Central Files

MAR 11 1977

MEMORANDUM FOR: Karl R. Goller, Assistant Director for Operating Reactors, DOR

FROM: Darrell G. Eisenhut, Assistant Director for Operational Technology, DOR

SUBJECT: OCONEE UNITS 1, 2 AND 3 - BYPRODUCT, SOURCE AND SPECIAL NUCLEAR MATERIAL AMENDMENT (TAC 6312)

PLANT NAME: Oconee Units 1, 2 and 3
DOCKET NUMBERS: 50-269, 270 and 287
RESPONSIBLE BRANCH: ORB-1
PROJECT MANAGER: J. D. Neighbors
REVIEW STATUS: EEB - Continuing

The Environmental Evaluation Branch is reviewing proposed amendments to operating licenses DPR-38, -47 and -55 for the Oconee Units 1, 2 and 3. The change, proposed in a letter from Duke Power Company (the licensee) dated October 13, 1976, pertains to the receipt, possession and use of byproduct, source and special nuclear material.

In order to complete our review, it is necessary to obtain certain information regarding radioactive materials safety that is not contained in the licensee's FSAR. The additional information needed is given in Enclosure 1. Enclosure 2 is an example of a typical program.

/s/

Darrell G. Eisenhut, Assistant Director
for Operational Technology
Division of Operating Reactors
Office of Nuclear Reactor Regulation

Enclosures:
As stated

cc: V. Stello
A. Schwencer
B. Grimes
D. Neighbors
L. Barrett

DISTRIBUTION:
Central Files
EEB Reading
D. Eisenhut
D. Davis
S. Block
R. Bevan

Contact: S. Block, R. Bevan - EEB/DOR
28066

memo-4

OFFICE ➤	EEB/OT/DOR	EEB/OT/DOR	EEB/OT/DOR	AD/OT/DOR		
SURNAME ➤	RBevan:	LBarrett	BGrimes	DEisenhut		
DATE ➤	3/9/77	3/ /77	3/10/77	3/11/77		

7912300 145 P

ENCLOSURE 1

ADDITIONAL INFORMATION NEEDED AS A

SUPPLEMENT TO THE FSAR

Section 11 of the FSAR should address the following:

1. Materials Safety Program

   Describe the program which will be implemented to assure the safe storage, handling, and use of sealed and unsealed source, byproduct and special nuclear materials. Other sections of the FSAR may be referenced as appropriate.

2. Facilities and Equipment

   Describe the laboratory facilities and equipment such as hoods, gloveboxes, filters, survey and measuring instruments and monitoring devices. Other sections of the FSAR may be referenced as appropriate.

3. Personnel and Procedure

   Describe the experience and qualifications of the key personnel responsible for handling and monitoring the materials. Summarize the content of radiation safety instructions to personnel working in operations to be covered. Other sections of the FSAR may be referenced as appropriate.

4. List isotopes, quantity, form and use for all required source, byproduct and special nuclear material which exceeds the amounts of Table 1.

Table 1

Material	Form and Use	Possession Limit
A. Any byproduct, source, and special nuclear material	As reactor fuel; as sealed neutron sources for reactor startup, as sealed sources for calibration of reactor instruments and radiation monitoring equipment; and as fission detectors	Amount required for reactor operation
B. Any byproduct material	Any form for sample analysis or instrument calibration	100 millicuries each isotope
C. Any source or special nuclear material	Any form for sample analysis or instrument calibration	100 milligrams each isotope

12.4 RADIOACTIVE MATERIALS SAFETY

12.4.1 Materials Safety Program

The plant Radiation Protection Program will be officially initiated when fuel licensed to Edison is first brought on the Fermi 2 site, and it will be in effect continuously thereafter. This program, which is described in Section 12.3, is used to ensure the safe storage, handling and use of sealed and unsealed special nuclear, source and byproduct material. It consists of rules, practices and procedures that include the safe handling and storage of radioactive material. The implementation of this program is the responsibility of the Rad-Chem Engineer.

12.4.1.1 Personnel Radiation Protection Training

Operations, maintenance and technical personnel are provided radiation protection training appropriate for their assigned responsiblilities. Normally, licensed radioactive material, except for fuel and startup sources, is handled only by personnel in the Rad-Chem Group, who are listed on the AEC Byproduct and/or the Special Nuclear Material Licenses (Subsection 12.4.3), or by personnel under their direction. In addition, Rad-Chem personnel are normally the only personnel to handle unsealed liquid sources, many of which are license-exempt. Therefore, Rad-Chem personnel are given training in the safe handling of unsealed liquid sources in addition to the normal radiation protection training.

