



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038

Nuclear Department

August 24, 1983

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

Dear Dr. Murley:

INSPECTION REPORT NO. 50-272/82-28
NO. 1 UNIT
SALEM GENERATING STATION
SEPTEMBER 3, 1982

In Inspection Report No. 50-272/82-28 a violation on the reporting of gaseous radioactive effluents was found. In our response to the Notice of Violation, dated February 4, 1983, and in a subsequent letter dated March 4, 1983, we indicated that we would review all Radioactive Effluent Release Reports (RERRs) from 1976 and revise them to reflect our best estimate of noble gas effluents based on recent reviews. The results of this review are provided in the attachment to this letter.

In your inspection report and in your Health Physics Appraisal conducted at Salem in 1980, it was indicated that a mechanism did not exist for quantifying anomalous releases which could have occurred between routine samplings of the plant vent. In our letter to you dated February 4, 1983, we indicated that since the 1R16 Unit 1 plant vent radiation monitor setpoint was 500,000 counts per minute in the past, our staff did not consider count rates above background, but below the alarm setpoint as indicating an anomalous condition. However, we agree that lowering the setpoint of radiation monitor 1R16 to a lower value for quantifying abnormal conditions is appropriate. By applying a new setpoint of 10,000 counts per minute, abnormal discharges can be assumed to have occurred in the interim between our normal weekly and monthly grab sampling, which were not specifically referenced in our Radiological Effluent Release Reports. We have previously identified these possible discharges to you and have quantified them in our February 4, 1983, letter.

We would like to emphasize that it is our position that our previously submitted RERRs were prepared in a manner consistent with Regulatory Guide 1.21. The additional "abnormal releases," which could have occurred in the period between our normal grab

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The Energy People

Dr. Thomas E. Murley, Regional Administrator
U.S. Nuclear Regulatory Commission

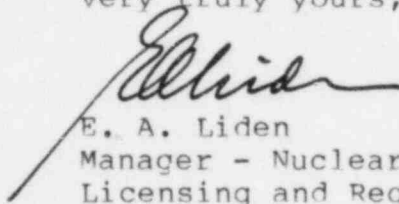
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samples, seem to indicate in some cases higher cumulative curie quantities being discharged than previously reported. We maintain, however, that the activity represented by these "abnormal releases" is an upper bound only. In re-estimating the cumulative totals, conservative relationships were used, and because the activity of the vent samples is below analytical detection limits, this upper bound is an uncertain measure of the actual release.

Should you have any questions in this regard, do not hesitate to contact us.

Very truly yours,



E. A. Liden
Manager - Nuclear
Licensing and Regulation

Attachment

CC: Mr. Donald C. Fischer
Licensing Project Manager

Mr. Leif Norrholm
Senior Resident Inspector

RE-ANALYSIS OF RADIOLOGICAL RELEASE REPORTS
(SALEM NUCLEAR GENERATING STATION)
GASEOUS RELEASES

In your Inspection Report No. 50-272/82-28 you requested that we comment on the validity of prior Radiological Effluent Release Reports (RERRs).

It was and still is our position that the methods which we used in our preparation of the RERRs were consistent with Regulatory Guide 1.21. It is our position that these reports would be inaccurate only if during the reporting period abnormal releases occurred which were not concurrently reported to the USNRC as batch releases.

Since the 1R16 channel setpoint was set at 500,000 cpm, which in the past was the ETS limit, our staff did not consider count rates above "normal levels" but below this value as an abnormal condition. By applying our new setpoint of 10,000 cpm to past data, abnormal discharges can be said to have occurred in prior years which were not included in our RERRs. We have previously identified those discharges and have quantified them for your review in our letter dated February 4, 1983. We acknowledge that our alarm setpoint value of 500,000 cpm, although below our Technical Specification limits, was set too high to provide for immediate identification and quantification of abnormal conditions.

Since actual sample data are not available for these releases, we have utilized conservative default relationships between the radiation monitor instrument responses and radioactivity concentrations to develop release estimates.

Since perturbations in RMS readings are expected to occasionally occur during routine and non-routine maintenance, inspection, and other plant activities, certain distinctions must be made concerning the treatment of elevated plant vent RMS readings. For purposes of emergency planning efforts, we have defined UNPLANNED/UNCONTROLLED releases as those releases of radioactive gases from the plant which are not expected from routine and non-routine maintenance, inspection and other plant activities. The plant vent noble gas monitors (1R16, 2R16, 1R41C, 2R41C) will be used to quantify abnormalities in conjunction with reliable sample data if they are available. For emergency planning notification purposes, an UNPLANNED OR UNCONTROLLED RELEASE will be defined as any release in excess of 25 percent of our Technical Specification limits. Before this instantaneous limit is reached, PSE&G investigates increases of the RMS vent monitors whenever levels exceed 500 uCi/sec. (less than one percent of our Technical Specification limits). We have defined this condition as an INVESTIGATION LEVEL.

When this level is attained, investigation is required to determine the cause of the "upscale" meter response and quantification of release is required if there is any reason to believe that the meter response is actually based on the presence of increased radioactivity in the plant vent. The increased level of radioactivity may be related to routine activities or may be indicative of a developing problem. In any case, investigation includes obtaining a plant vent grab sample and noble gas grab samples within the plant if this is practical.

