RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS (RETS) IMPLEMENTATION - FORT ST. VRAIN NUCLEAR GENERATING PLANT

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ABSTRACT

A review of the Radiological Effluent Technical Specifications (RETS) of the Fort St. Vrain Nuclear Generating Plant 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 requirements of the NRC review guidelines. The proposed Offsite Dose Calculation Manual was reviewed and generally found to be in compliance with the NRC review guidelines. However, there are outstanding items that will be resolved at a future date. A Process Control Program will be prepared and submitted to the NRC for review at a future date.

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. 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 St. Vrain Nuclear Generating Plant with regard to Radiological Effluent Technical Specifications (RETS), the proposed Offsite Dose Calculation Manual (ODCM), and the Process Control Program (PCP).

Since model Technical Specifications do not exist for a gas-cooled reactor (HTGR), 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 50.36a,[3] "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 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 initial NRC position on the model RETS was established in May 1978 when the NRC's Regulatory Requirements Review Committee approved the first model RETS (NUREG-0472 for PWRs and NUREG-0473 for boiling water reactors [BWRs]).

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] in September 1982 to serve as new guidance for the review teams.

1.3 Plant-Specific Background

On January 2, 1981, the Public Service Company of Colorado (PSC) submitted RETS to the NRC[14] to conform to the requirements of 10 CFR Part 50, Appendix I, as specified in the 1975 directive.[4] This submittal was a continuation of effort by PSC towards the RETS implementation and the effort is summarized in Attachment 2 of the January 2, 1981 letter. EG&G Idaho, Inc., (EG&G), selected as an independent task review team, initiated a review and evaluation of the 1981 RETS submittal. The submittal was compared with the

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 II limits.[22]

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.

The primary source of radioactive liquids to the radioactive liquid waste system is the water removed by the helium purification system. Major sources of water in the primary coolant are from atmospheric moisture mixing with the primary coolant during refueling or maintenance and steam leakage into the primary coolant via the steam-driven helium recirculators. Liquids in the radioactive liquid waste system are passed through demineralizer resin beds before release to the offsite discharge point.

Water sources for the reactor building sump are miscellaneous drains within the reactor building. Contents of the reactor building sump are normally filtered and discharged at a restricted flow of 10 gpm but may be discharged at a flow rate of 50 gpm. Effluents are passed through an oil separator before release to the cooling tower blowdown.

Service water discharges have a very low probability for containing radioactive liquids. The component cooling water system (CCW) is cooled by an intermediate closed system (IC) which in turn is cooled by the service water system (SW). Multiple failures would have to occur before radioactive CCW could contaminate the SW. As shown in Figure 1, blowdown from the service water cooling tower can be diverted to the main cooling tower or released directly to the offsite discharge point.

3.1.2 Radioactive Gaseous Effluents

The reactor building vent is the common radioactive gaseous effluent release point for several feed streams as shown in Figure 2. Figure 3 shows the location of the liquid and gaseous effluent release points.

The major source of gaseous radioactive waste is the regeneration of the low temperature filter adsorbers of the helium purification system. These gaseous wastes are held in the gas waste surge tank prior to a batch release. Gamma isotopic and tritium analyses are required before release of the tank.

Discharges from the gas waste header are normally continuously released via the reactor building vent. High activity at the gas waste header

