VERMONT YANKEE
NUCLEAR POWER CORPORATION

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May 14, 2002
BVY 02-34

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Subject: **Vermont Yankee Nuclear Power Station**
License No. DPR-28 (Docket No. 50-271)
Annual 2001 Radioactive Effluent Release Report

In accordance with Vermont Yankee (VY) Technical Specification (TS) 6.6.D, attached is a copy of the annual 2001 Radioactive Effluent Release Report.

In addition, VY TS 6.7.B requires reporting of changes to the Off-site Dose Calculation Manual (ODCM). A summary of the changes made to the ODCM during 2001 is provided as Appendix H of the subject report and copies of the revised pages are included as Attachment 2 to this letter.

We trust that the information provided is adequate; however, should you have questions or require additional information, please contact Mr. Sam A. Wender (802) 258-5650.

Sincerely,

VERMONT YANKEE NUCLEAR POWER CORPORATION

Gautam Sen
Licensing Manager

Attachments
cc: USNRC Region 1 Administrator
USNRC Resident Inspector – VYNPS
USNRC Project Manager – VYNPS
Vermont Department of Public Service
Vermont Division of Occupational and Radiological Health
Massachusetts Metropolitan District Commission
Massachusetts Department of Public Health

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SUMMARY OF VERMONT YANKEE COMMITMENTS

BVY NO.: 02-34 "2001 Annual Radioactive Effluent Release Report"

The following table identifies commitments made in this document by Vermont Yankee. Any other actions discussed in the submittal represent intended or planned actions by Vermont Yankee. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager of any questions regarding this document or any associated commitments.

COMMITMENT	COMMITTED DATE OR "OUTAGE"
None	N/A

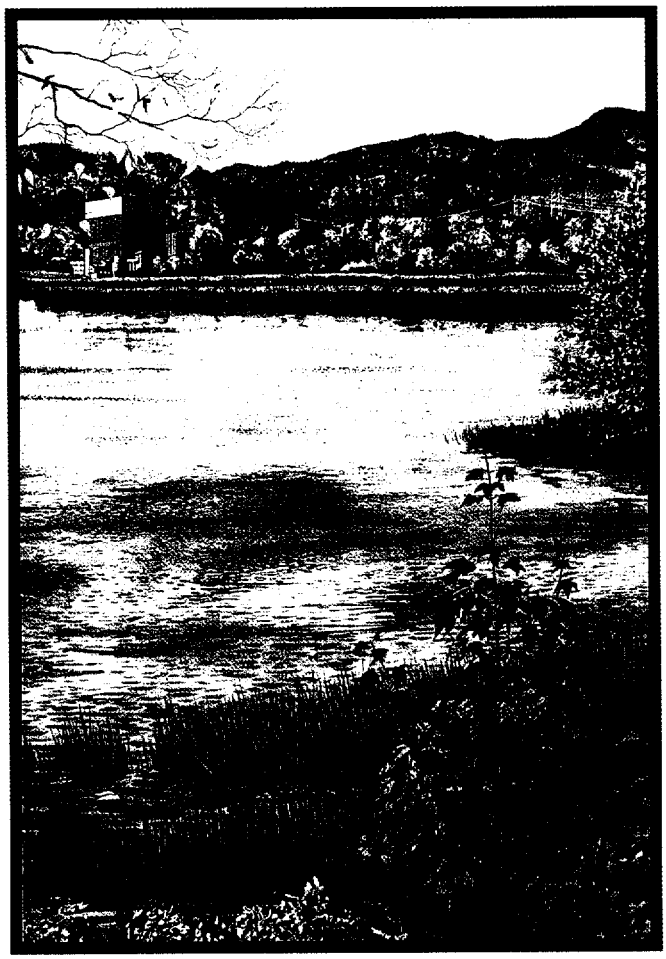
Docket No. 50-271
BVY 02-34

Attachment 1

Vermont Yankee Nuclear Power Station

2001 Radioactive Effluent Release Report

Vermont Yankee Nuclear Power Station
Vernon, Vermont



2001 Radioactive Effluent Release Report

RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2001 INCLUDING ANNUAL RADIOLOGICAL IMPACT ON MAN

Vermont Yankee Nuclear Power Station

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LIST OF TABLES

Radiological Effluent Release Report for 2001

[Including Annual Radiological Impact on Man]

1.0 INTRODUCTION

Tables 1 through 3 list the recorded radioactive liquid and gaseous effluents and solid waste for the year, with data summarized on a quarterly basis for both liquids and gases. Table 4A summarizes the estimated radiological dose commitments from all radioactive liquid and gaseous effluents released during the year 2001 in response to the ALARA objectives of 10CFR50, Appendix I. Also included on Table 4A is the estimate of direct dose from fixed station sources along the limiting west site boundary line. Tables 5A through 6H report the cumulative joint frequency distributions of wind speed, wind direction, and atmospheric stability for the 12-month period, January to December 2001. Radioactive effluents reported in Tables 1 and 2 were used to determine the resulting doses for 2001.

As required by ODCM Section 10.1, dose commitments resulting from the release of radioactive materials in liquids and gases during the reporting period were estimated in accordance with the "Vermont Yankee Nuclear Power Station Off-Site Dose Calculation Manual" (ODCM). These dose estimates were made using a "Method II" analysis as described in the ODCM. A "Method II" analysis incorporates the methodology of Regulatory Guide 1.109 (Reference 3) and actual measured meteorological data recorded during the reporting period.

As required by ODCM Section 10.1, this report shall also include an assessment of the radiation doses from radioactive effluents to member(s) of the public due to allowed recreational activities inside the site boundary during the year. For this reporting period, the only recreational activity permitted was employee access to a boat launching ramp adjacent to the intake structure. The assessment of recreational activities is described in Section 3.6.

Assessment of radiation doses (including direct radiation) to the likely most exposed real member(s) of the public for the calendar year for the purposes of demonstrating conformance with 40CFR190, "Environmental Radiation Protection Standards for Nuclear Power Operations," are also required to be included in this report if the conditions indicated in ODCM 3/4.6, "Total Dose," have been exceeded during the year. Since the conditions indicated in the action statement under ODCM 3/4.6 were not entered into during the year, no additional radiation dose assessments are required. However, Table 4B does provide the combination of doses and dose commitments from plant effluents and direct radiation sources for the limiting member of the public off-site as a demonstration of compliance with the dose standards of 40CFR190.

All calculated dose estimates for this reporting period are below the dose criteria of 10CFR Part 50, Appendix I, and 40CFR190.

Appendices B through H indicate the status of reportable items per the requirements of ODCM Section 10.1.

2.0 METEOROLOGICAL DATA

Meteorological data was collected during this reporting period from the site's 300-foot met tower located approximately 2,200 feet northwest of the reactor building, and about 1,400 feet from the plant stack. The 300-foot tower is approximately the same height as the primary plant stack (94 meters) and is designed to meet the requirements of Regulatory Guide 1.23 for meteorological monitoring.

X/Q and D/Q values were derived for all receptor points from the site meteorological record for each quarter using a straight-line airflow model. All dispersion factors have been calculated employing appropriate source configuration considerations, as described in Regulatory Guide 1.111 (Reference 1). A source depletion model as described in "Meteorology and Atomic Energy - 1968" (Reference 2) was used to generate deposition factors, assuming a constant deposition velocity of 0.01 m/sec for all stack (elevated) releases. Changes in terrain elevations in the site environment were also factored into the meteorological models as appropriate.

Table 4C lists the distances from the plant stack to the nearest site boundary, resident, and milk animal in each of the 16 principle compass directions as determined during the 2001 land use census. These locations were used in the calculation of atmospheric dispersion factors.

3.0 DOSE ASSESSMENT

3.1 Doses From Liquid Effluents

ODCM 3/4.2.2 limits total body (1.5 mrem per quarter, and 3 mrem per year) and organ doses (5 mrem per quarter, and 10 mrem per year) from liquid effluents to a member of the public to those specified in 10CFR Part 50, Appendix I. By implementing the requirements of 10CFR Part 50, Appendix I, ODCM 3/4.2.2 assures that the release of radioactive material in liquid effluents will be kept "as low as is reasonably achievable."

For periods in which liquid waste discharges actually occur, the exposure pathways that could exist are fish, direct exposure from river shoreline sedimentation, milk and meat via animal ingestion of the Connecticut River water, and meat, milk and vegetable pathways via crop irrigation with water withdrawn from the Connecticut River. The drinking water and aquatic invertebrate pathways do not exist down river of the Vermont Yankee plant.

There were no recorded liquid radwaste discharges during the report period, and therefore, no dose impact.

3.2 Doses From Noble Gases

ODCM 3/4.3.2 limits the gamma air dose (5 mrad per quarter, and 10 mrad per year) and beta air (10 mrad per quarter, and 20 mrad per year) dose from noble gases released in gaseous effluents from the site to areas at and beyond the site boundary to those specified in 10CFR Part 50, Appendix I. By implementing the requirements of 10CFR Part 50, Appendix I, ODCM 3/4.3.2 assures that the releases of radioactive noble gases in gaseous effluents will be kept "as low as is reasonably achievable."

Dose estimates due to the release of noble gases to the atmosphere are typically calculated at the site boundary, nearest resident in each of the sixteen principal compass directions, the point of highest off-site ground level air concentration of radioactive materials, and for each of the milk animal locations located within five miles of the plant.

3.3 Doses From Iodine-131, Iodine-133, Tritium, and Radionuclides in Particulate Form With Half-Lives Greater Than 8 Days

ODCM 3/4.3.3 limits the organ dose to a member of the public from iodine-131, iodine-133, tritium and radionuclides in particulate form with half-lives greater than 8 days (hereafter called iodines and particulates) in gaseous effluents released from the site to areas at and beyond the site boundary to those specified in 10CFR Part 50, Appendix I (7.5 mrem per quarter, and 15 mrem per year). By implementing the requirements of 10CFR Part 50, Appendix I, ODCM 3/4.3.3 assures that the releases of iodines and particulates in gaseous effluents will be kept "as low as is reasonably achievable."

Exposure pathways that could exist as a result of the release of iodines and particulates to the atmosphere include external irradiation from activity deposited onto the ground surface, inhalation, and ingestion of vegetables, meat and milk. Dose estimates were made at the site boundary and nearest resident in each of the sixteen principal compass directions, as well as all milk animal locations within five miles of the plant. The nearest resident and milk animals in each sector were identified by the most recent Annual Land Use Census as required by ODCM 3/4.5.2 (see Table 4C). Conservatively, a vegetable garden was assumed to exist at each milk animal and nearest resident location. Furthermore, the meat pathway was assumed to exist at each milk cow location since this data category is not part of the annual land use census. Doses were also calculated at the point of maximum ground level air concentration of radioactive materials in gaseous effluents and included the assumption that the inhalation, vegetable garden, and ground plane exposure pathways exist for an individual with a 100 percent occupancy factor.

It is assumed that milk and meat animals are free to graze on open pasture during the second and third quarters with no supplemental feeding. This assumption is conservative since most of the milk animals inventoried in the site vicinity are fed stored feed throughout the entire year with only limited grazing allowed during the growing season. It has also been assumed that only 50 percent of the iodine deposited from gaseous effluent is in elemental form (I_2) and is available for uptake (see p. 26, Reference 3). During the first and fourth quarters, the milk animals are assumed to receive only stored feed. Usage factors for gaseous effluents are listed by age group and pathway in Table 4D. Table 4E provides other dose model parameter assumptions used in the dose assessments.

The resultant organ doses were determined after adding the contributions from all pathways at each location. Doses were calculated for the whole body, GI-tract, bone, liver, kidney, thyroid, lung and skin for adults, teenagers, children and infants. The maximum estimated quarterly and annual organ doses to any age group due to iodines and particulates at any of the off-site receptor locations are reported in Table 4A. These estimated organ doses are well below the 10CFR Part 50, Appendix I dose criteria of ODCM 3/4.3.3.

3.4 Whole-Body Doses in Unrestricted Areas From Direct Radiation

The major source of dose, consisting of direct radiation and skyshine, from the station is due to N-16 decay in the Turbine Building. Because of the orientation of the Turbine Building on the site, and the shielding effects of the adjacent Reactor Building, only the seven westerly sectors (SSW to NNW) see any significant direct radiation.

Prior to 2001, historical High Pressure Ionization Chamber (HPIC) measurements made along the plant property line were used to estimate the direct radiation from the plant's steam cycle and carryover of N-16. Past correlation's of measurements of site boundary dose rate with different plant power levels (from shutdown to 100 percent), resulted in an algorithm of predicted integrated dose from direct radiation based on recorded gross megawatts generated by the plant over periods of interest. This original method as documented in the ODCM (Revision 29) was applicable during the first calendar quarter of 2001 up to the refueling outage with began April 27. During the 2001 refueling outage, the station implemented Noble Metal Chemistry (NMC) in the reactor coolant system as a precursor to also utilizing Hydrogen Water Chemistry to help counter stress corrosion fatigue of the reactor coolant system. As a secondary consequence of this change in coolant chemistry, the expected carryover of N-

16 in the steam cycle could no longer be expected to follows a simple correlation with gross power output as originally measured. Following the 2001 plant outage, a new set of HPIC measurements along the west site boundary were made over a six week period, with the results correlated with in-plant dose rates measured by the four Main Steam Line Radiation Monitors (MSLRM) over the same period. A new correlation method was derived that allowed changes in the N-16 carryover in the main steam flow to be directly related to changes in the site boundary dose without consideration of gross power output. Direct doses at the maximum site boundary location from radiation sources in the steam cycle used this new method to account for accumulated doses on the site boundary and nearest resident situated along this same boundary line following return to power from the refueling outage (May, 2001).

The other fixed sources of dose, including direct radiation and skyshine, to the site boundary are from low level radioactive waste stored in the North Warehouse, the Low Level Waste Storage Pad Facility, and old turbine rotors and casings in the turbine storage facility. The annual dose is based on dose rate measurements in these three storage facilities and determined at the same most restrictive site boundary dose location as that for N-16 shine from the Turbine Building.

The estimated direct radiation dose from all major sources combined for the most limiting site boundary location is listed on Table 4A. These site boundary doses assume a 100 percent occupancy factor, and take no credit for the shielding effect of any residential structure.

Table 4B lists the combination of direct radiation and effluent release doses at the limiting nearest residence for the purpose of demonstrating compliance with the dose standards contained in 40CFR190. For direct radiation, no credit for actual occupancy time is taken (i.e., occupancy is equal to 100%).

3.5 Doses From On-Site Disposal of Septic Waste and Cooling Tower Silt

Off-Site Dose Calculation Manual, Appendices B and F, require that all applications of septage and the cooling tower silt within the approved designated disposal areas be limited to ensure the dose to a maximally-exposed individual during the period of Vermont Yankee site control be maintained at less than 1 mrem/year to the whole body and any organ. After the period associated with Vermont Yankee operational control, the dose to the inadvertent intruder is to be maintained at less than 5 mrem/year. The projected dose from on-site disposals of septic waste and the cooling tower silt is given in Appendix J of this report.

3.6 On-Site Recreational Activities

During 2001, no access for employees, their families and guests to the boat launching ramp located on-site just north of the intake structure was permitted. As such, no recreational activities were permitted on-site during the report period and, therefore, no associated dose impact to members of the public.

