OCT 4 1982

DOCKET NO.: 70-2945

APPLICANT: Union Electric Company

FACILITY: Callaway Nuclear Plant, Unit 1

SUBJECT: SAFETY EVALUATION REPORT - Review of License Application Dated June 26, 1981 and Supplements Dated February 5 and 18, May 13, July 28, and August 11, 1982 for a Materials License

I. Introduction

A. Application

By application dated June 26, 1981 and supplements dated February 5 and 18, May 13, July 28, and August 11, 1982, Union Electric Company (UE) requested an NRC Materials License authorizing the receipt, possession, inspection and storage of enriched uranium fuel assemblies and fission counters and chambers containing enriched uranium.

The material authorized by this license is for use in the Callaway Nuclear Plant, Unit 1, a pressurized water reactor, located in Callaway County in East Central Missouri.

B. Scope of Review

The staff safety review of UE's request for a materials license included an evaluation of Callaway's organization, nuclear criticality safety, radiation safety, fire safety, and physical security of the site. The application was also discussed with the NRR project manager and the NRC resident inspector.

The Division of Safeguards, pursuant to 10 CFR Part 73, has reviewed the protection of the material requested in the application. Their letter approving the protection and security of the site was issued on August 11, 1982.

II. Authorized Activities

A. Enriched Uranium Fuel Assemblies

The applicant proposes to receive the fuel assemblies from Westinghouse Electric Corporation in shipping containers approved by the NRC. The fuel assemblies will be unloaded, inspected and stored in the Fuel Building. Inspection will occur in the New Fuel Assembly Inspection Area. Storage will be in either the new fuel storage facility, the spent fuel storage facility or both.

The license also authorizes the repackaging of any assembly, if necessary, for delivery to a carrier. This will permit the return of damaged fuel assemblies to the manufacturer. A general license is provided in 10 CFR 71.12(b) for this need.

Each fuel assembly consists of 264 zircaloy rods containing UO_2 pellets. The fuel pellets are 0.3225-inches in diameter. The cladding is 0.0225-inches thick and has an outside diameter of 0.374-inches. The fuel length is about 144-inches. The assembly also contains 24 guide tubes and one instrument tube. The rods and tubes are arranged in a 17 x 17 square array. Each assembly is about 8.4-inches square by 160-inches long.

Each assembly contains about 461 kgs of uranium as uranium dioxide. The nominal enrichment of the fuel for the first core loading will be 2.1, 2.6, and 3.1 w/o U-235. The maximum enrichment requested under this license is 3.5 w/o U-235. The applicant has requested authorization to receive 2400 kg of U-235 in the form of fuel assemblies. Accordingly the following license conditions are recommended:

Material	Chemical Or Physical Form	Quantity
Uranium-235	UO_2 in unirradiated fuel elements	2400 kg of U-235 in uranium enriched up to 3.5 w/o in U-235.

B. Enriched Uranium Fission Chambers and Fission Counters

Each fission chamber will contain 4.1 mg of U-235 as U_3O_8. The U-235 enrichment is 93%. The chambers will be manufactured by Westinghouse and will be used in the Incore Detector system for Unit 1. Prior to use, the chambers will be stored in a vault in the Fuel Building. Fifteen chambers will be received under this license.

Two fission counters will be received for use in the Post Accident Sampling System for Unit 1. Prior to use, the counters will be stored in the vault in the Fuel Building. Each counter contains 1.6 grams U-235 as uranium enriched to 93% U-235. The uranium will be in the form of UO_2 or U_3O_8.

The following license conditions are recommended:

Material	Chemical Or Physical Form	Quantity
Uranium-235	UO_2 or U_3O_8 in fission chambers and counters	4 grams U-235 in uranium enriched up to 93 w/o in U-235.

III. Organization

A. Fuel Handling and Radiation Protection Responsibilities

Fuel handling and inspection activities will be under the supervision of a Shift Supervisor, Operating Supervisor or Unit Reactor Operator. Fuel handling equipment will be operated by Unit Reactor Operators, Equipment Operators and their assistants. All individuals handling the fuel will be trained at Callaway on fuel handling equipment. Fuel handling procedures are approved by the Superintendent, Operations.

