

Attachment 6

Millstone Nuclear Power Station, Unit No. 3

**Calculation WM(B)-02
Normalized X/Q at the Unit 3 Control Room For
Releases From the Unit 1 Stack**



CALCULATION TITLE PAGE

Total Number of Pages: 30

Normalized X/Q at the Unit 3 Control Room For Releases From the Unit 1 Stack

TITLE	
N/A	0
CALCULATION #	REVISION No.
WM(B)-02	CB
RBVS/SLCRS SYSTEM NAME	
3314I	
VENDOR CALCULATION NUMBER	Structure
	System Number

NUCLEAR INDICATOR:	Calc. Supports DCR/MMOD?	Calc. Supports Ind. Analysis?	N/A
☒ CATI	☒ YES	☐ YES	Component
☐ RWQA	☐ NO	☒ NO	
☐ SBOQA			
☐ FPQA			
☐ ATWSQA			
☐ NON-QA			

↓
M3-98-029
DCR/MMOD No.↓
N/A
Reference

INCORPORATES:

CCN NO:

N/A

AGAINST REV.

N/A

Executive Summary

THIS IS FORMAL APPROVAL OF A QA APPROVED VENDOR CALCULATION. NO (NU) IR IS REQUIRED.

REC'D. 6-8-98
ON HOLD
CDS 6/17/98
CDS QC 6/23/98
NRP ✓ TJ

Approvals (Print & Sign Name)	
Preparer: James L. Wheeler	Date: 5/27/98
Interdiscipline Reviewer: N/A	Discipline: Date:
Interdiscipline Reviewer: N/A	Discipline: Date:
Independent Reviewer: N/A	Date:
Supervisor: William Eakin	Date: 5/27/98
Installation Verification	
☒ Calculation accurately reflects plant configuration, OR	
☐ N/A does not affect plant configuration)	
Preparer/Designer Engineer: JAMES L. WHEELER	Date: 5/27/98

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CTP Database	1B
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Vendor Calculation Pages	1 thru 12
Appendix 1	15 pages
Total number of pages	30

STONE & WEBSTER ENGINEERING CORPORATION
CALCULATION TITLE PAGE

CLIENT & PROJECT: NORTHEAST UTILITIES - MILLSTONE UNIT 3				PAGE 1 of 12 Total Pages: 27 w/attachments pages		
CALCULATION TITLE: Normalized Concentrations (X/Q) at Unit 3 Control Room Air Intake for Gaseous Releases from the Top of the Unit 1 Stack Under Fumigation and Non-Fumigation Conditions				QA CATEGORY (✓) ☒ 1		
CALCULATION IDENTIFICATION NUMBER				OPTIONAL WORK PACKAGE NO.		
JOB ORDER NO. 037037002	DISCIPLINE WM(B)	CURRENT CALC NO. 02 <i>REV 0</i>	OPTIONAL TASK CODE			
APPROVALS - SIGNATURE & DATE				REVISION NO. OR NEW CALCULATION NO.	SUPERSEDES CALCULATION NO. OR REVISION NO.	CONFIRMATION REQUIRED (✓) YES NO
PREPARES(S) / DATE(S)	REVIEWER(S) / DATE(S)	INDEPENDENT REVIEWER(S) / DATE(S)				
S. A. Vigeant <i>Stephen A. Vigeant</i> 5/21/98	C. A. Mazzola <i>Carl A. Mazzola</i> 5/21/98	C. A. Mazzola <i>Carl A. Mazzola</i> 5/21/98	0			✓
DISTRIBUTION						
GROUP	NAME & LOCATION	COPY SENT (✓)	GROUP	NAME & LOCATION	COPY SENT (✓)	
Record Mgmt. File (or Fire File if none)						
Lead	Carl A. Mazzola					
Environmental Specialist	Atlanta Steven A. Vigeant	cc				
Project Files	Boston Charlie Cronan					
NU RAD PROT	Boston RJ Schmidt	cc				
NUNDS	New Britain MP3 Site	ORIGINAL				
SWEC Rad Prot	SFerguson (Boston)	cc				

CALCULATION IDENTIFICATION NUMBER				
JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	OPTIONAL TASK CODE	PAGE
037037002	WM(B)	02 <i>W-0</i>		2 OF 12

REVISION NO.	DESCRIPTION OF CHANGES	PAGES REVISED	PAGES ADDED	PAGES REPLACED
0	0	N/A		

STONE & WEBSTER ENGINEERING CORPORATION
CALCULATION SHEET

5010.65

CALCULATION IDENTIFICATION NUMBER				
JOB ORDER NO. 037037002	DISCIPLINE WM(B)	CALCULATION NO. 02 <i>REV 0</i>	OPTIONAL TASK CODE	PAGE 3 OF 12

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STONE & WEBSTER ENGINEERING CORPORATION
CALCULATION SHEET

CALCULATION IDENTIFICATION NUMBER

JOB ORDER NO.	DISCIPLINE	CALCULATION NO.	OPTIONAL TASK CODE	PAGE
037037002	WM(B)	02 <i>Rev 0</i>		4 OF 12

OBJECTIVE

To calculate the normalized atmospheric dispersion (X/Q) values at the Unit 3 Control Room air intake for a gaseous release from the top of the Unit 1 stack under fumigation conditions for the 0 - 4 hour period and under non-fumigation conditions for the remaining averaging periods of 4-8 hours, 8-24 hours, 1-4 days, and 4-30 days.

METHODOLOGY

The applicable methodology is identified in Regulatory Guide 1.145 (Ref. 1). The fumigation X/Q is used for the first 4 hours of the accident. The non-fumigation X/Qs for the longer averaging times are derived from the log-log interpolation between the 2-hour and annual average value obtained from Ref. 3 using 1974 to 1981 on-site meteorological data (Ref. 4). The highest annual average X/Q from among the affected downwind sectors is taken Ref. 3. The affected downwind sectors (W, WNW, NW, and NNW) are determined using the "s/d" method from Ref. 9 (see Data Section).

ASSUMPTIONS

1. It is conservatively assumed that the sea breeze fumigation condition is occurring simultaneously with the onset of an accident condition with the wind direction moving the plume centerline towards the Unit 3 CR intake located on the control building.
2. It is conservatively assumed that the NRC recommended wind speed of 2.0 meters per second in Regulatory Guide 1.145 is representative of the fumigation layer. Fumigation most frequently occurs at higher wind speeds (Ref. 5). The top of the fumigation layer is located at the centerline of the elevated plume, while the bottom of the fumigation layer is conservatively located at the shortest roof height in the control building complex (Ref. 8) rather than ground level. The stack effluent is uniformly mixed in the vertical fumigation layer which normally extends from stack top to ground level.
3. It is conservatively assumed that the effective stack height is the same as the actual stack height. Therefore, no credit is taken for plume rise that can occur due to either thermal buoyancy, where the plume is warmer than the ambient air it is being released into, or mechanical rise due to its efflux velocity.
4. The sea breeze fumigation condition is assumed to persist for the 0-4 hour period which is consistent with the NRC recommendation in Ref. 1 for off-site calculations. Although sea breeze fumigation can persist for longer periods of time, the point of fumigation moves with time due to sea breeze inland penetration and backing due to the Coriolis effect forming a helical track down the coastline (Ref. 5).
5. It is assumed that the Unit 3 control room air intake X/Q values are representative of the X/Q values for the center of the Unit 3 control room given that the distances and directions from the release to these receptors are very similar.

