TECHNICAL EVALUATION REPORT

RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATION IMPLEMENTATION (A-2)

CONSOLIDATED EDISON COMPANY OF NEW YORK

INDIAN POINT NUCLEAR POWER PLANT UNIT 2

NRC DOCKET NO. 50-247

NRC TAC NO. 8113

NRC CONTRACT NO. NRC-03-81-130

FRC PROJECT C5506

FRC ASSIGNMENT 4

FRC TASK 95

Prepared by

Franklin Research Center
20th and Race Streets
Philadelphia, PA 19103

Author: C. Fernandez

FRC Group Leader: S. Pandey

Prepared for

Nuclear Regulatory Commission
Washington, D.C. 20555

Lead NRC Engineer: F. Congel
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Research Center
he Franklin Institute
n Parkway, Phila., Pa. 19103 (215) 448-1000

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August 22, 1983

Prepared by:	Reviewed by:	Approved by:
C. Fernandez	S. Pandey	D. J. Toman for SPC
Principal Author	Group Leader	Department Director
Date: Aug 19, 1983	Date: Aug 22, 1983	Date: Aug 22, 1983

Franklin Research Center
A Division of The Franklin Institute
The Benjamin Franklin Parkway, Phila., Pa. 19103 (215) 448-1000

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FOREWORD

This Technical Evaluation Report was prepared by Franklin Research Center under a contract with the U.S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Operating Reactors) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

1. INTRODUCTION

1.1 PURPOSE OF REVIEW

The purpose of this technical evaluation report (TER) is to review and evaluate the proposed changes in the Technical Specifications of the Indian Point Nuclear Power Plant Unit 2 with regard to Radiological Effluent Technical Specifications (RETS) and the Offsite Dose Calculation Manual (ODCM). The TER, however, does not address the corresponding proposed changes in the Technical Specifications for Indian Point Nuclear Power Plant Unit 1 which were part of the Licensee's submittal but outside the scope of FRC's RETS review.

The evaluation uses criteria proposed by the NRC staff in the model technical specifications for pressurized water reactors (PWRs), NUREG-0472 [1]. This effort is directed toward the NRC objective of implementing RETS which comply principally with the regulatory requirements of the Code of Federal Regulations, Title 10, Part 50 (10CFR50), "Domestic Licensing of Production and Utilization Facilities," Appendix I [2]. Other regulations pertinent to the control of effluent releases are also included within the scope of compliance.

1.2 GENERIC BACKGROUND

Since 1970, 10CFR50, Section 50.36a, "Technical Specifications on Effluents from Nuclear Power Reactors," has required licensees to provide technical specifications which ensure that radioactive releases will be kept as low as reasonably achievable (ALARA). In 1975, numerical guidance for the ALARA requirement was issued in 10CFR50, Appendix I. The licensees of all operating reactors were required [3] to submit, no later than June 4, 1976, their proposed ALARA Technical Specifications and information for evaluation in accordance with 10CFR50, Appendix I.

However, in February 1976, the NRC staff recommended that proposals to modify Technical Specifications be deferred until the NRC completed the model RETS. The model RETS deals with radioactive waste management systems and

environmental monitoring. Although the model RETS closely parallels 10CFR50, Appendix I requirements, it also includes provisions for addressing other issues.

These other issues are specifically stipulated by the following regulations:

- 10CFR20 [4], "Standards for Protection Against Radiation," Paragraphs 20.105(c), 20.106(g), and 20.405(c) require that nuclear power plants and other licensees comply with 40CFR190 [5], "Environmental Radiation Protection Standards for Nuclear Power Operations," and submit reports to the NRC when the 40CFR190 limits have been or may be exceeded.

- 10CFR50, Appendix A [6], "General Design Criteria for Nuclear Power Plants," contains Criterion 60 - Control of releases of radioactive materials to the environment; Criterion 63 - Monitoring fuel and waste storage; and Criterion 64 - Monitoring radioactivity releases.

- 10CFR50, Appendix B [7], establishes the quality assurance required for nuclear power plants.

The NRC position on the model RETS was established in May 1978 when the NRC's Regulatory Requirements Review Committee approved the model RETS: NUREG-0472 for PWRs [1] and NUREG-0473 [8] for boiling water reactors (BWRs). Copies were sent to licensees in July 1978 with a request to submit proposed site-specific RETS on a staggered schedule over a 6-month period. Licensees responded with requests for clarifications and extensions.

The Atomic Industrial Forum (AIF) formed a task force to comment on the model RETS. NRC staff members first met with the AIF task force on June 17, 1978. The model RETS was subsequently revised to reflect comments from the AIF and others. A principal change was the transfer of much of the material concerning dose calculations from the model RETS to a separate ODCM.

The revised model RETS was sent to licensees on November 15 and 16, 1978 with guidance (NUREG-0133 [9]) for preparation of the RETS and the ODCM and a new schedule for responses, again staggered over a 6-month period.

Four regional seminars on the RETS were conducted by the NRC staff during November and December 1978. Subsequently, Revision 2 of the model RETS, additional guidance on the ODCM, and a Process Control Program (PCP) were

issued in February 1979 to each utility at individual meetings. In response to the NRC's request, operating reactor licensees have subsequently submitted initial proposals on plant RETS and the ODCM. Review leading to ultimate implementation of these documents was initiated by the NRC in 1981 using subcontracted independent teams as reviewers.

As the RETS review process has progressed since September 1981, feedback from the licensees has led the NRC to believe that modification to some provisions in the current version of Revision 2 is needed to better clarify specific concerns of the licensees and thus expedite the entire review process. Starting in April 1982, NRC distributed revised versions of RETS in draft form to the licensees during the site visits. The new guidance on these changes was presented in the AIF meeting on May 19, 1982 [10]. Some interim changes regarding the Radiological Environmental Monitoring Section were issued in August 1982 [11]. With the incorporation of these new changes, NRC issued, in September 1982, a draft version of NUREG-0472, Revision 3 [12], to serve as new guidance for the review teams.

1.3 PLANT-SPECIFIC BACKGROUND

In conformance with the 1975 directive [3], Consolidated Edison Company of New York (Con Edison), the Licensee for Indian Point Nuclear Power Plant Unit 2, submitted information for 10CFR50, Appendix I Evaluation, dated March 14, 1977 [13].

