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# RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS (RETS) IMPLEMENTATION - FORT CALHOUN STATION

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## ABSTRACT

A review of the Radiological Effluent Technical Specifications (RETS) of the Fort Calhoun Station was performed. The principal review guidelines used were NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," and Draft 7'' of NUREG-0472, Revision 3, "Radiological Effluent Technical Specifications for Pressurized Water Reactors." Draft submittals were discussed with the Licensee by both EG&G and the NRC staff until all items requiring changes to the Technical Specifications were resolved. The Licensee then submitted final proposed RETS to the NRC which were evaluated and found to be in compliance with the NRC review guidelines. The proposed Offsite Dose Calculation Manual was reviewed and generally found to be in compliance with the NRC review guidelines.

## FOREWORD

This Technical Evaluation Report was prepared by EG&G Idaho, Inc. under a contract with the U. S. Nuclear Regulatory Commission (Office of Nuclear Reactor Regulation, Division of Systems Integration) for technical assistance in support of NRC operating reactor licensing actions. The technical evaluation was conducted in accordance with criteria established by the NRC.

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# 1.0 INTRODUCTION

## 1.1 Purpose of the Technical Evaluation

The purpose of this Technical Evaluation Report (TER) is to review and evaluate the proposed changes in the Technical Specifications of the Fort Calhoun Station with regard to Radiological Effluent Technical Specification (RETS) and the proposed Offsite Dose Calculation Manual (ODCM).

The evaluation used criteria proposed by the Nuclear Regulatory Commission (NRC) staff in the model Technical Specifications for pressurized water reactors (PWRs), NUREG-0472,[1] and subsequent revisions. This effort is directed toward the NRC objective of implementing RETS which comply with the regulatory requirements, primarily those of 10 CFR Part 50, Appendix I.[2] Other regulations pertinent to the control of effluent releases are also included within the scope of compliance.

## 1.2 Generic Issue Background

Since 1970, 10 CFR Part 50, Section 50.36.a,[3] "Technical Specifications on Effluents from Nuclear Power Reactor," has required licensees to provide Technical Specifications which ensure that radioactive releases will be kept as low as is reasonably achievable (ALARA). In 1975, numerical guidance for the ALARA requirement was issued in 10 CFR Part 50, Appendix I. The licensees of all operating reactors were required[4] to submit, no later than June 4, 1976, their proposed ALARA Technical Specifications and information for evaluation in accordance with 10 CFR Part 50, 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 deal with radioactive waste management systems and environmental monitoring. Although the model RETS address the 10 CFR Part 50, Appendix I requirements, subsequent revisions include provisions for addressing issues not covered in Appendix I. These provisions are stipulated in the following regulations:

- 10 CFR Part 20,[5] "Standards for Protection Against Radiation," Sections 20.105.c, 20.106.g and 20.405.c which require that nuclear power plants and other Licensees comply with 40 CFR Part 190,[6] "Environmental Radiation Protection Standards for Nuclear Power Operations," and submit reports to the NRC when the 40 CFR Part 190 limits have been or may be exceeded.

- 10 CFR Part 50, Appendix A,[7] "General Design Criteria for Nuclear Power Plants," which contains Criterion 60--Control of releases of radioactive materials to the environment; Criterion 63--Monitoring fuel and waste storage; and Criterion 64--Monitoring radioactive releases.

- 10 CFR Part 50, Appendix B,[8] which 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 and NUREG-0473 for BWRs. Copies of the model RETS were sent to licensees in July 1978 with a request to submit proposed site-specific RETS on a staggered schedule over a six-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 were subsequently revised (Revision 1) 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 document, the ODCM.

Revision 1 of the 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 six-month period.

Four regional seminars on the RETS were conducted by the NRC staff during November and December 1978. Subsequently, a preliminary copy of Revision 2 of the model RETS and additional guidance on the ODCM and a PCP were issued in February 1979 to each utility at individual meetings. NUREG-0472, Revision 2[1] and NUREG-0473, Revision 2[10] were published in July 1979 and updated in January 1980 and February 1980. 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 September 1981 using subcontracted independent teams as reviewers.

As the RETS reviews progressed, feedback from the licensees led the NRC to modify some of the provisions in the February 1, 1980 version of Revision 2 to clarify specific concerns of the licensees and thus expedite the reviews. Starting in April 1982, the 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 an AIF meeting on May 19, 1982.[11] Some interim changes regarding the Radiological Environmental Monitoring Section were issued in August 1982.[12] With the incorporation of these changes, the NRC issued Draft 7'' of Revision 3 of NUREG-0472[13] and NUREG-0473[14] in September 1982 to serve as new guidance for the review teams.