DATA

Top of stack = plant elevation 389.0 ft MSL (Ref. 6)
 Bottom of stack = plant elevation 14.0 ft MSL (Ref. 6)
 Height of lowest roof top in control building complex = plant elevation 64.5 ft MSL (Ref. 8)
 h_e = Height from stack top to bottom of fumigation layer = $389.0 \text{ ft} - 64.5 \text{ ft} = 324.5 \text{ ft} = 98.9 \text{ m}$
 u_{he} = Wind speed representative of the fumigation layer = 2.0 m/sec (Ref. 1)
 Distance (s) from stack to Unit 3 control room air intake = 1165 ft = 355 m (Ref. 7)
 Direction from stack to Unit 3 control room air intake = 130° (Ref. 7)
 Diameter (d) of stack top = 7.0 ft = 2.1 m (Ref. 6)
 $s/d = 355 \text{ m} / 2.1 \text{ m} = 169.1$ or 3 sectors ($3 \times 22.5^\circ = 68^\circ$ or $130^\circ - 34^\circ = 96^\circ$ to $130^\circ + 34^\circ = 164^\circ$) (Ref. 9)
 Wind directions 96° to 164° include the 22.5° downwind sectors of W, WNW, NW, and NNW
 σ_z @ 355 m for F-stability class = 14.51 m (Ref. 2)

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EQUATION

$$X/Q = [(2\pi)^{1/2} (u_{he}) \sigma_y (h_e)]^{-1} \quad (\text{Ref. 1})$$

CALCULATION

Unit 1 Stack to Unit 3 Control Room Air Intake

$$u_{he} = 2.0 \text{ m/sec (Ref. 1)}$$

$$\sigma_y @ 355 \text{ m for F-stability class} = 14.51 \text{ m (Ref. 2)}$$

$$h_e = 98.9 \text{ m}$$

Short-Term X/Q Value for Unit 3 Intake (0 - 4 Hours)

$$X/Q = [(2.5066) (2 \text{ m/sec})(14.51\text{m})(98.9 \text{ m})]^{-1}$$

$$X/Q = 1.39 \text{ E-4 sec/m}^3$$

CONCLUSIONS

The fumigation X/Q applicable to the Unit 3 intake for the 0-4 hour period of the accident is 1.39 E-4 sec/m³. The non-fumigation X/Qs for the longer averaging times are derived from the log-log interpolation between the 2-hour and annual average value obtained from Ref. 3 using 1974 to 1981 on-site meteorological data (Ref. 4). This period of record (8 years) is temporally representative of the meteorological conditions encountered at the site. The highest annual average X/Q from among the affected downwind sectors is taken Ref. 3 (see Appendix 1, p. 15). The affected downwind sectors (W, WNW, NW, and NNW) are determined using the "s/d" method from Ref. 9 (see Data Section). The X/Q values are as follows:

Period (Hours after Accident)	Logarithmic Interpolation Point (Hr)	X/Q (sec/m ³)
4-8	8	3.23 E-5
8-24	16	1.56 E-5
24-96	72	3.20 E-6
96-720	624	3.30 E-7
Annual	8760	2.05 E-8

The intermediate period X/Q values are calculated according to the expression:

$$X/Q_t = \exp \{ \ln(X/Q_2) + \{ [(\ln(X/Q_a) - \ln(X/Q_2)) / (\ln(8760) - \ln(2))] [\ln(t) - \ln(2)] \} \}$$

where t is the time period in hours, X/Q_t is the X/Q value for time t, X/Q₂ is the 2-hour X/Q value, X/Q_a is the annual average X/Q value, and 8760 is the number of hours in a year.

The Unit 3 control room air intake X/Q values are representative of the X/Q values for the center of the Unit 3 control room given that the distances and directions from the release to these receptors are very similar. The Unit 3 control room air intake X/Q values are also representative of those for the Technical Support Center which is located adjacent to the control room.

STONE & WEBSTER ENGINEERING CORPORATION
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037037002	WM(B)	02 <i>W-0</i>		6 OF 12

REFERENCES

1. US Nuclear Regulatory Commission, Office of Standards Development, Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants", August, 1979.
2. U. S. Nuclear Regulatory Commission, Subroutine "POLYN", Horizontal and Vertical Dispersion Coefficients as a Function of Downwind Distance (see Attachment 1 for F-stability values), 1974.
3. Stone & Webster computer program EN-113, Version 6, Level 8. See output in Appendix 1.
4. On-site meteorological data for the period 1974 - 1981 provided by Northeast Utilities. The data are hourly values represented by one 15-minute average value per hour (see Attachment 2).
5. Lyons, W. A., "Turbulent Diffusion and Pollutant Transport in Shoreline Environments" from Lectures on Air Pollution and Environmental Impact Analyses, American Meteorological Society, Boston, Massachusetts, September 29 to October 3, 1975, pp. 182-194.
6. Telecopier transmittal from Bill Jones, Northeast Utilities to Joe Creamer, Stone & Webster dated 4/23/98 providing Millstone Unit 1 stack dimensions (see Attachment 3).
7. Stone & Webster Drawing No. 12179-EY-16A-7, Rev. 7, 8/18/81, "Station Plan" (see Attachment 4)
8. Stone & Webster Drawing No. 12179-EM-1A-11. (see Attachment 5)
9. Murphy, K.G. and K.M. Campe., "Nuclear Power Plant Control Room Ventilation System Design for Meeting General Design Criterion 19". Presented at the 13th AEC Air Cleaning Conference, August, 1974.

ATTACHMENTS

1. "POLYN" Horizontal and Vertical Dispersion Coefficient Values as a Function of Downwind Distance (F-stability).
2. Letter from Northeast Utilities transmitting onsite meteorological data for the period 1974 - 1981.
3. Telecopier transmittal from Bill Jones, Northeast Utilities to Joe Creamer, Stone & Webster dated 4/23/98 providing Millstone Unit 1 stack dimensions
4. Stone & Webster Drawing No. 12179-EY-16A-7, Rev. 7, 8/18/81, "Station Plan"
5. Stone & Webster Drawing No. 12179-EM-1A-11, "Plot Plan".

APPENDICES (15 pages)

1. EN-113 computer output, Job No. 04820 dated 4/29/98.

10 MAR 1981

DISPERSION COEFFICIENTS AS A FUNCTION OF DOWNWIND DISTANCE
PASQUILL STABILITY CLASS (F)

PAGE 41

DOWNWIND DISTANCE (METERS)	STONE & WEBSTER	POLYN (LONG)	POLYN (DESERT)	POLYN (XOQDOO)
	SIGMA Y	SIGMA Z	SIGMA Y	SIGMA Z
10.	0.4739	0.1971	0.4014	0.1395
20.	0.0769	0.4437	0.8020	0.3243
30.	1.3054	0.6928	1.2022	0.5313
40.	1.7048	0.9383	1.6022	0.7540
50.	2.0977	1.1786	2.0021	0.9093
60.	2.4055	1.4134	2.4019	1.2351
70.	2.8591	1.6427	2.8015	1.4900
80.	3.2490	1.8667	3.2011	1.7530
90.	3.6259	2.0857	3.6006	2.0232
100.	4.0000	2.3000	4.0000	2.3000
110.	4.3716	2.5098	4.3994	2.5829
120.	4.7409	2.7153	4.7907	2.7365
130.	5.1032	2.9169	5.1979	2.8894
140.	5.4736	3.1146	5.5971	3.0416
150.	5.8372	3.3088	5.9963	3.1930
160.	6.1991	3.4995	6.3954	3.3437
170.	6.5595	3.6870	6.7945	3.4937
180.	6.9184	3.8714	7.1936	3.6430
190.	7.2759	4.0528	7.5926	3.7916
200.	7.6321	4.2314	7.9916	3.9395
210.	7.9871	4.4073	8.3905	4.0867
220.	8.3409	4.5806	8.7895	4.2332
230.	8.6935	4.7514	9.1884	4.3790
240.	9.0451	4.9198	9.5872	4.5241
250.	9.3956	5.0860	9.9861	4.6685
260.	9.7451	5.2499	10.3825	4.8123
270.	10.0936	5.4117	10.6986	4.9553
280.	10.4412	5.5714	11.0542	5.0977
290.	10.7878	5.7292	11.4095	5.2395
300.	11.1337	5.8850	11.7643	5.3805
310.	11.4786	6.0390	12.1100	5.5209
320.	11.8220	6.1912	12.4729	5.6607
330.	12.1661	6.3416	12.8266	5.7997
340.	12.5007	6.4903	13.1799	5.9382
350.	12.8505	6.6374	13.5320	6.0759
360.	13.1916	6.7830	13.8854	6.2131
370.	13.5320	6.9269	14.2375	6.3496
380.	13.8718	7.0694	14.5893	6.4854
390.	14.2107	7.2104	14.9407	6.6206
400.	14.5491	7.3500	15.2917	6.7552
410.	14.8868	7.4882	15.6424	6.8892
420.	15.2239	7.6251	15.9927	7.0225
430.	15.5604	7.7607	16.3426	7.1552
440.	15.8963	7.8949	16.6921	7.2872
450.	16.2316	8.0280	17.0413	7.4187
460.	16.5663	8.1598	17.3901	7.5496
470.	16.9005	8.2904	17.7385	7.6798
480.	17.2340	8.4199	18.0865	7.8094
490.	17.5670	8.5482	18.4342	7.9384

"POLYN" Dispersion Coefficients

P 7
03703.7602
WM(B)-02
NW-0



Northeast
Utilities System

107 Selden Street, Berlin, CT 06037

Northeast Utilities Service Company
P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

P. 8

03703,701.