REFERENCES

1. Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors", U.S. Nuclear Regulatory Commission, Office of Standards Development, March 1976.

2. Meteorology and Atomic Energy, 1968, Section 5-3.2.2, "Cloud Depletion", pg. 204. U. S. Atomic Energy Commission, July 1968.

3. Regulatory Guide 1.109, "Calculation of Annual Doses to Man From Routine Release of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR Part 50, Appendix I", U. S. Nuclear Regulatory Commission, Office of Standards Development, Revision l, October 1977.

4. W. M. Lowder, P. D. Raft, and G. dePlanque Burke, "Determination of N-16 Gamma Radiation Fields at BWR Nuclear Power Stations", Health and Safety Laboratory, Energy Research and Development Administration, Report No. 305, May 1976.

TABLE lA
Vermont Yankee
Effluent and Waste Disposal Annual Report
First and Second Quarters, 2001
Gaseous Effluents - Summation of All Releases

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
A. Fission and Activation Gases				
1. Total release	Ci	1.33 E-01	3.41 E-01	±2.30E+01
2. Average release rate for period	µCi/sec	1.69 E-02	4.29 E-02	
3. Percent of ODCM limit (1)	%	1.08 E-04	1.21E-03	
B. Iodines				
1. Total Iodine	Ci	1.87 E-04	2.77 E-04	±1.80E+01
2. Average release rate for period	µCi/sec	2.38 E-05	3.53 E-05	
3. Percent of ODCM limit (2)	%	7.77 E-02	6.81 E-02	
C. Particulates				
1. Particulates with T-1/2>8 days	Ci	4.49 E-04	1.76 E-04	±1.80E+01
2. Average release rate for period	µCi/sec	5.71 E-05	2.24 E-05	
3. Percent of ODCM limit (3)	%	(3)	(3)	
4. Gross alpha radioactivity	Ci	0.00 E+00	2.74 E-07	
D. Tritium				
1. Total release	Ci	5.39E+00	2.09E+00	±1.80E+01
2. Average release rate for period	µCi/sec	6.86E-01	2.66 E-01	
3. Percent of ODCM limit (3)	%	(3)	(3)	

(1) ODCM Control 3.3.2. for the most limiting of beta air or gamma air dose.
(2) ODCM Control 3.3.3. for dose from I-131, I-133, Tritium, and radionuclides in particulate form.
(3) Per ODCM Control 3.3.3, dose contribution from Tritium and particulates are included with Iodine above in Part B.

TABLE lA
(Continued)

Vermont Yankee
Effluent and Waste Disposal Annual Report
Third and Fourth Quarters, 2001
Gaseous Effluents - Summation of All Releases

	Unit	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and Activation Gases				
1. Total release	Ci	0.00 E+00	1.73 E+00	±2.30E+01
2. Average release rate for period	µCi/sec	0.00 E+00	2.18 E-01	
3. Percent of ODCM limit (1)	%	0.00 E+00	2.45 E-03	
B. Iodines				
1. Total Iodine	Ci	6.15 E-05	3.18 E-05	±1.80E+01
2. Average release rate for period	µCi/sec	7.74 E-06	4.00 E-06	
3. Percent of ODCM limit (2)	%	7.68 E-03	4.37 E-02	
C. Particulates				
1. Particulates with T-1/2>8 days	Ci	6.20 E-06	2.33E-05	±1.80E+01
2. Average release rate for period	µCi/sec	7.80 E-07	2.93 E-06	
3. Percent of ODCM limit (3)	%	(3)	(3)	
4. Gross alpha radioactivity	Ci	0.00 E+00	2.15E-07	
D. Tritium				
1. Total release	Ci	1.45 E+00	2.18E+00	±1.50E+01
2. Average release rate for period	µCi/sec	1.82 E-01	2.74 E-01	
3. Percent of ODCM limit (3)	%	(3)	(3)	

(1) ODCM Control 3.3.2. for the most limiting of beta air or gamma air dose.
(2) ODCM Control 3.3.3. for dose from 1-131, 1-133, Tritium, and radionuclides in particulate form.
(3) Per ODCM Control 3.3.3, dose contribution from Tritium and particulates are included with Iodine above in Part B.

TABLE 1B
Vermont Yankee
Effluent and Waste Disposal Annual Report
First and Second Quarters, 2001
Gaseous Effluents - Elevated Releases

		Continuous Mode		Batch Mode (1)	
		Quarter		Quarter	
Nuclides Released	Units	1	2	1	2
1. Fission Gases					
Argon-41	Ci	ND	3.41 E-01		
Krypton-85	Ci	ND	ND		
Krypton-85m	Ci	ND	ND		
Krypton-87	Ci	ND	ND		
Krypton-88	Ci	ND	ND		
Xenon-133	Ci	1.33 E-01	ND		
Xenon-133m	Ci	ND	ND		
Xenon-135	Ci	ND	ND		
Xenon-135m	Ci	ND	ND		
Xenon-138	Ci	ND	ND		
Unidentified	Ci	ND	ND		
Total for Period	**Ci**	**1.33 E-01**	**3.41 E-01**	**0.00E+00**	**0.00E+00**
2. Iodines					
Iodine-131	Ci	4.79 E-05	5.03 E-05		
Iodine-133	Ci	1.39 E-04	2.27 E-04		
Iodine-135	Ci	ND	ND		
Total for Period	**Ci**	**1.87 E-04**	**2.77 E-04**	**0.00E+00**	**0.00E+00**
3. Particulates					
Strontium-89	Ci	3.90 E-05	1.66 E-05		
Strontium-90	Ci	ND	ND		
Cesium-134	Ci	ND	ND		
Cesium-137	Ci	5.27 E-06	ND		
Barium-Lanthanum-140	Ci	ND	ND		
Manganese-54	Ci	ND	3.58 E-06		
Chromium-51	Ci	3.52 E-04	1.14 E-04		
Cobalt-58	Ci	ND	ND		
Cobalt-60	Ci	ND	9.28 E-06		
Cerium-141	Ci	ND	ND		
Zinc-65	Ci	5.02 E-05	3.26 E-05		
Total for Period	**Ci**	**4.46 E-04**	**1.76 E-04**	**0.00E+00**	**0.00E+00**

(1) There were no batch mode gaseous releases for this reporting period.
ND Not Detected at the plant stack

TABLE lB
(Continued)

Vermont Yankee
Effluent and Waste Disposal Annual Report
Third and Fourth Quarters, 2001
Gaseous Effluents -Elevated Releases

	Continuous Mode			Batch Mode (1)	
		Quarter		Quarter	
Nuclides Released	Units	3	4	3	4
1. Fission Gases					
Krypton-85	Ci	ND	ND		
Krypton-85m	Ci	ND	ND		
Krypton-87	Ci	ND	4.73 E-01		
Krypton-88	Ci	ND	ND		
Xenon-133	Ci	ND	3.90 E-01		
Xenon-133m	Ci	ND	ND		
Xenon-135	Ci	ND	8.66 E-01		
Xenon-135m	Ci	ND	ND		
Xenon-138	Ci	ND	ND		
Unidentified	Ci	ND	ND		
Total for Period	**Ci**	**0.00 E+00**	**1.73 E+00**	**0.00 E+00**	**0.00 E+00**
2. Iodines					
Iodine-131	Ci	ND	3.18 E-05		
Iodine-133	Ci	6.15 E-05	ND		
Iodine-135	Ci	ND	ND		
Total for Period	**Ci**	**6.15 E-05**	**3.18 E-05**	**0.00E+00**	**0.00E+00**
3. Particulates					
Strontium-89	Ci	6.20 E-06	6.44 E-06		
Strontium-90	Ci	ND	ND		
Cesium-134	Ci	ND	ND		
Cesium-137	Ci	ND	ND		
Barium-Lanthanum-140	Ci	ND	ND		
Manganese-54	Ci	ND	ND		
Chromium-51	Ci	ND	ND		
Cobalt-58	Ci	ND	ND		
Cobalt-60	Ci	ND	ND		
Cerium-141	Ci	ND	ND		
Cerium-144	Ci	ND	1.85 E-05		
Zinc-65	Ci	ND	ND		
Total for Period	**Ci**	**6.20 E-06**	**2.49 E-05**	**0.00E+00**	**0.00E+00**

ND Not Detected at the Plant Stack
(1) There were no batch mode gaseous releases for this reporting period.

TABLE 1C
Vermont Yankee
Effluent and Waste Disposal Annual Report
First and Second Quarters, 2001
Gaseous Effluents - Ground Level Releases (2)

		Continuous Mode		Batch Mode	
		Quarter		Quarter	
Nuclides Released	Units	1(1)(2)	2	1	2
1. Fission Gases					
Krypton-85	Ci	ND			
Krypton-85m	Ci	ND			
Krypton-87	Ci	ND			
Krypton-88	Ci	ND			
Xenon-133	Ci	ND			
Xenon-135	Ci	ND			
Xenon-135m	Ci	ND			
Xenon-138	Ci	ND			
Unidentified	Ci	ND			
Total for Period	**Ci**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
2. Iodines					
Iodine-131	Ci	ND			
Iodine-133	Ci	ND			
Iodine-I 35	Ci	ND			
Total for Period	**Ci**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
3. Particulates					
Strontium-89	Ci	ND			
Strontium-90	Ci	ND			
Cesium-134	Ci	ND			
Cesium- 137	Ci	1.60 E-07			
Barium-Lanthanum-140	Ci	ND			
Manganese-54	Ci	5.52 E-08			
Chromium-51	Ci	ND			
Cobalt-58	Ci	ND			
Cobalt-60	Ci	8.27 E-07			
Cerium-141	Ci	ND			
Zinc-65	Ci	1.50 E-07			
Iron-55	Cl	2.10 E-06			
Total for Period	**Ci**	**3.29 E-06**	**0.00E+00**	**0.00E+00**	**0.00E+00**

(1) Burning of used oil was treated as a continuous release for the first quarter. Used oil was burned only in the first quarter.
(2) The North Warehouse stack was used as a ground level release point for burning of used oil.
ND Not detected in the used oil sample.

TABLE 1C
(Continued)

Vermont Yankee
Effluent and Waste Disposal Annual Report
Third and Fourth Quarters, 2001
Gaseous Effluents - Ground Level Releases

		Continuous Mode		Batch Mode	
		Quarter		Quarter	
Nuclides Released	Units	3(1)	4(1)	3(1)	4(1)
1. Fission Gases					
Krypton-85	Ci				
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-133	Ci				
Xenon-135	Ci				
Xenon-135m	Ci				
Xenon-138	Ci				
Unidentified	Ci				
Total for Period	**Ci**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
2. Iodines					
Iodine-131	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Total for Period	**Ci**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
3. Particulates					
Strontium-89	Ci				
Strontium-90	Ci				
Cesium- 134	Ci				
Cesium-137	Ci				
Barium-Lanthanum- 140	Ci				
Manganese-54	Ci				
Chromium-51	Ci				
Cobalt-58	Ci				
Cobalt-60	Ci				
Cerium-141	Ci				
Zinc-65	Ci				
Iron-55	CI				
Total for Period	**Ci**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**

(1) There were no ground level gaseous releases for this reporting period.

TABLE 1D
Vermont Yankee
Effluent and Waste Disposal Annual Report
for 2001
Gaseous Effluents - Nonroutine Releases

There were no nonroutine or accidental gaseous releases during this reporting period.

TABLE 2A
Vermont Yankee
Effluent and Waste Disposal Annual Report
for 2001
Liquid Effluents - Summation of All Releases

There were no liquid releases during this reporting period.

TABLE 2B
Vermont Yankee
Effluent and Waste Disposal Annual Report
for 2001
Liquid Effluents - Nonroutine Releases

There were no nonroutine or accidental liquid releases during this reporting period.

TABLE 3
Vermont Yankee
Effluent and Waste Disposal Annual Report
First and Second Quarters, 2001
Solid Waste and Irradiated Fuel Shipments

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (not irradiated fuel)

1. Type of Waste

Shipped from VY for Burial or Disposal	Unit	1ST and 2ND Quarters 2001	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	1.90 E+01 5.62 E+01	± 2.5 E+1
b. Dry compressible waste, contaminated equipment, etc.	m^3 Ci	None	± 2.5 E+1
c. Irradiated components, control rods, etc.:	m^3 Ci	None	± 2.5 E+1

Shipped from Processor(s) for Burial or Disposal	Unit	1ST and 2ND Quarters 2001	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	None	± 2.5 E+1
b. Dry compressible waste, contaminated equipment, etc.	m^3 Ci	1.10 E+00 9.00 E-03	± 2.5 E+1
c. Irradiated components, control rods, etc.:	m^3 Ci	None	± 2.5 E+1

2. Estimate of Major Nuclide Composition (By Type of Waste)

a. Spent resins, filter sludge, evaporator bottoms, etc.			b. Dry compressible waste, contaminated equipment, etc.		
Isotope	Percent (1)		Isotope	Percent (1)	
Zinc-65	%	2.02 E+01	Iron-55	%	6.41 E+01
Cesium-137	%	1.30 E+01	Zinc-65	%	7.50 E+00
Cobalt-60	%	2.62 E+01	Cobalt-60	%	1.62 E+01
Ni-63	%	1.42 E+01	Manganese-54	%	5.30 E+00
Manganese-54	%	7.50 E+00	Cesium-137	%	1.20 E+00
Iron-55	%	1.34 E+01	Cr-51	%	3.30 E+00

(1) Includes only those nuclides that are greater than 1% of the total activity.

Note: Sections A.1. and A.2. above do not include the data for the waste shipments from VY to the processors. The data for this waste will be included in the report that covers the year that this waste is shipped from the processor for burial or disposal.

TABLE 3
(Continued)

Vermont Yankee
Effluent and Waste Disposal Annual Report
First and Second Quarters, 2001
Solid Waste and Irradiated Fuel Shipments

3. Disposition of solid waste shipments (1st and 2nd Quarters)

Number of Shipments	From VY	From Processor	Mode of Transportation	Destination	
				Processor	Burial or Disposal
4	x		Truck		CNS, Inc. Barnwell, SC
7		x	Truck		Envirocare Clive, UT
4	x		Truck	GTS Duratek Oak Ridge, TN	

B. Irradiated Fuel Shipments (Disposition): None

C. Additional Data (1st and 2nd Quarters)

Supplemental Information	Shipments from VY to Processors	Shipments from VY for Burial or Disposal	Shipments from Processors for Burial or Disposal
Class of solid waste shipped	4 A	4 A	A (quantity of containers not required)
Type of containers used	4 Strong Tight	4 Type A	Strong Tight (quantity of containers not required)
Solidification agent or absorbent	None	None	None

TABLE 3
(Continued)
Vermont Yankee
Effluent and Waste Disposal Annual Report
Third and Fourth Quarters, 2001
Solid Waste and Irradiated Fuel Shipments

B. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (not irradiated fuel)

1 Type of Waste

Shipped from VY for Burial or Disposal	Unit	3rd and 4th Quarters 2001	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	None	±2.50 E+01
b. Dry compressible waste, contaminated equipment, etc.	m^3 Ci	None	±2.50 E+01
c. Irradiated components, control rods, etc.	m^3 Ci	None	±2.50 E+01

Shipped from Processor(s) for Burial or Disposal	Unit	3rd and 4th Quarters 2001	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	None	±2.50 E+01
b. Dry compressible waste, contaminated equipment, etc.	m^3 Ci	1.32 E+01 7.30 E-01	±2.50 E+01
c. Irradiated components, control rods, etc.	m^3 Ci	None	±2.50 E+01

2. Estimate of Major Nuclide Composition (By Type of Waste)

a. Spent resins, filter sludges, evaporator bottoms, etc.		b. Dry compressible waste, contaminated equipment, etc.		c. Irradiated components, control rods, etc.	
Isotope	Percent (1)	Isotope	Percent (1)	Isotope	Percent (1)
Zinc-65	% 2.02 E+01	Iron-55	% 6.41 E+01		% E+
Cesium-137	% 1.30 E+01	Zinc-65	% 7.50 E+00		% E+
Cobalt-60	% 2.62 E+01	Cobalt-60	% 1.62 E+01		% E+
Ni-63	% 1.42 E+01	Manganese-54	% 5.30 E+00		% E+
Manganese-54	% 7.50 E+00	Cesium-137	% 1.20 E+00		
Iron-55	% 1.34 E+01	Cr-51	% 3.30 E+00		

(1) Includes only those nuclides that are greater than 1% of the total activity.