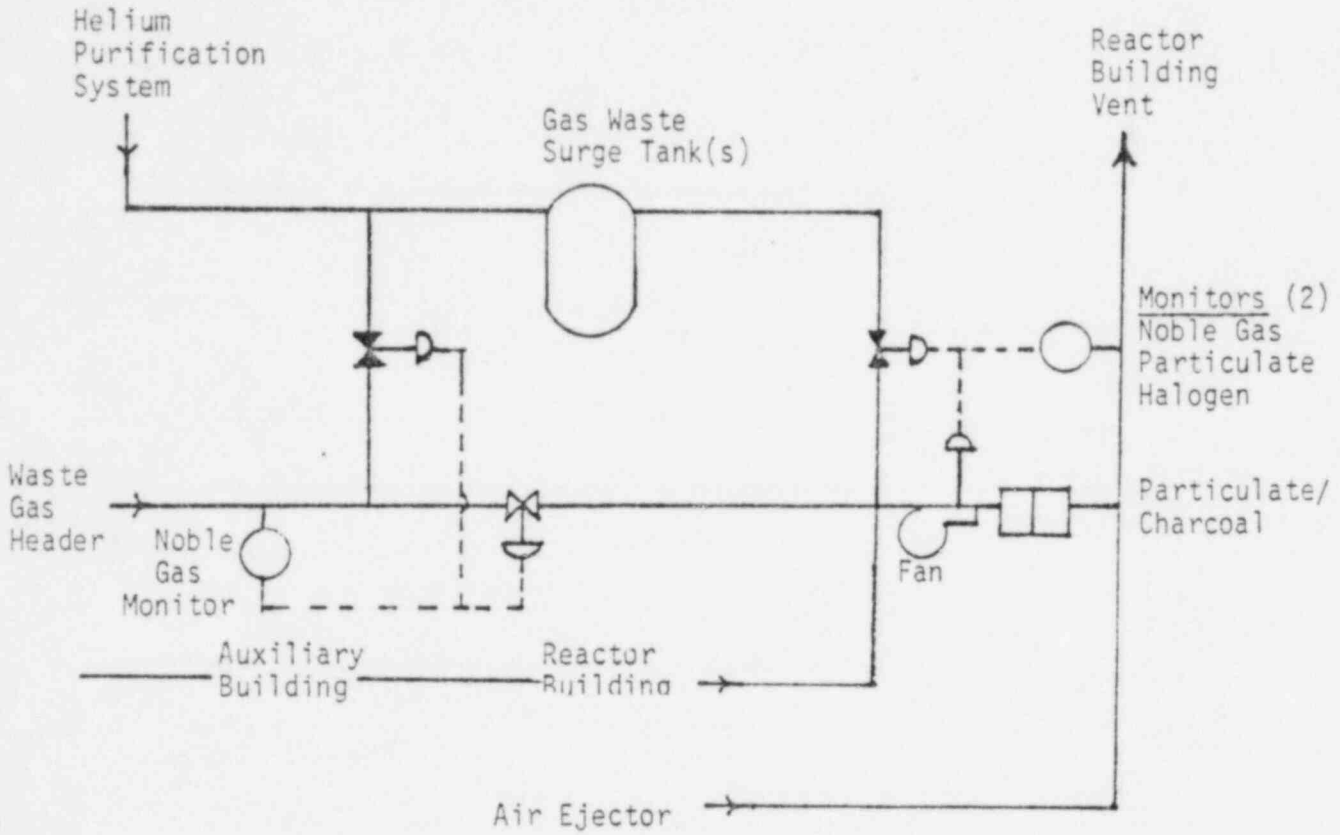

Figure 2. Fort St. Vrain Radioactive Gaseous Discharge Pathway.

noble gas monitor will automatically transfer the discharge to the gas waste surge tank for batch release.

Except for air ejector discharge, all normal releases of radioactive gases shall be processed through the reactor building ventilation exhaust particulate filters and charcoal adsorbers.

3.2 Radiological Effluent Technical Specifications

The following sub-sections 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 the maximum permissible concentrations (MPCs) listed in 10 CFR Part 20.

3.2.1.1 Radioactive Liquid Effluent Instrumentation

The offsite discharge radioactive liquid effluent release point at the Fort St. Vrain site is monitored with adequate instrument surveillance performed.

As shown in Figure 1, releases from the radioactive liquid waste system or the reactor building sump are continuously monitored with two radiation monitors. High radiation at the monitors and/or low cooling water blowdown flow will automatically terminate releases from either of

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, immediate action shall be taken to terminate the release. Batch releases are sampled and analyzed prior to release and the reactor building sump continuous releases are continuously sampled and the samples analyzed as soon as practical.

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

3.2.2.2 Gaseous Effluent Dose Rate

The Licensee's RETS include a commitment to maintain the offsite gaseous dose rate from the site to areas at and beyond the site boundary to within 10 CFR Part 20 limits, and if the concentration of gaseous effluents exceeds these limits or the equivalent dose rate values, immediate action shall be taken to terminate releases from the gas waste system or the reactor shall be shut down immediately.

The waste gas surge tanks are sampled and analyzed prior to the batch release to ensure the release will be within the dose rate limits. The online vent iodine/particulate monitor filters are analyzed once per week for gross alpha, gross beta, and principal gamma emitters to determine that releases were in compliance with the dose rate 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.

wastes through the demineralizer bed at all times precludes the requirement for projecting doses. Limiting discharges from the reactor building sump to less than 10 gpm provides for effluent monitoring sensitivity and increases the dilution effects when mixed with the cooling tower blowdown prior to release from the site.

Except for air ejector discharge, all normal releases of gaseous waste from the plant shall be processed through the reactor building ventilation exhaust particulate filters and charcoal adsorbers. This precludes the requirement for monthly dose projections. In addition, radioactive gases from the primary coolant purification system are held for decay in the gas waste surge tanks prior to release.