Reactor fuel and startup neutron sources are handled by operations personnel with AEC Operators Licenses (or Senior Operators Licenses) assisted by other operations and maintenance personnel. The operations personnel receive additional training in the handling of fuel and startup sources as part of their cold license training. These operations are surveyed by members of the Rad-Chem Group.

Prior to plant startup, and at least every three years thereafter, personnel will be trained in radiation protection procedures and techniques that include the safe handling and storage of sources. Personnel will be tested prior to startup, and at least annually thereafter, to verify that they understand how these procedures relate to the safe performance of their jobs. This radiation protection training program meets the requirements of 10 CFR Part 19, 10 CFR Part 20, 10 CFR Part 55, and AEC Regulatory Guides 1.8, 8.2 and 8.10.

12.4.1.2 Sealed Source Leak Testing

Sealed sources will be leak tested at least semi-annually except sources that are installed in the reactor or are otherwise inaccessible. These tests are performed under the direction of the Rad-Chem Engineer or the Rad-Chem Supervisor.

Sealed sources will normally be swiped with a moistened filter paper, using tongs to reduce exposure. If this cannot be done because of exposure levels or inaccessibility of the source, the source holder, source tube or storage pig will be swiped instead, if possible. The filter paper will be dried and counted in appropriate counting room instruments.

The sealed sources incorporated into detecting instruments (area radiation monitors and process monitors) will be leak tested by swiping as deemed necessary when the monitors are disassembled for repair.

12.4.2 Facilities and Equipment

Prior to unloading radioactive material from a vehicle, the material is surveyed by the Rad-Chem Group. The portable survey instrument and the smear counters used are discussed in Subsection 12.3.2. Once unloaded, the vehicle is surveyed to ensure that it has not become contaminated during shipment. Packages which contained licensed radioactive material are normally opened only in a restricted area according to written procedures. After unloading, and prior to storage, the shipping containers are roped off, posted, and, depending on the type of material, physical surveillance may be supplied (an armed guard if the material is fuel). The material is stored in the proper storage area as soon as it is feasible. The proper storage area for licensed material used by the Rad-Chem Group is normally the calibration room, which is described in Subsection 12.3.2 and shown in Figures 12.3-2 and 12.3-3. The proper storage area for new fuel is in storage racks in the new fuel vault, which is described in Section 9.1 and shown in Figures 9.1-1 through 9.1-3. The startup neutron source is stored in its original locked container near the spent fuel pool or under water in the spent fuel pool, which is described in Subsection 9.1-2 and shown in Figure 9.1-3.

These areas are posted as radioactive material areas to comply with 10 CFR Part 20.203. If licensed materials are temporarily stored in an unrestricted area, it will be posted to comply with 10 CFR Part 20.203. The material will be secured against unauthorized removal from the place of storage to comply with 10 CFR Part 20.207.

Licensed radioactive material used by the Rad-Chem Group is usually in the form of sealed sources. These sources are normally used in the calibration room. An area radiation monitor calibrator and other sources are taken into other parts of the plant to calibrate radiation monitors periodically. Liquid sources are normally prepared by the Rad-Chem Group in the high level laboratory, and are used as calibration standards in the counting room or the spectrometer room, which are described in Section 12.3.2 and shown in Figures 12.3-2 and 12.3-3. The high level laboratory, low level laboratory and the counting room have fume hoods with a face velocity of 100 feet per minute and HEPA filters on the exhaust, as described in Section 12.2. The hood in the high level laboratory has miniature manipulators that can be used to handle source material to reduce extremity exposure. Forceps, tongs and remote manipulating tools are used as much as practicable to reduce extremity exposure when handling or transferring sources.

12.4.3 Personnel and Procedures

The key personnel who will be responsible for handling and monitoring the radioactive material used by the Rad-Chem Group are the Rad-Chem Engineer (Norman M. Ewbank, Jr.), who is also the Radiation Protection Officer under the Byproduct Material License, the Rad-Chem Supervisor (Ronald E. Baer); and one of the senior Rad-Chem Technicians (Gary W. Frost). Experience and qualifications of the Rad-Chem personnel are listed on the following pages.