Note: Sections A.1. and A.2. above do not include the data for the shipments from VY to the processors. The data for this waste will be included in the report that covers the year that this waste is shipped from the processor for burial or disposal.

TABLE 3
(Continued)
Vermont Yankee
Effluent and Waste Disposal Annual Report
Third and Fourth Quarters, 2001
Solid Waste and Irradiated Fuel Shipments

3. Disposition of Solid Waste Shipments (3rd and 4th Quarters)

Number of Shipments	From VY	From Processor	Mode of Transportation	Destination	
				Processor	Burial or Disposal
	X		Truck		CNS, Inc. Barnwell, SC
		X	Truck		Envirocare Clive, UT
	X		Truck	GTS Duratek Oak Ridge, TN	

B. Irradiated Fuel Shipments (Disposition): None

C. Additional Data (3rd and 4th Quarters)

Supplemental Information	Shipments from VY to Processors	Shipments from VY for Burial or Disposal	Shipments from Processors for Burial or Disposal
Class of solid waste shipped	A	A B C	A (quantity of containers not required)
Type of containers used	Strong Tight	Type A Type B	Strong Tight (quantity of containers not required)
Solidification agent or absorbent			

TABLE 4A
Vermont Yankee
Maximum* Off-Site Doses/Dose Commitments to Members of the Public from Liquid and Gaseous Effluents for 2001
(10CFR50, Appendix I)

Source	Dose (mrem)(a)				
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Year(b)
Liquid Effluents					
Total Body Dose					
Footnotes	(c)	(c)	(c)	(c)	(c)
Organ Dose					
Footnotes	(c)	(c)	(c)	(c)	(c)
Airborne Effluents					
Iodines and Particulates	1.72E-03	3.31E-03	3.31E-04	1.04E-03	6.40E-03
Footnotes	(1)	(2)	(3)	(1)	
Noble Gases					
Beta Air (mrad)	4.87E-06	2.86E-05	--	3.44E-04	3.77E-04
Footnotes	(4)	(6)	(d)	(8)	
Gamma Air (mrad)	1.09E-06	7.89E-05	--	1.05E-04	1.85E-04
Footnotes	(5)	(7)	(d)	(9)	
Direct Radiation					
See Section 3.4	4.24	3.09	3.60	3.47	14.4 (e)

* "Maximum" means the largest fraction of the corresponding 10CFR50, Appendix I dose design objective.

(a) The numbered footnotes indicate the age group, organ, and location of the dose receptor, where appropriate.

(b) The yearly dose is the sum of the doses for each quarter, or a full annual assessment.

(c) There were no liquid releases in this quarter.

(d) There were no noble gas releases in this quarter.

(e) Maximum direct dose point located on the west site boundary

(1) Child/Thyroid / NW / 2900 meters

(2) Infant / Thyroid / SSE / 5240 meters

(3) Child/Thyroid / SW / 2600 meters

(4) NW / 3055 meters

(5) NW / 2755 meters

(6) WNW / 2400 meters

(7) SSE / 850 meters

(8) NW / 2900 meters

(9) NW / 2600 meters

TABLE 4B
Vermont Yankee
Maximum Annual Dose Commitments from Direct External Radiation,
Plus Liquid and Gaseous Effluents for 2001(*)
(40CFR190)

Pathway	Total Body (mrem)	Maximum Organ (mrem)	Thyroid (mrem)
Direct External (a)	14.4	14.4	14.4
Liquids	(c)	(c)	(c)
Gases	7.87E-05	8.47E-05(d)	7.72E-05
Annual Total (b)	14.4	14.4	14.4

(*) The location of the projected maximum individual doses from combined direct radiation plus liquid and gaseous effluents correspond to residences at the southwest boundary relative to the Turbine Hall.

(a) No occupancy time fraction (assumed 100%) or residential shielding credit is assumed which would reduce real doses below the calculated values. Expected direct external radiation doses would be reduced by about 54% with a realistic residential shielding credit and occupancy time (0.7 shielding factor from Regulatory Guide 1.109 and annual occupancy time 6760 hours).

(b) Annual dose limits contained in the EPA Radiation Protection Standards (40CFR190) equal 25 mrem to the total body and any organ, except 75 mrem to the thyroid of a real member of the public.

(c) There was no liquid release in 2001.

(d) Maximum dose to any organ over all age groups for each release.

TABLE 4C
Receptor Locations for Vermont Yankee

Sector	Site Boundary [1] (Meters)	Nearest Resident[2] (Meters)	Nearest Milk Animal[2] Within 10 km (Meters)
N	400	1470	--
NNE	350	1400	5520 (Cows)
NE	350	1250	--
ENE	400	970	--
E	500	930	--
ESE	700	2830	--
SE	750	1970	3600 (cows)
SSE	850	2050	5240* (cows)
S	385	450	2220 (cows)
SSW	300	450	--
SW	250	410	8200 (cows)
WSW	250	450	9590 (goats)
W	300	620	820 (cows)
WNW	400	1060	6980* (cows)
NW	550	2600	4260* (cows)
NNW	550	2600	--

* Receptor locations were conservatively included although these farms have been classified as "out of business"

(1) Vermont Yankee UFSAR Figure 2.2-5.

(2) The location(s) given are based on data from the Vermont Yankee 2001 Land Use Census relative to the plant stack. Gardens are assumed to be present at all resident locations.

TABLE 4D

Usage Factors for Various Gaseous Pathways at Vermont Yankee

(From Reference 1, Table E-5[1])

Age Group	Veg. (kg/yr)	Leafy Veg. (kg/yr)	Milk (l/yr)	Meat (kg/yr)	Inhalation (m^3/yr)
Adult	520	64	310	110	8,000
Teen	630	42	400	65	8,000
Child	520	26	330	41	3,700
Infant	0	0	330	0	1,400

(1) Regulatory Guide 1.109.

TABLE 4E
Environmental Parameters for Gaseous Effluents at Vermont Yankee

Variable		Vegetables		Cow Milk		Goat Milk		Meat	
		Stored	Leafy	Pasture	Stored	Pasture	Stored	Pasture	Stored
YV	Agricultural Productivity (kg/m^2)	2	2	0.70	2	0.70	2	0.70	2
P	Soil Surface Density (kg/m^2)	240	240	240	240	240	240	240	240
T	Transport Time to User (hrs)			48	48	48	48	480	480
TB	Soil Exposure Time [a] (hrs)	131,400	131,400	131,400	131,400	131,400	131,400	131,400	131,400
TE	Crop Exposure Time to Plume (hrs)	1,440	1,440	720	1,440	720	1,440	720	1,440
TH	Holdup After Harvest (hrs)	1,440	24	0	2,160	0	2,160	0	2,160
QF	Animals Daily Feed (kg/day)			50	50	6	6	50	50
FP	Fraction of Year on Pasture[b]			0.50		0.50		0.50	
FS	Fraction Pasture Feed When on Pasture[c]			1		1		1	

Note:Footnotes on following page.

TABLE 4E
(Continued)

Environmental Parameters for Gaseous Effluents at Vermont Yankee

Variable		Vegetables		Cow Milk		Goat Milk		Meat	
		Stored	Leafy	Pasture	Stored	Pasture	Stored	Pasture	Stored
FG	Fraction of Stored Vegetables Grown in Garden	0.76							
FL	Fraction of Leafy Vegetables Grown in Garden		1.0						
FI	Fraction Elemental Iodine = 0.5								
H	Absolute Humidity = 5.6[(d)]								

(a) For Method II dose/dose rate analyses of identified radioactivity releases of less than one year, the soil exposure time for that release may be set at 8,760 hours (one year) for all pathways.

(b) For Method II dose/dose rate analyses performed for releases occurring during the first or fourth calendar quarters, the fraction of time animals are assumed to be on pasture is zero (nongrowing season). For the second and third calendar quarters, the fraction of time on pasture (FP) will be set at 1.0. FP may also be adjusted for specific farm locations if this information is so identified and reported as part of the land use census.

(c) For Method II analyses, the fraction of pasture feed while on pasture may be set to less than 1.0 for specific farm locations if this information is so identified and reported as part of the land use census.

(d) For all Method II analyses, an absolute humidity value equal to 5.6 (gm/m^3) shall be used to reflect conditions in the Northeast (Reference: Health Physics Journal, Volume 39 (August), 1980; Pages 318-320, Pergammon Press).

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
321	Table 5A																	
322	Stability Class 5A																	
323	Class Frequency = 0.70%																	
324	Upper Data Collection Station (297 ft)																	
325																		
326	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
327	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
328	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
329	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
330	GE 0.00 and LE 0.95	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
331	% of all valid observations for this stability class	15.79	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.54
332	% of all valid observations for this period	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
333																		
334	GT 0.95 and LE 3.50	4	3	0	1	1	1	2	1	1	0	0	0	0	0	0	1	15
335	% of all valid observations for this stability class	7.02	5.26	0.00	1.75	1.75	1.75	3.51	1.75	1.75	0.00	0.00	0.00	0.00	0.00	0.00	1.75	26.32
336	% of all valid observations for this period	0.05	0.04	0.00	0.01	0.01	0.01	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.18
337																		
338	GT 3.50 and LE 7.50	1	4	6	0	0	1	0	1	0	0	0	0	0	0	0	6	19
339	% of all valid observations for this stability class	1.75	7.02	10.53	0.00	0.00	1.75	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.53	33.33
340	% of all valid observations for this period	0.01	0.05	0.07	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.23
341																		
342	GT 7.50 and LE 12.50	1	0	3	1	0	0	0	0	1	0	0	0	0	0	0	0	6
343	% of all valid observations for this stability class	1.75	0.00	5.26	1.75	0.00	0.00	0.00	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.53
344	% of all valid observations for this period	0.01	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
345																		
346	GT 12.50 and LE 18.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
347	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	0.00	0.00	0.00	1.75
348	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
349																		
350	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
351	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.51	3.51
352	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
353																		
354	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4
355	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.02	7.02
356	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
357																		
358	All Velocities	15	8	9	2	1	2	2	2	2	0	0	0	1	0	0	13	57
359	% of all valid observations for this stability class	26.32	14.04	15.79	3.51	1.75	3.51	3.51	3.51	3.51	0.00	0.00	0.00	1.75	0.00	0.00	22.81	100.00
360	% of all valid observations for this period	0.18	0.10	0.11	0.02	0.01	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.70

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
361	Table 5B																	
362	Stability Class 5B																	
363	Class Frequency = 0.44%																	
364	Upper Data Collection Station (297 ft)																	
365																		
366	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
367	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
368	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
369	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
370	GE 0.00 and LE 0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
371	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
372	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
373																		
374	GT 0.95 and LE 3.50	1	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	4
375	% of all valid observations for this stability class	2.78	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	2.78	0.00	0.00	0.00	11.11
376	% of all valid observations for this period	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.05
377																		
378	GT 3.50 and LE 7.50	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	1	4
379	% of all valid observations for this stability class	0.00	0.00	0.00	5.56	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	11.11
380	% of all valid observations for this period	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05
381																		
382	GT 7.50 and LE 12.50	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	5	8
383	% of all valid observations for this stability class	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	2.78	0.00	13.89	22.22
384	% of all valid observations for this period	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.06	0.10
385																		
386	GT 12.50 and LE 18.50	2	0	0	0	0	0	0	1	2	0	0	0	0	2	1	7	15
387	% of all valid observations for this stability class	5.56	0.00	0.00	0.00	0.00	0.00	0.00	2.78	5.56	0.00	0.00	0.00	0.00	5.56	2.78	19.44	41.67
388	% of all valid observations for this period	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.02	0.01	0.09	0.18
389																		
390	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
391	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33	8.33
392	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04
393																		
394	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
395	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.56	5.56
396	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
397																		
398	All Velocities	4	0	0	3	0	0	1	1	2	1	1	0	1	3	1	18	36
399	% of all valid observations for this stability class	11.11	0.00	0.00	8.33	0.00	0.00	2.78	2.78	5.56	2.78	2.78	0.00	2.78	8.33	2.78	50.00	100.00
400	% of all valid observations for this period	0.05	0.00	0.00	0.04	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.00	0.01	0.04	0.01	0.22	0.44

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
401	Table 5C																	
402	Stability Class 5C																	
403	Class Frequency = 1.48%																	
404	Upper Data Collection Station (297 ft)																	
405																		
406	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
407	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
408	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
409	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
410	GE 0.00 and LE 0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
411	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
412	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
413																		
414	GT 0.95 and LE 3.50	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	3
415	% of all valid observations for this stability class	0.00	0.83	0.00	0.83	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50
416	% of all valid observations for this period	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
417																		
418	GT 3.50 and LE 7.50	5	0	0	0	3	0	1	3	1	1	0	0	0	0	1	5	20
419	% of all valid observations for this stability class	4.17	0.00	0.00	0.00	2.50	0.00	0.83	2.50	0.83	0.83	0.00	0.00	0.00	0.00	0.83	4.17	16.67
420	% of all valid observations for this period	0.06	0.00	0.00	0.00	0.04	0.00	0.01	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.06	0.25
421																		
422	GT 7.50 and LE 12.50	7	1	0	0	0	0	1	7	10	0	3	0	1	2	1	13	46
423	% of all valid observations for this stability class	5.83	0.83	0.00	0.00	0.00	0.00	0.83	5.83	8.33	0.00	2.50	0.00	0.83	1.67	0.83	10.83	38.33
424	% of all valid observations for this period	0.09	0.01	0.00	0.00	0.00	0.00	0.01	0.09	0.12	0.00	0.04	0.00	0.01	0.02	0.01	0.16	0.57
425																		
426	GT 12.50 and LE 18.50	6	0	0	0	1	0	0	0	4	0	0	0	2	4	1	15	33
427	% of all valid observations for this stability class	5.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00	3.33	0.00	0.00	0.00	1.67	3.33	0.83	12.50	27.50
428	% of all valid observations for this period	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.02	0.05	0.01	0.18	0.41
429																		
430	GT 18.50 and LE 24.50	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	13	17
431	% of all valid observations for this stability class	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	10.83	14.17
432	% of all valid observations for this period	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.16	0.21
433																		
434	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
435	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00	0.83
436	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
437																		
438	All Velocities	19	2	0	1	4	1	2	10	15	1	3	0	4	6	6	46	120
439	% of all valid observations for this stability class	15.83	1.67	0.00	0.83	3.33	0.83	1.67	8.33	12.50	0.83	2.50	0.00	3.33	5.00	5.00	38.33	100.00
440	% of all valid observations for this period	0.23	0.02	0.00	0.01	0.05	0.01	0.02	0.12	0.18	0.01	0.04	0.00	0.05	0.07	0.07	0.57	1.48

