	Adult	730 l/y	E-11
Bottom Sediment	Teen	67 h/y	E-6
Atmospheric Releases			
Inhalation	Teen	8,000 m^3/y	E-8
Direct Exposure	All	6,100 h/y**	N/A (ODCM Table 3-4)
Leafy Vegetables	Child	26 kg/y	E-13
Fruits, Vegetables & Grain	Teen	630 kg/y	E-12
Milk	Infant	330 l/y	E-14

* Adapted from Regulatory Guide 1.109, Table E-5

** Net exposure of 6,100 h/y is based on the total 8760 hours per year adjusted by a 0.7 shielding factor as recommended in Regulatory Guide 1.109.

5.0 ASSESSMENT OF LAND USE CENSUS DATA

A land use census (LUC) is conducted annually in the vicinity of the Davis-Besse site. This census fulfills two main purposes: 1) meet requirements of TS 3.12.2 (as required by 10 CFR 50, Appendix I, Section IV.B.3) for identifying controlling location/pathway for dose assessment of TS 3.11.2.3; and 2) provide data on actual exposure pathways for assessing realistic doses to MEMBERS OF THE PUBLIC.

5.1 Land Use Census as Required by TS 3.12.2

As required by TS 3.12.2, a land use census shall be conducted during the growing season at least once per twelve months. The purpose of the census is to identify within a 5 mile distance the location in each of the 16 meteorological sectors of the nearest milk animal, nearest residence and nearest garden larger than 500 ft^2 producing broad leaf vegetation. The census shall be conducted by either a door-to-door survey, aerial survey, or by consulting local agricultural authorities (or a combination thereof). The data from the LUC is used for updating the location/pathway for dose assessment and for updating the Radiological Environmental Monitoring Program.

If the census identifies a location/pathway(s) yielding a higher potential dose to a MEMBER OF THE PUBLIC than currently being assessed as required by TS 3.11.2.3 (and ODCM Section 3.6 and table 3-3), this new location/pathway(s) shall be used for dose assessment. Tables 3-2 and 3-3 shall be updated to include the currently identified controlling location/pathway(s). Also, if the census identifies a location(s) that yields a calculated potential dose (via the same exposure pathway) 20% greater than a location currently included in the Radiological Environmental Monitoring Program, the new locations(s) shall be added to the program within 30 days if samples are reasonably obtainable. The sampling locations(s) excluding control locations, having a lower calculated dose via the same pathway may be deleted from the program at the time the new location/pathway(s) is added. As required by TS 3.12.2 and 6.9.1.11, the new location/pathway shall be identified in the next Semiannual Radioactive Effluent Release Report.

The following guideline shall be used for assessing the results from the land use census to ensure compliance with TS 3.12.2.

A. Data Compilation

A.1 Locations and pathways of exposure as identified by the land use census will be compiled for comparison with the current locations as presented in Table 3-3.

A.2 Changes from the previous year's census will be identified. Also, any location/pathway not currently included in the REMP (Table 6-1) will be identified.

A.3 Historical, annual average meteorological dispersion parameters (X/Q, D/Q for any new location (i.e., location not previously identified and/or evaluated) will be determined. All location should be evaluated against the same historical meteorological data set.

B. Relative Dose Significance

B.1 For all new locations, the relative dose significance will be determined by applicable pathways of exposure.

B.1.1 Relative dose calculations should be based on a generic radionuclide distribution (e.g., Davis-Besse USAR gaseous effluent source term of past year actual effluents). An I-131 source term dose may be used for assessment of the maximum organ ingestion pathway dose because of its overwhelming contribution to the total dose relative to the other particulate radionuclides.

B.1.2 The pathway dose equations of the ODCM should be used.

C. Data Evaluation

C.1 The controlling location used in the ODCM Table 3-3 will be verified. If any location/pathway(s) is identified with a higher relative dose, this location/pathway(s) should replace the previously identified controlling location/pathway in Table 3-3. If the previously identified controlling pathway is no longer present, the current controlling location/pathway should be determined.

C.2 Any changes in either the controlling location/pathway(s) of the ODCM dose calculations (Section 3.7 and Table 3-3) or the Radiological Environmental Monitoring Program (ODCM Section 6.0 and Table 6-1) shall be reported to NRC in accordance with TS 3.12.2, Action Item a. and b. and TS 6.9.1.11.

5.2 Land Use Census to Support Realistic Dose Assessment

The Land Use Census (LUC) provides data needed to support the special dose analyses of the ODCM.

Lower Limit of Detection--Decay Correction Factor

The equation and definition of the lower limit of detection in the NRC Standard Radiological Effluent Technical Specification include the term $e^{-\lambda t}$ which is used to decay correct the analysis. The LLD is further defined as an a priori (before the fact) limit representing the capabilities of a measurement system and not an a posteriori (after the fact) limit for a particular measurement.