The Health Physics program is carried out under the supervision of the Assistant Superintendent, Engineering-Radiation-Chemical. The Health Physicist

reports directly to the Assistant Superintendent, Engineering-Radiation-Chemical who reports directly to the Plant Superintendent.

B. Minimum Technical Qualifications

The licensee's original application and supplements do not specify minimum technical qualifications for the position of Assistant Superintendent, Engineering-Radiation-Chemical. Although the staff found the incumbent qualified to fulfill this position, the staff recommends the following condition be added to the license to ensure that, if the incumbent leaves his job, a qualified person will be appointed to this position:

> The minimum technical qualifications for the Assistant Superintendent, Engineering-Radiation-Chemical shall be at least a B.S. degree in Radiation Safety or equivalent and 2 years' experience in radiation safety or related fields.

The licensee's August 11, 1982 supplement described the qualifications of fuel handling positions. Supervisors shall be certified for a Senior Reactor Operator's License or a Reactor Operator's License.

C. Training

The training program includes instruction in applicable NRC regulations and plant procedures for protection of personnel in accordance with 10 CFR 19.12. Topics covered include the basics of radiation, dose limits specified in 10 CFR 20, emergency response and ALARA. The staff has concluded, based upon 10 CFR 19.12 requirements, that the applicants training program is adequate to allow UE personnel to safely carry out activities authorized by this license.

IV. Nuclear Criticality Safety

Neither the licensee, nor the NRC staff, attempted to show that more than one fuel assembly out of the shipping containers or the storage rack at the same time would be subcritical under all credible conditions of moderation and

reflection. Because of the importance of assuring subcriticality during fuel handling operations, the staff recommends the following license condition:

> No more than one fuel assembly shall be out of authorized shipping container or storage location at a given time.

The new fuel storage facility has a capacity for 66 assemblies. The facility is a reinforced concrete structure covered with a steel plate, with hinged cover plates over every two fuel assembly storage locations. A floor drain is designed to prevent flooding of the facility. The steel racks and the concrete structure are designed to seismic Category I criteria for structural integrity.

The assemblies are stored in ports which are formed from steel tubes with inner dimensions of 9-inches by 9-inches and walls which are 0.075-inches thick. Each tube will hold one assembly. The tubes within each pair of rows are on 21-inch centers with a 46-inch aisle between each pair of rows.

The spent fuel pool is a reinforced concrete structure in the Fuel Building. The steel racks in the pool are designed to seismic Category I requirements for structural integrity. Some or all of the assemblies may be stored in the spent fuel pool racks. The racks consist of steel square tubes welded together to form a honeycomb module. Each tube is 0.12-inches thick, which produces a wall of steel 0.24-inches thick between storage locations. The fuel assemblies will be stored in alternate tubes in the Spent Fuel Storage Rack on 18.28-inch centers.

The applicant proposes to store the fuel elements in air. In this condition, k-infinity is less than unity.

Accident conditions which the applicant considered are flooding of the arrays with water and immersion of the arrays in low density water (mist) such as might be experienced during fire fighting. For the new fuel storage facility, the applicant calculated a k-effective of not more than 0.95 for flooding and not more than 0.98 for mist immersion. The NRC staff was able to confirm the k-effective for full density water moderation, but calculated a higher k-effective for mist immersion. The applicant has committed to having only

one cover plate open at a time so that mist immersion of the array is not credible. Accordingly, the staff recommends the following license condition:

> Only one hinged cover plate in the steel plate over the new fuel storage facility may be open at a given time.

The applicant calculated k-infinity for fuel in the spent fuel pool. For both full density and mist density, k-infinity is less than 0.95. The staff was able to independently confirm this value by a series of KENO calculations.

A condition which the applicants did not discuss in the safety analysis is control over plastic dust wrappers. Fuel assemblies are frequently shipped and stored in such wrappers. If the wrappers around the fuel were to inadvertently fill with water while the water between assemblies drained away, criticality could occur under some circumstances. To assure that this situation does not occur, the staff proposes the following license condition:

> If fuel assemblies are in plastic dust wrappers, such assemblies shall be stored in such a manner that water will drain freely from within the dust wrappers.

