PSE&G

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October 22, 1975

Director of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

ATTENTION: B. J. Youngblood, Chief
Environmental Projects Branch 3

Gentlemen:

APPLICANT COMMENTS
PROPOSED ENVIRONMENTAL TECHNICAL SPECIFICATIONS
NO. 1 AND 2 UNITS
SALEM NUCLEAR GENERATING STATION
DOCKET NO. 50-272 AND 50-311

In reference to your letter of September 15, 1975, the attached list of comments and proposed changes are hereby transmitted for your information and use.

Sincerely yours,

R. L. Mittl
General Manager - Projects
Engineering and Construction Department

12642

The Energy People

COMMENTS ON PROPOSED ENVIRONMENTAL TECHNICAL SPECIFICATIONS
NO. 1 AND 2 UNITS
SALEM NUCLEAR GENERATING STATION
OCTOBER 22, 1975

1.0 DEFINITIONS, ABBREVIATIONS AND NOTES

The below listed definitions should be revised as indicated to more accurately reflect the design of the Salem Station:

"7. CONDENSER OUTLET TEMPERATURE

The average condenser outlet circulating water temperature of those condenser sections in service measured as per DISCHARGE TEMPERATURE."

"8. CONDENSER SHELL

A single heat exchanger in the Circulating Water System which includes two inlet and outlet water boxes and two tube bundles."

"10. DISCHARGE TEMPERATURE

The average temperature of the six 84-inch ID discharge lines for each unit. The temperatures are measured at a point approximately 20 feet downstream from the condenser outlet waterboxes."

2.1.1b MAXIMUM AT ACROSS CONDENSER DURING PUMP OUTAGE

This specification should be revised as follows:

"Objective

To limit thermal stress to the aquatic ecosystem by limiting the maximum ΔT across the condenser during pump outage.

Specification

1. The maximum ΔT across the condenser shall not exceed $27.5^{\circ}F$ during periods of pump outage due to scheduled maintenance and inspection or pump failure.

2. The maximum ΔT across the condenser shall not exceed $20^{\circ}F$ for more than 24 hours for reasons of scheduled maintenance and inspection or pump failure.

3. The maximum ΔT across the condenser shall not exceed $16.5^{\circ}F$ for more than one month for reasons of scheduled maintenance and inspection or pump failure.

2.1.1b MAXIMUM AT ACROSS CONDENSER FURING PUMP OUTAGE (CONTINUED)

In the event that either specification is exceeded, corrective action shall be taken to reduce the ΔT to within specification. Such corrective action could include cleaning condenser water boxes or reduction of unit power level, unless an emergency need for power exists."

This change is necessary because excessive condenser tube and screen blockage together with circulating water pump outage are anticipated to be the principal causes of greater than normal circulating water temperature rise. The maximum cooling water temperature rise under such conditions would be 27.5°F. Operational response to such problems, by means of condenser and screen cleaning, would be expected to reduce the cooling water temperature rise to 20°F within 24 hours. However, serious mechanical failure, such as pump failure which could require manufacturer rework of major parts, could render equipment inoperable for a period of up to a month. This could result in a cooling water temperature rise of 20°F for that time.

2.2.1 BIOCIDES

The sixth line on page 2.2-3 should read "...chlorination will be no greater than 30 minutes and will be done 3 times..." to be consistent with Specification 2.2.1.2.

2.3 RADIOACTIVE EFFLUENTS

Attached for your information is a suggested revision of Section 2.3. In this revision, the design objective limits have been changed to reflect the recently adopted Appendix I to 10CFR50.

The distance of the location of the highest anticipated annual dose had been corrected from 1280 meters to 1270 meters (page 2.3-15).

3.1.1.1 Chlorine

The last paragraph of the Bases (page 3.1-2) has been revised as follows:

"The EPA - NPDES permit limits residual chlorine in the station effluent to a maximum of 0.5 mg/liter with an average limit of 0.2 mg/liter."

The EPA has challenged the Water Quality Certificate previously issued by DRBC and has issued a permit with the limits reflected above.

3.1.1.3 Suspended Solids

In the first line of the Bases, "total solids" is a typographical error. The term should read "suspended solids."

3.1.2.2 Impingement of Organisms

PSE&G believes that the requirement for impinged organisms to be sampled for three 24-hour periods per week is unduly restrictive. It is our proposal that one 24-hour period per week is sufficient. This proposal is supported by the following:

Preoperational Ecological Studies

Since 1968 Ichthyological Associates has been conducting extensive aquatic and terrestial ecological studies within a 5-mile radius of Artificial Island. Their annual documents during that time contain vast amounts of fish data that are pertinent to impingement of fish. This data includes ichthyoplankton data on fish eggs and larvae; fish catches from gill netting, trawling, and sieving. There appears to be adequate evidence to predict when and where various species of fish will be in the river and which species will tend to predominate. Since 1968, fish swim speed studies have been performed for the most important species of fish, as well as temperature, avoidance, and toxicity studies.

This background and knowledge of existing conditions with respect to fish life in the river provides a reasonable basis for predicting post-operational impingement effects.

Intake Design

The intake design for the Salem Station was originally conceived during the period of 1967 and 1968, utilizing the best available technology. The intake design was based on engineers and biologists working together in an effort to minimize fish mortalities due to impingement on the intake screens. The following considerations were reviewed and incorporated into the final intake design and completed structure:

1. The intake systems(service water and circulating water systems) were designed to reduce the velocity to approximately one foot per second in front of the intake screens.

2. Any possibility of a canal was eliminated.

Intake Design (Continued)

3. Fish escape passages were provided to allow lateral movement across the intake structure through an escape system back into the river (see Salem Environmental Report for details).

4. The entire intake structure is designed and constructed almost flush with the existing river embankment.

Based on the above, it is concluded that the intake design should result in minimal impingement losses.

Winter Months Sampling Program

The following comments regarding relative frequency of impingement sampling during the winter months compared to sampling during the remainder of the year are provided.

During the winter months, from mid-December to mid-March, there are less fish in the Delaware River Estuary, therefore it seems reasonable that less frequent sampling requirements for fish impingement are appropriate. The decrease in fish density during the winter is due primarily to the physical and chemical properties of water such as temperature and salinity. Whether it is temperature or salinity, fish have a preference and a tolerance range for different physical and chemical properties of water. They have lethal ranges as well. Anadromous fish will generally pass through the Artificial Island area very quickly in the spring because they are going from salt water to fresh water to spawn. In the fall they are returning rapidly to sea, going from fresh water to salt water. Generally when they pass through the Artificial Island area in either the spring or fall the salinities are very low or non-existent and they pass through this area very quickly. One species in particular, the white perch, is able to cope with a wide range of salinity and temperature, and would likely be the most abundant fish to be found in the winter.

Based on the above, it appears particularly appropriate to consider a reduced sampling program for the period of December 15 through March 15.

Additional Monitoring

Under a single 24-hour sampling period per week, informal, continuous monitoring of the intakes for fish impingement would be performed by station personnel. In the event unusual losses or activity were observed, Ichthyological Associates would be notified. Appropriate personnel would be collected during abnormal conditions, thereby ensuring that periods with greater than normal losses were recorded.

