

October 7, 1986

0703-016

Docket No. 50-313

Mr. Gene Campbell
Vice President, Nuclear
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Arkansas Power and Light Company
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Dear Mr. Campbell:

The Commission has issued the enclosed Amendment No. 102 to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated April 30, 1986, as supplemented July 31, 1986.

The amendment provides changes to ANO-1 TSs 3.14 and 4.12 related to two new thermal hydrogen recombiners to replace the existing hydrogen purge system.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY

Guy S. Vissing, Project Manager
PWR Project Directorate #6
Division of PWR Licensing-B

Enclosures:

1. Amendment No. 102 to DPR-51
2. Safety Evaluation

cc w/enclosures:
See next page

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

ARKANSAS POWER AND LIGHT COMPANY

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 102
License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Arkansas Power and Light Company (the licensee) dated April 30, 1986, as supplemented July 31, 1986, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, 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, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.c.(2) of Facility Operating License No. DPR-51 is hereby amended to read as follows:

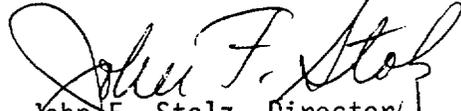
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Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented no later than November 18, 1986.

FOR THE NUCLEAR REGULATORY COMMISSION


John E. Stolz, Director
PWR Project Directorate #6
Division of PWR Licensing-B

Attachment:
Changes to the Technical
Specifications

Date of Issuance: October 7, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 102

FACILITY OPERATING LICENSE NO. DPR-51

DOCKET NO. 50-313

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

Remove

ii
66e
66f
109b
110

Insert

ii
66e
66f
109b
110

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
3.14	HYDROGEN RECOMBINERS	66e
3.15	FUEL HANDLING AREA VENTILATION SYSTEM	66g
3.16	SHOCK SUPPRESSORS (SNUBBERS)	66i
3.17	FIRE SUPPRESSION WATER SYSTEM	66m
3.18	FIRE SUPPRESSION SPRINKLER SYSTEMS	66n
3.19	CONTROL ROOM AND AUXILIARY CONTROL ROOM HALON SYSTEMS	66o
3.20	FIRE HOSE STATIONS	66p
3.21	PENETRATION FIRE BARRIERS	66q
3.22	REACTOR BUILDING PURGE FILTRATION SYSTEM	66r
3.23	REACTOR BUILDING PURGE VALVES	66t
3.24	EXPLOSIVE GAS MIXTURE	66u
3.25	RADIOACTIVE EFFLUENTS	66v
3.25.1	<u>Radioactive Liquid Effluents</u>	66v
3.25.1.1	Concentration	66v
3.25.1.2	Dose	66w
3.25.1.3	Waste Treatment	66x
3.25.1.4	Liquid Holdup Tanks	66y
3.25.2	<u>Radioactive Gaseous Effluents</u>	66z
3.25.2.1	Dose Rate	66z
3.25.2.2	Dose - Noble Gases	66aa
3.25.2.3	Dose - Iodine-131, Tritium, and Radionuclides in Particulate Form	66bb
3.25.2.4	Gaseous Radwaste Treatment	66cc
3.25.2.5	Gas Storage Tanks	66dd
3.25.3	Total Dose	66ee
3.25.4	<u>Solid Radioactive Waste</u>	66ff
4.	<u>SURVEILLANCE STANDARDS</u>	67
4.1	<u>OPERATIONAL SAFETY ITEMS</u>	67
4.2	REACTOR COOLANT SYSTEM SURVEILLANCE	76
4.3	TESTING FOLLOWING OPENING OF SYSTEM	78
4.4	REACTOR BUILDING	79
4.4.1	<u>Reactor Building Leakage Tests</u>	79
4.4.2	<u>Structural Integrity</u>	85
4.5	EMERGENCY CORE COOLING SYSTEM AND REACTOR BUILDING COOLING SYSTEM PERIODIC TESTING	92
4.5.1	<u>Emergency Core Cooling Systems</u>	92
4.5.2	<u>Reactor Building Cooling Systems</u>	95
4.6	AUXILIARY ELECTRICAL SYSTEM TESTS	100
4.7	REACTOR CONTROL ROD SYSTEM TESTS	102
4.7.1	<u>Control Rod Drive System Functional Tests</u>	102
4.7.2	<u>Control Rod Program Verification</u>	104
4.8	EMERGENCY FEEDWATER PUMP TESTING	105
4.9	REACTIVITY ANOMALIES	106
4.10	CONTROL ROOM EMERGENCY AIR CONDITIONING AND ISOLATION SYSTEM SURVEILLANCE	107
4.11	PENETRATION ROOM VENTILATION SYSTEM SURVEILLANCE	109
4.12	HYDROGEN RECOMBINERS SURVEILLANCE	109b
4.13	EMERGENCY COOLING POND	110a
4.14	RADIOACTIVE MATERIALS SOURCES SURVEILLANCE	110b
4.15	AUGMENTED INSERVICE INSPECTION PROGRAM FOR HIGH ENERGY LINES OUTSIDE OF CONTAINMENT	110c

