November 18, 2005

Mr. David H. Oatley
General Manager and Vice President
Acting Chief Nuclear Officer
Pacific Gas and Electric Company
Diablo Canyon Power Plant
P.O. Box 56
Avila Beach, CA 93424

SUBJECT: HUMBOLDT BAY POWER PLANT UNIT 3 - USE OF ASSIGNED PROTECTION FACTOR WITH THE USE OF FRENCH-DESIGNED AIR SUPPLIED RESPIRATOR EQUIPMENT

Dear Mr. Oatley:

By letter dated October 7, 2005, Pacific Gas and Electric Company (PG&E) requested U.S. Nuclear Regulatory Commission (NRC) authorization, pursuant to Title 10 *Code of Federal Regulations* (10 CFR), Section 20.1705, to: (1) use French-designed respiratory protection equipment that has not been tested and certified by the National Institute for Occupational Safety and Health; (2) to not provide standby rescue persons whenever this equipment is used; and, (3) to take credit for an assigned protection factor of 5000 for this equipment.

The NRC staff concludes in the enclosed Safety Evaluation that the PG&E request is acceptable, and within the provisions of 10 CFR Part 20. Therefore, you are authorized to use the Mururoa air supplied suits, models V4 F1 and V4 MTH2, with an assigned protection factor of 5000, and to not provide standby rescue persons whenever this equipment is used, at the Humboldt Bay Power Plant Unit 3.

If you or your staff have any questions concerning the resolution of this matter, please contact me at 301-415-3017.

Sincerely,

/RA/

John B. Hickman, Project Manager
Reactor Decommissioning Section
Decommissioning Directorate
Division of Waste Management
and Environmental Protection
Office of Nuclear Material Safety
and Safeguards

Docket No.: 50-133

Enclosure: Safety Evaluation

November 18, 2005

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Acting Chief Nuclear Officer
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Docket No.: 50-133
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SAFETY EVALUATION

BY THE OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFGUARDS

USE OF A PROTECTION FACTOR OF 5000 WITH

FRENCH DESIGNED RESPIRATORY PROTECTION EQUIPMENT

PACIFIC GAS AND ELECTRIC COMPANY

HUMBOLDT BAY POWER PLANT UNIT 3

DIABLO CANYON UNITS 1 AND 2

DOCKET NOS. 50-133, 50-275, AND 50-323

1.0 INTRODUCTION

By letter dated October 7, 2005, Pacific Gas and Electric Company (PG&E, the licensee) requested U.S. Nuclear Regulatory Commission (NRC) authorization, pursuant to Title 10 *Code of Federal Regulations* (10 CFR), Section 20.1705, to: (1) use French-designed respiratory protection equipment that has not been tested and certified by the National Institute for Occupational Safety and Health (NIOSH); (2) to not provide standby rescue persons whenever this equipment is used; and, (3) to take credit for an assigned protection factor (APF) of 5000 for this equipment.

PG&E requested to use an APF greater than that listed in Appendix A to 10 CFR Part 20, for persons working in areas of airborne radioactivity with certain respiratory protection equipment that has not been certified by NIOSH. Specifically, PG&E requested authorization to use an APF of 5000 with the Mururoa air supplied suits, models V4 F1 and V4 MTH2, manufactured by Delta Protection.

2.0 REGULATORY EVALUATION

Part 20 to 10 CFR, “Standards for Protection Against Radiation,” Subpart H, “Respiratory Protection and Controls to Restrict Internal Exposure in Restricted Areas,” concerns the use of respiratory protection equipment for protection against airborne radioactive materials.

Section 20.1703, “Use of individual respiratory protection equipment,” paragraph(a), requires that respiratory protection equipment used by a licensee to limit the intake of radioactive material be tested and certified by NIOSH. Section 20.1703(b) states that a licensee can submit an application to the NRC for authorized use of respiratory protection equipment that has not been tested and certified by NIOSH.

Enclosure

Appendix A to 10 CFR Part 20, “Assigned Protection Factors for Respirators,” does not provide an APF for atmosphere supplying respirator (air-line respirator) suits in a continuous-flow operating mode. Instead, it references footnote (g) that states, “No NIOSH approval schedule is currently available for atmosphere supplying suits. This equipment may be used in an acceptable respiratory protection program as long as all the other minimum program requirements, with the exception of fit testing, are met (i.e., Section 20.1703).”

Section 20.1705, “Application for use of higher assigned protection factors,” states that a licensee shall obtain NRC authorization before using assigned protection factors in excess of those specified in Appendix A to Part 20. Thus, PG&E must obtain NRC approval to take credit for an APF for the French-designed respiratory protection equipment.