Reporting Requirement

It is requested that the monthly results from the impingement studies be submitted to the NRC within 20 days after the end of the month. As presently written, 10 days do not appear to be adquate for quantification and analysis of data, nor proper review of results.

3.2 RADIOLOGICAL SURVEILLANCE

Attached is a suggested revision of Section 3.2. The radiological review point (RRP) equation in Specification 6 should be revised to read:

$$RRP = \bar{x}_i + 3.3\,\sigma_i$$

In addition, the reporting requirement in accordance with Specification 5.6.2, upon exceeding an RRP, should be deleted. This is a misinterpretation of an RRP.

The RRP is intended to be an internal action criterion for PSE&G use in flagging any unusual results prior to reclining a point where a report must be filed.

For those parameters which had small variances, the RRP will not be very different from the mean. As an example, only a very small variance is seen from month to month in TLD's. This has the effect of making the RRP not very different from the mean in value. The monthly average of TLD results is 4 mrem/standard month (equivalent to a daily dose rate of approximately 0.1 mrem/day). The RRP for TLD's would be 7 mrem/standard month (or 0.2 mrem/day). Therefore, the 10-day reporting requirement of 5.6.2 would be quite severe in this case.

In Table 3.2-2, those parameters for which sufficient data is not available to calculate $\bar{x}_i$ and σ have been deleted. It is our intent to update this table periodically as more data is accumulated.

4.4 INTAKE VELOCITY STUDY

Exception is taken to the request for an intake velocity measurement program. The intakes were carefully designed taking into account fish escape velocity requirements as determined by Dr. E. C. Raney and the intake hydraulic model work of Dr. A. B. Rudavsky. Fish escape passages have been provided. Dr. Rudavsky's report entitled "Circulating Water Intake Hydraulic Model Studies Nos. 1 and 2 Units, Salem Nuclear Generating Station" indicates the expected velocity distributions in front of the traveling water screens. Public Service will participate in all impingement and entrainment studies as required by the U. S. Environmental Protection Agency. To date the EPA has not finalized a 316(b) guideline document that outlines studies to be covered.

4.4 INTAKE VELOCITY STUDY (CONTINUED)

Furthermore, detailed studies on organism impingement and entrainment will be undertaken in accordance with Section 3.1.3. Intake velocity is only important as it relates to impingement and entrainment. Since we are measuring the end result of intake velocity, i.e., impingement and entrainment, it seems unnecessary to measure this intermediate factor.

For the reasons stated above, PSE&G feels that this requirement is excessive and unnecessary and that Section 4.4 should be deleted from the Environmental Technical Specifications.

5.6.2.2 Nonroutine Radiological Environmental Operating Report

1. Anomalous Measurement Report

The first sentence should be changed to read:

"...environmental medium exceeds 10 times the control station value, a written report..."

The basis for this change was discussed previously under Section 3.2.

It should also be noted that the term "control station value," as used above, is considered by PSE&G to be synonymous with "preoperational mean" and "normal background radiation level."

2.3 LIMITING CONDITIONS FOR OPERATION

Radioactive Effluents

Objective: To define the limits and conditions for the controlled release of radioactive materials in liquid and gaseous effluents to the environs to ensure that these releases are as low as practicable. These releases should not result in radiation exposures in unrestricted areas greater than a few percent of natural background exposures. The concentrations of radioactive materials in effluents shall be within the limits specified in 10 CFR Part 20.

To ensure that the releases of radioactive material above background to unrestricted areas be as low as practicable as defined in Appendix I to 10 CFR Part 50, the following design objectives apply:

For liquid wastes:

a. The annual dose above background to the total body of an individual from each reactor at the site should not exceed 3 mrem in an unrestricted area, and not exceed 10 mrem to an organ of an individual in an unrestricted area.

For gaseous wastes:

b. The annual total quantity of noble gases above background discharged from each reactor should result in an air dose due to gamma radiation of less than 10 mrad, and an air dose due to beta radiation of less

than 20 mrad, at any location near ground level which could be occupied by individuals at or beyond the boundary of the site.

c. The annual total quantity of all radioiodines and radioactive material in particulate forms with half-lives greater than eight days, above background, from each reactor at a site should not result in an annual dose to any organ of an individual in an unrestricted area from all pathways of exposure in excess of 15 mrem.

d. The annual total quantity of iodine-131 discharged from each reactor at the site should not exceed 2 Ci.

2.3.1 Specifications for Liquid Waste Effluents

a. The concentration of radioactive materials released in liquid waste effluents from each reactor at the site shall not exceed the values specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas.

b. The annual dose above background shall not exceed 6 mrem to the total body and not exceed 20 mrem to any individual in an unrestricted area from each reactor during a calendar quarter.

c. The annual dose above background shall not exceed 12 mrem to the total body, and not exceed 40 mrem to an individual in an unrestricted area from each reactor in any 12 consecutive months.

d. During release of radioactive wastes, the effluent control monitor shall be set to alarm and to initiate the automatic closure of each waste isolation valve prior to exceeding the limits specified in 2.3.1.a above.

e. The operability of each automatic isolation valve in the liquid

radwaste discharge lines shall be demonstrated quarterly.

f. If the projected annual dose exceeds 1.5 mrem to the whole body or 5 mrem to any organ from each reactor at the site, the licensee shall make an investigation to identify the causes for such releases, define and initiate a program of action to reduce such releases to the design objective levels, and report these actions to the NRC in accordance with Specification 5.6.2.c(1).

g. An unplanned or uncontrolled offsite release of radioactive materials in liquid effluents in excess of 0.5 curies requires notification. This notification shall be in accordance with Specification 5.6.2.c(3).

2.3.2 Specifications for Liquid Waste Sampling and Monitoring

a. Plant records shall be maintained of the radioactive concentration and volume before dilution of liquid waste intended for discharge and the average dilution flow and length of time over which each discharge occurred. Sample analysis results and other reports shall be submitted as required by Section 5.6.1 of these Specifications.

Estimates of the sampling and analytical errors associated with each reported value shall be included.

b. Prior to release of each batch of liquid waste, a sample shall be taken from that batch and analyzed for the concentration of each significant gamma energy peak in accordance with Table 2.3-1 to demonstrate compliance with Specification 2.3.1 using the flow rate into which the waste is discharged during the period of discharge.

c. Sampling and analysis of liquid radioactive waste shall be performed in accordance with Table 2.3-1. Prior to taking samples from a monitoring tank, at least two tank volumes shall be recirculated.

d. The radioactivity in liquid wastes shall be continuously monitored and recorded during releases. Whenever these monitors are inoperable for a period not to exceed 72 hours, two independent samples of each tank to be discharged shall be analyzed and two plant personnel shall independently check valving prior to the discharge. If these monitors are inoperable for a period exceeding 72 hours, no release from a liquid waste tank shall be made and any release in progress shall be terminated.

e. The flow rate of liquid radioactive waste shall be continuously measured and recorded during release.

f. All liquid effluent radiation monitors shall be calibrated at least quarterly by means of a radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall also have a functional test monthly and an instrument check prior to making a release.

g. The radioactivity in steam generator blowdown shall be continuously monitored and recorded. Whenever these monitors are inoperable, the blowdown flow shall be diverted to the waste management system and the direct release to the environment terminated.