Utilization of this technique permits the quantification of any releases which may have occurred in between routine plant vent sampling periods for noble gases discharged to the environs.

We have described an overview of the quantification methods which we use in Figure 1. Quantification of radioactive gases from the Salem Station falls within one of the four categories listed below:

- a. Discharging of Waste Gas Decay Tanks
- b. Containment Purges
- c. Continuous Releases from the Plant Vent (Grab Samples)
- d. Elevated Plant Vent Radiation Monitoring System Readings

A review of each effluent release report is provided in the next section.

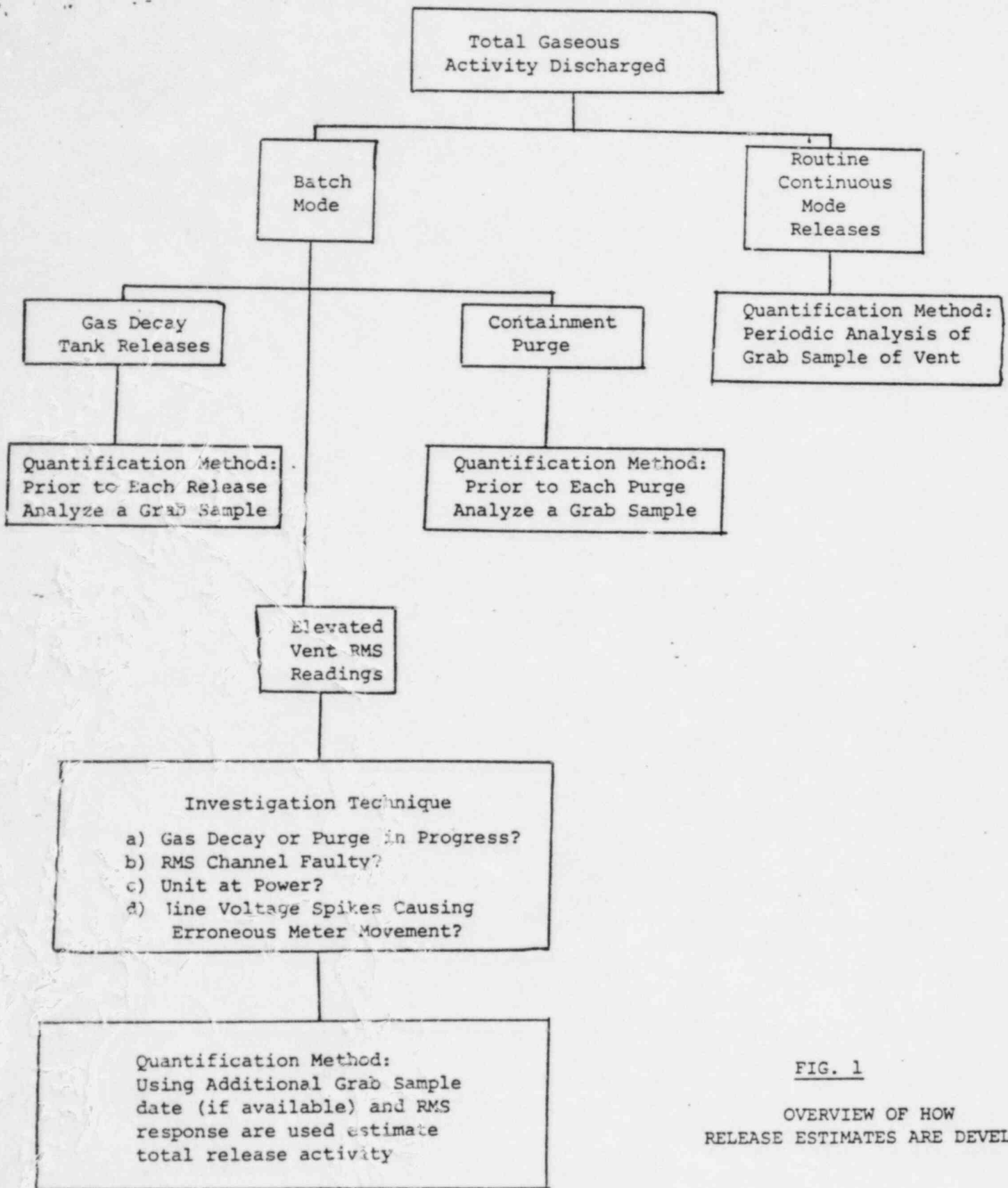


FIG. 1

OVERVIEW OF HOW
RELEASE ESTIMATES ARE DEVELOPED

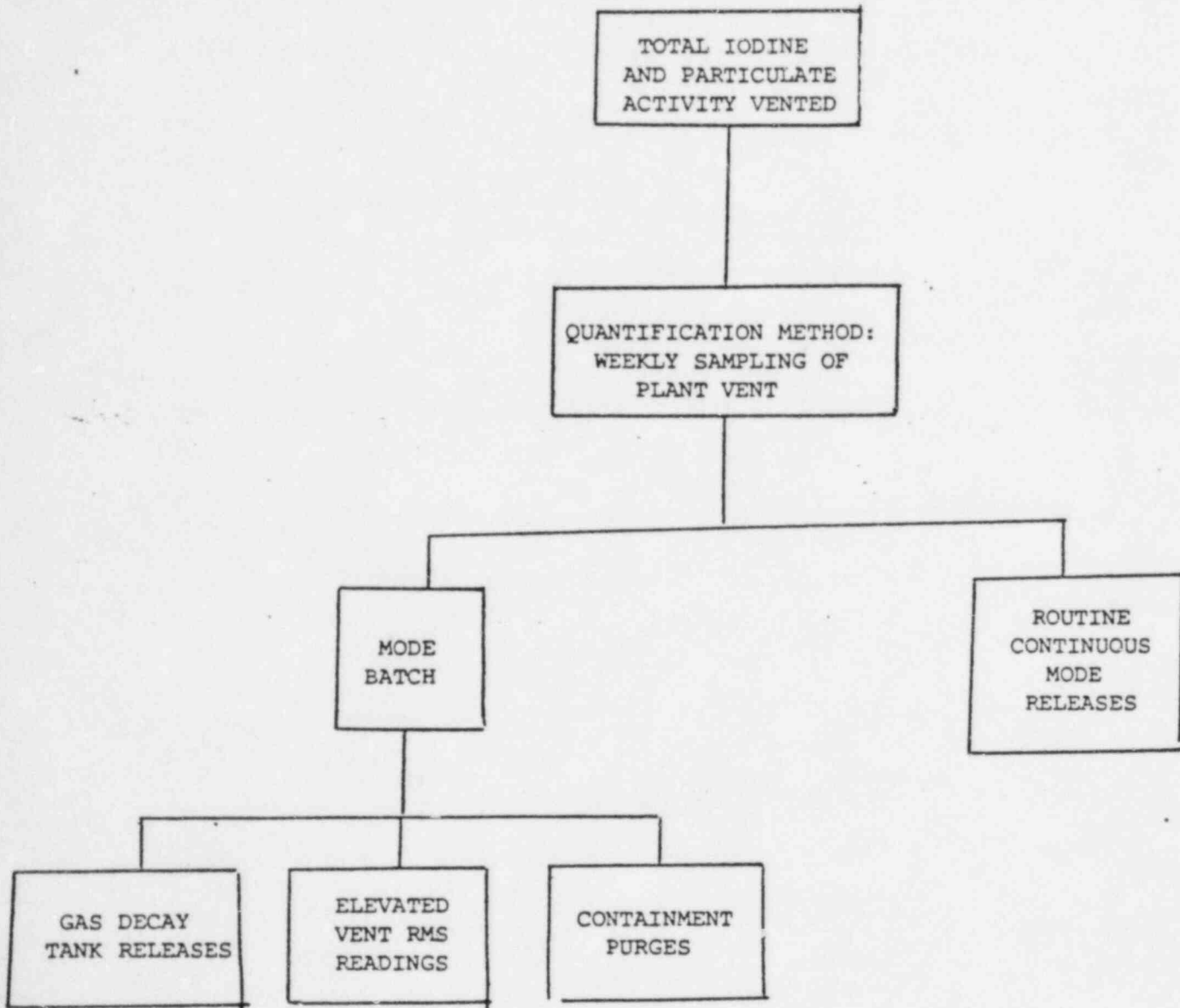


FIG. 1 (Cont'd)

OVERVIEW OF HOW
RELEASE ESTIMATES ARE DEVELOPED

ERROR ASSOCIATED WITH CUMULATIVE CURIE ESTIMATES FROM
VENTILATION SYSTEMS EFFLUENT BASED
UPON MONTHLY GRAB SAMPLING

All samples of the plant vent are analyzed by PSE&G for compliance with the requirements of Table 2.3-2 of the Salem Environmental Technical Specifications. The Salem Environmental Technical Specifications require that all monthly gas samples be analyzed such that a concentration of 10^{-4} uCi/cc (or lower if readily achievable) be detectable. All of the vent samples analyzed by PSE&G met this requirement. The minimum detection limit of 10^{-4} uCi/cc developed by the USNRC is based upon technical feasibility and upon the potential for significant environmental impact. In general, most of the routine monthly vent gas grab samples collected by PSE&G contained less than 1×10^{-6} uCi/cc of noble gas activity.

In developing estimates of the routine activity being vented from the Salem Station, the results of the routine monthly vent grab samples were multiplied by the volume of effluent vented from the respective nuclear unit. If the assay of the plant vent grab samples indicated that the sample was less than the lower limit of detection (LLD) of the analytical technique, PSE&G did not assume that the activity in the vent was numerically equal to the LLD value. In the past, if noble gas activity was detected on either the weekly particulate or iodine continuous sampler devices, then PSE&G included this activity in our reports.

Using the detection threshold value, it can be shown that release estimates would be a small fraction of Technical Specification limits if it is assumed that the average vent flow is 70,000 cfm and the LLD for noble gas analysis is 1×10^{-6} uCi/cc.

In our response to the USNRC letter dated February 19, 1976. concerning compliance with 10CFR 50, App. I, PSE&G indicated that approximately 1200 curies/yr of noble gases would be discharged from our station through routine Reactor and Auxiliary Building Ventilation System operation.

