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December 6, 1978

1-128-6

Director of Nuclear Reactor Regulation
ATTN: Mr. R. W. Reid, Chief
Operating Reactor Branch #4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Operating License Amendment, K-85
(File: 1510)

Gentlemen:

Our letter of August 16, 1978, requested an Operating License Amendment to allow possession, storage and use of a Krypton 85 source exceeding the allowable limits of our current Operating License.

As a result of subsequent telecons with the Staff, the attached marked-up pages of the ANO-1 FSAR are submitted. These changes will be incorporated in the ANO-1 FSAR. These pages supersede the corresponding pages attached to our August 16, 1978, letter.

Very truly yours,

Donald A. Rueter
for Daniel H. Williams
Manager, Licensing

DHW:JTE:vb

Attachment

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11.3 RADIOACTIVE MATERIALS SAFETY

11.3.1 MATERIALS SAFETY PROGRAM

11.3.1.1 Special Nuclear Material

Arkansas Power & Light Company has implemented a "Nuclear Fuel Safeguards and Accountability System" to assure control of the special nuclear material under title to, or in the possession of, the Company. The use, storage and control of the special nuclear material at the operating station is done according to the operating procedure entitled "Control and Accountability Procedure for Nuclear Fuel". This procedure is part of the Company's fuel accountability program, and the procedure references the operating procedures that are used in receiving, handling and storing the fuel assemblies containing the special nuclear material.

Special nuclear material contained in unirradiated fuel assemblies is stored in non-critical arrays in either the new or spent fuel pools, both of which are Seismic Class I structures as described in Section 5.A.2.1.1. Fuel assemblies are inserted into and removed from the reactor according to approved fuel handling procedures using the fuel handling equipment, as discussed in Section 9.6.2.2. Irradiated fuel assemblies will be handled and stored under water, as described in Section 9.6.2.2 and licensed shipping casks will be used to move the fuel from the site.

12.4.1.2 Sealed Neutron Sources For Reactor Startup

The neutron sources used for reactor startup consist of source pellets encapsulated to form a complete neutron source set. The neutron sources are handled, assembled and stored under water according to the provisions of the "Neutron Source Handling Procedure". The sources are stored in either the shipping cask or the neutron source holder until the sources are loaded into fuel assemblies. The fuel assemblies containing the neutron sources are then returned to the spent fuel storage racks or inserted into the reactor under the control of the initial fuel loading procedure.

11.3.1.2 Other Sealed Sources

The Radiological Safety Program is described in Section 11.1.7 and is further clarified in the Radiation Protection Manual and procedures. In addition, sealed sources (with the exception of the startup source) containing a sufficient quantity of radioactive material to create a high radiation area will be locked in a shield or locked in the shielded position when not in use. When in use and unattended the rooms in which these sources are used will be posted and locked.

11.3.2 FACILITIES AND EQUIPMENT

11.3.2.1 Facilities

The Radiochemistry lab has been constructed for ease of decontamination.

The lab is designed for the preparation and analysis of reactor coolant samples. There is a stainless steel lined fume hood in the Radiochemistry Laboratory with a designed exhaust flow of 800 cfm. Two exhaust fans draw air from the fume hood, Radiochemistry Lab, Sample Room and Counting Room as well as other areas in the Auxiliary Building. One fan will start automatically if the other fan stops. If both fans fail, an alarm will sound in the Control Room. Drains from the fume hood and sinks are connected to the liquid waste storage system provided in the plant. Additional information on laboratory facilities is given in Section 11.2.7.4.

11.3.2.1.1 Present Facilities, Control and Use

A. At present there are two Cs-137 instrument calibration sources. One source is 100 millicuries with permanent collimator and is electrically operated. A cart and track arrangement was built to make use of the inverse square law for obtaining the desired exposure. The other source is a 50 Curie source.

This source has a self-contained exposure cavity with a lead glass viewing window and is mechanically interlocked to prevent personnel exposure during use. The desired exposure is obtained by placing lead attenuators in the beam.

Both sources are locked in the shielded position when not in use. These sources are used by and the storage areas controlled by Health Physics personnel. Whenever the sources are in use and unattended, the areas in which they are located are locked and appropriately posted. When the 100 millicurie source is in use, the area is posted as a radiation area.

