

Docket No.: 50-483

Mr. D. F. Schnell
Vice President - Nuclear
Union Electric Company
Post Office Box 149
St. Louis, Missouri 63166

DEC 29 1986

Dear Mr. Schnell:

Subject: Issuance of Exemption to 10 CFR Part 20, Appendix A,
Footnote d-2(c) - Callaway Plant

The Nuclear Regulatory Commission has granted the enclosed Exemption which allows the use of a radioiodine protection factor of 50 for certain respiratory protection canisters used by workers at the Callaway Plant. The Exemption was granted in response to your letters dated October 22, 1985, and August 29, 1986.

We find that granting the Exemption is authorized by law and will not result in undue hazard to life or property.

Also enclosed is a safety evaluation report supporting granting of the Exemption.

The Exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

151

Paul W. O'Connor, Project Manager
PWR Project Directorate #4
Division of PWR Licensing-A

Enclosures:

1. Exemption
2. Safety Evaluation

8701080499 861229
PDR ADOCK 05000483
P PDR

cc w/enclosures: See next page

DISTRIBUTION:

Docket File 50-483

Local PDR
B. J. Youngblood R/F
H. Thompson
B. Grimes
W. Jones
OPA
E. Butcher

NRC PDR
PRC System
M. Duncan
OGC/Bethesda
E. Jordan
T. Barnhart (8)
LFMB

NSIC
PWR#4 R/F
D. Hood
J. Partlow
L. Harmon
ACRS (10)
N. Thompson

PWR#4/DPWR-A
PO'Connor/rad
12/2/86

PWR#4/DPWR-A
MDuncan
12/3/86

PWR#4/DPWR-A
BJYoungblood
12/1/86

Mr. D. F. Schnell
Union Electric Company

Callaway Plant
Unit No. 1

cc:

Mr. Nicholas A. Petrick
Executive Director - SNUPPS
5 Choke Cherry Road
Rockville, Maryland 20850

Gerald Charnoff, Esq.
Thomas A. Baxter, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N Street, N. W.
Washington, D. C. 20037

Mr. J. E. Birk
Assistant to the General Counsel
Union Electric Company
Post Office Box 149
St. Louis, Missouri 63166

U. S. Nuclear Regulatory Commission
Resident Inspectors Office
RR#1
Steedman, Missouri 65077

Mr. Donald W. Capone, Manager
Nuclear Engineering
Union Electric Company
Post Office Box 149
St. Louis, Missouri 63166

Chris R. Rogers, P.E.
Manager - Electric Department
301 W. High
Post Office Box 360
Jefferson City, Missouri 65102

Regional Administrator
U. S. NRC, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Mr. Ronald A. Kucera, Deputy Director
Department of Natural Resources
P. O. Box 176
Jefferson City, Missouri 65102

Mr. Glenn L. Koester
Vice President - Nuclear
Kansas Gas and Electric Company
201 North Market Street
Post Office Box 208
Wichita, Kansas 67201

Lewis C. Green, Esq.
Green, Hennings & Henry
Attorney for Joint Intervenor
314 N. Broadway, Suite 1830
St. Louis, Missouri 65251

Ms. Marjorie Reilly
Energy Chairman of the League of
Women Voters of Univ. City, MO
7065 Pershing Avenue
University City, Missouri 63130

Mr. Donald Bollinger, Member
Missourians for Safe Energy
6267 Delmar Boulevard
University City, Missouri 63130

Mr. Dan I. Bolef, President
Kay Drey, Representative
Board of Directors Coalition
for the Environment
St. Louis Region
6267 Delmar Boulevard
University City, Missouri 63130

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of
Union Electric Company

(CALLAWAY PLANT)

Docket No. 50-483

EXEMPTION

I.

Union Electric Company, (the licensee) is the holder of Facility Operating License No. NPF-30, issued October 18, 1984, which authorizes operation of the Callaway Plant (the facility) at steady-state reactor power levels not in excess of 3411 megawatts thermal. This license provides, among other things, that it is subject to all rules, regulations and Orders of the Commission now or hereafter in effect. The facility consists of a pressurized water reactor located in Callaway County, Missouri.

II.

