

ARKANSAS POWER AND LIGHT COMPANY

DOCKET NO. 50-313

ARKANSAS NUCLEAR ONE, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 8
License No. DPR-51

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The applications for amendment by Arkansas Power & Light Company (the licensee) dated July 8, 1975, September 26, 1975, and October 9, 1975, comply 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; and
 - 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.
2. Accordingly, the license is amended by a change to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.c.(2) of Facility License No. DPR-51 is hereby amended to read as follows:

(2). Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised, are hereby incorporated in the license.

OFFICE						
SURNAME						
DATE						

8004210 666

The licensee shall operate the facility in accordance with the Technical Specifications as revised by issued changes thereto through Change No. 8."

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

FOR THE NUCLEAR REGULATORY COMMISSION

Daniel R. Muller, Assistant Director
for Environmental Projects
Division of Reactor Licensing

Attachment:
Change No. 8 to Technical
Specifications

Date of Issuance: DEC 23 1975

OFFICE	RL:EP-3	RL:EP-3	RL:OR-2	RL:OR-2	OELB	RL:ADEP
SURNAME	FJMira	BJYoungblood	MConverse	RDiggs	LDDAvis	DRMuller
DATE	12/10/75	12-23-75	12/11/75		12/14	12/23

ATTACHMENT TO LICENSE AMENDMENT
AMENDMENT NO. 8 TO FACILITY OPERATING LICENSE NO. DPR-51
CHANGE NO. 8 TO TECHNICAL SPECIFICATIONS
ARKANSAS POWER AND LIGHT COMPANY
ARKANSAS NUCLEAR ONE, UNIT 1
DOCKET NO. 50-313

Revise Appendix B as follows:

Remove pages i, ii, iii, iv, 2-5, 2-6, 2-7, 2-8, 2-9, 2-10, 2-15, 2-16, 2-19, 2-20, 3-1, 3-2, 3-3, 3-4, 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-29, 4-30, 4-31, 4-32, 4-33, 4-34, 4-35, 5-3, 5-4, 5-5, and 5-6, and insert the attached revised pages. No changes made on pages iii, 2-10, 2-19, 3-2, 3-4, 4-30. Pages 2-7, 2-8, 2-15, 2-16, 2-20, 4-2, 4-3, 4-4, 4-5, 4-32, 4-33, 4-34, and 4-35 are deleted. Add pages 2-5a and 5-5a. The changed areas on the revised pages are shown by marginal lines.

Effective January 19, 1975, activities under the U. S. Atomic Energy Commission regulatory program were assumed by the U. S. Nuclear Regulatory Commission in accordance with the Energy Reorganization Act of 1974. Any references to the Atomic Energy Commission (AEC) contained herein should be interpreted as Nuclear Regulatory Commission (NRC).

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2.2 Hydraulic

2.2.1 Intake Velocity

A study will be undertaken as described in Section 4.1.2 to determine means of limiting fish impingement on the traveling water screens.

2.2.2 Discharge Velocity

Not Applicable.

2.2.3 Flow Rate Restrictions

Not Applicable.

2.2.4 Reservoir Drawdown

Not Applicable.

2.3 Chemical

Objective (General)

To protect the local biota from lethal and sublethal effects of chemical discharges. To assure that the most sensitive use of the receiving medium by human populations is protected. To minimize degradation of the quality of the receiving medium.

Specification (General)

All plant chemical discharges except that from the plant sanitary system shall be diluted by the plant circulating water during release to assure that the stated objective can be achieved. No release of demineralizer waste shall be made without a dilution equivalent to one-half (approximately 383,000 gpm) the full flow of the Unit 1 circulating water pumps.

Any limitation on the quality of plant effluents and requirements for monitoring the same imposed under conditions of the Federal Water Pollution Control Act shall be a part of these Technical Specifications. All reports to state or federal agencies regarding compliance with any such limitation shall also be provided to NRC as described in specification 5.6.2.

