AVERAGE DAILY UNIT POWER LEVEL

DOCKET NO. 50-387
UNIT One
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

MONTH July, 1985

DAY	AVERAGE DAILY POWER LEVEL (MWe-Net)	DAY	AVERAGE DAILY POWER LEVEL (MWe-Net)
1	1029	17	1034
2	1028	18	1031
3	1025	19	1026
4	1029	20	1025
5	1022	21	1024
6	1022	22	1026
7	1025	23	1034
8	1035	24	1034
9	1027	25	1028
10	1029	26	1023
11	1034	27	822
12	1031	28	890
13	1029	29	1026
14	1022	30	1023
15	1023	31	1028
16	1026		

INSTRUCTIONS

On this format, list the average daily unit power level in MWe-Net for each day in the reporting month. Compute to the nearest whole megawatt.

(9/77)

IE24
1/1

SUSQUEHANNA STEAM ELECTRIC STATION

PP&L

OPERATING DATA REPORT

DOCKET NO. 50-387
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

OPERATING STATUS

Unit 1

1. Unit Name: Susquehanna Steam Electric Station
2. Reporting Period: July, 1985
3. Licensed Thermal Power (MWt): 3293
4. Nameplate Rating (Gross MWe): 1152
5. Design Electrical Rating (Net MWe): 1065
6. Maximum Dependable Capacity (Gross MWe): 1068
7. Maximum Dependable Capacity (Net MWe): 1032
8. If Changes Occur in Capacity Ratings (Items Number 3 Through 7) Since Last Report, Give Reasons:
   None

Notes

9. Power Level To Which Restricted, If Any (Net MWe): None
10. Reasons For Restrictions, If Any: None

	This Month	Yr.-to-Date	Cumulative
11. Hours In Reporting Period	744	5,087	18,840
12. Number Of Hours Reactor Was Critical	744	2,148.5	12,541.2
13. Reactor Reserve Shutdown Hours	0	41.8	513.2
14. Hours Generator On-Line	744	2,068.5	12,215.4
15. Unit Reserve Shutdown Hours	0	0	0
16. Gross Thermal Energy Generated (MWH)	2,420,853	6,100,303	36,729,291
17. Gross Electrical Energy Generated (MWH)	784,216	1,976,036	11,966,566
18. Net Electrical Energy Generated (MWH)	756,234	1,862,412	11,442,982
19. Unit Service Factor	100	40.7	64.8
20. Unit Availability Factor	100	40.7	64.8
21. Unit Capacity Factor (Using MDC Net)	98.5	35.5	58.8
22. Unit Capacity Factor (Using DER Net)	95.4	34.4	57.0
23. Unit Forced Outage Rate	0	2.5	12.2

24. Shutdowns Scheduled Over Next 6 Months (Type, Date, and Duration of Each):
    None

25. If Shut Down At End Of Report Period, Estimated Date of Startup: N/A
26. Units In Test Status (Prior to Commercial Operation):

	Forecast	Achieved
INITIAL CRITICALITY		
INITIAL ELECTRICITY		
COMMERCIAL OPERATION		

(9/77)

UNIT SHUTDOWNS AND POWER REDUCTIONS

REPORT MONTH July, 1985

DOCKET NO. 50-387
UNIT NAME One
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

No.	Date	Type[1]	Duration (Hours)	Reason[2]	Method of Shutting Down Reactor[3]	Licensee Event Report #	System Code[4]	Component Code[5]	Cause & Corrective Action to Prevent Recurrence
	None								

1
F: Forced
S: Scheduled

2
Reason:
A-Equipment Failure (Explain)
B-Maintenance or Test
C-Refueling
D-Regulatory Restriction
E-Operator Training & License Examination
F-Administrative
G-Operational Error (Explain)
H-Other (Explain)

3
Method:
1-Manual
2-Manual Scram.
3-Automatic Scram.
4-Continuation from previous month
5-Reduction
9-Other

4
Exhibit G - Instructions for Preparation of Data Entry Sheets for Licensee Event Report (LER) File (NUREG-0161)

5
Exhibit I - Same Source

(9/77)

UNIT 1

SUSQUEHANNA STEAM ELECTRIC STATION

Docket No. 50-387
Date 08/08/85
Completed By L.A. Kuczynski
Telephone (717)542-3759