10 CFR Part 20, Appendix A, "Protection Factors for Respirators," establishes protection factors of air-purifying respirators for protection against particulates only. Furthermore, footnote d-2(c) states, "No allowance is to be made for the use of sorbents against radioactive gases or vapors." This restriction was needed since an inadequate data base had existed for evaluating the complex interaction of many factors affecting the service life and removal efficiency of radioactive gases and vapors by sorbents canisters.

8701080510 861229
PDR ADOCK 05000483
P PDR

Also, due to the lack of a data base, a NIOSH/MSHA certification schedule to ensure that canisters meet acceptable performance criteria has not been established.

However, 10 CFR Sections 20.103(e) and 20.501 allow an exemption to be authorized by the Commission in lieu of a NIOSH/MSHA certification schedule based on adequate testing, material and performance characteristics. An application by a licensee for this authorization must include a demonstration by testing, or on the basis of reliable test information, that the material and performance characteristics of the equipment are capable of providing the proposed degree of protection under anticipated conditions of use. The licensee has made such an application.

By letter dated October 22, 1985, as supplemented by letter dated August 29, 1986 the licensee requested an exemption based on 10 CFR 20.103(e) to allow the use of a protection factor of 50 when utilizing radioiodine GMR-I canisters for personnel respiratory protection during scheduled refueling outage work. The licensee cited research data, test results, test protocol and a quality assurance sampling plan that it stated satisfies the recommended qualification process of NUREG/CR-3403. The Commission staff evaluated the information provided by the licensee to support the exemption request. The Commission's safety evaluation on this matter relating to the use of a radioiodine protection factor for GMR-I canisters at Callaway has been issued. The safety evaluation concludes that the licensee's proposed use of radioiodine GMR-I canisters with certain usage restrictions and controls can result in significant dose savings over alternative methods while still providing effective protection.

DEC 29 1986

- 3 -

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 20.501, an exemption as requested by the licensee's letter of October 22, 1985 as supplemented August 29, 1986, is authorized by law and will not result in undue hazard to life or property. The Commission hereby grants an exemption from the restrictions of 10 CFR Part 20, Appendix A, footnote d-2(c), and authorizes the use of the GMR-I canister, with restrictions as shown in Attachment 1 to this exemption. The exemption is subject to modification by rule, regulation or Order of the Commission.

Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of the exemption will have no significant impact on the environment (51 FR).

This Exemption is effective upon issuance.

Dated at Bethesda, Maryland this 29 day of December 1986.

FOR THE NUCLEAR REGULATORY COMMISSION

151
Thomas M. Novak, Acting Director
Division of PWR Licensing-A
Office of Nuclear Reactor Regulation

Attachment:

As stated

PWR#4/DPWR-A
MDuncan/rad
12/3/86

AD/DPWR-A
TMNovak
12/15/86

PWR#4/DPWR-A
PO'Connor
12/2/86

OGC/BETHESDA
12/10/86

PWR#4/DPWR-A
BJYoungblood
12/12/86

Attachment 1

Limitations, Usage Restrictions, and Controls Applicable to the Use of GMR-1 Canister at the Callaway Plant

1. Protection factor equal to 50 as a maximum value.
2. The maximum permissible continuous use time is eight hours after which the canister will be discarded.
3. Canisters are not to be used in the presence of organic solvent vapors.
4. Canisters are to be stored in sealed, humidity barrier packaging in a cool, dry environment.*
5. The allowable service life for sorbent canisters is to be calculated from the time of unsealing the canister, including periods of non-exposure.
6. Canister is to be used with a full facepiece capable of providing protection factors greater than 100.
7. Canisters are not to be used in total challenge concentrations of organic iodines and other halogenated compounds greater than 1 ppm, including nonradioactive compounds.
8. Canisters are not to be used in environments where temperatures are greater than 120°F, or dewpoint exceeds 107°F.

In addition to the limitations and usage restrictions noted above, the following additional controls will be utilized by the licensee:

1. Temperatures will be measured prior to and/or coincidentally with the use of GMR-I canisters to assure that work temperatures do not exceed 120°F or temperature corresponding to a dewpoint of 107°F during sorbent canister use.
2. In the initial implementation of sorbent canister use, the following program verification measures will be used:
 - a. weekly whole body counts for individuals using the sorbent canister for radioiodine protection;
 - b. for individuals who exceed 10 MPC hours in seven consecutive days, a whole body count will be required prior to their next entry into a radioiodine atmosphere (i.e., effectively a 10 MPC hour stay time);
 - c. if an individual measures 70nCi or greater iodine uptake to the thyroid during a whole body count, the individual's entry into radioiodine atmospheres will be restricted pending health physics evaluation;
 - d. a whole body count/survey data base will be compiled to evaluate the results of the program.