2.3.1 Biocides

Specification

a. Chlorine (Circulating Water System)

Chlorination of condenser cooling water shall be intermittent (1 to 2 hours each day or as may be necessary). Total available chlorine residual in the plant effluent shall be less than 0.1 mg/l. If the total available chlorine residual in the discharge canal exceeds 0.1 mg/l, the chlorine feed rate shall be reduced to a rate at which this specification can be met.

b. Chlorine (Sanitary Waste System)

The hypochlorinator of the sewage-treatment system shall be maintained so that the free available chlorine residual of the effluent shall not be greater than 0.1 mg/l at point of discharge to the embayment.

Monitoring Requirement

a. Chlorine (Circulating Water System)

Total available chlorine residual in the discharge canal shall be measured twice weekly during periods of chlorination. Analyses will be made according to Standard Methods Number 114F or 114B or method of equivalent accuracy or precision.

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b. Chlorine (Sanitary Waste System)

The sewage treatment effluent shall be checked monthly to ensure that the total available chlorine residual is not greater than 0.1 mg/l at point of discharge to the embayment. Analysis will be made according to Standard Methods Number 114F or 114B or method of equivalent accuracy or precision.

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Bases

The once-through circulating water flow taken from the Illinois Bayou arm of the Dardanelle Reservoir will pass through the turbine condenser and will be discharged into an 80-acre embayment of the Reservoir.

Analysis of the chlorine demand of the Arkansas River water (i.e., the amount of chlorine required to oxidize substances in the water which reduce free chlorine) range from 2 to 4 mg/l for a contact time of 10 minutes. Reaction of chlorine with the untreated dilution water during the 4 to 5 minutes required for the flow to reach the embayment should reduce the concentration of total available chlorine residual below 0.1 mg/l in the effluent. It is estimated that Unit 1 chlorine usage will be 330,000 lb/year.

- 2.3.2 Deleted
- 2.3.3 Deleted
- 2.3.4 Deleted
- 2.3.5 Deleted

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*Specifications 2.3.2 through 2.3.5 on Pages 2-6 through 2-9 deleted.

2.4 Radioactive Discharge

Objective

To define the limits and conditions for the controlled release of radioactive effluents to the environs to ensure that these releases are as low as practicable. These releases should not result in radiation exposures in unrestricted areas greater than a few percent of natural background exposure. The release rate for all effluent discharges should be within the limits specified in 10 CFR Part 20.

To assure that the release of radioactive material to unrestricted areas meet the as-low-as-practicable concept, the following objectives apply:

For liquid wastes:

- a. The annual total quantity of radioactive materials in liquid waste, excluding tritium and dissolved gases, should not exceed 5 curies;
- b. The annual average concentration of radioactive materials in liquid waste upon release from the Restricted Area, excluding tritium and dissolved noble gases, shall not exceed 2×10^{-8} $\mu\text{Ci/ml}$; and
- c. The annual average concentration of dissolved gases in liquid waste, upon release from the Restricted Area, shall not exceed 2×10^{-6} $\mu\text{Ci/ml}$.

For gaseous wastes:

- a. Averaged over a yearly interval, the release rate of noble gases and other radioactive isotopes, except I-131 and particulate radioisotopes with half-lives greater than eight days, discharged from the plant should result in a dose rate at the site boundary of less than 10 mrem to the whole body or any organ of an individual.

- b. Averaged over a yearly interval, the release rate of I-131 and other particulate radioisotopes with half lives longer than eight days discharged from the plant should result in a dose in the unrestricted area of less than 15 mrem to the thyroid of a child through the grass-cow-milk chain.

2.4.1 Liquid Discharge

Specification

1. The rate of release of radioactive materials in liquid waste from the plant shall be controlled such that the instantaneous concentrations of radioactivity in liquid waste, upon release from the Restricted Area, do not exceed the values listed in 10 CFR 20, Appendix B, Table II, Column 2.
2. If the cumulative release of radioactive materials in liquid effluents, excluding tritium and dissolved gases, over a calendar quarter, exceeds 2.5 curies, the Licensee shall:
 - a. Make an investigation to identify the causes for such release rates;
 - b. Define and initiate a program of action to reduce such release rates to the design levels; and,
 - c. Notify the Director, Directorate of Licensing within 30 days, identifying the causes and describing the proposed program of action to reduce such release rates.
3. The release rate of radioactive liquid effluents, excluding tritium and dissolved gases, shall not exceed 10 curies during any calendar quarter.
4. During release of liquid radioactive waste, the following conditions shall be met:
 - a. At least two (2) condenser circulating water pumps shall be in operation to provide a minimum dilution flow of approximately 383,000 gpm in the discharge canal for the liquid waste effluent;
 - b. The effluent control monitor shall be set to alarm and automatically close the waste discharge valve such that the requirements of Specification 2.4.1 are met; and,