WM(B)-02

lw o

April 28, 1998

Mr. Joseph Creamer
Stone and Webster
245 Summer Street, 7th Floor
Boston, MA 02210

Dear Mr. Creamer:

Millstone Nuclear Power Station
Meteorological Data

Accompanying this memo are four computer diskettes containing the meteorological data from 1974 through 1981, for your use in the Millstone Unit 3 X/Q calculations. Each diskette contains two years of data, as noted on the labels. The year of data is represented in each dataset name.

Each line of the datasets represents one hour of data. There is a nine character "time stamp" on each line; columns 1 and 2 are the year, columns 3 through 5 are the Julian day, and columns 6 through 9 are the time (military time, always on Eastern Standard Time). Columns 10 through 54 are, in order, the AT033, WS033, WD033, WS142, WD142, DT142, WS374, WD374, & DT374 (AT = air temperature, WS = wind speed, WD = wind direction, DT = delta-temperature, and numbers are instrument height). These are all in "F5.1" format. Missing data are represented by "999.0."

The data generated by our meteorological monitoring system consist of four fifteen-minute averages per hour. However, the attached datasets only contain one fifteen-minute average per hour. Historically, most of our analyses involving meteorological data, including Category 1 X/Q calculations, have been based on one fifteen-minute average representing an entire hour of data. It was found that this methodology introduced very small errors into the analyses results, compared to calculating an average of the available fifteen-minute averages for each hour.

If you have any questions, please call me, at (860) 665-3183.

Very truly yours,

H. L. Chamberlain, Jr.
Environmental Services

Enclosures



Northeast
Utilities System

TELECOPIER COVER LETTER
(FAX)

P. 3
03703.700
WH(6)-0
Kuro

WH1261-1 REV. 3-94

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TO:

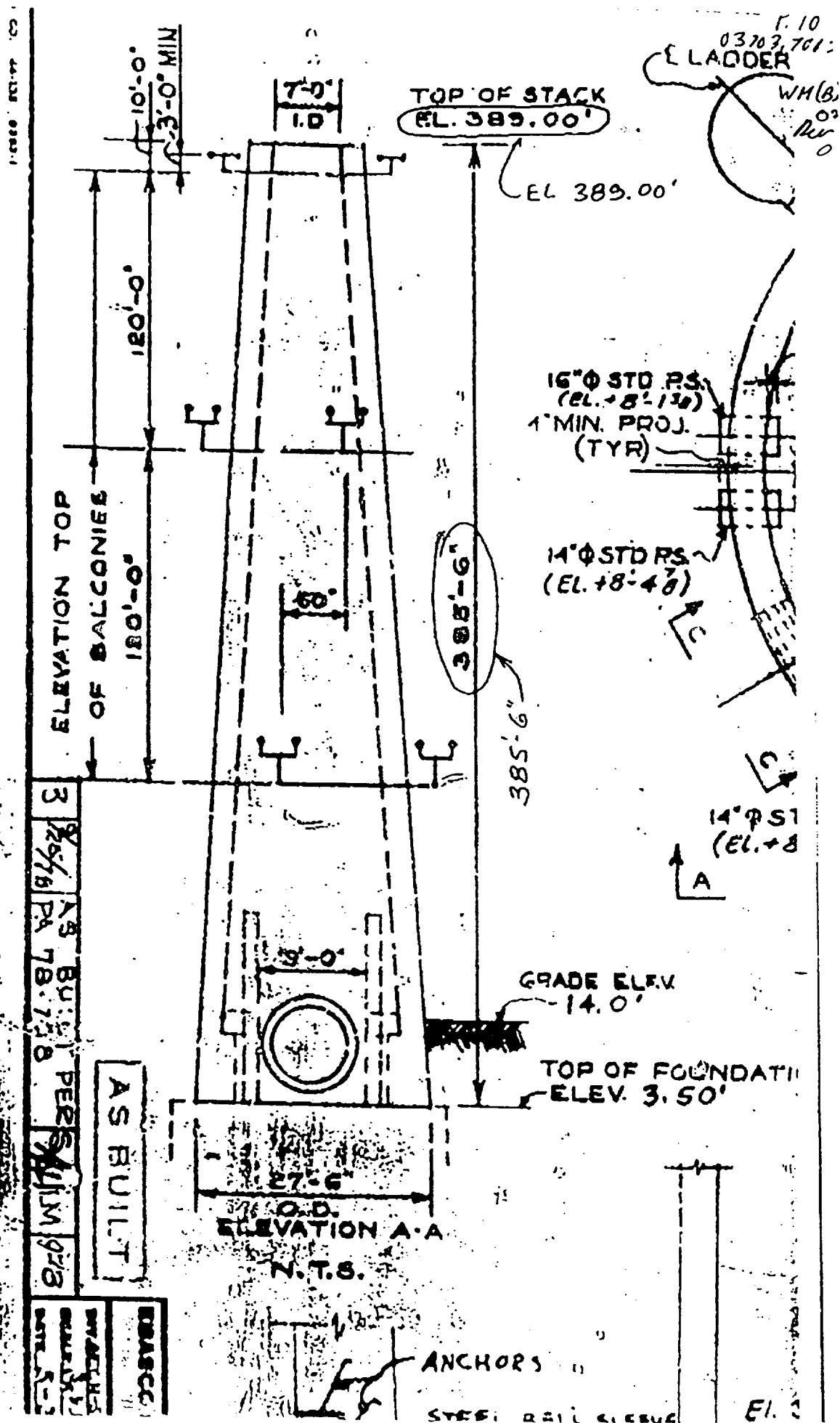
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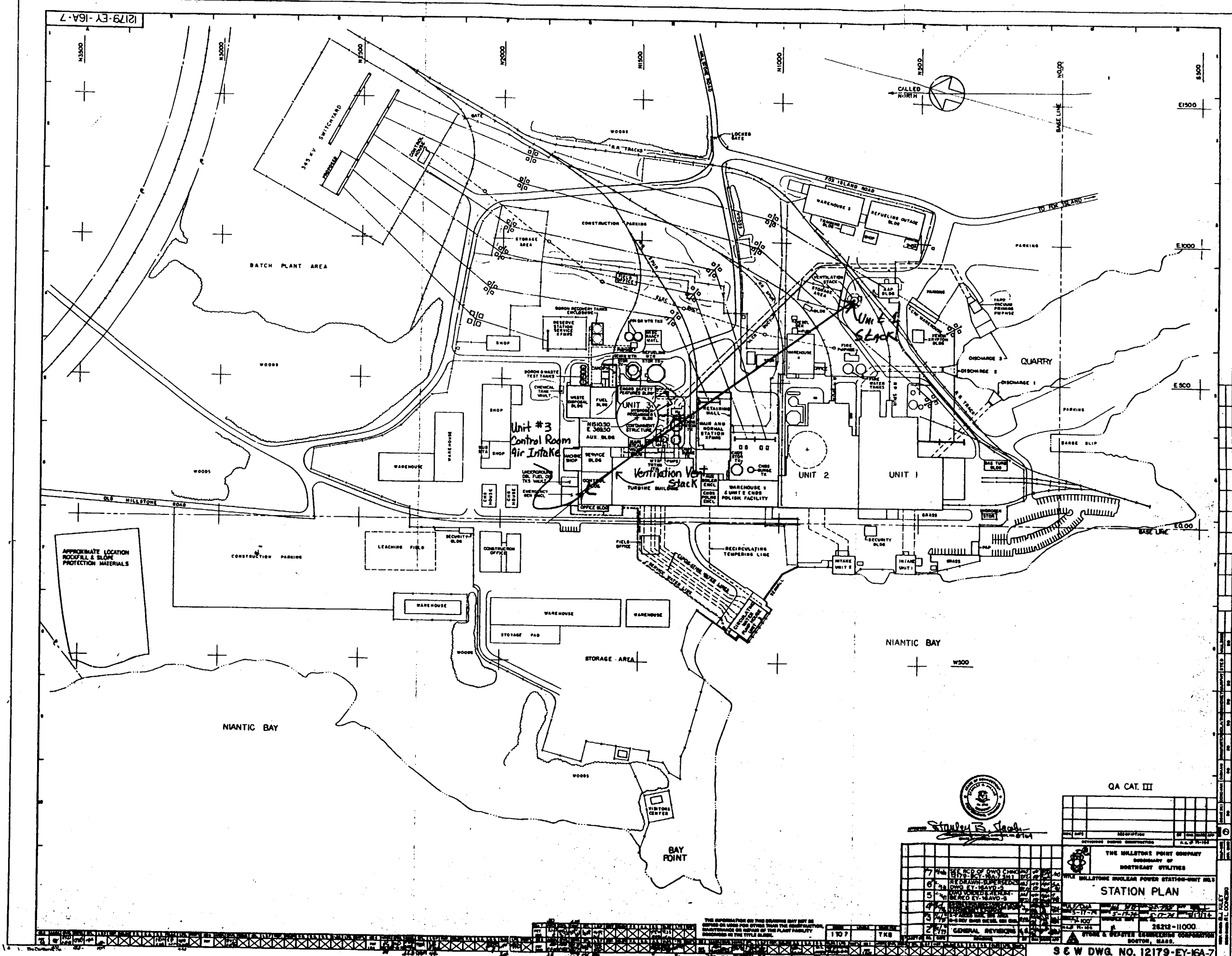
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Bill Jones	()	X0199
DEPARTMENT/DIVISION		
TELECOPIER TELEPHONE NUMBER	() (INCLUDE AREA CODE)	