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
441	Table 5D																	
442	Stability Class 5D																	
443	Class Frequency = 48.21%																	
444	Upper Data Collection Station (297 ft)																	
445																		
446	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
447	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
448	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
449	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
450	GE 0.00 and LE 0.95	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2
451	% of all valid observations for this stability class	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.05
452	% of all valid observations for this period	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
453																		
454	GT 0.95 and LE 3.50	49	36	32	23	40	46	63	43	16	6	3	4	8	9	26	43	447
455	% of all valid observations for this stability class	1.25	0.92	0.82	0.59	1.02	1.17	1.61	1.10	0.41	0.15	0.08	0.10	0.20	0.23	0.66	1.10	11.40
456	% of all valid observations for this period	0.60	0.44	0.39	0.28	0.49	0.57	0.77	0.53	0.20	0.07	0.04	0.05	0.10	0.11	0.32	0.53	5.50
457																		
458	GT 3.50 and LE 7.50	77	38	26	17	45	81	146	167	73	23	8	15	17	23	37	190	983
459	% of all valid observations for this stability class	1.96	0.97	0.66	0.43	1.15	2.07	3.72	4.26	1.86	0.59	0.20	0.38	0.43	0.59	0.94	4.85	25.07
460	% of all valid observations for this period	0.95	0.47	0.32	0.21	0.55	1.00	1.79	2.05	0.90	0.28	0.10	0.18	0.21	0.28	0.45	2.34	12.09
461																		
462	GT 7.50 and LE 12.50	139	33	10	8	9	38	80	155	252	43	21	31	92	111	51	227	1300
463	% of all valid observations for this stability class	3.55	0.84	0.26	0.20	0.23	0.97	2.04	3.95	6.43	1.10	0.54	0.79	2.35	2.83	1.30	5.79	33.15
464	% of all valid observations for this period	1.71	0.41	0.12	0.10	0.11	0.47	0.98	1.91	3.10	0.53	0.26	0.38	1.13	1.36	0.63	2.79	15.98
465																		
466	GT 12.50 and LE 18.50	107	8	2	0	1	2	14	22	110	16	14	20	64	172	101	206	859
467	% of all valid observations for this stability class	2.73	0.20	0.05	0.00	0.03	0.05	0.36	0.56	2.81	0.41	0.36	0.51	1.63	4.39	2.58	5.25	21.91
468	% of all valid observations for this period	1.32	0.10	0.02	0.00	0.01	0.02	0.17	0.27	1.35	0.20	0.17	0.25	0.79	2.11	1.24	2.53	10.56
469																		
470	GT 18.50 and LE 24.50	44	2	0	0	0	1	1	3	6	0	0	4	11	50	47	109	278
471	% of all valid observations for this stability class	1.12	0.05	0.00	0.00	0.00	0.03	0.03	0.08	0.15	0.00	0.00	0.10	0.28	1.28	1.20	2.78	7.09
472	% of all valid observations for this period	0.54	0.02	0.00	0.00	0.00	0.01	0.01	0.04	0.07	0.00	0.00	0.05	0.14	0.61	0.58	1.34	3.42
473																		
474	GT 24.50	2	1	0	0	0	0	0	0	0	0	0	0	1	14	8	26	52
475	% of all valid observations for this stability class	0.05	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.36	0.20	0.66	1.33
476	% of all valid observations for this period	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.17	0.10	0.32	0.64
477																		
478	All Velocities	418	119	70	48	95	168	304	390	457	88	46	74	193	379	270	802	3921
479	% of all valid observations for this stability class	10.66	3.03	1.79	1.22	2.42	4.28	7.75	9.95	11.66	2.24	1.17	1.89	4.92	9.67	6.89	20.45	100.00
480	% of all valid observations for this period	5.14	1.46	0.86	0.59	1.17	2.07	3.74	4.79	5.62	1.08	0.57	0.91	2.37	4.66	3.32	9.86	48.21

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
481	Table 5E																	
482	Stability Class 5E																	
483	Class Frequency = 32.43%																	
484	Upper Data Collection Station (297 ft)																	
485																		
486	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
487	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
488	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
489	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
490	GE 0.00 and LE 0.95	4	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6
491	% of all valid observations for this stability class	0.15	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.23
492	% of all valid observations for this period	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.07
493																		
494	GT 0.95 and LE 3.50	118	80	59	51	57	69	79	56	27	15	7	5	7	14	32	48	724
495	% of all valid observations for this stability class	4.47	3.03	2.24	1.93	2.16	2.62	2.99	2.12	1.02	0.57	0.27	0.19	0.27	0.53	1.21	1.82	27.45
496	% of all valid observations for this period	1.45	0.98	0.73	0.63	0.70	0.85	0.97	0.69	0.33	0.18	0.09	0.06	0.09	0.17	0.39	0.59	8.90
497																		
498	GT 3.50 and LE 7.50	149	18	9	3	14	19	168	165	91	22	14	17	30	40	33	296	1088
499	% of all valid observations for this stability class	5.65	0.68	0.34	0.11	0.53	0.72	6.37	6.25	3.45	0.83	0.53	0.64	1.14	1.52	1.25	11.22	41.24
500	% of all valid observations for this period	1.83	0.22	0.11	0.04	0.17	0.23	2.07	2.03	1.12	0.27	0.17	0.21	0.37	0.49	0.41	3.64	13.38
501																		
502	GT 7.50 and LE 12.50	76	7	1	0	1	2	20	51	44	31	16	18	36	59	56	169	587
503	% of all valid observations for this stability class	2.88	0.27	0.04	0.00	0.04	0.08	0.76	1.93	1.67	1.18	0.61	0.68	1.36	2.24	2.12	6.41	22.25
504	% of all valid observations for this period	0.93	0.09	0.01	0.00	0.01	0.02	0.25	0.63	0.54	0.38	0.20	0.22	0.44	0.73	0.69	2.08	7.22
505																		
506	GT 12.50 and LE 18.50	23	0	0	0	0	0	2	7	23	10	0	4	14	31	18	52	184
507	% of all valid observations for this stability class	0.87	0.00	0.00	0.00	0.00	0.00	0.08	0.27	0.87	0.38	0.00	0.15	0.53	1.18	0.68	1.97	6.97
508	% of all valid observations for this period	0.28	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.28	0.12	0.00	0.05	0.17	0.38	0.22	0.64	2.26
509																		
510	GT 18.50 and LE 24.50	9	0	0	0	0	0	0	0	3	0	0	2	2	4	1	25	46
511	% of all valid observations for this stability class	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.08	0.08	0.15	0.04	0.95	1.74
512	% of all valid observations for this period	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02	0.02	0.05	0.01	0.31	0.57
513																		
514	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3
515	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.04	0.11
516	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.04
517																		
518	All Velocities	379	106	69	54	72	90	269	279	188	78	38	46	89	150	140	591	2638
519	% of all valid observations for this stability class	14.37	4.02	2.62	2.05	2.73	3.41	10.20	10.58	7.13	2.96	1.44	1.74	3.37	5.69	5.31	22.40	100.00
520	% of all valid observations for this period	4.66	1.30	0.85	0.66	0.89	1.11	3.31	3.43	2.31	0.96	0.47	0.57	1.09	1.84	1.72	7.27	32.43

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
521	Table 5F																	
522	Stability Class 5F																	
523	Class Frequency = 13.62%																	
524	Upper Data Collection Station (297 ft)																	
525																		
526	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
527	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
528	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
529	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
530	GE 0.00 and LE 0.95	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
531	% of all valid observations for this stability class	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
532	% of all valid observations for this period	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
533																		
534	GT 0.95 and LE 3.50	52	43	30	23	25	39	48	40	33	12	11	13	11	16	22	29	447
535	% of all valid observations for this stability class	4.69	3.88	2.71	2.08	2.26	3.52	4.33	3.61	2.98	1.08	0.99	1.17	0.99	1.44	1.99	2.62	40.34
536	% of all valid observations for this period	0.64	0.53	0.37	0.28	0.31	0.48	0.59	0.49	0.41	0.15	0.14	0.16	0.14	0.20	0.27	0.36	5.50
537																		
538	GT 3.50 and LE 7.50	59	9	2	5	5	16	69	86	42	20	23	23	20	19	27	85	510
539	% of all valid observations for this stability class	5.32	0.81	0.18	0.45	0.45	1.44	6.23	7.76	3.79	1.81	2.08	2.08	1.81	1.71	2.44	7.67	46.03
540	% of all valid observations for this period	0.73	0.11	0.02	0.06	0.06	0.20	0.85	1.06	0.52	0.25	0.28	0.28	0.25	0.23	0.33	1.04	6.27
541																		
542	GT 7.50 and LE 12.50	11	0	0	0	0	0	8	8	6	11	6	13	12	12	14	44	145
543	% of all valid observations for this stability class	0.99	0.00	0.00	0.00	0.00	0.00	0.72	0.72	0.54	0.99	0.54	1.17	1.08	1.08	1.26	3.97	13.09
544	% of all valid observations for this period	0.14	0.00	0.00	0.00	0.00	0.00	0.10	0.10	0.07	0.14	0.07	0.16	0.15	0.15	0.17	0.54	1.78
545																		
546	GT 12.50 and LE 18.50	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	4
547	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.09	0.00	0.00	0.09	0.00	0.36
548	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.01	0.00	0.05
549																		
550	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
551	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09
552	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
553																		
554	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
555	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
556	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
557																		
558	All Velocities	122	53	32	28	30	55	125	134	82	44	40	50	43	47	64	159	1108
559	% of all valid observations for this stability class	11.01	4.78	2.89	2.53	2.71	4.96	11.28	12.09	7.40	3.97	3.61	4.51	3.88	4.24	5.78	14.35	100.00
560	% of all valid observations for this period	1.50	0.65	0.39	0.34	0.37	0.68	1.54	1.65	1.01	0.54	0.49	0.61	0.53	0.58	0.79	1.95	13.62

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
561	Table 5G																	
562	Stability Class 5G																	
563	Class Frequency = 1.36%																	
564	Upper Data Collection Station (297 ft)																	
565																		
566	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
567	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
568	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
569	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
570	GE 0.00 and LE 0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
571	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90
572	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
573																		
574	GT 0.95 and LE 3.50	4	0	1	1	2	3	6	2	2	0	0	0	2	1	1	6	31
575	% of all valid observations for this stability class	3.60	0.00	0.90	0.90	1.80	2.70	5.41	1.80	1.80	0.00	0.00	0.00	1.80	0.90	0.90	5.41	27.93
576	% of all valid observations for this period	0.05	0.00	0.01	0.01	0.02	0.04	0.07	0.02	0.02	0.00	0.00	0.00	0.02	0.01	0.01	0.07	0.38
577																		
578	GT 3.50 and LE 7.50	5	1	0	0	1	1	6	6	6	2	3	1	2	3	10	12	59
579	% of all valid observations for this stability class	4.50	0.90	0.00	0.00	0.90	0.90	5.41	5.41	5.41	1.80	2.70	0.90	1.80	2.70	9.01	10.81	53.15
580	% of all valid observations for this period	0.06	0.01	0.00	0.00	0.01	0.01	0.07	0.07	0.07	0.02	0.04	0.01	0.02	0.04	0.12	0.15	0.73
581																		
582	GT 7.50 and LE 12.50	2	0	0	0	0	0	1	1	3	2	3	1	1	2	0	3	19
583	% of all valid observations for this stability class	1.80	0.00	0.00	0.00	0.00	0.00	0.90	0.90	2.70	1.80	2.70	0.90	0.90	1.80	0.00	2.70	17.12
584	% of all valid observations for this period	0.02	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.04	0.02	0.04	0.01	0.01	0.02	0.00	0.04	0.23
585																		
586	GT 12.50 and LE 18.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
587	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.90
588	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
589																		
590	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
591	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
592	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
593																		
594	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
595	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
596	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
597																		
598	All Velocities	11	1	1	1	3	4	13	9	11	4	6	2	5	6	11	23	111
599	% of all valid observations for this stability class	9.91	0.90	0.90	0.90	2.70	3.60	11.71	8.11	9.91	3.60	5.41	1.80	4.50	5.41	9.91	20.72	100.00
600	% of all valid observations for this period	0.14	0.01	0.01	0.01	0.04	0.05	0.16	0.11	0.14	0.05	0.07	0.02	0.06	0.07	0.14	0.28	1.36

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
601	Table 5ALL																	
602	Stability Class 5ALL																	
603	Class Frequency = 98.24%																	
604	Upper Data Collection Station (297 ft)																	
605																		
606	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
607	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
608	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
609	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
610	GE 0.00 and LE 0.95	13	4	0	0	0	0	0	0	0	0	1	0	0	0	0	2	20
611	% of all valid observations for this stability class	0.16	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.25
612	% of all valid observations for this period	0.16	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.02	0.25
613																		
614	GT 0.95 and LE 3.50	228	163	122	101	125	159	198	142	79	33	22	22	29	40	81	127	1671
615	% of all valid observations for this stability class	2.85	2.04	1.53	1.26	1.56	1.99	2.48	1.78	0.99	0.41	0.28	0.28	0.36	0.50	1.01	1.59	20.91
616	% of all valid observations for this period	2.80	2.00	1.50	1.24	1.54	1.95	2.43	1.75	0.97	0.41	0.27	0.27	0.36	0.49	1.00	1.56	20.54
617																		
618	GT 3.50 and LE 7.50	296	70	43	27	68	118	391	428	213	68	48	56	69	85	108	595	2683
619	% of all valid observations for this stability class	3.70	0.88	0.54	0.34	0.85	1.48	4.89	5.36	2.67	0.85	0.60	0.70	0.86	1.06	1.35	7.45	33.58
620	% of all valid observations for this period	3.64	0.86	0.53	0.33	0.84	1.45	4.81	5.26	2.62	0.84	0.59	0.69	0.85	1.04	1.33	7.31	32.99
621																		
622	GT 7.50 and LE 12.50	237	41	14	9	10	40	110	222	316	88	49	63	142	187	122	461	2111
623	% of all valid observations for this stability class	2.97	0.51	0.18	0.11	0.13	0.50	1.38	2.78	3.95	1.10	0.61	0.79	1.78	2.34	1.53	5.77	26.42
624	% of all valid observations for this period	2.91	0.50	0.17	0.11	0.12	0.49	1.35	2.73	3.88	1.08	0.60	0.77	1.75	2.30	1.50	5.67	25.95
625																		
626	GT 12.50 and LE 18.50	138	8	2	0	2	2	16	30	140	27	14	25	81	209	122	281	1097
627	% of all valid observations for this stability class	1.73	0.10	0.03	0.00	0.03	0.03	0.20	0.38	1.75	0.34	0.18	0.31	1.01	2.62	1.53	3.52	13.73
628	% of all valid observations for this period	1.70	0.10	0.02	0.00	0.02	0.02	0.20	0.37	1.72	0.33	0.17	0.31	1.00	2.57	1.50	3.45	13.49
629																		
630	GT 18.50 and LE 24.50	54	2	0	0	0	1	1	3	9	0	0	6	13	54	51	153	347
631	% of all valid observations for this stability class	0.68	0.03	0.00	0.00	0.00	0.01	0.01	0.04	0.11	0.00	0.00	0.08	0.16	0.68	0.64	1.91	4.34
632	% of all valid observations for this period	0.66	0.02	0.00	0.00	0.00	0.01	0.01	0.04	0.11	0.00	0.00	0.07	0.16	0.66	0.63	1.88	4.27
633																		
634	GT 24.50	2	1	0	0	0	0	0	0	0	0	0	0	2	16	8	33	62
635	% of all valid observations for this stability class	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.20	0.10	0.41	0.78
636	% of all valid observations for this period	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.20	0.10	0.41	0.76
637																		
638	All Velocities	968	289	181	137	205	320	716	825	757	216	134	172	336	591	492	1652	7991
639	% of all valid observations for this stability class	12.11	3.62	2.27	1.71	2.57	4.00	8.96	10.32	9.47	2.70	1.68	2.15	4.20	7.40	6.16	20.67	100.00
640	% of all valid observations for this period	11.90	3.55	2.23	1.68	2.52	3.93	8.80	10.14	9.31	2.66	1.65	2.11	4.13	7.27	6.05	20.31	98.24