There are two rooms being used for instrument calibrations. One is located adjacent to the Unit 1 Health Physics office and the other is in the Unit 1 Turbine Building basement. Both rooms are normally maintained locked and the room containing the 50 Curie Cs-137 source is under the control of the Health Physics office.

B. There are two calibration sources used to check and calibrate the out of core detectors. One is a 4.71 Curie Pu-Be source and the other is a 500 millicurie Co-60 source. When not in use both sources are locked in their storage containers and the keys are controlled by Health Physics. Presently, Health Physics personnel are present whenever the sources are handled. Instrument Department personnel may handle the neutron source after they are trained by Health Physics Personnel in handling procedures and techniques. Handling the sources requires the issuance of a Special Work Permit.

C. Smaller check sources are used to check or calibrate some radiation instruments. There is a 20 microcurie Co-60 and a 39 millicurie Cs-137 source used to check the installed radiation monitors. The beam is collimated and directed into a cylindrical cavity that fits down over the detector. This cavity acts as a beam stop. These sources are stored under health physics control but may be used by other plant personnel in addition to Health Physics for checking area monitors. (Personnel will be trained by Health Physics personnel in handling the sources before they are allowed to use them).

11.3.2.1.2 Future Facilities, Control and Use

A. The 500 millicurie Co-60 source may be used as a calibration source for portable instruments in the future. If so, it will be used in a suitable configuration to limit personnel exposure and will be used by Health Physics personnel. (Insert A)

B. The calibration sources described in 11.3.2.1.1A above may be moved to Unit 2. If so, they will be in rooms or areas controlled by Health Physics.

C. Additional instrument calibration sources may be acquired in the future.

11.3.2.2 Portable Survey and Monitoring Instruments

Information on radiation survey instrumentation is given in Section 11.2.7.5. A description or portable survey and monitoring instruments and their use is given below. These instruments or their equivalent will be used.

RADIATION DETECTION INSTRUMENTS

Type of Instrument	Min. No. Avlb.*	Radiation Detected	Sensitivity Range	Window Thickness (mg/cm)	Use
1. Portable GM Count Rate (Batt)	4	gamma, beta	0-280K cpm	30 or <2	Monitoring
2. Portable GM Survey (Batt)	2	beta, gamma	0-1000 R/hr	30	Survey
3. GM Monitoring Instrument (AC)	4	alpha, beta gamma	0-50K cpm	30 or <2	Monitoring
4. Gas Flow Proportional Survey Meter (Batt)	2	alpha, beta	0-500K cpm	<2	Contamination Survey
5. Portable Ionization Survey Meter (Batt)	2	gamma, beta	0-500 R/hr	<2	Survey
6. Portable Ionization Survey Meter (Batt)	2	beta, gamma	0-1000 R/hr	30	Survey
7. Portable Ionization Survey Meter (Batt)	1	alpha, beta gamma	0-300 mR/hr	<2	Survey
8. Portable BF Neutron Flux Survey Meter (Batt)	1	fast neutron slow neutron	0-500K cpm		Survey
9. BF_3 Portable REM Counter (Batt)	1	neutron	0-500 mR/hr		Survey

* All for use in Units 1 and 2.

Insert A - Non-Health Physics personnel that may be required to handle these are trained, by health physics personnel, in handling the sources before they are allowed to use them.

11.3.2.3 Portable Air Monitoring Equipment

Portable air monitors consist of four air samplers that are capable of continuously monitoring and recording particulate and gaseous activity. These monitors can be set to alarm on high particulate or gaseous activity. In addition, these monitors can be equipped with an iodine collection cartridge that can be counted in the laboratory. (Particulate and gaseous activities of 3×10^{-11} and 1×10^{-7} μCi/cc, respectively, can readily be detected in low background areas. In higher background areas, particulate and gaseous activities of 3×10^{-10} and 1×10^{-6} μCi/cc, respectively, can be detected.)