COMMENTS/DIRECTIONS

UNIT 1 STACK HEIGHT



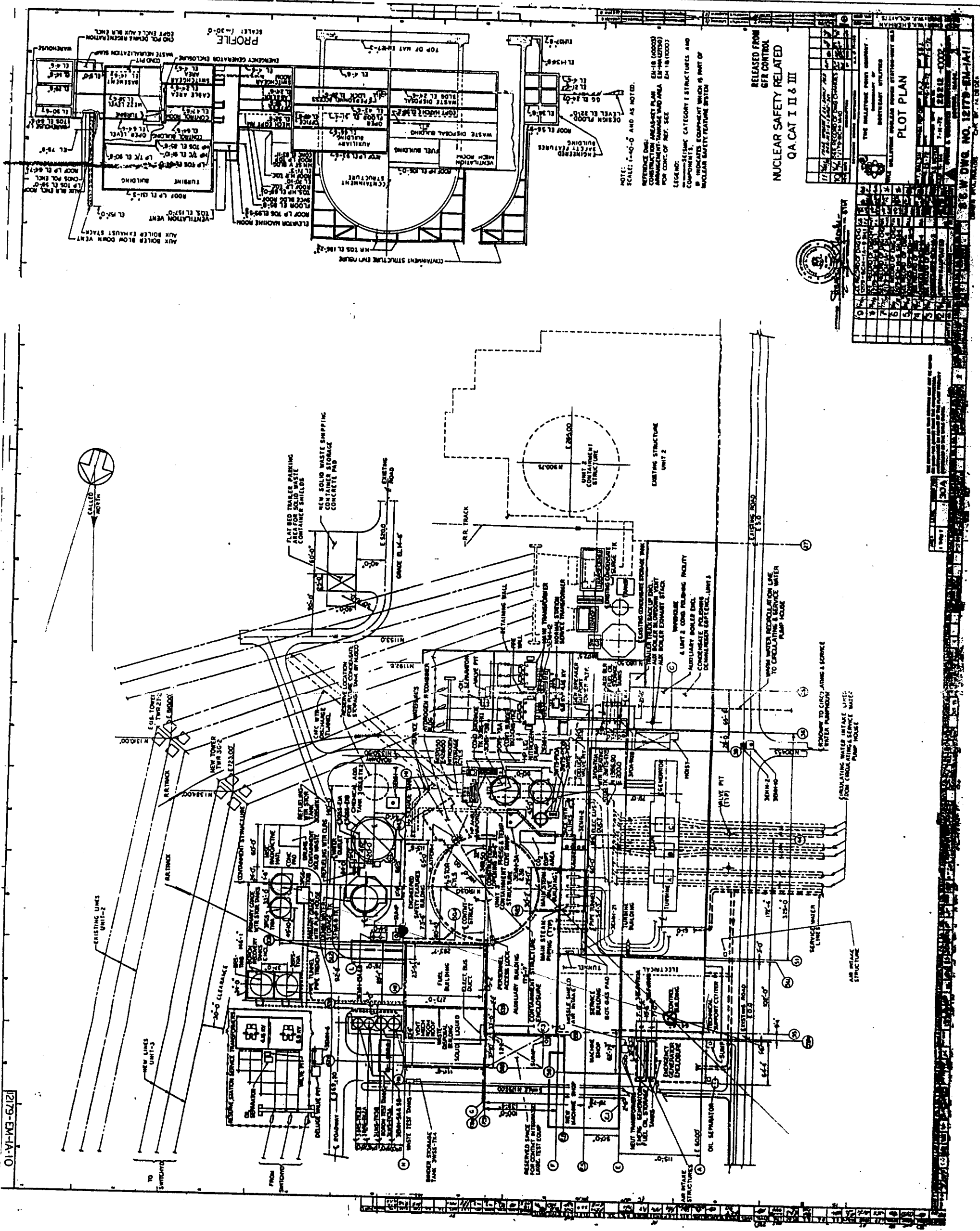
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QA CAT. III

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THE MILLSTONE POINT COMPANY
SUBSIDIARY OF
NORTHEAST UTILITIES
STATION PLAN
28212-11000
S & W DWG. NO. 12179-EY-16A-7



JES2 JOB LOG -- SYSTEM C168 -- NODE JES2B0S

10.02.03 JOB04820 IRR010I USERID VIG7988 IS ASSIGNED TO THIS JOB.
10.02.37 JOB04820 ICH70001I VIG7988 LAST ACCESS AT 10:01:36 ON WEDNESDAY, APRIL 29, 1998
10.02.37 JOB04820 \$HASP373 CQ68 STARTED - INIT 10 - CLASS A - SYS C168
10.02.47 JOB04820 IEC137I TRACK OVERFLOW RESET FOR FT11F001
10.03.06 JOB04820 IEC137I TRACK OVERFLOW RESET FOR FT10F001
10.03.10 JOB04820 IEC137I TRACK OVERFLOW RESET FOR FT16F001
10.03.10 JOB04820 IEC137I TRACK OVERFLOW RESET FOR FT31F001
10.05.13 JOB04820 +IH0002I STOP 1
10.05.14 JOB04820 \$HASP395 CQ68 ENDED