The RETS were addressed in the next submittal by the Licensee, dated July 20, 1979 [14], in response to the November 15-16, 1978 NRC request. An ODCM was not submitted at that time but was later submitted on April 1, 1983 [15]. On May 14, 1982, Franklin Research Center (FRC), selected as an independent reviewer, initiated a review and evaluation of the RETS and ODCM submittals. These submittals were compared to the model RETS [1] and to the general provisions for the ODCM [16] which were given to each operating reactor (OR) as guidelines for preparing the RETS and the ODCM. The Licensee's RETS and ODCM submittals were assessed for compliance with the requirements of 10CFR50, Appendix I, and the "General Design Criteria," 10CFR50, Appendix A.

Copies of the draft review report for the RETS submittal dated July 16, 1982 [17] were delivered to the NRC and to the Licensee prior to a site visit to the Indian Point site in Buchanan, NY. The purpose of the site visit was to resolve questions raised in the draft review report for the RETS submittal and to discuss the requirements for the ODCM and obtain a commitment for an ODCM submittal.

The site visit was conducted on September 29-30, 1982. Discussions were held with Con Edison and Indian Point Unit 2 personnel to review the RETS and ODCM requirements. Agreement was reached on most items discussed at the meetings, at which time the Licensee made a commitment to resubmit the RETS and to prepare and submit an ODCM following NRC guidance. A trip report was prepared and delivered to the NRC on October 22, 1982 [18]. The report included the resolutions reached, as well as "open items" to be resolved by the NRC with the Licensee.

Under a cover letter dated February 1, 1983, Con Edison delivered its final proposed RETS [19] to the NRC. Copies of this submittal were delivered to FRC [20] on February 23, 1983, and the final review was initiated. The proposed RETS was reviewed and evaluated based on the draft model RETS, NUREG-0472, Revision 3 [12], and comments on the proposed RETS were supplied to the NRC on April 21, 1983 [21]. Under a cover letter dated April 1, 1983 [15], Con Edison delivered its proposed ODCM to the NRC, and it was evaluated in accordance with the existing guidelines specified by NUREG-0133 [9]. It is anticipated that a process control program will be submitted by the end of September. It will be reviewed and the results of the review issued as a supplement to this TER.

Details of the RETS review are documented in the comparison copy [22], which incorporates comments and resolutions obtained from the NRC staff [23].

Indian Point Unit 2 shares the same site with two other nuclear power plant units, i.e., Indian Point Unit 1, which is in a permanent shutdown mode (license terminated June 19, 1980), and Indian Point Unit 3, which is owned and operated by the Power Authority of the State of New York. Since Indian Point Units 1 and 2 have shared radwaste systems and shared effluent release

points, the Licensee has elected to include certain radiological effluent technical specifications which are applicable to Unit 1 in the proposed Unit 2 RETS submittal.

This evaluation is limited to the Indian Point Unit 2 RETS submittal, which is Attachment B to the Licensee's February 1, 1983 submittal [19].

2. REVIEW CRITERIA

Review criteria for the RETS and ODCM were provided by the NRC in three documents:

NUREG-0472, RETS for PWRs

NUREG-0473, RETS for BWRs

NUREG-0133, Preparation of RETS for Nuclear Power Plants.

Twelve essential criteria are given for the RETS and ODCM:

1. All significant releases of radioactivity shall be controlled and monitored.

2. Offsite concentrations of radioactivity shall not exceed the 10CFR20, Appendix B, Table II limits.

3. Offsite radiation doses shall be ALARA.

4. Equipment shall be maintained and used to keep offsite doses ALARA.

5. Radwaste tank inventories shall be limited so that failures will not cause offsite doses exceeding 10CFR20 limits.

6. Hydrogen and/or oxygen concentrations in the waste gas system shall be controlled to prevent explosive mixtures.

7. Wastes shall be processed to shipping and burial ground criteria under a documented program, subject to quality assurance verification.

8. An environmental monitoring program, including a land-use census, shall be implemented.

9. The radwaste management program shall be subject to regular audits and reviews.

10. Procedures for control of liquid and gaseous effluents shall be maintained and followed.

11. Periodic and special reports on environmental monitoring and on releases shall be submitted.

12. Offsite dose calculations shall be performed using documented and approved methods consistent with NRC methodology.

Subsequent to the publication of NUREG-0472 and NUREG-0473, the NRC staff issued guidelines [24, 25], clarifications [26, 27], and branch positions [28, 29, 30] establishing a policy that requires the licensees of operating reactors to meet the intent, if not the letter, of the model RETS provisions. The NRC branch positions issued since the RETS implementation review began have clarified the model RETS implementation for operating reactors.

Review of the ODCM will be based on the following NRC guidelines: Branch Technical Position, "General Content of the Offsite Dose Calculation Manual" [16]; NUREG-0133 [9]; and Regulatory Guide 1.109 [31]. The ODCM format is left to the Licensee and may be simplified by tables and grid printouts.

3. TECHNICAL EVALUATION

3.1 GENERAL DESCRIPTION OF RADIOLOGICAL EFFLUENT SYSTEMS

This section briefly describes the liquid and gaseous radwaste effluent systems, release paths, and control systems installed at Indian Point Nuclear Power Plant Unit 2, which is a pressurized water reactor.

3.1.1 Radioactive Liquid Effluent

The Unit 2 liquid radwaste treatment system, which contains components from Unit 1, has the capability to collect, treat, store, and dispose of most radioactive liquid wastes. The wastes are collected in sumps and drain tanks in the various buildings and are then transferred to the appropriate tanks in the radwaste area for further treatment, temporary storage, and disposal. The processed liquid wastes are either returned to the chemical and volume control system or released to the environment through the discharge canal. Batches of radioactive liquid waste are discharged to the Hudson River if the concentration of radioactive materials is within the allowable limits.