2-15

2-16

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TABLE 2-1

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DELETED

TABLE 2-2 (Cont'd)

MINIMUM SAMPLING FREQUENCY

- (1) When activity level exceeds 10 percent of the limits of Specification 2.4.2.3.b, the sampling frequency shall be increased to a minimum of once each day. When the gross activity release rate exceeds one percent of maximum release rate specified in Specification 2.4.2.3.a and the average gross activity release rate increases by 50 percent over the previous day, an analysis shall be performed for iodines and particulates.
- (2) A proportional sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged from the plant.
- (3) The detectability limits for activity analysis are based on the technical feasibility and on the potential significance in the environment of the quantities released. For some nuclides, lower detection limits may be readily achievable and when nuclides are measured below the stated limits, they should also be reported.
- (4) For certain mixtures of gamma emitters, it may not be possible to measure radionuclides in concentrations near their sensitivity limits when other nuclides are present in the sample in much greater concentrations. Under these circumstances, it will be more appropriate to calculate the concentration of such radionuclides using observed ratios with those radionuclides which are measurable.

2-20

TABLE 2-3

3

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DELETED

3.0 DESIGN FEATURES AND OPERATING PRACTICES

3.1 Intake System

A velocity of 1.5 fps will occur in the intake canal from Illinois Bayou. Velocities greater than 2.0 fps are expected to exist at the intake screens. Therefore loss of fish due to impingement against the intake screens is expected to occur. Monitoring specified in 4.1.2 shall permit a quantitative assessment of the impact and an early identification of the need, if any, for corrective action or modifications to the intake system.

3.2 Discharge System

There are no design features or operating practices pertaining to the discharge system not covered in Section 2 which would have a significant adverse effect on the environmental impact if changed.

3.3 Chemical Usage

To assure that changes in the use of chemicals to treat plant water systems are preceded by consideration of environmental impact, the use of chemicals other than biocides to treat plant water systems of ANO Unit 1 shall be restricted to those chemicals listed in Table 3-1. Short term and annual use rates shall not exceed the limits in the table by more than a factor of 3.0. Records of actual chemical usage shall be maintained and summarized by month in reports filed under Specification 5.6.1.

If actual short-term or annual use rate exceeds the values in Table 3-1 by more than a factor of 3.0 or if other chemicals must be used, environmental effects of such chemical usage, the expected release concentration and the duration of use shall be reported in accordance with Specification 5.6.2.

3.4 Plant Shutdown

The rate of change of the condenser discharge water temperature is limited by Specification 2.1.4 to protect aquatic organisms from thermal shock as a result of plant shutdown.

3.5 Land Management

Transmission line rights-of-way have low growing species of cedar, sumac, oak and shrubs as a screen and to assist with erosion control. Planting of grass and clover shall be carried out to further prevent erosion. Further plantings of game food and cover shall be made in cooperation with landowners and the Arkansas Game and Fish Commission. No herbicides shall be used for land management on transmission line rights-of-way.

The grounds in the immediate vicinity of the plant building shall be landscaped. Remaining portions of the plant site shall be allowed to remain in their present wild state with the exception of the area on which the visitors center will be located. This area is located approximately 0.7 mile northeast of the Reactor Building on a hill overlooking the plant.