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Table 6A																	
2	Stability Class 6A																	
3	Class Frequency = 2.29%																	
4	Lower Data Collection Station (35 ft)																	
5																		
6	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
7	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
8	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
9	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
10	GE 0.00 and LE 0.95	7	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	10
11	% of all valid observations for this stability class	3.76	1.08	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.38
12	% of all valid observations for this period	0.09	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
13																		
14	GT 0.95 and LE 3.50	3	5	0	0	0	0	0	1	0	0	0	1	0	0	0	0	10
15	% of all valid observations for this stability class	1.61	2.69	0.00	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00	5.38
16	% of all valid observations for this period	0.04	0.06	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.12
17																		
18	GT 3.50 and LE 7.50	5	3	6	2	1	1	1	4	2	1	2	0	0	1	1	12	42
19	% of all valid observations for this stability class	2.69	1.61	3.23	1.08	0.54	0.54	0.54	2.15	1.08	0.54	1.08	0.00	0.00	0.54	0.54	6.45	22.58
20	% of all valid observations for this period	0.06	0.04	0.07	0.02	0.01	0.01	0.01	0.05	0.02	0.01	0.02	0.00	0.00	0.01	0.01	0.15	0.52
21																		
22	GT 7.50 and LE 12.50	24	2	3	3	2	0	0	5	14	0	0	0	1	7	6	32	99
23	% of all valid observations for this stability class	12.90	1.08	1.61	1.61	1.08	0.00	0.00	2.69	7.53	0.00	0.00	0.00	0.54	3.76	3.23	17.20	53.23
24	% of all valid observations for this period	0.30	0.02	0.04	0.04	0.02	0.00	0.00	0.06	0.17	0.00	0.00	0.00	0.01	0.09	0.07	0.39	1.22
25																		
26	GT 12.50 and LE 18.50	7	0	0	1	1	1	0	0	0	0	0	0	0	0	2	13	25
27	% of all valid observations for this stability class	3.76	0.00	0.00	0.54	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	6.99	13.44
28	% of all valid observations for this period	0.09	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.16	0.31
29																		
30	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33																		
34	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37																		
38	All Velocities	46	12	10	6	4	2	1	10	16	1	2	1	1	8	9	57	186
39	% of all valid observations for this stability class	24.73	6.45	5.38	3.23	2.15	1.08	0.54	5.38	8.60	0.54	1.08	0.54	0.54	4.30	4.84	30.65	100.00
40	% of all valid observations for this period	0.57	0.15	0.12	0.07	0.05	0.02	0.01	0.12	0.20	0.01	0.02	0.01	0.01	0.10	0.11	0.70	2.29

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
41	Table 6B																	
42	Stability Class 6B																	
43	Class Frequency = 2.29%																	
44	Lower Data Collection Station (35 ft)																	
45																		
46	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
47	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
48	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
49	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
50	GE 0.00 and LE 0.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
52	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
53																		
54	GT 0.95 and LE 3.50	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	3
55	% of all valid observations for this stability class	0.00	0.54	0.54	0.00	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.61
56	% of all valid observations for this period	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
57																		
58	GT 3.50 and LE 7.50	10	6	1	0	2	4	4	6	5	2	0	1	2	3	4	13	63
59	% of all valid observations for this stability class	5.38	3.23	0.54	0.00	1.08	2.15	2.15	3.23	2.69	1.08	0.00	0.54	1.08	1.61	2.15	6.99	33.87
60	% of all valid observations for this period	0.12	0.07	0.01	0.00	0.02	0.05	0.05	0.07	0.06	0.02	0.00	0.01	0.02	0.04	0.05	0.16	0.77
61																		
62	GT 7.50 and LE 12.50	12	2	0	0	0	1	3	7	20	2	3	3	5	12	8	14	92
63	% of all valid observations for this stability class	6.45	1.08	0.00	0.00	0.00	0.54	1.61	3.76	10.75	1.08	1.61	1.61	2.69	6.45	4.30	7.53	49.46
64	% of all valid observations for this period	0.15	0.02	0.00	0.00	0.00	0.01	0.04	0.09	0.25	0.02	0.04	0.04	0.06	0.15	0.10	0.17	1.13
65																		
66	GT 12.50 and LE 18.50	5	1	0	0	0	0	0	0	0	0	0	0	1	1	4	15	27
67	% of all valid observations for this stability class	2.69	0.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.54	2.15	8.06	14.52
68	% of all valid observations for this period	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.05	0.18	0.33
69																		
70	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
71	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.00	0.00	0.54
72	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01
73																		
74	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
76	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
77																		
78	All Velocities	27	10	2	0	2	5	7	13	26	4	3	4	8	17	16	42	186
79	% of all valid observations for this stability class	14.52	5.38	1.08	0.00	1.08	2.69	3.76	6.99	13.98	2.15	1.61	2.15	4.30	9.14	8.60	22.58	100.00
80	% of all valid observations for this period	0.33	0.12	0.02	0.00	0.02	0.06	0.09	0.16	0.32	0.05	0.04	0.05	0.10	0.21	0.20	0.52	2.29

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
81	Table 6C																	
82	Stability Class 6C																	
83	Class Frequency = 4.18%																	
84	Lower Data Collection Station (35 ft)																	
85																		
86	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
87	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
88	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
89	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
90	GE 0.00 and LE 0.95	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	3
91	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.88
92	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04
93																		
94	GT 0.95 and LE 3.50	1	1	2	2	2	3	1	4	0	1	0	0	1	0	0	4	22
95	% of all valid observations for this stability class	0.29	0.29	0.59	0.59	0.59	0.88	0.29	1.18	0.00	0.29	0.00	0.00	0.29	0.00	0.00	1.18	6.47
96	% of all valid observations for this period	0.01	0.01	0.02	0.02	0.02	0.04	0.01	0.05	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.05	0.27
97																		
98	GT 3.50 and LE 7.50	20	11	4	4	10	18	15	22	18	8	1	0	8	4	5	15	163
99	% of all valid observations for this stability class	5.88	3.24	1.18	1.18	2.94	5.29	4.41	6.47	5.29	2.35	0.29	0.00	2.35	1.18	1.47	4.41	47.94
100	% of all valid observations for this period	0.25	0.14	0.05	0.05	0.12	0.22	0.18	0.27	0.22	0.10	0.01	0.00	0.10	0.05	0.06	0.18	2.00
101																		
102	GT 7.50 and LE 12.50	18	2	0	0	0	5	4	7	30	5	2	3	6	16	14	16	128
103	% of all valid observations for this stability class	5.29	0.59	0.00	0.00	0.00	1.47	1.18	2.06	8.82	1.47	0.59	0.88	1.76	4.71	4.12	4.71	37.65
104	% of all valid observations for this period	0.22	0.02	0.00	0.00	0.00	0.06	0.05	0.09	0.37	0.06	0.02	0.04	0.07	0.20	0.17	0.20	1.57
105																		
106	GT 12.50 and LE 18.50	4	1	0	0	0	0	0	0	1	0	0	0	1	4	6	5	22
107	% of all valid observations for this stability class	1.18	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.29	1.18	1.76	1.47	6.47
108	% of all valid observations for this period	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.05	0.07	0.06	0.27
109																		
110	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2
111	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.29	0.00	0.59
112	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02
113																		
114	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
115	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
116	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
117																		
118	All Velocities	43	15	6	6	12	28	20	33	49	14	4	3	16	25	26	40	340
119	% of all valid observations for this stability class	12.65	4.41	1.76	1.76	3.53	8.24	5.88	9.71	14.41	4.12	1.18	0.88	4.71	7.35	7.65	11.76	100.00
120	% of all valid observations for this period	0.53	0.18	0.07	0.07	0.15	0.34	0.25	0.41	0.60	0.17	0.05	0.04	0.20	0.31	0.32	0.49	4.18

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
121	Table 6D																	
122	Stability Class 6D																	
123	Class Frequency = 41.76%																	
124	Lower Data Collection Station (35 ft)																	
125																		
126	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
127	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
128	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
129	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
130	GE 0.00 and LE 0.95	2	4	0	3	2	4	2	11	3	0	1	0	0	0	1	0	33
131	% of all valid observations for this stability class	0.06	0.12	0.00	0.09	0.06	0.12	0.06	0.32	0.09	0.00	0.03	0.00	0.00	0.00	0.03	0.00	0.97
132	% of all valid observations for this period	0.02	0.05	0.00	0.04	0.02	0.05	0.02	0.14	0.04	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.41
133																		
134	GT 0.95 and LE 3.50	81	69	36	45	44	55	64	42	64	38	23	26	26	53	63	119	848
135	% of all valid observations for this stability class	2.38	2.03	1.06	1.32	1.30	1.62	1.88	1.24	1.88	1.12	0.68	0.77	0.77	1.56	1.85	3.50	24.96
136	% of all valid observations for this period	1.00	0.85	0.44	0.55	0.54	0.68	0.79	0.52	0.79	0.47	0.28	0.32	0.32	0.65	0.77	1.46	10.43
137																		
138	GT 3.50 and LE 7.50	169	62	18	22	50	95	138	192	155	53	31	35	74	96	75	269	1534
139	% of all valid observations for this stability class	4.97	1.83	0.53	0.65	1.47	2.80	4.06	5.65	4.56	1.56	0.91	1.03	2.18	2.83	2.21	7.92	45.16
140	% of all valid observations for this period	2.08	0.76	0.22	0.27	0.61	1.17	1.70	2.36	1.91	0.65	0.38	0.43	0.91	1.18	0.92	3.31	18.86
141																		
142	GT 7.50 and LE 12.50	127	13	2	0	0	5	15	23	126	26	6	6	46	127	102	181	805
143	% of all valid observations for this stability class	3.74	0.38	0.06	0.00	0.00	0.15	0.44	0.68	3.71	0.77	0.18	0.18	1.35	3.74	3.00	5.33	23.70
144	% of all valid observations for this period	1.56	0.16	0.02	0.00	0.00	0.06	0.18	0.28	1.55	0.32	0.07	0.07	0.57	1.56	1.25	2.23	9.90
145																		
146	GT 12.50 and LE 18.50	16	1	0	0	0	0	0	1	5	0	0	1	2	49	53	33	161
147	% of all valid observations for this stability class	0.47	0.03	0.00	0.00	0.00	0.00	0.00	0.03	0.15	0.00	0.00	0.03	0.06	1.44	1.56	0.97	4.74
148	% of all valid observations for this period	0.20	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.01	0.02	0.60	0.65	0.41	1.98
149																		
150	GT 18.50 and LE 24.50	0	0	0	0	0	1	0	0	0	0	0	0	0	7	8	0	16
151	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.24	0.00	0.47
152	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.10	0.00	0.20
153																		
154	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
156	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157																		
158	All Velocities	395	149	56	70	96	160	219	269	353	117	61	68	148	332	302	602	3397
159	% of all valid observations for this stability class	11.63	4.39	1.65	2.06	2.83	4.71	6.45	7.92	10.39	3.44	1.80	2.00	4.36	9.77	8.89	17.72	100.00
160	% of all valid observations for this period	4.86	1.83	0.69	0.86	1.18	1.97	2.69	3.31	4.34	1.44	0.75	0.84	1.82	4.08	3.71	7.40	41.76

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
161	Table 6E																	
162	Stability Class 6E																	
163	Class Frequency = 29.87%																	
164	Lower Data Collection Station (35 ft)																	
165																		
166	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
167	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
168	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
169	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
170	GE 0.00 and LE 0.95	6	0	1	1	1	0	1	10	7	7	6	3	3	6	4	5	61
171	% of all valid observations for this stability class	0.25	0.00	0.04	0.04	0.04	0.00	0.04	0.41	0.29	0.29	0.25	0.12	0.12	0.25	0.16	0.21	2.51
172	% of all valid observations for this period	0.07	0.00	0.01	0.01	0.01	0.00	0.01	0.12	0.09	0.09	0.07	0.04	0.04	0.07	0.05	0.06	0.75
173																		
174	GT 0.95 and LE 3.50	58	17	17	21	14	17	26	58	69	123	152	182	199	180	174	184	1491
175	% of all valid observations for this stability class	2.39	0.70	0.70	0.86	0.58	0.70	1.07	2.39	2.84	5.06	6.26	7.49	8.19	7.41	7.16	7.57	61.36
176	% of all valid observations for this period	0.71	0.21	0.21	0.26	0.17	0.21	0.32	0.71	0.85	1.51	1.87	2.24	2.45	2.21	2.14	2.26	18.33
177																		
178	GT 3.50 and LE 7.50	48	9	2	1	1	12	22	49	73	50	16	29	52	79	83	163	689
179	% of all valid observations for this stability class	1.98	0.37	0.08	0.04	0.04	0.49	0.91	2.02	3.00	2.06	0.66	1.19	2.14	3.25	3.42	6.71	28.35
180	% of all valid observations for this period	0.59	0.11	0.02	0.01	0.01	0.15	0.27	0.60	0.90	0.61	0.20	0.36	0.64	0.97	1.02	2.00	8.47
181																		
182	GT 7.50 and LE 12.50	32	1	0	0	0	0	2	4	19	5	2	1	3	24	27	55	175
183	% of all valid observations for this stability class	1.32	0.04	0.00	0.00	0.00	0.00	0.08	0.16	0.78	0.21	0.08	0.04	0.12	0.99	1.11	2.26	7.20
184	% of all valid observations for this period	0.39	0.01	0.00	0.00	0.00	0.00	0.02	0.05	0.23	0.06	0.02	0.01	0.04	0.30	0.33	0.68	2.15
185																		
186	GT 12.50 and LE 18.50	2	0	0	0	0	0	0	0	0	0	0	0	0	6	3	3	14
187	% of all valid observations for this stability class	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.12	0.12	0.58
188	% of all valid observations for this period	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.04	0.04	0.17
189																		
190	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
191	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
192	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
193																		
194	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
195	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
196	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197																		
198	All Velocities	146	27	20	23	16	29	51	121	168	185	176	215	257	295	291	410	2430
199	% of all valid observations for this stability class	6.01	1.11	0.82	0.95	0.66	1.19	2.10	4.98	6.91	7.61	7.24	8.85	10.58	12.14	11.98	16.87	100.00
200	% of all valid observations for this period	1.79	0.33	0.25	0.28	0.20	0.36	0.63	1.49	2.07	2.27	2.16	2.64	3.16	3.63	3.58	5.04	29.87