A diagram of the liquid effluent release paths indicating the location of the liquid effluent monitors is shown in Figure 1. The radioactive liquid wastes originating from the primary drains, equipment drains, floor drains, regenerate waste, and chemical waste are collected in the waste condensate tank and waste holdup tank. Liquid waste from the waste condensate tank is monitored and controlled by the waste disposal liquid effluent monitor (R-18). Liquid waste from the waste holdup tank is processed through evaporators and is monitored and controlled by the steam generator blowdown effluent monitor (R-19) prior to release to the environment. Liquid waste from the steam generator blowdown can also be collected in the waste holdup tank after filtration and demineralization if further processing is required. Liquid waste from the steam generator blowdown that does not require further processing is monitored by the Unit 1 secondary boiler blowdown purification system (SBBPS) effluent monitor. The turbine building floor drains are imbedded in the concrete foundation and, hence, inaccessible and unmonitored.

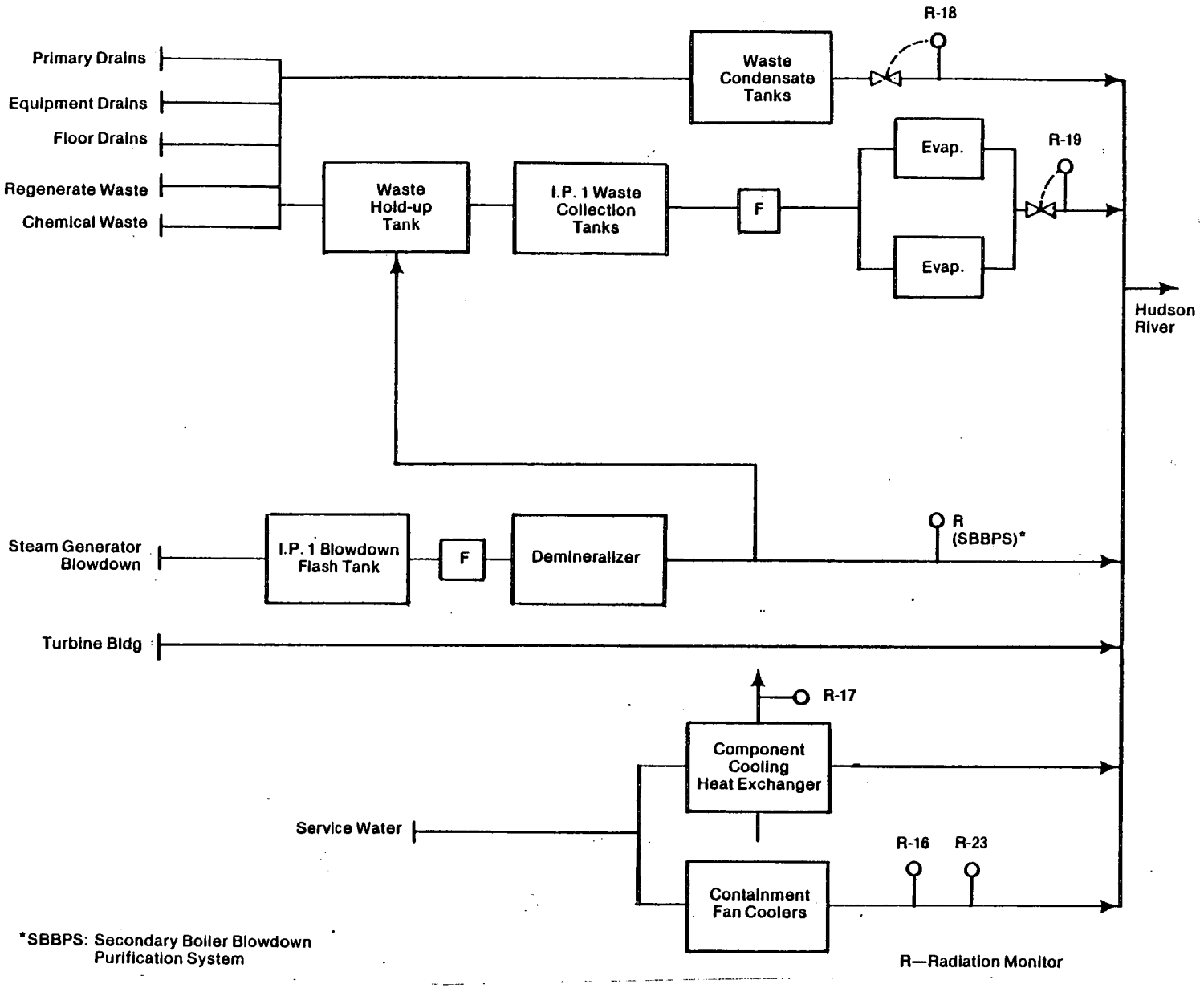

Figure 1. Liquid Radwaste Treatment Systems, Effluent Paths, and Controls for Indian Point Nuclear Power Plant Unit 2

The floor drains are discharged to the environment without processing due to the normally low radioactive concentration in the turbine building sumps. Potential leakage of radioactive material into the service water effluent system is monitored by service water system effluent monitors (R-16 and R-23) which are downstream of the containment fan coolers. As a safety feature, the waste disposal liquid effluent monitor and steam generator blowdown effluent monitor are provided with automatic termination of release upon a high concentration alarm signal.

3.1.2 Radioactive Gaseous Effluent

Airborne particulates and gases vented from process equipment and building ventilation exhaust air are the normal sources of radioactive gaseous effluents from the Indian Point site. The major source from Indian Point Unit 2 is the waste gas holdup system, which contains waste gas compressors and four large gas decay tanks and six small gas decay tanks to provide sufficient holdup to ensure that releases are ALARA.

A diagram of the radioactive gaseous effluents indicating the location of effluent radiation monitors and process treatment equipment is shown in Figure 2. Indian Point Unit 2 has a plant vent which is a combined release point for the major sources of gaseous effluents from the plant. Other gaseous effluent releases from the site addressed by the radiological effluent technical specifications for Indian Point Unit 2 are releases from the Unit 1 plant stack and the steam generator flash tank vents. Releases from the plant vent and the Unit 1 plant stack are monitored; releases from the steam generator flash tank vents are unmonitored.