TABLE 3-1

CHEMICALS ADDED TO ANO-1 PLANT WATER SYSTEMS

<u>Chemical</u>	<u>Chemical Formula</u>	<u>Annual Usage (lbs)</u>	<u>Description of Use</u>
Sulfuric Acid	H_2SO_4	1,000,000	Demineralizer Regenerant
Sodium Hydroxide	NaOH	1,400,000	Demineralizer Regenerant
Ammonium Hydroxide	NH_4OH	250,000	Control of Condensate pH
Sodium Sulfite	Na_2SO_3	12,500	Demineralizer Regenerant
Boron as Boric Acid	-	200,000	Neutron Absorber Processed Through Liquid Radwaste System
Lithium Hydroxide	LiOH	10,700	Primary System pH Control
Hydrazine	N_2H_4	45,500	Oxygen Scavenger in Condensate
Detergents	-	4,000	Laundry and Plant Cleanup
Sodium Nitrite	$NaNO_2$	3,000	Corrosion Control in Closed Cooling Water Systems

TABLE 3-1 (Cont'd)

CHEMICALS DISCHARGED IN CIRCULATING COOLING WATER TO LAKE DARDANELLE

<u>Chemical</u>	<u>lb/day</u>	<u>Increment Added to 383,000 GPM* Discharge Flow (Mg/l)</u>	<u>Average Concentration of Chemical Present in Lake, Mg/l</u>	<u>Chemical Use</u>
B ⁻	560	0.1	0.08	Neutron Absorber Processed Through Liquid Radwaste
LiOH	29.4	0.006	NA	Primary System pH Control
N ₂ H ₄	122	0.02	NA	Oxygen Scavanger in Condensate
Detergents	10	0.002	NA	Laundry and Plant Cleanup

* A minimum of two pumps will be run (Approximately 383,000 GPM) at all times during discharge.

* NA = Not Analyzed

4.0 ENVIRONMENTAL SURVEILLANCE

The surveillance program provides an examination of the aquatic ecosystem of Lake Dardanelle in the vicinity of the plant as well as providing information on air, precipitation, ground water, soil, vegetation and milk by radiological analysis of samples in the area of the plant.

Since the aquatic ecosystem is the most likely to be affected both chemically and radiologically by plant operation, more emphasis has been placed on its surveillance. The waters of Lake Dardanelle are subjected to frequent chemical and radiological analyses. Organisms that live in the lake are studied biologically and subjected to radiological testing. Studies are also made on the effects of impingement and entrainment of organisms in the cooling water system. Provision is also made for temperature monitoring and controlling the rate of change in water temperature (Specification 2.1.4).

Results of the program, including the reports submitted in accordance with Specification 5.6, will be reviewed as specified in 5.3.

4.1 Nonradiological Environmental Surveillance

4.1.1 Abiotic

a. Aquatic

(1), (2), (3), (4) and (5) DELETED

* Specifications 4.1.1.a.(1) through 4.1.1.a.(5) on pages 4-1 to 4-6 deleted

(6) Water Quality

Objective:

To determine effects of plant operation on the physical and chemical parameters at selected points covered in the pre-operational background surveys.

Specification:

- (a) Chemical tests listed in Table 4-5 shall be performed monthly on water samples taken at points listed in Table 4-3 and shown in Figure 4-3.
- (b) Physical measurements listed in Table 4-4 shall be made monthly at points listed in Table 4-3 and shown in Figure 4-3.

Reporting Requirements:

These measurements are made by personnel of the University of Arkansas at Little Rock and results will be reported in the Semiannual Report of the UALR Project and will be included in reports filed under Specification 5.6.1.

Bases:

This program is essentially a continuation of the Dardanelle Background Survey begun by the University of Arkansas at Little Rock in 1968.