It can be demonstrated that if 1200 curies/yr are discharged uniformly over a calendar year, it would correspond to a concentration of approximately 1×10^{-6} uCi/cc if the average ventilation system flow rate was 70,000 cfm. Grab sample "snap shots" of the plant vent would not discern this activity if the LLD was 1×10^{-6} uCi/cc.

1976

(We revised RERR-1 to reflect the elevated I-R16 channel response of December 16, 1976 which occurred while the reactor was critical but at zero power level.)

TABLE 1A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1976)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

REV. 1

RERR-1

	Unit	Quarter 3	Quarter 4	Est. Total Error %
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A. Fission & activation gases

1. Total release	Ci		7.61E-01	10%
2. Average release rate for period	μ Ci/sec.		9.57E-02	
3. Percent of Technical specification limit (See sets Spec. 2.3.3.2)	%		1.62E-04	

B. Iodines

1. Total iodine-131	Ci		(1)	
2. Average release rate for period	μ Ci/sec.			
3. Percent of technical specification limit	%			

C. Particulates

1. Particulates with half-lives \geq 8 days	Ci		(2)	
2. Average release rate for period	μ Ci/sec.			
3. Percent of technical specification limit	%			
4. Gross alpha radioactivity	Ci			

D. Tritium

1. Total release	Ci		1.46 E-5	10%
2. Average release rate for period	μ Ci/sec.		2.56 E-4 (3)	
3. Percent of technical specification	%		(4)	

- (1) No detectable levels of iodine 131 were present in releases for the period from December 11, 1976 to December 31, 1976. The detectable level for I 131 was approximately $2.54 \text{ E-}14 \text{ uCi/ml}$ during this period.
- (2) No detectable levels of particulate matter with half lives \geq 8 days were present in releases for the period of record (Dec. 11, 1976 to Dec. 31, 1976) The lower limit of detection for the principal gamma emitting particulate was $2.25 \text{ E-}9 \text{ uCi/ml}$ for CO-60.
- (3) Calculated during Batch Release only.
- (4) No Technical Specification Limits.

TABLE 1B

REV. 1

RERR-1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1976)

GASEOUS EFFLUENTS-ELEVATED RELEASE

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
1. Fission gases ¹					
Krypton-85	Ci				
Krypton-85m	Ci				
Krypton-87	Ci				
Krypton-88	Ci				
Xenon-133	Ci				8.90 E-5
Xenon-135	Ci				
Xenon-135M	Ci				
Xenon-138	Ci				
Others (specify)	Ci				
	Ci				
	Ci				
Unidentified	Ci				7.61E-01
Total for period	Ci				7.61E-01
2. Iodines ²					
Iodine-131	Ci				
Iodine-133	Ci				
Iodine-135	Ci				
Total for period					
3. Particles					
Strontium-89	Ci				
Strontium-90	Ci				
Cesium-134	Ci				
Cesium-137	Ci				
Barium-lanthanum-140	Ci				
Others (specify)	Ci				
	Ci				
	Ci				
Unidentified	Ci				
4. Tritium					
	Ci				1.46 E-5

- Other than Xe 133 all fission gases were below detectable activity (Approximately less than 6.67 E-7 uCi/ml).
- Weekly sampling of the plant vent has indicated that there is no detectable Iodine activity (Approximately less than $2.54 \cdot 10^{-14} \text{ uCi/ml}$ for I-131).

E RADIOLOGICAL IMPACT ON MAN

The calculated doses in this section pertain to those received in unrestricted areas.

LIQUID PATHWAYS

Doses to individuals in the population resulting from liquid pathways will be provided at a later date, as sample analysis has not been fully completed. These doses will be relatively insignificant as the only liquid pathway is the ingestion of seafood. The low-level liquid releases coupled with the small seafood harvest during the month of December will result in a minimal impact.

AIR PATHWAY

The individual and population doses resulting from the release of radioiodines and particulates will be inconsequential as there was no iodine or particulates present in any of the samples taken for this period of record.

There were only two isotopes identified as a result of gaseous samples taken during this reporting period. These isotopes, Xe-133 and E-3, were identified as a result of sample analysis. The resulting maximum, unrestricted area, whole body and skin doses were calculated to be $1.53E-05$ mrem and $4.34E-05$ mrem respectively. The highest dose to any organ dose from radioactive iodines and particulates was not calculated due to their absence in sample analysis. The calculated population whole body dose was $2.57E-07$ man-rem. The average total body dose to the population within 50 miles of the site was $5.30E-08$ mrem.

The doses were calculated using methods described in Regulatory Guide 1.109.

DIRECT RADIATION

The direct radiation, resulting from station operation, is considered to be zero due to the short operating period and low-level operations for this period of record.

1977

(It was not necessary to change RERR-2.
We revised RERR-3 using the estimates
previously supplied to you in our
February 4, 1983 memo.)

Part E. Radiological Impact on Man

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on the projected 1980 population and site specific data i.e., food production, milk production, feed for milch animals and seafood production, gathered during 1976.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The maximum total body dose to an individual was calculated to be $3.65E-3$ mrem. The calculated population total body dose was $5.58E-2$ man-rem. The average total body dose to the population within fifty miles of the site was $1.04E-2$ mrem. The highest organ dose from liquid releases was $2.62E-2$ mrem to the gastrointestinal tract.