Bases: The release of radioactive materials in liquid waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20 and should be as low as practicable in accordance with the requirements of 10 CFR Part 50.36a. These specifications provide reasonable assurance that the resulting annual dose to the total body of an individual in an unrestricted area will not exceed 3 mrem and not exceed 10 mrem to any organ. At the same time, these specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the design objective levels but still within the concentration limits specified in 10 CFR Part 20. It is expected that by using this operational flexibility under unusual operating conditions, and exerting every effort to keep levels of radioactive material in liquid wastes as low as practicable, the annual releases will not exceed a small fraction of the concentration limits specified in 10 CFR Part 20.

The design objectives have been developed based on operating experience taking into account a combination of variables including defective fuel, primary system leakage, primary to secondary system leakage, steam generator blowdown and the performance of the various waste treatment systems, and are consistent with Appendix I to 10 CFR Part 50.

Specification 2.3.1.a requires the licensee to limit the concentration of radioactive materials in liquid waste effluents released from the site to levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2, for unrestricted areas. This specification provides assurance that no member of the general public will be exposed to liquid containing radioactive materials in excess of limits considered permissible under the Commission's Regulations.

Specifications 2.3.1.b and 2.3.1.c establish the upper limits for the release of radioactive materials in liquid effluents. The intent of these Specifications is to permit the licensee the flexibility of operation to assure that the public is provided a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the levels normally achievable when the plant and the liquid waste treatment systems are functioning as designed. Releases of up to these levels will result in concentrations of radioactive material in liquid waste effluents at small percentages of the limits specified in 10 CFR Part 20.

Consistent with the requirements of 10 CFR Part 50, Appendix A, Design Criterion 64, Specifications 2.3.1.d and 2.3.1.e require operation of suitable equipment to control and monitor the releases of radioactive materials in liquid wastes during any period that these releases are taking place.

Specification 2.3.1.f requires that the licensee maintain and operate the equipment installed in the liquid waste systems to reduce the release of radioactive materials in liquid effluents to as low as practicable consistent

with the requirements of 10 CFR Part 50.36a. Normal use and maintenance of installed equipment in the liquid waste system provides reasonable assurance that the quantity released will not exceed the design objective. In order to keep releases of radioactive materials as low as practicable, the specification requires operation of equipment whenever it appears that the projected cumulative discharge rate will exceed one-fourth of this design objective annual quantity during any calendar quarter.

In addition to limiting conditions for operation listed under Specifications 2.3.1.b and 2.3.1.c, the reporting requirements of Specification 2.3.1.h delineate that the licensee shall identify the cause whenever the cumulative release of radioactive materials in liquid waste effluents exceeds one-half the design objective annual quantity during any calendar quarter and describe the proposed program of action to reduce such releases to design objective levels on a timely basis. This report must be filed within 30 days following the calendar quarter in which the release occurred as required by Specification 5.6.2 of these Technical Specifications.

The sampling and monitoring requirements given under Specification 2.3.2 provide assurance that radioactive materials in liquid wastes are properly

controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive liquid wastes released to the environment. Reports on the quantities of radioactive materials released in liquid waste effluents are furnished to the Commission according to Section 5.6.1 of these Technical Specifications. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

The points of release to the environment to be monitored in Section 2.3.2 include all the monitored release points as provided for in Table 2.3-3.

2.3.3 Specifications for Gaseous Waste Effluents

The terms used in these Specifications are as follows:

subscripts v, refers to vent releases

i, refers to individual noble gas nuclide

(Refer to Table 2.4-5 for the noble gas nuclides considered)

Q_T = the total noble gas release rate (Ci/sec)

$= \sum_i Q_i$ sum of the individual noble gas radionuclides determined to be present by isotopic analysis

$\bar{K}$ = the average total body dose factor due to gamma emission (rem/yr per Ci/sec)

$\bar{L}$ = the average skin dose factor due to beta emissions (rad/yr per Ci/sec)

$\bar{M}$ = the average air dose factor due to beta emissions (rad/yr per Ci/sec)

$\bar{N}$ = the average air dose factor due to gamma emissions (rad/yr per Ci/sec)

The values of $\bar{K}$, $\bar{L}$, $\bar{M}$ and $\bar{N}$ are to be determined each time isotopic analysis is required as delineated in Specification 2.3.4. Determine the following using the results of the noble gas radionuclide analysis:

$$\bar{K} = (1/Q_T) \sum_i Q_i K_i$$

$$\bar{L} = (1/Q_T) \sum_i Q_i L_i$$

$$\bar{M} = (1/Q_T) \sum_i Q_i M_i$$

$$\bar{N} = (1/Q_T) \sum_i Q_i N_i$$

Where the values of K_i, L_i, M_i and N_i are provided in Table 2.3-5, and are site dependent gamma and beta dose factors:

Q = the measured release rate of the radioiodines and radioactive materials in particulate forms with half-lives greater than eight days.

a. (1) The release rate limit of noble gases from each reactor shall be such that

$$2.0 \left[Q_{Tv} \bar{K}_v \right] \leq 1$$

and

$$0.33 \left[Q_{Tv} \left(\bar{L}_v + 1.1 \bar{N}_v \right) \right] \leq 1$$

(2) The release rate limit of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days, released to the environs as part of the gaseous wastes from each reactor at the site shall be such that:

$$1.5 \times 10^5 \, Q_v \leq 1$$

b. (1) The average release rate of noble gases from each reactor at the site during any calendar quarter shall be such that:

$$13 \left[Q_{Tv} \bar{N}_v \right] \leq 1$$

and

$$6.3 \left[Q_{Tv} \bar{M}_v \right] \leq 1$$

(2) The average release rate of noble gases from each reactor at the site during any 12 consecutive months shall be:

$$25 \left[Q_{Tv} \bar{N}_v \right] \leq 1$$

and

$$13 \left[Q_{Tv} \bar{M}_v \right] \leq 1$$

(3) The average release rate per reactor of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter shall be such that

$$13 \left[1.5 \times 10^5 Q_v \right] \leq 1$$

(4) The average release rate per reactor of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any period of 12 consecutive months shall

be such that:

$$25\left[1.5 \times 10^{5} Q_v\right] \leq 1$$

(5) The amount of iodine-131 released during any calendar quarter shall not exceed 2 Ci/reactor.

(6) The amount of iodine-131 released during any period of 12 consecutive months shall not exceed 4 Ci/reactor.

c. Should any of the conditions of 2.3.3.c(1), (2) or (3) listed below exist, the licensee shall make an investigation to identify the causes of the release rates, define and initiate a program of action to reduce the release rates to design objective levels listed in Section 2.3 and report these actions to the NRC within 30 days from the end of the quarter during which the releases occurred.

(1) If the average release rate of noble gases from each reactor during any calendar quarter is such that:

$$50\left[Q_{Tv}\bar{N}_v\right] > 1$$

or

$$25\left[Q_{Tv}\bar{M}_v\right] > 1$$

(2) If the average release rate per reactor of all radioiodines and radioactive materials in particulate form with half-lives greater than eight days during any calendar quarter is such that:

$$50\left[1.5 \times 10^{5} Q_v\right] > 1$$

(3) If the amount of iodine-131 released during any calendar quarter is greater than 1.0 Ci/reactor.

d. During the release of gaseous wastes from the primary system waste gas holdup system the effluent monitors listed in Table 2.3-2 shall be operating and set to alarm and to initiate the automatic closure of the waste gas discharge valve prior to exceeding the limits specified in 2.3.3.a above. The operability of each automatic isolation valve shall be demonstrated quarterly.

e. The maximum activity to be contained in one waste gas storage tank shall not exceed 41,000 curies (considered as Xe-133).

2.3.4 Specifications for Gaseous Waste Sampling and Monitoring

a. Plant records shall be maintained and reports of the sampling and analyses results shall be submitted in accordance with Section 5.6 of these Specifications. Estimates of the sampling and analytical error associated with each reported value should be included.

b. Gaseous releases to the environment, except from the turbine building ventilation exhaust and as noted in Specification 2.3.4.c, shall be continuously monitored for gross radioactivity and the flow continuously measured and recorded. Whenever these monitors

are inoperable, grab samples shall be taken and analyzed daily for gross radioactivity. If these monitors are inoperable for more than seven days, these releases shall be terminated.

c. During the release of gaseous wastes from the primary system waste gas holdup system, the gross activity monitor, the iodine collection device, and the particulate collection device shall be operating.

d. All waste gas effluent monitors shall be calibrated at least quarterly by means of a known radioactive source which has been calibrated to a National Bureau of Standards source. Each monitor shall have a functional test at least monthly and instrument check at least daily.

e. Sampling and analysis of radioactive material in gaseous waste, including particulate forms and radioiodines shall be performed in accordance with Table 2.3-2.

Bases: The release of radioactive materials in gaseous waste effluents to unrestricted areas shall not exceed the concentration limits specified in 10 CFR Part 20 and should be as low as practical in accordance with the requirements of 10 CFR Part 50.36a. These specifications provide reasonable assurance that the resulting annual air dose from the site due to gamma radiation will not exceed 10 mrad, and an annual air dose from the site due to beta radiation will not exceed 20 mrad from noble gases, that no individual in an unrestricted area will receive an annual dose greater than 15 mrem from fission product noble gases, and that the annual dose to any organ of an individual from radioiodines and radioactive material in particulate

form with half-lives greater than eight days will not exceed 15 mrem per site.

At the same time these specifications permit the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided with a dependable source of power under unusual operating conditions which may temporarily result in releases higher than the design objective levels but still within the concentration limits specified in 10 CFR Part 20. Even with this operational flexibility under unusual operating conditions, if the licensee exerts every effort to keep levels of radioactive material in gaseous waste effluents as low as practicable, the annual releases will not exceed a small fraction of the concentration limits specified in 10 CFR Part 20.

The design objectives have been developed based on operating experience taking into account a combination of system variables including defective fuel, primary system leakage, primary to secondary system leakage, steam generator blowdown and the performance of the various waste treatment systems.

Specification 2.3.3.a(1) limits the release rate of noble gases from the site so that the corresponding annual gamma and beta dose rate above background to an individual in an unrestricted area will not exceed 500 mrem to the total body or 3000 mrem to the skin in compliance with the limits of 10 CFR Part 20.

For Specification 2.3.3.a(1), gamma and beta dose factors for the individual noble gas radionuclides have been calculated for the plant gaseous release

points and are provided in Table 2.3-5. The expressions used to calculate these dose factors are based on dose models derived in Section 7 of Meteorology and Atomic Energy-1968 and model techniques provided in Draft Regulatory Guide 1.AA.

Dose calculations have been made to determine the site boundary location with the highest anticipated dose rate from noble gases using on-site meteorological data and the dose expressions provided in Draft Regulatory Guide 1.AA. The dose expression considers the release point location, building wake effects, and the physical characteristics of the radionuclides.

The offsite location with the highest anticipated annual dose from released noble gases is 1270 meters in the North direction.

The release rate Specifications for a radioiodine and radioactive material in particulate form with half-lives greater than eight days are dependent on existing radionuclide pathways to man. The pathways which were examined for these Specifications are: 1) individual inhalation of airborne radionuclides, 2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, and 3) deposition onto grassy areas where milch animals graze with consumption of the milk by man. Methods for estimating doses to the thyroid via these pathways are described in Draft Regulatory Guide 1.AA. The offsite location with the highest anticipated thyroid dose rate from radioiodines and radioactive material in particulate form with half-lives greater than eight days was determined using on-site meteorological data and the expressions described in Draft Regulatory Guide 1.AA.

Specification 2.3.3.a(2) limits the release rate of radioiodines and radioactive material in particulate form with half-lives greater than eight days so that the corresponding annual thyroid dose via the most restrictive pathway is less than 1500 mrem..

For radioiodines and radioactive material in particulate form with half-lives greater than eight days, the most restrictive location is a dairy farm located 6600 meters in the NW direction (vent $X/Q = 1.1 \times 10^{-7}$ sec/m^3).

Specification 2.3.3.b establishes upper offsite levels for the releases of noble gases and radioiodines and radioactive material in particulate form with half-lives greater than eight days at twice the design objective annual quantity during any calendar quarter, or four times the design objective annual quantity during any period of 12 consecutive months. In addition to the limiting conditions for operation of Specifications 2.3.3.a and 2.3.3.b, the reporting requirements of 2.3.3.c provide that the cause shall be identified whenever the release of gaseous effluents exceeds one-half the design objective annual quantity during any calendar quarter and that the proposed program of action to reduce such release rates to the design objectives shall be described.

Specification 2.3.3.d requires that suitable equipment to monitor and control the radioactive gaseous releases are operating during any period these releases are taking place.

Specification 2.3.3.e limits the maximum quantity of radioactive gas that can be contained in a waste gas storage tank. The calculation of this

quantity should assume instantaneous ground release, a X/Q based 5 percent meteorology, the average gross energy is 0.19 Mev per disintergration (considering Xe-133 to be the principal emitter) and exposure occurring at the minimum site boundary radius using a semi-infinite cloud model. The calculated quantity will limit the offsite dose above background to 0.5 rem or less, consistent with Commission guidelines.

Specification 2.3.3.f provides for reporting release events which, while below the limits of 10 CFR Part 20, could result in releases higher than the design objectives.

The sampling and monitoring requirements given under Specification 2.3.4 provide assurance that radioactive materials released in gaseous waste effluents are properly controlled and monitored in conformance with the requirements of Design Criteria 60 and 64. These requirements provide the data for the licensee and the Commission to evaluate the plant's performance relative to radioactive waste effluents released to the environment. Reports on the quantities of radioactive materials released in gaseous effluents are furnished to the Commission on the basis of Section 5.6.1 of these Technical Specifications. On the basis of such reports and any additional information the Commission may obtain from the licensee or others, the Commission may from time to time require the licensee to take such action as the Commission deems appropriate.