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 RETS does not include a specification on curie limits for outside tanks containing liquids. At the Fort St. Vrain site there are no outside liquid storage tanks nor is there a projected need for future temporary outside storage tanks. Thus, a technical specification is not required.

The Licensee's RETS state that each waste gas surge tank is limited

for waste solidification.

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

3.2.8 Radiological Environmental Monitoring Program

The objectives of the model RETS with regard to radiological environmental monitoring 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 for a radiological environmental monitoring program have followed the model RETS and the Branch Technical Position on the subject issued November 1979,[28] 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. 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

RETS state that the records of the radiological environmental monitoring program will be retained for the life of the plant.

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 requirements is to ensure that appropriate annual and semi-annual 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 analysis 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 the participation 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 and is submitted within 60 days after January 1 and July 1 of each year. The report also includes a summary of solid waste shipped offsite, an assessment of offsite doses, doses to individuals due to their activities inside the site boundary, doses to the likely most exposed member of the public (including direct radiation), the prescribed meterological data, and a list of unplanned releases. A listing of new locations required by the land use census as well as any changes to ODCM, PCP and the radioactive waste treatment system is included.

3. Special Reports: The Licensee's RETS include a commitment to file a special report within 30 days under the following conditions:

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 rate 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

For batch releases from the liquid monitor tank, the alarm/trip setpoints for the liquid effluent monitor is determined by circulating the water past the monitor and the monitor's response documented. The alarm/trip setpoints are set at 25% above the observed count rate. It will be determined prior to release that this 25% increase will not result in exceeding the MPC at the unrestricted areas.

For continuous liquid releases, the alarm setpoints are set to 20% of the response corresponding to the unrestricted area MPC.

This assures the alarm/trip functions will occur prior to exceeding the 10 CFR Part 20, Appendix B, Table II values at the discharge point to the unrestricted area. Thus, the Licensee's ODCM for liquid releases contains setpoint methodology that satisfies the requirements of NUREG-0133.

each and every sample location in RETS Environmental Monitoring Table 8.2-1, attachment RPAP-2F of the ODCM. The figure is illegible and must be improved. This is an outstanding item that will be resolved at a future date.

The Licensee's ODCM for Fort St. Vrain is generally in compliance with the NRC requirements and uses methods consistent with the methodology and guidance prescribed in NUREG-0133. Outstanding items will be resolved at a future date.

3.4 Process Control Program

NUREG-0472 specifies that the Licensee develop a PCP to ensure that the processing and packaging of solid radioactive wastes will be accomplished in compliance with 10 CFR Part 20, 10 CFR Part 71, 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. The criteria for the PCP are to address only today's requirements. The uncertainty about PCP requirements results from the recent promulgation of 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The NRC staff's technical positions are presently being developed by the Division of Waste Management.[32]

3.4.1 Evaluation

The Licensee submitted an outline for a PCP procedure.[17] The outline was reviewed by EG&G and comments submitted to the NRC.[20] The Licensee will submit another PCP to the NRC at a future date.

4. CONCLUSIONS

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

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

RETS Requirement	NUREG-0472[a]	Current Technical Specification[b]	Licensee Proposal (Section)
Effluent Instrumentation	3.3.3.10 3.3.3.11	LCO 4.8.2.d, 4.8.3.d LCO 4.8.1.d	ELCO 8.1.3.d ELCO 8.1.1.h, k
Concentrations	3.11.1.1 3.11.2.1	LCO 4.8.2.a LCO 4.8.1.a	ELCO 8.1.2.a ELCO 8.1.1.j
Offsite Doses	3.11.1.2 3.11.2.2 3.11.2.3 3.11.4	--- --- --- ---	ELCO 8.1.2.g ELCO 8.1.1.i ELCO 8.1.1.i ELCO 8.1.5.a
Effluent Treatment	3.11.1.3 3.11.2.4	LCO 4.8.2.b, 4.8.3.a LCO 4.8.1.c, d	ELCO 8.1.2.h ELCO 8.1.1.c
Tank Inventory Limits	3.11.1.4 3.11.2.6	--- LCO 4.8.1.g	--- ELCO 8.1.1.d
Explosive Gas Mixtures	3.11.2.5	---	---
Solid Radwaste	3.11.3	---	ELCO 8.1.4
Environmental Monitoring	3.12.1	SR 5.9.1	ELCO 8.2.1.a
Land Use Census	3.12.2	---	ELCO 8.2.1.h
Interlaboratory Comparisons	3.12.3	---	ELCO 8.2.1.g
Audits and Reviews	6.5.1 6.5.2	--- ---	AC 7.1.2.5 AC 7.1.3.7
Procedures and Records	6.8 6.10	--- ---	AC 7.4.a AC 7.3.b
Reports	6.9	AC 7.5.1.c	AC 7.5.1
Other Administrative Controls	6.13 6.14 6.15	--- --- ---	AC 7.4.a

a. Section number sequence is according to NUREG-0472, Rev. 3, Draft 7''.
b. Being revised or deleted.

