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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO FACILITY LICENSE NO. DPR-51

ARKANSAS POWER & LIGHT COMPANY

ARKANSAS NUCLEAR ONE - UNIT 1

DOCKET NO. 50-313

INTRODUCTION

By letter dated November 7, 1975, Arkansas Power & Light Company (AP&L) requested an amendment to Facility License No. DPR-51 for the Arkansas Nuclear One - Unit 1 (ANO-1) facility. This request was in response to the NRC staff's (the "staff") January 10, 1975 letter regarding installed filter systems and proposes changes to the Technical Specifications with regard to establishing Limiting Conditions for Operation (LCOs) and Surveillance Requirements (SRs) for safety related air filter systems.

DISCUSSION

The staff's January 10, 1975 letter to the licensee indicated the need for revision of the ANO-1 facility Technical Specifications to include LCOs and SRs for the facility's installed safety related filter systems. The staff provided model specifications based on Regulatory Guide 1.52, "Design, Testing, and Maintenance Criteria for Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants" (June 1973). The model technical specifications were revised in the Spring of 1975 and discussed with the licensee in July 1975. The revised model technical specifications are based on Regulatory Guide 1.52 and ANSI-N510 (1975), "Testing of Nuclear Air-Cleanup Systems."

The licensee's November 7, 1975 submittal is based on the revised technical specification model and includes the Control Room Emergency Air Conditioning System, the Penetration Room Ventilation System, the Hydrogen Purge System, and the Fuel Handling Area Ventilation System. These systems constitute the facility's safety related filter systems, i.e., systems for which credit was taken in the accident analysis presented in the ANO-1

Final Safety Analysis Report and the staff's ANO-1 Safety Evaluation dated June 6, 1973. The existing Technical Specifications only include LCOs for the Penetration Room Ventilation System and SRs for the Penetration Room Ventilation System, the Hydrogen Purge System, and the Control Room Emergency Air Conditioning System. The tests required for the filter banks in these systems are inadequate compared with the guidance given in Regulatory Guide 1.52 (June 1973) and ANSI-N510 (1975). Tests of various safety features, periodic operational tests, and provisions to curtail reactor operation upon failure of all or part of these filter systems are not included in the specifications.

During our review of the proposed changes, we found that certain modifications to the proposal were necessary to meet Regulatory requirements. These changes were discussed with the licensee's staff. The licensee has agreed with these changes and the changes have been incorporated into the amendment.

EVALUATION

A. Air Treatment System Tests Recommended by the NRC staff

Certain tests should be required on high efficiency particulate air (HEPA) and charcoal filters to assure filter system operability. The following tests for installed filter systems are recommended in ANSI-N510 (1975) and Regulatory Guide 1.52, and were proposed in the staff's model technical specifications:

Test #1 In-place cold dioctyl phthalate (DOP) tests on HEPA filters. This test is performed to check possible degradation of the filter during operation or after system installation and maintenance and consists of injecting cold DOP aerosol upstream of the filter and measuring the downstream concentration to ascertain the removal efficiency of the filter. At least 99% DOP removal is required to demonstrate capability of the filters to remove at least 90% of the particulate activity produced from postulated accidents.

Test #2 In-place halogenated hydrocarbon tests on charcoal adsorber filters. This test is performed to check filter integrity and leakage during operation and after system installation or maintenance. The test consists of injecting a refrigerant tracer gas (halogenated hydrocarbon) upstream of the adsorber and measuring the concentration upstream and downstream of the filter. At least 99% halogenated hydrocarbon removal is required to assure proper filter leaktightness.

Test #3 Laboratory carbon sample analysis of the charcoal adsorber banks. This test is performed to check the iodine removal effectiveness of the adsorber filter. At least 90% radioactive methyl iodide removal is required during the test to assure that the filter will remove 90% of the inorganic iodine and 70% of the organic iodine contained in the air passing through the filter following a postulated accident.

Test #4 Fan capacity. System fans are required to operate at design flow rate (±10%) to assure proper filter system operation.

Test #5 Filter pressure drop. Measurement of the pressure drop across the combined HEPA and adsorber filter banks is performed to assure that the filters do not become plugged. The maximum allowable pressure drop is based on filter design values.

