

10 CFR 50.90

June 30, 2005
5928-05-20124

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Three Mile Island, Unit 1 (TMI Unit 1)
Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Response To Request For Additional Information –
Technical Specification Change Request No. 326: Elimination of Containment
Equipment Hatch Closure During Refueling
(TAC NO. MC4904)

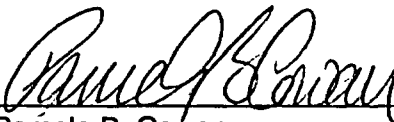
This letter provides additional information in response to NRC request for additional information dated May 2, 2005, regarding TMI Unit 1 Technical Specification Change Request No. 326, submitted to NRC for review on October 20, 2004. The additional information is provided in Enclosure 1.

No new regulatory commitments are established by this submittal. If any additional information is needed, please contact David J. Distel at (610) 765-5517.

I declare under penalty of perjury that the foregoing is true and correct.

Very truly yours,

6/30/05
Executed On


Pamela B. Cowan
Director - Licensing & Regulatory Affairs
AmerGen Energy Company, LLC

8678 Enclosures: 1) Response to Request for Additional Information
2) TMI Unit 1 Calculation C-1101-826-E410-030, Revision 0, "Additional Onsite
X/Q Values for Alternative Source Term Application"
3) Electronic Disk of TMI Unit 1 ARCON96 Files and Meteorological Data (1992,
1993, 1995 & 1996)

cc: S. J. Collins, USNRC Administrator, Region I
P. S. Tam, USNRC Senior Project Manager, TMI Unit 1
D. M. Kern, USNRC Senior Resident Inspector, TMI Unit 1 - (w/o Enclosure 3)
File No. 04092 - (w/o Enclosure 3)

ACC 1

ENCLOSURE 1

TMI UNIT 1

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

**TECHNICAL SPECIFICATION CHANGE REQUEST No. 326
ELIMINATION OF CONTAINMENT EQUIPMENT HATCH CLOSURE DURING
REFUELING**

1. **NRC Question**

The FHA radiological consequence analysis for Amendment No. 236 uses X/Q values that were derived assuming a diffuse source release from the reactor building; i.e., the activity being released is assumed to be homogeneously distributed throughout the reactor building and leak over the entire reactor building surface. In reality, the releases are likely to occur through the unit vent or through an open personnel, equipment, and/or emergency hatch. Please confirm that the diffuse source control room X/Q values used in the Amendment No. 236 dose assessment bound the atmospheric dispersion characteristics for releases from the unit vent, personnel hatch, equipment hatch, and emergency air lock.

Response

As stated above, the dose previously calculated for the Fuel Handling Accident Inside Containment (FHAIC) radiological consequence analysis for Amendment No. 236 used a X/Q value that was derived assuming a diffuse source release from the reactor building; i.e., the activity being released is assumed to be homogeneously distributed throughout the reactor building and leak over the plane of the reactor building surface perpendicular to the control room air intake tunnel. This previously calculated diffuse X/Q value was $3.40\text{E-}04 \text{ sec/m}^3$ for a 0-2 hour release.

In order to confirm that the X/Q value selected is the bounding value, it was decided that a X/Q for the equipment hatch, unit vent, personnel air lock, and emergency air lock (positioned within the equipment hatch) would be re-calculated for the control room intake using ARCON96 and the guidance provided in Regulatory Guide 1.194. Please refer to the enclosed calculation (Enclosure 2) for additional details. Enclosure 3 provides an electronic disk containing the ARCON96 files as well as the same four years of meteorological data (1992, 1993, 1995, 1996) used to develop the existing licensing basis X/Q values previously reviewed and approved in TMI-1 Amendment Nos. 210 and 215, dated April 15, 1999 and August 24, 1999, respectively. This meteorological data was used in the calculation provided in Enclosure 2 to develop the revised X/Q values described above. As discussed in Enclosure 2, upper level wind data is not used in the new X/Q determinations. The associated upper level wind speed instrument is not required by TMI Unit 1 Technical Specifications nor is it necessary for this analysis since only ground level release X/Q values are being determined. Consistent with the previous license amendment request supporting TMI-1 Amendment No. 210, referenced above, since less than 90% of the 1994 TMI meteorological data was recovered, this year is excluded.

These new X/Q values are summarized below:

<u>Location</u>	<u>0-2 Hours X/Q (sec/m³)</u>
Unit Vent:	5.34E-04
Personnel Air Lock:	2.68E-04
Equipment Hatch:	4.51E-04
Emergency Air Lock:	4.47E-04

Since releases can occur through the unit vent or through open personnel, equipment, and/or emergency hatch, the highest X/Q ($5.34\text{E-}04 \text{ sec/m}^3$ corresponding to the unit vent) is used to develop the revised control room dose consequence for the FHAIC.

Note that the filter that is available and aligned on this pathway is still not being credited in the dose analysis.

Regarding the calculated dose to control room operators, the X/Q value is a direct multiplier in the dose equation. Therefore, since the fuel handling accident occurs over a two-hour period, the X/Q ratio (new / previous) for the 0 to 2-hour release period can be applied as a direct multiplier to the originally calculated control room dose as follows to obtain the new maximum calculated dose:

$$0.655 \text{ Rem TEDE} \times (5.34\text{E-}04 / 3.40\text{E-}04) = 1.028 \text{ Rem TEDE}$$

Where:

0.655 Rem TEDE = originally calculated/submitted/approved dose

5.34E-04 = highest new calculated X/Q value (sec/m³) the unit vent

3.40E-04 = previously calculated diffuse source X/Q value (sec/m³)

The revised FHAIC calculated control room operator dose of 1.028 Rem TEDE, based on using the bounding X/Q value described above, remains well below the regulatory criteria of 5 Rem TEDE specified in 10 CFR 50.67 and GDC-19. The previously analyzed Exclusion Area Boundary and Low Population Zone dose consequences are not impacted by this change.

Note that this control room dose value will be further revised as a result of changes being made to the dose analysis model assumptions and parameters in response to additional NRC review questions. These changes have no impact on the above bounding calculation for the X/Q value. The final calculated dose consequences for the FHAIC are being submitted separately and are expected to remain well below the regulatory criteria.

2. NRC Question

The FHA radiological consequence analysis for Amendment No. 236 uses X/Q values that were derived assuming all infiltration into the control room (both filtered and unfiltered) occurs through the control room yard air intake. Using the results of the tracer gas testing performed on the TMI-1 control room envelope, please confirm that there are no potential unfiltered inleakage pathways during the control room isolation mode that could result in X/Q values that are higher than the control room yard air intake X/Q values.

Response

The tracer gas testing report confirms that there are no specifically identified potential unfiltered inleakage pathways in the control room isolation mode that could result in X/Q values that are higher than that for the control room yard air intake. This is further demonstrated by the fact that differential pressure readings between all areas within the control room (CR) envelope and outside areas were shown to be positive. Positive pressure in the CR with respect to outside areas precludes inleakage through the boundary walls. This implies that the more credible source of inleakage would be through the air intake tunnel as currently described. The maximum inleakage as measured by the tracer gas test was during operation of the "A" train at 233 +/- 129 cfm

(189 +/- 103 cfm for the "B" train). Additionally, the maximum assumed unfiltered inleakage value used in the TMI-1 design basis calculations is 1,000 cfm, which provides significant margin compared to the maximum measured values. The personnel air lock, although located within the Intermediate Building, is in a location close to the Control Building. It is unlikely that leakage through the personnel air lock would be directed towards the Control Building that could contribute to unfiltered inleakage through the CR boundary walls. This is partially due to the positive pressure in the Control Building as well as the fact that leakage from the air lock would be into the Intermediate Building and/or Turbine Building. The Intermediate Building normal exhaust pathway is through the unit vent. The Turbine Building exhaust pathway would be farther away and more favorable. For conservatism, the X/Q for the personnel air lock was based on its location without credit for any release-containing structures. The more credible inleakage path into the CR is through the air intake tunnel. Therefore, use of the highest calculated X/Q value (unit vent, personnel air lock, equipment hatch, or emergency air lock), as described in response to Question No. 1 above, ensures that the maximum credible calculated dose is determined. Based on the above, it is concluded that other potential pathways do not represent credible unfiltered inleakage pathways to the CR during CR isolation mode of operation.

ENCLOSURE 2

**TMI UNIT 1 CALCULATION C-1101-826-E410-030
Revision 0**

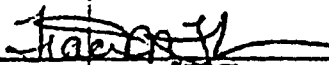
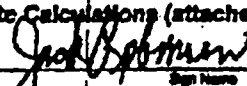
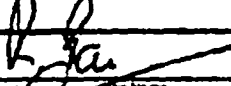
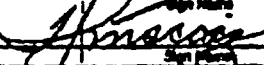
“Additional Onsite X/Q Values for Alternative Source Term Application”

Exelon

Nuclear

CC-AA-309-1001
Revision 2

Design Analysis Cover Sheet

Design Analysis (Major Revision)		Last Page No. ' 9 (body), Att. H1	
Analysis No.: ' C-1101-828-E410-030		Revision: ' 0	
Title: ' Additional Onsite X/Q Values for Alternative Source Term Application			
EC/ECR No.: ' ECR 05-00432		Revision: ' 0	
Station(s): ' Three Mile Island	Component(s): ' N/A		
Unit No.: ' 1			
Discipline: ' Mech			
Descrip. Code/Keyword: ' SR, AST, DBA, Dose, Dispersion			
Safety/QA Class: ' SR			
System Code: ' 828			
Structure: ' N/A			
CONTROLLED DOCUMENT REFERENCES "			
Document No.:	From/To	Document No.:	From/To
Calculation No. C-1101-828-E540-020, Rev. 2	From	Drawing 1E-156-02-005, Rev. 7	From
Drawing 1E-163-02-002, Rev. 6	From	Drawing E-012-003, Rev. 41	From
Drawing 1E-154-02-001, Rev. 8	From		
Drawing 1E-153-02-006, Rev. 4	From		
Is this Design Analysis Safeguards Information? " Yes ☐ No ☒ If yes, see SY-AA-101-108			
Does this Design Analysis contain Unverified Assumptions? " Yes ☐ No ☒ If yes, AT/AR#:			
This Design Analysis SUPERCEDES: " None In its entirety.			
Description of Revision (list affected pages for partials): " New Calculation			
Preparer: " Traci Thomas		8/20/05	
Method of Review: " Detailed Review ☒ Alternate Calculations (attached) ☐ Testing ☐			
Reviewer: " Jack Robinson		8/20/05	
Review Notes: " Independent review ☒ Peer Review ☐ N/A.			
Reviewer concurred with the analysis approach, with the inputs used in the analysis, and with the results provided.			
(For External Analysis Only) External Approver: " 		8/20/05	
Exelon Reviewer: " 		6/23/05	
Is a Supplemental Review Required? " Yes ☐ No ☒ If yes, complete Attachment 3			
Exelon Approver: " 		6/30/05	

Owners Acceptance Review Checklist for External Design Analysis

DESIGN ANALYSIS NO. C-1101-826-E410-030

REV:000

PAGE: 2

		Yes	No	N/A
1.	Do assumptions have sufficient rationale?	☒	☐	☐
2.	Are assumptions compatible with the way the plant is operated and with the licensing basis?	☒	☐	☐
3.	Do the design inputs have sufficient rationale?	☒	☐	☐
4.	Are design inputs correct and reasonable?	☒	☐	☐
5.	Are design inputs compatible with the way the plant is operated and with the licensing basis?	☒	☐	☐
6.	Are Engineering Judgments clearly documented and justified?	☒	☐	☐
7.	Are Engineering Judgments compatible with the way the plant is operated and with the licensing basis?	☒	☐	☐
8.	Do the results and conclusions satisfy the purpose and objective of the design analysis?	☒	☐	☐
9.	Are the results and conclusions compatible with the way the plant is operated and with the licensing basis?	☒	☐	☐
10.	Does the design analysis include the applicable design basis documentation?	☒	☐	☐
11.	Have any limitations on the use of the results been identified and transmitted to the appropriate organizations?	☒	☐	☐
12.	Are there any unverified assumptions?	☐	☒	☐
13.	Do all unverified assumptions have a tracking and closure mechanism in place?	☐	☐	☒

EXELON REVIEWER: /

Print / Sign

DATE: 6/23/05

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ATTACHMENTS

A. Drawing 1E-153-02-002, Revision 6, <i>General Arrangement Reactor Building, Plan</i> <i>Floor El. 308'-0"</i> , showing release locations	A1-A1
B. Wind Roses	B1-B4
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E. Excerpt of Drawing E-012-003, Revision 41, <i>Plot Plan</i> , showing release and intake locations	E1-E1
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1.0 PURPOSE

This calculation, C-1101-826-E410-030, Rev. 0, presents new atmospheric relative concentration (X/Q) values for Alternative Source Term (AST) accident evaluations for the Three Mile Island Station as additions and changes to those provided in Reference 9. The purpose of this calculation is to determine the Yard Intake relative concentration values (X/Q, in sec/m^3) resulting from certain postulated accidental radiological release locations that may be different from those in Reference 9. The values resulting from this calculation can be used as input for the determination of radiological doses using the Alternative Source Terms (AST) per Regulatory Guide (RG) 1.183 (Reference 1) for these new release locations.

The X/Q values resulting at the Yard Intake are calculated using the NRC-sponsored computer code ARCON96 (Reference 2) consistent with the guidance in RG 1.194 (Reference 3). This analysis is presented in Section 2.0 below.

2.0 ARCON96 ANALYSIS OF YARD INTAKE X/Q FOR NEW RELEASE LOCATIONS

2.1 Identification of Computer Programs/Method of Analysis

ARCON96 is a commercial software package designated by Washington Group International as NU-830, an "active" program applicable to nuclear safety related analyses as well as non-safety related studies and evaluations. Its use is principally control room habitability assessments. The NU-830 code has been verified for 0-2 hour, 2-8 hour, and 8-24 hour centerline and sector X/Q averages and the 95% maximum X/Q. This verification is in accordance with Revision 4 of the Washington Group International Nuclear Engineering Standard for Computer Software Control, NEP-09. Revision 0 of NU-830 was verified for ground-level and zero exit velocity uncapped vents, and Revision 1 was verified for zero exit velocity stack releases.

ARCON96 Program Description [excerpted from NUREG/CR-6331 Rev. 1 (Reference 2)]

ARCON96 is a straight line Gaussian dispersion model used in control room habitability assessments for estimating dispersion in the vicinity of buildings to calculate relative concentrations at control room air intakes that would be exceeded no more than five percent of the time. The basic diffusion model implemented in the ARCON96 code is a straight-line Gaussian model that assumes the release rate is constant for the entire period of release. This assumption is made to permit evaluation of potential effects of accidental releases without having to specify a complete release sequence. Ambient atmospheric conditions measured in accordance with RG 1.23 (Reference 4) are input to ARCON96 by way of a sequential hour-by-hour meteorological database of jointly measured wind speed, wind direction, and Pasquill stability class, as derived from the vertical temperature difference recorded at representative elevations (i.e., tower levels).

ARCON96 permits evaluation of ground-level, vent, and elevated releases. Building wake effects are considered in the evaluation of relative concentrations from ground-level and vent releases as a function of the ratio between the effluent vertical velocity and the release-height wind speed, using the same procedure used in the NRC XOQDOQ code (Reference 5).

Diffusion coefficients used in ARCON96 have three components. The first component is the diffusion coefficient used in other NRC models, for example XOQDOQ, and PAVAN. The other two components

are corrections to account for enhanced dispersion under low wind speed conditions and in building wakes. Derivations of the low wind speed and building wake corrections are described by Ramsdell and Fosmire (Reference 6). Parameter values for the correction factors are based on analysis of diffusion data collected in various building wake diffusion experiments (Reference 6). The experiments were conducted under a wide range of meteorological conditions. However, a large number of experiments were conducted during low wind speeds, when wake effects are minimal. The wake correction model included in ARCON96 treats diffusion under these conditions much better than previous models. Thus, the diffusion coefficients in ARCON96 account for both low-wind speed meander and wake effects.

ARCON96 calculates relative concentrations using hourly meteorological data. It then combines the hourly averages to estimate concentrations for periods ranging in duration from 2 hours to 30 days. Wind direction is considered as the averages are formed. As a result, the averages account for persistence in both diffusion conditions and wind direction. Cumulative frequency distributions are prepared from the average relative concentrations. Relative concentrations that are exceeded no more than five percent of the time (95th percentile relative concentrations) are determined from the cumulative frequency distributions for each averaging period. Finally, the relative concentrations for five standard averaging periods used in control room habitability assessments are calculated from the 95th percentile relative concentrations.