12. F. J. Congel, memo to RAB Staff (NRC), Interim Changes in the Model RETS, August 9, 1982.

13. United States Nuclear Regulatory Commission, Standard Radiological Effluent Technical Specifications for Pressurized Water Reactors, NUREG-0472, Revision 3, Draft 7, September 1982.

14. O. R. Lee, letter of transmittal, Proposed Environmental Technical Specifications, P-81001, January 2, 1981.

15. S. W. Duce, letter of transmittal, Transmittal of Questions for Fort St. Vrain RETS Review, SWD-5-82, September 28, 1982.

16. S. W. Duce, letter of transmittal, Fort St. Vrain Effluent Technical Specifications, SWD-7-82, October 21, 1982.

17. O. R. Lee, letter of transmittal, Proposed Technical Specification Change - Radiological and Environmental Technical Specifications, P-83114, March 23, 1983.

18. S. W. Duce, letter of transmittal, Fort St. Vrain RETS, ODCM, and PCP Review, SWD-13-83, April 22, 1983.

19. S. W. Duce, letter of transmittal, Unresolved Issues for Fort St. Vrain RETS, SWD-14-83, April 25, 1983.

20. W. Serrano, letter of transmittal, Fort St. Vrain RETS, ODCM, and PCP Final Reviews, Serr-15-83, May 23, 1983.

21. C. Miller (NRC), C. Willis (NRC), P. Wagner (NRC), and PSC personnel, telephone conference, August 16, 1983.

22. United States Office of The Federal Register, Title 10, Code of Federal Regulations, Part 20, Appendix B, "Concentrations in Air and Water Above Natural Background."

23. C. A. Willis, letter to F. B. Simpson (summarizing changes to RETS requirements following meeting with Atomic Industrial Forum), November 20, 1981.

24. W. E. Kreger (NRC), memo to R. J. Mattson (NRC), Plans for Dealing with The Explosive Gas Issue in Implementing The Radiological Effluent Technical Specifications (RETS), December 14, 1981.

APPENDIX A

Evaluation of Proposed Radiological Effluent Technical Specifications (RETS)

EVALUATION OF PROPOSED
RADIOLOGICAL EFFLUENT TECHNICAL SPECIFICATIONS
(RETS)

1. INTRODUCTION

This appendix contains a comparison of the model Technical Specifications (NUREG-0472) and the Licensee's proposed RETS with explanatory statements where further comment is required. Those sections, where the Licensee has either equivalent requirements or where the "intent" of the model is met, are identified.

TABLE A-1. COMPARISON BETWEEN THE REQUIREMENTS OF NUREG-0472 AND THE PROPOSED RETS FOR FORT ST. VRAIN

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
1.1	---		X	1
1.2	2.3c		X	2
1.3	2.3a	X		
1.4	2.3b		X	3
1.5	pg. 8.0-2	X		
1.6	---		X	4
1.7	pg. 8.0-3	X		
1.8	pg. 8.0-4	X		
1.9	2.7	X		
1.11	pg. 8.0-4	X		
1.12	---		X	5
1.13	2.12	X		
1.14	pg. 8.0-5	X		
1.15	pg. 8.0-5	X		
1.16	pg. 8.0-5	X		
1.18	pg. 8.0-6	X		
1.19	---		X	4
1.20	---		X	5
Table 1.2	--- ELCO 8.1.2c, i		X	6
3.3.3.10	ELCO 8.1.3d		X	7
Applicability	ELCO 8.1.2c and 8.1.3d	X		8

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
Action a	---		X	9
b	ELCO 8.1.2d,e,f ELCO 8.1.3e,f,g,h		X	10
c	---		X	11
4.3.3.10	---		X	12
Table 3.3-12 1a	ELCO 8.1.2c ELCO 8.1.3d	X		
1b,2c,3a &b, 4b & d, 5b, 6	---		X	13
2a	---		X	14
2b	---		X	22
3	ELCO 8.1.3b	X		
4a	---		X	15
4c	ELCO 8.1.2f	X		16
4	ELCO 8.1.3a	X		15
5a	ELCO 8.1.2c and ELCO 8.1.3d		X	17
Action 28	ELCO 8.1.2b, & d	X		18
29 & 32			X	13
30	ELCO 8.1.3f		X	19
31	ELCO 8.1.2f and ELCO 8.1.3g	X		
33	ELCO 8.1.2e and ELCO 8.1.3f	X		
---	ELCO 8.1.3h		X	20
Table 4.3-12				
1a	ESR 8.1.2c and ESR 8.1.3		X	21