Challenges to Main Steam Safety Relief Valves

None

Changes to the Offsite Dose Calculation Manual

See attached

Major Changes to Radioactive Waste Treatment Systems

None

AVERAGE DAILY UNIT POWER LEVEL

DOCKET NO. 50-388
UNIT Two
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

MONTH July, 1985

DAY	AVERAGE DAILY POWER LEVEL (MWe-Net)	DAY	AVERAGE DAILY POWER LEVEL (MWe-Net)
1	0	17	1045
2	0	18	1038
3	0	19	1034
4	0	20	1032
5	0	21	1030
6	0	22	1030
7	246	23	1043
8	837	24	1020
9	802	25	1033
10	921	26	961
11	937	27	709
12	879	28	923
13	1010	29	1030
14	1023	30	1032
15	1032	31	1037
16	1036		

INSTRUCTIONS

On this format, list the average daily unit power level in MWe-Net for each day in the reporting month. Compute to the nearest whole megawatt.

(9/77)

OPERATING DATA REPORT

DOCKET NO. 50-388
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

OPERATING STATUS

1. Unit Name: Unit 2 Susquehanna Steam Electric Station
2. Reporting Period: July, 1985
3. Licensed Thermal Power (MWt): 3293
4. Nameplate Rating (Gross MWe): 1152
5. Design Electrical Rating (Net MWe): 1065
6. Maximum Dependable Capacity (Gross MWe): 1068
7. Maximum Dependable Capacity (Net MWe): 1032

Notes

8. If Changes Occur in Capacity Ratings (Items Number 3 Through 7) Since Last Report, Give Reasons:
None

9. Power Level To Which Restricted, If Any (Net MWe): None
10. Reasons For Restrictions, If Any: None

	This Month	Yr.-to-Date	Cumulative
11. Hours In Reporting Period	744	4,079	4,079
12. Number Of Hours Reactor Was Critical	610.7	3,652.3	3,652.3
13. Reactor Reserve Shutdown Hours	133.3	380.2	380.2
14. Hours Generator On-Line	593.5	3,561.5	3,561.5
15. Unit Reserve Shutdown Hours	0	0	0
16. Gross Thermal Energy Generated (MWH)	1,827,559	11,165,534	11,165,534
17. Gross Electrical Energy Generated (MWH)	590,294	3,643,126	3,643,126
18. Net Electrical Energy Generated (MWH)	567,230	3,512,499	3,512,499
19. Unit Service Factor	79.8	87.3	87.3
20. Unit Availability Factor	79.8	87.3	87.3
21. Unit Capacity Factor (Using MDC Net)	73.9	83.4	83.4
22. Unit Capacity Factor (Using DER Net)	71.6	80.9	80.9
23. Unit Forced Outage Rate	20.2	12.7	12.7

24. Shutdowns Scheduled Over Next 6 Months (Type, Date, and Duration of Each):
None

25. If Shut Down At End Of Report Period, Estimated Date of Startup: N/A
26. Units In Test Status (Prior to Commercial Operation):

	Forecast	Achieved
INITIAL CRITICALITY		
INITIAL ELECTRICITY		
COMMERCIAL OPERATION		

(9/77)

UNIT SHUTDOWNS AND POWER REDUCTIONS

REPORT MONTH July, 1985

DOCKET NO. 50-388
UNIT NAME Two
DATE 08/08/85
COMPLETED BY L.A. Kuczynski
TELEPHONE (717)542-3759

No.	Date	Type[1]	Duration (Hours)	Reason[2]	Method of Shutting Down Reactor[3]	Licensee Event Report #	System Code[4]	Component Code[5]	Cause & Corrective Action to Prevent Recurrence
11	850630	F	150.5	A	4	85-021-00	EG	TRANSF	Main generator neutral overvoltage was caused by the failure of a main transformer 'C' phase low voltage bushing. The bushing was replaced and the Unit was returned to service on July 7, 1985.
12	850727	S	0	H	5	NA	ZZ	ZZZZZZ	Power reduction for control rod pattern sequence exchange.