----- JES2 JOB STATISTICS -----

29 APR 1998 JOB EXECUTION DATE

59 CARDS READ

1,971 SYSOUT PRINT RECORDS

0 SYSOUT PUNCH RECORDS

148 SYSOUT SPOOL KBYTES

2.62 MINUTES EXECUTION TIME

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

P. 1
03703.7002
WM(B)-02
11-0

```

1 //CQ68 JOB (0031,3), 'VIGANT-SA',
// MSGLEVEL=2,MSGCLASS=A
// * RJEIRAN,VIG7968.DAT(CQ68EL)
/*JOBPARM ROOM=3
2 //HETROISK EXEC HETRRPROC
9 //DISK DD DISP=SHR,DSN=ENVIRONH.METDATA.HILSTONE.YR7481
12 //SYSIN DD * GENERATED STATEMENT
13 //CHIO68 EXEC PGH=CHIO68,REGION=700K,TIME=20
14 //STEPLIB DD DSN=ENVIRONH.HXLOADLB,DISP=SHR
15 //GO.FT06F001 DD DCB=PRINT1,SYSOBT=*
16 //GO.FT08F001 DD DUMHY
17 //GO.FT09F001 DD DCB=PRINT1,SYSOBT=*
18 //GO.FT10F001 DD UNIT=DISK,SPACE=(19982,(100,10)),DISP=(,PASS),
// DCB=(RECFH=VBST,LRECL=X,BLKSIZE=19982)
19 //GO.FT11F001 DD UNIT=DISK,SPACE=(19982,(100,10)),DISP=(,PASS),
// DCB=(RECFH=VBST,LRECL=X,BLKSIZE=19982)
20 //GO.FT12F001 DD UNIT=DISK,DISP=(OLD,DELETE),DSN=4SAMPLE
21 //GO.FT16F001 DD UNIT=DISK,SPACE=(32760,(70,10)),DISP=(,PASS),
// DCB=(RECFH=VST,LRECL=X,BLKSIZE=32760,BUFNO=1)
22 //GO.FT31F001 DD UNIT=DISK,SPACE=(32760,(70,10)),DISP=(,PASS),
// DCB=(RECFH=VST,LRECL=X,BLKSIZE=32760,BUFNO=1)
23 //GO.FT05F001 DD *
24 //IMBLIST EXEC PGH=IMBLIST
25 //SYSPRINT DD SYSOBT=*
26 //SYSLIB DD DSN=ENVIRONH.HXLOADLB,DISP=SHR
27 //SYSIN DD * GENERATED STATEMENT

```

29-APR-90JOB04820

JOB04820

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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DINT NO. MESSAGE
 2 IEFC001I PROCEDURE METRPROC HAS EXPANDED USING SYSTEM LIBRARY SYS1.USER.PROCLIB
 ICH70001I VIG7988 LAST ACCESS AT 10:01:36 ON WEDNESDAY, APRIL 29, 1998
 IEF236I ALLOC. FOR CQ68 METRPROC METRODISK
 IGD103I SMS ALLOCATED TO DDNAME STEPLIB
 IEF237I JES2 ALLOCATED TO FT06F001
 IEF237I JES2 ALLOCATED TO SYSPRINT
 IGD103I SMS ALLOCATED TO DDNAME SYS010
 IGD101I SMS ALLOCATED TO DDNAME (SYS011)
 DSN (SYS98119.T100237.RA000.CQ68.SAMPLE.H01)
 STORCLAS (TEMP) HGHTCLAS () DATACLAS ()
 VOL SER NOS= VIO
 IEF237I JES2 ALLOCATED TO FT05F001
 IEF142I CQ68 METRPROC METRODISK - STEP HAS EXECUTED - COND CODE 0000
 IGD104I ENVIRONH.METODOLOGY RETAINED, DDNAME=STEPLIB
 IEF285I VIG7988.CQ68.JOB04820.D0000104.? SYSOUT
 IEF285I VIG7988.CQ68.JOB04820.D0000105.? SYSOUT
 IGD104I ENVIRONH.METDATA.MILSTONE.YR7481 RETAINED, DDNAME=SYS010
 IGD106I SYS98119.T100237.RA000.CQ68.SAMPLE.H01 PASSED, DDNAME=SYS011
 IEF285I VIG7988.CQ68.JOB04820.D0000101.? SYSIN

.....
 JOB - CQ68 , SUBMITTER - VIGEANT-SA , FLOOR - 3 , READER TIME, DATE - 10.02.02, 04/29/98 V09
 STEP NUMBER - 1, STEP NAME - METRPROC, PROGRAM NAME - METHR01 , RAN FROM 10.02.37 TO 10.02.44
 ENDING CONDITION - RETURN CODE 0, REGION USED - 380K, PERFORMANCE GROUP - 20, SHAPS - 0
 PAGEINS - 0, PAGEOUTS - 0, VIO PAGEINS - 0, VIO PAGEOUTS - 0
 CPU TIME - .60 VECTOR TIME - .00 SECS, EXCPS -(354 NON-VIO, 1,754 VIO), CPU UNITS - 2.50 SECS
 SYSIN RECORDS - 3, OPENS - (0 TAPE, 0 TEMP, 0 PERM), COST = \$4.17
 EXCPS/DDNAME - 9/STEPLIB 345/SYS010 1,754/SYS011

IEF373I STEP/METRPROC/START 1998119.1002
 IEF374I STEP/METRPROC/STOP 1998119.1002 CPU 0MIN 00.56SEC SRB 0MIN 00.02SEC VIRT 88K SYS 292K EXT 4K SYS 10120K
 IEF236I ALLOC. FOR CQ68 CHIO68
 IGD103I SMS ALLOCATED TO DDNAME STEPLIB
 IEF237I JES2 ALLOCATED TO FT06F001
 IEF237I DNY ALLOCATED TO FT08F001
 IEF237I JES2 ALLOCATED TO FT09F001
 IGD101I SMS ALLOCATED TO DDNAME (FT10F001)
 DSN (SYS98119.T100237.RA000.CQ68.R0110984)
 STORCLAS (TEMP) HGHTCLAS () DATACLAS ()
 VOL SER NOS= VIO
 IGD101I SMS ALLOCATED TO DDNAME (FT11F001)
 DSN (SYS98119.T100237.RA000.CQ68.R0110985)
 STORCLAS (TEMP) HGHTCLAS () DATACLAS ()
 VOL SER NOS= VIO
 IGD103I SMS ALLOCATED TO DDNAME FT12F001
 IGD101I SMS ALLOCATED TO DDNAME (FT16F001)
 DSN (SYS98119.T100237.RA000.CQ68.R0110986)
 STORCLAS (TEMP) HGHTCLAS () DATACLAS ()
 VOL SER NOS= VIO
 IGD101I SMS ALLOCATED TO DDNAME (FT31F001)
 DSN (SYS98119.T100237.RA000.CQ68.R0110987)
 STORCLAS (TEMP) HGHTCLAS () DATACLAS ()
 VOL SER NOS= VIO
 IEF237I JES2 ALLOCATED TO FT05F001
 IEC137I TRACK OVERFLOW RESET FOR FT11F001
 IEC137I TRACK OVERFLOW RESET FOR FT10F001
 IEC137I TRACK OVERFLOW RESET FOR FT16F001
 IEC137I TRACK OVERFLOW RESET FOR FT31F001
 IEF142I CQ68 CHIO68 - STEP HAS EXECUTED - COND CODE 0001