*Sorbent canisters will be stored in conditions not to exceed 90°F or 70% humidity in accordance with Procedure HPH 06-XXX (currently in draft).



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE USE OF

RADIOIODINE PROTECTION FACTOR FOR SORBENT CANISTERS

AT UNION ELECTRIC'S CALLAWAY PLANT

DOCKET No. 50-483

Introduction

By their submittals dated October 22, 1985 and August 26, 1986, Union Electric Company (UEC) has requested an exemption to 10 CFR Part 20, Appendix A, footnote d-2(c). The licensee submitted this request in accordance with 10 CFR Part 20.103(e) and provided further justification for the exemption in response to our requests for additional information.

Test data and canister qualification information have been provided by UEC by reference to Mine Safety Appliances Company (MSA) data submitted in conjunction with similar exemption requests for Farley 1&2 by Alabama Power Company, and for San Onofre 1, 2, and 3 by Southern California Edison Company. UEC has provided a detailed response to all NRC staff concerns relating to the request for exemption to 10 CFR Part 20, Appendix A, footnote d-2(c). The exemption would allow the use of a radioiodine protection factor of 50 for MSA GMR-I canisters to be used at the Callaway Unit 1 power reactor facility. Criteria and background information used for the evaluation include 10 CFR Part 20.103, 10 CFR Part 19.12, Regulatory Guide 8.15, "Acceptable Programs for Respiratory Protection," Regulatory Guide 8.20, "Applications of Bioassay for I-125 and I-131," NUREG/CR-3403, "Criteria and Test Methods for Certifying Air Purifying Respirator Cartridges and Canisters Against Radioiodine," and Regulatory Guide 8.8, "Information Relevant to Ensuring That Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable."

Discussion and Evaluation

Since a NIOSH/MSHA testing and certification schedule for sorbents for use for protection against radioiodine gases and vapors has not been developed, the NRC staff has evaluated UEC's request and verified, as required by 10 CFR Part 20.103(e), that the licensee has demonstrated through reliable test data and adequate quality assurance measures that the material and performance characteristics of the MSA GMR-I canister can provide the proposed degree of protection (i.e., a protection factor of 50) under the anticipated conditions of use, for 8 hours. Canister efficiency and service life, and the effects of temperature, poisons, relative humidity, challenge concentration and breathing rates on canister efficiency and service life were considered in the staff's technical evaluation. The staff's programmatic evaluations considered quality control/quality assurance, administrative controls, and radiation protection/ALARA, including task preparation and planning, on-the-job and post-task evaluations, use of engineering controls, radiological surveillance, and radiological training.

The licensee has provided reliable test information which verifies that the MSA GMR-I canister will provide a protection factor of 50 over a period of 8 hours of continuous use, provided that the total challenge of radioactive and non-radioactive iodine and other halogenated compounds does not exceed 1 ppm, and temperature does not exceed 110°F, or up to 120°F provided the dewpoint does not exceed 107°F. The data provided by MSA showed the breakthrough point to be well beyond 8 hours.

Testing has been conducted under acceptable conditions of cyclic flow, and under worst case conditions for those environmental factors affecting service life: temperature, relative humidity, and challenge concentration of CH_3I (methyl iodide/methyl radioiodide), which is the most penetrating of the challenge forms. Data provided from MSA indicate that the MSA GMR-I canisters perform adequately under the accepted test conditions. These conditions - the criteria and test methods - are consistent with those derived for the canisters by the staff from NUREG/CR-3403, and are acceptable.

The licensee, through verification and acceptance of overall MSA QA controls for the Callaway Quality Supplier List, and through review and acceptance of the Kansas Gas and Electric (KG&E) quality assurance audit performed in conjunction with a similar KG&E exemption request, has provided commitments that the MSA-GMR-I canisters used with a protection factor at the Callaway plant will meet standards for quality assurance and quality control which are recognized by NIOSH, compatible with NRC staff positions and are, therefore, acceptable. This includes a commitment by MSA to establish a 1% AQL (Acceptable Quality Limit) in a 5 to 10 ppm challenge concentration of CH_3I , 90% relative humidity, 110°F, 64 LPM cyclic flow, for a service life of 8 hours or more at penetration equal to 1% of the challenge concentration. Testing data referenced by the licensee demonstrated that performance (i.e., service life) of canisters at 100% relative humidity is acceptable. UEC on-site quality control audits and surveillances will be expanded to include GMR-I canister use.