### 1.3 Plant-Specific Background

In conformance with the 1975 directive,[4] Omaha Public Power

District (OPPD), the Licensee of Fort Calhoun Station, filed with the NRC on June 4, 1976[15] the information necessary for evaluation of Fort Calhoun Station with respect to Appendix I of 10 CFR Part 50. This information was evaluated by the Nuclear Regulatory Commission Division of Site Safety and Environmental Analysis and found to meet the requirements of Appendix I.[16]

In response to the USNRC's letters of July 11, 1978 (Mr. B. R. Grimes, Assistant Director for Engineering and Projects, Division of Operation Reactors, to all Power Reactor Licensees) and November 15, 1978, Omaha Public Power District submitted proposed RETS for Fort Calhoun Station to the Commission, dated March 21, 1978.[17] This sought to amend the Fort Calhoun Station Technical Specifications in order to ensure compliance with the dose design objectives of Appendix I to 10 CFR 50. This application was revised by a later submittal from OPPD dated March 30, 1979.[18] EG&G Idaho, Inc. (EG&G), selected as an independent task review team, initiated a review and evaluation of the March 1979 submittal. The submittal was compared with the model RETS and assessed for compliance with the requirements of 10 CFR Part 50, Appendix I, and 10 CFR Part 50, Appendix A. The Licensee's ODCM (Dose Evaluation Program) dated March 1979 was reviewed against NUREG-0133 and Regulatory Guide 1.109. Review comments and questions dated January 7, 1982,[19] concerning the March, 1979 RETS and ODCM, were mailed to the NRC prior to arranging a site visit with the Licensee.

During the site visit on January 26 and 27, 1982, technical discussions resolved many of the issues identified in the January 1982 letter. Following the site visit, EG&G prepared an updated review of the RETS and ODCM identifying the remaining unresolved issues and transmitted the review to NRC in letter dated May 11, 1982.[20] The NRC prepared and sent to OPPD a draft Safety Evaluation Report[21] which included a summary of the remaining unresolved items in the Licensee's proposals. OPPD responded to the Safety Evaluation with a discussion of the unresolved items, including agreement to modify many items in their proposed RETS to meet the intent of NUREG-0472 and statements supporting

their posisiton concerning other items.[22] A meeting was held January 11, 12, 1983 between NRC and EG&G representatives to discuss OPPD's response to the unresolved items contained in the draft Safety Evaluation. Following this meeting, EG&G prepared another letter identifying the remaining unresolved issues.[23] The NRC transmitted the list of unresolved issues to OPPD in a letter dated July 19, 1983[24] and requested another RETS submittal from OPPD. On August 5, 1983, EG&G transmitted to the NRC a reformatted list[25] of unresolved issues showing model RETS requirements in juxtaposition with the corresponding requirements of the Licensee's proposed RETS. Following this letter, a conference was held at Omaha, Nebraska on October 12-13, 1983 between representatives of the NRC and OPPD to discuss the Licensee's submittal. Most of the outstanding issues were resolved at this meeting. The results of this meeting were summarized in a letter by the NRC Project Manager for Fort Calhoun, dated November 4, 1983.[26] A conference between NRC and OPPD personnel in Washington, D.C. on April 17, 1984 resolved the remaining outstanding issues concerning the Licensee's RETS, resulting in a final RETS and ODCM submittal dated October 18, 1984.[27] This submittal allowed preparation of a TER by EG&G for transmittal to the NRC.

The October 18, 1984 ODCM was reviewed by EG&G and comments transmitted to the NRC in a letter dated November 28, 1984.[28] It was determined the ODCM contains documented and approved methods that are generally consistent with the guidelines of NUREG-0133 and is therefore acceptable to NRC as a reference.

## 2.0 REVIEW CRITERIA

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

1. NUREG-0472, RETS for PWRs
2. NUREG-0473, RETS for BWRs
3. 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 10 CFR Part 20, Appendix B, Table 2 limits.[29]

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 would not cause offsite doses exceeding 10 CFR Part 20 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.

In addition to NUREG-0472 and NUREG-0473 and their subsequent revisions, the NRC staff issued guidelines,[30,31] clarifications,[32,33] and branch positions[34,35,36] establishing a policy that requires the licensees of operating reactors to meet the intent, if not the letter, of the model RETS requirements. The NRC branch positions issued since the RETS implementation review began have clarified the model RETS for operating reactors.

Review criteria for the ODCM are based on the following NRC guidelines: Branch Technical Position, "General Content of the Offsite Dose Calculation Manual;"[37] NUREG-0133;[9] and Regulatory Guide 1.109.[38] The format for the ODCM is left to the licensee and may be simplified by tables and grid printouts.

# 3.0 TECHNICAL EVALUATION

## 3.1 General Description of Radiological Effluent Systems

This section briefly describes the liquid and gaseous radwaste effluent treatment systems, release paths, and control systems installed at Fort Calhoun Station, a PWR.

### 3.1.1 Radioactive Liquid Effluents

The liquid waste system and discharge pathways of the Fort Calhoun Station are block diagrammed in Figure 1. Hydrogen bearing liquid radwaste derived from reactor coolant liquids is collected in the reactor coolant drain tank and the auxiliary coolant drain tank, both of which are blanketed with nitrogen. The contents of these tanks and bleed-offs from the CVCS are directed to the neutralization tank for pH adjustment. The neutralized wastes are pumped to the waste holdup tanks where they are analyzed to determine the type of treatment required. They are then pumped to the monitor tanks or to the treatment inlet header. Treatment can consist of any combination of filtration, gas stripping, evaporation, and demineralization. Treated wastes are transferred to the monitor tanks prior to discharge.