Air Pathways

The resulting maximum whole body and skin doses to an individual were calculated to be $1.67E-01$ mrem and $1.67E-01$ mrem respectively. The calculated population total body dose was $1.72E-01$ man-rem. The average total body dose to the population within fifty miles of the site was $3.21E-05$ mrem/person.

Direct Radiation

Direct radiation may be estimated by TLD measurements. One method for comparing TLD measurements is by comparison with preoperational data. Direct radiation measurements of on site locations averaged only 4.77 mrem/month. This value is not statistically different from the preoperational value of 4.42 mrem/month.

Maximum Organ Doses

The maximum organ doses from radioactive iodines and particulates was $5.39E-6$ mrem to the thyroid.

Part F. Meteorological Data

Cumulative joint wind frequency distribution by atmospheric stability class are provided for the third and fourth quarters of 1977 as Table 5 and 6. Tables 7 and 8 provide joint wind frequencies during batch releases.

TABLE 1A
EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1977)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

REV. 1

RERR-3

	Unit	3rd Quarter	4th Quarter	Est. Total(2) Error %
A. Fission & activation gases				
1. Total release	Ci	2.06E+00	4.35E+01	5.00E+01
2. Average release rate for period	uCi/sec.	1.30E-01	5.47E+00	
3. Percent of technical specification limit	%	2.20E-06	9.24E-03	
(See ETS Spec. 2.3.3.b) (1)				
B. Iodines				
1. Total iodine-131	Ci	-	-	
2. Average release rate for period	uCi/sec.			
3. Percent of technical specification limit	%			
C. Particulates				
1. Particulates with half-lives 8 days	Ci	3.91E-10	-	5.00E+01
2. Average release rate for period	uCi/sec.	2.46E-11	-	
3. Percent of technical specification limit	%	1.89E-10	-	
4. Gross alpha radioactivity	Ci	LLD	LLD	
D. Tritium				
1. Total release	Ci	9.07E-01	5.02E+01	5.00E+01
2. Average release rate for period	uCi/sec.	5.80E-02	3.16E+00	
3. Percent of technical specification limit	%	N/A	N/A	

(1) No detectable levels of iodine 131 were present in releases for the period from July - December 1977.

(2) For batch releases the estimated overall error is within 10%.

EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1977)
 GASEOUS EFFLUENTS-ELEVATED RELEASES

REV. 1
 RERR-3

CONTINUOUS MODE BATCH MODE

Unit 3rd Quarter 4th Quarter 3rd Quarter 4th Quarter

Nuclides Released

1. Fission gases (1)

Krypton-85	Cl			5.70E-03	3.14E-04
Krypton-85m	Cl			1.00E-03	
Krypton-87	Cl			4.92E-03	
Krypton-88	Cl			1.85E+00	1.40E-01
Xenon-133	Cl			1.90E-01	1.60E-02
Xenon-135	Cl				
Xenon-135M	Cl				
Xenon-138	Cl				
Others (specify) xel33m	Cl			3.51E-03	2.28E-03
Argon-41	Cl			9.67E-03	
Fluorine-18	Cl				4.33E+01
Unidentified	Cl			2.06E+00	4.35E+01
Total for period	Cl				

2. Iodines (2)

Iodine-131	Cl				
Iodine-133	Cl				
Iodine-135	Cl				
Total for period				LLD	LLD

3. Particles

Strontium-89	Cl				
Strontium-90	Cl			3.91E-10	
Cesium-134	Cl				
Cesium-137	Cl				
Barium-Lanthanum-140	Cl				
Others (specify)	Cl				
Rubidium 88	Cl			5.34E-04	
Unidentified Gross Alpha	Cl				

- 1978

(We changed RERR-4 using the estimates previously supplied to you in our February 4, 1983 memo. It was not necessary to change RERR-5.)

Part E. Radiological Impact on Man

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on the projected 1980 population and historical site specific data i.e., food production, milk production, feed for milch animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be $7.95E-3$ mrem. The calculated population total body dose was $3.96E-2$ man-rem. The highest organ dose from liquid releases was $2.78E-2$ mrem to the gastrointestinal tract.

Air Pathways

The resulting whole body and skin doses to an individual were calculated to be $2.49E-2$ mrem and $2.49E-2$ mrem respectively. The calculated population total body dose was $2.59E-0$ man-rem.

Direct Radiation

Direct radiation may be estimated by TLD measurements. One method for comparing TLD measurements is by comparison with preoperational data. Direct radiation measurements of on site locations averaged only 4.46 mrem/month. This value is not statistically different from the preoperational value of 4.42 mrem/month.

Maximum Organ Doses

The maximum organ doses from radioactive iodines and particulates was $2.85E-2$ mrem to the GI-Tract.

Part F. Meteorological Data

Cumulative joint wind frequency distribution by atmospheric stability class are provided for the first and second quarters of 1977 as Table 5 and 6. Tables 7 and 8 provide joint wind frequencies during batch releases.