2.2 Assumptions

The following dimensions were assumed based on minimizing distances from the release to the intake and verified as conservative during a site walkdown on May 24, 2005:

- Unit Vent release height 6 ft above the top of the Reactor Building.
- Personnel Hatch release at the top of a 6 ft doorway positioned on the platform shown in Attachment A.

In addition, the Equipment Hatch and Emergency Airlock release heights were set equal to the intake height.

2.3 Inputs

2.3.1 Meteorological Data

The Three Mile Island meteorological tower data for the four years 1992, 1993, 1995 and 1996, as supplied by Exelon (Reference 7), were applied in the ARCON96 modeling analyses. Wind measurements were taken at tower elevations 100 ft and 150 ft.

Executing ARCON96 requires the meteorological input file to contain two (2) wind levels (lower and upper), however, since the tower data are validated at the 100 ft level only, the 100 ft wind data were substituted for the 150 ft wind data, resulting in an ARCON96 meteorological database with two identical levels of wind data to represent the lower and upper level required input.

Attachment B includes the four yearly wind rose diagrams based on the 100 ft meteorological tower wind data and Attachment C contains the joint wind direction, wind speed, and stability class distribution tables for the same data.

2.3.2 Yard Intake Scenarios

The release points identified for consideration at Three Mile Island are the Unit Vent, Personnel Hatch, Equipment Hatch, and Emergency Airlock. The locations of these release points are shown in Attachment A (Reference 8).

All release points were modeled in ARCON96 as ground-level releases. Aerodynamic building plume downwash effects are present for ground-level releases; therefore, in accordance with RG 1.194, the building area perpendicular to the wind direction is utilized. For all scenarios, the Containment Building area of 2127 m² was utilized (Reference 9).

The center of the Yard Intake is located 18 ft (5.49 m) above grade as seen in Attachment D (Reference 10), and is identified with respect to the release points in Attachment E (Reference 11).

ARCON96 requires a horizontal source-receptor distance to be input, which is defined in RG 1.194 Section 3.4 as "the shortest horizontal distance between the release point and the intake". However, for releases in building complexes, a "taut string length" can be utilized as justifiable. For the Personnel Hatch this "taut string length" (calculation shown in Attachment F) was utilized to account for the intervening Fuel Handling Building. Per a Washington Group International phone conversation with Mr. Steve Lavie of NRC on May 17, 2004, when the "taut string length" is utilized, the intake and release height should be set equal to each other so as not to also take undue advantage of the slant distance that ARCON96 calculates. Therefore, for the personnel hatch, the intake height was set equal to the release height of 3.5 m.

The releases for the Yard Intake modeling scenarios are each treated as a point source, and are conservatively assumed to have a zero (0) vertical velocity, exhaust flow and stack radius. The ARCON96 input parameter values were set in accordance with RG 1.194, Table A-2 (e.g. surface roughness length = 0.2 m; wind direction window = 90 degrees, 45 degree on either side of line of sight from source to receptor; minimum wind speed = 0.5 m/s; and averaging sector width constant = 4.3).

A summary of ARCON96 input parameters and certain output meteorological data statistics is shown below in Table 2-1.

TABLE 2-1
Three Mile Island: ARCON96 Yard Intake Modeling Scenario Summary

	Unit vent	Personnel Hatch	Equipment Hatch	Emergency Air Lock	Reference/Notes
Number of meteorological data files	4	4	4	4	1992, 1993, 1995 and 1996 meteorological tower database 100 ft wind data utilized for both upper and lower level in the ARCON96 meteorological database. (100 ft is the only validated level)
Height of lower wind instrument (m)	30.48	30.48	30.48	30.48	Calculation No. C-1101-826-E540-020, Revision 2, Section 6.2 (Reference 9)
Height of upper wind instrument (m)	30.48	30.48	30.48	30.48	Since the met tower data is only validated at the 100 ft level, wind data from this level was utilized for both the upper and lower level in the ARCON96 meteorological input database.
Release height (m)	48.07	3.5	5.49	5.49	<u>Unit Vent</u> : Drawings 1E-153-02-006 and 1E-156-02-005 supplemented by plant walkdown (References 12 and 13) <u>Personnel Hatch</u>: Drawing 1E-153-02-002 supplemented by plant walkdown (Reference 8) <u>Equipment Hatch and Emergency Airlock</u>: Release height conservatively set to intake height.
Building area (m ²)	2127 (Containment Building)	2127 (Containment Building)	2127 (Containment Building)	2127 (Containment Building)	Calculation No. C-1101-826-E540-020, Revision 2, Section 6.3 (Reference 9)
Effluent vertical velocity (m/s)	0	0	0	0	
Vent or stack flow (m ³ /s)	0	0	0	0	
Vent or stack radius (m)	0	0	0	0	
Direction .. Intake to source (deg)	42	61	39	35	
Wind direction sector width (deg)	90	90	90	90	RG 1.194 Table A-2
Wind direction window (deg)	357 - 067	016 - 106	354 - 064	350 - 060	
Distance to Intake (m)	94.1	140.7	101.0	101.7	Taut String Length for Personnel Hatch used in accordance with RG 1.194 Section 3.4.
Intake height (m)	5.49	3.5	5.49	5.49	- Drawing 1E-154-02-001, Rev. 8, Section F-F (Reference 10) <u>Personnel Hatch</u>: Intake Height set equal to release height since utilizing taut string length (per phone conversation with Mr. Steve Lavie of NRC May 17, 2004).
Terrain elevation difference (m)	0	0	0	0	
Minimum wind speed (m/s)	0.5	0.5	0.5	0.5	RG 1.194 Table A-2
Surface roughness length (m)	0.20	0.20	0.20	0.20	RG 1.194 Table A-2
Sector averaging constant	4.3	4.3	4.3	4.3	RG 1.194 Table A-2
Initial value of sigma y	0	0	0	0	
Initial value of sigma z	0	0	0	0	
Total number of hours of data processed	35093	35093	35093	35093	
Hours of missing data	329	329	329	329	
Hours direction in window	4747	5416	4835	5035	
Hours elevated plume w/ dir. in window	0	0	0	0	
Hours of calm winds	2239	2239	2239	2239	
Hours direction not in window or calm	27778	27109	27690	27490	

Shaded Cells indicate data is obtained from ARCON96 model output.

3.0 RESULTS AND CONCLUSIONS

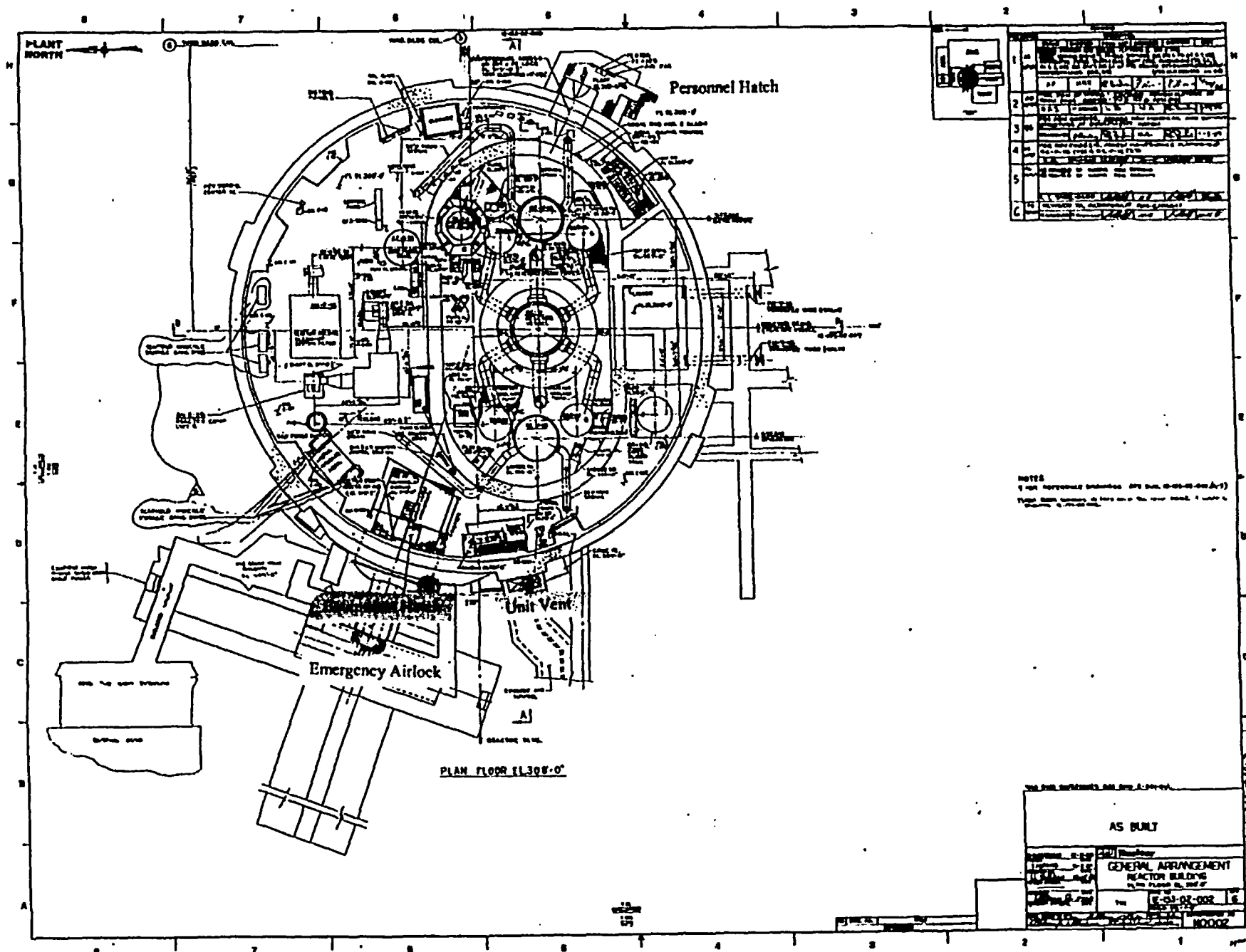
The X/Q values resulting from the ARCON96 modeling analysis of each new release location/Yard Intake scenario are presented in Table 2-2 below. The modeling details and computer output for these scenarios are contained in Attachment G and the corresponding WGI Computer Disclosure Sheet is contained in Attachment H.

TABLE 2-2 Three Mile Island ARCON96 Yard Intake X/Q Summary						
Release Location	Release Type	X/Q (sec/m ³) *				
		0-2 hrs	2-8 hrs	8-24 hrs	1-4 days	4-30 days
Unit vent	Point	5.34E-04	3.10E-04	1.36E-04	9.70E-05	6.02E-05
Personnel Hatch	Point	2.68E-04	1.89E-04	8.24E-05	5.76E-05	3.64E-05
Equipment Hatch	Point	4.51E-04	2.68E-4	1.23E-04	8.62E-05	5.47E-05
Emergency Air Lock	Point	4.47E-04	2.67E-4	1.19E-04	8.45E-05	5.60E-05

* X/Q values are based on 1992, 1993, 1995 and 1996 100 ft meteorological tower data.

References

- 1) *Regulatory Guide 1.183, "Alternative Radiological Source Terms For Evaluating Design Basis Accidents At Nuclear Power Reactors"*; U.S. Nuclear Regulatory Commission; July 2000.
- 2) *Atmospheric Relative Concentrations in Building Wakes*; NUREG/CR-6331, PNNL-10521, Rev. 1; prepared by J. V. Ramsdell, Jr., C. A. Simmons, Pacific Northwest National Laboratory; prepared for U.S. Nuclear Regulatory Commission; May 1997 (Errata, July 1997).
- 3) *Regulatory Guide 1.194; Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants*; U.S. Nuclear Regulatory Commission; June 2003.
- 4) *Regulatory Guide 1.23 (Safety Guide 23), Onsite Meteorological Programs*; U. S. Nuclear Regulatory Commission; USNRC Office of Standards Development; Washington, D.C.; 1972.
- 5) *XOQDOQ: Computer Program for the Meteorological Evaluation of Routine Releases at Nuclear Power Stations*; NUREG/CR-2919; J. F. Sagendorf, J. T. Goll, and W. F. Sandusky, U.S. Nuclear Regulatory Commission; Washington, D.C; 1982.
- 6) *Atmospheric Dispersion Estimates in the Vicinity of Buildings*; J. V. Ramsdell and C. J. Fosmire, Pacific Northwest Laboratory; 1995.
- 7) Three Mile Island 1992, 1993, 1995 and 1996 Meteorological Tower Data; provided by Exelon via e-mail from Tom Mscisz on 6/17/2005.
- 8) Drawing 1E-153-02-002, Revision 6, *General Arrangement Reactor Building, Plan Floor El 308'-0"*.
- 9) Calculation No. C-1101-826-E540-020, Revision 2, *Atmospheric Transport X/Q's Using ARCON96 Code – Control Room Habitability*.
- 10) Drawing 1E-154-02-001, Revision 8, *General Arrangement Auxiliary Building and Air Intake Tunnel, Partial Plans and Sections*.
- 11) Drawing E-012-003, Revision 41, *Plot Plan*.
- 12) Drawing 1E-153-02-006, Revision 4, *General Arrangement Reactor Building, Section 'A-A' & 'C-C'*.
- 13) Drawing 1E-156-02-005, Revision 7, *General Arrangement Intermediate Building, Sections*.



TMI 1992 100 ft

January 1

December 31

Midnight-11 PM

NOTE: Frequencies
indicate direction
from which the
wind is blowing.

W

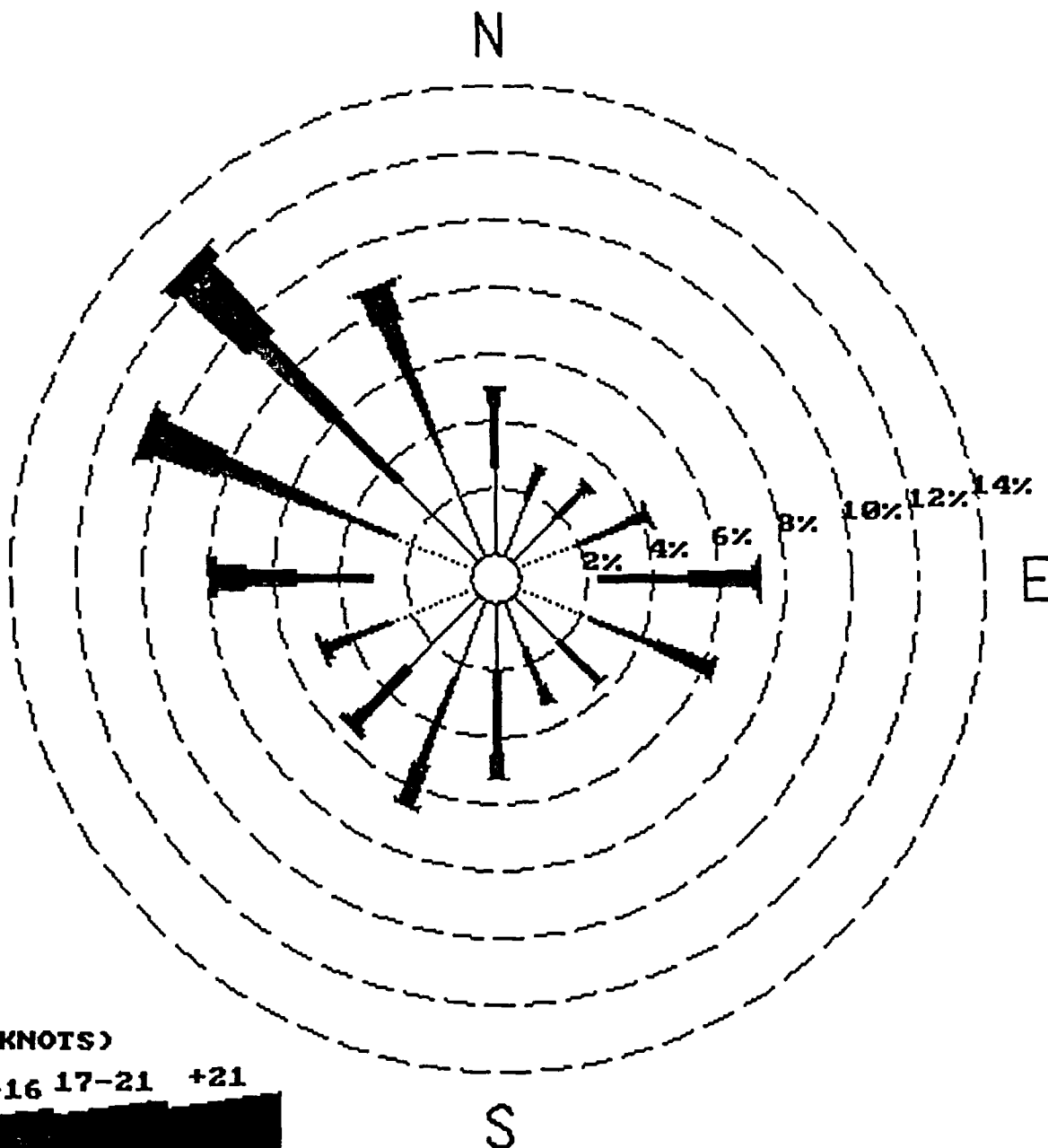
E

CALM WINDS 1.29%

WIND SPEED (KNOTS)

