Docket

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

December 30, 1993

Docket Nos. 50-498
and 50-499

Mr. William T. Cottle
Group Vice-President, Nuclear
Houston Lighting & Power Company
South Texas Project Electric
Generating Station
Post Office Box 289
Wadsworth, Texas 77483

Dear Mr. Cottle:

SUBJECT: EXEMPTION AND AUTHORIZATION FOR USE OF SORBENT CANISTERS FOR PROTECTION OF RADIOIODINE AT SOUTH TEXAS PROJECT, UNITS 1 AND 2 (TAC NOS. M82728 AND M82729)

By letter dated December 19, 1991, as supplemented by letters dated July 1, 1993, and November 3, 1993, Houston Lighting & Power Company (HL&P) requested an exemption from the requirements of footnote d-2(c) of Appendix A to 10 CFR Part 20 to allow the use of radioiodine Mine Safety Appliance Company (MSA) GMR-1 canisters with a protection factor of 50 for personnel respiratory protection.

A National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) testing and certification schedule for sorbents to be used for protection against radioiodine gases and vapors has not been implemented. Therefore, in accordance with paragraph 20.103(e) of 10 CFR Part 20, the NRC staff has evaluated the licensee's request and verified 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 are capable of providing the proposed degree of protection (i.e., a protection factor of 50) under the anticipated conditions of use for 8 hours.

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The Commission has granted this exemption pursuant to 10 CFR 20.501. A copy of the exemption is enclosed and is being forwarded to the Office of the Federal Register for publication. Also enclosed is a safety evaluation which supports the granting of the exemption.

Sincerely,

Original Signed By

Lawrence E. Kokajko, Senior Project Manager
Project Directorate IV-2
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

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Enclosures:
1. Exemption
2. Safety Evaluation

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
HOUSTON LIGHTING & POWER COMPANY	)	Docket Nos. 50-498
	)	and 50-499
(South Texas Project, Units 1 and 2)	)	

EXEMPTION

I.

On March 22, 1988, and March 28, 1989, the Commission issued Facility Operating License Nos. NPF-76 and NPF-80 to Houston Lighting & Power Company, et al. (the licensee) for South Texas Project, Unit Nos. 1 and 2, respectively. These licenses provided, among other things, that the facilities are subject to all rules, regulations, and orders of the Commission.

II.

Appendix A of Part 20 of Title 10 of the Code of Federal Regulations, "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 material in the form of gases or vapors." This restriction was needed since an inadequate data base has existed for evaluating the complex interaction of many factors affecting the service life and removal efficiency of radioactive gases and vapors by sorbent canisters. Also, due to the lack of a data base, a National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA)

certification schedule has not been established to ensure that the canisters meet acceptable performance criteria.

Section 20.103(e) of 10 CFR Part 20 allows the Commission to authorize the use of respiratory equipment in lieu of an NIOSH/MSHA certification when such an action is justified based on adequate testing of material and performance characteristics.

By letter dated December 19, 1991, as supplemented by letters dated July 1, 1993, and November 3, 1993, HL&P requested an exemption based on 10 CFR 20.501 to allow the use of radioiodine Mine Safety Appliance Company (MSA) GMR-1 canisters with a protection factor of 50 for personnel respiratory protection. In support of the exemption request, HL&P cited test results and a quality assurance plan that satisfies the recommended qualification process of NUREG/CR-3403, "Criteria and Test Methods for Certifying Air-Purifying Respirator Cartridges and Canisters Against Radioiodine."

III.

The NRC staff evaluated the information provided by HL&P. The licensee provided reliable test information verifying that the MSA GMR-1 canister is capable of providing 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 provided the dewpoint does not exceed 107°F. The data 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 (i.e., temperature, relative humidity, and challenge

concentration of CH_3I (methyliodide/methyl radioiodide), the most penetrating of the challenge forms). The data showed that the MSA GMR-I canisters performed adequately under acceptable test conditions. These conditions, including criteria and test methods, are consistent with those derived by the NRC staff from NUREG/CR-3403, "Criteria and Test Methods for Certifying Air-Purifying Respirator Cartridges and Canisters Against Radioiodine."

HL&P, through acceptance of MSA QA controls, has provided commitments that the MSA GMR-1 canisters will meet standards for quality assurance and quality control that are recognized by NIOSH and are compatible with NRC staff positions. This includes a commitment to establish a 1 percent AQL (acceptable quality limit) in a 5 to 10 ppm challenge concentration of CH_3I, 90 percent relative humidity, 110°F, 64 liters per minute cyclic flow, for a service life of 8 hours or more at a penetration equal to 1 percent of the challenge concentration. Test data referenced by HL&P demonstrate that performance (i.e., service life) of canisters at 100 percent relative humidity is acceptable.

IV.

Accordingly, the Commission has determined that, pursuant to 10 CFR 20.501, this exemption is authorized by law and will not result in undue hazard to life or property.

Accordingly, the Commission hereby grants an exemption as described in Section III above from 10 CFR Part 20, Appendix A, footnote d-2(c) to authorize the use of the MSA GMR-1 canister at South Texas Project, Units 1 and 2. For additional details regarding the basis of this exemption, including usage limitations and restrictions, see the staff's safety evaluation dated December 30, 1993 available for public inspection at the

Commission's Public Document Room, the Gelman Building, 2120 L Street, N.W., Washington, D.C., and at the Wharton County Junior College, J.M. Hodges Learning Center, 911 Boling Highway, Wharton, Texas 77488.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of the Exemption will have no significant impact on the environment (58 FR 42112).

This Exemption is effective upon issuance.

Dated at Rockville, Maryland, this 30th day of December 1993.

FOR THE NUCLEAR REGULATORY COMMISSION

Elinor G. Adensam

Elinor G. Adensam, Acting Director
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO THE USE OF

SORBENT CANISTERS FOR PROTECTION AGAINST RADIOIODINE

HOUSTON LIGHTING & POWER COMPANY

CITY PUBLIC SERVICE BOARD OF SAN ANTONIO

CENTRAL POWER AND LIGHT COMPANY

CITY OF AUSTIN, TEXAS

SOUTH TEXAS PROJECT, UNITS 1 AND 2

DOCKET NOS. 50-498 AND 50-499

1.0 INTRODUCTION

Houston Lighting & Power Company (HL&P, the licensee) in its letter dated December 19, 1991, as supplemented by letters dated July 1, 1993, and November 3, 1993, requested approval by the NRC of its use of iodine sorbent respirator canisters. The proposed maximum time of use for any individual canister is 8 hours. The use of such respiratory protection equipment is not authorized by the Commission's regulations, and footnote d-2(c) to Appendix A to 10 CFR Part 20, explicitly prohibits allowance for the use of sorbents against radioactive gases or vapors. However, Section 20.501 of 10 CFR Part 20 provides for the Commission's granting of exemptions from its regulations, and Section 20.103(e) specifies the necessary basis for approval.

Test data and canister qualification information have been provided by the licensee to support an exemption to allow the use of a radioiodine protection factor of 50 for Mine Safety Appliance (MSA) GMR-1 canisters at the South Texas Project, Units 1 and 2.

2.0 EVALUATION

A National Institute for Occupational Safety and Health/Mine Safety and Health Administration (NIOSH/MSHA) testing and certification schedule for sorbents to be used for protection against radioiodine gases and vapors has not been implemented. Therefore, in accordance with paragraph 20.103(e) of 10 CFR Part 20, the staff has evaluated the licensee's request and verified 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 are capable of providing 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. The evaluation of the licensee's program for the use of the canisters included quality control/quality assurance, and radiation protection/as-low-as-reasonably-achievable (ALARA) considerations, including task preparation and planning, on-the-job and post-task evaluations, the use of engineering controls, radiological surveillance, and radiological safety training.

The licensee has provided reliable test information verifying that the MSA GMR-I canister is capable of providing 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 provided the dewpoint does not exceed 107°F. The data 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 (i.e., temperature, relative humidity, and challenge concentration of CH_3I (methyliodide/methyl radioiodide), the most penetrating of the challenge forms). The data showed that the MSA GMR-I canisters performed adequately under acceptable test conditions. These conditions, including criteria and test methods are consistent with those derived by the NRC staff from NUREG/CR-3403 for the canisters and are acceptable.