The plant vent is comprised of the following effluent substreams: waste gas holdup system, vent header, auxiliary building, fuel storage building, radwaste area, containment purge, and the condenser air ejector discharge. The containment purge discharge is monitored by the containment air particulate and gas monitors (R-11 and R-12); the condenser air ejector discharge is monitored by the air ejector noble gas monitor (R-15); and the waste gas decay tanks activity inventory is monitored by the waste disposal

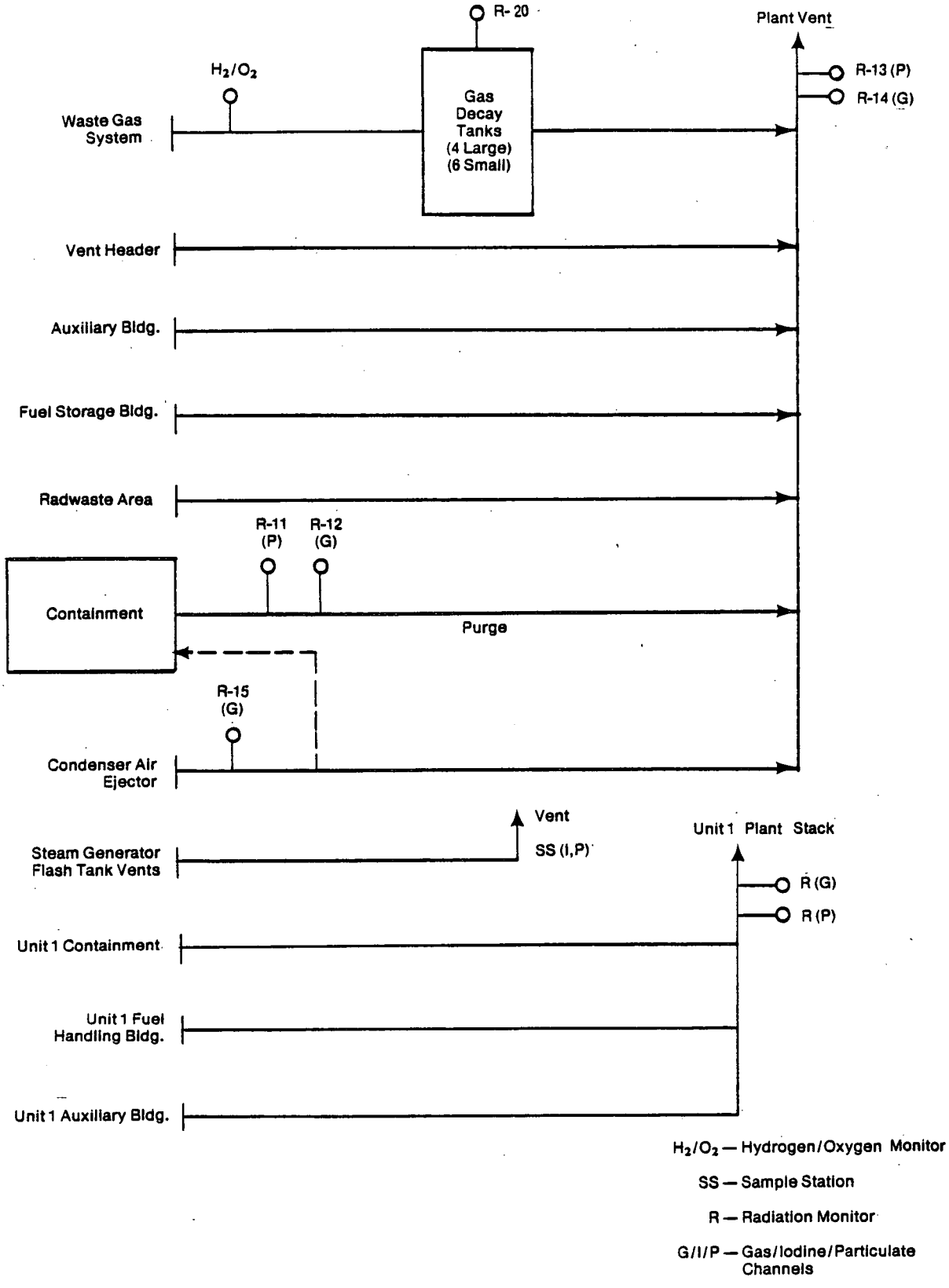

Figure 2. Gaseous Radwaste Treatment Systems, Effluents Paths, and Controls for Indian Point Nuclear Power Plant Unit 2

gas monitor (R-20). The plant vent effluent release point is provided with particulate and gas effluent monitors (R-13 and R-14).

The Unit 1 plant stack is comprised of the following effluent substreams: Unit 1 containment, Unit 1 fuel handling building, and the Unit 1 auxiliary building. The Unit 1 plant stack is provided with a particulate and gas effluent monitor. Releases from the steam generator flash tank vents are not monitored but are provided with a sample point for sampling iodine and particulate airborne radioactivity.

3.2 RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS

The evaluation of the Licensee's proposed RETS against the provisions of NUREG-0472 included the following:

- a review of information provided by the Licensee in the 1979 proposed RETS submittal [14]
- resolution of problem areas in that submittal by means of a site visit [18]
- review of the Licensee's February 1, 1983 final RETS submittal [19].

3.2.1 Effluent Instrumentation

The objective of the RETS with regard to effluent instrumentation is to ensure that all significant liquid and gaseous effluent releases are monitored. The RETS specify that all effluent monitors be operable and that alarm/trip setpoints be determined in order to ensure that radioactive levels do not exceed the maximum permissible concentration (MPC) set by 10CFR20. To further ensure that the instrumentation functions properly, surveillance requirements are also needed in the specifications.

In Section 3.9.A.2 of the submittal, the Licensee specified liquid effluent monitors with automatic termination of release and associated flow rate measurement devices for the liquid radwaste effluent line and the steam generator blowdown effluent line. The Licensee also specified liquid effluent monitors for the service water system effluent line and the Unit 1 SBBPS

effluent line. Tank level indicating devices have been provided for those tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system. The Licensee is not able to provide a radiation monitor for the turbine building sump effluent lines because these lines are imbedded in concrete and are inaccessible. The Licensee is also not able to provide continuous composite samplers as specified in the model RETS. The liquid effluent monitoring instrumentation meets the intent of NUREG-0472 on an interim basis until an NRC position is established on the turbine building sump effluent line monitoring requirements.

In Section 3.9.B.2 of the submittal, the Licensee specified gaseous effluent radiation monitors for the two major gaseous effluent release points from the plant, i.e., the plant vent and the Unit 1 plant stack. The Licensee also provided noble gas activity monitors for the condenser air ejector discharge and for the waste gas holdup system to measure activity inventory in the decay tanks; this provision meets the intent of NUREG-0472.

In Section 4.10.A.3 and 4.10.B.3 of the submittal, adequate surveillance requirements were specified for the liquid and gaseous effluent monitoring instrumentation; these provisions meet the intent of NUREG-0472.

3.2.2 Concentration and Dose Rates of Effluents

3.2.2.1 Liquid Effluent Concentration

In Section 3.9.A.1 of the submittal, the Licensee made a commitment to maintain the concentration of radioactive liquid effluents released from the site to unrestricted areas to within 10CFR20 limits, and if the concentration of liquid effluents to unrestricted area exceeds these limits, to restore it without delay to a value equal to or less than the MPC values specified in 10CFR20. Both batch and continuous releases are sampled and analyzed periodically in accordance with a sampling and analysis program (Table 4.10-1 of the Licensee's submittal), which meets the intent of NUREG-0472.

3.2.2.2 Gaseous Effluent Dose Rate

In Section 3.9.B.1 of the submittal, the Licensee made a commitment to maintain the offsite gaseous dose rate from the site to areas at and beyond the site boundary to within 10CFR20 limits, and if the concentration of gaseous effluents exceeds these limits or the equivalent dose values, to restore it without delay to a value equal to or less than these limits.

The radioactive gaseous waste sampling and analysis program (Table 4.10-3 of the Licensee's submittal) provides adequate grab and continuous sampling and analysis of the waste gas storage tanks, containment purge, condenser air ejector, plant vent, and the Unit 1 stack vent, and therefore meets the intent of NUREG-0472.

3.2.3 Offsite Doses from Effluents

The objective of the RETS with regard to offsite doses from effluents is to ensure that offsite doses are kept ALARA, are in compliance with the dose specifications of NUREG-0472, and are in accordance with 10CFR50, Appendix I, and 40CFR190. The Licensee made a commitment to meet the quarterly and yearly dose limits for (1) liquid effluents, per Section 3.11.2 [12]; (2) air doses for beta and gamma radiation in unrestricted areas due to noble gases as specified in 10CFR50, Appendix I, Section II.B; and (3) dose to any member of the public from releases of iodine-131, tritium, and particulates with half-lives greater than 8 days within the design objectives of 10CFR50, Appendix I, Section II.C. The Licensee made a commitment to limit the annual dose or dose commitment to any member of the public due to releases of radioactivity and radiation from uranium fuel cycle sources to within the requirements of 40CFR190. The Licensee also made a commitment to perform the dose calculations according to methods and parameters given in the ODCM. This commitment satisfies the intent of NUREG-0472.

3.2.4 Effluent Treatment

The objective of the RETS with regard to effluent treatment is to ensure that wastes are treated to keep releases ALARA and to satisfy the provisions

for technical specifications governing the maintenance and use of radwaste treatment equipment. The Licensee made a commitment to use the liquid and gaseous radwaste treatment system when the projected doses averaged over 31 days exceed 25% of the annual dose design objectives, prorated monthly. The Licensee also made a commitment to use the gaseous radwaste treatment system and the ventilation exhaust treatment system if the monthly projected dose exceeds the limits prescribed in NUREG-0472. This commitment meets the intent of 10CFR50, Appendix I, Section II.D. The Licensee also made a commitment to project the monthly dose in accordance with the ODCM; this also meets the intent of NUREG-0472.

3.2.5 Tank Inventory Limits

The objective of the RETS with regard to tank inventory limits is to ensure that the rupture of a radwaste tank would not cause offsite doses greater than the limits set in 10CFR20 for nonoccupational exposure. In Sections 3.9.A.5 and 3.9.B.7 of the Licensee's submittal, a commitment was made to limit the radioactive inventory of all unprotected outdoor liquid tanks listed in the specifications to less than 10 curies (excluding tritium and dissolved or entrained noble gases), and each gas storage tank to less than 30,000 curies of noble gases (considered as xenon-133). The Licensee made a commitment to a sampling program of the unprotected outdoor liquid holdup tanks and the gas storage tanks to ensure that the radioactive content of the tanks does not exceed the specified limits. The Licensee's commitment to comply with tank inventory limits satisfies the intent of NUREG-0472.

3.2.6 Explosive Gas Mixtures

The objective of the RETS with regard to explosive gas mixtures is to prevent hydrogen explosions in the waste gas system. The waste gas holdup system is a hydrogen-rich system not designed to withstand a hydrogen explosion; therefore, Section 3/4.11.2.5B of the model RETS [12] applies to this submittal. In Section 3.9.B.6 of the Licensee's submittal, a commitment

was made to limit the concentration of oxygen in the waste gas holdup system to less than 2% by volume whenever the hydrogen concentration exceeds 4% by volume. Hydrogen and oxygen monitors are provided to continuously monitor for the possibility of an explosive gas mixture concentration in the waste gas holdup system. The Licensee action specification states that the oxygen concentration will be reduced to appropriate concentration levels when trigger levels are exceeded as specified in the model RETS [12]. In Table 3.9.2, Radioactive Gaseous Effluent Monitoring Instrumentation, redundant channels are not provided as specified in the model RETS [12]; however, the present system meets the intent of the model RETS on an interim basis according to the current NRC staff position on explosive gas monitoring for PWRs [25].

3.2.7 Solid Radwaste System

The objective of the RETS with regard to the solid radwaste system is to ensure that radwaste will be properly processed and packaged before it is shipped to a burial site, in accordance with 10CFR71 and Specification 3.11.3 of NUREG-0472. In Sections 3.9.D and 4.10.D of the Licensee's submittal, a commitment was made to use the solid radwaste system to process wet radioactive waste in accordance with a process control program to ensure that the shipping and burial ground requirements are met. The process control program is used to verify the solidification of test specimens representative of wet radioactive waste. The process control program ensures that radwaste is properly processed and packaged before it is shipped to the burial site. The proposed technical specification for solid radioactive waste meets the intent of NUREG-0472.