The applicant has requested, pursuant to 10 CFR 70.24(d), an exemption from the provisions of 10 CFR 70.24. Based upon the applicant's demonstration of subcriticality under normal and accident conditions, good cause exists for exemption from the requirements of 10 CFR 70.24. Because of the inherent features associated with storage and inspection of unirradiated fuel containing uranium enriched to less than 3.5% in the U-235 isotope when no fuel processing activities are to be performed, the staff hereby determined that granting such an exemption will not endanger life or property or the common defense and security, and is otherwise in the public interest. This exemption is authorized pursuant to 10 CFR 70.14. The staff recommends that this exemption be added as a condition of the license.

> The licensee is hereby exempted from the provisions of 10 CFR 70.24 insofar as the exemption applies to materials held under this license only.

VI. Radiation Safety

Upon receipt of the licensed material, the external surfaces of the shipping containers will be monitored for radiation levels and contamination. Radiation surveys will be performed with a portable Geiger-Mueller instrument. Smear surveys will be done to check contamination levels. The licensee has stated that radioactive contaminations or levels exceeding the limits specified in 10 CFR 20.205 will result in establishing radiological controls and immediate notification of the NRC. Since the licensee had failed to state that it would notify the final delivery carrier, the NRC staff recommends the following license condition:

> In the event that radiation contamination levels on incoming packages of licensed material exceed the limits specified in 10 CFR 20.205, the licensee will notify the final delivery carrier and the NRC.

If contamination levels exceeding the site contamination limits are discovered, control measures will be implemented. These measures include the establishment of a contamination control point, control of personnel access to the area, use of protective clothing and periodic air sampling. Decontamination of any contaminated areas will be conducted under the supervision of the Health Physics Department. Portable radiation detection instruments will be calibrated quarterly and lab counting instruments will be standardized monthly.

The NRC staff feels that based upon the preceding statements, authorized activities will not pose a significant radiation hazard to the workers nor the general public.

VII. Environmental Protection

The "Final Environmental Statement," related to the operation of Callaway Nuclear Plant, Unit 1, has been prepared and issued by the NRC as NUREG-0813. Based on the environmental statement, implementation of the 10 CFR Part 70 license for the storage and handling of special nuclear material will have an insignificant effect on the environment. Accordingly, the issuance of this license is not a major federal action significantly affecting the quality of

the environment and thus, pursuant to 10 CFR 51.5(d)(4), no environmental impact statement, negative declaration, or environmental impact appraisal need be prepared.

VIII. Fire Safety

Fire safety for the railroad bay, new fuel shipping container storage area and unloading area is provided by a sprinkler alarm system which can be triggered by a local pulldown station. Additional fire protection is provided by permanently mounted fire hose racks, water extinguishers, CO_2 extinguishers, and one chemical extinguisher.

Fire safety for the new fuel storage area consists of one CO_2 and one water extinguisher. Fire protection for the spent fuel pool consists of a permanently mounted hose rack, three CO_2 extinguishers and one water extinguisher. There is another hose rack and CO_2 extinguisher which are common to both the new fuel and spent fuel storage locations. It is the staff's opinion that the fire protection equipment is adequate to reduce the risk of a large plant fire.

IX. Physical Security

Fuel storage areas are located in the Fuel Building which is a controlled access area. The Physical Security Plan will be implemented by the date of fuel receipt and will remain in effect until the security plan submitted pursuant to 10 CFR 50.34(c) is approved and implemented. The Division of Safeguards has determined that the Plan is adequate and meets the requirements of 10 CFR 73.67.

X. Conclusions and Recommendations

The NRC Staff finds that the proposed activities can be performed without undue risk to the health and safety of the public and operating personnel. It has been determined by the staff that the application fulfills the requirements of 10 CFR 70.22(a).