Auxiliary systems wastes, which may be contaminated by reactor coolant but which may also be aerated prior to entering the waste disposal system, are collected in the spent regenerant tanks. These tanks are vented to the building ventilation exhaust system. A completed waste batch is sampled, analyzed, and then delivered to either the treatment inlet header or the monitor tanks.

Hotel wastes from the laundry drain header, showers, and hand sinks, are collected in the hotel waste tanks, from which they are delivered to either the treatment inlet header or the monitor tanks by manually controlled pumps.

Waste from the monitor tanks is diluted by a circulating water flow of

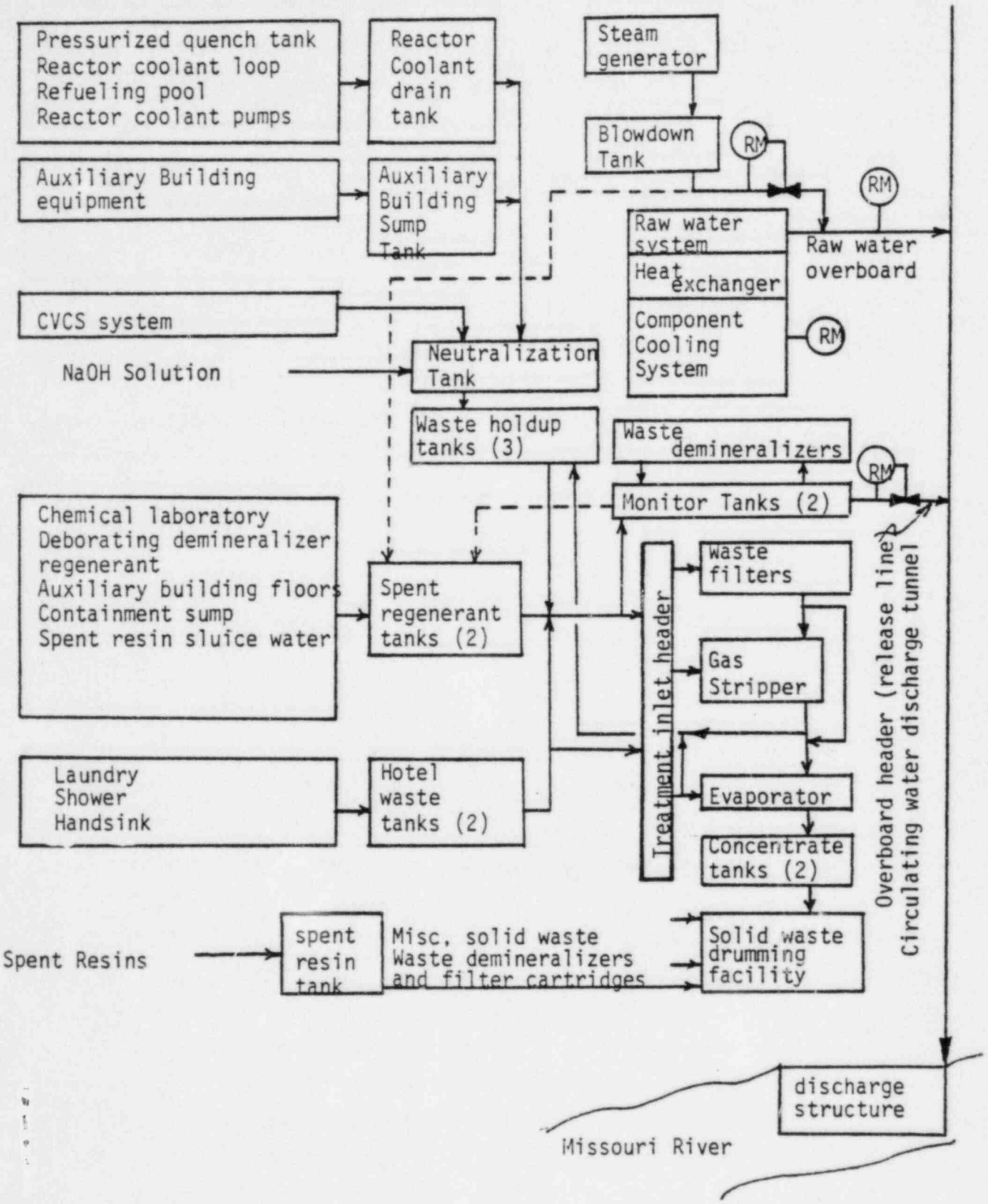


Figure 1. Fort Calhoun liquid radwaste treatment and effluent system

at least 120,000 gpm to ensure that the concentration limits of 10 CFR 20, Appendix B are not exceeded. An effluent control monitor on the release line is set to alarm and automatically close the waste discharge valve prior to exceeding these limits.

Steam generator blowdown liquid is normally released from the blowdown tank to the circulating water discharge tunnel.

The closed component cooling water system is designed to cool components carrying radioactive or potentially radioactive fluids. It also serves as a cooling medium for the containment air coolers and the control room air-conditioning equipment. The system provides a monitored intermediate barrier between these fluids and the raw water system which transfers heat from the component cooling water system to the river.