1
F: Forced
S: Scheduled

2
Reason:
A-Equipment Failure (Explain)
B-Maintenance or Test
C-Refueling
D-Regulatory Restriction
E-Operator Training & License Examination
F-Administrative
G-Operational Error (Explain)
H-Other (Explain)

3
Method:
1-Manual
2-Manual Scram.
3-Automatic Scram.
4-Continuation from previous month
5-Reduction
9-Other

4
Exhibit G - Instructions for Preparation of Data Entry Sheets for Licensee Event Report (LER) File (NUREG-0161)

5
Exhibit I - Same Source

(9/77)

UNIT 2

SUSQUEHANNA STEAM ELECTRIC STATION

Docket No. 50-388
Date 08/08/85
Completed By L.A. Kuczynski
Telephone (717)542-3759

Challanges to Main Steam Relief Valves

None

Changes to the Offsite Dose Calculation Manual

See attached

Major Changes to Radioactive Waste Treatment Systems

None

Attachment

July, 1985

These revised pages were made effective April 26, 1985, upon signature by the Manager-Nuclear Support. Changes have been denoted by revision bars in the right margin. These changes:

1) added basis for offgas pretreatment monitor setpoints;
2) removed indication that offgas hydrogen analyzers cause isolation at 2% H;
3) changed definition of discharge line dilution factor to reflect it being based on average LRW effluent line flow instead of maximum flow;
4) changed typographical error, p 39a "connection" correction;
5) updated REMP map; and
6) added description of basis for NSI-4.6 dose factors.

PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
OFFSITE DOSE CALCULATION MANUAL

Prepared By J.E. Wichner Date 4/26/85

Reviewed By K.E. Stark Date 4/26/85

PORC Review Required Yes ( ) No (✓) Date

Approved By [signature] Date 4/26/85
Manager-Nuclear Support

CONTROLLED

TABLE OF CONTENTS

APR 26 1985

APR 28 '85

CONTROLLED

LIST OF TABLES

LIST OF FIGURES

For the noble gas setpoint, the calculated whole body and skin dose rates via the plume pathway are subject to the 10CFR20-derived limits of 500 and 3000 mrem/yr, respectively. The whole body dose rate limit is usually most restrictive. For particulates and for iodine-131, the maximum calculated organ dose via the inhalation pathway is subject to the limit of 1500 mrem/yr.

4. The limiting release rates are converted to limiting vent concentrations using high limit vent flow rates.

Limiting Vent Concentration, uCi/cc =

$$\frac{\text{(Limiting Release Rate, Ci/yr) (10E6uCi/Ci)}}{\text{(5.26E5 min/yr) (Vent Flow Rate, cc/min)}}$$

Sample calculations of liquid and gaseous effluent monitor setpoints are presented in Appendix A.

Vent flow rates and sample flow rates are monitored and recorded for each of the five SSES release points. The measured flow rates are used to calculate vent concentrations and release rates. Flow channel setpoints are set at 10% and 90% of the calibrated sensor ranges to provide indication of possibly abnormal flow rates.

The main condenser offgas pre-treatment monitor provides indication of offgas activity prior to input to the holdup system. Alarm setpoints are based on two times and three times the steady state full power offgas activity readings.

APR 26 1985

SPECIFICATION 3.11.2.6 - THE CONCENTRATION OF HYDROGEN OR OXYGEN IN THE MAIN CONDENSER OFFGAS TREATMENT SYSTEM SHALL BE LIMITED TO LESS THAN OR EQUAL TO 4% BY VOLUME.

Hydrogen recombiners are used at SSES to maintain the relative concentration of components of potentially explosive gas mixtures outside the explosive envelope. The main condenser offgas treatment system explosive gas monitoring system (offgas hydrogen analyzers) have setpoints to alarm at 1% and 2% hydrogen.

C_i = the average concentration of radionuclide (i) in undiluted liquid effluent during time period, Δt, for any liquid effluent batch release (μCi/ml).

F = the discharge line dilution factor for C_i during any liquid effluent batch release. Defined as the ratio of the average undiluted liquid radwaste effluent line flow during release to the average flow from the plant discharge line to unrestricted receiving waters.

$A_{i\tau}$ = the composite dose parameter for the total body or any organ (τ) for each identified principal gamma and beta emitter (i) (mrem/hr per μCi/ml) (see Equation 11, Table 5).

$$A_{i\tau} = K_o \left(U_w/D_w + U_f\ BF_i\right) DF_{i\tau} \qquad (11)$$

where:

k_o = conversion factor of $1.1 \times 10^5 = \frac{(10^6\ pCi/\mu Ci)(10^3 ml/kg)}{8760\ hr/yr}$

U_w = a receptor person's water consumption by age group from Regulatory Guide 1.109, Table E-5.