CALMS

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



TMI 1993 100 ft

January 1

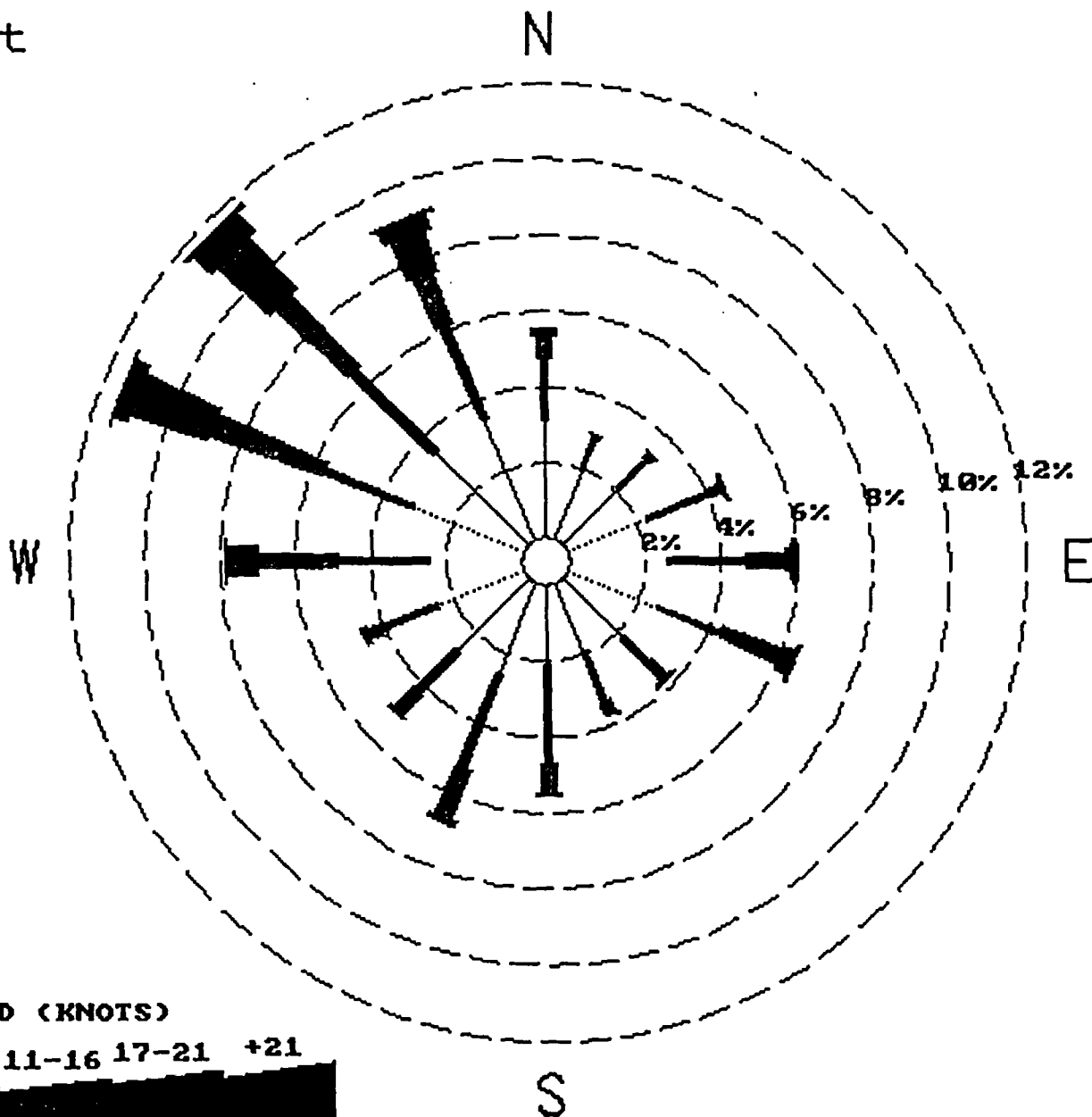
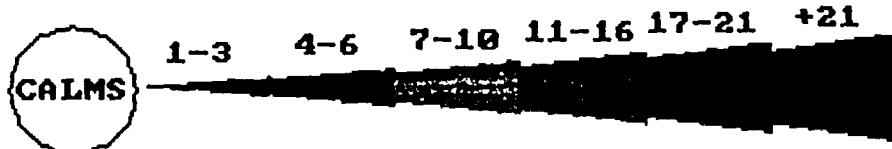
December 31

Midnight-11 PM

NOTE: Frequencies
indicate direction
from which the
wind is blowing.

CALM WINDS 1.34%

WIND SPEED (KNOTS)



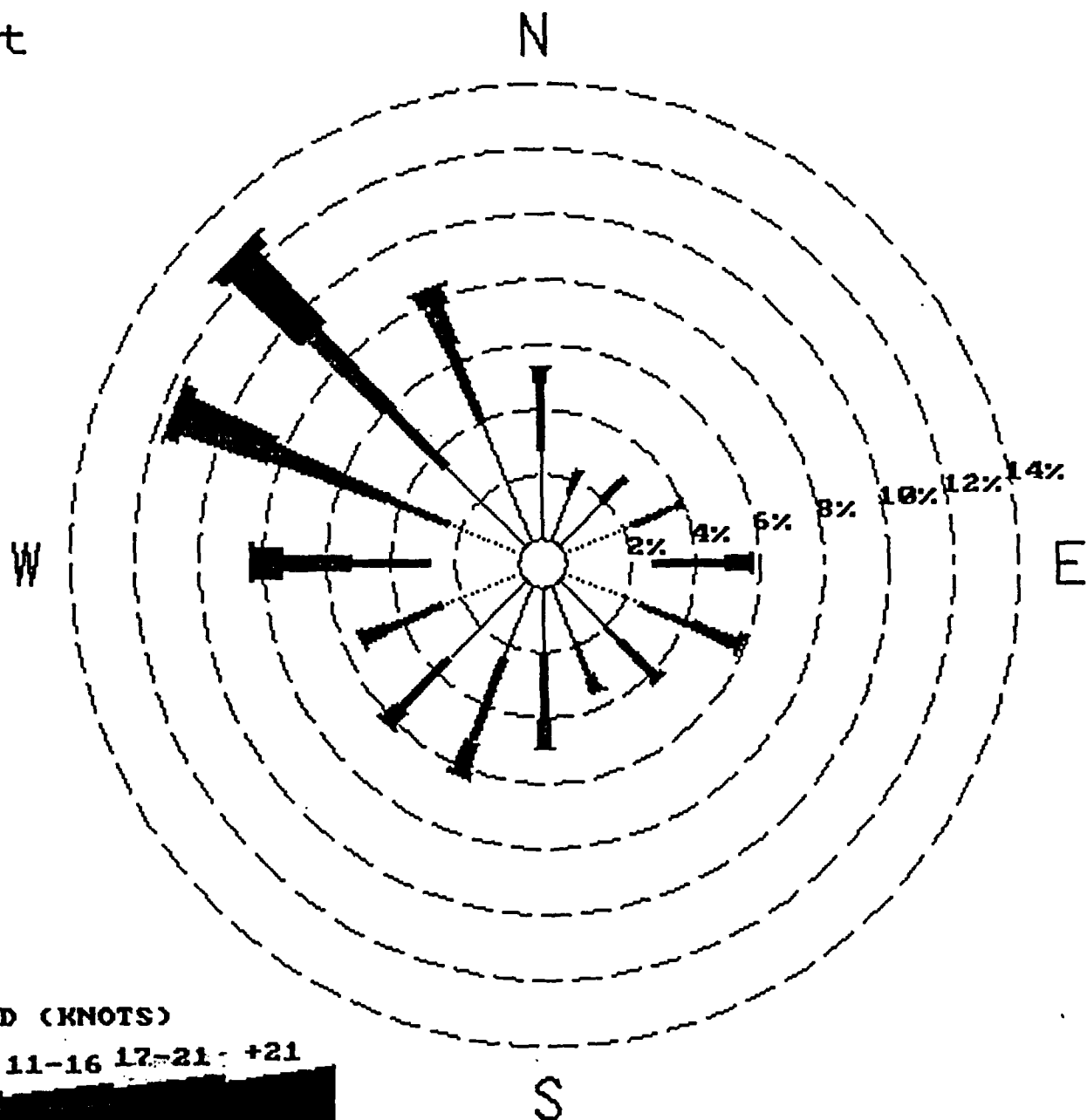
TMI 1995 100 ft

January 1

December 31

Midnight-11 PM

NOTE: Frequencies indicate direction from which the wind is blowing.



CALM WINDS 1.35%

WIND SPEED (KNOTS)

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

CALMS

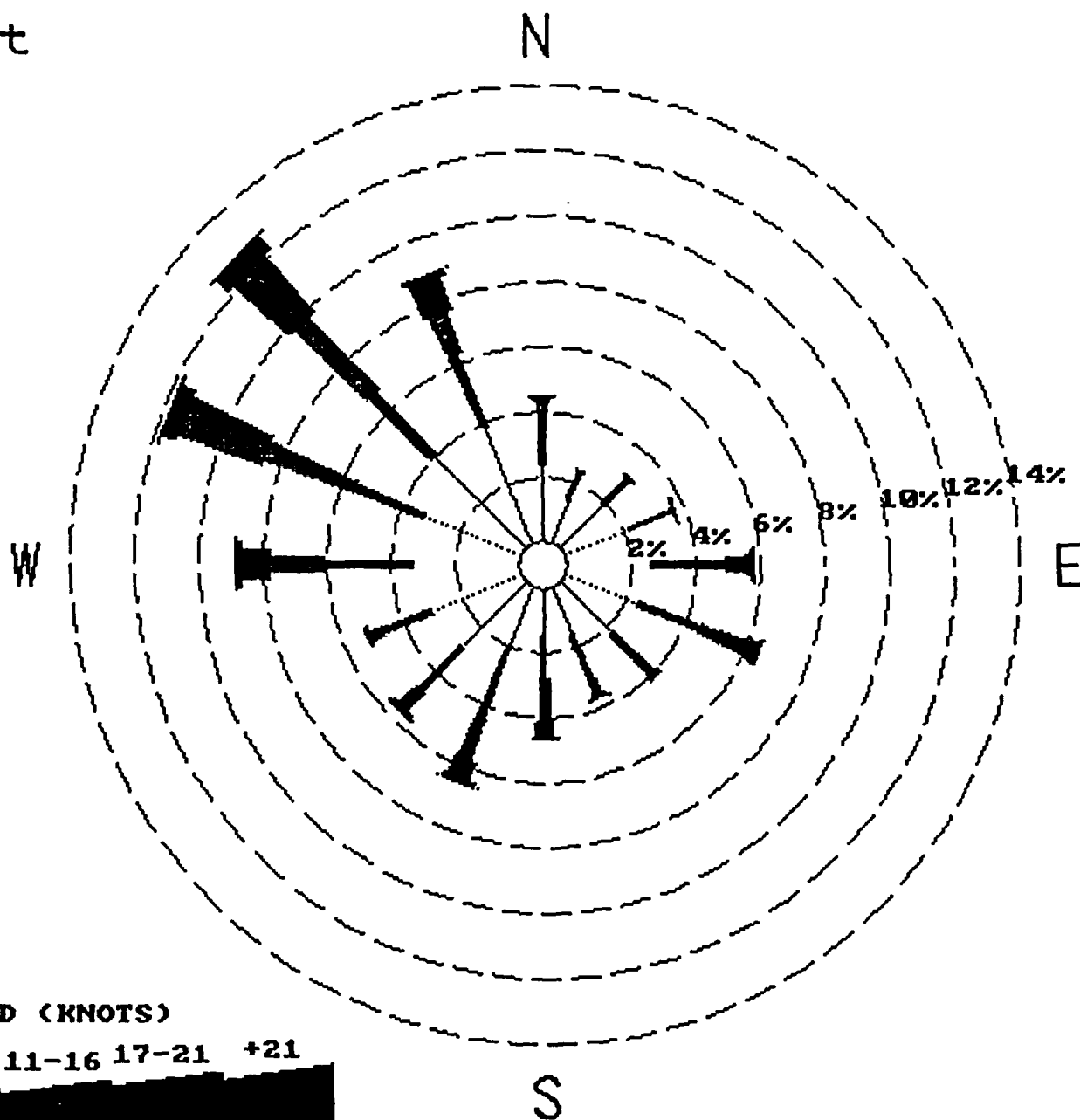
TMI 1996 100 ft

January 1

December 31

Midnight-11 PM

NOTE: Frequencies
indicate direction
from which the
wind is blowing.



CALM WINDS 1.59%

CALMS

Three Mile Island

Joint Frequency Occurrences Distribution

1992, 1993, 1995 and 1996

60 ft tower level

Stability Class	Wind Speed Category ⁽¹⁾	Wind Direction Category																Calms	Total
		N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW		
1 (A)	2	58	15	13	15	21	12	15	10	13	35	65	88	78	88	159	164		
	3	145	17	23	39	54	57	53	37	32	156	229	101	90	155	344	382		
	4	55	4	0	7	7	52	38	17	28	141	88	25	86	122	285	151		
	5	8	0	0	1	2	5	0	0	0	15	8	4	25	52	98	48		
	6	2	0	0	0	2	0	0	0	0	2	2	0	5	10	17	17		
	7	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	0	4198
	7	1	0	0	0	0	0	0	0	0	0	0	0	0	1	5	3	0	4198
2 (B)	2	15	8	5	9	8	8	9	1	7	12	23	25	18	22	39	26		
	3	34	10	10	22	37	43	39	23	23	65	33	21	20	35	50	57		
	4	20	1	9	11	17	42	24	12	23	78	31	9	36	58	105	60		
	5	5	0	1	1	5	10	2	0	2	9	4	4	32	58	79	38		
	6	3	0	0	0	1	0	0	0	0	5	0	0	2	17	31	13		
	7	0	0	0	0	1	0	0	0	0	0	0	0	0	3	10	7	0	1634
	7	0	0	0	0	1	0	0	0	0	0	0	0	0	3	10	7	0	1634
3 (C)	2	8	5	8	7	5	6	3	6	5	8	11	9	9	11	15	21		
	3	13	9	18	23	27	20	26	19	15	30	26	21	17	20	27	26		
	4	6	0	0	8	35	31	23	9	10	40	7	13	27	38	66	31		
	5	5	1	0	0	0	12	5	1	3	5	5	2	13	36	54	17		
	6	0	0	0	0	1	0	0	0	0	0	0	0	2	8	27	11		
	7	0	0	0	0	0	0	0	0	0	1	0	0	2	1	2	5	0	1039
	7	0	0	0	0	0	0	0	0	0	1	0	0	2	1	2	5	0	1039
4 (D)	2	134	109	145	136	137	104	92	87	58	60	83	87	79	97	130	132		
	3	233	200	288	305	363	357	264	253	317	335	215	178	293	254	250	283		
	4	98	25	38	82	302	444	194	97	150	198	78	44	345	583	554	217		
	5	36	4	10	7	29	36	27	14	24	46	14	10	140	453	567	171		
	6	4	0	1	4	16	3	3	0	0	7	2	1	27	95	171	35		
	7	0	0	0	0	5	0	0	0	0	2	0	0	3	9	16	2	0	11508
	7	0	0	0	0	5	0	0	0	0	2	0	0	3	9	16	2	0	11508
5 (E)	2	220	146	186	157	202	246	165	117	114	121	185	211	222	232	239	246		
	3	456	215	189	208	308	262	154	202	359	458	370	350	419	383	281	335		
	4	77	25	14	13	87	132	69	59	98	142	96	64	182	325	325	118		
	5	19	2	4	1	6	18	17	15	19	38	19	8	52	102	179	82		
	6	0	0	0	0	2	1	3	1	3	9	2	0	8	12	41	33		
	7	1	0	0	0	6	0	0	0	0	2	0	0	1	3	5	5	4	10483
	7	1	0	0	0	6	0	0	0	0	2	0	0	1	3	5	5	4	10483
6 (F)	2	150	78	78	90	184	203	154	132	143	139	183	175	235	218	177	148		
	3	182	34	24	49	84	66	27	27	51	87	68	78	117	77	106	185		
	4	8	0	0	2	1	4	3	3	1	8	8	4	13	13	14	15		
	5	0	0	0	0	0	2	4	5	1	2	4	0	1	1	4	2		
	6	0	0	0	0	0	0	0	3	0	0	0	0	1	1	3	0		
	7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3856
	7	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3856
7 (G)	2	46	28	34	45	64	101	79	64	83	87	98	81	74	77	62	58		
	3	51	15	12	26	50	25	7	4	20	63	39	19	42	34	47	64		
	4	1	1	0	0	1	0	0	0	0	1	3	1	2	0	4	3		
	5	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0		
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1617
																		34334	