Test #6 Automatic initiation. Tests of automatic initiation are performed on those systems which have this feature. Circuit actuation or control board indication is required to assure system actuation.

Test #7 Filter air distribution in large capacity systems. Test of the exit air velocity distribution across the HEPA and adsorber filter banks is performed to demonstrate uniform distribution (±20% of the average velocity). Uniform air distribution assures proper assembly of the filter bank following maintenance or installation.

Test #8 Heaters. Operation of heaters are checked for systems having this component in the filter circuit to assure proper humidity control of input air to system filters.

B. Proposed Technical Specifications

1. Safety Related Filter Systems

a. Control Room Emergency Air Conditioning System (CREACS)

The CREACS consists of two circuits, each containing a fan and a filter unit. The filter unit has a prefilter, a HEPA filter, and a charcoal adsorber filter in series. One circuit is capable of automatic initiation upon high radiation level in the control room. The other circuit must be manually initiated. Manually-initiated packaged air conditioning units are available to cool the control room air in an emergency. Electric power to the system is supplied from the emergency bus.

The licensee has proposed LCOs for the CREACS which include the appropriate limits for Tests #1, 2, 3, 4, 5, and 6 above. Satisfactory performance of these tests would demonstrate the system to be "operable." Operability of the CREACS would be necessary only when Reactor Building integrity is required. Other proposed LCOs would permit continued facility operation for seven days with one (and only one) circuit of the system inoperable but would require placing the facility in cold shutdown within 36 hours if both circuits were inoperable or the inoperable circuit could not be returned to service within seven days.

The licensee has proposed SRs for the CREACS to perform Tests #1, 2, 3, 4, 5, and 6 at least once per refueling period but not to exceed intervals of 18 months. Tests #1, 2, 3, and 4 also would be performed after 720 hours of system operation or following events which might affect the operability of the system filters (e.g., fire, painting, or chemical release). Tests #1 and #2 would be performed upon replacement of the HEPA filters or the charcoal adsorber filters, respectively. Both Tests #1 and #2 would be performed after structural maintenance on the system housing. Each circuit of the system would be operated at least one hour every month.

b. Penetration Room Ventilation System (PRVS)

The PRVS is an Engineered Safety System consisting of two circuits which take suction from the Reactor Building piping and electrical penetration rooms. Each circuit contains a fan and a filter unit. The filter unit contains a pre-filter, a HEPA filter, and a charcoal adsorber filter in series. Both circuits are capable of automatic initiation by the Reactor Building isolation signal (high Reactor Building pressure or low Reactor Coolant System pressure). The system discharges to the Reactor Building vent.

The licensee has proposed LCOs for the PRVS which include the appropriate limits for Tests #1, 2, 3, 4, 5, and 7 above. Satisfactory performance of these tests would demonstrate the system to be "operable." Operability of the PRVS would be

necessary only when Reactor Building integrity is required. Other proposed LCOs would permit continued facility operation for seven days with one (and only one) circuit of the system inoperable but would require placing the facility in cold shutdown within 36 hours if both circuits were inoperable or the inoperable circuit could not be returned to service within seven days. The staff has concluded that Test #6 must be performed to assure operability of the system's automatic initiation feature. This change has been incorporated into the LCOs.

The SRs for the PRVS, modified by the inclusion of Test #6, require the performance of Tests #1, 2, 3, 4, 5, 6, and 7 least once per refueling period but not to exceed intervals of 18 months. Tests #1, 2, 3, and 4 also would be performed after 720 hours of system operation or following events which might affect the operability of the system filters (e.g., fire, painting, or chemical release). Tests #1 and #2 would be performed upon replacement of the HEPA filters or the charcoal adsorber filters, respectively. Both Tests #1 and #2 would be performed after structural maintenance on the system housing. Each circuit of the system would be operated at least one hour every month.

c. Hydrogen Purge System (HPS)

The HPS is an Engineered Safety System and consists of two independent circuits, each containing a radiation detector, a hydrogen concentration detector, a heater (to reduce humidity of the inlet air), a fan, and a filter package. The filter package contains a HEPA filter and a charcoal adsorber filter in series. The system is manually initiated and discharges to the Reactor Building vent.