TABLE 4-3

AQUATIC SAMPLING LOCATION AND FREQUENCIES

<u>Sample Type</u>	<u>Sample Frequency</u>	<u>Sample Station #</u>
Plankton	Quarterly - January, April July, October	1, 2, 3, 5, 10, 11, 14, 15, 16, 21
Benthic Organisms	Quarterly - January, April July, October	1, 2, 3, 5, 10, 11, 14, 15, 16, 21
Gill Net Survey	2 sets of 2 net-nights in each area within 30 days of each quarter	Areas A, B, C, D,
Trawling Survey	Two samples in each area every other week March, April, May, June	Areas A, B, C, D
Trap Net Survey	5 consecutive days Spring and Fall	Areas A, B, D
Cove Rotenone Survey	September	Areas A, C
Shoreline Seine Survey	Two samples in each area every other week March, April, May, June	Areas A, C
Fish Cage Survey (Mussels)	Semi-Annually	Areas A, B, C, D
Chemical	Monthly	1*, 3, 5, 7, 8, 10, 11, 13, 14, 15, 16, 17, 21
Physical	Monthly	3, 5, 7, 8, 10, 11, 13, 14, 15, 16, 17, 21

*Chemical tests 1, 6, 10, 11, 12 and 13 shown on Table 4-5 shall be performed at Sample Station #1.

TABLE 4-4

PHYSICAL MEASUREMENTS

1. Air Temperature
2. Sky Condition
3. Wind mph
4. Solar BTU Radiation
5. Water Condition
6. Water Level
7. Water Temperature
8. Local Fishing Conditions
(Commercial Fishing Activity)

TABLE 4-5

CHEMICAL ANALYTICAL METHODS USED IN THE
UALR BACKGROUND STUDY

1. Dissolved Oxygen - Yellow springs Model 54 dissolved oxygen meter (Polarographic). Analyses shall be made at the one and two foot depths and at five foot intervals thereafter to the bottom.
2. PH - Taylor Color Comparator
3. Iron - Hach photoelectric colorimeter Model DR and ' 10 phenanthroline
4. Manganese - Hach Colorimeter Model DR - Cold periodate method
5. Turbidity - Hach Colorimeter, Model DR
6. Chemical Oxygen Demand - Method 220 of "Standard Methods"
7. Total Hardness - Orion Specific Electrode Method
8. Boron - Method 107A, "Standard Methods"
9. Filterable Iron - Method 124A, Procedure 4.(b) "Standard Methods"
- 10* Total Suspended and Total Dissolved Solids - "Standard Methods" or method of equivalent accuracy and precision
- 11* Sulfate - "Standard Methods" or method of equivalent accuracy and precision
- 12* Chloride - "Standard Methods" or method of equivalent accuracy and precision
- 13* Total Kjeldahl Nitrogen - "Standard Methods" or method of equivalent accuracy and precision

*Chemical tests 10, 11, 12 and 13 shall be made only at Sample Stations #1, #5 and #21.

TABLE 4-6

DELETED

*Table 4-6 on pages 4-32 through 4-35 deleted.

5.4.3 A report for each occurrence shall be prepared as specified in Section 5.6.2.

5.5 Procedures

5.5.1 Detailed written procedures shall be prepared and followed for all activities involved in carrying out the environmental technical specifications. Procedures shall include sampling, instrument calibration, analysis, and actions to be taken when limits are approached or exceeded. Testing frequency of any alarms shall be included. These frequencies shall be determined from experience with similar instruments in similar environments and from manufacturers' technical manuals.

5.5.2 In addition to the procedures specified in Section 5.5.1, the plant standard operating procedures shall include provisions to ensure the plant and all its systems and components are operated in compliance with the limiting conditions for operations established as part of the environmental technical specifications.

5.5.3 Temporary changes to procedures in 5.5.1 above, which do not change the intent of the original procedure may be made, provided such changes are approved by two members of the plant staff, at least one of whom shall be a Shift Supervisor. Such changes shall be documented.

5.6 Plant Reporting Requirements

5.6.1 Routine Reports

A report on environmental surveillance programs for the previous six months operations shall be submitted within 60 days after January 1 and July 1 of each year. The period of the first report shall begin with the date of initial criticality. The report shall be a summary of the results of the environmental activities for the 6 month period and an assessment of the observed impacts of the plant operation on the environment.

The report shall include a summary of the quantities of radioactive effluents released from the plant as outlined in USAEC Regulatory Guide 1.21, with data summarized on a monthly basis following the format of Appendix A thereof. A summary of the iodine analyses performed on primary coolant as required by Appendix A of these Technical Specifications shall also be included.