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1978)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

REV. 1

RERR-4

	Unit	1st Quarter	2nd Quarter	Est. Total(2) Error %
A. Fission & activation gases				
1. Total release	ci	2.48E+00	3.42E+01	2.50E+01
2. Average release rate for period	uCi/sec.	3.19E-01	4.35E+00	
3. Percent of technical specification limit (See ETS Spec. 2.3.3.b)	%	5.63E-04	1.64E-02	
(1)				
B. Iodines				
1. Total iodine-131	ci	-	6.11E-05	2.50E+01
2. Average release rate for period	uCi/sec.	-	7.77E-06	
3. Percent of technical specification limit	%	-	1.51E-03	
C. Particulates				
1. Particulates with half-lives > 8 days	ci	3.12E-05	0	2.50E+01
2. Average release rate for period	uCi/sec.	4.01E-06	0	
3. Percent of technical specification limit	%	7.82E-04	0	
4. Gross alpha radioactivity	ci	4.98E-08	3.07E-06	2.50E+01
D. Tritium				
1. Total release	ci	1.29E+02	0	2.50E+01
2. Average release rate for period	uCi/sec.	1.66E+01	0	
3. Percent of technical specification limit	%	N/A	0	

(1) No detectable levels of iodine 131 were present in releases for the period from January - March 1978.

(2) For batch releases the estimated overall error is within 10%.

CONTINUOUS MODE BATCH MODE

Nuclides Released	Unit	1st Quarter		2nd Quarter	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1. Fission gases (1)					
Krypton-85	CI				
Krypton-85m	CI		1.38E-03		
Krypton-87	CI				
Krypton-88	CI				
Xenon-133	CI		1.78E+00		
Xenon-135	CI	2.96E-05	6.45E-02	4.19E-04	
Xenon-135M	CI				
Xenon-138	CI				
Xe133m	CI		2.66E-03		
Argon-41	CI		1.28E-03		
Fluorine-18	CI				
Unidentified	CI		6.21E-01	3.42E+01	
Total for period	CI		2.48E+00	3.42E+01	
2. Iodines					
Iodine-131	CI	LLD	6.11E-05	LLD	
Iodine-133	CI	LLD	6.68E-05		
Iodine-135	CI				
Total for period				LLD	
3. Particles					
Strontium-89	CI		3.09E-05		
Strontium-90	CI			2.50E-07	
Cesium-134	CI				
Cesium-137	CI				
Barium-Lanthanum-140	CI				
Others	CI				
Rubidium 88	CI				
Gross Alpha	CI	4.98E-08	1.24E-07		2.95E-06
Unidentified	CI				

1979

(It was not necessary to change RERR-6.
We changed RERR-7 using the release
estimates previously supplied to you
in our February 4, 1983 memo.)

Part E. Radiological Impact on Man

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on the projected 1980 population and historical site specific data i.e., food production, milk production, feed for milch animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Doses from batch and continuous releases were calculated using the meteorological dispersion coefficient X/Q for the period July 1 - December 31, 1979.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be $4.50E-3$ mrem. The calculated population total body dose was $1.10E-1$ person-rem. The highest organ dose from liquid releases was $2.95E-2$ mrem to the gastrointestinal tract.

Air Pathways

The resulting whole body and skin doses to an individual were calculated to be $2.32E+0$ mrem and $2.63E+0$ mrem respectively. The calculated population total body dose was $1.27E+2$ person-rem. The average total body dose to the population within fifty miles of the site was $5.00E-3$ mrem/person.

Direct Radiation

Direct radiation may be estimated by TLD measurements. One method for comparing TLD measurements is by comparison with preoperational data. TLD measurements on site near the Service Water pumps (location 11S1) and (location 10S1) near the Circulating Water pumps averaged 21.6 and 9.2 mrad/months, respectively, apparently due to trace activity in the Refueling Water Storage Tank.

TLD's at onsite locations 2S1 and 5S1 which are 0.3 miles and 0.9 miles from the reactor containment averaged 5.82 and 4.44 mrad/month respectively. These values are within the statistical variation associated with the preoperation program results which were 4.57 ± 2.00 and 3.91 ± 0.62 mrad/month for stations 2S1 and 5S1, respectively.

TABLE 1A
 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1979)
 GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

REV. 1

RERR-7

	Unit	3rd Quarter	4th Quarter	Est.Total(1) Error %
A. Fission & activation gases				
1. Total release	Ci	1.31E+03	2.46E+02	2.50E+01
2. Average release rate for period	uCi/sec.	1.65E+02	3.09E+01	
3. Percent of technical specification limit (See ETS Spec. 2.3.3.b)	%	2.79E-01	5.23E-02	
B. Iodines (2)				
1. Total iodine-131	Ci			
2. Average release rate for period	uCi/sec.			
3. Percent of technical specification limit	%			
C. Particulates				
1. Particulates with half-lives > 8 days	Ci		7.57E-04	2.50E+01
2. Average release rate for period	uCi/sec.		9.63E-05	
3. Percent of technical specification limit	%		1.88E-02	
4. Gross alpha radioactivity	Ci			
D. Tritium				
1. Total release	Ci		2.40E-03	2.50E+01
2. Average release rate for period	uCi/sec.		3.05E-04	
3. Percent of technical specification limit	%		N/A	

(1) For batch releases the estimated overall error is within 10%

(2) Iodine was below the minimal detection limit.

