

## TECHNICAL EVALUATION REPORT

**RADIOLOGICAL EFFLUENT TECHNICAL  
SPECIFICATION IMPLEMENTATION (A-2)**

CONSUMERS POWER COMPANY

BIG ROCK POINT NUCLEAR POWER PLANT

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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 Big Rock Point Nuclear Power Plant with regard to Radiological Effluent Technical Specifications (RETS), the Offsite Dose Calculation Manual (ODCM), and the Process Control Program (PCP).

The evaluation uses criteria proposed by the NRC staff in the Model Technical Specifications for boiling water reactors (BWRs), NUREG-0473 [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 [3]. The licensees of all operating reactors were required 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:

- o 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.
- o 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.
- o 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-0473 [1] for BWRs and NUREG-0472 for pressurized water reactors (PWRs) [8]. 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 and additional guidance on the ODCM were issued in February 1979 to each utility at individual meetings. In response to the NRC's request, operating reactor licensees 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 of the guidelines in the current version of Revision 2 is needed to 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 site visits. The new guidance on these changes was presented at the AIF meeting on May 19, 1982 [10]. Some interim changes regarding the Radiological Environmental Monitoring Section were issued in 1982 [11, 12]. With the incorporation of these new changes, NRC issued, in December 1983, a draft version of NUREG-0473, Revision 3 [13], to serve as new guidance for the review teams.

### 1.3 PLANT-SPECIFIC BACKGROUND

Due to lack of a complete formal submittal from the Licensee, the Consumers Power Company (CPC), the Licensee's original RETS submittal consisted only of scattered information on technical specification changes [14, 15, 16] and the Licensee's responses [17] to NRC comments. These pieces of information therefore formed the basis for an initial RETS evaluation [18, 19] conducted by an independent review team at the Franklin Research Center (FRC) and for a site visit.

The site visit was conducted on January 5-7, 1982 by the reviewers with the participation of plant personnel and the NRC staff. Discussion focused on the initial review of the proposed changes to the RETS and on the technical approaches for an ODCM. The technical deficiencies in the Licensee's proposed RETS were considered, and deviations from NRC guidelines were pointed out. In order to incorporate the new information provided by the Licensee at the site, it was determined [20] that an updated comparison review was necessary. This new update was reflected in the RETS comparison copy issued by FRC in April 1982 [21].

Subsequent to the site visit, the Licensee submitted to NRC the proposed technical specification changes and clarifications [22, 23, 24, 25, 26], which did not, however, include a complete formal RETS submittal.

In view of the lack of Licensee action in submitting a formal RETS, on July 26, 1983 [27], the NRC staff requested the review team at FRC to re-open the RETS evaluation, using the Licensee's existing technical specification and partial submittals pertinent to RETS.

In this evaluation, the Licensee's submittals were evaluated against NUREG-0473, Draft Revision 3 [13]. A RETS comparison report [28] dated September 16, 1983, was prepared as a result of the evaluation. The evaluation also included preparation of reports on the ODCM and PCP. The ODCM evaluation was based on the submittal of Reference 25, and the PCP evaluation was based on Reference 16.

These FRC evaluation reports and copies of current NRC guidance were forwarded to the Licensee by the NRC staff, along with a request for a meeting at the plant site to discuss differences. On August 24, 1984, staff members of the Licensee and NRC met to discuss the differences between NRC guidance and the Licensee's submittal, and resolution was achieved on all problems and open items.

Under a cover letter dated January 7, 1985 [29], and a subsequent amendment dated March 14, 1985 [30], Consumers Power Company delivered its final submittals on RETS, ODCM, and PCP to the NRC. Copies of these submittals were transmitted to FRC for review. The Licensee's RETS submittal was again evaluated against NUREG-0473, Draft 7", Revision 3. The ODCM was also evaluated according to the existing guidelines specified by NUREG-0133. The PCP was reviewed against the NRC guidelines dated January 7, 1983 [31].

The review also incorporated the additional guidance that FRC received from the NRC staff on plant-specific issues [32]. Details of the draft RETS review were documented in the comparison copy [33].



## 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 of radioactivity 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 concentration 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 and an interlaboratory comparison program, 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 [34, 35], clarifications [36, 37], and branch positions [38, 39, 40, 41] establishing a policy that guides 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 was based on the following NRC guidelines: Branch Technical Position, "General Content of the Offsite Dose Calculation Manual" [42]; NUREG-0133 [9]; and Regulatory Guide 1.109 [43]. The ODCM format is left to the licensee and may be simplified by tables and grid printouts.