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
1b,2c,3a & b, 4b & d, 5b & 6	---		X	13
2	---		X	14
3	ESR 8.1.3b	X		
4a	---		X	15
4b	NA			
4c	ESR 8.1.2d	X		
4d	ESR 8.1.3		X	23
5a	ESR 8.1.2d	X		
Notation	---			
1	ESR 8.1.2 Note		X	24
2	ESR 8.1.2 Note	X		
3	ESR 8.1.2 Note	X		
4	ESR 8.1.2 Note	X		
3.3.3.11	ELCO 8.1.1h & k	X		
Applicability	ELCO 8.1.1h	X		
Action a	---		X	25
b	ELCO 8.1.1h 3, 4, 5, & 6		X	10
c	---		X	26
4.3.3.11	---		X	12
Table 3.3-13				
1			X	27,28b
2	---		X	29
3	---	X		27a

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
Table 3.3-13 Cont.				
4	ELCO 8.1.1.h.6	X		30
6,7,8	ELCO 8.1.1.c		X	27
5	NA			28a
6a	ELCO 8.1.1.h.1		X	28b
6b-d	ELCO 8.1.1.h.1 & 5	X		
6e	ELCO 8.1.1.h		X	31
9	---		X	32
Action 35	ELCO 8.1.1.h.4	X		
36	ELCO 8.1.1.h.5	X		
37	ELCO 3.1.1.h.3 & 6	X		
38	---		X	28a
39 & 40	---		X	29
41	ELCO 8.1.1.h.2	X		
Table 4.3-13				
6,7,8	---		X	27
5	NA		X	28a
1	ESR 8.1.1a		X	33,27
2	---		X	29
3	---		X	27
4a	ESR 8.1.1.a	X		
4b-e	---		X	27
6a-c	ESR 8.1.1a	X		
6d-3	ESR 8.1.1c & Note	X		

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
Table 4.3-13 Cont.				
9	---		X	32
Table Notation 1	ESR 8.1.1.b & Note	X		
2	ESR 8.1.1 Note	X		
3	ESR 8.1.1 Note	X		
2,4,5	NA			
3.11.1.1	ELCO 8.1.2a	X		
Action	ELCO 8.1.2a	X		
4.11.1.1.1	ELCO 8.1.2b ESR 8.1.3.a	X		34
4.11.1.1.2	ELCO 8.1.2b		X	35
Table 4.11-1A	ELCO 8.1.2b		X	36,37,38
B	ELCO 8.1.3a & b		X	36,37,38
Table Notation a	ELCO 8.1.2.b.2	X		
b	ELCO 8.1.2.b.1		X	39
c	8.1.2.b.3		X	40
d	pg. 8.0-2		X	41
e	pg. 8.0-2	X		
f	ELCO 8.1.3.a and pg. 8.0-2		X	41
3.11.1.2	ELCO 8.1.2.g	X		
Action	7.5.4.b	X		
4.11.1.2	ESR 8.1.2.e	X		
3.11.1.3	ELCO 8.1.2.h		X	42
Action	ELCO 8.1.2.n	X		

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
4.11.1.3	NA		X	42
3.11.1.4	NA		X	43
3.11.2.1	ELCO 8.1.1.j	X		
Action	ELCO 8.1.1b		X	44
4.11.2.1.1	ESR 8.1.1.d		X	45
4.11.2.1.2	ESR 8.1.1e, f		X	46
Table 4.11-2A	ELCO 8.1.1e ESR 8.1.1g	X		
B	NA		X	28a
C	---		X	47
D	ESR 8.1.1f		X	48
D	ESR 8.1.1e & g		X	49
Notation a	ESR 8.1.1g ESR 8.1.1g	X X		
b	---		X	50
c,d,e,g	---		X	51
f	ELCO 8.1.1h		X	52
3.11.2.2	ELCO 8.1.1.i	X		
Action	7.5.4.a.1	X		
4.11.2.2	ESR 8.1.1.h	X		
3.11.2.3	ELCO 8.1.1.i	X		
Action	7.5.4.a.1	X		
4.11.2.3	ESR 8.1.1.h	X		
3.11.2.4	ELCO 8.1.1.c		X	53
Action	7.5.4.a.2	X		

