

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of)
PACIFIC GAS & ELECTRIC COMPANY) Docket Nos. 50-275/50-323
(Diablo Canyon Nuclear Power)
Plant, Unit Nos. 1 and 2))

EXEMPTION

I.

Pacific Gas & Electric Company holds Facility Operating License Nos. DPR-80 and DPR-82, which authorize operation of the Diablo Canyon Nuclear Power Plant, Unit Nos. 1 and 2. The two units collectively are called the facilities. The licenses provide, among other things, that the facilities are subject to all rules, regulations and orders of the Nuclear Regulatory Commission (the Commission) now or hereafter in effect. These facilities are pressurized water reactors located in San Luis Obispo County, California.

II.

Appendix A of 10 CFR Part 20, "Standards for Protection Against Radiation," defines protection factors for respirators. Footnote d-2(c) of this Appendix states that "No allowance is to be made for the use of sorbents against radioactive gases or vapors."

By letters dated April 18, 1986, as supplemented July 15, 1986, Pacific Gas and Electric Company (PG&E or licensee) 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 request for additional information.

Test data and canister qualification information have been provided by PG&E by reference to Mine Safety Appliances Company (MSA) data submitted in conjunction with similar exemption requests for Farley 1 & 2 by Alabama Power Company dated January 13, 1984, and for San Onofre 1, 2, and 3 by Southern California Edison Company dated March 20, 1985. PG&E 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 Diablo Canyon 1 & 2 power reactor facilities. Criteria and background information used for the evaluation includes 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." The NRC staff's discussion and evaluation of the request for exemption follows.

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 PG&E'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 nonradioactive 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 CH₃I (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 a planned verification and acceptance of MSA QA controls, has provided commitments that the MSA GMR-I canisters used with a protection factor at Diablo Canyon 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 CH₃I, 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.

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 110°F . 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 hexane, toluene, xylene and their derivatives, trichloroethane, methylenechloride, trichlorofluoroethane, and Stoddard Solvent) 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 developed.

Certain limitations and precautions based on NUREG/CR-3403 guidance are necessary for utilization of the sorbent canisters. The staff agrees 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. The 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 110°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 coincidentally with the use of GMR-I canisters to assure that work temperatures do not exceed 110°F.
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;

*Sorbent canisters will be stored in Class A storage conditions with temperatures controlled between 60°F and 90°F, and relative humidity between 30% and 60%, in accordance with Nuclear Power Administrative Procedure (NPAP) D-538, "Control of Materials at DCPD."

- b. for individuals who exceed 30 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 30 MPC hour stay time);
 - c. if an individual measures 35 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;
 - 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. These procedures, Specifications for Supplier Quality Assurance Program (SPD-0), Surveillance Test Procedures M-4, M-5, and M-6A, and AP D-360, 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.
 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 PG&E'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 Diablo Canyon can result in significant dose savings and should be an effective ALARA measure.

Other actions taken by PG&E 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 30 MPC hours) and radioiodine data will be trended to detect problems; an investigation level for radioiodine uptakes has been established (at 35 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 positions in Regulatory Guide 8.8 and are acceptable.

In summary, the NRC staff's review of the licensee's proposal indicates that the actions proposed by PG&E 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 NRC criteria. The licensee's proposed exemption, with the controls and limitations, meets the positions in 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) and 20.501.

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 20.501, the exemption is authorized by law and will not result in undue hazard to life or property. The Commission hereby grants an exemption from the requirements of Footnote d-2(c) of Appendix A to 10 CFR Part 20.

The Commission has prepared an Environmental Assessment and Finding of No Significant Impact related to this action which was published in the Federal Register on December 28, 1987 (52 FR 48887). The Environmental Assessment concluded that this action will not have a significant effect on the quality of the human environment, and therefore the Commission has determined not to prepare an environmental impact statement for this exemption.

For further details with respect to this action, see the application for exemption dated April 18, 1986 and supplemental information provided by letter dated July 15, 1986, which are available for public inspection at the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., and

at the California Polytechnic State University Library, Government Documents
and Maps Department, San Luis Obispo, California 93407.

Dated at Bethesda, Maryland, this 4th day of January, 1988.

FOR THE NUCLEAR REGULATORY COMMISSION

Dennis M. Crutchfield
Dennis M. Crutchfield, Director
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation