



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555

April 24, 1984

Docket Nos: 50-327
and 50-328

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

Dear Mr. Parris:

Subject: Issuance of Amendment No. 35 to Facility Operating License
No. DPR-77 and Amendment No. 26 to Facility Operating
License No. DPR-79 - Sequoyah Nuclear Plant, Units 1 and 2

The Nuclear Regulatory Commission has issued the enclosed Amendment No. 35 to Facility Operating License No. DPR-77 and Amendment No. 26 to Facility Operating License No. DPR-79.

The amendments change license conditions to authorize operation of the installed Post Accident Sampling System. The amendments are in response to your letter dated November 23, 1983, and supplemented December 21, 1983, January 9 and 10, and March 23, 1984.

A copy of the related safety evaluation supporting Amendment No. 35 to Facility Operating License DPR-77 and Amendment No. 26 to Facility Operating License DPR-79 is enclosed.

Sincerely,

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosures:

1. Amendment No. 35 to DPR-77
2. Amendment No. 26 to DPR-79
3. Safety Evaluation

cc w/enclosures:
See next page

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SEQUOYAH

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 35
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Sequoyah Nuclear Plant, Unit 1 (the facility) Facility Operating License No. DPR-77 filed by the Tennessee Valley Authority (licensee), dated November 23, 1983, and supplemented December 21, 1983, January 9 and 10, and March 23, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the license, as amended, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, Facility Operating License No. DPR-77 is changed as follows:
 - A. Change paragraph 2.C.(23)F. to read as follows:

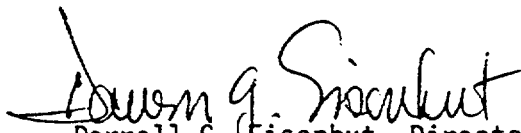
Post Accident Sampling (Section 22.3, II.B.3)

TVA is authorized to operate the installed Post Accident Sampling System as described in their letters dated November 23 and December 21, 1983, January 9 and 10, and March 23, 1984. The system shall be operable no later than startup following the second refueling outage.

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3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: April 24, 1984



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 26
License No. DPR-79


1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment to the Sequoyah Nuclear Plant, Unit 2 (the facility) Facility Operating License No. DPR-79 filed by the Tennessee Valley Authority (licensee), dated November 23, 1983, and supplemented December 21, 1983, January 9 and 10, and March 23, 1984, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's regulations as set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the license, as amended, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, Facility Operating License No. DPR-79 is changed as follows:
 - A. Change paragraph 2.C.(16)g. to read as follows:

Post Accident Sampling (Section 22.2, II.B.3)

TVA is authorized to operate the installed Post Accident Sampling System as described in their letters dated November 23 and December 21, 1983, January 9 and 10, and March 23, 1984. The system shall be operable no later than startup following the second refueling outage.

3. This license amendment is effective as of its date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: April 24, 1984



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 35 TO FACILITY OPERATING LICENSE DPR-77
AND AMENDMENT NO. 26 TO FACILITY OPERATING LICENSE DPR-79
TENNESSEE VALLEY AUTHORITY

INTRODUCTION

Subsequent to the TMI-2 incident, the need was recognized for an improved post accident sampling system (PASS) to determine the extent of core degradation following a severe reactor accident. Criteria for an acceptable sampling and analysis system are specified in NUREG-0737, Item II.B.3. The Sequoyah Nuclear Plant, Unit No. 1, operating license condition 2.C.(23).F requires the licensee to complete the corrective actions necessary for Item II.B.3 of NUREG-0737, Post Accident Sampling System. The same requirements exist for Unit No. 2 as operating license condition 2.c.(16).g. To meet these requirements, the licensee requested, by letters dated November 23 and December 21, 1983, and January 9 and 10, 1984, our approval of the proposed license amendments to complete the installation of the PASS at Sequoyah Nuclear Plant, Unit Nos. 1 and 2. In these letters, the licensee also informed us that a portion of the installation associated with the PASS had been determined to be an unreviewed safety question pursuant to 10 CFR 50.59.

On February 28, 1984, a meeting was held at the Sequoyah facility to review the design of the PASS. As a result of the meeting the licensee submitted on March 23, 1984, additional information to clarify certain design features of the system in order for the staff to complete the review.

EVALUATION

Criterion (1):

The licensee shall have the capability to promptly obtain reactor coolant samples and containment atmosphere samples. The combined time allotted for sampling and analysis should be three hours or less from the time a decision is made to take a sample.