3.2.8 Radiological Environmental Monitoring Program

The objectives of the RETS with regard to environmental monitoring are to ensure that (1) an adequate full-area-coverage (land and water inclusive) monitoring program exists; (2) the requirements of 10CFR50, Appendix I for technical specifications on environmental monitoring are satisfied; and (3)

the Licensee maintains both a land-use census and interlaboratory comparison program.

The Licensee followed NUREG-0472 guidelines, including the Branch Technical Position dated November 1979 [29], and provided an adequate number of sample locations for pathways identified.

The 40 thermoluminescent dosimeter (TLD) monitoring stations proposed by the Licensee satisfy the specification of NUREG-0472. The Licensee's method of analysis and maintenance of the monitoring program satisfy the requirements of Appendix I, 10CFR50. The Licensee also made a commitment to describe the specific sample locations in the ODCM. This commitment meets the intent of NUREG-0472.

The commitments to a yearly land-use census within NUREG-0472 specifications and to an ongoing interlaboratory comparison program equivalent to the model RETS guidelines on environmental monitoring meet the intent of NUREG-0472.

3.2.9 Audits and Reviews

The objective of the RETS with regard to audits and reviews is to ensure that audits and reviews of the radwaste and environmental monitoring programs are properly conducted. The Licensee's administrative structure designates the station nuclear safety committee (SNSC) and the nuclear facility safety committee (NFSC) as the two groups responsible for reviews and audits, respectively. In Section 6.5.1.6 of the Licensee's submittal, a commitment was made for review of changes to the process control program and the offsite dose calculation manual and for review of unplanned releases to the environment by the station nuclear safety committee. In Section 6.5.2.8 of the Licensee's submittal, a commitment was made to perform periodic audits of the ODCM, the PCP, the quality assurance program (QA) for effluent and environment monitoring, and the radiological environmental monitoring program by the nuclear facility safety committee. The audit and review requirements meet the intent of NUREG-0472.

3.2.10 Procedures and Records

The objective of the RETS with regard to procedures is to satisfy the provisions for written procedures for implementing the ODCM, the PCP, and the QA program. It is also an objective of RETS to properly retain the documented records related the environmental monitoring program and certain QA procedures. In Section 6.8 of the submittal, the Licensee made a commitment to establish, implement, and maintain written procedures for the PCP, the ODCM, and the QA programs which satisfy the provisions of NUREG-0472. The Licensee also made a commitment to retain the records of the radiological environmental monitoring program, and this commitment meets the intent of NUREG-0472.

3.2.11 Reports

In addition to the reporting requirements of Title 10, Code of Federal Regulations (10CFR), the objective of the RETS with regard to administrative controls is also to ensure that appropriate periodic and special reports are submitted to the NRC.

The Licensee made a commitment to follow applicable reporting requirements stipulated by 10CFR regulations and also the following reports specified by NUREG-0472:

1. Annual radiological environmental operating report. In Section 6.9.1.5 of the Licensee's submittal, a commitment was made to provide an annual radiological environmental operating report that includes summaries, interpretations, and statistical evaluation of the results of the environmental surveillance program. The report also includes the results of land use censuses, and participation in an inter-laboratory comparison program specified by Specification 3.12.3 of NUREG-0472.

2. Semiannual radioactive and solid waste release reports. In Section 6.9.1.6 of the Licensee's submittal, a commitment was made to provide semiannual radioactive effluent and solid waste release reports which include a summary of radioactive liquid and gaseous effluents and solid waste released, an assessment of offsite doses, and a list of unplanned releases. Listing of new locations for dose calculations identified by the land use census as well as any changes to ODCM are also included in the report.

3. Special Report. In Section 6.9.2 of the Licensee's submittal, a commitment was made to file a 30-day special report to the NRC under the following conditions as prescribed by the proposed specifications:

   - o exceeding radioactive liquid effluent limits according to:

     Dose, Specification 3.9.A.3
     Liquid Waste Treatment, Specification 3.9.A.4

   - o exceeding radioactive gaseous effluent limits according to:

     Dose, Specifications 3.9.B.3 and 3.9.B.4
     Gaseous Waste Treatment, Specification 3.9.B.5

   - o exceeding radioactive effluent limits according to:

     Uranium Fuel Cycle Dose Commitment, Specification 3.9.C

   - o exceeding the reporting levels of Table 4.12-2 for the radioactivity measured in the environmental sampling medium, Specification 4.11.

These reporting commitments have satisfied the provisions of NUREG-0472.

3.2.12 Implementation of Major Programs

One objective of the administrative controls is to ensure that implementation of major programs such as the PCP, ODCM, and major changes to the radioactive waste treatment system follows appropriate administrative procedures. The Licensee made a commitment to review, report, and implement major programs such as the PCP, ODCM, and major changes to the radioactive waste treatment system. This commitment meets the intent of NUREG-0472.

3.3 OFFSITE DOSE CALCULATION MANUAL (ODCM)

As specified in NUREG-0472, the ODCM is to be developed by the Licensee to document the methodology and approaches used to calculate offsite doses and maintain the operability of the effluent system. As a minimum, the ODCM should provide equations and methodology for the following topics:

- o alarm and trip setpoint on effluent instrumentation
- o liquid effluent concentration in unrestricted areas

- o gaseous effluent dose rate at or beyond the site boundary
- o liquid and gaseous effluent dose contributions
- o liquid and gaseous effluent dose projections.

In addition, the ODCM should contain flow diagrams, consistent with the systems being used at the station, defining the treatment paths and the components of the radioactive liquid, gaseous, and solid waste management systems. A description and the location of samples in support of the environmental monitoring program are also required in the ODCM.

3.3.1 Evaluation

The Licensee followed the methodology of NUREG-0133 [9] to determine the alarm and trip setpoints for the liquid and gaseous effluent monitors. To ensure that the MPC, as specified in 10CFR20, will not be exceeded even in the case of simultaneous discharge, the Licensee will administratively control the setpoints to allocate a percentage of the total allowable release to each of the release sources.

The Licensee demonstrated the method of calculating the radioactive liquid concentration by describing in the ODCM the means of determining dilution parameters to ensure that liquid releases are maintained below MPC limits in unrestricted areas upon discharge into the Hudson River Estuary. The method provides added assurance of compliance with 10CFR20 for liquid releases.