APPENDIX 1
 EN-113 Program Output
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1001041 ENVIRONH.HXLOADL  RETAINED, DDNAME=STEPLIB
REF2651 VIG7988.CQ68.JOB04820.D0000106.? SYSOUT
REF2651 VIG7988.CQ68.JOB04820.D0000107.? SYSOUT
1001061 SYS98119.T100237.RA000.CQ68.R0110984 PASSED, DDNAME=FT10F001
1001061 SYS98119.T100237.RA000.CQ68.R0110985 PASSED, DDNAME=FT11F001
1001051 SYS98119.T100237.RA000.CQ68.SAMPLE.H01 DELETED, DDNAME=FT12F001
1001061 SYS98119.T100237.RA000.CQ68.R0110986 PASSED, DDNAME=FT16F001
1001061 SYS98119.T100237.RA000.CQ68.R0110987 PASSED, DDNAME=FT31F001
REF2651 VIG7988.CQ68.JOB04820.D0000102.? SYSIN
.....
JOB - CQ68 , SUBMITTER - VIGEANT-SA , FLOOR - 3 , READER TIME, DATE - 10.02.02, 04/29/98 V09
STEP NUMBER - 2, STEP NAME - CHIQ68 , PROGRAM NAME - CHIQ68 , RAN FROM 10.02.44 TO 10.05.14
ENDING CONDITION - RETURN CODE 1, REGION USED - 864K, PERFORMANCE GROUP - 20, SHAPS - 0
PAGEINS - 0, PAGEOUTS - 0, VIO PAGEINS - 0, VIO PAGEOUTS - 0
CPU TIME - 21.02 VECTOR TIME - .00 SECS, EXCPS -( 30 NON-VIO, 10,311 VIO), CPU UNITS - 30.33 SECS
SYSIN RECORDS - 28, OPENS - ( 0 TAPE, 0 TEMP, 0 PERM), COST = $50.55
EXCPS/DDNAME - 30/STEPLIB 228/FT10F001 228/FT11F001 1,755/FT12F001
4,050/FT16F001 4,050/FT31F001
.....
REF3731 STEP/CHIQ68 /START 1998119.1002
REF3741 STEP/CHIQ68 /STOP 1998119.1005 CPU 0MIN 20.98SEC SRB 0MIN 00.03SEC VIRT 556K SYS 308K EXT 4K SYS 10404K
REF2361 ALLOC. FOR CQ68 IMBLIST
REF2371 JES2 ALLOCATED TO SYSPRINT
1001031 SHS ALLOCATED TO DDNAME SYSLIB
REF2371 JES2 ALLOCATED TO SYSIN
REF1421 CQ68 IMBLIST - STEP HAS EXECUTED - COND CODE 0008
REF2651 VIG7988.CQ68.JOB04820.D0000108.? SYSOUT
1001041 ENVIRONH.HXLOADL RETAINED, DDNAME=SYSLIB
REF2651 VIG7988.CQ68.JOB04820.D0000103.? SYSIN
.....
JOB - CQ68 , SUBMITTER - VIGEANT-SA , FLOOR - 3 , READER TIME, DATE - 10.02.02, 04/29/98 V09
STEP NUMBER - 3, STEP NAME - IMBLIST , PROGRAM NAME - IMBLIST , RAN FROM 10.05.14 TO 10.05.14
ENDING CONDITION - RETURN CODE 8, REGION USED - 428K, PERFORMANCE GROUP - 20, SHAPS - 0
PAGEINS - 0, PAGEOUTS - 0, VIO PAGEINS - 0, VIO PAGEOUTS - 0
CPU TIME - .03 VECTOR TIME - .00 SECS, EXCPS -( 0 NON-VIO, 0 VIO), CPU UNITS - .03 SECS
SYSIN RECORDS - 1, OPENS - ( 0 TAPE, 0 TEMP, 0 PERM), COST = $0.05
.....
REF3731 STEP/IMBLIST /START 1998119.1005
REF3741 STEP/IMBLIST /STOP 1998119.1005 CPU 0MIN 00.03SEC SRB 0MIN 00.00SEC VIRT 156K SYS 272K EXT 4K SYS 10116K
1001051 SYS98119.T100237.RA000.CQ68.R0110984 DELETED, DDNAME=FT10F001
1001051 SYS98119.T100237.RA000.CQ68.R0110985 DELETED, DDNAME=FT11F001
1001051 SYS98119.T100237.RA000.CQ68.R0110986 DELETED, DDNAME=FT16F001
1001051 SYS98119.T100237.RA000.CQ68.R0110987 DELETED, DDNAME=FT31F001
REF3751 JOB/CQ68 /START 1998119.1002
REF3761 JOB/CQ68 /STOP 1998119.1005 CPU 0MIN 21.57SEC SRB 0MIN 00.05SEC
.....
TOTAL CPU TIME - 21.65 SECS, TOTAL VECTOR TIME - .00 SECS, TOTAL CPU UNITS - 32.85 SECS
TOTAL EXCPS -( 364 NON-VIO, 12,065 VIO)
TOTAL JOB COST EXCLUDING PRINT CHARGES = $54.77 CHARGED TO AUTH = 0031 , JO/HO = 022685067

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11/10



STONE & WEBSTER ENGINEERING CORPORATION
ENVIRONMENTAL ENGINEERING DIVISION

COMPUTER CODE IDENTIFICATION

PROGRAM NAME: SITE DATA RETREIVAL PROGAM

VERSION OF PROGRAM: 00

LINK EDIT DATE (JULIAN): 80.184

DATE OF RUN (MO/DAY/YR): 4/29/98

JOB NAME OF RUN: CQ68

LIBRARY REFERENCE NUMBER: EN-112

LEVEL OF PROGRAM: 01

LINK EDIT TIME (HRS.MINS.SECONDS): 14.21.36

TIME OF RUN (MILITARY): 1002

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APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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INPUT DATA TRACEBACK

DATA SUBMITTED ON DEVICE: 5

CARD#	1	2	3	4	5	6	7	8
1	3							
2	131	132	135					
3	74001	81365						

***** END OF INPUT ON DEVICE 5 *****

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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INPUT TO METONER PROGRAM

111 130 135

0001 01365

EIF OF INPUT DATA REACHED

NUMBER OF CARDS SELECTED = 8766

NUMBER OF DAYS SELECTED = 2922



STONE & WEBSTER ENGINEERING CORPORATION
ENVIRONMENTAL ENGINEERING DIVISION

COMPUTER CODE IDENTIFICATION

PROGRAM NAME: ATMOSPHERIC DISPERSION FACTORS

VERSION OF PROGRAM: 06

LOAD MODULE: ENVIRONM.HXLOADLB

LINK EDIT DATE (JULIAN): 82.263

DATE OF RUN (MO/DAY/YR): 4/29/98

JOB NAME OF RUN: CQ68

LIBRARY REFERENCE NUMBER: EN-113

LEVEL OF PROGRAM: 08

MEMBER (PGM): CHIOQ68

LINK EDIT TIME (HRS.MINS.SECONDS): 12.40.03

TIME OF RUN (MILITARY): 1002

JOB04820

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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WFO

INPUT DATA TRACEBACK

DATA SUBMITTED ON DEVICE: 5

CARD#	1	2	3	4	5	6	7	8
1	MILLSTONE NUCLEAR POWER STATION - UNIT 3 037037002							
2	ONSITE METDATA (1974-1981)							
3	7400181365	2922	3 341	2				
4	131	132	0	0	0	135	0	0
5	0.1	0	0	0	0	0.1	0	0
6	2 ELEVATED RELEASE (355 M)							
7	1	0	389	0	0	0	00	2
8	1	0	0	0	16	3	0	0
9	1	0	0	0	1000	8	0	1.1
10	35599999							

CARD#	1	2	3	4	5	6	7	8
11	35199999							
12								
13	1	64.5	64.5					
14	2	64.5	64.5					
15	3	64.5	64.5					
16	4	64.5	64.5					
17	5	64.5	64.5					
18	6	64.5	64.5					
19	7	64.5	64.5					
20	8	64.5	64.5					

CARD#	1	2	3	4	5	6	7	8
21	9	64.5	64.5					
22	10	64.5	64.5					
23	11	64.5	64.5					
24	12	64.5	64.5					
25	13	64.5	64.5					
26	14	64.5	64.5					
27	15	64.5	64.5					
28	16	64.5	64.5					

CARD#	1	2	3	4	5	6	7	8
***** END OF INPUT ON DEVICE 5 *****								

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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----- PROGRAM OPTIONS AVAILABLE IN THE LOAD MODULE (ENVIRONM.HXLOADLB(CHIOQ68)) -----