) Wind Speed Categories defined as follows:

Category	Wind Speed (mph)
2	>=0.7 to <3.5
3	>=3.5 to <7.5
4	>=7.5 to <12.5
5	>=12.5 to <18.5
6	>=18.5 to <24
7	>=24

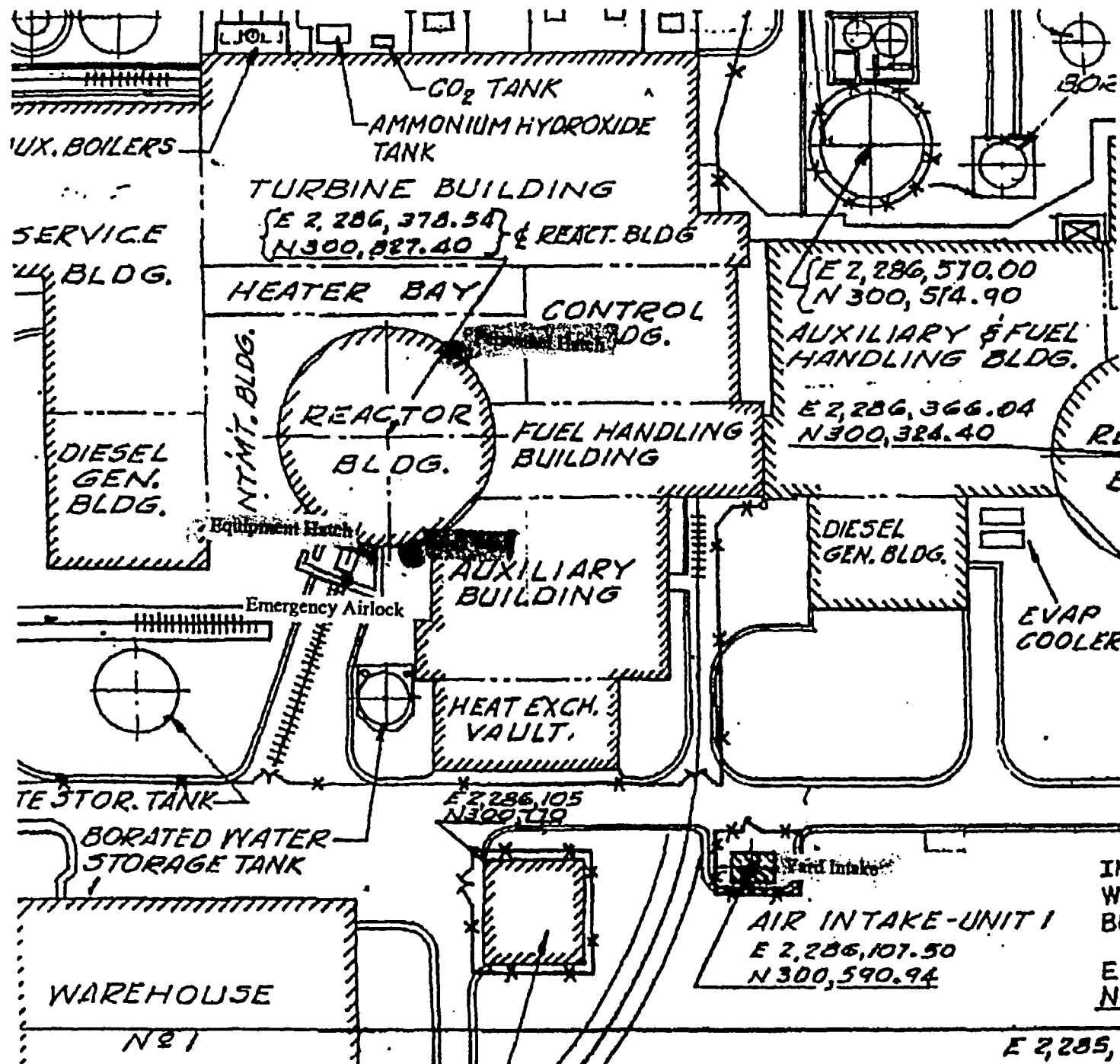
Three Mile Island

Joint Frequency Percent Distribution

992, 1993, 1995 and 1996

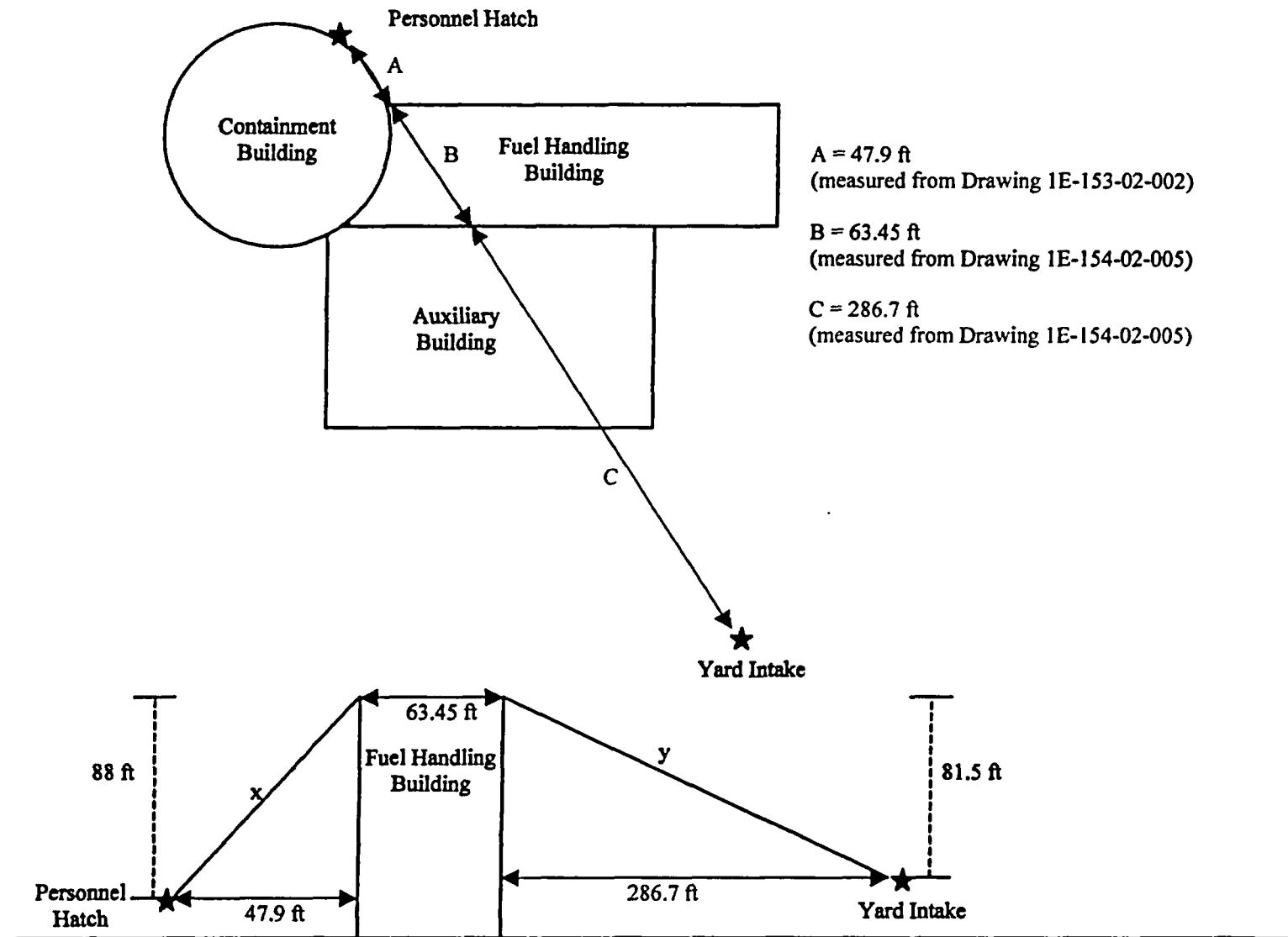
00 ft tower level

Stability Class	Wind Speed Category ⁽¹⁾	Wind Direction Category																16 Calms	Total	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
1 (A)	2	0.168928759	0.043688	0.037863	0.043688	0.061184	0.034951	0.043688	0.029126	0.037863	0.10194	0.188317	0.256306	0.22718	0.256306	0.463098	0.477808			
	3	0.422321897	0.049514	0.086989	0.11359	0.157278	0.188018	0.154368	0.107785	0.093202	0.45436	0.886977	0.294189	0.262131	0.451448	1.001822	1.1125998			
	4	0.160191084	0.01165	0	0.020388	0.020388	0.151453	0.110677	0.049514	0.081552	0.410672	0.250481	0.072814	0.250481	0.355333	0.830081	0.4397973			
	5	0.023300518	0	0	0.002913	0.005825	0.014563	0	0	0	0.043688	0.017475	0.01185	0.072814	0.151453	0.285431	0.1398031			
	6	0.00582513	0	0	0	0.005825	0	0	0	0	0	0.005825	0.005825	0	0.014563	0.029126	0.049514	0.0495136		
2 (B)	7	0.002912565	0	0	0	0	0	0	0	0	0	0	0	0	0.002913	0.014563	0.0087377	0	12.22695	
	2	0.043688472	0.023301	0.014563	0.026213	0.023301	0.023301	0.026213	0.002913	0.020388	0.034951	0.086989	0.072814	0.052426	0.084076	0.11359	0.0757287			
	3	0.099027203	0.029126	0.029126	0.084076	0.107785	0.12524	0.11359	0.086989	0.086989	0.188317	0.096115	0.081184	0.058251	0.10194	0.145628	0.1660182			
	4	0.058251296	0.002913	0.026213	0.032038	0.049514	0.122328	0.086989	0.034951	0.086989	0.221355	0.09029	0.026213	0.104852	0.188929	0.305819	0.1747539			
	5	0.014562824	0	0.002913	0.002913	0.014563	0.029126	0.005825	0	0.005825	0.026213	0.01185	0.01185	0.003202	0.188929	0.230093	0.1108775			
3 (C)	6	0.008737894	0	0	0	0.002913	0	0	0	0	0	0.014563	0	0	0.005825	0.049514	0.09029	0.0378633		
	7	0	0	0	0	0.002913	0	0	0	0	0	0	0	0	0.008738	0.029126	0.020388	0	4.759131	
	2	0.023300518	0.014563	0.023301	0.020388	0.014563	0.017475	0.008738	0.017475	0.014563	0.023301	0.032038	0.026213	0.026213	0.032038	0.043688	0.0811839			
	3	0.037863342	0.026213	0.052426	0.086989	0.078639	0.058251	0.075727	0.056339	0.043688	0.087377	0.075727	0.081184	0.049514	0.058251	0.078639	0.0815518			
	4	0.017475389	0	0	0.023301	0.10194	0.09029	0.086989	0.026213	0.029126	0.118603	0.020388	0.037863	0.078639	0.110877	0.192229	0.0802895			
4 (D)	5	0.014562824	0.002913	0	0	0	0	0.034951	0.014563	0.002913	0.008738	0.014563	0.005825	0.037863	0.104852	0.157278	0.0495136			
	6	0	0	0	0	0.002913	0	0	0	0	0	0	0	0.005825	0.023301	0.078639	0.0320382			
	7	0	0	0	0	0	0	0	0	0	0.002913	0	0	0.005825	0.002913	0.005825	0.0145628	0	3.026155	
	2	0.390283684	0.31747	0.422322	0.398109	0.399021	0.302907	0.267956	0.195142	0.188929	0.174754	0.241743	0.253393	0.230093	0.282519	0.378633	0.3844586			
	3	0.878627599	0.582513	0.838819	0.888332	1.115612	1.039788	0.788917	0.738879	0.823263	0.875709	0.826201	0.512611	0.853361	0.739791	0.728141	0.8242558			
5 (E)	4	0.285431351	0.072814	0.110677	0.267956	0.879595	1.293179	0.565038	0.282519	0.436885	0.578888	0.22718	0.128153	1.004835	1.696025	1.613561	0.6320266			
	5	0.104852333	0.01165	0.029126	0.020388	0.081552	0.104852	0.078639	0.040776	0.086989	0.133978	0.040778	0.029126	0.407759	1.319392	1.651424	0.4980488			
	6	0.011860259	0	0.002913	0.01186	0.048601	0.008738	0.008738	0	0	0.020388	0.005825	0.002913	0.078639	0.276694	0.498049	0.1019398			
	7	0	0	0	0	0.014563	0	0	0	0	0	0.005825	0	0.008738	0.026213	0.048601	0.0058251	0	33.5178	
	2	0.640784257	0.425234	0.483488	0.457273	0.588338	0.716491	0.480573	0.34077	0.332032	0.35242	0.56795	0.814551	0.848589	0.875715	0.896103	0.7223161			
6 (F)	3	1.328129551	0.826201	0.550475	0.805813	0.891245	0.783092	0.448536	0.588338	1.045811	1.333955	1.077849	1.019398	1.220365	1.057261	0.818431	0.8757082			
	4	0.22426749	0.072814	0.040776	0.037863	0.253393	0.384459	0.200867	0.171841	0.279808	0.413584	0.279808	0.186404	0.530087	0.946584	0.946584	0.3436826			
	5	0.055338731	0.005825	0.01185	0.002913	0.017475	0.048601	0.049514	0.043688	0.055339	0.110677	0.055339	0.023301	0.151453	0.297082	0.521349	0.267956			
	6	0	0	0	0	0.005825	0.002913	0.008738	0.002913	0.008738	0.026213	0.005825	0	0.023301	0.034951	0.119415	0.0961148			
	7	0.002912565	0	0	0	0.017475	0	0	0	0	0.005825	0	0	0.002913	0.008738	0.014563	0.0145628	0.01165	30.53242	
7 (G)	2	0.436884721	0.221355	0.221355	0.262131	0.535912	0.591251	0.448536	0.384459	0.418497	0.404847	0.532999	0.500899	0.884453	0.834839	0.515524	0.4310598			
	3	0.471835498	0.089027	0.089027	0.142718	0.244855	0.192229	0.078639	0.078639	0.148541	0.253393	0.198054	0.221355	0.34077	0.224267	0.305819	0.5366245			
	4	0.023300518	0	0	0.005825	0.002913	0.01185	0.008738	0.008738	0.002913	0.023301	0.023301	0.01185	0.037863	0.037863	0.040778	0.0436886			
	5	0	0	0	0	0	0	0.005825	0.01185	0.014563	0.002913	0.005825	0.01185	0	0.002913	0.002913	0.01185	0.0058251		
	6	0	0	0	0	0	0	0	0.008738	0	0	0	0	0	0.002913	0.002913	0.008738	0	0.002913	
8 (H)	7	0	0	0	0	0.002913	0	0	0	0	0	0	0	0	0	0	0	0.002913	11.22794	
	2	0.133977981	0.081552	0.099027	0.131085	0.188404	0.294189	0.230093	0.188404	0.241743	0.253393	0.285431	0.235918	0.21553	0.224267	0.180579	0.1889288			
	3	0.148540805	0.043688	0.034951	0.075727	0.145628	0.072814	0.020388	0.01185	0.058251	0.183492	0.11359	0.055339	0.122328	0.089027	0.136891	0.1884041			
	4	0.002912565	0.002913	0	0	0.002913	0	0	0	0	0.002913	0.008738	0.002913	0.005825	0	0.01185	0.0087377			
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0.002913	0	0			
9 (I)	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
10 (J)	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
11 (K)	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
12 (L)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
13 (M)	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
14 (N)	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0</				



Excerpt of Drawing
E-012-003

Calculation of Taut String Length Personnel Hatch to Yard Intake



Personnel Hatch = 11.5 ft above grade
(Drawing 1E-153-02-002 supplemented by plant walkdown)

Fuel Handling Building = 99.5 ft above grade
(Drawing 1E-154-02-006)

Yard Intake = 18 ft above grade
(Drawing 1E-154-02-001 supplemented by plant walkdown)

