

January 19, 2006

Mr. J. M. Heffley  
Chief Nuclear Officer  
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1997 Annapolis Exchange Parkway  
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SUBJECT: CALVERT CLIFFS NUCLEAR PLANT, UNIT NOS. 1 AND 2, R.E. GINNA  
NUCLEAR POWER PLANT, AND NINE MILE POINT NUCLEAR POWER  
STATION, UNIT NOS. 1 AND 2 - AUTHORIZATION FOR USE OF DELTA  
PROTECTION MURUROA SINGLE USE SUPPLIED AIR SUITS, MODEL V4  
MTH2, WITH AN ASSIGNED PROTECTION FACTOR OF 5000  
(TAC NOS. MC8680, MC8681, MC8682, MC8683, AND MC8684)

Dear Mr. Heffley:

By letter dated October 14, 2005, Constellation Energy Generation Group (Constellation) submitted a request, pursuant to Section 20.1705, "Application for use of higher assigned protection factors," of Part 20 of Title 10 of the *Code of Federal Regulations* (10 CFR), to use and take credit for protection by single-use air supplied suits manufactured by Delta Protection (Models Mururoa V4 F1 and Mururoa V4 MTH2) at Calvert Cliffs Nuclear Power Plant, R.E. Ginna Nuclear Power Plant, and Nine Mile Point Nuclear Station. Specifically, Constellation requested to take credit for an assigned protection factor of 5000 for this equipment. Constellation would also not provide standby rescue personnel whenever this equipment is used.

The Nuclear Regulatory Commission staff has reviewed the request to take credit for the higher assigned protection factor and finds it acceptable when the suits are used in accordance with the applicable manufacturer's instructions, licensee commitments, and requirements of Subpart H of 10 CFR Part 20 as described in the enclosed Safety Evaluation.

Sincerely,

/RA/

Patrick D. Milano, Senior Project Manager  
Plant Licensing Branch I-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-317, 50-318, 50-244,  
50-220, and 50-410

Enclosure: Safety Evaluation

cc w/encl: See next page

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Annapolis, MD 21401

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Enclosure: Safety Evaluation  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

USE OF A PROTECTION FACTOR OF 5000 WITH

FRENCH DESIGNED RESPIRATORY PROTECTION EQUIPMENT

CONSTELLATION GENERATION GROUP, LLC

NINE MILE POINT NUCLEAR STATION, UNIT NOS. 1 AND 2

R.E. GINNA NUCLEAR POWER PLANT

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-220, 50-410, 50-224, 50-317, AND 50-318

1.0 INTRODUCTION

By letter dated October 14, 2005 (Agencywide Documents Access and Management System Accession No. ML052940065), Constellation Generation Group, LLC submitted a request, on behalf of Nine Mile Point Nuclear Station, LLC, R.E. Ginna Nuclear Power Plant, LLC, and Calvert Cliffs Nuclear Power Plant, Inc. (collectively, the licensee), to use an assigned protection factor (APF) greater than that listed in Appendix A, "Assigned Protection Factors for Respirators," to Part 20 of Title 10 of the *Code of Federal Regulations* (10 CFR), for persons working in areas of airborne radioactivity with certain respiratory protection equipment not certified by the National Institute for Occupational Safety and Health (NIOSH). Specifically, the licensee requested authorization to use an APF of 5000 with the Mururoa atmosphere-supplying suit, models V4F1, and V4MTH2, manufactured by Delta Protection, Bagnols-Sur-Ceze, France (hereafter referred to as the Delta Suit).

2.0 REGULATORY EVALUATION

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

Paragraph (a) of Section 20.1703, "Use of individual respiratory protection equipment," of 10 CFR Part 20 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 Nuclear Regulatory Commission (NRC) for authorized use of respiratory protection equipment that has not been tested and certified by NIOSH.

Appendix A to 10 CFR Part 20 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 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. Since Appendix A does not provide an APF for atmosphere supplying respirator (air-line respirator) suits in a continuous-flow operating mode, the licensee must obtain NRC approval to take credit for an APF for the French designed respiratory protection equipment.