METSTB - METHOD OF DETERMINING STABILITY CLASS. - ALL METHODS
 REDIS - REDISTRIBUTION OF CALMS - ALL
 TPGRAD - SPECIFIED TEMPERATURE GRADIENTS FOR STABILITY CLASS DETERMINATION
 RETYP - RELEASE POINT AND CALCULATION TYPE
 STTYP - STATION TYPE - NUCLEAR OR FOSSIL, - BOTH
 HLID - LIMITED MIXING LID HEIGHT
 ISTRLN - CALCULATE TIME PERIOD AVERAGES USING STRAIGHT LINE
 ICALM - RESET WIND SPEED TO CALM SPEED IF WIND SPEED FALLS BELOW CALM SPEED
 UCU - UNSTABLE AND NATURAL WIND SPEED CORRECTION FACTOR
 UCS - STABLE WIND SPEED HEIGHT CORRECTION FACTOR
 ISECVG - SECTOR AVERAGING CORRECTION
 MESHT - WIND SPEED MODIFICATION WITH HEIGHT (ASME)
 IAECSS - DISPERSION COEFFICIENTS (SIGMA Y AND SIGMA Z), AEC, AEC DESERT AND S+H (TURNER'S)
 IBHEFF - BUILDING WAKE EFFECT (SHORT TERM) - ALL
 ITOPO - TOPOGRAPHIC DATA INPUT CONTROL
 ITERIN - TERRAIN ADJUSTMENT FACTOR - ALL
 ISIGMA - SIGMA VALUE PRINTOUT CONTROL
 ISTABY - HORIZONTAL DISPERSION COEFFICIENT SELECTION ARRAY
 ISTABZ - VERTICAL DISPERSION COEFFICIENT SELECTION ARRAY
 NHR72 - 72 HOUR SLIDING AVERAGE HOURS TO BE SLID CONTROL
 NHR624 - 624 HOUR SLIDING AVERAGE HOURS TO BE SLID CONTROL
 LINXQR - X/Q - D/Q WRITE LIMIT CONTROL
 PRGHR - NUMBER OF PURGE HOURS
 RFCWSP - WIND SPEED BELOW WHICH TERRAIN RECIRCULATION FRACTION WILL BE APPLIED
 JHRARY - TIME PERIOD CONTROL
 IPLNEQ - PLUME RISE EQUATION CONTROL (14 METHODS)
 BHT - BUILDING HEIGHT WAKE EFFECT (LONG TERM)
 SPDBHE - GROUND TO ELEVATED RELEASE SHIFT AND DOWNHASH CONTROL
 IAJDIR - ADJACENT DOWNWIND SECTOR DISTANCE SELECTION SWITCH

APPENDIX 1
 EN-113 Program Output
 Unit 1 Stack to Unit 3 Control Room Air Intake

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HILLSTONE NUCLEAR POWER STATION - UNIT 3
ELEVATED RELEASE (355 M)

CALCULATION NUMBER
ONSITE METDATA (1974-1981)

037037002

----- READ1 (6.8) INPUT DATA -----

CLIENT(11)
HILLSTONE NUCLEAR POWER STATION - UNIT 3
SITE(11)

JOBNO(3)
037037002
CALCNU(5)

ONSITE METDATA (1974-1981)

ISTART ISTOP NDYSDT METSTB DHT IREDIS
74001 81365 2922 3 341.0 2

ELEVATED CONDITIONS

SPEED DIR TEMP RANGE STD DEV DELTA T SPEED DIR TEMP ISPUNT ITPUNT
131 132 0 0 0 135 0 0 0 0 0

0.10 1.00 1.00 1.00 1.00 0.10 1.00 1.00 1.00 0.0 0.0 0.0 0.0 0.0 0.0

----- READ2 (6.8) INPUT DATA -----

IRETYP RELSID(11)

2 ELEVATED RELEASE (355 M)

ISTTYP HFLUE STKHT STKDIA GASVEL TS HLID HFUEL HVALUE ISTRLN ICAHM UCU UCS
1 0 389.00 0.0 0.0 0. 0. 0. 0. 0 2 0 0.0 0.0

ISECVG MESHT IAECG IBHEFF ITOPO ITERIN ISIGMA ISTABY ISTABZ NHR72 NHR624 LIMXQR PRGHR5 RFCHSP
1 0 0 0 16 3 0 0000000 0000000 0 0 0 0.0 0.0

JHRRARY(6) IPLNEQ PLUMRS CALMAC CALMAN BHT SPOBHE IAJDIR
1 0 0 0 0 1000 0 0.0 1.1 0.6 0.0 0.0 0

DISITE(16)
355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0 355.0

DISLPZ(16)
351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0 351.0

IDSLP DISTAN(10)
0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

IDR TOPOMT(16,12)

1 64.5 64.5
2 64.5 64.5
3 64.5 64.5
4 64.5 64.5
5 64.5 64.5
6 64.5 64.5
7 64.5 64.5
8 64.5 64.5
9 64.5 64.5
10 64.5 64.5
11 64.5 64.5
12 64.5 64.5
13 64.5 64.5
14 64.5 64.5
15 64.5 64.5
16 64.5 64.5

----- TERRAIN ADJUSTMENT FACTORS USED -----

IDR FACTORS (2)

1 4.000 4.000
2 4.000 4.000
3 4.000 4.000
4 4.000 4.000
5 4.000 4.000
6 4.000 4.000
7 4.000 4.000
8 4.000 4.000

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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WCO

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air Intake

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W O

9	4.000	4.000
10	4.000	4.000
11	4.000	4.000
12	4.000	4.000
13	4.000	4.000
14	4.000	4.000
15	4.000	4.000
16	4.000	4.000

MILLSTONE NUCLEAR POWER STATION - UNIT 3

CALCULATION NUMBER

ONSITE METDATA (1974-1981)

037037002

ELEVATED RELEASE (355 M)

CHI/Q CALCULATION

1 HOUR PERIOD

1/01/74 - 12/31/81

RELEASE TYPE - ELEVATED NUCLEAR
 STABILITY DETERMINED BY DELTA TEMPERATURE
 WIND SPEED ASSIGNED TO CALM OBSERVATIONS = 1.10 MPH
 DISPERSION COEFFICIENTS (AEC GIFFORD'S)

ZERO PLUME RISE
 TOPOGRAPHY USED - YES
 CALM REDISTRIBUTION - PROP TO 1.5 MPS W/S CLASS DIR FREQ

----- CHI/Q VALUES -----

DOWNWIND SECTOR	DOWNWIND DISTANCE (M)	MAXIMUM VALUE	ARITHMETIC MEAN	50 PERCENT VALUE	50 PC EQUAL RISK VALUE	5 PERCENT VALUE	5 PC EQUAL RISK VALUE	8 PC EQUAL RISK VALUE
S	355.	0.8356E-05	0.5924E-07	0.5133E-14	0.7795E-23	0.5092E-07	0.2730E-07	0.1641E-13
SSH	355.	0.2051E-04	0.4650E-07	0.5191E-14	0.4313E-14	0.2850E-07	0.1945E-07	0.1641E-13
SW	355.	0.9601E-05	0.3937E-07	0.5966E-14	0.3547E-14	0.2850E-07	0.2964E-13	0.1641E-13
SSH	355.	0.7780E-05	0.7870E-08	0.6336E-14	0.3178E-59	0.2297E-13	0.1641E-13	0.1209E-13
W	355.	0.4600E-05	0.1766E-07	0.3995E-14	0.1626E-23	0.2552E-13	0.1413E-13	0.9571E-14
SSH	355.	0.8058E-05	0.3805E-07	0.4836E-14	0.9035E-59	0.2158E-07	0.1641E-13	0.1178E-13
SW	355.	0.1126E-04	0.7589E-07	0.7362E-23	0.1491E-59	0.4594E-13	0.1641E-13	0.1209E-13
SSH	355.	0.4102E-04	0.1217E-06	0.3118E-23	0.1000E-70	0.2137E-13	0.1371E-13	0.9987E-14
N	355.	0.1128E-04	0.6439E-07	0.2409E-23	0.1031E-23	0.1955E-13	0.1458E-13	0.1134E-13
SSH	355.	0.1456E-04	0.6309E-07	0.2120E-23	0.2409E-23	0.1458E-13	0.1641E-13	0.1134E-13
SW	355.	0.1253E-04	0.3063E-07	0.2120E-23	0.2648E-14	0.1242E-13	0.2042E-13	0.1242E-13
ENE	355.	0.2507E-04	0.2092E-07	0.2366E-23	0.4313E-14	0.1413E-13	0.1763E-07	0.1701E-13
E	355.	0.1003E-04	0.1550E-07	0.3797E-14	0.4940E-14	0.1407E-07	0.1970E-07	0.3675E-13
ESE	355.	0.2507E-04	0.3352E-07	0.5280E-14	0.6336E-14	0.2605E-07	0.6124E-07	0.2255E-07
SE	355.	0.9199E-05	0.8219E-07	0.5535E-14	0.8587E-14	0.4819E-06	0.8363E-06	0.5440E-06
SSE	355.	0.2256E-04	0.8636E-07	0.5405E-14	0.6425E-14	0.5326E-06	0.6571E-06	0.4306E-06
DIRECTION INDEPENDENT		0.4102E-04	0.4872E-07	0.4065E-14		0.2385E-07		