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
201	Table 6F																	
202	Stability Class 6F																	
203	Class Frequency = 14.65%																	
204	Lower Data Collection Station (35 ft)																	
205																		
206	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
207	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
208	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
209	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
210	GE 0.00 and LE 0.95	0	1	0	1	0	0	0	0	0	3	4	2	2	0	0	1	14
211	% of all valid observations for this stability class	0.00	0.08	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.25	0.34	0.17	0.17	0.00	0.00	0.08	1.17
212	% of all valid observations for this period	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.02	0.02	0.00	0.00	0.01	0.17
213																		
214	GT 0.95 and LE 3.50	22	12	6	3	6	7	7	25	44	114	159	205	187	129	86	60	1072
215	% of all valid observations for this stability class	1.85	1.01	0.50	0.25	0.50	0.59	0.59	2.10	3.69	9.56	13.34	17.20	15.69	10.82	7.21	5.03	89.93
216	% of all valid observations for this period	0.27	0.15	0.07	0.04	0.07	0.09	0.09	0.31	0.54	1.40	1.95	2.52	2.30	1.59	1.06	0.74	13.18
217																		
218	GT 3.50 and LE 7.50	3	1	1	0	1	0	0	2	5	14	11	9	9	12	19	16	103
219	% of all valid observations for this stability class	0.25	0.08	0.08	0.00	0.08	0.00	0.00	0.17	0.42	1.17	0.92	0.76	0.76	1.01	1.59	1.34	8.64
220	% of all valid observations for this period	0.04	0.01	0.01	0.00	0.01	0.00	0.00	0.02	0.06	0.17	0.14	0.11	0.11	0.15	0.23	0.20	1.27
221																		
222	GT 7.50 and LE 12.50	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
223	% of all valid observations for this stability class	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.25
224	% of all valid observations for this period	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.04
225																		
226	GT 12.50 and LE 18.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
227	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
228	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
229																		
230	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
231	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
232	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
233																		
234	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
235	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
236	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
237																		
238	All Velocities	27	14	7	4	7	7	7	27	49	131	174	216	199	141	105	77	1192
239	% of all valid observations for this stability class	2.27	1.17	0.59	0.34	0.59	0.59	0.59	2.27	4.11	10.99	14.60	18.12	16.69	11.83	8.81	6.46	100.00
240	% of all valid observations for this period	0.33	0.17	0.09	0.05	0.09	0.09	0.09	0.33	0.60	1.61	2.14	2.66	2.45	1.73	1.29	0.95	14.65

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
241	Table 6G																	
242	Stability Class 6G																	
243	Class Frequency = 3.16%																	
244	Lower Data Collection Station (35 ft)																	
245																		
246	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
247	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
248	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
249	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
250	GE 0.00 and LE 0.95	1	0	0	0	0	0	0	0	0	1	1	1	2	0	0	2	8
251	% of all valid observations for this stability class	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.39	0.39	0.78	0.00	0.00	0.78	3.11
252	% of all valid observations for this period	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.00	0.00	0.02	0.10
253																		
254	GT 0.95 and LE 3.50	9	5	6	0	1	2	2	7	12	34	26	32	27	26	34	9	232
255	% of all valid observations for this stability class	3.50	1.95	2.33	0.00	0.39	0.78	0.78	2.72	4.67	13.23	10.12	12.45	10.51	10.12	13.23	3.50	90.27
256	% of all valid observations for this period	0.11	0.06	0.07	0.00	0.01	0.02	0.02	0.09	0.15	0.42	0.32	0.39	0.33	0.32	0.42	0.11	2.85
257																		
258	GT 3.50 and LE 7.50	1	0	0	0	0	0	0	1	2	3	0	3	0	0	3	4	17
259	% of all valid observations for this stability class	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.39	0.78	1.17	0.00	1.17	0.00	0.00	1.17	1.56	6.61
260	% of all valid observations for this period	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.00	0.04	0.00	0.00	0.04	0.05	0.21
261																		
262	GT 7.50 and LE 12.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
263	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
264	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
265																		
266	GT 12.50 and LE 18.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
267	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
268	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
269																		
270	GT 18.50 and LE 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
271	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
272	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
273																		
274	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
275	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
276	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
277																		
278	All Velocities	11	5	6	0	1	2	2	8	14	38	27	36	29	26	37	15	257
279	% of all valid observations for this stability class	4.28	1.95	2.33	0.00	0.39	0.78	0.78	3.11	5.45	14.79	10.51	14.01	11.28	10.12	14.40	5.84	100.00
280	% of all valid observations for this period	0.14	0.06	0.07	0.00	0.01	0.02	0.02	0.10	0.17	0.47	0.33	0.44	0.36	0.32	0.45	0.18	3.16

Joint Frequency Distribution Table

01/01/2001 to 12/31/2001

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
281	Table 6ALL																	
282	Stability Class 6ALL																	
283	Class Frequency = 98.21%																	
284	Lower Data Collection Station (35 ft)																	
285																		
286	Wind From This Direction ->	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
287	Index ->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
288	Direction (Deg) GE ->	348.75	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	0
289	VELOCITY (MPH) and LT ->	11.25	33.75	56.25	78.75	101.25	123.75	146.25	168.75	191.25	213.75	236.25	258.75	281.25	303.75	326.25	348.75	360
290	GE 0.00 and LE 0.95	16	7	2	5	3	6	3	21	10	11	13	6	7	6	5	8	129
291	% of all valid observations for this stability class	0.20	0.09	0.03	0.06	0.04	0.08	0.04	0.26	0.13	0.14	0.16	0.08	0.09	0.08	0.06	0.10	1.61
292	% of all valid observations for this period	0.20	0.09	0.02	0.06	0.04	0.07	0.04	0.26	0.12	0.14	0.16	0.07	0.09	0.07	0.06	0.10	1.59
293																		
294	GT 0.95 and LE 3.50	174	110	68	71	67	84	100	137	190	310	360	446	440	388	357	376	3678
295	% of all valid observations for this stability class	2.18	1.38	0.85	0.89	0.84	1.05	1.25	1.72	2.38	3.88	4.51	5.58	5.51	4.86	4.47	4.71	46.04
296	% of all valid observations for this period	2.14	1.35	0.84	0.87	0.82	1.03	1.23	1.68	2.34	3.81	4.43	5.48	5.41	4.77	4.39	4.62	45.22
297																		
298	GT 3.50 and LE 7.50	256	92	32	29	65	130	180	276	260	131	61	77	145	195	190	492	2611
299	% of all valid observations for this stability class	3.20	1.15	0.40	0.36	0.81	1.63	2.25	3.46	3.25	1.64	0.76	0.96	1.82	2.44	2.38	6.16	32.69
300	% of all valid observations for this period	3.15	1.13	0.39	0.36	0.80	1.60	2.21	3.39	3.20	1.61	0.75	0.95	1.78	2.40	2.34	6.05	32.10
301																		
302	GT 7.50 and LE 12.50	215	20	5	3	2	11	24	46	209	38	13	13	62	186	157	298	1302
303	% of all valid observations for this stability class	2.69	0.25	0.06	0.04	0.03	0.14	0.30	0.58	2.62	0.48	0.16	0.16	0.78	2.33	1.97	3.73	16.30
304	% of all valid observations for this period	2.64	0.25	0.06	0.04	0.02	0.14	0.30	0.57	2.57	0.47	0.16	0.16	0.76	2.29	1.93	3.66	16.01
305																		
306	GT 12.50 and LE 18.50	34	3	0	1	1	1	0	1	6	0	0	1	4	60	68	69	249
307	% of all valid observations for this stability class	0.43	0.04	0.00	0.01	0.01	0.01	0.00	0.01	0.08	0.00	0.00	0.01	0.05	0.75	0.85	0.86	3.12
308	% of all valid observations for this period	0.42	0.04	0.00	0.01	0.01	0.01	0.00	0.01	0.07	0.00	0.00	0.01	0.05	0.74	0.84	0.85	3.06
309																		
310	GT 18.50 and LE 24.50	0	0	0	0	0	1	0	0	0	0	0	0	0	9	9	0	19
311	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.00	0.24
312	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.11	0.00	0.23
313																		
314	GT 24.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
315	% of all valid observations for this stability class	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
316	% of all valid observations for this period	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
317																		
318	All Velocities	695	232	107	109	138	233	307	481	675	490	447	543	658	844	786	1243	7988
319	% of all valid observations for this stability class	8.70	2.90	1.34	1.36	1.73	2.92	3.84	6.02	8.45	6.13	5.60	6.80	8.24	10.57	9.84	15.56	100.00
320	% of all valid observations for this period	8.54	2.85	1.32	1.34	1.70	2.86	3.77	5.91	8.30	6.02	5.50	6.68	8.09	10.38	9.66	15.28	98.21

APPENDIX A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
Supplemental Information
for 2001

Facility: Vermont Yankee Nuclear Power Station

Licensee: Vermont Yankee Nuclear Power Corporation

1A. ODCM DOSE AND DOSE RATE LIMITS -

	ODCM Controls	Dose Limit
a.	Noble Gases	
	3/4.3.1 Total body dose rate	500 mrem/yr
	3/4.3.1 Skin dose rate	3000 mrem/yr
	3/4.3.2 Gamma air dose	5 mrad in a quarter
	3/4.3.2 Gamma air dose	10 mrad in a year
	3/4.3.2 Beta air dose	10 mrad in a quarter
	3/4.3.2 Beta air dose	20 mrad in a year
b.	Iodine-131, Iodine-133, Tritium and Radionuclides in Particulate Form With Half-Lives Greater Than 8 Days	
	3/4.3.1 Organ dose rate	1500 mrem/yr
	3/4.3.3 Organ dose	7.5 mrem in a quarter
	3/4.3.3 Organ dose	15 mrem in a year
c.	Liquids	
	3/4.2.2 Total body dose	1.5 mrem in a quarter
	3/4.2.2 Total body dose	3 mrem in a year
	3/4.2.2 Organ dose	5 mrem in a quarter
	3/4.2.2 Organ dose	10 mrem in a year

2A. ODCM LIMITS - CONCENTRATION

	ODCM Control	Limit
a.	Noble Gases	No ECL Limits
b.	Iodine-131, Iodine-133, Tritium and Radionuclides in Particulate Form With Half-Lives	
	Greater Than 8 Days	No ECL Limits

c. Liquids

3/4.2.1 Sum of the fractions of ECL excluding noble gases (10CFR20, Appendix B, Table 2, Column 2):	$\leq$ 1.0E+01
3/4.2.1 Total noble gas concentration:	$\leq$ 2E-04 μCi/cc

3. AVERAGE ENERGY

Provided below are the average energy (E) of the radionuclide mixture in releases of fission and activation gases, if applicable.

a. Average gamma energy: Not Applicable

b. Average beta energy: Not Applicable

4. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

Provided below are the methods used to measure or approximate the total radioactivity in effluents and the methods used to determine radionuclide composition.

a. Fission and Activation Gases

Continuous stack monitors monitor the gross Noble Gas radioactivity released from the plant stack. Because release rates are normally below the detection limit of these monitors, periodic grab samples are taken and analyzed for the gaseous isotopes present. These are used to calculate the individual isotopic releases indicated in Table 1B and the totals of Table 1A. The error involved in these steps may be approximately $\pm$23 percent.

b. Iodines

Continuous isokinetic samples are drawn from the plant stack through a particulate filter and charcoal cartridge. The filters and cartridges are normally removed weekly and are analyzed for Iodine-131, 132, 133, 134, and 135. The error involved in these steps may be approximately $\pm$18 percent.

c. Particulates

The particulate filters described in b. above are also counted for particulate radioactivity. The error involved in this sample is also approximately ±18 percent.

d. Tritium

ODCM Table 4.3.1 requires as a minimum that grab samples from the plant stack be taken monthly and analyzed for tritium. The stack sampling design included a cold trap collection device for this sample collection. The error involved in this sample is approximately ±15 percent.

e. Waste Oil

Prior to issuing the permit to burn a drum of radioactively contaminated waste oil, one liter of the oil is analyzed by gamma spectroscopy to determine concentrations of radionuclides that meet or exceed the LLD for all of the liquid phase radionuclides listed in ODCM Table 4.2.1.

Monthly, samples from drums that were issued burn permits are sent to the contracted laboratory for compositing and analysis. The lab analyzes for tritium, alpha, Fe-55, Sr-89, and Sr-90 on the composite sample.

The error involved in this sample is approximately ±15 percent.

f. Liquid Effluents

If radioactive liquid effluents are to be released from the facility, they are continuously monitored. Measurements are also required on a representative sample of each batch of radioactive liquid effluents released. For each batch, station records are retained of the total activity (mCi) released, concentration (μCi/ml) of gross radioactivity, volume (liters), and approximate total quantity of water (liters) used to dilute the liquid effluent prior to release to the Connecticut River.

Each batch of radioactive liquid effluents to be released is analyzed for gross gamma and gamma isotopic radioactivity. A monthly proportional composite sample, comprising an aliquot of each batch released during a month, is analyzed for tritium and gross alpha radioactivity. A quarterly proportional composite sample, comprising an aliquot of each batch released during a quarter, is analyzed for Sr-89, Sr-90, and Fe-55.

5. BATCH RELEASES

a. Liquid

There were no routine liquid batch releases during the reporting period.

b. Gaseous

Waste oil was burned during the first quarter and was considered to be a continuous release.

The gaseous releases from burning waste oil are treated as either batch or continuous releases based on the total hours of burning in a calendar quarter.

6. ABNORMAL RELEASES

a. Liquid

There were no nonroutine liquid releases during the reporting period.

b. Gaseous

There were no nonroutine gaseous releases (measured) during the reporting period.

APPENDIX B

LIQUID HOLDUP TANKS

Requirement — Technical Specification 3.8.D.1 limits the quantity of radioactive material contained in any outside tank. With the quantity of radioactive material in any outside tank exceeding the limits of Technical Specification 3.8.D.1, a description of the events leading to this condition is required in the next annual Radioactive Effluent Release Report per 10.1.

Response: The limits of Technical Specification 3.8.D.1 were not exceeded during this reporting period.

APPENDIX C

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

Requirement: Radioactive liquid effluent monitoring instrumentation channels are required to be operable in accordance with ODCM Table 3.1.1. If an inoperable radioactive liquid effluent monitoring instrument is not returned to operable status prior to a release pursuant to Note 4 of Table 3.1.1, an explanation in the next annual Radioactive Effluent Release Report of the reason(s) for delay in correcting the inoperability are required per ODCM Section 10.1.

Response: Since the requirements of ODCM Table 3.1.1 governing the operability of radioactive liquid effluent monitoring instrumentation were met for this reporting period, no response is required.