The points of release to the environment to be monitored in Section 2.3.4 include all the monitored release points as provided for in Table 2.3-4.

Specification 2.3.4.b excludes monitoring the turbine building ventilation exhaust since this release is expected to be a negligible release point. Many PWR reactors do not have turbine building enclosures. To be consistent in this requirement for all PWR reactors, the monitoring of gaseous releases from turbine buildings is not required.

2.3.5 Specifications for Solid Waste Handling and Disposal

a. Measurements shall be made to determine or estimate the total curie quantity and principle radionuclide composition of all radioactive solid waste shipped offsite.

b. Reports of the radioactive solid waste shipments, volumes, principle radionuclides, and total curie quantity, shall be submitted in accordance with Section 5.6.1.

Bases: The requirements for solid radioactive waste handling and disposal given under Specification 2.3.5 provide assurance that solid radioactive materials stored at the plant and shipped offsite are packaged in conformance with 10 CFR Part 20, 10 CFR Part 71, and 49 CFR Parts 170-178.

TABLE 2.3-1

RADIOACTIVE LIQUID SAMPLING AND ANALYSIS

Liquid Source	Sampling Frequency	Type of Activity Analysis	Detectable Concentrations (μCi/ml)[a]
A. Monitor Tank Releases	Each Batch	Principal Gamma Emitters	5×10^{-7}[b]
	One Batch/Month	Dissolved Gases[f]	10^{-5}
	Weekly Composite[c]	Ba-La-140, I-131	10^{-6}
	Monthly Composite[c]	Sr-89	5×10^{-8}
		H-3	10^{-5}
		Gross α	10^{-7}
	Quarterly Composite[c]	Sr-90	5×10^{-8}
B. Primary Coolant	Weekly[d]	I-131, I-133	10^{-6}
C. Steam Generator Blowdown	Weekly[e]	Principal Gamma Emitters	5×10^{-7}[b]
		Ba-La-140, I-131	10^{-6}
	One Sample/Month	Dissolved Gases[f]	10^{-5}
	Monthly Composite[e]	Sr-89	5×10^{-8}
		H-3	10^{-5}
		Gross α	10^{-7}
	Quarterly Composite[e]	Sr-90	5×10^{-8}

[a] The detectability limits for activity analysis are based on the technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable, and when nuclides are measured below the stated limits, they should also be reported.

[b] For certain mixtures of gamma emitters, it may not be possible to measure radionuclides in concentrations near their sensitivity limits when other nuclides are present in the sample in much greater concentrations. Under these circumstances, it will be more appropriate to calculate the concentrations of such radionuclides using measured ratios with those radionuclides which are routinely identified and measured.

[c] A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged.

[d] The power level and cleanup or purification flow rate at the sample time shall also be reported.

[e] To be representative of the average quantities and concentrations of radioactive materials in liquid effluents, samples should be collected in proportion to the rate of flow of the effluent stream. Prior to analyses, all samples taken for the composite should be thoroughly mixed in order for the composite sample to be representative of the average effluent release.

[f] For dissolved noble gases in water, assume a MPC of 4×10^{-5} μCi/ml of water.

TABLE 2.3-2

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS

Gaseous Source	Sampling Frequency	Type of Activity Analysis	Detectable Concentrations (μCi/ml)[a]
A. Waste Gas Decay Tank Releases	Each Tank	Principal Gamma Emitters	10^{-4}[b]
		H-3	10^{-6}
B. Containment Purge Releases	Each Purge	Principal Gamma Emitters	10^{-4}[c]
		H-3	10^{-6}
C. Condenser Air Ejector	Monthly	Principal Gamma Emitters	10^{-4}[b, c]
		H-3	10^{-6}
D. Environmental Release Points	Monthly (Gas Samples)	Principal Gamma Emitters	10^{-4}[b, c]
		H-3	10^{-6}
	Weekly (Charcoal Sample)	I-131	10^{-12}
	Monthly (Charcoal Sample)	I-133, I-135	10^{-10}
	Weekly (Particulates)	Principal Gamma Emitters (at least for Ba-La-140, I-131)	10^{-11}
	Monthly Composite[d] (Particulates)	Sr-89	10^{-11}
		Gross α	10^{-11}
	Quarterly Composite[d] (Particulates)	Sr-90	10^{-11}

[a] The above detectability limits for activity analysis are based on technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable, and when nuclides are measured below the stated limits, they should also be reported.

[b] For certain mixtures of gamma emitters, it may not be possible to measure radionuclides at levels near their sensitivity limits when other nuclides are present in the sample at much higher levels. Under these circumstances, it will be more appropriate to calculate the levels of such radionuclides using observed ratios with those radionuclides which are measurable.

[c] Analyses shall also be performed following each refueling, startup, or similar operational occurrence which could alter the mixture of radionuclides.

[d] To be representative of the average quantities and concentrations of radioactive materials in particulate form released in gaseous effluents, samples should be collected in proportion to the rate of flow of the effluent stream.

TABLE 2.3-3

LIQUID WASTE DISPOSAL SYSTEM

LOCATION OF PROCESS AND EFFLUENT MONITORS AND SAMPLERS REQUIRED BY TECHNICAL SPECIFICATIONS

Process Stream or Release Point	Radiation Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	Measurement						High Liquid Level Alarm
					Gross Activity	I	Dissolved Gases	Alpha	H-3	Isotopic Analysis	
Chemical Drain Tank				X		X	X	X	X	X	X
Laundry and Hot Shower Tanks[a]				X		X	X	X	X	X	X
Primary Coolant				X		X					
Liquid Radwaste Discharge Pipe	X	X	X		X						
Steam Generator Blowdown System	X		X	X	X	X	X	X	X	X	
Component Cooling Systems	X		X		X						

[a]The contents of the Laundry & Hot Shower Tanks are sampled, analyzed, and then filtered prior to release through the liquid radwaste discharge pipe.

TABLE 2.3-4

GASEOUS WASTE DISPOSAL SYSTEM

LOCATION OF PROCESS AND EFFLUENT MONITORS AND SAMPLERS REQUIRED BY TECHNICAL SPECIFICATIONS

Process Stream or Release Point	Alarm	Auto Control to Isolation Valve	Continuous Monitor	Grab Sample Station	Measurement				
					Noble Gas	I	Particulate	H-3	Alpha
Waste Gas Decay Tanks				X	X	X	X	X	X
Waste Gas Discharge Line	X	X	X						
Condenser Air Removal System	X		X						
Plant Vent[a]	X		X		X	X	X		X
Reactor Containment Building (whenever there is flow)	X	X	X	X	X	X	X		X

[a]The process streams are routed to a single release point, therefore, the need for a continuous monitor at the individual charge point to the main exhaust duct is eliminated. One continuous monitor at the final release point is sufficient.