Review of the PCP was based on the guidance provided by the NRC staff [31].

### 3. TECHNICAL EVALUATION

#### 3.1 GENERAL DESCRIPTION OF RADIOLOGICAL EFFLUENT SYSTEM

This section briefly describes the liquid and gaseous effluent radwaste treatment systems, release paths, and control systems installed at Big Rock Point Nuclear Power plant, a BWR. The plant is located on Lake Michigan in Charlevoix County, Michigan, about 4 miles northeast of Charlevoix, Michigan, and about 11 miles west of Petosky, Michigan.

##### 3.1.1 Radioactive Liquid Effluent

The liquid radioactive wastes at Big Rock Point Nuclear Power Plant consist of four types: clean wastes, dirty wastes, chemical wastes, and miscellaneous wastes. The bulk of high purity wastes comes from the reactor coolant, condensate, and feedwater systems. Following processing and batch sampling, the liquid is pumped to the condensate storage tank for reuse in the plant or discharge offsite. All these wastes are discharged in batches into the discharge canal for release to Lake Michigan. Also joined into the circulating water and released to the environment is the continuous discharge of service water. The above effluent treatment systems and flow paths are shown in Figure 1.

##### 3.1.2 Radioactive Gaseous Effluent

The offgases from Big Rock Point Nuclear Power Plant are processed and routed to the plant stack (73 m high) for dilution and discharged to the atmosphere (see Figure 2). The substreams also routed to the plant stack are the gland seal/mechanical vacuum pumps' discharges, and discharges from the turbine building, the radwaste building, and the service building. The gaseous radwaste system consists of a delay line for condenser offgas which provides approximately 30 minutes of decay time prior to release via the stack.

#### 3.2 RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS

The evaluation of the Licensee's proposed RETS against the provisions of NUREG-0473 included the following: (1) a review of information provided in