The licensee has proposed LCOs for the HPS including the appropriate limits for Tests #1, 2, 3, 4, 5, 7, and 8 above. Satisfactory performance of these tests would demonstrate the system to be "operable." Operability of the HPS would be necessary only when Reactor Building integrity is required. Other proposed LCOs would permit continued facility operation for 30 days with one (and only one) circuit of the system

inoperable, but would require placing the facility in cold shutdown within 36 hours if both circuits were inoperable or the inoperable circuit could not be returned to service within 30 days. The staff has concluded that:

1. the data to be derived from Test #7 would not be meaningful for the HPS (because the system is small) and thus the test need not be performed;

2. an LCO should exist for the hydrogen detector in the system; and

3. the proposed limits for Tests #3 and #5 should be changed to correspond with the limits proposed in the staff's model specifications.

These changes have been incorporated into the LCOs.

The SRs for the HPS, modified by the exclusion of Test #7, requires the performance of Tests #1, 2, 3, 4, 5, and 8 and testing of the hydrogen detector at least once per refueling period but not to exceed intervals of 18 months. Tests #1, 2, 3, and 4 also would be performed after 720 hours of system operation or following events which might affect the operability of the system filters (fire, painting, or chemical release). Tests #1 and #2 would be performed upon replacement of the HEPA filters or the charcoal adsorber filters, respectively. Both Tests #1 and #2 would be performed after structural maintenance on the system housing. Each circuit of the system would be operated at least ten hours every month.

d. Fuel Handling Area Ventilation System (FHAVS)

The FHAVS consists of a single filter unit with redundant fans which take suction on the fuel handling area of the Auxiliary Building. The filter unit contains a prefilter, a HEPA filter, and a charcoal adsorber filter in series. The system is manually initiated and discharges to the Reactor Building vent.

The licensee has proposed LCOs for the FHAVS including the appropriate limits for Tests #1, 2, 3, 4, 5, and 7 above. Satisfactory performance of these tests would demonstrate the system to be "operable." Operability of the FHAVS would be required only when irradiated fuel handling operations are in progress in the Auxiliary Building. Movements of irradiated fuel would have to be terminated (after any movement already in progress is completed) if the FHAVS becomes inoperable. The staff has concluded that the proposed LCOs and the bases should be revised to require the system to be in operation when fuel handling is in progress. This would assure that the system would perform its safety functi- in the event of a fuel handling accident.

The licensee proposed SRs to require Tests #1, 2, 3, and 4 to be performed on the FHAVS a maximum of 720 hours prior to handling irradiated fuel in the Auxiliary Building, and to require Test #5 and #7 to be performed at least once per refueling period. Also the system would be required to be operated for at least ten hours prior to handling of irradiated fuel in the Auxiliary Building. In addition, the staff would require: 1) performance of Tests #1, 2, 3, and 4 following events which might affect the operability of the system filters (e.g., fire, painting, or chemical release); 2) performance of Test #1 following replacement of the HEPA filter; 3) performance of Test #2 following replacement of the charcoal adsorber filter; and 4) performance of Tests #1 and #2 following structural maintenance on the system housing. These changes have been incorporated into the SRs. All of the above surveillance tests would be required only prior to irradiated fuel handling in the Auxiliary Building.

e. Findings Regarding Proposed And Recommended Specifications

We have reviewed the above LCOs and SRs (as modified by the staff's recommendations) and have concluded that the specifications are in accordance with the staff's guidance for safety-related filter systems. The specifications, as modified, provide reasonable assurance that the system will function, when needed, as described in the licensee's ANO-1 Final Safety Analysis Report and the NRC staff's ANO-1 Safety Evaluation (June 6, 1973).

2. Reactor Building Purge System (RBPS)

The present LCO requiring the RBPS to be operable has been replaced with an LCO requiring operability of the RBPS isolation valves. This change is acceptable since credit was given in the staff's ANO-1 Safety Evaluation for system isolation but not for system operation.

C. Environmental Consideration

We have determined that the amendment does 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 amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental statement, negative declaration, or environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) 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.

Date: February 18, 1976