If statistically significant variations of offsite environmental radionuclide concentrations with time are observed, a comparison of these results with effluent releases shall be provided.

Individual samples which show higher than normal levels (25% above background for external dose, or twice background for radionuclide content) shall be noted in the reports.

Results from all radiological samples taken shall be summarized on a quarterly basis following the format of Table 5-1 for inclusion in the semiannual report. In the event that some results are not available within the 60 day period, the report should be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

5.6.2 Non-Routine Reports

a. Radioactive Discharge

The reporting requirements for radioactive discharges are specified in Section 2.4 of the Technical Specification.

b. Radiological Environmental Monitoring

- (1) In the event that a report level specified below is reached, a report shall be made within the designated time period to the addressees identified in Regulatory Guide 10.1. If a measured level of radioactivity in "critical pathway* environmental medium samples" indicates that the resultant annual dose to an individual from these levels could equal or exceed 4 times the design objective, a plan shall be submitted within ten days advising the AEC of the proposed action to ensure the plant related annual doses will be within the design objective. For example, with an I-131 design objective of 15 mrem/yr to the thyroid of any individual, if individual charcoal filters show I-131 concentrations in air of 4×10^{-12} pCi/cm³ or greater (2×10^{-14} pCi/m³ if the milk pathway is involved), or if individual milk samples show I-131 concentrations of 10 pCi/l or greater, the results shall be reported along with a proposed plan of action, as discussed above. For purposes of calculating doses the models presented in WASH-1258 issued in July 1973 and Regulatory Guide 1.42 shall be used.

*Critical pathway is defined by §14 of ICRP Publication 7.

(2) If samples of critical pathway environmental media collected over a calendar quarter show total levels of radioactivity that could result in accumulated plant related doses to an individual for that quarter of 1/2 the annual design objective, the results shall be reported and a plan submitted and implemented within 30 days to limit conditions so that the annual dose to an individual will not exceed the design objective.

c. Nonradiological

In the event a limiting condition for operation is exceeded, or a report level specified in Section 4, Environmental Surveillance is reached, or an unusual event involving a significant environmental impact occurs, a report shall be made within 24 hours by telephone and telegraph to the Director of the Regional Inspection and Enforcement Office, followed by a written report within ten days to the addresses identified in Regulatory Guide 10.1.

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The written report and to the extent possible, the preliminary telephone and telegraph report, shall: (a) describe, analyze and evaluate the occurrence, including extent and magnitude of the impact, (b) describe the cause of the occurrence and (c) indicate the corrective action (including any significant changes made in procedures) taken to preclude repetition of the occurrence and to prevent similar occurrences involving similar components or systems.

Copies of reports to federal and state agencies regarding compliance with limitations on quality of liquid effluents from ANO-1 shall be sent to the Director of the Regional Inspection and Enforcement Office (cc to Director of Reactor Licensing) within ten days of the original submittal.

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5.6.3

Changes

a. When a change to the plant design, to the plant operation, or to the procedures described in Section 5.5 is planned which would have a significant adverse effect on the environment or which involves an environmental matter or question not previously reviewed and evaluated by the AEC, a report on the change shall be made to the AEC prior to implementation. The report shall include a description and evaluation of the change including a supporting benefit-cost analysis.

- b. Changes or additions to permits and certificates required by Federal State, local and regional authorities for the protection of the environment shall be reported. When the required changes are submitted to the concerned agency for approval, they shall also be submitted to the Director of Reactor Licensing,

for information. The submittal shall include an evaluation of the environmental impact of the change. | 8

- c. Request for changes in environmental technical specifications shall be submitted to the Director of Reactor Licensing for prior review and authorization. The request shall include an evaluation of the impact on the change, including a supporting benefit-cost analysis. | 8

5.7 Records Retention

5.7.1 Records and logs relative to the following areas shall be retained for the life of the plant:

- a. Records and drawing changes reflecting plant design modifications made to systems and equipment as described in Section 5.6.3.
- b. Records of environmental surveillance data.
- c. Records to demonstrate compliance with the limiting conditions for operation in Section 2.

5.7.2 All other records and logs relating to the environmental technical specifications shall be retained for five years.