D_w = the dilution factor from the near field area of the release point to potable water intake. (The nearest potable water intake is located at Danville; dilution factor is 321.)

U_f = a receptor person's fish consumption by age group from Regulatory Guide 1.109, Table E-5.

BF_i = the bioaccumulation factor for nuclide (i) in fish (pCi/kg per pCi/l) from Regulatory Guide 1.109, Table A-1.

$DF_{i\tau}$ = the dose conversion factor for nuclide (i) in a receptor person for pre-selected organ (τ) (mrem/pCi) from Regulatory Guide 1.109, Tables E-11, E-12, E-13, and E-14.

The projected quarterly dose contribution from batch releases for which radionuclide concentrations are determined by periodic composite sample analysis, as stated in Table 4.11.1.1.1-1 of the SSES Technical Specification may be approximated by assuming an average concentration based on the previous monthly or quarterly composite analysis.

9.2 MONITORING PROGRAM

SPECIFICATION 3.12.1 - THE RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SHALL BE CONDUCTED AS SPECIFIED IN TABLE 3.12.1-1.

Environmental samples shall be collected and analyzed according to Table 7 at locations shown in Figures 6 and 7. Analytical techniques used shall ensure that the detection capabilities in Table 8 are achieved.

A dust loading study (RMC-TR-81-01) was conducted to assure that the proper transmission factor was used in calculating gross beta activity of air particulate samples. This study concluded that the sample collection frequency of once per week was sufficient and that the use of 1 for the transmission correction factor for gross beta analysis of air particulate samples is valid.

The charcoal sampler cartridges used in the airborne radioiodine sampling program (Science Applications, Inc., Model CP-100) are designed and tested by the manufacturer to assure a high quality of radioiodine capture. A certificate from the manufacturer is supplied and retained with each batch of cartridges certifying the percent retention of radioiodine versus air flow rate through the cartridge.

The results of the radiological environmental monitoring program are intended to supplement the results of the radiological effluent monitoring by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. Thus, the specified environmental monitoring program provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of individuals resulting from station operation. The initial radiological environmental monitoring program will