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
4.11.2.4	---		X	54
3.11.2.5	---		X	29
3.11.2.6	ELCO 8.1.1d	X		
Action	ELCO 3.1.1d	X		
4.11.2.6	ESR 8.1.1d		X	55
3.11.3 & Action	ELCO 8.1.4	X		
4.11.3	ESR 8.1.4	X		
3.11.4	ELCO 8.1.5a	X		
Action	ELCO 8.1.5b	X		
4.11.4	ESR 8.1.5	X		
3.12.1	ELCO 8.2.1a	X		
Action a	ELCO 8.2.1.f	X		
b	ELCO 7.5.4.d	X		
c	ELCO 8.2.1f	X		
d	---		X	11
4.12.1	ELCO 8.2.1b & d	X		
Table 3.12-1	Table 8.2-1			
1	Direct Radiation	X		
2	Airborne	X		
3	Waterborne	X		
4	Ingestion	X		
Table 3.12-2	Table 8.2-3	X		
Table 4.12-1	Table 8.2-2	X		
Notation a	Notation a	X		

TABLE A-1 (CONTINUED)

NUREG-0472	Ft. St. Vrain RETS	Equivalent Requirement	Meet the Intent	Comment
Notation c	a		X	56
Notation d	b	X		
3.12.3	ELCO 8.2.1g	X		
Action a	ELCO 8.2.1g.1	X		
b	---		X	11
4.12.3	ELCO 8.2.1g.2	X		
3.12.2	ELCO 8.2.1h		X	57
Action a	ELCO 8.2.1.h.1	X		
b	ELCO 8.2.1.h.2 & 3	X		
c	---		X	11
4.12.2	8.2.1.h	X		
Bases	Bases		X	58
Section 5	Figures 6.3-1 & 2	X		
6.5.1.6k	7.1.2.5k	X		
6.5.1.6l	7.1.2.5		X	59
6.5.2.8k,l,m,n	7.1.3.7b.1		X	60
6.8.1g,h,i	---		X	61
6.9.1.11	7.5.1.d	X		
6.9.1.12	7.5.1.e	X		
6.9.2	7.5.4	X		
6.10.2	---		X	62
6.13	---		X	63
6.14	---		X	63
6.15	---		X	63

COMMENTS ON FORT ST. VRAIN RETS

1. This term is well understood and a definition is not required.

2. The definition for channel calibration does not state it includes the channel functional test. However, the channel functional test is performed quarterly which would coincide with the channel calibration which is performed at least once every 18 months.

3. The channel test defined in the existing specifications is essentially the same as the channel functional test definition of NUREG-0472.

4. This system is alluded to in the proper specification and does not require a separate definition in Section 8.0.

5. There are no purges or ventings at this facility.

6. Notations are not used in the specifications but the terms are written out; therefore, a separate table is not required.

7. Effluents from the radioactive liquid waste system and the reactor building sump are monitored by the same monitoring system. The setpoints are determined in accordance with the ODCM.

8. "At all times" is implied by the wording of the specification.

9. This action item is not required as there is only a single liquid release point and the setpoint is set and tested prior to the release.

10. The Licensee agreed to include a requirement to exert best efforts to return the out-of-service instrument to operable status or explain in the next Semiannual Report.[21]

11. The Licensee chooses to leave these items as a reportable occurrence. Also, they do not have a comparable 3.0.3 or 3.0.4 model RETS specification, but they will take appropriate action.

12. The surveillance requirements for the liquid and gaseous instrumentation is stated for each instrument in the specifications. That is, the instrumentation has not been tabulated.

13. Monitoring equipment for these systems are not required at this facility because they do not exist or the liquids are released through monitored discharge pathways.

14. A cooling water system, No. 46, intermediate to the component cooling water and the service water system has a process monitor and a pressure monitor and both provide alarms. These alarms alert the Licensee to sample the service water for radioactivity. Therefore, ELCO and ESR specifications are required for both monitors. The Licensee agreed to address the monitors in the final RETS submittal.[21]

15. The flowrate of the liquid radwaste effluent is limited by a control orifice. The upper limit of discharge is 10 gpm as determined by the pump size on this system.

16. Cooling tower blowdown flow is the equivalent to the discharge canal.

17. The radioactivity recorder for the liquid radwaste line and reactor building sump does not provide an alarm or trip signal.

18. The wording of 8.1.2b requires two samples to be taken. The liquid sampling system operation ensures that these samples are independent. The wording of 8.1.2d then fulfills all of the model RETS requirements for this action.