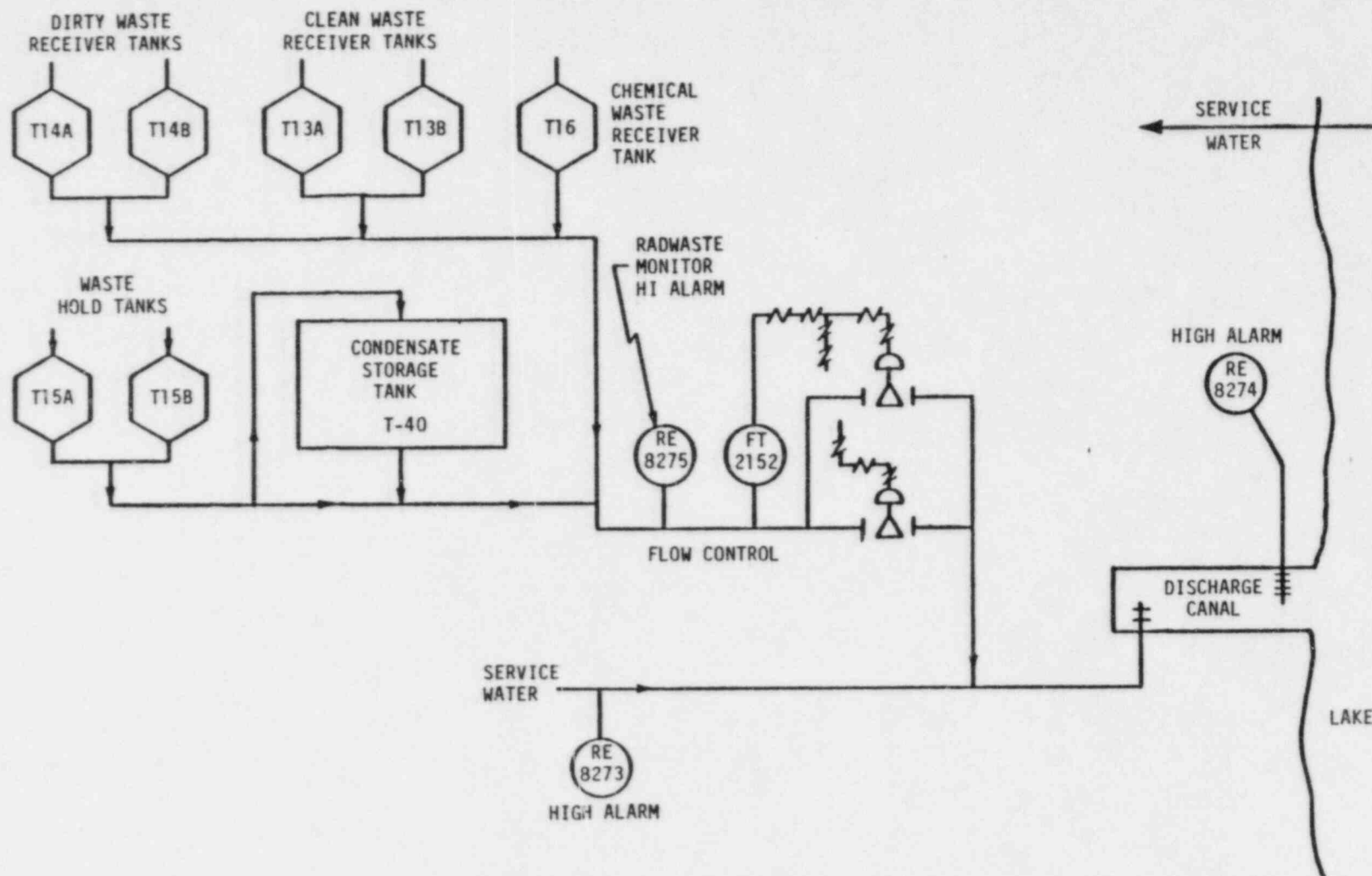


Figure 1. Liquid Radwaste Treatment Systems, Effluent Paths, and Controls for Big Rock Point Nuclear Power Plant (taken from Licensee-proposed ODCM) [29]