The licensee has provided sampling and analysis capability to promptly obtain and analyze reactor coolant samples and containment atmosphere samples within three hours from the time a decision is made to take a sample. The PASS electrical power supply is provided by the vital (Class 1E) bus (except power supply to the PASS Ventilation Air Cleaning Unit fans. See Criterion 11 evaluation) so that sampling may be performed during a loss of offsite power. We find that these provisions meet Criterion (1) and are, therefore, acceptable.

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Criterion (2):

The licensee shall establish an onsite radiological and chemical analysis capability to provide, within the three-hour time frame established above, quantification of the following:

- a) certain radionuclides in the reactor coolant and containment atmosphere that may be indicators of the degree of core damage (e.g., noble gases, iodines and cesiums, and nonvolatile isotopes);
- b) hydrogen levels in the containment atmosphere;
- c) dissolved gases (e.g., H₂), chloride (time allotted for analysis subject to discussion below), and boron concentration of liquids; and
- d) alternatively, have in-line monitoring capabilities to perform all or part of the above analyses.

The PASS provides the capability to collect diluted or undiluted liquid and gaseous reactor coolant and containment atmosphere grab samples that can be transported to the onsite radiological and chemical laboratory for boron and/or radionuclide analyses. Dissolved hydrogen and oxygen, dissolved gases, conductivity, pH, and chloride concentrations are determined by in-line instruments. The containment hydrogen analyzer, installed to meet the requirements of NUREG-0737, Item II.F.1, Attachment 6, will be used for determination of the hydrogen levels in the containment atmosphere. We find that these provisions meet Criterion (2) of NUREG-0737, Item II.B.3, and are, therefore, acceptable.

Criterion (3):

Reactor coolant and containment atmosphere sampling during post accident conditions shall not require an isolated auxiliary system (e.g., the letdown system or the reactor water cleanup system) to be placed in operation in order to use the sampling system.

Reactor coolant and containment atmosphere sampling during post accident conditions does not require an isolated auxiliary system to be placed in operation in order to perform the sampling function. The PASS provides the ability to obtain reactor coolant samples from the reactor vessel hot legs and containment sump, and gaseous samples from the containment atmosphere. The licensee's proposal to meet Criterion (3) is acceptable since PASS sampling is performed without requiring operation of an isolated auxiliary system, and PASS valves, which are not accessible after an accident, meet IEEE Class 1E requirements.

Criterion (4):

Pressurized reactor coolant samples are not required if the licensee can quantify the amount of dissolved gases with unpressurized reactor coolant samples. The measurement of either total dissolved gases or H₂ gas in reactor coolant samples is considered adequate. Measuring the O₂ concentration is recommended, but is not mandatory.

Pressurized reactor coolant samples are depressurized and degassed to obtain representative total dissolved gas samples at the PASS sampling station. The depressurized coolant and stripped gas are routed to the inline monitors for dissolved hydrogen and oxygen analyses. The hydrogen concentration is measured by gas chromatography. The dissolved oxygen content in the coolant is measured by a dissolved oxygen probe and inline analyzer. We determined that these provisions meet Criterion (4) of Item II.B.3 in NUREG-0737 and are, therefore, acceptable.

Criterion (5):

The time for a chloride analysis to be performed is dependent upon two factors: (a) if the plant's coolant water is seawater or brackish water, and (b) if there is only a single barrier between primary containment system and the cooling water. Under both of the above conditions, the licensee shall provide for a chloride analysis within 24 hours of the sample being taken. For all other cases, the licensee shall provide for the analysis to be completed within 4 days. The chloride analysis does not have to be done onsite.

The above factors (a) and (b) do not apply to Sequoyah. Therefore, analysis will be performed within 4 days on undiluted samples by an ion chromatograph. We determined that these provisions meet Criterion (5) and are, therefore, acceptable.

Criterion (6):

The design basis for plant equipment for reactor coolant and containment atmosphere sampling and analysis must assume that it is possible to obtain and analyze a sample without radiation exposures to any individual exceeding the criteria of GDC-19 (Appendix A, 10 CFR Part 50) (i.e., 5 rem whole body, 75 rem extremities). (Note that the design and operational review criterion was changed from the operational limits of 10 CFR Part 20 (NUREG-0578) to the GDC-19 criterion (October 30, 1979 letter from H. R. Denton to all Licensees).)

The licensee has performed a shielding analysis to ensure that operator exposure, while obtaining and analyzing a PASS sample, is within the acceptable limits. This operator exposure includes entering and exiting the sample panel area, operating sample panel manual valves, positioning the grab sample into the shielded transfer carts, and performing sample dilutions. PASS personnel radiation exposures from reactor coolant and containment atmosphere sampling

and analysis are within 5 rem whole body and 75 rem extremities, which meet the requirements of GDC-19 and Criterion (6), and are, therefore, acceptable.