19. Liquid analyses are performed according to 8.1.2b which states appropriate LLD's for each analysis.

20. With the continuous sampler inoperable, the amount of activity released during the day can be determined using the chart for the activity recorder which is connected to the radioactivity monitor. Therefore, a daily sample is adequate.

21. The activity monitor has a channel check during release which meets the intent of NUREG-0472.

22. The component cooling water (CCW) system, No. 47, is cooled by an intermediate system, No. 46, which is then cooled by the service water system (SW). The CCW would not require monitoring as it would require multiple failures before the CCW could be released. The intermediate system, No. 46, has a process monitor installed as well as a pressure alarm. The primary leak pathway would be from the gas waste compressor into this system. This type of leak would cause the system No. 46 pressure to increase actuating the pressure alarm. If radioactivity is detected in this system by the process monitor, the SW would be sampled for radioactivity determination. Therefore, instrumentation is not required for the CCW system.

23. The reactor building sump flow is restricted to less than 10 gpm when operated in the automatic mode. If the flow rate is greater than 10 gpm, grab samples shall be taken and analyzed. Periodic checks required for the flow rate device will be identified in the ODCM as agreed between the NRC and the Licensee.

24. The activity monitor and blowdown flow monitor send a trip signal to the blocking valve. Therefore, the wording of ESR 8.1.2b and the NOTE at the bottom of page 8.1-18 will meet the intent of this notation.

25. An action concerning improper setpoints for the reactor building exhaust ventilation noble gas monitor has not been included. However, this setpoint is recalculated monthly per the ODCM and is based on a measured value that has been assured not to exceed the MPC's.

26. The Licensee chooses to leave these items as a reportable occurrence. Also, they will take whatever action is required, including shutdown of the reactor, to comply with the gaseous discharge limits.

27. All normal releases of gaseous waste from the facility are processed through the reactor building ventilation exhaust cleanup system particulate and charcoal filters. The air ejection exhaust is added after these filters. The ventilation exhaust is monitored for noble gases, halogens, and particulates prior to release. The reactor building stack noble gas monitors will terminate the gas waste surge tank release and the reactor building ventilation, as per discussions during the plant visit.

28a. The primary containment vessel at Fort St. Vrain is called the pre-stressed concrete reactor vessel. This is not purged as with a PWR or BWR. Therefore, to address containment purge requirements is meaningless. The reactor building ventilation is analagous to the auxiliary building ventilation system of the model RETS, and therefore, our review addresses these requirements.

28b. During discussions at the plant visit, we were informed that the gas waste header monitor automatically diverted the gases to the gas waste surge tank. If gaseous concentrations exceed a setpoint, the reactor building exhaust vent monitor provided automatic termination of releases from the gas waste surge tank and terminated releases from the reactor building by shutting off the exhaust fan.

29. Explosive gas instrumentation is not required due to the use of helium as a primary coolant. Therefore, H_2 and O_2 is not formed.

30. The gas waste header monitor function is to divert the gases to the gas waste surge tank upon alarm. Normally these gases vent to the reactor building vent.

31. The proposal ELCO 8.1.1.h.5 does not address the monitor flow rate measuring device for either of the two monitoring systems. The flow rate measuring devices are part of the monitor which is a plant specific approval for meeting the intent of NUREG-0472.

32. There is no steam generator blowdown at this facility.

33. The reactor building ventilation noble gas monitor is channel checked daily and source checked monthly for the continuous release mode which satisfies the channel check and source check prior to release requirements for the waste gas holdup system.

34. There is no surveillance table for sampling and analysis for liquid or gaseous effluents but the requirements are stated in the Technical Specifications.

35. A specification addressing the requirements for using the analysis results as input to the ODCM equations to ensure the radioactivity concentrations are within the limits for offsite concentrations will be included in the specifications as agreed between the NRC and the Licensee.[21]

36. The appropriate LLD value will be included for each type of analysis as agreed between the NRC and the Licensee.[21]

37. Historically Fe-59 has never been observed at an LLD of 7×10^{-8} µCi/ml in the liquids sampled. Analysis of resins used in the liquid radwaste cleanup system has identified Fe-59, but only after large volumes of water have been processed. Therefore, it is reasonable to assume that Fe-55 would not be present at the model RETS LLD of 1×10^{-6} µCi/ml, and Fe-55 analysis is not required.