OCT 4 1982

Based upon the above discussion, it is recommended pursuant to 10 CFR 70.23(a) that the license be issued, subject to the above conditions.

Original signed by:
Barry L. Serini

Barry L. Serini
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety, NMSS

Approved by: **Original Signed By:**
W. T. Crow
W. T. Crow

FCUP BLS.	FCUP GHB	FCUF LT	FCUP WTC
BLSerini	GHBidinger	LTyson	WTCrow
9/30/82	9/30/82	9/30/82	9/30/82

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

Docket No. 70-2945

Indemnity Agreement No. B-93

This Indemnity Agreement No. B- 93 is entered into by and between

Union Electric Company

(hereinafter referred to as the "licensee") and the United States Nuclear Regulatory Commission (hereinafter referred to as the "Commission") pursuant to subsection 170c of the Atomic Energy Act of 1954, as amended (hereinafter referred to as "the Act").

ARTICLE I

As used in this agreement:

1. "Nuclear reactor," "byproduct material," "person," "source material," and "special nuclear material" shall have the meanings given them in the Atomic Energy Act of 1954, as amended, and the regulations issued by the Commission.

2. Except where otherwise specifically provided, "amount of financial protection" means the amount specified in Item 2a and b, of the Attachment annexed hereto, as modified by paragraph 8, Article II, with respect to common occurrences.

3.(a) "Nuclear incident" means any occurrence, including an extraordinary nuclear occurrence, or series of occurrences at the location or in the course of transportation causing bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property, arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of the radioactive material.

(b) Any occurrence, including an extraordinary nuclear occurrence, or series of occurrences causing bodily injury, sickness, disease, or death, or loss of or damage to property, or loss of use of property,

arising out of or resulting from the radioactive, toxic, explosive, or other hazardous properties of

i. The radioactive material discharged or dispersed from the location over a period of days, weeks, months or longer, and also arising out of such properties of other material defined as "the radioactive material" in any other agreement or agreements entered into by the Commission under subsection 170c or k of the Act and so discharged or dispersed from "the location" as defined in any such other agreement, or

ii. The radioactive material in the course of transportation and also arising out of such properties of other material defined in any other agreement entered into by the Commission pursuant to subsection 170c or k of the Act as "the radioactive material" and which is in the course of transportation

shall be deemed to be a common occurrence. A common occurrence shall be deemed to constitute a single nuclear incident.

4. "Extraordinary nuclear occurrence" means an event which the Commission has determined to be an extraordinary nuclear occurrence as defined in the Atomic Energy Act of 1954, as amended.

5. "In the course of transportation" means in the course of transportation within the United States, or in the course of transportation outside the United States and any other nation, including handling or temporary storage incidental thereto, of the radioactive material to the location or from the location provided that:

(a) With respect to transportation of the radioactive material to the location, such transportation is not by predetermination to be interrupted by the removal of the material from the transporting conveyance for any purpose other than the continuation of such transportation to the location or temporary storage incidental thereto;

(b) The transportation of the radioactive material from the location shall be deemed to end when the radioactive material is removed from the transporting conveyance for any purpose other than the continuance of transportation or temporary storage incidental thereto;

(c) "In the course of transportation" as used in this agreement shall not include transportation of the radioactive material to the

location if the material is also "in the course of transportation" from any other "location" as defined in any other agreement entered into by the Commission pursuant to subsection 170c or k of the Act.

6. "Person indemnified" means the licensee and any other person who may be liable for public liability.

7. "Public liability" means any legal liability arising out of or resulting from a nuclear incident, except (1) claims under State or Federal Workmen's Compensation Acts of employees of persons indemnified who are employed (a) at the location or, if the nuclear incident occurs in the course of transportation of the radioactive material, on the transporting vehicle, and (b) in connection with the licensee's possession, use or transfer of the radioactive material; (2) claims arising out of an act of war; and (3) claims for loss of, or damage to, or loss of use of (a) property which is located at the location and used in connection with the licensee's possession, use, or transfer of the radioactive material, and (b) if the nuclear incident occurs in the course of transportation of the radioactive material, the transporting vehicle, containers used in such transportation, and the radioactive material.