3.14 HYDROGEN RECOMBINERS

Applicability

Applies to the operating status of the hydrogen recombiner systems.

Objective

To ensure that the hydrogen recombiner systems will perform within acceptable levels of efficiency and reliability.

Specification

- 3.14.1 Two independent hydrogen recombiner systems shall be operable whenever reactor building integrity is required.
- 3.14.2 With one hydrogen recombiner system inoperable, restore the inoperable system to operable status within 30 days or the reactor shall be placed in the hot shutdown condition within the next 6 hours.
- 3.14.3 Hydrogen concentration instruments shall be operable.
- 3.14.4 With one of two hydrogen concentration instruments inoperable, restore the inoperable analyzer to OPERABLE status within 30 days or be in at least hot shutdown within the next 6 hours.

Bases

The hydrogen recombiner systems are designed to operate as necessary to limit the hydrogen concentration in the reactor building following a Loss of Coolant Accident.

The system is composed of two redundant 100% capacity Internal Electrical Hydrogen Recombiners, manufactured by Westinghouse.

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4.12 HYDROGEN RECOMBINERS SURVEILLANCE

Applicability

Applies to the surveillance of the hydrogen recombiner systems.

Objective

To verify an acceptable level of efficiency and operability of the hydrogen recombiner systems.

Specification

4.12.1 Each hydrogen recombiner system shall be demonstrated OPERABLE:

- a. At least once per 6 months by verifying during a recombiner system functional test that the minimum heater sheath temperature increases to greater than or equal to 700°F within 90 minutes. Upon reaching 700°F, increase the power setting to maximum power for 2 minutes and verify that the power meter reads greater than or equal to 60 KW.
- b. At least once per 18 months by:
 1. Performing a CHANNEL CALIBRATION of all recombiner instrumentation and control circuits,
 2. Verifying through a visual examination that there is no evidence of abnormal conditions within the recombiner enclosure (i.e., loose wiring or structural connections, deposits of foreign materials, etc.), and
 3. Verifying the integrity of the heater electrical circuits by performing a resistance to ground test following the above required functional test. The resistance to ground for any heater phase shall be greater than or equal to 10,000 ohms.

4.12.2 Hydrogen concentration instruments shall be calibrated once every 18 months with proper consideration to moisture effect.

Bases

The OPERABILITY of the recombiners for the control of hydrogen gas ensures that this equipment will be available to maintain the hydrogen concentration within containment below its flammable limit during post-LOCA conditions. Either recombiner unit is capable of controlling the

expected hydrogen generation associated with 1) zirconium-water reactions, 2) radiolytic decomposition of water, and 3) corrosion of metals within containment. The hydrogen recombiner systems are consistent with the recommendations of Regulatory Guide 1.7, "Control of Combustible Gas Concentrations in Containment Following LOCA", Rev. 2, November, 1978.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 102 TO FACILITY OPERATING LICENSE NO. DPR-51

ARKANSAS POWER AND LIGHT COMPANY

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

INTRODUCTION

By letter dated April 30, 1986, as supplemented July 31, 1986, Arkansas Power and Light Company (AP&L or the licensee) requested amendment to the Technical Specifications (TSs) appended to Facility Operating License No. DPR-51 for Arkansas Nuclear One, Unit No. 1 (ANO-1). The proposed amendment would permit operation with two proposed thermal hydrogen recombiners to be installed in the containment to replace the existing hydrogen purge system and change TSs 3.14 and 4.12. The recombiners are of a standard design made by Westinghouse. Similar recombiners have been installed in several other nuclear plants. The licensee has provided justification for the replacement of the hydrogen purge system with the recombiners on the basis that the safety of the plant is improved by providing a high capacity, hydrogen control system which could operate without the need for venting the containment gases to the atmosphere.