Criterion (7):

The analysis of primary coolant samples for boron is required for PWRs. (Note that Rev. 2 of Regulatory Guide 1.97 specifies the need for primary coolant boron analysis capability at BWR plants.)

The boron analysis will be performed by an ion chromatograph using the diluted sample, which is capable of measuring boron concentrations in coolant from 0.5 ppm to 20 ppm. This provision meets the recommendations of Regulatory Guide 1.97, Rev. 2 and Criterion (7), and is, therefore, acceptable.

Criterion (8):

If in-line monitoring is used for any sampling and analytical capability specified herein, the licensee shall provide backup sampling through grab samples, and shall demonstrate the capability of analyzing the samples. Established planning for analysis at offsite facilities is acceptable. Equipment provided for backup sampling shall be capable of providing at least one sample per week until the accident condition no longer exists.

The chemical analysis panels provide in-line analysis as well as backup grab samples. A diluted and undiluted reactor coolant grab sample and undiluted containment atmosphere grab sample can be obtained for analyses of boron, dissolved hydrogen, pH, chloride and radioisotopes in the reactor coolant and hydrogen, oxygen and radioisotopes in the containment atmosphere. We find that these provisions meet Criterion (8) and are, therefore, acceptable.

Criterion (9):

The licensee's radiological and chemical sample analysis capability shall include provisions to:

- a) Identify and quantify the isotopes of the nuclear categories discussed above to levels corresponding to the source terms given in Regulatory Guides 1.3 or 1.4 and 1.7. Where necessary and practicable, the ability to dilute samples to provide capability for measurement and reduction of personnel exposure should be provided. Sensitivity of onsite liquid sample analysis capability should be such as to permit measurement of nuclide concentration in the range from approximately 1 uCi/g to 10 Ci/g.

- b) Restrict background levels of radiation in the radiological and chemical analysis facility from sources such that the sample analysis will provide results with an acceptably small error (approximately a factor of 2). This can be accomplished through the use of sufficient shielding around samples and outside sources, and by the use of a ventilation system design which will control the presence of airborne radioactivity.

The radionuclides in both the primary coolant and the containment atmosphere will be identified and quantified. Provisions are available for diluted reactor coolant samples to minimize personnel exposure. The PASS can perform radioisotope analyses at the levels corresponding to the source terms given in Regulatory Guides 1.4, Rev. 2, and 1.7. The isotopic analysis will be performed in the range of 1 uCi/gm to 10 Ci/gm. The isotopic measurement will be performed in a 4-inch lead shield or equivalent to reduce the background and produce results with a range of accuracy within a factor of 2. We find that these provisions meet Criterion (9) and are, therefore, acceptable.

Criterion (10):

Accuracy, range and sensitivity shall be adequate to provide pertinent data to the operator in order to describe the radiological and chemical status of the reactor coolant systems.

The accuracy, range and sensitivity of the PASS instruments and analytical procedures are consistent with the recommendations of Regulatory Guide 1.97, Rev. 2, and the clarifications of NUREG-0737, Item II.B.3, Post Accident Sampling Capability. Therefore, they are adequate for describing the radiological and chemical status of the reactor coolant. The analytical methods and instrumentation were selected for their ability to operate in the post accident sampling environment. A program which will ensure the capability to obtain and analyze reactor coolant, radioactive iodines and particulates in plant gaseous effluents, and containment atmosphere samples under accident conditions will include:

- (1) Training of personnel,
- (2) Procedures for sampling and analysis, and
- (3) Provisions for maintenance of sampling and analysis equipment.

The training of adequate number of chemistry personnel to operate the PASS has been initiated to provide adequate 24 hour a day coverage. All necessary training to operate the PASS will be completed by December 31, 1984.

We find that these meet Criterion (10) and are, therefore, acceptable.

Criterion (11):

In the design of the post accident sampling and analysis capability, consideration should be given to the following items:

- a) Provisions for purging sample lines, for reducing plateout in sample line, for minimizing sample loss or distortion, for preventing blockage of sample lines by loose material in the RCS or containment, for appropriate disposal of the samples, and for flow restrictions to limit reactor coolant loss from a rupture of the sample line. The post accident reactor coolant and containment atmosphere samples should be representative of the reactor coolant in the core area and the containment atmosphere following a transient or accident. The sample lines should be as short as possible to minimize the volume of fluid to be taken from containment. The residues of sample collection should be returned to containment or to a closed system.
- b) The ventilation exhaust from the sampling station should be filtered with charcoal adsorbers and high efficiency particulate air (HEPA) filters.