The criteria and background information used for the NRC staff's technical evaluation include 10 CFR Part 20, Subpart H; 10 CFR Part 19, Section 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 supplied-air suits, noting that in certain work environments, supplied-air suits may be the best respiratory device when considering respiratory protection, heat stress, trying to minimize skin contamination, and trying to maintain worker doses as low as is 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 licensee's request. The licensee has requested authorization to use, and to take credit for, the protection provided by two suits during normal (non-emergency) operations. The two suits are made by Delta Protection, France and are identified as Mururoa V4 F1 (Certificate No. 0073/197/162/12/97/0028) and V4 MTH2 (Certificate No. 0073/197/162/01/96/0001). Both models have been approved as a single-use suits (a suit that is disposed after one use), and the licensee proposes to use the suit in the approved configurations, relative to the suits' form, fit, and function.

The European Standard 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 5,000 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 such workplace factors as higher heat and humidity conditions, longer work durations, and greater worker fatigue.

In general, when compared with other air-fed respirators, both Delta Suits provide the following advantages to the user: (1) dual zippers (metal zipper inside and plastic zipper outside); (2) a welded sleeve-to-insert communication cable; (3) a removable strip near the mouth that could be used for emergency breathing in case of loss of supplied air; (4) an egress strip stretching from the left arm, over the head, and to the right arm that is used for undressing and for self-rescue in an emergency, such as loss of supplied air; (5) an air intake located at the waist with a built-in regulator that can adjust, but not block, air flow; (6) dual magnetic valves that provide ventilation and relief of excess pressure in case the suit is squeezed or pinched unexpectedly; (7) a very low noise level at maximum air flow; and (8) air flow to the hands, feet, face, and chest.

Safety features also include its light-weight (2.5 pounds), one-piece construction with welded gloves and booties with tie straps. The helmet is made with polyvinyl chloride (PVC) material that provides distortion-free vision and is 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 shut off below the required minimum air flow. The Delta Suits provide two additional vents near the chin for cooling to the face. Both models are heat resistant to 65 EC and can be used in temperatures up to 60 EC. The suits are constructed with reinforced elbow, knee, and crotch areas.

The licensee intends to use the suits to minimize personnel exposure/contamination in radiation areas with high contamination or potential for high airborne radioactivity. Examples of these areas include the steam generator primary manways, underneath the reactor head, and in the reactor cavity. Both models of the Delta Suits 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 Delta Suits are preferable to the currently used bubblehood



because the safety features of the Delta Suits eliminate the need for using a standby rescue person (per 10 CFR 20.1703(f)), thus helping to minimize occupational radiation exposures. In addition, the ease of removal features provide a means to undress that minimizes the potential for personnel contamination events and provides an easy-escape design.

Upon loss of air supplied 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.

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. The licensee intends to integrate the use of the Delta Suits into their existing, ongoing respiratory protection program that satisfies the requirements of 10 CFR Part 20. The NRC staff finds this approach acceptable. The following summary of controls and program elements generally follows the specific 10 CFR Part 20 requirements pertinent to the use of air-supplied suits. Since the licensee has a viable, ongoing respiratory protection program, only items pertinent and specific to the use of the Delta Suits are discussed below.

1. Section 20.1703(c) requires, among other things, written procedures governing the training of respirator users (workers). The licensee has committed to develop new lesson plans to train workers on the suit's features; how to don, use and doff the suit; and instructions on using the built-in escape strips for routine and emergency egress conditions. This training will 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. The radiation protection personnel will be trained on storage, usage, expiry date, as well as on assisting the wearer in dressing and undressing in accordance with the manufacturer's "M.T.H.2, Instructions for Use," dated December 2000.
2. Communication channels will be established and maintained between the licensees, 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). The licensee has committed to use their self-assessment program to document and evaluate any unexpected problems with the Delta Suits and to report any suit defects in a timely manner to the U.S. nuclear industry through its Operating Experience Process and to the manufacturer.
3. Section 20.1703(c)(4)(vii) requires, among other things, written procedures governing respirator storage and quality assurance. The licensee has committed to implement the



provisions in the suit manufacturer's instructions "MTH2, Instructions For Use," dated December 2000, 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 Delta Suits are single use only. Both model suits will only be used during normal (non-emergency) operations and will not be used in atmospheres that are immediately deleterious to life and health.

#### 4.0 CONCLUSION

On the basis of 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 licensee's request to use, and take credit for an APF of 5,000, with both the Mururoa V4 F1 and Mururoa V4 MTH2 supplied air suits is acceptable.

Principal Contributors: R. Pedersen  
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Date: January 19, 2006