Methods are also included for showing that dose rates at or beyond the site boundary due to noble gases, iodine-131, tritium, and radionuclides in particulate form with half-lives greater than 8 days are in compliance with 10CFR20. In this calculation, the Licensee considered effluent releases from the plant vent, stack vent, and unmonitored sources (such as the steam generator blowdown and purification system flash tank vent and the secondary boiler blowdown purification system flash tank vent); releases from the stack vent are treated as an elevated release, and releases from the plant vent and unmonitored sources are treated as ground level. In all cases, the Licensee

used the highest annual average values of relative concentration (X/Q) and relative deposition (D/Q) to determine the controlling locations. The Licensee intends to use the maximally exposed individual and the critical organ as the reference receptor. For noble gases, the Licensee considered the total body dose and the skin dose resulting from gamma and beta radiation, respectively. For iodine-131, tritium, and particulates, the Licensee considered the inhalation pathway for estimating the doses. The Licensee demonstrated that the described methods and relevant parameters have followed the conservative approaches provided by NUREG-0133 and Regulatory Guide 1.109.

Evaluation of the cumulative dose is to ensure that the quarterly and annual dose design objectives specified in RETS are not exceeded.

For liquid releases, the Licensee identified freshwater fish and shellfish consumption as the main pathway. In the calculation, the Licensee used a near-field dilution factor specific to the plant; all other key parameters follow the suggested values given in Regulatory Guide 1.109. The Licensee used the maximally exposed adult individual as the reference receptor. To correctly assess the cumulative dose, the Licensee intends to estimate the dose once per 31 days.

Evaluation of the cumulative dose from noble gas releases includes both beta and gamma and air doses at and beyond the site boundary. The critical organs under consideration are the total body and skin for gamma and beta radiation, respectively. Again, the Licensee used the maximum X/Q values as discussed earlier and followed the methodology and parameters of NUREG-0133 and Regulatory Guide 1.109.

For iodine-131, tritium, and particulates with half-lives greater than 8 days, the Licensee provided a method to demonstrate that cumulative doses calculated from the release meet both quarterly and annual design objectives. The Licensee demonstrated a method of calculating the dose using maximum annual average X/Q values for the inhalation pathway and included D/Q values for the ground plane deposition pathway and the grass-cow-milk pathway, for which the Licensee considered the thyroid to be the critical organ and

calculates doses for all age groups. This approach is consistent with the methodology of NUREG-0133.

Using the existing methodology for gaseous and liquid dose calculations, the Licensee demonstrated a procedure to project the monthly dose and to ensure that the design objectives for the liquid radwaste system and the gaseous radwaste system are not exceeded.

The Licensee provided a description of sampling locations in the ODCM and identified them in Section 13 of that document. This description is consistent with the sampling locations specified in the Licensee's RETS Table 4.11-1 on environmental monitoring.

The Licensee did not provide flow diagrams defining the effluent paths and components of the radioactive liquid and gaseous waste treatment systems as specified in the Branch Technical Position, "General Content of the Offsite Dose Calculation Manual" [16].

In summary, the Licensee's ODCM uses documented and approved methods that are consistent with the methodology and guidance in NUREG-0133 and, with the exception of the omitted flow diagrams, the ODCM is an acceptable reference.

4. CONCLUSIONS

Table 1 summarizes the results of the final review and evaluation of the submittal for Indian Point Nuclear Power Plant Unit 2. The Licensee made one radiological effluent technical specifications (RETS) submittal for Unit 2 [19]. The offsite dose calculation manual (ODCM) was submitted under a separate cover [15].

The following conclusions have been reached:

1. The Licensee's proposed RETS, submitted February 1, 1983, meets the intent of the NRC staff's "Standard Radiological Effluent Technical Specifications," NUREG-0472, for Indian Point Nuclear Power Plant Unit 2.

2. The Licensee's ODCM, submitted April 1, 1983, uses documented and approved methods that are consistent with the criteria of NUREG-0133 and applicable to Indian Point Nuclear Power Plant Unit 2, with the following exception:

   - The proposed ODCM does not provide flow diagrams defining the effluent paths and components of the radioactive liquid and gaseous waste treatment systems as specified in the Branch Technical Position, "General Content of the Offsite Dose Calculation Manual."

Table 1. Evaluation of Proposed Radiological Effluent Technical Specifications (RETS), Indian Point Unit 2

	Technical Specifications		Replaces or Updates Existing Tech. Specs. (Section)	Evaluation
	NRC Staff Std. RETS NUREG-0472 (Section)*	Licensee Proposal (Section)		
Effluent Instrumentation	3/4.3.3.3.10 3/4.3.3.3.11	3.9.A.2, 4.10.A 3.9.B.2, 4.10.B	2/3.4.1 2/3.4.2 (Appendix B)	Meets the intent of NRC criteria
Radioactive Effluents	3/4.11.1.1 3/4.11.2.1	3.9.A.1, 4.10.A 3.9.B.1, 4.10.B	2/3.4.1 2/3.4.2 (Appendix B)	Meets the intent of NRC criteria in the interim
Offsite Doses	3/4.11.1.2, 3/4.11.2.2, 3/4.11.2.3, 3/4.11.4	3.9.A.3, 4.10.A 3.9.B.3, 4.10.B 3.9.B.4, 4.10.C 3.9.C	2/3.4.1 2/3.4.2 (Appendix B)	Meets the intent of NRC criteria
Effluent Treatment	3/4.11.1.3 3/4.11.2.4	3.9.A.4, 4.10.A 3.9.B.5, 4.10.B	2/3.4.1 2/3.4.2 (Appendix B)	Meets the intent of NRC criteria
Tank Inventory Limits	3/4.11.1.4 3/4.11.2.6	3.9.A.5, 4.10.A 3.9.B.7, 4.10.B	2/3.4.1 2/3.4.2 (Appendix B)	Meets the intent of NRC criteria
Explosive Gas Mixtures	3/4.11.2.5B	3.9.B.6, 4.10.B	Not Addressed	Meets the intent of NRC criteria in the interim
Solid Radioactive Waste	3/4.11.3	3.9.D, 4.10.D	2.4.3 (Appendix B)	Meets the intent of NRC criteria
Environmental Monitoring	3/4.12.1	4.11	4.2 (Appendix B)	Meets the intent of NRC criteria
Audits and Reviews	6.5.1, 6.5.2	6.5.1, 6.5.2	6.5.1 6.5.2 (Appendix A)	Meets the intent of NRC criteria
Procedures and Records	6.8, 6.10	6.8, 6.10	6.8, 6.10 (Appendix A)	Meets the intent of NRC criteria

*Section number sequence is according to NUREG-0472, Rev. 3 [12].