EFFLUENT AND WASTE DISPOSAL, SEMIANNUAL REPORT (1979)
 GASEOUS EFFLUENTS-ELEVATED RELEASES

REV. 1
 RERR-7

TABLE 1B

CONTINUOUS MODE DATCII MODE

Nuclides Released	Unit	CONTINUOUS MODE		DATCII MODE	
		3rd Quarter	4th Quarter	3rd Quarter	4th Quarter
1. Fission gases (1)					
Krypton-85	CI				
Krypton-85m	CI				
Krypton-87	CI				
Krypton-88	CI				
Xenon-133	CI				1.04E-01
Xenon-135	CI				
Xenon-135m	CI				
Xenon-138	CI				
Xenon-133m	CI				
Argon-41	CI				
Fluorine-18	CI				
Unidentified	CI			1.86E+02	
Total for period	CI			1.86E+02	1.04E-01
2. Iodines (2)					
Iodine-131	CI				
Iodine-133	CI				
Iodine-135	CI				
Total for period	CI				
3. Particulates					
Strontium-89	CI				
Strontium-90	CI				
Cesium-134	CI				
Cesium-137	CI				
Barium-Lanthanum-140	CI				
Cobalt-60	CI				7.57E-04
Rubidium-88	CI				
Gross Alpha	CI				
Cobalt-58	CI				
Total For Period	CI				7.57E-04

(2) Iodine was below the minimal detection limit.

1980

(It was not necessary to amend RERR-9.
We amended RERR-8 using the release
estimates previously supplied to you.)

Part E. Radiological Impact on Man

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on the projected 1980 population and historical site specific data i.e., food production, milk production, feed for milch animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Doses from batch and continuous releases were calculated using the meteorological dispersion coefficient X/Q for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be $2.69E-3$ mrem. The calculated population total body dose was $1.26E-2$ person-rem. The highest organ dose from liquid releases was $7.79E-3$ mrem to the gastrointestinal tract.

Air Pathways

The resulting whole body and skin doses to an individual were calculated to be $2.84E-2$ mrem and $2.59E-2$ mrem respectively. The calculated population total body dose was $3.13E-0$ person-rem. The average total body dose to the population within fifty miles of the site was $6.78E-4$ mrem/person.

Direct Radiation

Direct radiation may be estimated by TLD measurements. One method for comparing TLD measurements is by comparison with preoperational data. TLD measurements on site near the Service Water pumps (location 11S1) and near the Circulating Water pumps (location 10S1) averaged 18.3 and 9.1 mrad/months, respectively, apparently due to trace activity in the Refueling Water Storage Tank.

TLD's at onsite locations 2S1 and 5S1 which are 0.3 miles and 0.9 miles from the reactor containment, averaged 5.73 and 4.75 mrad/month respectively. The values for station 2S1 are within the statistical variation associated with the preoperation program results which was 4.57 ± 2.00 . Values at onsite location 5S1 were slightly higher than preoperation value of 3.91 ± 0.62 .

TABLE 1A
 EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1980)
 GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

REV. 1
 RERR-8

	Unit	1st Quarter	2nd Quarter	Est.Total(1) Error %
A. Fission & Activation Gases				
1. Total release	Ci	9.27E+00	3.96E+01	2.50E+01
2. Average release rate for period	uCi/sec.	1.18E+00	5.04E+00	
3. Percent of technical specification limit (See ETS Spec. 2.3.3.b)	%	2.23E-03	9.51E-03	
B. Iodines				
1. Total iodine-131	Ci	4.50E-09	8.39E-05	2.50E+01
2. Average release rate for period	uCi/sec.	5.73E-10	1.07E-05	
3. Percent of technical specification limit	%	1.08E-12	2.02E-08	
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.65E-04	1.18E-03	2.50E+01
2. Average release rate for period	uCi/sec.	2.10E-05	1.50E-04	
3. Percent of technical specification limit	%	4.09E-03	2.92E-02	
4. Gross alpha radioactivity (2)	Ci	-	-	
D. Tritium				
1. Total release	Ci	1.46E-05	7.01E-3	2.50E+01
2. Average release rate for period	uCi/sec.	1.86E-06	8.92E-04	
3. Percent of technical specification limit	%	N/A	N/A	

(1) For batch releases the estimated overall error is within 10%.
 (2) Analyses indicate no measurable alpha emitting transuranics.

EFFLUENT AND WASTE DISPOSAL, SEMIANNUAL REPORT (1980)
 GASEOUS EFFLUENTS-ELEVATED RELEASES

REV. 1
 RERR-8

TABLE 1B

CONTINUOUS MODE BATCH MODE

Nuclides Released	Unit	1st Quarter		2nd Quarter	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1. Fission gases (1)					
Krypton-85	Ci			1.81E-02	
Krypton-85m	Ci			4.87E-02	
Krypton-87	Ci			9.60E-03	
Krypton-80	Ci			4.09E-02	
Xenon-133	Ci	5.41E-01	3.31E-04	6.05E+00	4.50E-02
Xenon-135	Ci	1.33E-07	5.17E-07	5.55E-01	
Xenon-135m	Ci			1.30E-02	
Xenon-138	Ci				
Xenon-133m	Ci			1.00E-01	4.28E-04
Argon-41	Ci				
Fluorine-18	Ci				
Unidentified	Ci			1.35E+00	3.96E+01
Total for period	Ci	5.41E-01	3.32E-04	8.19E+00	3.96E+01
2. Iodines (2)					
Iodine-131	Ci	4.50E-09	6.56E-05		1.83E-05
Iodine-133	Ci	1.43E-09	3.48E-08		
Iodine-135	Ci				2.79E-04
Total for period	Ci	5.93E-09	6.56E-05		2.97E-04
3. Particulates					
Strontium-89	Ci				
Strontium-90	Ci				
Cesium-134	Ci				
Yttrium-88	Ci			1.65E-04	1.39E-04
Manganese-54	Ci				
Cobalt-60	Ci				
Rubidium-88	Ci				9.52E-04
Gross Alpha	Ci				
Cobalt-58	Ci				
Total For Period	Ci			1.65E-04	1.11E-03