8. "The location" means the location described in Item 4 of the Attachment hereto.

9. "The radioactive material" means source, special nuclear, and byproduct material which (1) is used or to be used in, or is irradiated or to be irradiated by, the nuclear reactor or reactors subject to the license or licenses designated in the Attachment hereto, or (2) which is produced as the result of operation of said reactor(s).

10. "United States" when used in a geographical sense includes all Territories and possessions of the United States, the Canal Zone and Puerto Rico.

ARTICLE II

1. At all times during the term of the license or licenses designated in Item 3 of the Attachment hereto, the licensee will maintain financial protection in the amount specified in Item 2 of the Attachment and in the form of the nuclear energy liability insurance policy

designated in the Attachment. If more than one license is designated in Item 3 of the Attachment, the licensee agrees to maintain such financial protection until the end of the term of that license which will be the last to expire. The licensee shall, notwithstanding the expiration, termination, modification, amendment, suspension or revocation of any license or licenses designated in Item 3 of the Attachment, maintain such financial protection in effect until all the radioactive material has been removed from the location and transportation of the radioactive material from the location has ended as defined in subparagraph 5(b), Article I, or until the Commission authorizes the termination or the modification of such financial protection. The Commission will not unreasonably withhold such authorization.

2. In the event of any payment by the insurer or insurers under a policy or policies specified in Item 5 of the Attachment hereto which reduces the aggregate limit of such policy or policies below the amount of financial protection, the licensee will promptly apply to his insurers for reinstatement of the amount specified in Item 2a of the Attachment (without reference to paragraph b of Item 2) and will make all reasonable efforts to obtain such reinstatement. In the event that the licensee has not obtained reinstatement of such amount within ninety days after the date of such reduction, and in the absence of good cause shown to the contrary, the Commission may issue an order requiring the licensee to furnish financial protection for such amount in another form.

3. Any obligations of the licensee under subsection 53a(8) of the Act to indemnify the United States and the Commission from public liability, together with any public liability satisfied by the insurers under the policy or policies designated in the Attachment hereto, shall not in the aggregate exceed the amount of financial protection with respect to any nuclear incident, including the reasonable costs of investigating and settling claims and defending suits for damage.

4. With respect to any extraordinary nuclear occurrence to which this agreement applies, the Commission, and the licensee on behalf of itself and other persons indemnified, insofar as their interests appear, each agree to waive

(a) any issue or defense as to the conduct of the claimant or fault of persons indemnified, including, but not limited to

(1) negligence;

(2) contributory negligence;

(3) assumption of the risk;

(4) unforseeable intervening causes, whether involving the conduct of a third person or an act of God.

As used herein, "conduct of the claimant" includes conduct of persons through whom the claimant derives his cause of action;

(b) any issue or defense as to charitable or governmental immunity;

(c) any issue or defense based on any statute of limitations if suit is instituted within three years from the date on which the claimant first knew, or reasonably could have known, of his injury or damage and the cause thereof, but in no event more than 20 years after the date of the nuclear incident.

The waiver of any such issue or defense shall be effective regardless of whether such issue or defense may otherwise be deemed jurisdictional or relating to an element in the cause of action. The waivers shall be judicially enforceable in accordance with their terms by the claimant against the person indemnified.

5. The waivers set forth in paragraph 4 of this Article:

(a) shall not preclude a defense based upon a failure to take reasonable steps to mitigate damages;

(b) shall not apply to injury or damage to a claimant or to a claimant's property which is intentionally sustained by the claimant or which results from a nuclear incident intentionally and wrongfully caused by the claimant;

(c) shall not apply to injury to a claimant who is employed at the site of and in connection with the activity where the extraordinary nuclear occurrence takes place if benefits therefor are either payable or required to be provided under any workmen's compensation or occupational disease law: Provided, however, That with respect to an extraordinary nuclear occurrence occurring at the facility, a claimant who is employed at the facility in connection

with the construction of a nuclear reactor with respect to which no operating license has been issued by the Atomic Energy Commission shall not be considered as employed in connection with the activity where the extraordinary nuclear occurrence takes place if:

(1) the claimant is employed exclusively in connection with the construction of a nuclear reactor, including all related equipment and installations at the facility, and

(2) no operating license has been issued by the NRC with respect to the nuclear reactor, and

(3) the claimant is not employed in connection with the possession, storage, use or transfer of nuclear material at the facility.