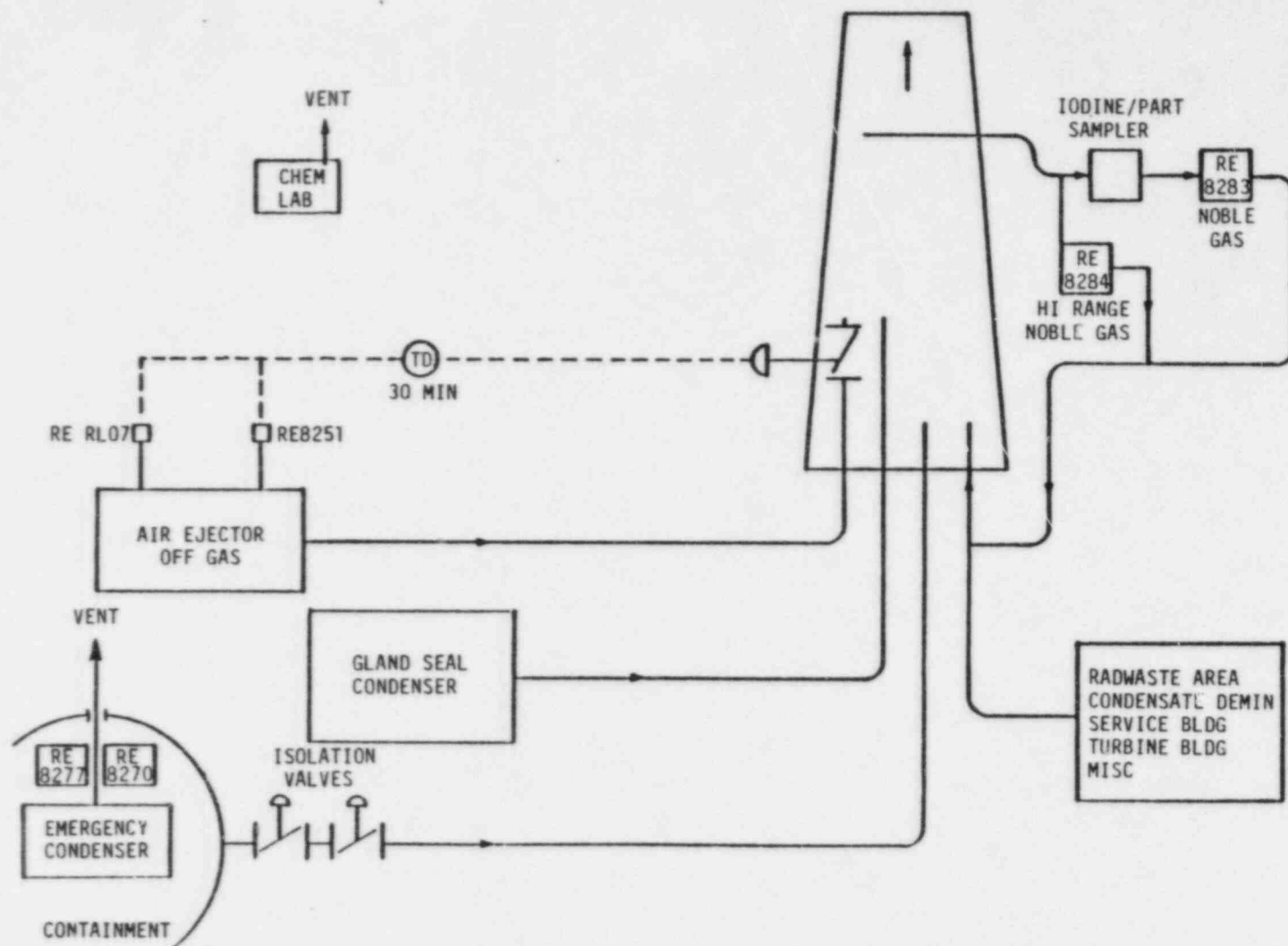


Figure 2. Gaseous Radwaste Treatment Systems, Effluent Paths, and Controls for Big Rock Point Nuclear Power Plant  
(taken from Licensee-proposed ODCM) [29]

the Licensee's 1979 and 1982 draft submittals [16, 25], (2) a discussion of problem areas in those submittals by means of a site visit [20], and (3) a review of the Licensee's 1985 final RETS submittals [29, 30].

### 3.2.1 Effluent Instrumentation

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

#### 3.2.1.1 Radioactive Liquid Effluent Monitoring Instrumentation

A radiation monitor (RE-8275) has been installed for the liquid radwaste effluent line (Figure 1) which combines effluent streams from the releases of clean wastes, chemical wastes, dirty wastes, and miscellaneous wastes. This monitor at the radwaste effluent line is equipped with an alarm function. The Licensee has also provided a radiation monitor (RE-8274) for circulation water at the discharge canal. A radiation monitor (RE-8273) with high alarm has been installed for the service water effluent line and is considered a process monitor.

These existing monitoring capabilities have provided adequate assurance that the provisions of NUREG-0473 for the radioactive liquid effluent monitoring instrumentation are met.

#### 3.2.1.2 Radioactive Gaseous Effluent Monitoring Instrumentation

The Licensee has provided noble gas monitors (RE-8251 and RE-8283) for the air ejector offgas system and stack gas effluent system, respectively. The monitor at the air ejector has alarm and automatic control functions. For the stack gas effluent system, an iodine/particulate sampler is also provided.

The existing monitoring capabilities provided by the Licensee have met the intent of NUREG-0473 for radioactive gaseous effluent monitor instrumentation.



### 3.2.2 Concentration and Dose Rates of Effluents

#### 3.2.2.1 Liquid Effluent Concentration

In Section 13.1.2 of the Licensee's submittal, a commitment is made to maintain the concentration of radioactive liquid effluents released to areas at or beyond the site boundary to within 10CFR20 limits, and, if the concentration of liquid effluents exceeds these limits, the concentration will be promptly restored to a value equal to or less than the MPC specified in 10CFR20. All batches of radioactive liquid effluents from the release tanks are sampled and analyzed in accordance with a sampling and analysis program (Table 13-3 of the Licensee's submittal) which meets the intent of NUREG-0473.

It was determined that the Licensee-proposed specification meets the intent of NUREG-0473.

#### 3.2.2.2 Gaseous Effluent Dose Rate

In Section 13.1.3 of the Licensee's submittal, a commitment is made to maintain the offsite dose rate from radioactive gaseous effluents to areas at and beyond the site boundary within 10CFR20 limits, or the equivalent dose rate values prescribed by Section 3.11.2.1 of NUREG-0473. If the dose rate of gaseous effluents exceeds these limits, it will be restored promptly to a value equal to or less than these limits. This commitment satisfies the provisions of NUREG-0473.

The radioactive gaseous waste sampling and analysis program (Table 13-3 of the Licensee's submittal) provides adequate sampling and analysis of the plant stack discharges, including the substreams, and therefore meets the intent of NUREG-0473.