Slant distance from Personnel Hatch to top of Fuel Handling Building:

$$x = \sqrt{47.9^2 + 88^2}$$

$$x = 100.2 \text{ ft}$$

Slant distance from top of Fuel Handling Building to the Yard Intake:

$$x = \sqrt{81.5^2 + 286.7^2}$$

$$x = 298.1 \text{ ft}$$

$$\text{Total Taut String Length} = 100.2 + 63.45 + 298.1 = 461.75 \text{ ft} = 140.7 \text{ m}$$

ARCON96 Input and Output

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Personnel Hatch to Yard Intake G7
Equipment Hatch to Yard Intake..... G12
Emergency Airlock to Yard Intake G17

Unit Vent to Yard Intake

4
 C:\TRACI~1\THREEM~1\ARCON96\TMI92T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI93T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI95T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI96T.MET
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 94.10
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 tmiuv1.cfd
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 0.50
 4.30
 1 2 4 8 12 24 96 168 360 720
 1 2 4 8 11 22 87 152 324 648
 0.00 0.00
 n

X/Q CUMULATIVE FREQUENCY DISTRIBUTIONS

XOQ	1	2	4	8	XOQ	12	24	96	168	360	720
Abv. Lim.	0.	0.	0.	0.	Abv. Lim.	0.	0.	0.	0.	0.	0.
9.120E-04	0.	0.	0.	0.	9.120E-04	0.	0.	0.	0.	0.	0.
8.318E-04	0.	0.	0.	0.	8.318E-04	0.	0.	0.	0.	0.	0.
7.586E-04	23.	2.	1.	0.	7.586E-04	0.	0.	0.	0.	0.	0.
6.918E-04	93.	21.	10.	2.	6.918E-04	0.	0.	0.	0.	0.	0.
6.310E-04	380.	148.	45.	14.	6.310E-04	0.	0.	0.	0.	0.	0.
5.754E-04	895.	527.	263.	95.	5.754E-04	1.	0.	0.	0.	0.	0.
5.248E-04	1922.	1261.	780.	396.	5.248E-04	19.	0.	0.	0.	0.	0.
4.786E-04	2622.	1759.	1154.	713.	4.786E-04	80.	0.	0.	0.	0.	0.
4.365E-04	3073.	2086.	1487.	1014.	4.365E-04	355.	0.	0.	0.	0.	0.
3.981E-04	3431.	2366.	1875.	1364.	3.981E-04	645.	14.	0.	0.	0.	0.
3.631E-04	3758.	2660.	2212.	1700.	3.631E-04	971.	91.	0.	0.	0.	0.
3.311E-04	4010.	2924.	2534.	2027.	3.311E-04	1305.	239.	0.	0.	0.	0.
3.020E-04	4225.	3410.	2949.	2363.	3.020E-04	1682.	468.	0.	0.	0.	0.
2.754E-04	4389.	3841.	3390.	2748.	2.754E-04	2057.	691.	0.	0.	0.	0.
2.512E-04	4440.	4410.	3905.	3182.	2.512E-04	2473.	1023.	40.	0.	0.	0.
2.291E-04	6713.	5692.	4530.	3671.	2.291E-04	2856.	1379.	61.	0.	0.	0.
2.089E-04	6866.	6033.	4881.	4231.	2.089E-04	3288.	1802.	110.	0.	0.	0.
1.905E-04	6923.	6333.	5212.	4811.	1.905E-04	3799.	2217.	220.	52.	0.	0.
1.738E-04	6945.	6660.	6114.	5422.	1.738E-04	4438.	2655.	401.	77.	0.	0.
1.585E-04	6963.	6885.	6492.	5904.	1.585E-04	5057.	3207.	659.	108.	0.	0.
1.445E-04	6969.	7074.	6988.	6752.	1.445E-04	5720.	3801.	1026.	204.	0.	0.
1.318E-04	6976.	7144.	7533.	7386.	1.318E-04	6470.	4379.	1450.	389.	0.	0.
1.202E-04	6978.	7743.	8364.	7999.	1.202E-04	7146.	5059.	1995.	759.	0.	0.
1.096E-04	6978.	9498.	9279.	8632.	1.096E-04	7876.	5807.	2583.	1320.	65.	0.
1.000E-04	6978.	9574.	9617.	9010.	1.000E-04	8592.	6689.	3404.	2058.	465.	0.
9.120E-05	6980.	9599.	9902.	9372.	9.120E-05	9335.	7614.	4394.	2956.	860.	0.
8.318E-05	6981.	9625.	10133.	10352.	8.318E-05	10055.	8545.	5623.	4263.	1737.	0.
7.586E-05	6983.	9639.	10333.	10874.	7.586E-05	10700.	9544.	6923.	5596.	2807.	73.
6.918E-05	6983.	9648.	10502.	11243.	6.918E-05	11330.	10489.	8130.	7102.	4976.	1608.
6.310E-05	6985.	9654.	10549.	11795.	6.310E-05	11920.	11458.	9393.	8706.	7388.	4252.
5.754E-05	6986.	9656.	12506.	13114.	5.754E-05	12646.	12426.	11013.	10515.	9815.	7485.
5.248E-05	6986.	9656.	12703.	13406.	5.248E-05	13259.	13412.	12536.	12359.	12500.	11947.
4.786E-05	6986.	9657.	12756.	13703.	4.786E-05	13888.	14330.	14188.	14301.	15165.	16573.
4.365E-05	6986.	9657.	12772.	13991.	4.365E-05	14378.	15174.	15839.	16240.	17364.	20188.
3.981E-05	6986.	9657.	12804.	14239.	3.981E-05	15326.	16025.	17432.	18015.	19602.	22880.
3.631E-05	6986.	9659.	12816.	14403.	3.631E-05	15734.	16688.	18793.	19930.	22662.	25681.
3.311E-05	6986.	9659.	12828.	14468.	3.311E-05	16198.	17378.	20435.	21722.	25379.	28291.
3.020E-05	6986.	9662.	12834.	14483.	3.020E-05	16785.	17997.	21801.	23375.	27577.	30425.
2.754E-05	6986.	9662.	12834.	16390.	2.754E-05	17081.	18715.	23016.	24999.	29377.	32081.
2.512E-05	6986.	9662.	12834.	16488.	2.512E-05	17397.	19404.	24243.	26170.	30790.	33079.
2.291E-05	6986.	9662.	12835.	16509.	2.291E-05	17938.	20000.	25349.	27372.	31829.	33888.
2.089E-05	6986.	9662.	12835.	16541.	2.089E-05	18111.	20550.	26475.	28628.	32538.	34222.
1.905E-05	6986.	9662.	12836.	16560.	1.905E-05	19212.	21120.	27384.	29609.	33112.	34308.
1.738E-05	6986.	9662.	12836.	16571.	1.738E-05	19413.	21603.	28043.	30415.	33495.	34328.
1.585E-05	6986.	9662.	12836.	16584.	1.585E-05	19510.	22096.	28802.	31028.	33770.	34446.
1.445E-05	6986.	9662.	12840.	16584.	1.445E-05	19561.	22463.	29456.	31533.	33977.	34446.
1.318E-05	6986.	9662.	12840.	16584.	1.318E-05	19593.	22840.	29966.	32027.	34165.	34446.
1.202E-05	6986.	9662.	12840.	16585.	1.202E-05	19634.	23148.	30425.	32463.	34232.	34446.
1.096E-05	6986.	9662.	12840.	16585.	1.096E-05	20425.	23907.	30864.	32811.	34266.	34446.
1.000E-05	6986.	9662.	12840.	16585.	1.000E-05	20456.	24371.	31106.	32951.	34304.	34446.
9.120E-06	6986.	9662.	12840.	16586.	9.120E-06	20461.	24791.	31450.	33191.	34361.	34446.
8.318E-06	6986.	9662.	12840.	16586.	8.318E-06	20478.	24965.	31876.	33366.	34378.	34446.
7.586E-06	6986.	9662.	12840.	16594.	7.586E-06	20484.	25086.	31995.	33459.	34382.	34446.
6.918E-06	6986.	9662.	12840.	16594.	6.918E-06	20484.	25166.	32102.	33512.	34391.	34446.
6.310E-06	6986.	9662.	12840.	16594.	6.310E-06	20494.	25189.	32324.	33639.	34393.	34446.
5.754E-06	6986.	9662.	12840.	16594.	5.754E-06	20494.	26104.	32417.	33701.	34430.	34446.

5.248E-06	6986.	9662.	12840.	16594.	5.248E-06	20494.	26172.	32703.	33755.	34430.	34446.
4.786E-06	6986.	9662.	12840.	16594.	4.786E-06	20502.	26219.	32848.	33792.	34430.	34446.
4.365E-06	6986.	9662.	12840.	16594.	4.365E-06	20502.	26232.	32945.	33881.	34430.	34446.
3.981E-06	6986.	9662.	12840.	16594.	3.981E-06	20502.	26253.	33159.	33913.	34430.	34446.
3.631E-06	6986.	9662.	12840.	16594.	3.631E-06	20502.	26253.	33227.	33956.	34430.	34446.
3.311E-06	6986.	9662.	12840.	16594.	3.311E-06	20502.	26263.	33264.	33965.	34430.	34446.
3.020E-06	6986.	9662.	12840.	16594.	3.020E-06	20502.	26265.	33331.	34121.	34430.	34446.
2.754E-06	6986.	9662.	12840.	16594.	2.754E-06	20506.	26265.	33479.	34135.	34430.	34446.
2.512E-06	6986.	9662.	12840.	16594.	2.512E-06	20506.	26273.	33503.	34141.	34430.	34446.
2.291E-06	6986.	9662.	12840.	16594.	2.291E-06	20506.	26273.	33540.	34157.	34430.	34446.
2.089E-06	6986.	9662.	12840.	16594.	2.089E-06	20506.	26273.	33614.	34159.	34430.	34446.
1.905E-06	6986.	9662.	12840.	16594.	1.905E-06	20506.	26273.	33614.	34175.	34430.	34446.
1.738E-06	6986.	9662.	12840.	16594.	1.738E-06	20506.	26273.	33614.	34191.	34430.	34446.
1.585E-06	6986.	9662.	12840.	16594.	1.585E-06	20506.	26273.	33617.	34195.	34430.	34446.
1.445E-06	6986.	9662.	12840.	16594.	1.445E-06	20506.	26289.	33814.	34195.	34430.	34446.
1.318E-06	6986.	9662.	12840.	16594.	1.318E-06	20506.	26289.	33890.	34196.	34430.	34446.
1.202E-06	6986.	9662.	12840.	16594.	1.202E-06	20506.	26289.	33890.	34208.	34430.	34446.
1.096E-06	6986.	9662.	12840.	16594.	1.096E-06	20506.	26289.	33890.	34208.	34430.	34446.
1.000E-06	6986.	9662.	12840.	16594.	1.000E-06	20506.	26289.	33891.	34208.	34430.	34446.
9.120E-07	6986.	9662.	12840.	16594.	9.120E-07	20506.	26289.	33891.	34208.	34430.	34446.
8.318E-07	6986.	9662.	12840.	16594.	8.318E-07	20506.	26289.	33891.	34215.	34430.	34446.
7.586E-07	6986.	9662.	12840.	16594.	7.586E-07	20506.	26289.	33891.	34215.	34430.	34446.
6.918E-07	6986.	9662.	12840.	16594.	6.918E-07	20506.	26289.	33891.	34215.	34430.	34446.
6.310E-07	6986.	9662.	12840.	16594.	6.310E-07	20506.	26289.	33891.	34215.	34430.	34446.
5.754E-07	6986.	9662.	12840.	16594.	5.754E-07	20506.	26289.	33891.	34215.	34430.	34446.
5.248E-07	6986.	9662.	12840.	16594.	5.248E-07	20506.	26289.	33891.	34215.	34430.	34446.
4.786E-07	6986.	9662.	12840.	16594.	4.786E-07	20506.	26289.	33891.	34215.	34430.	34446.
4.365E-07	6986.	9662.	12840.	16594.	4.365E-07	20506.	26289.	33891.	34215.	34430.	34446.
3.981E-07	6986.	9662.	12840.	16594.	3.981E-07	20506.	26289.	33891.	34215.	34430.	34446.
3.631E-07	6986.	9662.	12840.	16594.	3.631E-07	20506.	26289.	33891.	34215.	34430.	34446.
3.311E-07	6986.	9662.	12840.	16594.	3.311E-07	20506.	26289.	33891.	34215.	34430.	34446.
3.020E-07	6986.	9662.	12840.	16594.	3.020E-07	20506.	26289.	33891.	34215.	34430.	34446.
2.754E-07	6986.	9662.	12840.	16594.	2.754E-07	20506.	26289.	33891.	34215.	34430.	34446.
2.512E-07	6986.	9662.	12840.	16594.	2.512E-07	20506.	26289.	33891.	34215.	34430.	34446.
2.291E-07	6986.	9662.	12840.	16594.	2.291E-07	20506.	26289.	33891.	34215.	34430.	34446.
2.089E-07	6986.	9662.	12840.	16594.	2.089E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.905E-07	6986.	9662.	12840.	16594.	1.905E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.738E-07	6986.	9662.	12840.	16594.	1.738E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.585E-07	6986.	9662.	12840.	16594.	1.585E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.445E-07	6986.	9662.	12840.	16594.	1.445E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.318E-07	6986.	9662.	12840.	16594.	1.318E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.202E-07	6986.	9662.	12840.	16594.	1.202E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.096E-07	6986.	9662.	12840.	16594.	1.096E-07	20506.	26289.	33891.	34215.	34430.	34446.
1.000E-07	6986.	9662.	12840.	16594.	1.000E-07	20506.	26289.	33891.	34215.	34430.	34446.
Belw. Lim.	0.	0.	0.	0.	Belw. Lim.	0.	0.	0.	0.	0.	0.

Program Title: ARCON96.

Developed For: U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Reactor Program Management

Date: June 25, 1997 11:00 a.m.

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Code Documentation: NUREG/CR-6331 Rev. 1

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Program Run 6/ 1/2005 at 14:34:31

***** ARCON INPUT *****

Number of Meteorological Data Files = 4

Meteorological Data File Names

C:\TRACT~1\THREEM~1\ARCON96\TMI92T.MET

C:\TRACT~1\THREEM~1\ARCON96\TMI93T.MET

C:\TRACT~1\THREEM~1\ARCON96\TMI95T.MET

C:\TRACT~1\THREEM~1\ARCON96\TMI96T.MET

Height of lower wind instrument (m) = 30.5

Height of upper wind instrument (m) = 30.5

Wind speeds entered as miles per hour

Ground-level release

Release height (m) = 48.1

Building Area (m^2) = 2127.0

Effluent vertical velocity (m/s) = .00

Vent or stack flow (m^3/s) = .00

Vent or stack radius (m) = .00

Direction .. intake to source (deg) = 042

Wind direction sector width (deg) = 90

Wind direction window (deg) = 357 - 087

Distance to intake (m) = 94.1

Intake height (m) = 5.5

Terrain elevation difference (m) = .0

Output file names

tmiuv1.log

tmiuv1.cfd

Minimum Wind Speed (m/s) = .5
 Surface roughness length (m) = .20
 Sector averaging constant = 4.3

Initial value of sigma y = .00
 Initial value of sigma z = .00

Expanded output for code testing not selected

Total number of hours of data processed = 35093
 Hours of missing data = 329
 Hours direction in window = 4747
 Hours elevated plume w/ dir. in window = 0
 Hours of calm winds = 2239
 Hours direction not in window or calm = 27778

DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL

AVER. PER.	1	2	4	8	12	24	96	168	360	720
UPPER LIM.	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03
LOW LIM.	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07
ABOVE RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN RANGE	6986.	9662.	12840.	16594.	20506.	26289.	33891.	34215.	34430.	34446.
BELOW RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZERO	27778.	24915.	21376.	16921.	14056.	8298.	701.	126.	0.	0.
TOTAL X/Qs	34764.	34577.	34216.	33515.	34562.	34587.	34592.	34341.	34430.	34446.
% NON ZERO	20.10	27.94	37.53	49.51	59.33	76.01	97.97	99.63	100.00	100.00

95th PERCENTILE X/Q VALUES

5.34E-04 4.81E-04 4.14E-04 3.66E-04 2.99E-04 2.12E-04 1.26E-04 1.04E-04 8.33E-05 6.89E-05

95% X/Q for standard averaging intervals

0 to 2 hours 5.34E-04
 2 to 8 hours 3.10E-04
 8 to 24 hours 1.36E-04
 1 to 4 days 9.70E-05
 4 to 30 days 6.02E-05