1981

(It was not necessary to change RERR-11.
We admended RERR-10 using the release
estimates previously supplied to you.)

Part E. Radiological Impact on Man

The calculated individual doses in this section are based on actual locations of nearby residents and farms. The population dose impact is based on historical site specific data i.e., food production, milk production, feed for milch animals and seafood production.

The doses were calculated using methods described in Regulatory Guide 1.109 and represent calculations for the six month reporting interval. Doses from batch and continuous releases were calculated using the meteorological dispersion coefficient X/Q for the six month reporting interval.

Liquid Pathways

Doses to individuals in the population from liquid releases are primarily from the seafood ingestion pathway. The total body dose to an individual was calculated to be $1.21E-02$ mrem. The calculated population total body dose was $4.64E-02$ person-rem. The highest organ dose from liquid releases was $5.59E-02$ mrem to the gastrointestinal tract.

Air Pathways

The resulting whole body and skin doses to an individual were calculated to be $2.80E-02$ mrem and $3.16E-02$ mrem respectively. The calculated population total body dose was $1.45E+00$ person-rem. The average total body dose to the population within fifty miles of the site was $2.71E-04$ mrem/person.

Direct Radiation

Direct radiation may be estimated by TLD measurements. One method for comparing TLD measurements is by comparison with preoperational data. As mentioned in previous Effluent Release Reports, TLD measurements at location 10S1 and 11S1 have averaged higher than at other locations. This was due to trace activity in the Refueling Water Storage Tank. The average of all on site TLD locations, except 10S1 and 11S1, was found to be 5.30 mrem/month. This value is within the statistical variation of the preoperational mean which was 4.42 ± 1.18 mrem/month.

TABLE 1A-1
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1981)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES
UNIT 1

REV. 1
RERR-10

	Unit	1st Quarter	2nd Quarter	Est.Total(1) Error %
A. Fission & Activation Gases				
1. Total release	Ci	2.96E+02	2.64E+02	2.50E+01
2. Average release rate for period	uCi/sec.	3.81E+01	3.36E+01	
3. Percent of technical specification limit (See ETS Spec. 2.3.3.b)	%	2.52E-01	2.23E-01	
B. Iodines				
1. Total iodine-131	Ci	8.74E-04	7.49E-03	2.50E+01
2. Average release rate for period	uCi/sec.	1.12E-04	9.53E-04	
3. Percent of technical specification limit	%	2.18E-02	1.86E-01	
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.76E-04	3.26E-01	2.50E+01
2. Average release rate for period	uCi/sec.	2.26E-05	4.15E-02	
3. Percent of technical specification limit	%	4.41E-03	8.09E+00	
4. Gross alpha radioactivity (2)	Ci	0.00E+00	0.00E+00	
D. Tritium				
1. Total release	Ci	1.07E+00	2.96E-01	
2. Average release rate for period	uCi/sec.	1.38E-01	3.76E-02	
3. Percent of technical specification limit	%	N/A	N/A	

(1) For batch releases the estimated overall error is within 10%.
(2) Analyses indicate no measurable alpha emitting transuranics.

TABLE 1B-1
 EFFLUENT AND WASTE DISPOSAL SEMI-ANNUAL REPORT (1981)
 GASEOUS EFFLUENTS-ELEVATED RELEASES
 UNIT 1
 CONTINUOUS MODE BATCH MODE

REV. 1
 RERR-10

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		1st Quarter	2nd Quarter	1st Quarter	2nd Quarter
1. Fission gases					
Krypton-85	Cl			2.30E-01	8.51E-02
Krypton-85m	Cl			5.87E-03	2.38E-02
Krypton-87	Cl				6.36E-03
Krypton-88	Cl				2.59E-02
Xenon-133	Cl	8.32E-03	3.13E-03	7.22E+01	1.03E+02
Xenon-135	Cl	8.83E-02	1.79E-02	8.85E-01	1.53E+00
Xenon-135m	Cl				
Xenon-138	Cl				
Xenon-133m	Cl			9.25E-01	6.14E-01
Argon-41	Cl				2.43E-03
Fluorine-18	Cl				3.09E-04
Unidentified	Cl			2.22E+02	1.59E+02
Total for period	Cl	9.66E-02	2.10E-02	2.96E+02	2.64E+02
2. Iodines					
Iodine-131	Cl	8.74E-04	4.30E-03		3.19E-03
Iodine-133	Cl	4.96E-04	3.04E-04		1.21E-04
Iodine-135	Cl				
Total for period	Cl	1.37E-03	4.60E-03	0.00E+00	3.31E-03