3.1.2 Radioactive Gaseous Effluents

A block diagram of the gas handling systems and effluents pathways is shown in Figure 2.

Radioactive waste gases are collected, compressed, stored, analyzed and monitored in the radioactive waste disposal system (RWDS).

Radioactive gases, normally present in trace amounts in reactor primary coolant liquids, collect in the vapor space above the various tanks and components as the liquid becomes depressurized. Hydrogen gas, used for corrosion control in the reactor coolant system, enters the coolant at the CVCS volume control tank. Nitrogen gas is used to blanket the tanks and components, thereby greatly diluting the hydrogen and radioactive gases. As a tank fills, or a component operates, the gases occupying the vapor space are forced into the vent header (VH), where they are known as waste gases. Any gases, including radioactive gases, that remain in waste liquids after collection and partial processing are

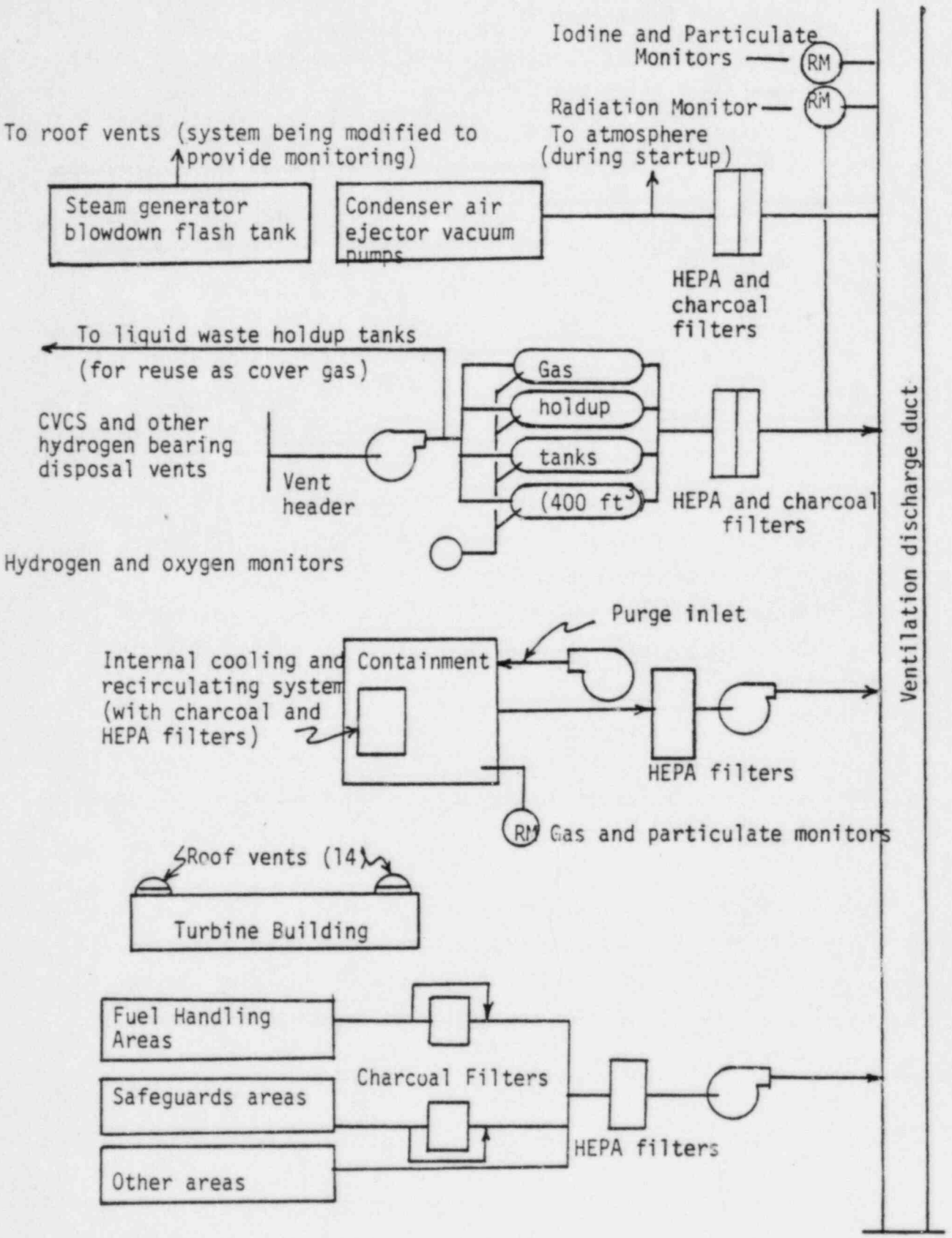


Figure 2. Fort Calhoun gaseous radwaste treatment and effluent system

removed at the gas stripper and transfered to the vent header.

Two waste gas compressors take gas from the vent header and deliver it to one of four gas decay tanks. The contents of a filled decay tank are analyzed to determine whether the gas must be retained to permit radioactive decay or is suitable for controlled release to the atmosphere. Waste gas may also be reused for cover gas, instead of injecting fresh nitrogen. Gases from the holdup tanks are released through the ventilation discharge duct.

Gases from the air ejector are released through a charcoal filter to the ventilation discharge duct except during startup. During startup the effluent gases are released directly to the atmosphere.

The containment purge exhaust provides for the removal of potentially contaminated gases from within the containment and exhausts them to the environs. The containment atmosphere is continuously cooled and cleaned by an internal cleanup system which includes a HEPA and charcoal filter system. The purged gas is released through a HEPA filter to the ventilation exhaust duct.

The auxiliary building atmosphere, including effluents from the fuel handling area, are exhausted through HEPA filters to the ventilation discharge duct.

The turbine building ventilation exhaust provides a release path for potentially radioactive gaseous and air particulate activity generated by steam leakage, equipment vents, packing leakage, and other secondary system losses with the turbine building. Effluents are released at turbine building roof vents.

## 3.2 Radiological Effluent Technical Specifications

The following subsections describe the primary objectives of each section of the model RETS and a summary of the commitments of the Licensee's RETS. A cross-reference between the numbering in the model

RETS and the Licensee's RETS is contained in Table 1. The chronological sequence of the RETS review was described in the Plant-Specific Background, Section 1.3 of this report.

### 3.2.1 Effluent Instrumentation

The objective of the model RETS with regard to effluent instrumentation is to ensure that all significant liquid and gaseous radioactive effluents are monitored. The model RETS specify that all effluent monitors be operable with periodic surveillance and that alarm/trip setpoints be determined in order to ensure that offsite radioactive effluent concentrations do not exceed maximum permissible concentrations (MPCs) listed in 10 CFR Part 20.

The licensee has provided radiation monitors for all effluent lines with potential for release of significant amounts of radioactivity in liquid or gaseous effluents.

#### 3.2.1.1 Radioactive Liquid Effluent Instrumentation

All liquid effluents from the Fort Calhoun Station that potentially contain significant radioactivity are released through the overboard header, which is equipped with a monitor providing automatic termination of release in case of high radiation levels. The steam generator blowdown line is equipped with a separate monitor which terminates the discharge from that source only. Adequate instrument surveillance is performed on the monitoring systems.

Dilution of the radioactive liquid effluent from the plant is provided in the circulating water discharge tunnel by mixing with flow of the circulating water system.

#### 3.2.1.2 Radioactive Gaseous Effluent Instrumentation

There are two monitored release points for radioactive gaseous effluents from the Fort Calhoun Station. The releases are from the ventilation stack and the condenser air ejector.

The ventilation stack has noble gas monitors, iodine monitors, and particulate monitors. Each of the three stack monitors provides automatic termination of release upon a high radiation condition. The ventilation stack is the release point for radioactive gases from the waste gas holdup tanks, containment releases, and auxiliary building releases. Air ejector releases are monitored for noble gases and annunciation is provided upon a high radiation condition.

The radioactive gaseous effluent monitors have adequate surveillance requirements which meet the intent of NUREG-0472.

3.2.1.3 Liquid and Gaseous Instrumentation Setpoints

The Licensee's Technical Specifications require that the release rate of radioactive material in liquid or gaseous effluents shall be controlled such that the instantaneous concentrations for radionuclides do not exceed the values specified in 10 CFR Part 20, Appendix B, for unrestricted areas. The setpoints for the radioactive liquid and gaseous effluent instrumentation will be determined in accordance with the ODCM to provide alarm and/or automatic termination of release upon a high radiation condition.

The Licensee's RETS submittal on radioactive liquid and gaseous effluent monitoring instrumentation has satisfied the provisions and meets the intent of NUREG-0472.

3.2.2 Concentration and Dose Rates of Effluents

3.2.2.1 Liquid Effluent Concentration

The Licensee's RETS include a commitment to maintain the concentration of radioactive liquid effluents released from the site to the unrestricted areas to within 10 CFR Part 20 limits, and if the concentration of liquid effluents to the unrestricted area exceeds these limits, it will be restored immediately to a value equal to or less than the MPC values specified in 10 CFR Part 20. Both batch and continuous releases are

sampled and analyzed periodically in accordance with an acceptable sampling and analysis program.

Therefore, the Licensee's RETS submittal on liquid effluent dose rates meets the intent of NUREG-0472.

3.2.2.2 Gaseous Effluent Concentrations

The Licensee's RETS include a commitment to maintain the release rate of radioactive materials in gaseous effluents to the unrestricted area to within 10 CFR 20, Appendix B limits. If the concentration of gaseous effluents exceeds these limits, actions will be taken immediately to restore concentrations to within these limits.

The radioactive gaseous waste sampling and analysis program provides adequate sampling and analysis of the discharges.

Therefore, the Licensee's RETS submittal on gaseous effluent dose rates meets the intent of NUREG-0472.

3.2.3 Offsite Doses from Effluents

The objectives of the model RETS with regard to offsite doses from effluents are to ensure that offsite doses are kept ALARA, are in compliance with dose specifications of NUREG-0472 and are in accordance with 10 CFR Part 50, Appendix I and 40 CFR Part 190.

The Licensee's RETS include a commitment to:

1. Limit the dose or dose commitment to a member of the public during any calendar quarter to within the NUREG-0472 criteria.

2. Limit the air dose during any calendar quarter to within the NUREG-0472 criteria.

3. Limit the dose or dose commitment to any organ of an individual in an unrestricted area during any calendar quarter to within the NUREG-0472 criteria.

In addition, the Licensee's annual dose design objectives are equal to the annual dose limits of NUREG-0472 for liquid effluents, air dose due to noble gas releases, and dose to any organ due to release of iodine-131, tritium, and radionuclides in particulate form with half-lives greater than eight days.

The Licensee prefers to comply with the 40 CFR 190 total dose requirement without a technical specification. Since such compliance is mandatory, the intent of NUREG-0472 is met.

Therefore, the Licensee's RETS submittal on offsite doses from radioactive effluents meets the intent of NUREG-0472.

3.2.4 Effluent Treatment

The objectives of the model RETS with regard to effluent treatment are to ensure that the radioactive waste treatement systems are used to keep releases ALARA and to satisfy the provisions for Technical Specifications governing the maintenance and use of radwaste treatment equipment.

The Licensee's RETS include a commitment to operate the liquid radwaste treatement system as identified in the ODCM prior to the discharge of radioactive materials in liquid wastes. If the radioactive liquid wastes were discharged without treatement and it appears that the dose or dose commitment to a member of the public will exceed the quarterly limits, a special report shall be submitted to the Commission with 30 days.

The Licensee's RETS include a commitment to use the gaseous radwaste treatment system to treat gaseous effluents prior to discharge of radioactive materials in gaseous wastes. If the radioactive gaseous wastes were discharged without treatment, a special report shall be prepared and submitted to the Commission within 30 days.

Therefore, the Licensee's RETS submittal on effluent treatment meets the intent of NUREG-0472.

3.2.5 Tank Inventory Limits

The objective of the model RETS with regard to a curie limit on liquid-containing tanks is to ensure that in the event of a tank rupture, the concentrations in the nearest potable water supply and the nearest surface water supply in an unrestricted area would not exceed the limits of 10 CFR Part 20, Appendix B, Table II. The objective of the model RETS with regard to a curie limit on gas-containing tanks is to ensure that in the event of an uncontrolled release of the tank's contents the resulting total body exposure to an individual at the nearest exclusion area boundary will not exceed 0.5 rem.

The Licensee's ODCM includes a commitment to limit the quantity of radioactive materials in outside temporary liquid radwaste tanks to 10 curies.

It is impossible to inject a quantity of gaseous activity into one storage tank to result in an offsite dose of 0.5 rem based on the reactor coolant specific activity limit of Specification 2.1.3 and the corresponding total inventory of noble gases in the reactor coolant system. Therefore, a Technical Specification stating the curie limit for a waste gas decay tank is not required.

Therefore, the Licensee's RETS and ODCM submittals on tank inventory limits meets the intent of NUREG-0472.

3.2.6 Explosive Gas Mixtures

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

The Licensee's RETS state that hydrogen and oxygen monitors shall be monitoring the inservice gas decay tank during transfer of waste gases to the gas decay tank and the concentration of hydrogen and oxygen shall be limited to below flammability concentrations.

Whenever the monitors are inoperable, transfer of waste gases to a gas decay tank may continue provided grab samples are taken from the gas decay tank and analyzed every eight hours during degassing operations and daily during other operations.

Therefore, the Licensee's submittal on explosive gas mixtures meets the intent of NUREG-0472.

3.2.7 Solid Radwaste System

The objective of the model RETS with regard to the solid radwaste system is to ensure that radwaste will be properly processed and packaged before it is shipped from the plant to the burial site to satisfy the requirements of 10 CFR Part 20, Section 20.301 and 10 CFR Part 71.[39]

The Licensee's RETS include a commitment to use the solid radwaste system in accordance with a Process Control Program (PCP) to process wet radioactive wastes to meet the acceptance criteria of the PCP.

Therefore, the Licensee's RETS submittal on solid radioactive wastes meets the intent of NUREG-0472.

3.2.8 Radiological Environmental Monitoring Program

The objectives of the model RETS with regard to a radiological environmental monitoring program are to ensure that (a) an adequate full-area coverage environmental monitoring program exists, (b) there is an appropriate land use census, and (c) an acceptable Interlaboratory Comparison Program exists. The monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50, the land use census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50, and the requirement for participation in an approved Interlaboratory Comparison Program is provided to ensure that independent checks are performed as part of the quality assurance program for environmental monitoring to demonstrate that valid results are obtained for Section IV.B.2 of Appendix I to 10 CFR Part 50.

The Licensee's RETS and ODCM on a radiological environmental monitoring program have in general followed the model RETS and the Branch Technical Position on the subject issued November 1979,[35] as applicable to the site, and have provided an adequate number of sample locations for pathways identified. The Licensee's method of sample analysis and maintenance of the monitoring program satisfies the requirements of Appendix I, 10 CFR Part 50. The Licensee's RETS contain a land use census specification which requires the appropriate annual information for a PWR. The RETS also state that the Licensee will participate in an NRC-approved Interlaboratory Comparison Program.

Thus, the Licensee's RETS submittal for a radiological environmental program meets the intent of NUREG-0472.

3.2.9 Audits and Reviews

The objective of the model 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 identifies the Plant Review Committee (PRC) and the Safety Audit and Review Committee (SARC) as the two groups comparable to the Unit Review Group (URG) and the Company Nuclear Review and Audit Group (CNRAG), respectively.

The PRC is responsible for reviewing changes to the PCP and ODCM as a derivative of the responsibility for reviewing changes to the Technical Specifications. It was determined the requirement to review accidental, unplanned or uncontrolled radioactive releases was satisfied by existing Specifications.

The SARC is responsible for auditing the Radiological Effluent Program including the Radiological Environmental Monitoring Program and results thereof, the Offsite Dose Calculation Manual and implementing procedures, and the Process Control Program for the solidification of radioactive wastes at least once per two years. The Licensee commits to meet or

exceed the requirements of Appendix A of USNRC Regulatory Guide 1.33, which specifies requirements for the Quality Assurance Program.

The PRC and SARC encompass the total responsibility for reviews and audits specified in NUREG-0472. Therefore, the Licensee's requirement for audits and reviews meets the intent of NUREG-0472.

3.2.10 Procedures and Records

The objective of the model RETS with regard to procedures is to ensure that written procedures be established, implemented, and maintained for the PCP, the ODCM, and the QA program for effluent and environmental monitoring. The objective of the model RETS with regard to records is to ensure that documented records pertaining to the radiological environmental monitoring program are retained for the duration of the operating license.

The Licensee's RETS include a commitment to establish, implement, and maintain written procedures for the radwaste solidification program (PCP) and the dose evaluation program (ODCM). It was determined the procedure requirement for the quality assurance program was satisfied by OPPD's requirement for written procedures recommended in Appendix A of Regulatory Guide 1.33.

The Licensee's RETS state that records of analyses required by the Radiological Environemntal Monitoring Program shall be retained for the duration of the Facility Operating License.

Therefore, the Licensee's RETS submittal on procedures and records meets the intent of NUREG-0472.

3.2.11 Reports

The objective of the model RETS with regard to reporting requirments is to ensure that appropriate annual and semiannual periodic reports and special reports are submitted to the NRC.

The Licensee's RETS include commitments to submit the following reports:

1. Annual Radiological Environmental Operating Report

This report includes summaries, interpretations and anlaysis of trends of the results of the radiological environmental surveillance program. The report also includes the results of the land use census and results of particpation in the Interlaboratory Comparison Program. The report will be submitted prior to May 1 of each year.

2. Semiannual Radioactive Effluent Release Report

This report contains a summary of the quantities of radioactive liquid and gaseous effluents released and is submitted within 60 days after January 1 and July 1 of each year. The report commits to the requirements of Regulatory Guide 1.21 which is determined to include a summary of solid waste shipped offsite and a summary of unplanned releases. A summary of the unrestricted area boundary maximum noble gas gamma air and beta air doses shall be evaluated. Any changes to the PCP or ODCM will be included. The ODCM changes will include any changes required by the land use census.

3. Special Reports

The Licensee's RETS include a commitment to file a special report under the following conditions:

- Exceeding the liquid effluent dose limits according to Specification 2.9.1.(1)b.(iii) within 30 days of determination.

- Exceeding the gaseous effluent dose limits according to Specification 2.9.1.(2)b.(iii) within 30 days of determination.

- Exceeding the reporting levels for the radioactivity measured in environmental sampling program Specification 3.11.(2) within 30 days.

Therefore, the Licensee's RETS submittal on reports meets the intent of NUREG-0472.

3.2.12 Other Administrative Controls

An objective of the model RETS in the administrative controls section is to ensure that any changes to the PCP and ODCM and major changes to the radioactive waste treatment systems are reported to the NRC.

The Licensee's RETS commit to reporting changes to the PCP and the ODCM in the semiannual report. A level of detail commensurate to the significance of the change will be provided. Changes to the radwaste system will be reported in the monthly operating report.

Therefore, the Licensee's RETS submittal for these administrative controls meets the intent of NUREG-0472.

## 3.3 OFFSITE DOSE CALCULATION MANUAL

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:

- alarm and trip setpoints for effluent instrumentation,
- liquid effluent concentration in unrestricted areas,
- gaseous effluent dose rates or concentrations at or beyond the site boundary,
- liquid and gaseous effluent dose contributions,
- total dose compliance, including direct shine,
- 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 needed in the ODCM.

3.3.1 Evaluation

The Licensee's ODCM satisfies the equation in the addendum of NUREG-0133 to determine the alarm and trip setpoints for the steam generator blowdown and the overboard discharge header liquid effluent monitors. This assures that the alarm and trip actions will occur prior to exceeding the 10 CFR Part 20, Appendix B, Table II values at the discharge point to the unrestricted area.