EVALUATION

1. System Modification

By letter dated April 30, 1986, the licensee provided information on a new hydrogen control system proposed for installation at ANO-1. The new system would replace the existing hydrogen purge system which, although meeting the applicable regulatory requirements for hydrogen control, proved to be difficult to maintain. This difficulty was a result of continuous problems with maintenance of the water seals for the purge compressors. This type of compressor is difficult to maintain, and replacing them with a dry seal type compressor would entail high costs. The licensee decided, therefore, to replace the purge compressors with a new, more efficient thermal recombiner system. This system consists of two identical Model B electric hydrogen recombiners made by Westinghouse. The recombiner units are of a standard design approved by the NRC for use in several other nuclear plants. Each unit is capable of handling 100 scfm of containment gases which is twice the capacity of the existing hydrogen purge system. Hydrogen is recombined with oxygen from air in the recombiner by passing the gases over heated surfaces which supply the energy needed for recombination. Since this type of recombination does not rely on catalytic effects of the recombiner surfaces, it cannot be poisoned by impurities which may exist in the containment atmosphere after an accident. The gases in the recombiner flow by natural convection and there are no moving parts. The gases pass through an

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opening in the vertical walls of the unit protected by louvers from spraying water. The heated surfaces are maintained at a temperature between 1150°F and 1400°F. At this temperature, recombination occurs with 95 percent efficiency for the gases containing less than 3.5 v/o hydrogen. The containment cooling system has sufficient capacity to remove additional heat generated by the recombiners.

The recombiner units are designed for a lifetime consistent with that of the plant. Performance tests have indicated that they are operable under conditions which are more severe than those postulated to occur following a loss of coolant accident (LOCA). Design, fabrication and erection of the recombiners will be in conformance with Quality Group B and Seismic Category I criteria. Each recombiner will be powered by a separate onsite emergency power bus backed by the diesel generators. The installation of the recombiners will permit periodic inservice inspection and operability testing which will be performed in accordance with the requirements of TS 4.12.

Both recombiner units are to be located inside the containment on the refueling floor (elevation 426 ft.), on the top of the steam generator cavities. This location is recommended by the manufacturer and it assures that the units will receive uniformly mixed gases from all locations inside the containment. Mixing will be accomplished by the containment emergency cooling system and/or by the containment spray system. Performance of these systems is not affected by the installation of the recombiners. Similarly, the existing hydrogen sampling system will remain unchanged. We have reviewed the design of the recombiners and their installation in the containment of ANO-1 and find that during a design basis accident (LOCA), the system will be capable of maintaining hydrogen concentration in the containment below the flammability limit of 4 v/o.

2. Technical Specification Change

The licensee proposed revised TSs which reflect the above described system modifications. TS 3.14, "Hydrogen Purge System" will be replaced with "Hydrogen Recombiners", and TS 4.12, "Hydrogen Purge System Surveillance" will be replaced with "Hydrogen Recombiners Surveillance". The new specifications are based on the "Standard Technical Specifications for Babcock and Wilcox Pressurized Water Reactors" (NUREG-0103, Rev. 4) as applicable to Westinghouse electric hydrogen recombiners. Proposed TS 3.14 requires two independent recombiner systems to be operable. It also specifies the procedure to be followed if one of the recombiners becomes inoperable. Proposed TS 4.12 specifies the kind and frequency of surveillance operations to be performed on the recombiner system in order to assure its operability. This specification requires that every six months, the operability of the recombiners be verified by performing prescribed tests, and every 18 months, the entire system, including all instrumentation and electric circuits, be thoroughly checked. We have reviewed these proposed TSs and find that they are adequate to assure proper operation of the proposed hydrogen control system based on recombiners.

Based on the considerations discussed above, we conclude that the modification to the ANO-1 hydrogen control system proposed by the licensee meets the requirements of General Design Criterion (GDC) 41 by providing satisfactory means for post accident hydrogen control in the containment. We further conclude that the

proposed revised TSs for surveillance and testing of the hydrogen recombiners are consistent with the applicable Standard Technical Specifications and, therefore, meet the requirements of GDC 42 and GDC 43 for inspection and testing of containment atmosphere cleanup systems. We, therefore, find the proposed replacement of the hydrogen purge system with electric recombiners to be acceptable.

ENVIRONMENTAL CONSIDERATION

This amendment involves a change in the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. We have determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

CONCLUSION

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 this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: October 7, 1986

Principal Contributor: K. Parczewski