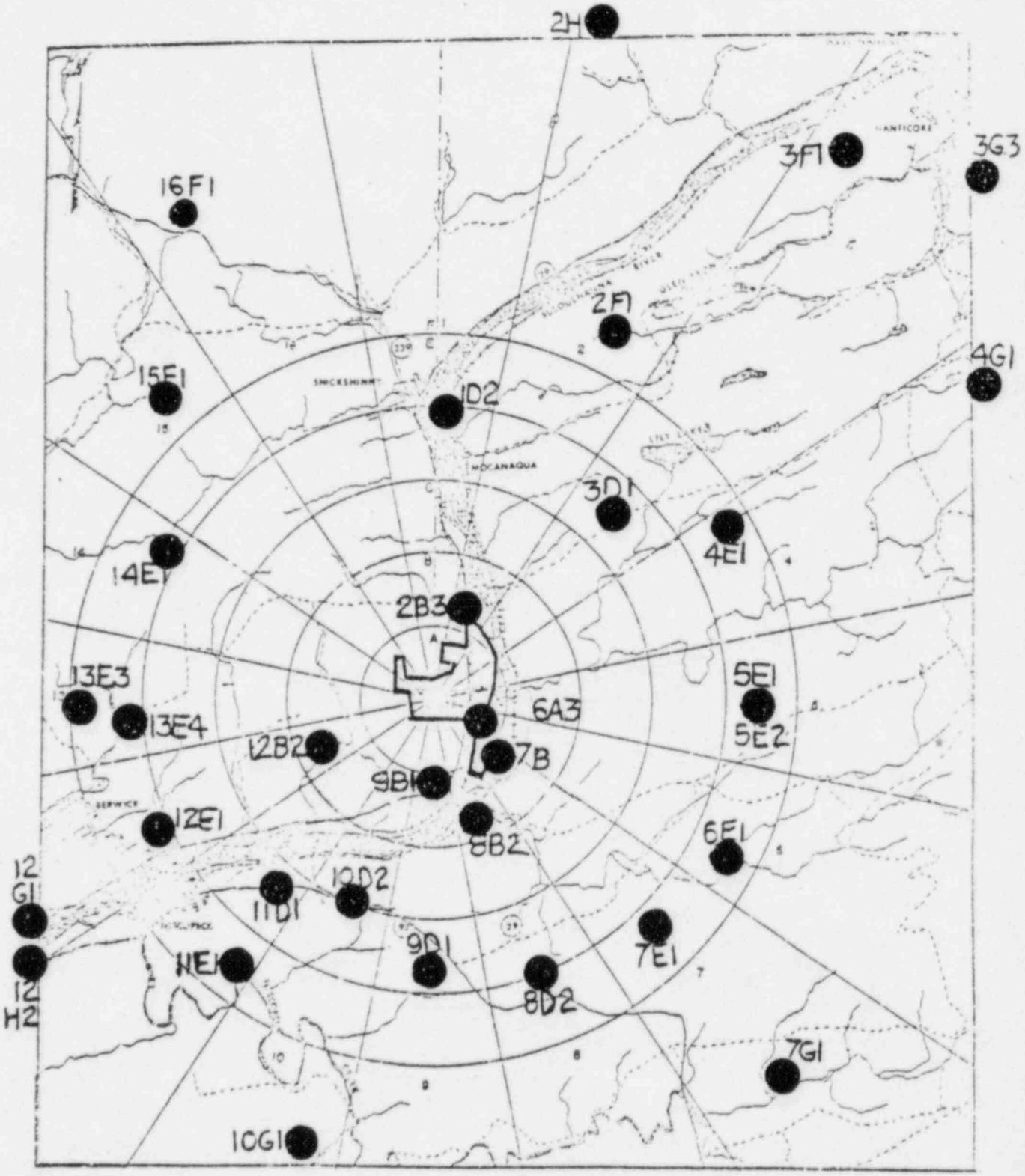

Figure 7. Offsite Environmental Sampling Locations - Susquehanna SES

APP

APPENDIX E

METHODS USED TO GENERATE NSI-4.6 DOSE RATE CALCULATION WORKSHEETS

I. BASED ON VENT MONITOR NOBLE GAS DATA (Form NSI-4.6A)

A. WHOLE BODY DOSE RATE

Equation 7 of the ODCM states that the whole body dose rate to unrestricted areas due to gaseous effluents is calculated as follows:

$$D_{wb} = \sum_i (K_i)(X/Q)_v \ (Q'_{iv})$$

where:

D_{wb} = the annual whole body dose rate (mrem/yr).

K_i = the whole body rate conversion dose factor due to gamma emissions for each identified noble gas radionuclide (i) (mrem/yr per uCi/m^3) from Table 2 of the ODCM.

Q'_{iv} = the release rate of radionuclide (i) from vent (v) (uCi/sec).

$(X/Q)_v$ = the highest calculated annual average relative concentration for any area at or beyond the site boundary in an unrestricted area from vent release point (v) (sec/m^3).

The whole body dose rate conversion constant of Form NSI-4.6A is calculated as follows:

$$\text{WB DOSE RATE CONV. FACTOR } \left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_{wb}}{(60 \sum_i Q'_{iv})} = \sum_i (f_i)(K_i)(X/Q)(1.67E\text{-}2)$$

where:

f_i = is the fraction of the total noble gas release which nuclide (i) constitutes.

1.67E-2 = the number of minutes per second.

The whole body dose rate conversion factor (5.88E-4) of Form NSI-4.6A, Rev. 0, is based on the SSES Final Environmental Statement (FES) expected annual noble gas releases and an annual average relative concentration of 4.1E-5 sec/m^3 (ref. SSES 1982 Meteorological Summary).

B. SKIN DOSE RATE

Equation 8 of the ODCM states that the skin dose rate to unrestricted areas due to gaseous effluents is calculated as follows:

$$D_s = \sum_i (L_i + 1.1\ M_i)\ (X/Q)_v\ (Q'_{iv})$$

where:

D_s = the annual skin dose rate (mrem/yr).

L_i = the skin dose rate conversion factor due to the beta emissions for each identified noble gas radionuclide (i) (mrem/yr per uCi/m^3) from Table 2 of the ODCM.

M_i = the air dose factor due to gamma emissions for each identified noble gas radionuclide (i) (mrad/yr per uCi/m^3) from Table 2 of the ODCM (conversion constant of 1.1 converts air dose (mrad) to skin dose (mrem).