Criteria and background information used for the NRC staff’s technical evaluation include 10 CFR Part 20, Subpart H; 10 CFR Part 19, paragraph 19.12, "Instruction to Workers”; Regulatory Guide 8.15, Revision 1, "Acceptable Programs for Respiratory Protection”; NUREG/CR-0041, Revision 1, "Manual of Respiratory Protection Against Airborne Radioactive Materials”; 42 CFR Part 84, which addresses NIOSH testing and certification regulations; Los Alamos National Laboratory Report LA-101560MS, "Acceptance Testing Procedures for Air-Line Supplied Air Suits”; and American National Standards Institute standard ANSI Z88.2-1992, "American National Standard Practices for Regulatory Protection."

3.0 TECHNICAL EVALUATION

NRC guidance provided in NUREG/CR-0041 encourages the use of suits, noting that in certain work environments, air-supplied suits may be the best respiratory device when considering heat stress, trying to minimize skin contamination, and trying to maintain worker doses as low as reasonably achievable (ALARA).

Testing conducted by the Institute for Nuclear Protection and Security, the European certifying agency (comparable to NIOSH), and over 20 years of successful use in European power plants of similar certified suits form the basis for the PG&E request. PG&E has requested authorization to take credit for the protection provided by two suits when used during normal (non-emergency) operations. The two suits are made by the same manufacturer and are identified as Mururoa V4 F1 and Mururoa V4 MTH2 (Certificate Nos. 0073/197/162/12/97/0028 and 0073/197/162/01/96/0001, respectively). Both models have been approved as single-use suits (a suit that is disposed of after one use), and PG&E proposes to use the suits in the approved configurations, relative to the suits’ form, fit, and function.

The European Standard CEN/EN 1073-1 (January 1998), “Protective Clothing Against Radioactive Contamination, Part 1: Requirements and Test Methods for Ventilated Protective Clothing Against Particulate Radioactive Contamination,” provided testing and acceptance criteria used for certification of the suits. This standard is generally consistent with the pertinent acceptance criteria provided in Los Alamos National Laboratory Report LA-10156-MS, which is used to test and authorize the use of air-supplied suits at Department of Energy sites.

The certification-testing regime was broadly based and encompassed a range of various functional areas, including: suit material strength, tear and puncture resistance, material flammability, wearer comfort, noise level, wearer visibility, air flow, carbon dioxide concentrations, and degree of contaminate in-leakage during a series of varied simulated work

practices and exercises. Both models passed all required tests, and both provided a measured average protection level (fit factor) of 50,000. A fit factor, which was developed in a simulated work environment, is the ratio of contaminate concentration outside the suit to the contaminate concentration inside the suit. Given an overall measured fit factor of 50,000 (averaged over all exercise activities), allowing an APF of 5000 provides a conservative safety factor for estimating the actual protection provided to the user by the suit in the actual working environment. APFs are generally lower than fit factors for all types of respirators, since workplace demands are typically greater on the user of the respirator than are laboratory conditions and simulated work activities due to higher heat and humidity, longer work durations, greater worker fatigue, etc.

In general, when compared with other air-fed respirators, both Mururoa suit models provide the following advantages to the user: (1) one piece single-use suit that includes welded gloves and booties with tie straps; (2) fire proof (up to 65°C); (3) made of Poly Vinyl Chloride (PVC) or Ethyfuge with reinforced elbows, knees and crotch areas; (4) dual zippers - metal zipper inside and plastic zipper outside; (5) helmet made of clear PVC material that provides distortion-free vision and large enough for wearing a headset; (6) welded sleeve to insert communication cable; (7) a removable strip near the mouth that could be used for emergency breathing in case of loss of supplied air; (8) an egress strip stretching from left arm, over the head, to right arm that is used for undressing and for self-rescue in an emergency, such as loss of supplied air; (9) air intake located at the waist with a built-in regulator that can adjust, but not block, air flow; (10) two exhaust valves that provide ventilation, and also protect from over pressure; (11) very low noise level at maximum air flow and (12) air flow to hands, feet, face and chest.

Safety features also include light-weight (2.5 pounds), one-piece construction with welded gloves and booties with tie straps. Helmets are made with PVC material that provides distortion-free vision and are large enough for wearing a headset. Noise levels are less than 80 decibels at maximum air flow, and air flow can be adjusted by the user for comfort, but cannot be throttled to below the required minimum air flow. The Mururoa V4 MTH2 model also provides two additional vents near the chin for cooling to the face. Both models are heat resistant to 65 ºC and can be used in temperatures up to 60 ºC. Suits are constructed with reinforced elbow, knee, and crotch areas.