12.4.3.1 Rad-Chem Engineer (Norman M. Ewbank, Jr.)

Education Resume

Indiana University, 1941-1942

U. S. Army, 1943, Chemical Warfare Non-Com Training

Purdue University, 1946-1949 B.S., Chemical Engineering

Illinois Institute of Technology, 1950, six hours Metallurgical Engineering

Pierce College, 1958-1960, 20 hours miscellaneous courses

San Fernando Valley State College, 1962-1963, Chemical and Nuclear Engineering graduate courses

Industrial College of the Armed Forces, 1968 National Security Management

Atomics International, 1969 Reactor Operator Training Course, Fortran IV Programming and 360 Time Share (Basic)

Environmental Protection Agency, 1971 Basic Radiological Health (Southwest Radiological Health Lab)

United States Public Health Service, 1971 Occupational Radiation Protection (Northeast Radiological Health Lab)

Experience

From 1941 to 1943, Mr. Ewbank was Assistant to the Superintendent of the Water Supply Station of Hammond, Indiana, with responsibility for operation of the water treatment plant and area security guards. During the summer of 1947, he filled the position of Chief Chemist for the Hammond, Indiana Sewage Disposal Plant.

From 1949 to 1951, Mr. Ewbank was the Senior Water Safety Chemist for the Water Safety Control Section of the City of Chicago Water Department. From 1951 through 1953 he was a Chemist-Engineer for the Coca Cola Company based in Atlanta, Georgia, performing field surveillance of franchised bottling companies with special emphasis on water treatment and sanitation practices. The field surveillance teams working from a mobile laboratory rendered engineering, biochemical and/or expert witness aid for any operational or natural problems encountered by the bottling companies or governmental units (event of floods, and so forth). During 1953 to 1955 he was responsible for the operation of the radioactive waste treatment plants at the Los Alamos Scientific Laboratory. At that time, he worked for the Radiological Health and Safety Branch of the United States Atomic Energy Commission at Los Alamos, New Mexico.

Mr. Ewbank, as Principal Chemical Engineer at Battelle Memorial Insititute in Columbus, Ohio from 1955 to 1957, was engaged in research involving autoradiographic and isotopic radiographic development studies, radioactive tracer investigations, radiation analysis techniques, and the study of radiation effects on reactor fuels and structural materials. The radiation effects studies involved in-pile work at the Chicago Pile - 5 reactor and the Materials Test Reactor at Idaho Falls.

From 1957 to 1970, he worked at Atomics International as Senior Research Engineer. The first four years were devoted to the investigation of potential moderator-coolants for the Organic Cooled and Moderated Reactor Program. Later, major responsibilities included the design and startup of a 660V Flash X-Ray Facility; preparation of license application, design, startup, and operation of a 25,000 curie Gamma Radiation Facility; and the development of a number of nondestructive testing techniques, including the initiation of a neutron radiographic facility. His work has involved a wide spectrum of radiation effects studies from synergistic studies of space radiation effects on Apollo thermal control coatings and windows to submarine fuel. Some of the studies involved onsite instrumented capsule irradiation studies at the former Curtiss-Wright Reactor in Quehanna, Pennsylvania, the Oak Ridge Graphite Reactor at Oak Ridge, Tennessee and the Shield Test Reactor at Santa Susanna, California. He has authored over 20 unclassified reports, publications and invited papers.

At the present, Mr. Ewbank is working with the System Engineering section of the Fermi Project Group with special review emphasis on radwaste, sampling and monitoring. He is involved with those areas that are not clear-cut systems such as preoperational cleaning, protective coating systems, health physics requirements, torus protection, monitoring in-house research projects, security and evacuation plans, and plant water balance, among others.

Experience Training

Training in the (a) principles and practices of radiation protection, (b) radioactivity measurement standardization and monitoring techniques and instruments, and (d) biological effects of radiation was received in an on-the-job method at Los Alamos Scientific Laboratory from 1953 to 1955. Formal courses were attended at Pierce College in Los Angeles, California in 1958 and San Fernando Valley State College in 1962. All types of training were received in the following two week programs; the EPA conducted "Basic Radiological Health" and the U.S.P.H.S. conducted "Operational Radiation Protection". Sub-item (c) mathematics and calculations basic to the use and measurement of radioactivity training was obtained in those sections listed in the education portion.

EXPERIENCE WITH RADIATION OF NORMAN M. EWBANK, JR.