The skin dose rate conversion constant of Form NSI-4.6A is calculated as follows:

$$\text{SKIN DOSE RATE CONV. FACTOR } \left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_s}{(60 \sum_i Q'_{iv})} = \sum_i (f_i)(L_i + 1.1M_i)(X/Q)(1.67E\text{-}2)$$

The skin dose rate conversion factor (1.16E-3) of Form NSI-4.6A, Rev. 0, is based on the SSES-FES expected annual noble gas releases and an annual average relative concentration of 4.1E-5 sec/m^3.

II. BASED ON VENT MONITOR DATA OTHER THAN NOBLE GASES

Equation 9 of the ODCM states that the dose rate from inhalation of radionuclides other than noble gases is calculated as follows:

$$D_c = \sum_i (P_i)\ (W_v)\ (Q'_{iv})$$

where:

D_c = the annual organ dose rate (mrem/yr).

P_i = the dose parameter for radionuclides other than noble gases for the inhalation pathway (mrem/yr per uCi/m^3).

W_v = the highest annual average dispersion parameter for estimating the dose to the critical receptor (relative concentration (X/Q, sec/m^3) for the inhalation pathway).

Q'_{iv} = the release rate of radionuclide (i) from vent (v) (uCi/sec).

The organ dose rate conversion factors for particulates and I-131 of Form NSI-4.6C are calculated as follows:

$$\text{ORGAN DOSE RATE CONV. FACTOR}\left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_c}{(60\sum_i Q'_{iv})} = \sum_i (f_i)(P_i)(W_v)(1.67E\text{-}2)$$

where:

f_i = the fraction of the total particulate release which nuclide (i) constitutes (equals 1 for I-131 dose rate conversion factor).

The organ dose rate conversion factors of Form NSI-4.6C (1.94 for particulates and 10.64 for I-131) are based on SSES-FES expected releases and an annual average relative concentration of 4.1E-5 sec/m^3.

III. BASED ON NOBLE GAS LABORATORY ANALYSIS

The whole body dose rate conversion constants of Form NSI-4.6B (Column M) are calculated as follows for each nuclide:

$$\text{WB DOSE RATE CONV. FACTOR}_i\left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_{wbi}}{60\ Q'_{iv}} = (K_i)(X/Q)(1.67E\text{-}2)$$

The skin dose rate conversion constants of Form NSI-4.6B (Column P) are calculated as follows for each nuclide:

$$\text{SKIN DOSE RATE CONV. FACTOR}_i\left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_{si}}{60\ Q'_{iv}} = (L_i + 1.1M_i)(X/Q)(1.67E\text{-}2)$$

An annual average relative concentration value of 4.1E-5 sec/m^3 was used for calculation of the constants on Form NSI-4.6B, Rev. 0.

IV. BASED ON LABORATORY ANALYSIS FOR NON-NOBLE GASES

The organ dose rate conversion constants of Form NSI-4.6D (Column BB) are calculated as follows for each nuclide:

$$\text{ORGAN DOSE RATE CONV. FACTOR}_i\left(\frac{\text{mrem/yr}}{\text{uCi/min}}\right) = \frac{D_{ci}}{60\ Q'_{iv}} = (P_i)(W_v)(1.67E\text{-}2)$$

An annual average relative concentration value of 4.1E-5 sec/m^3 was used for calculation of the constants on Form NSI-4.6D, Rev. 0.

Because different radionuclides result in maximum dose commitments to different age groups and/or organs, the methodology of Forms NSI-4.6C and D is conservative because dose rate contributions from nuclides to differing organs are summed and compared to the dose rate limit which is applicable to any one organ. If an apparent noncompliance is calculated by this method, then for each age group, an organ dose from each radionuclide should be calculated to determine if an actual noncompliance exists.

APR 25 [illegible]

2.

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

Harold W. Keiser
Vice President-Nuclear Operations
215/770-7502

AUG 12 1985

Director, Data Automation &
Management Information Division
Attention: Mr. M. R. Beebe
Management Information Branch
Office of Resource Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
MONTHLY OPERATING REPORTS
ER 100450 FILE 841
PLA-2516

Docket Nos. 50-387/NPF-14
50-388/NPF-22

Dear Mr. Beebe:

The July 1985 monthly operating reports for Susquehanna SES Units 1 and 2 are attached.

Very truly yours,

H. W. Keiser
Vice President-Nuclear Operations

Attachment

cc: Dr. Thomas E. Murley
Regional Administrator-Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attn: Document Control Desk (12 copies)

Mr. R. H. Jacobs - NRC
Ms. M. J. Campagnone - NRC

IE24
1/1