TABLE 2.3-5

GAMMA AND BETA DOSE FACTORS FOR

SALEM, UNITS 1 AND 2

Noble Gas Radionuclide	$X/Q = 1.1 \times 10^{-6}$ sec/m^3 Dose Factors for Vent K_{iv} Total Body (rem/yr)/(Ci/sec)	L_{iv} Skin (rem/yr)/(Ci/sec)	M_{iv} Beta Air (rad/yr)/(Ci/sec)	N_{iv} Gamma Air (rad/yr)/(Ci/sec)
Kr-83m	8.6×10^{-5}	0	0.043	0.35
Kr-85m	0.97	1.8	1.0	2.4
Kr-85	0.012	1.6	0.012	2.3
Kr-87	3.0	12	3.1	12
Kr-88	7.4	2.8	7.8	3.5
Kr-89	1.3	12	1.4	13
Xe-131m	0.34	0.57	0.43	1.3
Xe-133m	0.26	1.2	0.36	1.8
Xe-133	0.31	0.37	0.38	1.3
Xe-135m	1.2	0.85	1.3	0.89
Xe-135	1.4	2.2	1.5	2.9
Xe-137	0.18	15	0.19	15
Xe-138	2.9	5.0	3.0	5.7

3.2 RADIOLOGICAL SURVEILLANCE

Objective

An environmental radiological monitoring program shall be conducted to assist in verifying that radioactive effluent releases are within allowable limits and that plant operations have no detrimental effects on the environment.

Specification

1. Environmental samples shall be collected and analyzed in accordance with Table 3.2-1. The sample locations are shown on Figure 3.2-1.

2. Reports shall be submitted in accordance with the requirements of Specification 5.6.

3. During the seasons that animals producing milk for human consumption are on pasture, samples of fresh milk shall be obtained from these animals at the locations and frequencies shown in Table 3.2-1, and analyzed for their radioiodine content (calculated as I-131). Analyses shall be performed within eight days of sampling. Suitable analytical procedures shall be used to determine the radioiodine concentration to a sensitivity of 0.5 picocuries per liter of milk at the time of sampling. For activity levels at or above 0.5 picocuries per liter, the determinate error of the analysis shall be within $\pm$ 25%. Results shall be reported, with associated calculated error, as picocuries of I-131 per liter of milk at the time of sampling.

4. A census of milk animals within a 1-line radius from the plant site or within the 15 mrem/yr isodose line, whichever is larger, shall be conducted at the beginning and at the middle of each grazing season by using a door to door or equivalent counting technique to determine their location and number with respect to the site. A census shall be conducted within a 5-mile radius for cows and a 15-mile radius for goats, with enumeration by using referenced information from county agricultural agents or other reliable sources.

If it is learned from this census that milk animals are present at a location which yields a calculated infant thyroid dose greater than any other sampled locations, the new location shall be added to the surveillance program. The infant thyroid dose shall be calculated using the equations and assumptions presented in Regulatory Guide 1.42, Interim Licensing Policy on As Low As Practicable for Gaseous Radioiodine Releases from Light-Water-Cooled Nuclear Power Reactors, Revision 1, dated March 1974. Following the addition of any new location, a sampling location yielding a lower calculated dose may then be dropped from the surveillance program at the end of the grazing season during which the census was conducted.

Any locations from which milk can no longer be obtained may be dropped from the surveillance program upon written notification to the Commission that milk animals are no longer present at the location, sufficient quantity of milk cannot be obtained or that there exists a lack of cooperation in obtaining samples.

If the calculated dose to a child's thyroid at any location where there is an animal producing milk for human consumption exceeds 15 mrem/yr, milk sampling shall be done weekly with a I-131 analysis being performed on each sample.

5. Deviations shall be permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, or malfunctions of automatic sampling equipment. In the case of the latter, corrective action shall be completed prior to the end of the next sampling period, if possible. Any location from which environmental monitoring program samples can no longer be reasonably obtained may be dropped from the surveillance program upon written notification to the NRC of the reasons for this action. Any location which is dropped shall be replaced by a suitable alternate location.

6. Preoperational environmental radiological monitoring program data has been utilized to establish normal (baseline) levels for several critical environmental parameters. These normal (baseline) levels are hereinafter referred to as Radiological Review Points (RRP) and are determined from the equation:

$$RRP = \bar{x}_i + 3.3\ \sigma_i$$

where $\bar{x}_i$ = mean value of radiological parameter i, based upon preoperational environmental radiological monitoring program data.

σ_i = standard deviation of radiological parameter i, based upon

preoperational environmental radiological monitoring program data.

3.3 = statistical "z" parameter associated with a confidence level of 99.9%.

It shall be deemed that an RRP has not been exceeded if there is a 99.9% probability that a particular radiological value belongs to normal background or control station population distribution.

Environmental radiological data that are deemed to exceed an RRP shall be confirmed by:

a. Re-analysis of the same sample, or

b. Analysis of a different aliquot of the same sample (if possible), or

c. Analysis of a new sample that can be considered representative of the original sample.

All data exceeding an RRP shall be investigated, evaluated and included in accordance with Plant Reporting Requirement 5.6.1.

Reporting Requirement

An annual report shall be submitted in accordance with the requirements of Specification 5.6.1.

Non-routine reports shall be submitted, as required, in accordance with Specification 5.6.2.

Bases

The magnitude and fluctuation of radioactivity levels in the environment

surrounding the plant have been determined during implementation of the preoperational environmental radiation monitoring program. As discussed in Specification 3.2.6, Radiological Review Points are based on the magnitude and fluctuation of radioactivity levels observed during the preoperational program. The data has been treated, for calculational purposes, as being statistically normally distributed. The confidence level chosen was the 99.9 percentile. This value has been chosen since it is high enough to preclude the incidence of erroneous measurements but low enough to be a sensitive indicator of change. This information serves as a solid baseline for evaluating any changes in environmental radioactivity levels during plant operation. In order to be a reliable indicator of any environmental effects, RRP values were not calculated for data which was clearly not normally distributed. The Chi-square test was used. Additionally, RRP's were not calculated where an abundance of MDL data existed. The operational environmental radiation monitoring program was derived using the pre-operational environmental radiation monitoring program as a basis.

The monitoring program utilizes a series of sampling locations which were determined by consideration of the spatial distribution of station effluents, including areas where concentrations of effluents in the environment are expected to be greatest, site meteorology, population distribution and ease of access to the sampling stations. The selection of sampling media was based on an evaluation of potential critical pathways of radiation exposure to man.

Concurrent sampling at control and indicator stations permits plant-produced radionuclides to be distinguished from other sources of radionuclides. Where calculable, the pre-operational mean population and control station population were deemed synonymous.