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use
Plutonium and Polonium	Multi-Curie	Los Alamos, New Mexico	2 years	Process Recover and Disposal
Mixed Fission Products	Multi-Curie	Los Alamos, New Mexico	2 years	Radwaste Treatment
Tritium	Multi-Curie	Battelle Memorial Institute Columbus, Ohio		2 years Autoradiographic and Tracer Studies
Misc. By-Product Materials	Milli-Curie	Battelle Memorial Institute Columbus, Ohio		2 years Tracer, Source and Radiation Effects Studies
Co-60	25,000+ Curies	Atomics International Los Angeles, California	13 years	Radiography and Radiation Effects Studies
Polonium	Milli-Curie	Atomics International Los Angeles, California	13 years	LET and Radiation Effects Studies
Enriched Uranium	Kilogram	Atomics International Los Angeles, California	13 years	Accountability
Misc. By-Product Materials	Milli-Curie	Atomics International Los Angeles, California	13 years	Radiation Effects Studies

EF-2-FSAR

12.4.3.2 Rad-Chem Supervisor (Ronald E. Baer)

	Where Trained	Duration	On the Job	Formal Course
a.	Principles and practices of radiation protection:			
	U. S. Air Force	4 1/2 years	Yes	Yes
	U. S. Public Health Courses	4 weeks		Yes
	Reactor Safety and Hazards Evaluation Radionuclide Analysis by Gamma Spectroscopy			
	Research Laboratories, Div. of GMC	5 years	Yes	No
	Enrico Fermi Atomic Power Plant Unit 1	14 years	Yes	No
b.	Radioactivity measurement, standardization and monitoring techniques and instruments:			
	Facilities listed above	as listed	Yes	Yes
c.	Mathematics and calculations basic to the use and measurement of radioactivity			
	Facilities listed above	as listed	Yes	Yes
d.	Biological effects of radiation			
	Facilities listed above	as listed	Yes	Yes

EXPERIENCE WITH RADIATION OF RONALD E. BAER

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use
Co-60	2 Curies	Research Labs, Div. of GMC	5 years	Instrumentation Calibration
W-187	100 Curies	Research Labs, Div. of GMC	3 years	Research
Po-210	100 Curies	Research Labs, Div. of GMC	3 years	Research
Atomic Nos. 3 to 83	2 Curies	Research Labs, Div. of GMC	4 years	Research
Pu-235	10 Curies	Enrico Fermi Atomic Power Plant Unit 1	10 years	Instrumentation Calibration
Mixed Fission Products	30 K curies	Enrico Fermi Atomic Power Plant Unit 1	3 years 3 years	Spent Fuel Instrumentation
Co-60	1.2 Curies	Enrico Fermi Atomic Power Plant Unit 1	12 years	Calibration

12.4.3.3 Technician (Gary W. Frost)

	Where Trained	Duration	On the Job	Formal Course
a. Principles and practices of radiation protection				
	U. S. Navy	6 months	Yes	Yes
b. Radioactivity measurements, standardization and monitoring techniques and instruments:				
	U. S. Navy	6 months	Yes	Yes
	La Crosse BWR	14 months	Yes	Yes
	Enrico Fermi Atomic Power Plant	3 years	Yes	Yes
c. Mathematics and calculations basic to the use and measurement of radioactivity:				
	U. S. Navy	6 months	Yes	No
	La Crosse BWR	14 months	Yes	No
	Enrico Fermi Atomic Power Plant	3 years	Yes	No
d. Biological effects of radiation:				
	U. S. Navy	3 months	No	Yes

EXPERIENCE WITH RADIATION OF GARY W. FROST

Isotope	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use
Cs-137	10 Curies	La Cross BWR	14 months	Instrumentation Calibration
Co-60	0.5 Curies	Enrico Fermi Atomic Power Plant	3 years	Instrumentation Calibration
Mixed Fission Products	1000 Curies	Enrico Fermi Atomic Power Plant	6 months	Reactor Fuel Shipment

12.4.3.4 Radiation Safety Instructions

The Radiation Safety Program has been described in Subsection 12.4.1. The courses to implement this program are summarized in Chapter 13. The licensed operators receive a one-month course in Radiation Protection (Subsection 13.2.1) and the Rad-Chem Engineer, Rad-Chem Supervisor and Chemical Engineer receive a twelve-week course in Radiochemistry (Subsection 13.2.1) and/or a twelve-week course in Radiological Engineering (Subsection 13.2.1) in addition to the four-week basic Radiation Protection course (Section 13.2.1) that is given to nonlicensed personnel. These training courses give personnel an understanding of how to safely store and handle radioactive material. In addition, they are able to refer to written Rad-Chem procedures in the Rad-Chem Procedures Manual, operating procedures and instrumentation procedures for detailed instructions for specific materials.

12.4.4 Required Materials

Sources in excess of the limits specified in Regulatory Guide 170.3, Table 1 are not expected to be used at the Fermi 2 site by Edison.