HOURLY VALUE RANGE

	MAX X/Q	MIN X/Q
CENTERLINE	7.88E-04	6.19E-05
SECTOR-AVERAGE	4.59E-04	3.61E-05

NORMAL PROGRAM COMPLETION

Personnel Hatch to Yard Intake

4
 C:\TRACI~1\THREEM~1\ARCON96\TMI92T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI93T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI95T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI96T.MET
 30.48
 30.48
 2
 1
 3.50
 2127.00
 0.00
 0.00
 0.00
 61 90
 140.70
 3.50
 0.00
 tmiph1.log
 tmiph1.cfd
 .2
 0.50
 4.30
 1 2 4 8 12 24 96 168 360 720
 1 2 4 8 11 22 87 152 324 648
 0.00 0.00
 n

X/Q CUMULATIVE FREQUENCY DISTRIBUTIONS

XOQ	1	2	4	8	XOQ	12	24	96	168	360	720
Abv. Lim.	0.	0.	0.	0.	Abv. Lim.	0.	0.	0.	0.	0.	0.
9.120E-04	0.	0.	0.	0.	9.120E-04	0.	0.	0.	0.	0.	0.
8.318E-04	0.	0.	0.	0.	8.318E-04	0.	0.	0.	0.	0.	0.
7.586E-04	0.	0.	0.	0.	7.586E-04	0.	0.	0.	0.	0.	0.
6.918E-04	0.	0.	0.	0.	6.918E-04	0.	0.	0.	0.	0.	0.
6.310E-04	0.	0.	0.	0.	6.310E-04	0.	0.	0.	0.	0.	0.
5.754E-04	0.	0.	0.	0.	5.754E-04	0.	0.	0.	0.	0.	0.
5.248E-04	0.	0.	0.	0.	5.248E-04	0.	0.	0.	0.	0.	0.
4.786E-04	0.	0.	0.	0.	4.786E-04	0.	0.	0.	0.	0.	0.
4.365E-04	0.	0.	0.	0.	4.365E-04	0.	0.	0.	0.	0.	0.
3.981E-04	1.	0.	0.	0.	3.981E-04	0.	0.	0.	0.	0.	0.
3.631E-04	1.	0.	0.	0.	3.631E-04	0.	0.	0.	0.	0.	0.
3.311E-04	99.	47.	30.	12.	3.311E-04	0.	0.	0.	0.	0.	0.
3.020E-04	660.	420.	231.	104.	3.020E-04	0.	0.	0.	0.	0.	0.
2.754E-04	1542.	1168.	811.	456.	2.754E-04	14.	0.	0.	0.	0.	0.
2.512E-04	2211.	1721.	1260.	909.	2.512E-04	143.	0.	0.	0.	0.	0.
2.291E-04	2781.	2159.	1624.	1302.	2.291E-04	465.	0.	0.	0.	0.	0.
2.089E-04	3307.	2546.	2110.	1679.	2.089E-04	869.	54.	0.	0.	0.	0.
1.905E-04	3870.	2932.	2509.	2011.	1.905E-04	1238.	197.	0.	0.	0.	0.
1.738E-04	4439.	3365.	2894.	2401.	1.738E-04	1647.	408.	0.	0.	0.	0.
1.585E-04	6720.	4699.	3601.	2824.	1.585E-04	2027.	735.	0.	0.	0.	0.
1.445E-04	7366.	5206.	4053.	3310.	1.445E-04	2433.	1126.	0.	0.	0.	0.
1.318E-04	7469.	5541.	4569.	3904.	1.318E-04	2859.	1475.	17.	0.	0.	0.
1.202E-04	7612.	5935.	5661.	4597.	1.202E-04	3370.	1886.	90.	3.	0.	0.
1.096E-04	7632.	6271.	6129.	5168.	1.096E-04	3873.	2290.	165.	31.	0.	0.
1.000E-04	7644.	6638.	6455.	6101.	1.000E-04	4507.	2769.	443.	58.	0.	0.
9.120E-05	7648.	7124.	6891.	6591.	9.120E-05	5203.	3302.	779.	110.	0.	0.
8.318E-05	7648.	7680.	7418.	7167.	8.318E-05	6000.	3885.	1167.	202.	0.	0.
7.586E-05	7650.	10076.	8835.	8100.	7.586E-05	6802.	4440.	1604.	358.	0.	0.
6.918E-05	7652.	10101.	9123.	8523.	6.918E-05	7556.	5136.	2163.	877.	32.	0.
6.310E-05	7652.	10246.	9384.	9077.	6.310E-05	8347.	5887.	2864.	1471.	253.	0.
5.754E-05	7653.	10301.	9646.	10123.	5.754E-05	9061.	6743.	3746.	2379.	571.	0.
5.248E-05	7653.	10316.	9937.	10415.	5.248E-05	9833.	7653.	4631.	3425.	974.	30.
4.786E-05	7655.	10318.	10251.	10765.	4.786E-05	10493.	8676.	5713.	4406.	1753.	199.
4.365E-05	7655.	10318.	10644.	11187.	4.365E-05	11095.	9775.	6915.	5693.	3194.	1060.
3.981E-05	7655.	10318.	12347.	12477.	3.981E-05	11956.	10818.	8280.	7625.	5600.	2237.
3.631E-05	7655.	10318.	13068.	12934.	3.631E-05	12503.	11813.	9708.	9311.	8107.	4418.
3.311E-05	7655.	10318.	13175.	13166.	3.311E-05	13003.	12824.	11210.	10837.	10497.	8025.
3.020E-05	7655.	10318.	13299.	13427.	3.020E-05	13451.	13803.	12813.	12571.	13101.	12771.
2.754E-05	7655.	10318.	13325.	13622.	2.754E-05	14124.	14674.	14443.	14671.	15939.	17075.
2.512E-05	7655.	10318.	13336.	13898.	2.512E-05	14979.	15478.	15995.	16764.	17872.	20905.
2.291E-05	7655.	10318.	13336.	14200.	2.291E-05	15485.	16247.	17542.	18608.	20000.	23421.
2.089E-05	7655.	10318.	13336.	14595.	2.089E-05	15985.	16946.	18980.	20468.	22466.	25672.
1.905E-05	7655.	10318.	13336.	16593.	1.905E-05	16280.	17793.	20538.	22003.	25064.	27860.
1.738E-05	7655.	10318.	13336.	16615.	1.738E-05	16592.	18310.	22020.	23443.	26874.	29924.
1.585E-05	7655.	10318.	13336.	16802.	1.585E-05	16914.	18821.	23236.	24820.	28784.	31279.
1.445E-05	7655.	10318.	13336.	16845.	1.445E-05	17528.	19571.	24317.	26156.	30309.	32450.
1.318E-05	7655.	10318.	13336.	16877.	1.318E-05	18796.	20165.	25441.	27282.	31455.	33824.
1.202E-05	7655.	10318.	13336.	16878.	1.202E-05	18983.	20597.	26307.	28458.	32081.	34215.
1.096E-05	7655.	10318.	13336.	16878.	1.096E-05	19157.	21254.	27058.	29431.	32640.	34446.
1.000E-05	7655.	10318.	13336.	16878.	1.000E-05	19310.	21644.	27921.	30174.	33032.	34446.
9.120E-06	7655.	10318.	13336.	16878.	9.120E-06	19434.	21868.	28711.	30782.	33272.	34446.
8.318E-06	7655.	10318.	13336.	16878.	8.318E-06	19591.	22210.	29460.	31376.	33539.	34446.
7.586E-06	7655.	10318.	13336.	16878.	7.586E-06	20448.	23061.	30199.	31925.	33792.	34446.
6.918E-06	7655.	10318.	13336.	16878.	6.918E-06	20469.	23332.	30564.	32291.	34090.	34446.
6.310E-06	7655.	10318.	13336.	16878.	6.310E-06	20498.	23961.	30897.	32690.	34259.	34446.
5.754E-06	7655.	10318.	13336.	16878.	5.754E-06	20503.	24080.	31323.	32903.	34393.	34446.

5.248E-06	7655.10318.13336.16878.	5.248E-06	20513.24226.	31536.	33134.	34414.	34446.
4.786E-06	7655.10318.13336.16878.	4.786E-06	20513.24365.	31913.	33267.	34419.	34446.
4.365E-06	7655.10318.13336.16878.	4.365E-06	20513.24514.	32089.	33505.	34430.	34446.
3.981E-06	7655.10318.13336.16878.	3.981E-06	20513.24796.	32242.	33609.	34430.	34446.
3.631E-06	7655.10318.13336.16878.	3.631E-06	20513.25879.	32500.	33649.	34430.	34446.
3.311E-06	7655.10318.13336.16878.	3.311E-06	20513.25881.	32604.	33749.	34430.	34446.
3.020E-06	7655.10318.13336.16878.	3.020E-06	20513.25920.	32737.	33794.	34430.	34446.
2.754E-06	7655.10318.13336.16878.	2.754E-06	20513.25936.	32869.	33869.	34430.	34446.
2.512E-06	7655.10318.13336.16878.	2.512E-06	20513.25941.	32973.	33892.	34430.	34446.
2.291E-06	7655.10318.13336.16878.	2.291E-06	20513.25941.	32994.	33899.	34430.	34446.
2.089E-06	7655.10318.13336.16878.	2.089E-06	20513.25941.	33106.	33959.	34430.	34446.
1.905E-06	7655.10318.13336.16878.	1.905E-06	20513.25941.	33262.	33987.	34430.	34446.
1.738E-06	7655.10318.13336.16878.	1.738E-06	20513.25941.	33311.	34020.	34430.	34446.
1.585E-06	7655.10318.13336.16878.	1.585E-06	20513.25941.	33339.	34046.	34430.	34446.
1.445E-06	7655.10318.13336.16878.	1.445E-06	20513.25941.	33362.	34052.	34430.	34446.
1.318E-06	7655.10318.13336.16878.	1.318E-06	20513.25941.	33390.	34052.	34430.	34446.
1.202E-06	7655.10318.13336.16878.	1.202E-06	20513.25941.	33476.	34089.	34430.	34446.
1.096E-06	7655.10318.13336.16878.	1.096E-06	20513.25941.	33495.	34177.	34430.	34446.
1.000E-06	7655.10318.13336.16878.	1.000E-06	20513.25941.	33504.	34178.	34430.	34446.
9.120E-07	7655.10318.13336.16878.	9.120E-07	20513.25941.	33829.	34180.	34430.	34446.
8.318E-07	7655.10318.13336.16878.	8.318E-07	20513.25941.	33829.	34180.	34430.	34446.
7.586E-07	7655.10318.13336.16878.	7.586E-07	20513.25941.	33841.	34180.	34430.	34446.
6.918E-07	7655.10318.13336.16878.	6.918E-07	20513.25941.	33841.	34180.	34430.	34446.
6.310E-07	7655.10318.13336.16878.	6.310E-07	20513.25941.	33841.	34181.	34430.	34446.
5.754E-07	7655.10318.13336.16878.	5.754E-07	20513.25941.	33841.	34181.	34430.	34446.
5.248E-07	7655.10318.13336.16878.	5.248E-07	20513.25941.	33841.	34186.	34430.	34446.
4.786E-07	7655.10318.13336.16878.	4.786E-07	20513.25941.	33841.	34186.	34430.	34446.
4.365E-07	7655.10318.13336.16878.	4.365E-07	20513.25941.	33841.	34186.	34430.	34446.
3.981E-07	7655.10318.13336.16878.	3.981E-07	20513.25941.	33841.	34186.	34430.	34446.
3.631E-07	7655.10318.13336.16878.	3.631E-07	20513.25941.	33841.	34186.	34430.	34446.
3.311E-07	7655.10318.13336.16878.	3.311E-07	20513.25941.	33841.	34186.	34430.	34446.
3.020E-07	7655.10318.13336.16878.	3.020E-07	20513.25941.	33841.	34186.	34430.	34446.
2.754E-07	7655.10318.13336.16878.	2.754E-07	20513.25941.	33841.	34186.	34430.	34446.
2.512E-07	7655.10318.13336.16878.	2.512E-07	20513.25941.	33841.	34186.	34430.	34446.
2.291E-07	7655.10318.13336.16878.	2.291E-07	20513.25941.	33841.	34186.	34430.	34446.
2.089E-07	7655.10318.13336.16878.	2.089E-07	20513.25941.	33841.	34186.	34430.	34446.
1.905E-07	7655.10318.13336.16878.	1.905E-07	20513.25941.	33841.	34186.	34430.	34446.
1.738E-07	7655.10318.13336.16878.	1.738E-07	20513.25941.	33841.	34186.	34430.	34446.
1.585E-07	7655.10318.13336.16878.	1.585E-07	20513.25941.	33841.	34186.	34430.	34446.
1.445E-07	7655.10318.13336.16878.	1.445E-07	20513.25941.	33841.	34186.	34430.	34446.
1.318E-07	7655.10318.13336.16878.	1.318E-07	20513.25941.	33841.	34186.	34430.	34446.
1.202E-07	7655.10318.13336.16878.	1.202E-07	20513.25941.	33841.	34186.	34430.	34446.
1.096E-07	7655.10318.13336.16878.	1.096E-07	20513.25941.	33841.	34186.	34430.	34446.
1.000E-07	7655.10318.13336.16878.	1.000E-07	20513.25941.	33841.	34186.	34430.	34446.
Belw. Lim.	0. 0. 0. 0.	Belw. Lim.	0. 0. 0. 0.	0. 0. 0. 0.	0. 0. 0. 0.	0. 0. 0. 0.	0. 0. 0. 0.

Program Title: ARCON96.

Developed For: U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Reactor Program Management

Date: June 25, 1997 11:00 a.m.

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Code Documentation: NUREG/CR-6331 Rev. 1

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Program Run 6/1/2005 at 14:30:20

***** ARCON INPUT *****

Number of Meteorological Data Files = 4
Meteorological Data File Names
C:\TRACT~1\THREEM~1\ARCON96\TMI92T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI93T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI95T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI96T.MET

Height of lower wind instrument (m) = 30.5
Height of upper wind instrument (m) = 30.5
Wind speeds entered as miles per hour

Ground-level release
Release height (m) = 3.5
Building Area (m^2) = 2127.0
Effluent vertical velocity (m/s) = .00
Vent or stack flow (m^3/s) = .00
Vent or stack radius (m) = .00

Direction .. intake to source (deg) = 061
Wind direction sector width (deg) = 90
Wind direction window (deg) = 016 - 106
Distance to intake (m) = 140.7
Intake height (m) = 3.5
Terrain elevation difference (m) = .0

Output file names
tmiph1.log
tmiph1.cfd

Minimum Wind Speed (m/s) = .5
 Surface roughness length (m) = .20
 Sector averaging constant = 4.3

Initial value of sigma y = .00
 Initial value of sigma z = .00

Expanded output for code testing not selected

Total number of hours of data processed = 35093
 Hours of missing data = 329
 Hours direction in window = 5416
 Hours elevated plume w/ dir. in window = 0
 Hours of calm winds = 2239
 Hours direction not in window or calm = 27109

DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL

AVER. PER.	1	2	4	8	12	24	96	168	360	720
UPPER LIM.	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03
LOW LIM.	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07
ABOVE RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN RANGE	7655.	10318.	13336.	16878.	20513.	25941.	33841.	34186.	34430.	34446.
BELOW RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZERO	27109.	24259.	20880.	16637.	14049.	8646.	751.	155.	0.	0.
TOTAL X/Qs	34764.	34577.	34216.	33515.	34562.	34587.	34592.	34341.	34430.	34446.
% NON ZERO	22.02	29.84	38.98	50.36	59.35	75.00	97.83	99.55	100.00	100.00

95th PERCENTILE X/Q VALUES

2.68E-04	2.51E-04	2.25E-04	2.09E-04	1.71E-04	1.25E-04	7.44E-05	6.16E-05	4.80E-05	4.15E-05
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95% X/Q for standard averaging intervals

0 to 2 hours	2.68E-04
2 to 8 hours	1.89E-04
8 to 24 hours	8.24E-05
1 to 4 days	5.76E-05
4 to 30 days	3.64E-05

HOURLY VALUE RANGE

	MAX X/Q	MIN X/Q
CENTERLINE	4.09E-04	4.83E-05
SECTOR-AVERAGE	2.38E-04	2.81E-05

NORMAL PROGRAM COMPLETION

Equipment Hatch to Yard Intake

4
C:\TRACI~1\THREEM~1\ARCON96\TMI92T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI93T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI95T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI96T.MET