### 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 and are in accordance with 10CFR50, Appendix I, and 40CFR190. The Licensee has made a commitment to (1) meet the quarterly and yearly dose limitations for liquid effluents, per Section II.A of Appendix I, 10CFR50; (2) restrict the air doses for beta and

gamma radiation from the site to areas at and beyond the site boundary as specified in 10CFR50, Appendix I, Section II.B; (3) maintain the dose level at and beyond the site boundary from release of iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half lives greater than 8 days within the design objectives of 10CFR50, Appendix I, Section II.C; and (4) limit the annual dose from all uranium fuel cycle sources of the plant to any member of the public to within the requirements of 40CFR190. In each pertinent section, the Licensee has made a commitment to perform dose calculations in accordance with methods given in the ODCM. This satisfies the intent of NUREG-0473.

#### 3.2.4 Effluent Treatment

The objectives of the RETS with regard to effluent treatment are to ensure that wastes are treated to keep releases ALARA and to satisfy the provisions of technical specifications governing the maintenance and use of radwaste treatment equipment.

In the proposed submittal, the Licensee did not make a commitment to include in the RETS the model specifications for use of liquid and gaseous radwaste treatment systems. The Licensee, however, affirmed its commitment to operate the plant within 10CFR50, Appendix I limits at all times. For liquid effluents, the Licensee has a filter that is used at all times and which cannot be disconnected. For gaseous effluents, the Licensee has a fixed line from the offgas air ejector to the stack; there is a fixed holdup time (approximately 30 minutes) by passing through the line to the stack.

Based on the unique plant-specific information for the Big Rock Point plant, it was determined [32] that the Licensee's proposal on the radwaste treatment system meets the intent of NUREG-0473.

#### 3.2.5 Radioactivity Inventory Limits

The objective of the RETS with regard to the liquid 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. The Licensee did not include such a liquid tank specification in the proposed

submittal, since the Licensee stated that all the outside tanks have overflow to radwaste and for this plant none are likely to exceed 10 curies. The Licensee also has not specified a limit for the noble gas release rate from the main condenser air ejector. According to the Licensee, other technical specification commitments make a separate specification unnecessary.

Based on the unique plant-specific information for the Big Rock Point plant, it was determined [32] that the Licensee's proposal on the radioactivity inventory limits meets the intent of NUREG-0473.

### 3.2.6 Explosive Gas Mixtures

The objective of the RETS with regard to explosive gas mixtures is to prevent hydrogen explosions in waste gas systems.

The Licensee did not provide a specification for the control of explosive gases. The Licensee explained that the Big Rock Point plant does not require the monitoring of hydrogen based on the Licensee's response to IE Bulletin 78-03. The conclusion is based on the operation and design of the offgas system which make the potential for explosive hydrogen concentrations unlikely.

It was determined [32] that the Licensee meets the intent of NUREG-0473 in the interim until NRC completes its study of the explosive gas problem.

### 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 the burial site. Specification 3.11.3 of NUREG-0473 provides for the establishment of a PCP to show compliance with this objective. The Licensee has made a commitment to implement such a program in accordance with a PCP and to thus ensure that radwaste is properly processed and packaged before it is shipped to the burial site. This meets the intent of NUREG-0473.

### 3.2.8 Radiological Environmental Monitoring Program

The objectives of the RETS with regard to environmental monitoring are to ensure that an adequate and full-area-coverage monitoring program exists and that the 10CFR50, Appendix I requirements for technical specifications on environmental monitoring are satisfied. In all cases, the Licensee has followed NUREG-0473 guidelines, including the Branch Technical Position dated November 1979 [39], and has provided an adequate number (16) of thermoluminescent dosimeter (TLD) sample locations omitting water sectors not applicable to land pathways. The Licensee's methods of analysis and maintenance of yearly records satisfy the NRC guidelines and meet the intent of 10CFR50, Appendix I. The Licensee has also made a commitment to document the environmental monitoring sample locations in the ODCM, which meets the intent of NUREG-0473. The specification for the land use census satisfies the provisions of Section 3.12.2 of NUREG-0473 by providing for an annual census in the specified areas. The Licensee participates in an interlaboratory comparison program approved by the NRC and reports the results in the Annual Radiological Environmental Operating Report, which also meets the intent of NUREG-0473.

It was therefore concluded that the radiological environmental monitoring program as proposed by the Licensee meets the intent of NUREG-0473.