PG&E intends to use the suits during decontamination and decommissioning evolutions at Humboldt Bay Power Plant and during steam generator replacement and reactor head replacement at Diablo Canyon Power Plant. Both Mururoa suit models offer a safer and more efficient means to protect workers in areas of high-radiological contamination and in areas where there is a potential for airborne contamination. The existing practice of using a combination of rain suits and NIOSH-certified air-supplied hoods provides cooling only to the head and forces workers to wear the ensemble in a manner that makes self-rescue nearly impossible; thus, a rescue worker is required to be stationed nearby. The Mururoa suits provide improved cooling over the entire body, and the ease-of-removal features provide a means to undress that minimizes the potential for personnel contamination events and an easy-escape design.

Upon loss of supplied air to the suit, a worker can easily extricate himself or herself from the suit by pulling off the mouth strip and then opening the hood, or by pulling the egress strip from the forearm to the head. Based on these safety features, the NRC staff finds that the suit design provides for easy and effective self-rescue, thus, avoiding asphyxiation if the air supply is interrupted or lost. Because this design allows an unaided individual to easily extricate

himself or herself from the suit, standby rescue personnel are not required, as specified by 10 CFR 20.1703(f).

Subpart H of 10 CFR Part 20 establishes the requirements for implementing a respiratory protection program. These programmatic requirements ensure that worker doses from airborne radioactive materials are maintained ALARA. PG&E intends to integrate the use of the Mururoa suits into their existing, ongoing respiratory protection programs that satisfy 10 CFR Part 20 requirements. The NRC staff finds this approach acceptable. The following summary of controls and program elements generally follow the specific 10 CFR Part 20 requirements pertinent to the use of air-supplied suits. Since PG&E has a viable, ongoing respiratory protection program, only items specific to the use of suits are discussed below.

1. Section 20.1703(c) requires, among other things, written procedures governing the training of respirator users (workers). PG&E has committed to develop new lesson plans to train workers on the suits' features, donning, use and removal, cautions, and use of the mouth strip and tear off strips for routine and emergency egress. This training should include appropriate hands-on and classroom instruction. Specific training will be provided on actions to be taken by the user in the event of equipment malfunction. Radiation Protection personnel will be provided additional training for selection, approval, issue, equipment set-up, operation and maintenance instructions for the suits.

2. Communication channels will be established and maintained between PG&E, the manufacturer and the European certification authority to ensure that users are notified in a timely manner of significant problems that may affect suit safety, performance, or function. Depending on the severity of a problem or defect, the certification agency or the manufacturer may issue a product recall (e.g., a stop-use advisory or user warning issued to all registered users). PG&E has committed to use their Corrective Action Program to document any unexpected problems with the suits and track corrective actions taken. PG&E will report to the manufacturer any defects or incidences that may occur with the suits.

3. Section 20.1703(c)(4)(vii) requires, among other things, written procedures governing respirator storage and quality assurance. PG&E has committed to implement the provisions in the manufacturer's instructions for use and emergency features (ref. Delta, Mururoa V4F1 and MTH2-V4, Instructions For Use, NO/841442T) , with the minor clarification that the suits will be inspected and removed from their protective packaging outside of the plant's radiological controlled areas, in a way that maintains the integrity of the suit, but does not lead to the unnecessary generation of solid radioactive waste.

4. The Mururoa suits are single use only, and are not approved for use in atmospheres that are immediately deleterious to life and health (IDLH). PG&E has committed to discarding each suit after one use and that they will not be used in environments that are IDLH.

4.0 CONCLUSION

Based on the testing data provided, and when used in accordance with the applicable manufacturer's instructions, licensee commitments, and requirements of Subpart H of 10 CFR Part 20, the NRC staff concludes that the PG&E request to use the Mururoa V4 F1 and V4 MTH2 supplied air suits satisfies the 10 CFR Part 20 ALARA requirements, and will provide the suit wearer with an adequate level of protection while working in potentially high airborne radioactivity areas. Therefore, the NRC staff finds that the request is acceptable. The NRC staff also concludes that PG&E can take credit for an APF of 5000 for both of these suits, and that the standby rescue personnel, discussed in 10 CFR 20.1703(f), are not required when these suits are used.

Principal Contributor: John Hickman
Roger Pedersen (By Precedent)

Date: 11/18/05