APPENDIX D

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

Requirement: Radioactive gaseous effluent monitoring instrumentation channels are required to be operable in accordance with ODCM Table 3.1.2. If inoperable gaseous effluent monitoring instrumentation is not returned to operable status within 30 days pursuant to Note 5 of Table 3.1.2, an explanation in the next annual Radioactive Effluent Release Report of the reason(s) for the delay in correcting the inoperability is required per ODCM Section 10.1.

Response: Since the requirements of ODCM Table 3.1.2 governing the operability of radioactive gaseous effluent monitoring instrumentation were met for this reporting period, no response is required.

APPENDIX E

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Requirement: The radiological environmental monitoring program is conducted in accordance with ODCM Control 3/4.5.1. With milk samples no longer available from one or more of the sample locations required by ODCM Table 3.5.1, ODCM 10.1 requires the following to be included in the next annual Radioactive Effluent Release Report: (1) identify the cause(s) of the sample(s) no longer being available, (2) identify the new location(s) for obtaining available replacement samples and (3) include revised ODCM figure(s) and table(s) reflecting the new location(s).

Response: No changes were needed in the milk sampling locations as specified in ODCM Table 3.5.1 and implemented in ODCM Table 7.1 during the reporting year.

APPENDIX F

LAND USE CENSUS

Requirement: A land use census is conducted in accordance with ODCM Control 3/4.5.2. With a land use census identifying a location(s) that yields at least a 20 percent greater dose or dose commitment than the values currently being calculated pursuant to ODCM Control 4.3.3, the new location(s) must be identified in the next Annual Radioactive Effluent Release Report.

Response: The Land Use Census was completed during the third quarter of 2001. No locations were identified which yielded a 20 percent greater dose or dose commitment than the values currently being calculated pursuant to ODCM Control 4.3.3.

APPENDIX G

PROCESS CONTROL PROGRAM

Requirement: Technical Requirements Manual (TRM) 6.12.A.1 requires that licensee initiated changes to the Process Control Program (PCP) be submitted to the Commission in the annual Radioactive Effluent Release Report for the period in which the change(s) was made.

Response: In 1999, the PCP was upgraded to a plant procedure format, PP 7504. In 2001, changes were made to the Process Control Program (PCP) and issued as Revision 3 to PP 7504. The following copy of the Procedure Revision Control Form supplies the required documentation that the revision was reviewed by PORC and approved by the Vice President of Operations, as required by TRM 6.12.A.1.c. The attached copy of the memorandum to PORC describe the changes to the PCP (PP 7504) for Revision 3. Revision 3 to the Process Control Program is included.

These changes to the PCP have not affected TRM Section 6.12.

A determination was made that the changes do not reduce the overall conformance of the de-watered spent resins/filter media waste product to existing criteria for solid waste shipments and disposals.

Revision 3 does not affect Technical Specifications and does not affect any system or process described in the FSAR and a review of VOQAM was done with no findings.

These changes were reviewed against AP 6002.02; it was determined that no safety evaluation was required for Revision 3.

MEMORANDUM

DATE: JANUARY 31, 2001

TO: **PORC**

CC: **J. GEYSTER**

FROM: TIM MCCARTHY

RE: **PP 7504, REV.3: PROCESS CONTROL PROGRAM**

This procedure is required to be reviewed by PORC due to TRM 6.12.A.2. The partial review contains the following revisions due to commitment items. The procedure was reviewed against the original design and operation, standing orders and procedure change recommendations per VYAPF 0095.01.

- **Responsibilities:** added PORC to review and approve changes and revisions to the PCP prior implementation.

- added Quality Assurance to perform internal inspections of the RW program per 10CFR71.121.

- changed VP Ops to Senior Ops Executive

This revision does not affect Tech Specs and does not affect any system or process described in the FSAR or TRM. A review of VO QAM was done with no findings.

This change was reviewed against AP 6002.02; it was determined that no safety evaluation is required.

I have determined that the changes implemented in Rev. 3 of PP 7504 did not reduce the overall conformance of the dewatered spent resins/filter media waste product to existing criteria for solid waste shipments and disposal.

VERMONT YANKEE NUCLEAR POWER STATION

PROGRAM PROCEDURE

PP 7504

REVISION 3

PROCESS CONTROL PROGRAM

USE CLASSIFICATION: **INFORMATION**

LPC No.	Effective Date	Affected Pages

Implementation Statement: N/A

Issue Date: 09/19/2001

TABLE OF CONTENTS

PURPOSE

The Vermont Yankee Nuclear Power Plant Process Control Program (PCP) describes the administrative and technical controls of the radioactive waste systems which provide assurance that Vermont Yankee meets federal shipping and burial site requirements.

The solid radwaste system shall be used in accordance with this procedure as described in TRM Section 6.12 to process wet radioactive waste (spent resins/filter sludge) to meet shipping and burial ground requirements. If these requirements are not satisfied, shipments of defectively processed or defectively packaged solidified wet radioactive wastes from site, will be suspended. Verification of solidification of wet waste shall be performed as required in accordance with this procedure.

Solidification is defined as the conversion of wet wastes into a form that meets shipping and burial ground requirements. Suitable forms include dewatered resins and filter sludge.

The PCP complies with TRM 6.12 by describing process parameters, controls, tests, sampling and analysis to ensure compliance with 10 CFR 20, 10 CFR 71, 10 CFR 61 (Energy), and 49 CFR 172-173 (Transportation); State and burial site regulatory requirements.

DISCUSSION

This procedure functions as the document for describing the current process for administrating radioactive waste which applies to Vermont Yankee. This procedure:

- Lists all of the current waste streams that have been identified, and processes that VY utilizes.
- Lists approved burial containers which comply with site criteria for stabilized waste.
- Describes waste class determination protocols which comply with burial site and federal regulations.
- States the regulations and procedures which implement the process control program.

REFERENCES

1. Technical Specifications
   a. None
2. Technical Requirements Manual
   a. 6.12
3. Administrative Limits
   a. None

4. Other

a. 49 CFR 172-173
b. 10 CFR 20
c. 10 CFR 71
d. 10 CFR 61
e. CNS Burial Site Criteria
f. CNS RDS-1000 Dewatering System Manual
g. VOQAM, Operational Quality Assurance Manual
h. NRC Information Notice (IN) 97-51, Problems Experienced with Loading and Unloading Spent Fuel Storage and Transportation Casks, Issued July 11, 1997 (Accession Number 9707080365).
i. NRC Bulletin 96-02, Movement of Heavy Loads Over Fuel, Over Fuel in the Reactor Core, or Over Safety-Related Equipment, April 11, 1996 (Accession Number 9604080259).
h. AP 0504, Shipment of Radioactive Materials
i. AP 0619, Chemical Material Control
j. OP 2151, Liquid Radwaste
k. OP 2153, Solid Radwaste
l. OP 2511, Radwaste Cask/Liner Handling
m. OP 2512, Radwaste Drum, Box and Sealand Handling
n. OP 2527, Sampling and Analysis for Radwaste Classification
o. AP 6805, Document Control
p. PP 7503, Hazardous Waste Program

APPENDICES, ATTACHMENTS AND FIGURES

1. None

PROGRAM SCOPE

1. Applicability

This program properly describes the processing of waste materials generated as part of plant operations and applies to activities which generate radioactive waste materials at Vermont Yankee.

2. Objectives

The objective of the Process Control Program is to maintain an effective program for identifying, controlling, testing, sampling and processing waste materials generated at VY, specifically;

a. To ensure personnel safety along with minimizing exposures through personnel knowledge, awareness and proper handling techniques / practices;

b. To properly identify, process and classify waste streams generated as a result of operations and maintenance activities at VY;

c. To conduct all waste activities in compliance with pertinent regulations, permits, and licenses.

ORGANIZATION, AUTHORITIES AND RESPONSIBILITIES

1. Organization

Operations, Maintenance and Radiation Protection Departments' personnel are identified on the Vermont Yankee Organizational Chart. Specific individuals within the departments have varying degrees of involvement depending on their level and scope of training.

The size of the organization can expand temporarily as special needs arise or additional support or expertise is required. Permanent modifications to the organizational chart or increases in support personnel numbers beyond authorized resources require additional management approvals and shall be controlled by the appropriate corporate policies.

2. Responsibilities

A brief description of management level responsibilities is outlined below. More detailed responsibilities and specific authorities are defined in individual position descriptions or identified in approved policies, procedures or management directives.

a. Senior Operations Executive - Ultimate responsibility for corporate and plant activities to ensure safe, effective and proper administrative controls concerning radioactive waste operations. Review required per TRM.

b. Plant Manager - Maintains responsibility for safe, orderly and efficient operation of the VY Plant and therefore maintains control of any and all radioactive waste operations.

This position reports to the Senior Operations Executive.

c. Technical Services Superintendent (TSS) - Responsible for the proper conduct of radioactive waste activities to ensure personnel, public and environmental health and safety. The TSS shall ensure that goals which support the objectives of this program are established and performance indicators are defined to monitor the effectiveness of the Process Control Program.

This position reports to the Plant Manager.

d. Radiation Protection Manager (RPM) - Responsible for managing radioactive waste to ensure the health and safety of Plant personnel, the general public and the environment; and to ensure that all waste activities are performed in support of the objectives of this program.

This position reports to the TSS.

e. Operations Superintendent (OS) - Responsible for the day to day operational activities of the solid and liquid waste streams. The OS ensures procedure implementation and compliance for all operational radioactive waste processes.

f. Radwaste Supervisor (RWS) - Responsible for development and implementation of the radioactive waste program, to ensure compliance with all regulatory requirements. The RWS shall keep abreast of amendments to existing waste regulations proposed by state and federal agencies and ensure applicable procedures are current.

This position reports to the RPM.

g. Plant Operations Review Committee (PORC) – PORC will review and approve all changes and revisions to the Process Control Program prior to implementation.

h. Quality Assurance – Internal inspections of the Radwaste Program shall be performed per 10CFR71.121.

NOTE

Worker responsibilities are addressed through General Employee Training (GET) Requalification and Employee Continuing Training Programs.

IMPLEMENTING PROCEDURES AND DOCUMENTS

Generally, management approval and direction for hazardous waste activities is demonstrated in the review and approval process for plant procedures. Specific key elements of the program are outlined and described below with a basic philosophy or approach provided.

1. Procedures

   a. Controls for waste activities are written in the form of administrative and operational procedures. Procedures are to be considered as management directives and are expected to be followed.

   b. Written procedures shall contain sufficient detail to ensure satisfactory compliance with the work effort, but need not delineate basic skills normally possessed by qualified personnel as determined and described in the Training and Qualification Section of this procedure. Training prerequisites are outlined in AP 0504, Shipment of Radioactive Material.

   c. Vendor technical information shall be used as reference material in the preparation of procedures and should be used as guidance in conjunction with specific tasks, if appropriate.

2. Training and Qualification

   a. Performance-based, accredited training programs are approved, in place and functional for Technical Staff and Managers, Supervisor Development, Operations, Maintenance and Radiation Protection Technicians.

      Program performance monitoring and control of content is accomplished through direct interaction between department supervision and management, the Technical Services Superintendent and the Training Department.

b. Job posting and individual position descriptions establish the minimum qualifications. General knowledge and basic skill levels are demonstrated through testing of job applicants.

c. The RWS, integral with the Training Department, maintains and ensures the assignment of qualified personnel to perform duties in support of program objectives. This is accomplished through personnel observation, interaction and varying degrees of direct supervision. Training prerequisites are outlined in AP 0504, Shipment of Radioactive Material.

d. Contracted services, whether integrated with staff personnel or assigned specific tasks, are verified to have the necessary qualifications and training prior to commencement of work activities.

3. Performance Indicators

Performance indicators are an important element of any program which enable the program owner to conduct timely assessments of the effectiveness of a program.

The RWS shall monitor the effectiveness of the program efforts by generating and trending the following performance indicators, as a minimum:

- Monthly and annual radwaste amounts generated for burial in cubic feet and cubic meters.

- Monthly radwaste generated prior to processing; accrual cost and cubic feet or pounds generated.

4. General Implementation

Implementation of this program is generally controlled by approved procedures. This section does not supersede or eliminate the need for specific procedures when appropriate. The topics contained in this section illustrate management approval and direction for those areas identified.

a. Solidification

Vermont Yankee Nuclear Power Corporation does not routinely solidify liquid waste. If the use of solidification to dispose of any liquid waste is required, it will be done by an outside vendor under the vendor's PCP. The vendor PCP will be reviewed and approved by the Plant Health Physicist, the Radiation Protection Manager, PORC, Plant Manager and VP of Operations prior to implementation. This review is to identify that there is sufficient supporting documentation of the vendor's PCP to give assurance that the final product will meet all requirements for transport and burial, and that sufficient procedural controls exist to assure safe operations.

b. Cartridge Filter Elements

Low activity cartridge filter elements (<200 mR/hr @ 30cm) will be air dried (~24hr or as determined by the Radwaste Supervisor) and handled as dry active waste. Filters determined to be above the dose limitations per 49 CFR, will be placed in casks. The liner shall be dewatered by the RDS-1000 System or a similar approved system and then shipped for disposal.

c. Resins

Normal operations produce radioactive waste in the form of depleted resins. These resins are processed in the burial container using a rapid dewatering system (RDS-1000) manufactured by Chem-Nuclear Systems, Inc. [OP 2153]

The system has been tested, by Chem-Nuclear, for certification in meeting the Barnwell Site Criteria and disposal requirement for free standing liquid. These tests are described in Chem-Nuclear's Topical Report on the RDS-1000 Radioactive Waste Dewatering System. In addition, to comply with the statement, "Any liquids present in waste packages shall be non-corrosive with respect to the container," Vermont Yankee tested the pH of various resin mixtures used by the plant in solution with water. The range was found to be 4.2 - 8.4. A solution is not considered corrosive if the pH is greater than 4.0 and less than 10.0.

A resin sample is taken from each liner prior to shipment. The sample is counted to determine the activity and waste classification. Class A resins that exceed 1.0 μCi/cc of isotopes with greater than 5 year half-lives and all Class B and C resins will be disposed of in an approved High Integrity Container (HIC).

Vendor supplied or temporary methods of processing resins may be used in lieu of the above process provided that the vendor or temporary process meets the requirements of quality described above and does not conflict with accepted burial criteria or safety requirements. Such methods will be reviewed and approved by the personnel stated in 4.a prior to implementation.

d. Filter Liners

During refueling outages and normal operation, liquid radwaste processing may require use of a decanting filter on the condensate phase separators. A floating suction is used to decant the water and resin into a filter liner. Filtered water is pumped from the liner. The liner is dewatered in accordance with OP 2153 (MOOID9409-03) such that the burial site criterion for free-standing water is met. A resin sample is taken from the liner and analyzed to determine the activity and waste classification.

e. Dry Active Waste (DAW)

DAW is compacted, as practical, or shipped to a vendor that sorts the material for processing or recycling. All DAW is examined before being compacted or shipped. Any liquids or items found that would compromise the integrity of the package are removed and separated as specified by procedure [OP 2512]. DAW which includes compactable, incinerable and metal materials are segregated in the plant and transported to the applicable sealand container, then shipped to the appropriate/cost effective off-site processor. If deemed practical, the DAW will be surveyed and free-released onsite, if possible. Containers used for DAW shipments meet the criteria of 49 CFR 173.425a. or b. "No leakage of radioactive material," as specified in 49 CFR 173.425.b.1 will be met provided that no radioactive materials in quantities equal to or exceeding those specified in 49 CFR 173.443 are detected on the external surfaces of the package at any time during shipment.

f. Chelating Agents

In order to comply with 10 CFR 20 Appendix G, chelating agents are controlled by the plant chemistry department using procedure AP 7602.

g. Explosive Waste

No waste capable of detonation or of explosive decomposition or reaction will be disposed as per 10 CFR 61.56(a)(4). Refer to MSDS via AP 7602.

h. Toxic Waste

No waste capable of generating toxic gases, vapors, or fumes will be disposed as per 10 CFR 61.56(a)(5). Refer to MSDS via AP 7602.

i. Pyrophoric Waste

No waste that is pyrophoric will be disposed as per 10 CFR 61.56(a)(6). Refer to MSDS via AP 7602.

j. High Integrity Containers (HICs)

Vermont Yankee Nuclear Power Plant has contracted with various suppliers of approved HICs. South Carolina has approved PCPs for HICs used by Vermont Yankee. Any HIC Vermont Yankee may choose to use at some future time, will meet all applicable requirements.

k. Waste Class Determination

Along with an approved outside laboratory, Vermont Yankee periodically performs laboratory analysis on all waste streams to determine the activity of radionuclides listed in Tables 1 and 2 of 10 CFR 61. Correlation analysis verifies that the relative concentration of each radionuclide, with respect to the overall activity in a given Vermont Yankee waste stream, remains constant over time. A set of scaling factors is determined which allows the activity of 10 CFR 61 radionuclides to be estimated using the results of gamma spectrometric analysis or direct gamma dose rate measurements.

For resin wastes, analysis is performed on samples of each source of resin comprising the contents of a burial container. Scaling factors are applied to the activity of radionuclides identified by gamma spectrometry analysis to determine the activity of those radionuclides which are not detected in the gamma spectrum.

For DAW, dose rate-to-curie conversion calculations are performed to determine the total activity present in a container. Scaling factors are applied to the container's total curie content to determine the activity of individual radionuclides.

Specific procedures for determining 10 CFR 61 scaling factors are contained in OP 2527, "Sampling and Analysis for Radwaste Classification." Once the activity of each radionuclide in a burial container is estimated, the waste classification is derived using methods required by 10 CFR 61. Specific procedures for waste class determination are contained in AP 0504, "Shipment of Radioactive Material."

l. Mixed Waste

No mixed waste will be disposed as per 10 CFR 61.56(a)(8) unless properly treated. Refer to MSDS via AP 7602.

FINAL CONDITIONS

1. This procedure is retained per AP 6805.

APPENDIX H

OFF-SITE DOSE CALCULATION MANUAL

Requirement: Technical Specification 6.7.B.1 requires that licensee initiated changes to the Off-Site Dose Calculation Manual (ODCM) be submitted to the Commission in the annual Radioactive Effluent Release Report for the period in which the change(s) was made effective.

Response: During the reporting period, Revision No. 28 was made to the ODCM.

The major changes included in Revision 28 to the ODCM are:

(28.A) Deletion of Frequencies for the River Water Compositor

The frequencies suggested for the River Composite Sampler were deleted from note f. of Table 3.5.1.

(28.B) Revision in Method of Calculating Averages

Note f. of Table 4.5.1 included a requirement to convert sample results to zero before averaging. This note was deleted since this is not the recommended way to report low level analyses results since it skews averages to lower values. The preferred method is to use the report analysis values for the averaging even for the results that are below LLD. These results are reported in the Annual Radiological Environmental Operating Report.

The above-noted ODCM changes were determined to maintain the level of protection in the calculation of off-site doses resulting from radioactive gaseous and liquid effluents since no changes have been made to either the dose calculation or setpoint methodologies. It is therefore concluded that these revisions will maintain the level of radioactive effluent control required by 10CFR20.1302, 40CFR190, 10CFR50.36a, and Appendix I to 10CFR Part 50, and not adversely impact the accuracy or reliability of effluent dose or setpoint calculations.

Revision 28 of the ODCM was submitted to the Nuclear Regulatory Commission separately but concurrently with this report.

APPENDIX I

RADIOACTIVE LIQUID, GASEOUS, AND SOLID WASTE TREATMENT SYSTEMS

Requirement: ODCM Section 10.4 requires that licensee initiated major changes to the radioactive waste systems (liquid, gaseous, and solid) be reported to the Commission in the annual Radioactive Effluent Release Report for the period in which the evaluation was reviewed by the Plant Operation Review Committee.

Response: There were no licensee-initiated major changes to the radioactive waste systems during this reporting period.

APPENDIX J

ON-SITE DISPOSAL OF SEPTIC/SILT/SOIL WASTE

Requirement: Off-Site Dose Calculation Manual, Appendices B and F require that the dose impact due to on-site disposal of septic waste and the cooling tower silt during the reporting year and from previous years be reported to the Nuclear Regulatory Commission in the annual Radioactive Effluent Report if disposals occur during the reporting year. VYNPC will report in the Annual Radioactive Effluent Release Report a list of the radionuclides present and the total radioactivity associated with the on-site disposal activities at Vermont Yankee.

Response: There was one on-site disposal of septic waste and one on-site disposal of construction soil during the reporting year. The total volume of the septage spread was approximately 12,000 gallons and the total volume of soil spread was approximately 26.3 m^3. The total activity spread on the 1.9 acres (southern) on-site disposal field from 2001 spreadings and from previous years was as follows:

Nuclide	Activity Spread in 2001 (Ci)	Activity from 2001 and Activity from Past Disposals Decayed to 2001 (Ci)
Mn-54	0.00E+00	1.83E-07
Co-60	7.75E-06	1.99E-05
Zn-65	2.07E-06	2.13E-06
Cs-137	2.96E-06	6.75E-05
Ce-141	1.69E-07	1.69E-07

The maximum organ (or whole body) incremental dose from material spread in 2001 was estimated to be 2.49E-02 mrem/yr. The maximum organ dose from all past spreading operations, including the material spread in 2001, totaled 1.20E-01 mrem/yr. These calculated values are within the 1 mrem/yr limit applied during the period of operational control of the site. The projected hypothetical dose for the period following the loss of operational control of the site area due to all spreading operations to-date is 1.70E-01 mrem/yr versus a 5 mrem/yr dose limit.

Docket No. 50-271
BVY 02-34

Attachment 2

Vermont Yankee Nuclear Power Station

Off-site Dose Calculation Manual Revision 28 – Changed Pages

VERMONT YANKEE NUCLEAR POWER STATION

OFF-SITE DOSE CALCULATION MANUAL

REVISION 28

Originator: Deborah Voland Deborah Voland 4/4/01
Print Name Signature Date

Reviewed: Mona M. Houle M.M. Houle 4/4/01 Mtg. 2001-019
Print Name Signature Date
Plant Operations Review Committee

Approved: Kevin H. Beoneu Kevin H. Beoneu 4/5/01
Print Name Signature Date
Plant Manager

LIST OF AFFECTED PAGES

Page	Rev.	Page	Rev.	Page	Rev.	Page	Rev.
i	27	2-1	27	3/4-27	27	6-6	27
ii	27	2-2	27	3/4-28	27	6-7	27
iii	27	2-3	27	3/4-29	27	6-8	27
iv	27	2-4	27	3/4-30	27	6-9	27
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vi	27	2-6	27	3/4-32	28	6-11	27
vii	27	2-7	27	3/4-33	28	6-12	27
viii	27	2-8	27	3/4-34	27	6-13	27
ix	27	2-9	27	3/4-35	27	6-14	27
x	27			3/4-36	28	6-15	27
xi	27			3/4-37	27	6-16	27
				3/4-38	27	6-17	27
				3/4-39	27	6-18	27
				3/4-40	27	6-19	27
		3/4-1	27	3/4-41	27	6-20	27
		3/4-2	27	3/4-42	27	6-21	27
1-1	27	3/4-3	27	3/4-43	27	6-22	27
1-2	27	3/4-5	27	3/4-44	27	6-23	27
1-3	27	3/4-6	27	3/4-45	27	6-24	27
1-4	27	3/4-7	27	3/4-46	27	6-25	27
1-5	27	3/4-8	27	3/4-47	27	6-26	27
1-6	27	3/4-9	27			6-27	27
1-7	27	3/4-10	27			6-28	27
1-8	27	3/4-11	27			6-29	27
1-9	27	3/4-12	27			6-30	27
1-10	27	3/4-13	27	5-1	27	6-31	27
1-11	27	3/4-14	27	5-2	27	6-32	27
1-12	27	3/4-15	27	5-3	27	6-33	27
1-13	27	3/4-16	27	5-4	27	6-34	27
1-14	27	3/4-17	27			6-35	27
1-15	27	3/4-18	27			6-36	27
1-16	27	3/4-19	27			6-37	27
1-17	27	3/4-20	28			6-38	27
1-18	27	3/4-21	27			6-39	27
		3/4-22	27	6-1	27	6-40	27
		3/4-23	27	6-2	27	6-41	27
		3/4-24	27	6-3	27	6-42	27
		3/4-25	27	6-4	27	6-43	27
		3/4-26	27	6-5	27	6-44	27

TABLE 4.3.1 NOTATION

a. See footnote a. of Table 4.2.1.

b. Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after removal from samplers. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or thermal power change exceeding 25% of rated thermal power in one hour, and analyses shall be completed within 48 hours of changing the samples. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement to sample at least once per 24 hours for 7 days applies only if: (1) analysis shows that the dose equivalent I-131 concentration in the primary coolant has increased more than a factor of 3 and the resultant concentration is at least 1 x 10-1 μCi/ml; and (2) the noble gas monitor shows that effluent activity has increased more than a factor of 3.

c. Sampling and analyses shall also be performed following shutdown, startup, or a thermal power change exceeding 25% of rated thermal power per hour unless: (a) analysis shows that the dose equivalent I-131 concentration in the primary coolant has not increased more than a factor of 3 and the resultant concentration is at least 1 x 10-1 μCi/ml; and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

d. The principal gamma emitters for which the LLD specification will apply are exclusively the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135 and Xe-138 for gaseous emissions, and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below LLD for the analyses should not be reported as being present at the LLD level for that nuclide, but as "not detected". When unusual circumstances result in LLDs higher than required, the reasons shall be documented in the Radioactive Effluent Release Report.

e. The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Controls 3.3.1, 3.3.2, and 3.3.3.

f. The gaseous waste sampling and analysis program does not explicitly require sampling and analysis at a specified LLD to determine the I-133 release. Estimates of I-133 releases shall be determined by counting the weekly charcoal sample for I-133 (as well as I-131) and assume a constant release rate for the release period.

g. Lower Limit of Detection (LLD) applies only to particulate form radionuclides identified in Table Notation d. above.

TABLE 3.5.1
(Cont'd)

Radiological Environmental Monitoring Program

Exposure Pathway and/or Sample	Number of Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
3. WATERBORNE			
a. Surface[e]	1 sample upstream.	Monthly grab sample.	Gamma isotopic analysis[d] of each sample. Tritium analysis of composite sample at least once per quarter.
	1 sample downstream.	Composite sample collected over a period of one month[f].	
b. Ground	1 sample from within 8 km distance.	Quarterly.	Gamma isotopic[d] and tritium analyses of each sample.
	1 sample from a control location.	Quarterly.	
c. Sediment from Shoreline	1 sample from downstream area with existing or potential recreational value.	Semiannually.	Gamma isotopic analysis[d] of each sample.
	1 sample from north storm drain outfall.	Semiannually.	

TABLE 3.5.1
(Cont'd)

Radiological Environmental Monitoring Program

Exposure Pathway and/or Sample	Number of Sample Locations[a]	Sampling and Collection Frequency	Type and Frequency of Analysis
4. INGESTION			
a. Milk	Samples from milking animals in 3 locations within 5 km distance having the highest dose potential. If there are less than 3 primary locations available then 1 or more secondary sample from milking animals in each of 3 areas between 5 to 8 km distance where doses are calculated to be greater than 1 mrem per year.	Semimonthly if milking animals are identified on pasture; at least once per month at other times.	Gamma isotopic[d] and I-131 analysis of each sample.
	1 sample from milking animals in a control location.		
b. Fish	1 sample of two recreationally important species in vicinity of plant discharge area.	Semiannually.	Gamma isotopic analysis[d] on edible portions.
	1 sample (preferably of same species) in areas not influenced by plant discharge.		
c. Vegetation	1 grass sample at each air sampling station.	Quarterly when available.	Gamma isotopic analysis[d] of each sample.
	1 silage sample at each milk sampling station (as available).	At time of harvest.	Gamma isotopic analysis[d] of each sample.

TABLE 3.5.1 NOTATION

a Specific parameters of distance and direction sector from the centerline of the reactor and additional descriptions where pertinent, shall be provided for each and every sample location in Table 3.5.1 in a table and figure(s) in the ODCM (Section 7). Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every reasonable effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report pursuant to ODCM Section 10.2. It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances, suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the radiological environmental monitoring program. In lieu of a Licensee Event Report and pursuant to ODCM Section 10.1, identify the cause of the unavailability of samples for that pathway and identify the new location(s) for obtaining replacement samples in the next Radioactive Effluent Release Report and also include in the report a revised figure(s) and table for the ODCM reflecting the new location(s).

b One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a Thermoluminescent Dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation. The 40 stations is not an absolute number. The frequency of analysis or readout for TLD systems will depend upon the characteristics of the specific system used and should be selected to obtain optimum dose information with minimal fading.

c Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than ten times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

d Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

e The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. The "downstream" sample shall be taken in an area beyond but near the mixing zone.

f Composite sample aliquots shall be collected at time intervals that are very short relative to the compositing period in order to assure obtaining a representative sample.

g Each meteorological sector shall have an established "inner" and an "outer" monitoring location based on ease of recovery (i.e., response time) and year-round accessibility.

h Sample collection will be performed weekly whenever the main plant stack effluent release rate of I-131, as determined by the sampling and analysis program of Table 4.3.1, is equal to or greater than 1 x 10-1 uCi/sec. Sample collection will revert back to semimonthly no sooner than at least two weeks after the plant stack effluent release rate of I-131 falls and remains below 1 x 10-1 uCi/sec.

TABLE 4.5.1 NOTATION

(a) See Footnote (a) of Table 4.2.1.

(b) Parent only.

(c) If the measured concentration minus the 5 sigma counting statistics is found to exceed the specified LLD, the sample does not have to be analyzed to meet the specified LLD.

(d) This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the listed nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to Technical Specification 6.6.E and ODCM Section 10.2.

(e) The Ba-140 LLD and concentration can be determined by the analysis of its short-lived daughter product La-140 subsequent to an 8 day period following collection. The calculation shall be predicted on the normal ingrowth equations for a parent-daughter situation and the assumption that any unsupported La-140 in the sample would have decayed to an insignificant amount (at least 3.6 percent of its original value). The ingrowth equations will assume that the supported La-140 activity at the time of the collection is zero.

(f) Nuclides which are below the LLD for the analyses should not be reported as being present at the LLD.