### 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 Nuclear Operations Department per CPC 2A (Quality Assurance Program) for review and approval of the changes to the PCP and ODCM. Audits are performed under the cognizance of the Nuclear Safety Board (NSB); these audits encompass the radiological environmental monitoring program and the quality assurance program. It is determined that the Licensee-proposed administrative structure satisfactorily meets the intent of NUREG-0473.

### 3.2.10 Procedures and Records

The objective of the RETS with regard to procedures is to satisfy the provisions for written procedures specified in NUREG-0473. It is also an objective of RETS to properly retain the documented records related to the environmental monitoring program and certain QA procedures.

The Licensee's existing procedures and the newly proposed RETS specifications were deemed [32] to meet the intent of NUREG-0437.

### 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 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-0473:

1. Annual radiological environmental operating report. In Section 6.9.2.1 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 radiological environmental surveillance activities. The report also includes the results of land use censuses, and participation in an interlaboratory comparison program specified by Specification 13.2.4 of the submittal.
2. Semiannual radioactive release reports. In Section 6.9.2.2 of the Licensee's submittal, a commitment was made to provide semiannual effluent release reports which include a summary of radioactive liquid and gaseous effluents and solid waste released, using Regulatory Guide 1.21 as guidance and assessment of offsite doses. Listing of new locations for dose calculations identified by the land use census as well as any changes to ODCM and PCP are also included in the report.
3. Special report. The Licensee has made a commitment 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 13.1.4.1



- o Exceeding radioactive gaseous effluent limits according to:  
Dose, Specifications 13.1.4.2 and 13.1.4.3
- o Exceeding radioactive effluent limits according to:  
Uranium Fuel Cycle Dose Commitment, Specification 13.1.6.1
- o Exceeding the reporting levels of Table 13.3.2 for the radioactivity measured in the environmental sampling medium, Specification 13.2.1.

These reporting commitments have satisfied the provisions of NUREG-0473.

### 3.2.12 Implementation of Major Programs

One objective of the administrative controls is to ensure that implementation of major programs such as the ODCM, PCP, and major changes to the radioactive waste treatment system follow appropriate administrative procedures. The Licensee has made a commitment to review, report, and implement major programs such as the ODCM and PCP. These commitments meet the intent of NUREG-0473.

### 3.3 OFFSITE DOSE CALCULATION MANUAL (ODCM)

As specified in NUREG-0473, 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 systems. 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. Of course, these diagrams should be consistent with the systems being used at the station. A description and location of samples in support of the environmental monitoring program are also needed in the ODCM.

### 3.3.1 Evaluation

The Licensee has followed the methodology of NUREG-0133 [9] to determine the alarm and trip setpoints for the liquid effluent monitors, which ensures that the maximum permissible concentrations, as specified in 10CFR20, will not be exceeded by discharges from various liquid or gaseous release points.

The Licensee demonstrated the method of calculating the radioactive liquid concentration by describing in the ODCM the means of collecting and analyzing representative samples prior to and after releasing liquid effluents into the circulating water discharge.

Methods are also included for showing that dose rates released to unrestricted areas due to noble gases, radioiodines, and particulates with half-lives greater than 8 days are in compliance with 10CFR20. In this calculation, the Licensee has considered effluent releases from the plant stack. All releases are treated as elevated at 73 meters. The Licensee intends to use the maximally exposed individual and the critical organ as the reference receptor. The Licensee has 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 has identified fish ingestion and potable water consumption as the viable pathways. In the calculation, the Licensee has used the suggested methodology given in Regulatory Guide 1.109. The Licensee has used the maximally exposed 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 has followed the methodology of NUREG-0133 and Regulatory Guide 1.109.

For radioiodines and particulates with half-lives greater than 8 days, the Licensee has provided a method to demonstrate that cumulative doses calculated from the release meet both quarterly and annual design objectives.

Due to plant-specific reasons, the Licensee has not provided methods for monthly liquid and gaseous dose projections. The Licensee's alternative and commitment have been determined [32] to meet the intent of NUREG-0473, as discussed in Section 3.2.4 of this report.

The Licensee has provided flow diagrams for both the liquid and gaseous waste systems and has identified the effluent paths and components of the radioactive liquid and gaseous waste treatment systems.

The Licensee has not provided a description of sampling locations in the ODCM. The Licensee instead will continue to include maps and detailed locations in its Annual Radiological Environmental Operating Report. This has been determined [32] to meet the intent of NUREG-0473.