TABLE 3.2-1

[redacted]TIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PRO[redacted]

EXPOSURE PATHWAY	STATION CODE	LOCATION	COLLECTION METHOD & FREQUENCY	TYPE & FREQUENCY OF ANALYSIS
I. AIRBORNE				
(a) PARTICULATES	10D1	3.9 mi SSW of vent	Continuous low volume air sampler. Sample collected every week along with filter change	composite Sr 89 composite Sr 90 performed quarterly
	2S1	on site		
	1F1	5.8 mi N of vent		Gross beta analysis on each weekly sample done weekly
	2F2	8.7 mi NNE of vent		Composition Gamma scan quarterly
	3H3	110 mw NE of station		
	16E1	4.1 mi NNW of vent		
(b) IODINE	10D1	3.9 mi SSW of vent	A silver zeolite flow-through cartridge is connected to air particulate air sampler and is collected weekly***	Iodine 131 analyses are performed weekly
	16E1	4.1 mi NNW of vent		
	2F2	NJ; 8.7 mi NNE of vent		
	2S1	on site		
	3H3	110 mi NE of vent		
II. SOIL				
	10D1	3.9 mi SSW of vent	10 soil plugs to a depth of 6" over an area of 25 ft^2 are composited and sealed in a plastic bag at each location* A sample will be collected from each location once every 3 years	Gamma spectrometry performed on each sample on collection Sr-90 analyses on one sample from each location on collection
	16E1	4.1 mi NNW of vent		
	3G1	16.6 miles NE of vent		
	3H3	110 mi NE of station		
	1F1	5.8 mi N of vent		
	2F2	NJ; 8.7 mi NNE of vent		
	5D1	3.5 mi E of vent		
	2F1	5 mi NNE of vent		
	2E1	4.4 mi NNE of vent		
	2S1**	on site		

*Soil samples are taken in accordance with procedures outlined in HASL-300 (Rev. 5/73)

** if suitable sample exists

*** If silver zeolite is not available, charcoal cannisters will be used after the NRC is notified.

TABLE 3.2-1 (Cont.)

OPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM

EXPOSURE PATHWAY	STATION CODE	LOCATION	COLLECTION METHOD & FREQUENCY	TYPE & FREQUENCY OF ANALYSIS
III. DIRECT				
	10D1	3.9 mi SSW of vent	2 dosimeters will be collected from each location quarterly	Gamma dose-quarterly
	16E1	4.1 mi NNW of vent		
	2F2	8.7 mi NNE of vent		
	13F1	Middletown, Del; 9.8 miles W of vent		
	1F1	5.8 mi N of vent		
	3G1	16.6 miles NE of vent		
	3H1	34 mi NE of vent		
	2H1	38.5 mi NNE of vent		
	6S1	.2 miles ESE of vent		
	7S1	Station personnel gate		
	14D1	3.4 mi WNW of vent		
	10S1	Cooling water inlet 150 ft SSW of vent	At least one dosimeter collected from this location quarterly	
IV. WATER				
(a) SURFACE	11A1	Approximately 650 ft SW of vent	Two gallon sample to be collected monthly providing winter icing conditions allow sample collection	Gamma scan monthly H-3, Sr-89 and Sr-90 analyses of quarterly composites
	12C1	2-1/2 mi WSW of vent		
	7E1	1 mi W of Mad Horse Creek; 4.5 mi SE of vent		
(b) GROUND	4S1	on site	Two gallon grab sample is collected monthly	Gamma scan - QC H-3 analyses are done monthly
	3E1	4 mi NE of vent		
(c) DRINKING	2F3 (raw)	Salem Water Co.; 8 mi NNE of vent	50 ml aliquot is taken daily and composited to a monthly sample of two gallons	Gross beta monthly Gamma scan - QC H-3 monthly Sr 89 and Sr 90 analyses on quarterly composites

TABLE 3.2-1 (Cont.)

OPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING PROG[illegible]

EXPOSURE PATHWAY	STATION CODE	LOCATION	COLLECTION METHOD & FREQUENCY	TYPE & FREQUENCY OF ANALYSES
V.. AQUATIC				
BENTHOS	7E1	1 mi W of Mad Horse Creek; 4.5 mi SE of Vent	A benthos sample consisting of benthic organisms and associated sediment is taken semiannually.	Gamma spectrometry of each sample semi-annually; Sr-89 and Sr 90 on total sample
	12C1	2-1/2 mi WSW of vent		
	11A1	Outfall area; 650' SW of vent		
VI. INGESTION				
(a) MILK	15F1	5.2 mi NW of vent	Four gallon grab sample of fresh milk is collected from each farm monthly. Collected weekly if calculated dose exceeds 15 mrem to child's thyroid.	Gamma scan monthly; Sr-89 and Sr-90 monthly; I-131 monthly I-131 weekly if calculated dose exceeds 15 mrem to child's thyroid
	2F1	5 mi NNE of vent		
	5F1	6.5 mi E of vent		
	14F1	5.5 mi WNW of vent		
	3G1	16.6 miles NE of vent		
(b) FISH	11A1	Outfall area; 650' SW of vent	Two key samples of fish are sealed in plastic bag or jar and frozen semi-annually or when in season	Gamma scan of edible portion on collection
	12C1	2-1/2 mi WSW of vent		
(c) CRAB	11A1	Outfall area; 650' SW of vent	Two key samples of crab are sealed in a plastic bag or jar and frozen semi-annually or when in season	Gamma scan of edible portion on collection
	12C1	West bank opposite Artificial Island, 2-1/2 mi WSW of vent		
(d) FRUITS	1G1	10.2 miles N of vent	Samples are collected during the normal harvest season, sealed in plastic, and frozen if perishable. Sufficient sample is collected to yield 500 grams of dry weight and done annually	Radioiodine determination of green leafy vegetables on collection (via gamma scan)
or	2E1	4.45 mi NNE of vent		
VEGETATION	2F1	3.0 mi NNE of vent		Gamma scan on collection
		Other locations may be substituted if a farm discontinues to grow the samples of concern		
(e) GAME	XXX	Station vicinity east side of estuary	Muskrats are skinned and frozen semi-annually	Gamma scan on edible portion only on collection
	XXX	West side of estuary, 3-5 mi from vent		
	XXX	Within 10 mi of Station	Beef portion of cow is*** Sampled and frozen Semi-annually	

QC = Quarterly composite

XXX = location given at time of collection

*** = This sample is subject to availability of slaughtered cow

TABLE 3.2-2

Exposure Pathway	Analysis	$\overline{X}_i$	σ	Units
I. Airborne				
A. Air Particulate				
	Gross beta	75	91	10^{-15} µCi/ml
	Be 7	54	21	10^{-15} µCi/ml
	Cs 137	2.9	2.8	10^{-15} µCi/ml
	Ce 144	25.0	32.6	10^{-15} µCi/ml
	Zr 95	3.5	4.1	10^{-15} µCi/ml
B. Air Iodine				
	I-131	Note 1		
II. Soil				
	Sr 90	5.2	3.3	10^{-7} µCi/ml
III. Direct				
	Gamma Dose TLD's (Quarterly)	4.4	.6	mrad/std mo.
IV. Water				
A. Surface	H-3	2.4	1.4	10^{-7} µCi/ml
	K-40	5.4	4.1	10^{-9} µCi/ml

TABLE 3.2-2
(Con't)

Exposure Pathway	Analysis	$\overline{X}_i$	σ	Units
B. Ground				
	K-40	8.2	4.3	10^{-8} µCi/ml
C. Drinking	H-3	1.8	.9	10^{-7} µCi/ml
(raw or treated water)	Sr 90	10.6	5.3	10^{-10} µCi/ml
	Gross beta	4.3	2.6	10^{-9} µCi/ml
V. Aquatic				
Benthos				
VI. Ingestion				
A. Milk	I-131	Note	1	
	Sr 90	4.2	2.5	10^{-9} µCi/ml
				10^{-6} µCi/ml
B. Fruits or Vegetables	I-131	Note	1	

Table 3.2-2 (Con't)

Note 1: Because most values were MDL means and deviations could not be determined, however the following review points have been established:

I-131 in milk Review point = 2.4 pCi/l

I-131 in leafy vegetables Review point = 110 pCi/l

I-131 in air Review point = .5 pCi/m^3

Means and deviations listed in this table will be updated until station operation commences.