30.48

30.48

2

1

5.49

2127.00

0.00

0.00

0.00

39 90

101.00

5.49

0.00

tmieh1.log

tmieh1.cfd

.2

0.50

4.30

1 2 4 8 12 24 96 168 360 720

1 2 4 8 11 22 87 152 324 648

0.00 0.00

n

X/Q CUMULATIVE FREQUENCY DISTRIBUTIONS

XOQ	1	2	4	8	XOQ	12	24	96	168	360	720
Abv. Lim.	0.	0.	0.	0.	Abv. Lim.	0.	0.	0.	0.	0.	0.
9.120E-04	0.	0.	0.	0.	9.120E-04	0.	0.	0.	0.	0.	0.
8.318E-04	0.	0.	0.	0.	8.318E-04	0.	0.	0.	0.	0.	0.
7.586E-04	0.	0.	0.	0.	7.586E-04	0.	0.	0.	0.	0.	0.
6.918E-04	3.	0.	0.	0.	6.918E-04	0.	0.	0.	0.	0.	0.
6.310E-04	63.	18.	2.	2.	6.310E-04	0.	0.	0.	0.	0.	0.
5.754E-04	228.	100.	48.	15.	5.754E-04	0.	0.	0.	0.	0.	0.
5.248E-04	819.	493.	281.	123.	5.248E-04	0.	0.	0.	0.	0.	0.
4.786E-04	1401.	965.	614.	320.	4.786E-04	22.	0.	0.	0.	0.	0.
4.365E-04	1922.	1376.	963.	623.	4.365E-04	120.	0.	0.	0.	0.	0.
3.981E-04	2456.	1767.	1299.	911.	3.981E-04	312.	4.	0.	0.	0.	0.
3.631E-04	2893.	2047.	1643.	1223.	3.631E-04	610.	44.	0.	0.	0.	0.
3.311E-04	3303.	2371.	1964.	1504.	3.311E-04	896.	103.	0.	0.	0.	0.
3.020E-04	3680.	2657.	2276.	1794.	3.020E-04	1184.	247.	0.	0.	0.	0.
2.754E-04	4094.	3149.	2604.	2080.	2.754E-04	1497.	410.	0.	0.	0.	0.
2.512E-04	4457.	3671.	3046.	2448.	2.512E-04	1854.	605.	1.	0.	0.	0.
2.291E-04	6917.	4990.	3712.	2856.	2.291E-04	2183.	882.	39.	0.	0.	0.
2.089E-04	6998.	5277.	4104.	3418.	2.089E-04	2569.	1259.	65.	0.	0.	0.
1.905E-04	7050.	5623.	4564.	3924.	1.905E-04	3000.	1639.	93.	0.	0.	0.
1.738E-04	7059.	5946.	5510.	4603.	1.738E-04	3529.	2026.	182.	56.	0.	0.
1.585E-04	7068.	6282.	5880.	5116.	1.585E-04	4125.	2422.	370.	81.	0.	0.
1.445E-04	7069.	6625.	6247.	5917.	1.445E-04	4772.	2915.	603.	115.	0.	0.
1.318E-04	7070.	7060.	6936.	6499.	1.318E-04	5511.	3442.	907.	147.	0.	0.
1.202E-04	7073.	9466.	8534.	7530.	1.202E-04	6271.	4120.	1363.	321.	0.	0.
1.096E-04	7073.	9713.	8821.	7980.	1.096E-04	7054.	4822.	1799.	599.	0.	0.
1.000E-04	7073.	9765.	9088.	8495.	1.000E-04	7861.	5591.	2322.	1193.	127.	0.
9.120E-05	7073.	9797.	9403.	9553.	9.120E-05	8594.	6492.	3125.	1936.	419.	0.
8.318E-05	7074.	9808.	9623.	9913.	8.318E-05	9278.	7433.	4046.	2678.	746.	0.
7.586E-05	7074.	9815.	9951.	10269.	7.586E-05	10095.	8381.	5101.	3708.	1414.	0.
6.918E-05	7074.	9817.	10306.	10832.	6.918E-05	10694.	9426.	6398.	5062.	2493.	60.
6.310E-05	7074.	9822.	10683.	11426.	6.310E-05	11401.	10450.	7745.	6724.	4192.	1439.
5.754E-05	7074.	9822.	12829.	12809.	5.754E-05	12119.	11486.	9249.	8465.	6275.	3397.
5.248E-05	7074.	9822.	12920.	13055.	5.248E-05	12858.	12452.	10837.	9886.	8790.	6483.
4.786E-05	7074.	9822.	12979.	13315.	4.786E-05	13418.	13496.	12449.	11814.	12152.	10808.
4.365E-05	7074.	9822.	12992.	13597.	4.365E-05	14125.	14392.	14194.	14001.	14751.	15131.
3.981E-05	7074.	9824.	13008.	13823.	3.981E-05	15028.	15284.	15775.	16158.	17229.	19052.
3.631E-05	7074.	9824.	13010.	14150.	3.631E-05	15470.	16057.	17479.	18110.	19874.	22929.
3.311E-05	7074.	9824.	13011.	14523.	3.311E-05	15875.	16812.	18978.	20284.	22455.	25686.
3.020E-05	7074.	9824.	13016.	16362.	3.020E-05	16453.	17534.	20466.	22080.	25195.	28510.
2.754E-05	7074.	9824.	13016.	16666.	2.754E-05	16771.	18222.	21928.	23464.	27578.	30563.
2.512E-05	7074.	9824.	13016.	16715.	2.512E-05	17110.	18899.	23296.	24901.	29877.	32529.
2.291E-05	7074.	9824.	13016.	16750.	2.291E-05	17790.	19648.	24497.	26288.	31326.	33572.
2.089E-05	7074.	9824.	13020.	16772.	2.089E-05	18130.	20175.	25643.	27532.	32255.	34102.
1.905E-05	7074.	9824.	13020.	16779.	1.905E-05	19269.	20912.	26579.	28624.	32826.	34283.
1.738E-05	7074.	9824.	13020.	16779.	1.738E-05	19433.	21551.	27544.	29854.	33179.	34392.
1.585E-05	7074.	9824.	13020.	16784.	1.585E-05	19532.	22036.	28258.	30678.	33483.	34446.
1.445E-05	7074.	9824.	13020.	16784.	1.445E-05	19675.	22342.	29019.	31302.	33756.	34446.
1.318E-05	7074.	9824.	13020.	16784.	1.318E-05	19789.	22654.	29619.	31657.	34027.	34446.
1.202E-05	7074.	9824.	13020.	16784.	1.202E-05	20426.	23386.	30116.	32185.	34156.	34446.
1.096E-05	7074.	9824.	13020.	16784.	1.096E-05	20690.	23886.	30543.	32431.	34284.	34446.
1.000E-05	7074.	9824.	13020.	16792.	1.000E-05	20697.	24542.	30879.	32777.	34321.	34446.
9.120E-06	7074.	9824.	13020.	16792.	9.120E-06	20705.	24704.	31169.	32931.	34374.	34446.
8.318E-06	7074.	9824.	13020.	16792.	8.318E-06	20712.	24834.	31685.	33177.	34376.	34446.
7.586E-06	7074.	9824.	13020.	16792.	7.586E-06	20716.	24955.	31820.	33340.	34380.	34446.
6.918E-06	7074.	9824.	13020.	16792.	6.918E-06	20724.	25157.	32054.	33421.	34386.	34446.
6.310E-06	7074.	9824.	13020.	16792.	6.310E-06	20724.	25347.	32216.	33491.	34390.	34446.
5.754E-06	7074.	9824.	13020.	16792.	5.754E-06	20725.	26324.	32393.	33557.	34391.	34446.

5.248E-06	7074.	9824.	13020.	16792.	5.248E-06	20725.	26404.	32447.	33669.	34393.	34446.
4.786E-06	7074.	9824.	13020.	16792.	4.786E-06	20725.	26413.	32540.	33870.	34430.	34446.
4.365E-06	7074.	9824.	13020.	16792.	4.365E-06	20725.	26413.	32717.	33899.	34430.	34446.
3.981E-06	7074.	9824.	13020.	16792.	3.981E-06	20729.	26425.	32912.	33918.	34430.	34446.
3.631E-06	7074.	9824.	13020.	16792.	3.631E-06	20729.	26425.	32966.	33947.	34430.	34446.
3.311E-06	7074.	9824.	13020.	16792.	3.311E-06	20729.	26433.	33150.	33961.	34430.	34446.
3.020E-06	7074.	9824.	13020.	16792.	3.020E-06	20729.	26433.	33294.	33979.	34430.	34446.
2.754E-06	7074.	9824.	13020.	16792.	2.754E-06	20729.	26433.	33442.	33984.	34430.	34446.
2.512E-06	7074.	9824.	13020.	16792.	2.512E-06	20729.	26433.	33466.	34068.	34430.	34446.
2.291E-06	7074.	9824.	13020.	16792.	2.291E-06	20729.	26433.	33472.	34125.	34430.	34446.
2.089E-06	7074.	9824.	13020.	16792.	2.089E-06	20729.	26433.	33538.	34129.	34430.	34446.
1.905E-06	7074.	9824.	13020.	16792.	1.905E-06	20729.	26449.	33591.	34180.	34430.	34446.
1.738E-06	7074.	9824.	13020.	16792.	1.738E-06	20729.	26449.	33618.	34197.	34430.	34446.
1.585E-06	7074.	9824.	13020.	16792.	1.585E-06	20729.	26449.	33673.	34203.	34430.	34446.
1.445E-06	7074.	9824.	13020.	16792.	1.445E-06	20729.	26449.	33937.	34203.	34430.	34446.
1.318E-06	7074.	9824.	13020.	16792.	1.318E-06	20729.	26449.	33942.	34203.	34430.	34446.
1.202E-06	7074.	9824.	13020.	16792.	1.202E-06	20729.	26449.	33942.	34203.	34430.	34446.
1.096E-06	7074.	9824.	13020.	16792.	1.096E-06	20729.	26449.	33942.	34228.	34430.	34446.
1.000E-06	7074.	9824.	13020.	16792.	1.000E-06	20729.	26449.	33942.	34228.	34430.	34446.
9.120E-07	7074.	9824.	13020.	16792.	9.120E-07	20729.	26449.	33942.	34240.	34430.	34446.
8.318E-07	7074.	9824.	13020.	16792.	8.318E-07	20729.	26449.	33942.	34247.	34430.	34446.
7.586E-07	7074.	9824.	13020.	16792.	7.586E-07	20729.	26449.	33942.	34247.	34430.	34446.
6.918E-07	7074.	9824.	13020.	16792.	6.918E-07	20729.	26449.	33942.	34247.	34430.	34446.
6.310E-07	7074.	9824.	13020.	16792.	6.310E-07	20729.	26449.	33942.	34247.	34430.	34446.
5.754E-07	7074.	9824.	13020.	16792.	5.754E-07	20729.	26449.	33942.	34247.	34430.	34446.
5.248E-07	7074.	9824.	13020.	16792.	5.248E-07	20729.	26449.	33942.	34247.	34430.	34446.
4.786E-07	7074.	9824.	13020.	16792.	4.786E-07	20729.	26449.	33942.	34247.	34430.	34446.
4.365E-07	7074.	9824.	13020.	16792.	4.365E-07	20729.	26449.	33942.	34247.	34430.	34446.
3.981E-07	7074.	9824.	13020.	16792.	3.981E-07	20729.	26449.	33942.	34247.	34430.	34446.
3.631E-07	7074.	9824.	13020.	16792.	3.631E-07	20729.	26449.	33942.	34247.	34430.	34446.
3.311E-07	7074.	9824.	13020.	16792.	3.311E-07	20729.	26449.	33942.	34247.	34430.	34446.
3.020E-07	7074.	9824.	13020.	16792.	3.020E-07	20729.	26449.	33942.	34247.	34430.	34446.
2.754E-07	7074.	9824.	13020.	16792.	2.754E-07	20729.	26449.	33942.	34247.	34430.	34446.
2.512E-07	7074.	9824.	13020.	16792.	2.512E-07	20729.	26449.	33942.	34247.	34430.	34446.
2.291E-07	7074.	9824.	13020.	16792.	2.291E-07	20729.	26449.	33942.	34247.	34430.	34446.
2.089E-07	7074.	9824.	13020.	16792.	2.089E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.905E-07	7074.	9824.	13020.	16792.	1.905E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.738E-07	7074.	9824.	13020.	16792.	1.738E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.585E-07	7074.	9824.	13020.	16792.	1.585E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.445E-07	7074.	9824.	13020.	16792.	1.445E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.318E-07	7074.	9824.	13020.	16792.	1.318E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.202E-07	7074.	9824.	13020.	16792.	1.202E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.096E-07	7074.	9824.	13020.	16792.	1.096E-07	20729.	26449.	33942.	34247.	34430.	34446.
1.000E-07	7074.	9824.	13020.	16792.	1.000E-07	20729.	26449.	33942.	34247.	34430.	34446.
Belw. Lim.	0.	0.	0.	0.	Belw. Lim.	0.	0.	0.	0.	0.	0.

Program Title: ARCON96.

Developed For: U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Reactor Program Management

Date: June 25, 1997 11:00 a.m.

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Code Documentation: NUREG/CR-6331 Rev. 1

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Program Run 6/ 1/2005 at 14:27:03

***** ARCON INPUT *****

Number of Meteorological Data Files = 4
Meteorological Data File Names
C:\TRACI~1\THREEM~1\ARCON96\TMI92T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI93T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI95T.MET
C:\TRACI~1\THREEM~1\ARCON96\TMI96T.MET

Height of lower wind instrument (m) = 30.5
Height of upper wind instrument (m) = 30.5
Wind speeds entered as miles per hour

Ground-level release
Release height (m) = 5.5
Building Area (m^2) = 2127.0
Effluent vertical velocity (m/s) = .00
Vent or stack flow (m^3/s) = .00
Vent or stack radius (m) = .00

Direction .. intake to source (deg) = 039
Wind direction sector width (deg) = 90
Wind direction window (deg) = 354 - 084
Distance to intake (m) = 101.0
Intake height (m) = 5.5
Terrain elevation difference (m) = .0

Output file names
tmieh1.log
tmieh1.cfd

Minimum Wind Speed (m/s) = .5
 Surface roughness length (m) = .20
 Sector averaging constant = 4.3

Initial value of sigma y = .00
 Initial value of sigma z = .00

Expanded output for code testing not selected

Total number of hours of data processed = 35093
 Hours of missing data = 329
 Hours direction in window = 4835
 Hours elevated plume w/ dir. in window = 0
 Hours of calm winds = 2239
 Hours direction not in window or calm = 27690

DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL

AVER. PER.	1	2	4	8	12	24	96	168	360	720
UPPER LIM.	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03
LOW LIM.	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07
ABOVE RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN RANGE	7074.	9824.	13020.	16792.	20729.	26449.	33942.	34247.	34430.	34446.
BELOW RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZERO	27690.	24753.	21196.	16723.	13833.	8138.	650.	94.	0.	0.
TOTAL X/Qs	34764.	34577.	34216.	33515.	34562.	34587.	34592.	34341.	34430.	34446.
% NON ZERO	20.35	28.41	38.05	50.10	59.98	76.47	98.12	99.73	100.00	100.00

95th PERCENTILE X/Q VALUES

4.51E-04 4.02E-04 3.56E-04 3.14E-04 2.60E-04 1.87E-04 1.11E-04 9.38E-05 7.40E-05 6.23E-05

95% X/Q for standard averaging intervals

0 to 2 hours 4.51E-04
 2 to 8 hours 2.68E-04
 8 to 24 hours 1.23E-04
 1 to 4 days 8.62E-05
 4 to 30 days 5.47E-05