OBSERVATIONS EXAMINED 70128 GOOD OBSERVATIONS 65563 PERCENT DATA RECOVERY 93.49

GOOD DATA PERIODS 65563
 NUMBER CHI/Q = 0.0
 NON ZERO TOTAL

62538	62314	62719	63469	63066	63362	63430	63523	62782	61111	58971	58276	59875	60166	57739	60104	0
95.39	95.04	95.66	96.81	96.19	96.64	96.75	96.89	95.76	93.21	89.95	88.89	91.32	91.77	88.07	91.67	0.0
3025	3249	2844	2094	2497	2201	2133	2040	2781	4452	6592	7287	5688	5397	7824	5459	65563

APPENDIX 1
 EN-113 Program Output
 Unit 1 Stack to Unit 3 Control Room Air Intake

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CALCULATION NUMBER

***** CUMULATIVE FREQUENCY SUMMARY *****

DOWNWIND SECTOR	S	SSH	SH	HSW	H	WNH	NH	NNH	N	NNE	NE	ENE	E	ESE	SE	SSE	DIRECTION
DOWNWIND DISTANCE (M)	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	355.	INDEPENDENT
TOPOGRAPHIC HEIGHT	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	65.	
CHIRP RANGE																	
GTE LT																	
0.10E-08	2792	3034	2672	2057	2411	2083	2039	1983	2710	4357	6440	7041	5383	4908	6610	4823	61351
0.10E-08 0.39E-08	92.30	93.38	93.95	98.23	96.56	94.64	95.59	97.21	97.45	97.87	97.82	96.62	94.64	90.94	84.48	88.35	93.58
0.40E-08 0.69E-08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.70E-08 0.99E-08	92.30	93.38	93.95	98.23	96.56	94.64	95.59	97.21	97.45	97.87	97.82	96.62	94.64	90.94	84.48	88.35	93.58
0.10E-07 0.39E-07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.40E-07 0.69E-07	92.30	93.38	93.95	98.23	96.56	94.64	95.59	97.21	97.45	97.87	97.82	96.62	94.64	90.94	84.48	88.35	93.58
0.70E-07 0.99E-07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.10E-06 0.39E-06	92.30	93.38	93.95	98.23	96.56	94.64	95.59	97.21	97.45	97.87	97.82	96.62	94.64	90.94	84.48	88.35	93.58
0.40E-06 0.69E-06	69	85	63	12	31	37	14	5	6	9	38	116	188	278	536	235	1722
0.70E-06 0.99E-06	94.58	96.00	96.17	98.81	97.80	96.32	96.25	97.45	97.66	98.07	98.39	98.22	97.94	96.09	91.33	92.65	96.20
0.10E-05 0.29E-05	30	37	31	12	9	22	22	5	10	15	20	14	2	7	40	41	317
0.30E-05 0.49E-05	95.57	97.14	97.26	99.38	98.16	97.32	97.28	97.70	98.02	98.41	98.70	98.41	97.98	96.22	91.85	93.41	96.69
0.50E-05 0.69E-05	4	10	10	1	6	5	3	5	2	1	1	2	2	0	1	2	55
0.70E-05 0.89E-05	95.70	97.45	97.61	99.43	98.40	97.55	97.42	97.94	98.09	98.43	98.71	98.44	98.01	96.22	91.86	93.44	96.77
0.90E-05 0.11E-04	3	8	5	4	2	6	6	2	2	1	7	33	47	68	121	14	329
0.12E-04 0.31E-04	95.80	97.69	97.78	99.62	98.40	97.82	97.70	98.04	98.17	98.45	98.82	98.89	98.84	97.48	93.40	93.70	97.27
0.32E-04 0.51E-04	46	15	15	2	16	12	2	0	0	4	16	38	45	90	265	155	721
	97.32	98.15	98.31	99.71	99.12	98.36	97.80	98.04	98.17	98.54	99.06	99.41	99.63	99.15	96.79	96.54	98.37
	33	23	21	3	13	11	5	2	2	5	18	7	3	7	63	64	280
	98.41	98.86	99.05	99.86	99.64	98.86	98.03	98.14	98.24	98.65	99.33	99.51	99.68	99.28	97.60	97.71	98.80
	35	23	16	2	6	18	21	12	28	23	20	26	15	34	164	102	545
	99.57	99.57	99.61	99.95	99.80	99.68	99.02	98.73	99.24	99.17	99.64	99.86	99.95	99.91	99.69	99.58	99.63
	10	9	6	0	3	5	11	8	8	11	9	5	1	3	23	15	127
	99.90	99.85	99.82	99.95	100.00	99.91	99.53	99.12	99.53	99.42	99.77	99.93	99.96	99.96	99.99	99.85	99.82
	0	3	2	0	0	1	5	6	7	15	9	3	1	0	0	5	57
	99.90	99.94	99.89	99.95	100.00	99.95	99.77	99.41	99.78	99.75	99.91	99.97	99.98	99.96	99.99	99.95	99.91
	3	1	2	1	0	1	3	5	3	7	2	1	0	0	0	1	30
	100.00	99.97	99.96	100.00	100.00	100.00	99.91	99.66	99.89	99.91	99.94	99.99	99.98	99.96	99.99	99.96	99.96
	0	0	1	0	0	0	2	3	3	2	3	0	1	1	1	1	18
	100.00	99.97	100.00	100.00	100.00	100.00	99.80	100.00	99.96	99.98	99.99	100.00	99.98	100.00	99.98	99.98	99.98
	0	1	0	0	0	0	0	3	0	2	1	1	0	1	0	1	10
	100.00	100.00	100.00	100.00	100.00	100.00	99.95	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

APPENDIX 1
EN-113 Program Output
Unit 1 Stack to Unit 3 Control Room Air IntakeP. 14
03703.7002
WMM(B)-02
MWD

HILLSTONE NUCLEAR POWER STATION - UNIT 3

CALCULATION NUMBER

ONSITE METDATA (1974-1981)

037037002

ELEVATED RELEASE (355 M)

CHI/Q CALCULATION

ANNUAL

1/01/74 - 12/31/81

RELEASE TYPE - ELEVATED NUCLEAR

ZERO PLUME RISE

STABILITY DETERMINED BY DELTA TEMPERATURE

TOPOGRAPHY USED - YES

WIND SPEED ASSIGNED TO CALM OBSERVATIONS = 0.60 MPH

CALM REDISTRIBUTION - PROP TO 1.5 MPS W/S CLASS DIR FREQ

DISPERSION COEFFICIENTS (AEC GIFFORD'S)

RECIRCULATION FACTORS APPLIED (PLAIN (CURVE))

HEIGHT OF ELEVATED RELEASE 389.0 FEET (118.6 METERS)

***** ANNUAL CHI/Q AVERAGES ***** UNDECAYED UNDEPLETED CHI/Q VALUES.

DOWNWIND

DOWNWIND DISTANCE (M) AND CHI/Q AVERAGES

SECTOR	355	351
S	0.133E-07	0.129E-07
SSH	0.112E-07	0.108E-07
SH	0.809E-08	0.782E-08
HSW	0.118E-08	0.114E-08
H	0.299E-08	0.286E-08
HHW	0.628E-08	0.611E-08
NH	0.126E-07	0.124E-07
NNH	0.205E-07	0.202E-07
N	0.138E-07	0.134E-07
NNE	0.224E-07	0.220E-07
NE	0.159E-07	0.156E-07
ENE	0.116E-07	0.113E-07
E	0.642E-08	0.622E-08
ESE	0.133E-07	0.129E-07
SE	0.484E-07	0.471E-07
SSE	0.358E-07	0.349E-07

← 257° - 281°
 ← 282° - 305°
 ← 306° - 329°
 ← 330° - 353°

OBSERVATIONS EXAMINED 70128

GOOD OBSERVATIONS

65563

PERCENT DATA RECOVERY 93.49

Maximum Value 2.05×10^{-8}

APPENDIX 1
 EN-113 Program Output
 Unit 1 Stack to Unit 3 Control Room Air Intake

P. 15
 03703.7002
 WM(B)-02