The Licensee has assessed the total dose (40CFR190 requirement) including the direct radiation, which satisfies the total dose provision of NUREG-0473.

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

#### 3.4 PROCESS CONTROL PROGRAM (PCP)

NUREG-0473 specifies that the Licensee develop a PCP to ensure that the processing and packaging of solid radioactive wastes will be accomplished in compliance with 10CFR20, 10CFR71, and other federal and state regulations or requirements governing the offsite disposal of the low-level radioactive waste.

The PCP is not intended to contain a set of detailed procedures; rather, it is the source of basic criteria for the detailed procedures to be developed by the Licensee. The criteria used for the PCP are to address only current NRC guidance [31].

#### 3.4.1 Evaluation

The Licensee has made a commitment to process all liquid wet wastes prior to shipment offsite; has made a commitment to comply with federal regulations on shipping and packaging; has provided general descriptions for a laboratory test for solidification; has provided a general description of solidification process; and has made a commitment for the treatment of oily wastes.

In summary, it is concluded that the Licensee generally complies with the current NRC criteria for PCP implementation. The acceptability of this PCP is based on currently available guidelines, but a future revision should address compliance with 10CFR61 when revised guidance becomes available.

#### 4. CONCLUSIONS

Table 1 summarizes the results of the final review and evaluation of the submittal for the Big Rock Point Nuclear Power Plant proposed Radiological Effluent Technical Specifications (RETS). The following conclusions have been reached:

1. The Licensee's proposed Radiological Effluent Technical Specifications (RETS) submitted January 7, 1985 [29] meet the intent of NUREG-0473, "Radiological Effluent Technical Specifications."
2. The Licensee's Offsite Dose Calculation Manual (ODCM) submitted January 7, 1985 [29] uses documented and approved methods that are generally consistent with the criteria of NUREG-0133 and applicable to Big Rock Point Nuclear Power Plant. It is thus an acceptable reference.
3. The Licensee's PCP, submitted January 7, 1985 [29], generally complies with the current NRC criteria for implementing the PCP and is therefore acceptable.

Table 1. Evaluation of Proposed Radiological Effluent Technical Specifications (RETS), Big Rock Point Nuclear Power Plant

	<u>Technical Specifications</u>		<u>Replaces</u>	<u>Evaluation</u>
	<u>NRC Staff</u> Std. RETS NUREG-0473 (Section) *	<u>Licensee</u> Proposal (Section)	<u>or Updates</u> Existing Tech. Specs. (Section)	
Effluent Instrumentation	3/4.3.3.3.10 3/4.3.3.3.11	13.1.1.1	6.4.1 Appendix A	Meets the intent of NRC criteria
Radioactive Effluent Concentrations	3/4.11.1.1 3/4.11.2.1	13.1.2.1 13.1.3.1	To be added to Appendix B	Meets the intent of NRC criteria
Offsite Doses	3/4.11.1.2, 3/4.11.2.2, 3/4.11.2.3, 3/4.11.4	13.1.4.1 13.1.4.2 13.1.4.3 13.1.6	Appendix B	Meets the intent of NRC criteria
Effluent Treatment	3/4.11.1.3 3/4.11.2.4	NA NA	6.5.1 6.5.2	Meets the intent of NRC criteria
Radioactivity Inventory Limits	3/4.11.1.4 3/4.11.2.6	NA NA	Not addressed Not addressed	Meets the intent of NRC criteria
Explosive Gas Mixtures	3/4.11.2.5B	NA	Not addressed	Meets the intent of NRC criteria in the interim
Solid Radioactive Waste	3/4.11.3	13.1.5	6.5.3	Meets the intent of NRC criteria
Environmental Monitoring	3/4.12.1	13.2.1	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
Reports	6.9	6.9	6.9 Appendix A	Meets the intent of NRC criteria
Implementation of Major Programs	6.13, 6.14, 6.15	6.14, 6.15,	To be added to Appendix A	Meets the intent of NRC criteria

\*Section number sequence is according to NUREG-0473, Rev. 3, Draft 7" [13].

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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"
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Franklin Research Center, November 18, 1981
19. Technical Review of Offsite Dose Calculation Manual for Big Rock Point Nuclear Power Plant (Draft)  
Franklin Research Center, November 18, 1981

20. Franklin Research Center  
Letter of Transmittal to NRC  
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21. "Comparison of Specification NUREG-0472, Radiological Effluent Technical  
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