The methodology of the Licensee's ODCM to determine maximum allowable release rate setpoints for radioactive noble gases, iodine and particulates is based on a limiting activity at the site boundary. The methodology and the ODCM commitments to Notes 1 through 4 of 10 CFR Part 20, Appendix B, provides assurance that the maximum permissible concentrations in the unrestricted area will not be exceeded.

Compliance to the dose limits of 10 CFR Part 50, Appendix I, is demonstrated by calculating the cumulative dose contributions for liquid and gaseous releases on a quarterly basis. The drinking water and fish consumption pathways are considered the major pathways of exposure due to radioactive liquid effluents. The dose calculations for the gaseous releases include the noble gas doses to air and the total body and thyroid doses to the child and infant from I-131, tritium, and particulates with half-lives greater than 8 days. The dose to the individual considers the inhalation, ground, and food pathways.

Methodology for demonstrating compliance to 40 CFR 190 is not included in the ODCM since a total dose specification is not included in the Licensee's RETS submittal. Consequently demonstration of compliance is a responsibility of the Licensee.

Methodology for projecting doses to determine use of the liquid or gaseous radwaste treatment systems is not required since the ODCM states the equipment shall be in use prior to a release.

Specific parameters of distance and direction from the centerline of the containment for the radiological environmental monitoring program sample stations are provided in Table 10 and Figure 2 of the ODCM.

The Licensee's ODCM generally follows NRC guidance and uses methods consistent with the methodology and guidance prescribed in NUREG-0133.

## 4.0 CONCLUSIONS

The Licensee's proposed RETS and ODCM were reviewed and evaluated and the following conclusions were reached:

- The Licensee's proposed RETS for the Fort Calhoun Station submitted October 18, 1984 meet the intent of the NRC staff's "Standard Radiological Effluent Technical Specifications for Pressurized Water Reactors", NUREG-0472.

- The Licensee's ODCM dated August 1984, uses documented and approved methods that are applicable to the Fort Calhoun Station and are generally consistent with the guidelines of NUREG-0133.

A correspondence between (a) NUREG-0472, (b) the Licensee's current RETS, and (c) the Licensee's proposed RETS is shown in Table 1.

TABLE 1. CORRESPONDENCE OF PROVISIONS OF NUREG-0472. THE LICENSEE'S CURRENT TECHNICAL SPECIFICATIONS AND THE LICENSEE'S PROPOSAL FOR THE FORT CALHOUN STATION.

| RETS Requirement | NUREG-0472 | Current Technical Specification | Licensee Proposal (Section) |
|---|---|---|---|
| Effluent Instrumention | 3.3.3.10 | 2.9.(1)d,e | 2.9.(1)d,e |
| | 3.3.3.11 | 2.9.(2)f(iii) | 2.9.1(2)f |
| Concentrations or Dose Rates | 3.11.1.1 | 2.9.(1)a | 2.9.1(1)a |
| | 3.11.2.1 | 2.9.(2)a | 2.9.1(2)a |
| Offsite Doses | | | |
| | 3.11.1.2 | 2.9.(1) | 2.9.1(1) |
| | 3.11.2.2 | 2.9.(2) | 2.9.1.B |
| | 3.11.2.3 | 2.9.(2) | 2.9.1.B |
| | 3.11.4 | --- | --- |
| Radwaste Treatment | | | |
| | 3.11.1.3 | 2.9.(1)f | 2.9.1(1)c |
| | 3.11.2.4 | 2.9.(2)g | 2.9.1(2)c |
| Tank Inventory Limits | 3.11.1.4 | 2.9(1)g | ODCM |
| | 3.11.2.6 | 2.9(2)h | --- |
| Explosive Gas Mixtures | 3.11.2.5 | --- | 2.9.1(2)d(i) |
| Solid Radwaste | 3.11.3 | --- | 2.9.2 |
| Environmental Monitoring 3.11(2) | 3.12.1 | 3.11 | 3.11(1), |
| Land Use Census | 3.12.2 | --- | 3.11(3) |
| Interlaboratory Comparison | 3.12.3 | --- | 3.11(4) |
| Audits and Reviews | 6.5.1 | 5.5.1.6 | 5.5.1.6 |
| | 6.5.2 | 5.5.2.8 | 5.5.2.8, 5.8.1 |
| Procedures and Records | 6.8, 6.10 | 5.8, 6.10.2 | 5.8, 6.10.2 |
| Reports | 6.9 | 5.9 | 5.9 |
| Other Administrative Controls | 6.13 | --- | 5.9.4 |
| | 6.14 | --- | 5.9.4 |
| | 6.15 | --- | --- |

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13 ABSTRACT (200 words or less)

A review of the Radiological Effluent Technical Specifications (RETS) of the Fort Calhoun Station was performed. The principal review guidelines used were NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," and Draft 7'' of NUREG-0472, Revision 3, "Radiological Effluent Technical Specifications for Pressurized Water Reactors." Draft submittals were discussed with the Licensee by both EG&G and the NRC staff until all items requiring changes to the Technical Specifications were resolved. The Licensee then submitted final proposed RETS to the NRC which were evaluated and found to be in compliance with the NRC review guidelines. The proposed Offsite Dose Calculation Manual was reviewed and generally found to be in compliance with the NRC review guidelines.

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