HOURLY VALUE RANGE

	MAX X/Q	MIN X/Q
CENTERLINE	7.25E-04	8.48E-05
SECTOR-AVERAGE	4.23E-04	4.94E-05

NORMAL PROGRAM COMPLETION

Emergency Airlock to Yard Intake

4
 C:\TRACI~1\THREEM~1\ARCON96\TMI92T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI93T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI95T.MET
 C:\TRACI~1\THREEM~1\ARCON96\TMI96T.MET
 30.48
 30.48
 2
 1
 5.49
 2127.00
 0.00
 0.00
 0.00
 35 90
 101.70
 5.49
 0.00
 tmica1.log
 tmica1.cfd
 .2
 0.50
 4.30
 1 2 4 8 12 24 96 168 360 720
 1 2 4 8 11 22 87 152 324 648
 0.00 0.00

n

X/Q CUMULATIVE FREQUENCY DISTRIBUTIONS

XOQ	1	2	4	8	XOQ	12	24	96	168	360	720
Abv. Lim.	0.	0.	0.	0.	Abv. Lim.	0.	0.	0.	0.	0.	0.
9.120E-04	0.	0.	0.	0.	9.120E-04	0.	0.	0.	0.	0.	0.
8.318E-04	0.	0.	0.	0.	8.318E-04	0.	0.	0.	0.	0.	0.
7.586E-04	0.	0.	0.	0.	7.586E-04	0.	0.	0.	0.	0.	0.
6.918E-04	2.	1.	0.	0.	6.918E-04	0.	0.	0.	0.	0.	0.
6.310E-04	63.	21.	1.	0.	6.310E-04	0.	0.	0.	0.	0.	0.
5.754E-04	166.	92.	44.	9.	5.754E-04	0.	0.	0.	0.	0.	0.
5.248E-04	708.	431.	238.	99.	5.248E-04	1.	0.	0.	0.	0.	0.
4.786E-04	1307.	894.	563.	278.	4.786E-04	21.	0.	0.	0.	0.	0.
4.365E-04	1888.	1335.	920.	552.	4.365E-04	94.	0.	0.	0.	0.	0.
3.981E-04	2469.	1737.	1250.	865.	3.981E-04	262.	3.	0.	0.	0.	0.
3.631E-04	2909.	2064.	1591.	1177.	3.631E-04	549.	20.	0.	0.	0.	0.
3.311E-04	3332.	2381.	1934.	1465.	3.311E-04	833.	74.	0.	0.	0.	0.
3.020E-04	3750.	2694.	2293.	1782.	3.020E-04	1143.	167.	0.	0.	0.	0.
2.754E-04	4198.	3174.	2622.	2068.	2.754E-04	1491.	352.	0.	0.	0.	0.
2.512E-04	4506.	3689.	3100.	2445.	2.512E-04	1832.	545.	0.	0.	0.	0.
2.291E-04	7063.	5057.	3769.	2905.	2.291E-04	2194.	811.	28.	0.	0.	0.
2.089E-04	7170.	5384.	4195.	3452.	2.089E-04	2613.	1185.	50.	0.	0.	0.
1.905E-04	7230.	5716.	4683.	3973.	1.905E-04	3073.	1555.	75.	0.	0.	0.
1.738E-04	7243.	6110.	5639.	4673.	1.738E-04	3587.	1972.	126.	34.	0.	0.
1.585E-04	7260.	6403.	6016.	5227.	1.585E-04	4191.	2440.	294.	73.	0.	0.
1.445E-04	7262.	6772.	6373.	6105.	1.445E-04	4903.	2943.	545.	110.	0.	0.
1.318E-04	7265.	7155.	7027.	6695.	1.318E-04	5662.	3521.	825.	146.	0.	0.
1.202E-04	7269.	9512.	8678.	7770.	1.202E-04	6455.	4243.	1272.	234.	0.	0.
1.096E-04	7271.	9947.	9009.	8227.	1.096E-04	7256.	4998.	1709.	496.	0.	0.
1.000E-04	7273.	10016.	9278.	8701.	1.000E-04	8124.	5927.	2269.	1051.	109.	0.
9.120E-05	7273.	10050.	9603.	9748.	9.120E-05	8886.	6843.	3040.	1703.	459.	0.
8.318E-05	7274.	10059.	9888.	10156.	8.318E-05	9639.	7747.	4049.	2685.	838.	0.
7.586E-05	7274.	10076.	10177.	10520.	7.586E-05	10397.	8740.	5183.	3573.	1432.	0.
6.918E-05	7274.	10077.	10535.	11070.	6.918E-05	11018.	9770.	6502.	4861.	2334.	269.
6.310E-05	7274.	10084.	10909.	11629.	6.310E-05	11735.	10865.	7951.	6722.	4024.	1722.
5.754E-05	7274.	10084.	13048.	13048.	5.754E-05	12444.	11856.	9642.	8622.	5904.	3619.
5.248E-05	7274.	10089.	13193.	13329.	5.248E-05	13122.	12813.	11290.	10440.	8641.	6448.
4.786E-05	7274.	10091.	13262.	13543.	4.786E-05	13653.	13787.	13212.	12503.	12156.	10892.
4.365E-05	7274.	10091.	13273.	13850.	4.365E-05	14393.	14760.	15009.	14781.	15267.	15318.
3.981E-05	7274.	10092.	13296.	14132.	3.981E-05	15311.	15632.	16658.	16947.	18508.	19704.
3.631E-05	7274.	10092.	13296.	14423.	3.631E-05	15754.	16400.	18273.	18995.	21519.	23421.
3.311E-05	7274.	10092.	13301.	14715.	3.311E-05	16165.	17224.	19535.	20982.	23813.	27174.
3.020E-05	7274.	10092.	13306.	16439.	3.020E-05	16726.	17937.	20888.	22792.	26106.	29717.
2.754E-05	7274.	10092.	13309.	16885.	2.754E-05	17039.	18613.	22358.	24328.	28470.	31714.
2.512E-05	7274.	10092.	13315.	16967.	2.512E-05	17400.	19214.	23666.	25523.	30399.	33097.
2.291E-05	7274.	10092.	13315.	16994.	2.291E-05	18046.	19922.	24881.	26834.	31795.	33742.
2.089E-05	7274.	10092.	13316.	17012.	2.089E-05	18357.	20429.	25990.	28042.	32604.	34165.
1.905E-05	7274.	10092.	13316.	17025.	1.905E-05	19502.	21160.	26934.	29130.	33079.	34297.
1.738E-05	7274.	10092.	13316.	17025.	1.738E-05	19682.	21814.	27901.	30411.	33383.	34365.
1.585E-05	7274.	10092.	13316.	17039.	1.585E-05	19806.	22248.	28655.	31010.	33746.	34446.
1.445E-05	7274.	10092.	13316.	17040.	1.445E-05	19914.	22576.	29457.	31527.	33966.	34446.
1.318E-05	7274.	10092.	13316.	17041.	1.318E-05	20024.	22899.	30053.	31880.	34215.	34446.
1.202E-05	7274.	10092.	13316.	17042.	1.202E-05	20137.	23282.	30405.	32305.	34316.	34446.
1.096E-05	7274.	10092.	13316.	17042.	1.096E-05	20896.	24033.	30817.	32592.	34360.	34446.
1.000E-05	7274.	10092.	13316.	17043.	1.000E-05	20922.	24707.	31079.	32959.	34380.	34446.
9.120E-06	7274.	10092.	13316.	17043.	9.120E-06	20930.	24925.	31284.	33153.	34384.	34446.
8.318E-06	7274.	10092.	13316.	17043.	8.318E-06	20935.	25077.	31734.	33301.	34389.	34446.
7.586E-06	7274.	10092.	13316.	17043.	7.586E-06	20947.	25187.	31941.	33383.	34401.	34446.
6.918E-06	7274.	10092.	13316.	17043.	6.918E-06	20948.	25380.	32144.	33466.	34425.	34446.
6.310E-06	7274.	10092.	13316.	17043.	6.310E-06	20954.	25562.	32370.	33567.	34430.	34446.
5.754E-06	7274.	10092.	13316.	17043.	5.754E-06	20955.	26416.	32541.	33616.	34430.	34446.

5.248E-06	7274. 10092. 13316. 17043.	5.248E-06	20955. 26538. 32633. 33680. 34430. 34446.
4.786E-06	7274. 10092. 13316. 17043.	4.786E-06	20955. 26580. 32744. 33863. 34430. 34446.
4.365E-06	7274. 10092. 13316. 17043.	4.365E-06	20955. 26582. 33001. 33888. 34430. 34446.
3.981E-06	7274. 10092. 13316. 17043.	3.981E-06	20955. 26592. 33196. 33980. 34430. 34446.
3.631E-06	7274. 10092. 13316. 17043.	3.631E-06	20955. 26594. 33264. 34110. 34430. 34446.
3.311E-06	7274. 10092. 13316. 17043.	3.311E-06	20955. 26595. 33352. 34144. 34430. 34446.
3.020E-06	7274. 10092. 13316. 17043.	3.020E-06	20955. 26612. 33441. 34158. 34430. 34446.
2.754E-06	7274. 10092. 13316. 17043.	2.754E-06	20955. 26612. 33532. 34166. 34430. 34446.
2.512E-06	7274. 10092. 13316. 17043.	2.512E-06	20955. 26612. 33580. 34173. 34430. 34446.
2.291E-06	7274. 10092. 13316. 17043.	2.291E-06	20955. 26612. 33603. 34187. 34430. 34446.
2.089E-06	7274. 10092. 13316. 17043.	2.089E-06	20955. 26612. 33643. 34212. 34430. 34446.
1.905E-06	7274. 10092. 13316. 17043.	1.905E-06	20955. 26612. 33656. 34246. 34430. 34446.
1.738E-06	7274. 10092. 13316. 17043.	1.738E-06	20955. 26612. 33702. 34247. 34430. 34446.
1.585E-06	7274. 10092. 13316. 17043.	1.585E-06	20955. 26612. 33702. 34248. 34430. 34446.
1.445E-06	7274. 10092. 13316. 17043.	1.445E-06	20955. 26612. 33968. 34248. 34430. 34446.
1.318E-06	7274. 10092. 13316. 17043.	1.318E-06	20955. 26612. 33994. 34248. 34430. 34446.
1.202E-06	7274. 10092. 13316. 17043.	1.202E-06	20955. 26612. 33994. 34248. 34430. 34446.
1.096E-06	7274. 10092. 13316. 17043.	1.096E-06	20955. 26612. 33994. 34248. 34430. 34446.
1.000E-06	7274. 10092. 13316. 17043.	1.000E-06	20955. 26612. 33994. 34248. 34430. 34446.
9.120E-07	7274. 10092. 13316. 17043.	9.120E-07	20955. 26612. 33994. 34248. 34430. 34446.
8.318E-07	7274. 10092. 13316. 17043.	8.318E-07	20955. 26612. 33994. 34249. 34430. 34446.
7.586E-07	7274. 10092. 13316. 17043.	7.586E-07	20955. 26612. 34010. 34249. 34430. 34446.
6.918E-07	7274. 10092. 13316. 17043.	6.918E-07	20955. 26612. 34010. 34249. 34430. 34446.
6.310E-07	7274. 10092. 13316. 17043.	6.310E-07	20955. 26612. 34010. 34249. 34430. 34446.
5.754E-07	7274. 10092. 13316. 17043.	5.754E-07	20955. 26612. 34010. 34249. 34430. 34446.
5.248E-07	7274. 10092. 13316. 17043.	5.248E-07	20955. 26612. 34010. 34249. 34430. 34446.
4.786E-07	7274. 10092. 13316. 17043.	4.786E-07	20955. 26612. 34010. 34249. 34430. 34446.
4.365E-07	7274. 10092. 13316. 17043.	4.365E-07	20955. 26612. 34010. 34249. 34430. 34446.
3.981E-07	7274. 10092. 13316. 17043.	3.981E-07	20955. 26612. 34010. 34249. 34430. 34446.
3.631E-07	7274. 10092. 13316. 17043.	3.631E-07	20955. 26612. 34010. 34249. 34430. 34446.
3.311E-07	7274. 10092. 13316. 17043.	3.311E-07	20955. 26612. 34010. 34249. 34430. 34446.
3.020E-07	7274. 10092. 13316. 17043.	3.020E-07	20955. 26612. 34010. 34249. 34430. 34446.
2.754E-07	7274. 10092. 13316. 17043.	2.754E-07	20955. 26612. 34010. 34249. 34430. 34446.
2.512E-07	7274. 10092. 13316. 17043.	2.512E-07	20955. 26612. 34010. 34249. 34430. 34446.
2.291E-07	7274. 10092. 13316. 17043.	2.291E-07	20955. 26612. 34010. 34249. 34430. 34446.
2.089E-07	7274. 10092. 13316. 17043.	2.089E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.905E-07	7274. 10092. 13316. 17043.	1.905E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.738E-07	7274. 10092. 13316. 17043.	1.738E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.585E-07	7274. 10092. 13316. 17043.	1.585E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.445E-07	7274. 10092. 13316. 17043.	1.445E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.318E-07	7274. 10092. 13316. 17043.	1.318E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.202E-07	7274. 10092. 13316. 17043.	1.202E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.096E-07	7274. 10092. 13316. 17043.	1.096E-07	20955. 26612. 34010. 34249. 34430. 34446.
1.000E-07	7274. 10092. 13316. 17043.	1.000E-07	20955. 26612. 34010. 34249. 34430. 34446.
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Program Title: ARCON96.

Developed For: U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Reactor Program Management

Date: June 25, 1997 11:00 a.m.

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Code Documentation: NUREG/CR-6331 Rev. 1

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Program Run 6/ 8/2005 at 12:01:11

***** ARCON INPUT *****

Number of Meteorological Data Files = 4
Meteorological Data File Names
C:\TRACT~1\THREEM~1\ARCON96\TMI92T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI93T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI95T.MET
C:\TRACT~1\THREEM~1\ARCON96\TMI96T.MET

Height of lower wind instrument (m) = 30.5
Height of upper wind instrument (m) = 30.5
Wind speeds entered as miles per hour

Ground-level release
Release height (m) = 5.5
Building Area (m^2) = 2127.0
Effluent vertical velocity (m/s) = .00
Vent or stack flow (m^3/s) = .00
Vent or stack radius (m) = .00

Direction .. intake to source (deg) = 035
Wind direction sector width (deg) = 90
Wind direction window (deg) = 350 - 080
Distance to intake (m) = 101.7
Intake height (m) = 5.5
Terrain elevation difference (m) = .0

Output file names
tmieal.log
tmieal.cfd

Minimum Wind Speed (m/s) = .5
 Surface roughness length (m) = .20
 Sector averaging constant = 4.3

Initial value of sigma y = .00
 Initial value of sigma z = .00

Expanded output for code testing not selected

Total number of hours of data processed = 35093
 Hours of missing data = 329
 Hours direction in window = 5035
 Hours elevated plume w/ dir. in window = 0
 Hours of calm winds = 2239
 Hours direction not in window or calm = 27490

DISTRIBUTION SUMMARY DATA BY AVERAGING INTERVAL

AVER. PER.	1	2	4	8	12	24	96	168	360	720
UPPER LIM.	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03
LOW LIM.	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07	1.00E-07
ABOVE RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
IN RANGE	7274.	10092.	13316.	17043.	20955.	26612.	34010.	34249.	34430.	34446.
BELOW RANGE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
ZERO	27490.	24485.	20900.	16472.	13607.	7975.	582.	92.	0.	0.
TOTAL X/Qs	34764.	34577.	34216.	33515.	34562.	34587.	34592.	34341.	34430.	34446.
% NON ZERO	20.92	29.19	38.92	50.85	60.63	76.94	98.32	99.73	100.00	100.00

95th PERCENTILE X/Q VALUES

4.47E-04 3.99E-04 3.52E-04 3.12E-04 2.59E-04 1.84E-04 1.09E-04 9.11E-05 7.37E-05 6.31E-05

95% X/Q for standard averaging intervals

0 to 2 hours 4.47E-04
 2 to 8 hours 2.67E-04
 8 to 24 hours 1.19E-04
 1 to 4 days 8.45E-05
 4 to 30 days 5.60E-05

HOURLY VALUE RANGE

	MAX X/Q	MIN X/Q
CENTERLINE	7.16E-04	8.38E-05
SECTOR-AVERAGE	4.17E-04	4.89E-05

NORMAL PROGRAM COMPLETION

Computer Disclosure SheetDiscipline NuclearClient:: Exelon Corporation
Project: Three Mile IslandDate: June 2005
Job No. 28063-TMI0059.CALCHProgram(s) used
ARCON96Rev No.
1Rev. Date
5/1997

Calculation No.: C-1101-826-E410-030

Status ☐ Prelim.
☒ Final
☐ VoidWGI Prequalification ☒ Yes
☐ No

Run No. 1

Description: ARCON96 X/Q analysis consistent with procedures in Regulatory Guide 1.194
for Control Room habitability assessments.

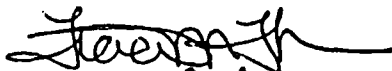
Analysis Description: ARCON96 calculations of X/Q are performed for ground releases to the Yard Intake. Centerline X/Q values, sector X/Q values and 95% max X/Q values are computed for 0-2 hours, 2-8 hours and 8-24 hours, 1-4 days, and 4-30 days.

The attached computer output has been reviewed, the input data checked,
and the results approved for release. Input criteria for this analysis were established.

By:

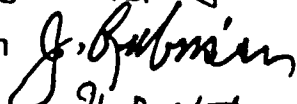
On:

Run by: T.Thomas



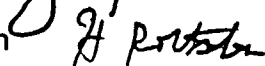
6/20/2005

Checked by: J. Robinson



6/20/2005

Approved by: H. Rothstein



6/20/2005

Remarks: WGI Form for Computer Software Control

ENCLOSURE 3

ELECTRONIC DISK OF TMI UNIT 1 ARCON96 Files and METEOROLOGICAL DATA

(1992, 1993, 1995 & 1996)