The licensee has addressed provisions for purging to ensure samples are representative, the size of sample line flow restrictions and/or the use of isolation valves to limit reactor coolant loss from a failure of the sample line, and the filtration of ventilation exhaust from PASS through charcoal adsorbers and HEPA filters. To limit iodine plateout, the containment air sample line is heat traced. The post accident reactor coolant and containment atmosphere samples will be representative of the reactor coolant in the core area and the containment atmosphere.

During normal plant operation, the Auxiliary Building Ventilation System supply fan provides ventilation air to the post accident sampling facility area and exhaust air from the area is routed back to the Auxiliary Building Ventilation System.

During post accident sampling operations, the normal ventilation supply and exhaust systems to the PASS area are isolated, and ventilation air is taken directly from the outside on the roof of Unit No. 1. Both Unit Nos. 1 and 2 post accident sampling facility areas share this common intake. A supply fan provides ventilation air to the sampling side of the facility and an exhaust fan draws ventilation from both the sample and valve gallery areas. This ventilation air is then processed through the PASS Air Cleanup Unit which consists of a prefilter, an electric heating coil, a charcoal filter, and a HEPA filter. Exhaust air from the unit is then routed to the exhaust duct downstream of the Auxiliary Building Gas Treatment System (ABGTS), which is an engineered safety system.

The PASS Air Cleaning Unit is not a nuclear safety-related system. However, it has redundant isolation dampers in the ductwork that interface with the ABGTS

and penetrate the Auxiliary Building Secondary Containment Enclosure (ABSCE). The isolation dampers and ductwork which interface with the ABGTS and the ABSCE are designed to seismic Category I criteria and the isolation dampers are backed by Class 1E vital bus.

The PASS Ventilation Air Cleaning Unit fans are not provided with the vital bus, but can be energized by a portable generator in sufficient time to complete sampling and analysis within three hours during loss of off-site power.

We determined that these provisions meet Criterion (11) of Item II.B.3 of NUREG-0737, and are, therefore, acceptable.

Conclusion

Based on the foregoing evaluation, we conclude that the PASS meets all the criteria of Item II.B.3 of NUREG-0737 and is acceptable.

ENVIRONMENTAL CONSIDERATION

We have determined that the amendments do not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendments involve an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of the amendments.

CONCLUSION

Notice of opportunity for a prior hearing was published in the Federal Register on February 16, 1984 (49 FR 6040). No requests for a hearing were received.

We have concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities will be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.

Dated: April 24, 1984

Principal Contributors: Carl Stahle, Licensing Branch No. 4, DL
Jay Lee, Meteorology and Effluent Treatment
Branch, DSI

U. S. NUCLEAR REGULATORY COMMISSIONTENNESSEE VALLEY AUTHORITYDOCKET NOS. 50-327 AND 50-328NOTICE OF ISSUANCE OF AMENDMENT TOFACILITY OPERATING LICENSE

The U.S. Nuclear Regulatory Commission (Commission) has issued Amendment No. 35 to Facility Operating License No. DPR-77 and Amendment No. 26 to Facility Operating License No. DPR-79, issued to Tennessee Valley Authority (the licensee), which revised conditions in the licenses for operation of the Sequoyah Nuclear Plant, Units 1 and 2, (the facilities) located in Hamilton County, Tennessee. The amendments were effective as of the date of their issuance.

The amendments change license conditions to authorize operation of the installed Post Accident Sampling System.

The application for the amendments complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendments.

Notice of Consideration of Issuance of Amendments and Opportunity for Prior Hearing in connection with this action was published in the FEDERAL REGISTER on February 16, 1984 (49 FR 6040). No request for a hearing or petition for leave to intervene was filed following this notice.

The Commission has determined that the issuance of the amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of the amendment.

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For further details with respect to the action see (1) the application for amendments dated November 23, 1983, and supplemented December 21, 1983, January 9 and 10, and March 23, 1984, (2) Amendment No. 35 to Facility Operating License No. DPR-77 and Amendment No. 26 to Facility Operating License No. DPR-79, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., and at the Chattanooga-Hamilton County Bicentennial Library, 1001 Broad Street, Chattanooga, Tennessee 37401. A copy of items (2) and (3) may be obtained upon request addressed to the U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Director, Division of Licensing.

Dated at Bethesda, Maryland, this 24th day of April 1984.

FOR THE NUCLEAR REGULATORY COMMISSION



Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

April 24, 1984

AMENDMENT NO. 35 TO FACILITY OPERATING LICENSE DPR-77 - SEQUOYAH UNIT 1
AMENDMENT NO. 26 TO FACILITY OPERATING LICENSE DPR-79 - SEQUOYAH UNIT 2

DISTRIBUTION w/enclosures:

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