(d) shall not apply to any claim for punitive or exemplary damages, provided, with respect to any claim for wrongful death under any State law which provides for damages only punitive in nature, this exclusion does not apply to the extent that the claimant has sustained actual damages, measured by the pecuniary injuries resulting from such death but not to exceed the maximum amount otherwise recoverable under such law;

(e) shall be effective only with respect to those obligations set forth in this agreement;

(f) shall not apply to, or prejudice the prosecution or defense of, any claim or portion of claim which is not within the protection afforded under (1) the limit of liability provisions under subsection 170e of the Atomic Energy Act of 1954, as amended, and (2) the terms of this agreement and the terms of the nuclear energy liability insurance policy or policies designated in the attachment hereto.

6. The obligations of the licensee under this agreement shall apply only with respect to nuclear incidents occurring during the term of this agreement.

7. Upon the expiration or revocation of any license designated in Item 3 of the Attachment, the Commission will enter into an appropriate amendment of this agreement with the licensee reducing the amount of financial protection required under this Article; provided, that the licensee is then entitled to a reduction in the amount of financial protection under applicable Commission regulations and orders.

B

8. With respect to any common occurrence:

(a) If the sum of the limit of liability of any Nuclear Energy Liability Property Insurance Association policy designated in Item 5 of the Attachment and the limits of liability of all other nuclear energy liability insurance policies (facility form) applicable to such common occurrence and issued by Nuclear Energy Liability Property Insurance Association exceeds $124,000,000, the amount of financial protection specified in Item 2a and b of the Attachment shall be deemed to be reduced by that proportion of the difference between said sum and $124,000,000 as the limit of liability of the Nuclear Energy Liability Property Insurance Association policy designated in Item 5 of the Attachment bears to the sum of the limits of liability of all nuclear energy liability insurance policies (facility form) applicable to such common occurrence and issued by Nuclear Energy Liability Property Insurance Association.

(b) If the sum of the limit of liability of any Mutual Atomic Energy Liability Underwriters policy designated in Item 5 of the Attachment and the limits of liability of all other nuclear energy liability insurance policies (facility form) applicable to such common occurrence and issued by Mutual Atomic Energy Liability Underwriters exceeds $36,000,000, the amount of financial protection specified in Item 2a and b of the Attachment shall be deemed to be reduced by that proportion of the difference between said sum and $36,000,000 as the limit of liability of the Mutual Atomic Energy Liability Underwriters policy designated in Item 5 of the Attachment bears to the sum of the limits of liability of all nuclear energy liability insurance policies (facility form) applicable to such common occurrence and issued by Mutual Atomic Energy Liability Underwriters;

(c) If any of the other applicable agreements is with a person who has furnished financial protection in a form other than a nuclear energy liability insurance policy (facility form) issued by Nuclear Energy Liability Property Insurance Association or Mutual Atomic Energy Liability Underwriters, and if also the sum of the amount of financial protection established under this agreement and the amounts of financial protection established under all other applicable agreements exceeds an amount equal to the sum of $160,000,000 and the amount available as secondary financial protection, the obligations of the licensee shall not exceed a greater proportion of an amount equal to the sum of $160,000,000 and the amount available as secondary financial protection than the amount of financial protection established under this agreement bears to the sum of such amount and the amounts of financial protection established under all other applicable agreements.

(d) As used in this paragraph 8, Article II, and in Article III, "other applicable agreements" means each other agreement entered into by the Commission pursuant to subsection 170c of the Act in which agreement the nuclear incident is defined as a "common occurrence." As used in this paragraph 8, Article II, "the obligations of the licensee" means the obligations of the licensee under subsection 53e(8) of the Act to indemnify the United States and the Commission from public liability, together with any public liability satisfied by the insurers under the policy or policies designated in the Attachment, and the reasonable costs of investigating and settling claims and defending suits for damage.

9. The obligations of the licensee under this Article shall not be affected by any failure or default on the part of the Commission or the Government of the United States to fulfill any or all of its obligations under this agreement. Bankruptcy or insolvency of any person indemnified other than the licensee, or the estate of any person indemnified other than the licensee, shall not relieve the licensee of any of his obligations hereunder.

ARTICLE III

1. The Commission undertakes and agrees to indemnify and hold harmless the licensee and other persons indemnified, as their interest may appear, from public liability.

2. With respect to damage caused by a nuclear incident to property of any person legally liable for the nuclear incident, the Commission agrees to pay to such person those sums which such person would have been obligated to pay if such property had belonged to another; provided, that the obligation of the Commission under this paragraph 2 does not apply with respect to:

(a) Property which is located at the location described in Item 4 of the Attachment or at the location described in Item 3 of the declarations attached to any nuclear energy liability insurance policy designated in Item 5 of the Attachment;

(b) Property damage due to the neglect of the person indemnified to use all reasonable means to save and preserve the property after knowledge of a nuclear incident;

(c) If the nuclear incident occurs in the course of transportation of the radioactive material, the transporting vehicles and containers used in such transportation;

(d) The radioactive material.

B

3. The Commission agrees to indemnify and hold harmless the licensee and other persons indemnified as their interest may appear, from the reasonable costs of investigating, settling and defending claims for public liability.

4.(a) The obligations of the Commission under this agreement shall apply only with respect to such public liability, such damage to property of persons legally liable for the nuclear incident (other than such property described in the proviso to paragraph 2 of this Article), and such reasonable costs described in paragraph 3 of this Article as in the aggregate exceed the amount of financial protection.

(b) With respect to a common occurrence, the obligations of the Commission under this agreement shall apply only with respect to such public liability, such damage to property of persons legally liable for the nuclear incident (other than such property described in the proviso to paragraph 2 of this Article), and to such reasonable costs described in paragraph 3 of this Article, as in the aggregate exceed whichever the following is lower: (1) The sum of the amounts of financial protection established under this agreement and all other applicable agreements; or (2) an amount equal to the sum of $160,000,000 and the amount available as secondary financial protection.

5. The obligations of the Commission under this agreement shall apply only with respect to nuclear incidents occurring during the term of this agreement.

6. The obligations of the Commission under this and all other agreements and contracts to which the Commission is a party shall not, with respect to any nuclear incident, in the aggregate exceed whichever of the following is the lowest: (a) $500,000,000; (b) $560,000,000 less the amount of financial protection required under this agreement; or (c) with respect to a common occurrence, $560,000,000 less the sum of the amount of financial protection established under this agreement and all other applicable agreements.

7. The obligations of the Commission under this agreement, except to the licensee for damage to property of the licensee, shall not be affected by any failure on the part of the licensee to fulfill its obligations under this agreement. Bankruptcy or insolvency of the licensee or any other person indemnified or of the estate of the licensee or any other person indemnified shall not relieve the Commission of any of its obligations hereunder.

ARTICLE IV

1. When the Commission determines that the United States will probably be required to make indemnity payments under the provisions of this agreement, the Commission shall have the right to collaborate with the licensee and other persons indemnified in the settlement and defense of any claim and shall have the right (a) to require the prior approval of the Commission for the settlement or payment of any claim or action asserted against the licensee or other person indemnified for public liability or damage to property of persons legally liable for the nuclear incident which claim or action the licensee or the Commission may be required to indemnify under this agreement; and (b) to appear through the Attorney General of the United States on behalf of the licensee or other person indemnified, take charge of such action and settle or defend any such action. If the settlement or defense of any such action or claim is undertaken by the Commission, the licensee shall furnish all reasonable assistance in effecting a settlement or asserting a defense.

2. Neither this agreement nor any interest therein nor claim thereunder may be assigned or transferred without the approval of the Commission.