TABLE 3.2-3

SENSITIVITY LEVELS FOR ENVIRONMENTAL SAMPLE ANALYSES

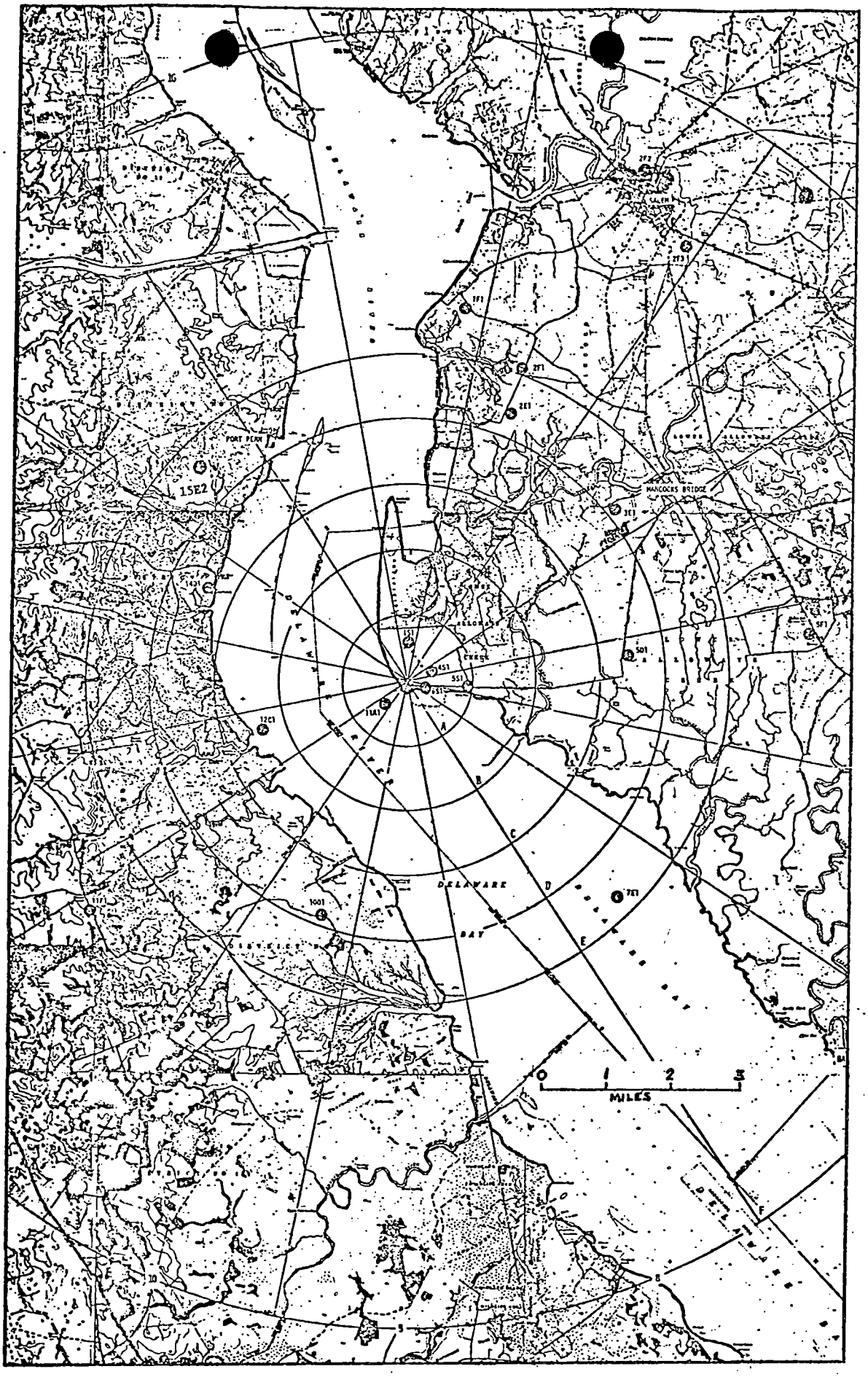
SAMPLE TYPE	TYPE OF ANALYSIS	SENSITIVITY	
Air Particulates	Gross beta	5×10^{-15}	µCi/ml
	Gamma scan	1×10^{-14}	" "
	Sr 89	5×10^{-15}	" "
	Sr 90	1×10^{-15}	" "
Air Iodine	I 131	4×10^{-14}	" "
Soil	Gamma scan	1×10^{-7}	µCi/g-dry
	Sr 90	5×10^{-8}	" "
Thermoluminescent Dosimeters	Gamma	approx. 5mrem/yr	
Surface water	Gamma scan	1×10^{-9}	µCi/ml
	Tritium	2×10^{-7}	" "
	Sr 89	5×10^{-9}	" "
	Sr 90	1×10^{-9}	" "
Ground water	Gamma scan	1×10^{-9}	" "
	Tritium	2×10^{-7}	" "
Drinking water	Gross beta	1×10^{-9}	" "
	Gamma scan	1×10^{-9}	" "
	Tritium	2×10^{-7}	" "
	Sr 89	5×10^{-9}	" "
	Sr 90	1×10^{-9}	" "
Benthos	Gamma scan	1×10^{-7}	µCi/g-dry
	Sr 89	5×10^{-7}	" "
	Sr 90	1×10^{-7}	" "
Fish	Gamma scan	8×10^{-8}	µCi/g-wet

TABLE 3.2-3 (Cont'd)

SENSITIVITY LEVELS FOR ENVIRONMENTAL SAMPLE ANALYSES

SAMPLE TYPE	TYPE OF ANALYSIS	SENSITIVITY *
Milk	Gamma scan	1×10^{-8} µCi/ml
	Sr 89	5×10^{-9} " "
	Sr 90	1×10^{-9} " "
	I 131	5×10^{-10} " "
Fruits and Vegetables	Gamma scan	5×10^{-8} µCi/g-wet
	I 131	5×10^{-8} " "
Meat	Gamma scan	8×10^{-8} " "
Game	Gamma scan	8×10^{-8} " "

* The sensitivity of the gamma scan analysis are for Cs 134 and Cs 137



PUBLIC SERVICE ELECTRIC AND GAS COMPANY SALEM NUCLEAR GENERATING STATION	LOCATIONS OF RADIOLOGICAL SAMPLING STATIONS WITHIN A 10 MILE RADIUS OF THE SITE FIG. 3.2-1