38. We were informed at the plant visit that the gross beta analysis is used to trigger analysis for Sr-89 and Sr-90 in the liquid sample. Gross beta analysis is performed on each batch and weekly for the

composite sample from the reactor building sump. The requirement to analyze for strontium will be included as agreed between the NRC and the Licensee.[21]

39. The proposed ELCO 8.1.2.b.1 states representative samples will be obtained and analyzed which meets the intent of footnote b of the model RETS.

40. The list of radionuclides stated for liquid analysis also includes the nuclides from the gaseous analysis list.

41. The Licensee agreed to add "and is representative of the liquids released" to the definition for composite sample.[21]

42. The facility states they will use the liquid radwaste treatment system to the maximum extent practicable. Therefore, no projection of dose is required.

43. There are no liquid tanks nor is there enough liquid waste to justify a specification for future storage tanks.

44. The major release of radioactive gaseous waste from this facility is the gas waste surge tanks. ELCO 8.1.1.b is worded such that immediate action will be taken to reduce the release rate so that MPC limits would not be exceeded at the site boundary. Under normal operating conditions, this wording of the Technical Specification would be adequate to cover the action of model RETS 3.11.2.1. Therefore, this will meet the intent of the RETS.

45. The proposed Technical Specifications have stated dose limits. To show compliance to these limits, the alarm/trip setpoints of the monitors in the reactor building vent have been set at a level where the gaseous concentration in the unrestricted area would not exceed that concentration which would result in the dose rate.

46. The specification will be reworded to state the calculations will be in accordance with the ODCM as agreed between the NRC and the Licensee.[21]

47. Sampling requirements for a monthly grab sample from the reactor building vent have not been addressed. The facility normally has two noble gas monitors, particulate monitors, and halogen monitors on this vent. Therefore, the intent of measuring the noble gas, particulates, and iodine concentrations is met. However, H-3 is not sampled at a monthly frequency on the plant vent. The H-3 grab sample from the gas waste surge tank prior to release accounts for the majority of the H-3 being released.

48. The Licensee agreed to state the filter will be analyzed once per week.[21]

49. The value for the minimum detectable activity will be included for the gross beta analysis in ESR 8.1.1e as agreed between the NRC and the Licensee.[21]

50. The facility has redundant noble gas monitors as well as iodine and particulate monitors on the reactor building vent. These monitors will allow for real time determination of the discharge concentrations. Therefore, increased sampling for power changes, startup, and shutdown is not required.

51. Fort St. Vrain is a gas-cooled reactor, and therefore, these table notations are not applicable. The spent fuel storage area is sealed and is not ventilated.

52. Particulate and iodine samples are obtained from the reactor building vent monitors. In order for these monitors to be OPERABLE, they have to be sampling a representative sample. Therefore, this notation is not required.

53. The waste gas header monitor will divert releases to the gas waste surge tank upon alarm. The primary coolant cleanup system gases go to the gas waste surge tank. These systems are used at all times, and therefore, a specification for the operation of the gas waste treatment system is not required. The ventilation exhaust treatment system has been addressed in ELCO 8.1.1.c. Prior to release, all gaseous effluents are passed through the ventilation exhaust treatment system with the exception of the air ejector releases.

54. As these systems are used at all times, this surveillance is not required.

55. The Technical Specification limit for noble gases in the circulating coolant is 20,800 Ci which is equivalent to approximately 800 equivalent curies of Kr-88. Therefore, nearly half of the noble gas activity would have to be in the waste gas tank before they would approach the 370 Ci limit on the gas surge tank and so the weekly tank surveillance meets the intent.

56. The definition for LLD will be changed to reflect the environmental definitions, specifically the definition for Δt as agreed to between the NRC and the Licensee.[21]

57. The land use census will include the location of the nearest resident as agreed between the NRC and the Licensee.[21]

58. The included bases statements were reviewed and found to be consistent with the Licensee's submittal. However, bases statements for Solid Radioactive Waste, ELCO 8.1.4, and Total Dose, ELCO 8.1.5 will be included as agreed between the NRC and the Licensee.[21]

59. The Licensee agreed to include the requirements of 6.5.1.6.1 of the model RETS in their final submittal.[21]

60. This Specification requires NFSC to audit "the conformance of facility operation to all provisions within the Technical Specifications and

applicable Licensee conditions at least once per year." This statement satisfies the intent of NUREG-0472.

61. A section addressing procedures and programs will be included in the final submittal as agreed between the NRC and the Licensee.[21]

62. A section covering record retention of analyses for the Radiological Environmental Monitoring Program will be included in the final submittal as agreed between the NRC and the Licensee.[21]

63. Administrative controls for changing the PCP, ODCM, and major changes to the radwaste treatment system will be included in the final submittal as agreed between the NRC and the Licensee.[21]