The licensee, through acceptance of MSA QA controls, has provided commitments that the MSA GMR-I canisters will meet standards for quality assurance and quality control that are recognized by NIOSH, are compatible with NRC staff positions, and are, therefore, acceptable. This includes a commitment to establish a 1 percent AQL (acceptable quality limit) in a 5 to 10 ppm challenge concentration of CH_3I, 90 percent relative humidity, 110°F, 64 liters per minute cyclic flow, for a service life of 8 hours or more at a penetration equal to 1 percent of the challenge concentration. Test data referenced by the licensee demonstrate that performance (i.e., service life) of canisters at 100 percent relative humidity is acceptable.

The licensee's proposed protection factor of 50 over an 8-hour time period is acceptable for the canisters when coupled with a full face facepiece respirator with the capability of providing a fit factor equal to or greater than 500 by quantitative fit test. As indicated above, test results show that canister efficiency will be retained for the radioiodine gas or vapors of interest (CH_3I, I_2, HOI) for this time period. To help prevent canister deterioration from aging, canister service life will be limited to 8 hours from the time of canister unsealing. Canisters will be stored in sealed humidity-barrier packaging in a relatively cool, dry environment, and discarded after the 8 hour service period to prevent reuse. Through usage restrictions, based, in part, on air sampling, the licensee will preclude canister exposures to organic vapors and chemicals (such as decontamination compounds, lubricants, volatized paint solvent, alcohols, and freon) and temperatures in excess of 110°F, which could accelerate aging or poisoning of the sorbent, or desorption of the absorbed radioiodines.

3.0 LIMITATIONS, PRECAUTIONS AND RESTRICTIONS

Certain limitations and precautions based on NUREG/CR-3403, "Criteria and Test Methods for Certifying Air-Purifying Respirator Cartridges and Canisters Against Radioiodine," guidance are necessary for utilization of the sorbent canisters. The staff agrees with the following limitations and usage restrictions as proposed by the licensee:

1. The protection factor shall not exceed 50.

2. The maximum permissible continuous "use" time is 8 hours after which the canister shall be discarded. "Use" time includes all elapsed time following unsealing of a canister. In other words, a canister shall be discarded 8 hours after it is first unsealed.

3. Canisters shall not be used in the presence of organic solvent vapors.

4. Canisters shall be stored in air-conditioned areas with temperatures averaging less than 90°F, and protected from the external environment, physical damage, and airborne contaminants.

5. Canisters shall be used with a full face facepiece respirator capable of providing a fit factor greater than 500 as established by a quantitative fit test.

6. Canisters shall not be used in total challenge concentrations of organic iodines and other halogenated compounds greater than 1 ppm, including nonradioactive compounds.

7. Canisters shall not be used in environments where temperatures are greater than 110°F.

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

1. Canister site-of-use temperatures shall be measured prior to and/or during the use of GMR-I canisters to assure that temperatures do not exceed 110°F.

2. Air samples shall be taken and analyzed prior to and during any activities that involve the use of the GMR-I canister for protection against radioactive iodine.

3. Weekly whole body counts shall be performed on each individual using GMR-I canisters for radioiodine protection.

4. A whole body count shall be performed on each individual shown to have exceeded 10 maximum permissible concentration-hours in a week and who used the GMR-I canister for respiratory protection in that period prior to that individual's next entry into a radioiodine atmosphere.

5. Anyone that measures 70 nCi or greater iodine uptake to the thyroid during a whole body count shall not enter a radioiodine atmosphere pending health physics evaluation.

6. Applicable radiological survey and whole body count information shall be compiled and used to evaluate the effectiveness of the licensee's use of the sorbent canisters.

7. Specific plant procedures shall be revised to explicitly incorporate the limitations and controls stated above.

4.0 CONCLUSION

The staff concludes that the licensee's proposed use of radioiodine MSA GMR-1 canisters with certain usage restrictions and controls will provide effective protection and is acceptable. 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-1 canisters are consistent with the staff's criteria. The proposed exemption, with the controls and limitations, meets the staff's positions in Regulatory Guide 8.8 "Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Reasonably Achievable" and NUREG/CR-3403. The actions proposed by the licensee are consistent with the requirements of 10 CFR 20.103(e). The staff agrees that the licensee has provided an acceptable basis to authorize the use of equipment (MSA GMR-1 canisters) in accordance with 10 CFR 20.103(e), and that the granting of an exemption is in accordance with the provisions of 10 CFR 20.501, which is authorized by law and will not result in undue hazard to life or property.

Principal Contributor: J. Bell, NRR
L. Kokajko, NRR

Date: December 30, 1993