Coupled with the use of a full facepiece with the capability of providing a protection factor of greater than 100, to be determined by fit test, the protection factor of 50 is conservative under these conditions. Canister efficiency will be retained for the radioiodine gas or vapors of interest (CH_3I , I_2 , HOI) for this time period. To preclude aging, service life will be calculated from unsealing time, including periods of non-use, and the canister will not be used in the presence of organic solvents or in temperatures in excess of 120°F or 107°F dewpoint. Canisters will be stored in sealed humidity-barrier packaging in a cool, dry environment, and discarded after the 8-hour use period to prevent reuse. Through usage restrictions and air sampling, the licensee will preclude exposures to organic vapors and chemicals [such as paint, paint thinner/remover (methyl ethyl ketones), freon cleaning agents (trichlorotrifluoroethane), isopropyl alcohol, methyl chloroform] which could cause aging, poisoning or desorption of the absorbed radioiodines. Plant procedures describing air sampling and administrative controls for detecting and precluding the presence of organic vapors and chemicals will be utilized or revised as necessary (i.e., APA-ZZ-00360, HTP-ZZ-08002).

Certain limitations and precautions based on NUREG/CR-3403 guidance are necessary for utilization of the sorbent canisters. We agree with the following such limitations and usage restrictions as proposed by the licensee:

1. Protection factor equal to 50 as a maximum value.
2. The maximum permissible continuous use time is eight hours after which the canister will be discarded.
3. Canisters are not to be used in the presence of organic solvent vapors.
4. Canisters are to be stored in sealed, humidity barrier packaging in a cool, dry environment.*
5. The allowable service life for sorbent canisters is to be calculated from the time of unsealing the canister, including periods of non-exposure.
6. Canister is to be used with a full facepiece capable of providing protection factors greater than 100.
7. Canisters are not to be used in total challenge concentrations of organic iodines and other halogenated compounds greater than 1 ppm, including nonradioactive compounds.
8. Canisters are not to be used in environments where temperatures are greater than 120°F, or dewpoint exceeds 107°F.

*Sorbent canisters will be stored in Class "C" or better storage conditions in the Callaway plant warehouse in accordance with procedure WSP-ZZ-0002, "Storeroom Storage and Control of Material, Components, and Equipment." Temperatures have averaged 90°F in this facility in the summer with relative humidity at 60%, and a maximum temperature of 100°F.

In addition to the limitations and usage restrictions noted above, administrative and procedural controls will be utilized by the licensee as follows:

1. Temperatures will be measured prior to and/or coincidently with the use of GMR-I canisters to assure that work temperatures do not exceed 120°F or temperatures corresponding to a dewpoint of 107°F during sorbent canister use.
2. In the initial implementation of sorbent canister use, the following program verification measures will be used:
 - a. weekly whole body counts for individuals using the sorbent canister for radioiodine protection;
 - b. for individuals who exceed 10 MPC hours in seven consecutive days, a whole body count will be required prior to their next entry into a radioiodine atmosphere (i.e., effectively a 10 MPC hour stay time);
 - c. if an individual measures 70 nCi or greater iodine uptake to the thyroid during a whole body count, the individual's entry into radioiodine atmospheres will be restricted pending health physics evaluation; and

- d. a whole body count/survey data base will be compiled to evaluate the results of the program.
3. Certain air contaminants which could affect GMR-I performance will be controlled under procedures governing performance of plant charcoal and HEPA air filtration systems, as required under Technical Specification 3/4.7.7. These procedures effect controls similar to those needed for GMR-I use.
4. Specific plant procedures will be modified to incorporate the limitations and usage restrictions, listed as 1 through 8 above, prior to GMR-I canister use (HDP-ZZ-06017, HTP-ZZ-08002).
5. Existing respiratory protection program requirements and restrictions (e.g., physicals, fit tests, Part 20 requirements, Appendices A and B) still apply.