Two portable air samplers are also available to obtain airborne grab samples for particulate, gaseous or iodine. (For normal sample and counting times, activities of 2×10^{-10}, 5×10^{-10} and 5×10^{-7} μCi/cc are readily detected for particulates, iodine and noble gases, respectively. By increasing collection and/or counting times lower levels of activity may be detected.)

11.3.2.4 Laboratory Counting Equipment

Laboratory counting equipment includes internal gas flow proporational counter scalers, thin window GM counter scalers and gamma spectroscopy equipment.

11.3.2.5 Installed Area Radiation Monitoring System

The Area Radiation Monitoring System is described in Section 11.2.6.

11.3.2.6 Installed Process Radiation Monitoring System

The Process Radiation Monitoring System is described in Section 11.1.3.4.

11.3.2.7 Personnel Monitoring Devices

The personnel monitoring equipment is described in Section 11.2.7.1.

11.3.3 PERSONNEL AND PROCEDURES

11.3.3.1 Personnel

The site Nuclear Engineer is designated as the Nuclear Materials Custodian and is responsible for the physical accountability of the special nuclear material and provides the storage, movement and loading sequences to minimize the handling of the fuel assemblies. The Supervisor of Plant Operations is responsible for the safe movement and handling of fuel assemblies according to written plant procedures. Plant operations personnel trained in the use of fuel handling equipment are used in moving the material and on-site Shift Operating Supervisors are responsible for fuel handling operations of their shift.

Section 12.1.3.1 gives the description of the positions for the Health Physics Supervisor and Radiochemistry Supervisor. The qualifications of the Health Physics Supervisor and Radiochemistry Supervisor are given in Appendix 1.

who are the key personnel responsible for handling and monitoring radioactive materials.

11.3.3.2 Procedures

All new or temporary employees shall receive a radiation protection orientation prior to their assignment of work in the Controlled Access Area. The orientation will include instruction in the Radiation Protection Manual.

Visitors must be escorted within the Controlled Access Area or othe radiation and/or contamination areas unless they have completed the required radiation protection orientation.

Radiological safety rules and guidelines are specified in the Arkansas Nuclear One Radiation Protection Manual and associated procedures. Instructions contained in these procedures require that personnel:

1. Familiarize themselves with radiological safety practices and procedures;
2. Contact Health Physics for any additional radiological safety information they need;
3. Be signed in on a valid Radiation Work Permit (or Special Work Permit) before working with or around radiation or radioactive materials;
4. Be aware of proper procedures to follow in an emergency;
5. Protect themselves and others from overexposure to external radiation;
6. Minimize the uptake of radioactive materials;
7. Prevent the spread of contamination;
8. Wear assigned personnel monitoring equipment within the plant;
9. Follow requirements and instructions on radiation work permits;
10. Assure themselves that adequate monitoring has been performed prior to starting a job;
11. Notify Health Physics of malfunctioning of any radiation protection equipment.
12. Monitor themselves prior to leaving the Controlled Access or other contaminated areas;
13. Utilize time, distance and shielding as practicable to minimize exposure;
14. Bag contaminated waste;
15. Maintain their exposure as low as practicable;
16. Notify the Shift Operating Supervisor and Health Physics as soon as possible of incidents involving radiation or contamination.

Other general radiological safety rules are:

1. There will be no eating, smoking, drinking or preparation of food or drink in contaminated areas.

2. No materials or equipment shall be removed from the Controlled Access or other contaminated areas unless released by Health Physics.

3. The limit for 40 hours per week exposure to unevaluated mixtures of beta-gamma emitting air particulate activity is 1×10^{-9} μCi/cc.

REQUIRED MATERIALS

At present there are no plans to have any radioactive materials onsite that exceed the limits specified below:

Material	Form and Use	Possession Limit
A. Any byproduct, source and special nuclear material	As reactor fuel; as sealed sources for reactor start up; as sealed sources for reactor instrument and radiation monitoring equipment calibration; and as fission detectors	As required for reactor operation
B. Any byproduct, source or special nuclear material	Any form for sample analysis ~~of~~ or instrument calibration	100 millicuries each isotope; any byproduct material 100 milligrams each isotope; any source or special nuclear material 2 Curies Krypton-85 as an instrument calibration source 51 Curies Cs-137 as an instrument calibration source.