Providing a decay correction for an evaluation of the capabilities of a system does not appear appropriate. It may be appropriate to decay correct certain analyses of specific samples to determine radionuclide concentrations at the time of release. Even in this case, such a correction is not appropriate for batch releases. Analyses are performed prior to any release; and, the sample will be decaying at the same rate as the batch from which the sample was taken. For continuous releases, decay correcting analyses of samples obtained over a specified sampling interval must take into account the accumulation of radioactivity in the sampling medium, the decay during the sampling interval and, especially for short lived radionuclides, equilibrium or quasi-equilibrium conditions that may be achieved.

Short-lived radionuclides will tend to reach an equilibrium value in the sampling medium as a function of source input and half-life. A single decay correction to adjust for sampling interval will provide an unacceptable overestimate. Equilibrium concentrations must be considered if analyses are to be indicative of actual release quantities.

Employing $\exp(-\lambda\Delta t)$ to adjust for radioactive decay between the end of sampling and the time of analysis is straightforward. However, to attempt to use the same term to adjust the decay during the sampling period is not proper. As a practical matter, when the half-life of a radionuclide is long relative to the sampling time and the time between sampling and analysis, i.e., minimal decay, the correction term will be near unity. In that event, the correction term is relatively unimportant.

At the other extreme, when the half-life of a radionuclide is much shorter than the sampling time or the time between the end of sampling and the analysis, the term $\exp(-\lambda\Delta t)$ could be used to adjust for decay between the end of sampling and the analysis. However, it would not be appropriate in that case to use the same term to attempt to adjust for decay during sampling.

The relationship between the radioactivity in a sample at the end of sampling and activity concentration in the medium being sampled is somewhat more involved. To explain this in the simplest condition, assume the radionuclide concentration is constant in the medium being sampled and that the medium is sampled at a constant rate.

In the instance of water sampling, the relationship between the activity concentration in the water being sampled and the activity concentration in the water sample at the end of sampling is:

$$C_1 = C_2 \frac{\lambda t}{1 - e^{-\lambda t}} \qquad (1)$$

where

C_1 = radionuclide concentration in the water being sampled
C_2 = radionuclide concentration in the water sample at the end of sampling
t = duration of sampling
λ = radionuclide decay constant

when $\lambda t >> 1$, $C_1 = C_2 \lambda t$

In the separate case of sampling a radionuclide in air by filtering the air and analyzing radioactive material collected on the filter, the radionuclide of interest is concentrated. Absent diluent air in the sample being analyzed, the relation between radioactivity on the sample media and radionuclide concentration in the air being sampled is:

$$q = \frac{C_1 F (1-e^{-\lambda t})}{\lambda} \qquad (2)$$

where

C_1 = radionuclide concentration in the air being sampled
q = radioactivity on the sample media (assuming 100% collection efficiency)
F = sampler flow rate (volume/time)
λ = radionuclide decay constant
t = duration of sampling

when $\lambda t \gg 1$, $C_1 = q \lambda / F$.

This merely recognizes that the rate of loss from the filter by radioactive decay equals the rate of collection onto the filter at equilibrium.

The NRC proposed equation appears to incorporate an adulterated way of encouraging analysis soon after the end of sampling and to encourage efficient sample concentration or radiochemical extraction. Although not rigorous, it combines both objectives in a simple and thus practical way, provided the decay correction is not extrapolated to a time earlier than the end of sampling.

A more nearly rigorous way of determining the activity concentration (or minimum detectable activity) in the medium being sampled is to assess the LLD in the sample at the time of analysis. Then the activity concentration in the medium being sampled can be calculated with the product of $\exp(-\lambda \Delta t)$ for decay between the end of sampling and the analysis and one of the equations derived herein for the relation between the medium being sampled and the activity in the sample at the end of sampling.

However, this method is not very practical or necessary considering the types of sampling and analysis at nuclear power plants, the significant radionuclides, and the offsite potential doses. The bulk of radioactivity is released as batch releases with all sampling and analysis performed prior to release. Therefore, no decay corrections are applicable. It is in the sampling and analysis of continuous releases that the accumulation and decay of the radioactive material may need to be considered. The use of NRC's guidance for decay correction to the mid-point of the sampling period can grossly overestimate actual release qualities of short-lived radionuclides, while providing little improvement for

the quantification of the longer half-life radionuclides that are the major dose contributors.

Overall, it may be appropriate to decay correct a certain analysis to account for radionuclide decay during the sampling period. However, simple decay correction to the mid-point of sampling will grossly overestimate any short-lived radionuclides that may be detected. More consideration needs to be given by the NRC to address this problem. In any case, the use of a decay correction factor in defining a lower limit of detection is inappropriate. The LLD is a measurement of the capability of the measurement system and should not be used to try to establish a regulatory position on sampling and decay correction for quantification of releases.

Appendix E

Milk Sample Unavailability

Milk samples from location T-20, 5.5 miles WSW of Davis-Besse, have become unavailable because the dairy farm has sold the herd. No replacement milk sampling locations are present within an eight kilometer (five mile) radius. However, additional milk samples are being collected at a site approximately six miles SW of the site.

T-20 milk sampling location will be deleted from the Offsite Dose Calculation Manual (ODCM) in the next revision.