ARTICLE V

The parties agree that they will enter into appropriate amendments of this agreement to the extent that such amendments are required pursuant to the Atomic Energy Act of 1954, as amended, or licenses, regulations or orders of the Commission.

ARTICLE VI

The licensee agrees to pay to the Commission such fees as are established by the Commission pursuant to regulations or orders of the Commission.

ARTICLE VII

The term of this agreement shall commence as of the date and time specified in Item 6 of the Attachment and shall terminate at the time of expiration of that license specified in Item 3 of the Attachment, which is the last to expire; provided that, except as may otherwise be provided in applicable regulations or orders of the Commission, the term of this agreement shall not terminate until all the radioactive material has been removed from the location and transportation of the radioactive material from the location has ended as defined in subparagraph 5(b), Article I. Termination of the term of this agreement shall not affect any obligation of the licensee or any obligation of the Commission under this agreement with respect to any nuclear incident occurring during the term of this agreement.

ARTICLE VIII

1. If the licensee fails to pay assessed deferred premiums, the Commission reserves the right to pay those premiums on behalf of the licensee and to recover the amount of such premiums from the licensee.

2. The Commission shall require the immediate submission of financial statements by those licensees who indicate, after an assessment of the retrospective premium by the insurance pools, that they will not pay the assessment. Such financial statements shall include, as a minimum, exhibits indicating internally generated funds from operations and accumulated retained earnings. Subsequent submission of financial statements by such licensees may be requested by the Commission, as required.

3. If premiums are paid by the Commission as provided in paragraph 1, payment by the Commission shall create a lien in the amount paid in favor of the United States upon all property and rights to property, whether real or personal, belonging to such licensee. The lien shall arise at the time payment is made by the Commission and shall continue until the liability for the amount (or a judgment against the licensee arising out of such liability) is satisfied or becomes unenforceable. The Commission will issue a certificate of release of any such lien if it finds that the liability for the amount has been fully satisfied or has become legally uneforceable.

4. If the Commission determines that the licensee is financially able to reimburse the Commission for a deferred premium payment made in its behalf, and the licensee, after notice of such determination by the Commission fails to make such reimbursement within 120 days, the Commission will take appropriate steps to suspend the license for 30 days. The Commission may take any further action as necessary if reimbursement is not made within the 30-day suspension period including, but not limited to, termination of the operating license.

UNITED STATES NUCLEAR REGULATORY COMMISSION

ATTACHMENT

Indemnity Agreement No. B-93

Item 1 - Licensee — Union Electric Company

Address — 1901 Gratiot Street

P. O. Box 149

St. Louis, Missouri 63166

Item 2 - Amount of financial protection

a. $1,000,000.00

b. With respect to any nuclear incident, the amount specified in Item 2a of this Attachment shall be deemed to be (i) reduced to the extent that any payment made by the insurer or insurers under a policy or policies specified in Item 5 of this Attachment reduces the aggregate amount of such insurance policies below the amount specified in Item 2a and (ii) restored to the extent that, following such reduction, the aggregate amount of such insurance policies is reinstated.

Item 3 - License number or numbers

SNM-1901

Item 4 - Location

All of the premises including the land and all buildings and structures of Union Electric Company's Callaway Plant (including but not limited to Units 1 and 2) situated on a site consisting of approximately 2767 acres and located approximately (5) five miles north of the Missouri River in Callaway County, Missouri. The site is approximately (10) ten miles southeast of Fulton, Missouri and (80) eighty miles west of St. Louis, Missouri.

Item 5 - Insurance Policy No(s).

Nuclear Energy Liability Policy (Facility Form) No. NF-264 issued by the Nuclear Energy Liability Property Insurance Association.

Item 6 - The indemnity agreement designated above, of which this Attachment is a part, is effective as of 12:01 a.m. on the 4th day of October 1982.

FOR THE UNITED STATES NUCLEAR REGULATORY COMMISSION

Jerome Saltzman, Assistant Director
State and Licensee Relations
Office of State Programs

FOR UNION ELECTRIC COMPANY

BY _____

Dated at Bethesda, Maryland
the 4th day of October 1982.