Table 1 (Cont.)

	Technical Specifications		Replaces or Updates	
	NRC Staff Std. RETS NUREG-0472 (Section)*	Licensee Proposal (Section)	Existing Tech. Specs. (Section)	Evaluation
Reports	6.9.1.9, 6.9.1.11, 6.9.1.12, 6.9.2	6.9.1.5, 6.9.1.6, 6.9.2	5.6.1.1, 5.6.1.2, 5.6.2.1, 5.6.2.2 (Appendix B)	Meets the intent of NRC criteria
Implementation of Major Programs	6.13, 6.14, 6.15	6.14, 6.15, 6.16	Not addressed	Meets the intent of NRC criteria

5. REFERENCES

1. "Radiological Effluent Technical Specifications for Pressurized Water Reactors," Rev. 2
   NRC, July 1979
   NUREG-0472

2. Title 10, Code of Federal Regulations, Part 50, Appendix I, "Numerical Guides for Design Objectives and Limiting Conditions for Operation to Meet the Criterion, 'As Low As Is Reasonably Achievable,' for Radioactive Material in Light-Water-Cooled Nuclear Power Reactor Effluents"

3. Title 10, Code of Federal Regulations, Part 50, Appendix I, Section V, "Effective Dates"

4. Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation"

5. Title 40, Code of Federal Regulations, Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations"

6. Title 10, Code of Federal Regulations, Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants"

7. Title 10, Code of Federal Regulations, Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"

8. "Radiological Effluent Technical Specifications for Boiling Water Reactors," Rev. 2
   NRC, July 1979
   NUREG-0473

9. "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants, A Guidance Manual for Users of Standard Technical Specifications"
   NRC, October 1978
   NUREG-0133

10. C. Willis and F. Congel (NRC)
    "Summary of Draft Contractor Guidance of RETS"
    Presented at the AIF Environmental Subcommittee Meeting, Washington, DC
    May 19, 1982

11. F. Congel (NRC)
    Memo to RAB Staff (NRC)
    Subject: Interim Changes in the Model Radiological Effluent Technical Specifications (RETS)
    August 9, 1982

12. "Radiological Effluent Technical Specifications for Pressurized Water Reactors," Rev. 3, Draft 7', intended for contractor guidance in reviewing RETS proposals for operating reactors
NRC, September 1982
NUREG-0472

13. "An Evaluation to Demonstrate the Compliance of the Indian Point Reactors with the Design Objectives of 10CFR Part 50, Appendix I"
Consolidated Edison Company of New York and Power Authority of the State of New York
March 14, 1977

14. W. J. Cahill (Con Edison)
Letter of Transmittal to NRC
Subject: Proposed Radiological Effluent Technical Specifications for Indian Point Units 1 and 2
July 20, 1979

15. J. O'Toole (Con Edison)
Letter of Transmittal to NRC
Subject: Offsite Dose Calculation Manual for Indian Point Units 1 and 2
April 1, 1983

16. General Contents of the Offsite Dose Calculation Manual," Rev. 1
NRC, 1979

17. "Radiological Effluent Technical Specification Implementation, Comparison of Plant and Model RETS"
Franklin Research Center, Draft dated July 16, 1982

18. Trip Report to Indian Point Nuclear Power Plant Unit 2
Trip Date: September 29-30, 1982
S. Pandey (FRC) to F. Congel/C. Willis (NRC)
October 22, 1982

19. J. O'Toole (Con Edison)
Letter of Transmittal to NRC
Subject: Revised Radiological Effluent Technical Specifications for Indian Point Units 1 and 2
February 1, 1983

20. Final Indian Point Unit 2 RETS Submittal
Tranmitted to S. Pandey (FRC) from W. Meinke (NRC)
February 23, 1983

21. Informal Technical Communication
from C. Fernandez/S. Pandey (FRC) to W. Meinke (NRC)
"RETS Review Questions"
April 21, 1983

22. "Comparison of Specification NUREG-0472, Radiological Effluent Technical Specifications for PWRs, vs. Licensee Final Submittal of Radiological Effluent Technical Specifications, dated February 1, 1983, for Indian Point Nuclear Power Plant Unit 2"
Franklin Research Center
June 7, 1983

23. W. Meinke (NRC)
Memo to S. Pandey/C. Fernandez (FRC)
"Comments and Resolutions to Review Questions"
April 27, 1983

24. C. Willis (NRC)
Letter to S. Pandey (FRC)
Subject: Changes to RETS requirements following meeting with Atomic Industrial Forum (AIF)
November 20, 1981

25. C. Willis (NRC)
Letter to S. Pandey (FRC)
Subject: Control of explosive gas mixture in PWRs
December 18, 1981

26. C. Willis and F. Congel (NRC)
"Status of NRC Radiological Effluent Technical Specification Activities"
Presented at the AIF Conference on NEPA and Nuclear Regulations, Washington, D.C.
October 4-7, 1981

27. C. Willis (NRC)
Memo to P. C. Wagner (NRC)
"Plan for Implementation of RETS for Operating Reactors"
November 4, 1981

28. W. P. Gammill (NRC)
Memo to P. C. Wagner (NRC)
"Current Position on Radiological Effluent Technical Specifications (RETS) Including Explosive Gas Controls"
October 7, 1981

29. "An Acceptable Radiological Environmental Monitoring Program"
Radiological Assessment Branch Technical Position, Revision 1
November 1979

30. Methods for Demonstrating LWR Compliance with the EPA Uranium Fuel Cycle Standard (40CFR190)
NRC, February 1980
NUREG-0543

31. Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I
NRC, October 1977
Regulatory Guide 1.109, Revision 1