The primary bases for UEC's request for exemption are the potentials for both work effort reduction and dose reduction. The utilization of air purifying respirators in lieu of air-supplied or self-contained apparatuses, where possible, can result in person-rem reductions estimated overall at 30% for tasks requiring radioiodine protection, and up to 50% for some major tasks. The light weight, less cumbersome air purifying respirators (i.e., sorbent canisters) can provide increased comfort and mobility in most cases, and result in increased worker efficiency and decreased time on-the-job. The licensee has provided a task analysis which shows that the use of sorbent canisters at the Callaway plant can result in significant dose savings and should be an effective ALARA measure.

Other actions taken by UEC to assure that exposures to radioiodine are as low as is reasonably achievable (ALARA) are: radioiodine air sampling before and during activities involving the use of sorbent canisters for radioiodine protection; engineering controls such as portable HEPA ventilation and temporary containments to control leakage and reduce airborne levels to ALARA levels; purification and degasification of the primary coolant conducted prior to refueling resulting in reduced radioiodine levels; and area decontamination to control contamination levels. Whole body counts will be conducted routinely (e.g., weekly and at 10 MPC hours) and radioiodine data will be trended to detect problems; an investigation level for radioiodine uptakes has been established (at 70 nCi); training of workers and health physics technicians in the use and restrictions for use of sorbent canisters for radioiodine protection will be conducted prior to their use; and procedures iterating the controls, restrictions, and requirements have been developed and will be implemented. The licensee's efforts to keep exposure ALARA are consistent with our positions in Regulatory Guide 8.8 and are acceptable.

Safety Summary

Our review of the licensee's proposal indicates that the actions proposed by UEC can result in significant dose savings over alternative methods while still providing effective protection. This exemption would enable the licensee to use a protection factor for air purifying radioiodine gas and vapor respirators in estimating worker exposures from radioiodine gases and vapors. The licensee has provided usage restrictions and controls which can

assure an effective radioiodine protection program. The proposed criteria and test methods for verifying the effectiveness and quality of GMR-I canisters are consistent with our criteria. The licensee's proposed exemption, with the controls and limitations, meets our positions in the SRP, NUREG/CR-3403 and Regulatory Guide 8.8, and is acceptable. The actions proposed by the licensee are consistent with the requirements of 10 CFR Part 20.103(e), and form an acceptable basis to authorize the granting of an exemption in accordance with the provisions of 10 CFR Part 20.103(e).

Principal Contributors: R. Serbu, PSB
P.O. Connor, PAD#4

Dated:

DISTRIBUTION:

Docket File

PAD#4 Reading

MDuncan

PO' Connor

December 29, 1986

DOCKET NO. 50-483

MEMORANDUM FOR: Rules and Procedures Branch
Division of Rules and Records
Office of Administration

FROM: Office of Nuclear Reactor Regulation

SUBJECT: Union Electric Company (Callaway Plant)

One signed original of the *Federal Register* Notice identified below is enclosed for your transmittal to the Office of the Federal Register for publication. Additional conformed copies (5) of the Notice are enclosed for your use.

- ☐ Notice of Receipt of Application for Construction Permit(s) and Operating License(s).
- ☐ Notice of Receipt of Partial Application for Construction Permit(s) and Facility License(s); Time for Submission of Views on Antitrust Matters.
- ☐ Notice of Consideration of Issuance of Amendment to Facility Operating License.
- ☐ Notice of Receipt of Application for Facility License(s); Notice of Availability of Applicant's Environmental Report; and Notice of Consideration of Issuance of Facility License(s) and Notice of Opportunity for Hearing.
- ☐ Notice of Availability of NRC Draft/Final Environmental Statement.
- ☐ Notice of Limited Work Authorization.
- ☐ Notice of Availability of Safety Evaluation Report.
- ☐ Notice of Issuance of Construction Permit(s).
- ☐ Notice of Issuance of Facility Operating License(s) or Amendment(s).
- ☐ Order.
- ☒ Exemption.
- ☐ Notice of Granting Exemption.
- ☐ Environmental Assessment.
- ☐ Notice of Preparation of Environmental Assessment.
- ☐ Other: _____

Office of Nuclear Reactor Regulation

Enclosure:
As stated

Contact: Marilee Duncan
Phone: 28928

OFFICE	PAD#4						
URNNAME	MDuncan						
DATE	12/29/86						