

October 2, 2006

Mr. J. V. Parrish  
Chief Executive Officer  
Energy Northwest  
P.O. Box 968 (Mail Drop 1023)  
Richland, WA 99352-0968

SUBJECT: COLUMBIA GENERATING STATION - USE OF DELTA PROTECTION SUITS  
(TAC NO. MD2114)

Dear Mr. Parrish:

By letter dated May 22, 2006, you requested U.S. Nuclear Regulatory Commission (NRC) authorization, pursuant to Title 10 of the *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) not provide standby rescue persons whenever this equipment is used; and, (3) take credit for an assigned protection factor of 5,000 for this equipment.

The NRC staff concludes in the enclosed safety evaluation that the 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 5,000, and whenever this equipment is used you do not need to provide standby rescue persons.

Sincerely,

**/RA/**

David Terao, Chief  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-397

Enclosure: As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

USE OF RESPIRATORY PROTECTION EQUIPMENT

FACILITY OPERATING LICENSE NO. NPF-21

ENERGY NORTHWEST

COLUMBIA GENERATING STATION

DOCKET NO. 50-397

1.0 INTRODUCTION

By letter dated May 22, 2006, Energy Northwest (the licensee) submitted a request to use certain air-supplied suits that provide respiratory protection for persons working in areas of airborne radioactivity. Specifically, the licensee requested authorization (1) to use French-designed respiratory protection equipment that has not been tested and certified by the National Institute of 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 5,000 for this equipment.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, "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 Nuclear Regulatory Commission (NRC) for authorized use of respiratory protection equipment that has not been tested and certified by NIOSH.

Section 20.1703(f) requires that standby rescue personnel be provided whenever respiratory protection equipment from which an unaided individual would have difficulty extricating himself or herself is used.

Appendix A, "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) which 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., § 20.1703)."

Section 20.1705, "Application for use of higher assigned protection factors," states that a licensee shall obtain NRC authorization before using APFs in excess of those specified in Appendix A to Part 20. Thus, the licensee 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 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 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 the licensee 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 the 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 higher heat and humidity, longer work durations, greater worker fatigue, etc.

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 Ethyfuse with reinforced elbows, knees and crotch areas; (4) dual zippers - metal zipper inside and plastic zipper outside; (5) a helmet made of clear PVC material that provides distortion-free vision and large enough for wearing a headset; (6) a welded sleeve to insert a 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 the left arm, over the head, to the right arm that is used for undressing and for self-rescue in an emergency, such as loss of supplied air; (9) an 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 overpressure; (11) very low noise level at maximum air flow and (12) air flow to hands, feet, face, and chest.

Safety features also include lightweight (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 °C and can be used in temperatures up to 60 °C. Suits are constructed with reinforced elbow, knee, and crotch areas.

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. When used as proposed, the design features of the suit, coupled with the required training on escape methods that is given to all suit users, are adequate for the staff to conclude that the standby rescue personnel addressed in Section 20.1703(f) are not required.

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 Mururoa suits into the licensee's existing, ongoing respiratory protection program that satisfies Part 20 requirements. The NRC staff finds this approach acceptable. The following summary of controls and program elements generally follows the specific Part 20 requirements pertinent

to the use of air-supplied suits. Since the licensee has a viable, ongoing respiratory protection program and has successfully used air-supplied hoods in the past, only items pertinent and 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). The licensee has committed to develop new lesson plans to train workers on the suits' features; how to don, use and doff the suits; and instructions on using the built-in escape strips for routine and emergency egress conditions. 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 an equipment malfunction. The radiation protection personnel will be trained to ensure that they are competent to issue the suits, assist in helping the user don and doff the suits, and set up and operate the unit.
2. The licensee indicated that communication channels will be established and maintained between the licensee, the manufacturer, and the United States nuclear industry 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 manufacturer may issue a product recall (e.g., a stop-use advisory or user warning issued to all registered users). This communication network is analogous to the NIOSH-vendor-user link established in the United States of America.
3. Section 20.1703(c)(4)(vii) requires, among other things, written procedures governing respirator storage and quality assurance. Since the suits are approved for only single use, there are no maintenance requirements. The vendor's manufacturing process is inspected annually by ASQUAL, a European quality assurance organization, to ensure that the required level of process and product quality is maintained. Additionally, on a formalized sample basis, the vendor performs destructive and nondestructive testing of the product line.

#### 4.0 REGULATORY COMMITMENTS

The licensee's May 22, 2006, application contains the following regulatory commitments:

1. The manufacturer's instructions for use and storage of the Delta Protection Mururoa V4 F1 and V4 MTH2 suits will be integrated into the Columbia respiratory program with the minor clarification that the suits will be inspected and removed from their protective packaging outside of the plant's radiological controlled area in a way that maintains the integrity of the suit, but does not lead to the unnecessary generation of solid radioactive waste.
2. Lesson plans will be developed and used to train workers and radiation protection technicians on the Delta Protection Mururoa V4 F1 and V4 MTH2 suit features, donning, use and removal, and use of mouth strip and tear off strips for routine and emergency egress.
3. Columbia radiation protection personnel will be provided additional training for selection, approval, issue, equipment set-up, operation and maintenance instructions for the Delta Protection Mururoa V4 F1 and V4 MTH2 suits.

4. The Delta Protection Mururoa V4 F1 and V4 MTH2 suits will be discarded after a single use and will not be used in atmospheres that are immediately dangerous to life and health (IDLH).
5. Communication channels will be established between the manufacturer and Energy Northwest for the purpose of timely notification of significant problems that may affect suit safety, performance, or function. Any defects identified in the Delta Protection Mururoa V4 F1 and V4 MTH2 suits will be entered into the Columbia Corrective Action Program and reported to the manufacturer.

The NRC staff finds that reasonable controls for the implementation and for subsequent evaluation of proposed changes pertaining to the above regulatory commitments are best provided by the licensee's administrative processes, including its commitment management program. The above regulatory commitments do not warrant the creation of a regulatory requirement (an item requiring prior NRC approval of subsequent changes).

#### 5.0 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 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 the licensee can take credit for an APF of 5,000 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 Contributors: B. Benney

Date: October 2, 2006

Columbia Generating Station

cc:

Mr. W. Scott Oxenford (Mail Drop PE04)  
Vice President, Technical Services  
Energy Northwest  
P. O. Box 968  
Richland, WA 99352-0968

Mr. Albert E. Mouncer (Mail Drop PE01)  
Vice President, Corporate Services/  
General Counsel/CFO  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Chairman  
Energy Facility Site Evaluation Council  
P.O. Box 43172  
Olympia, WA 98504-3172

Mr. Douglas W. Coleman (Mail Drop PE20)  
Manager, Regulatory Programs  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Mr. Gregory V. Cullen (Mail Drop PE20)  
Supervisor, Licensing  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-4005

Chairman  
Benton County Board of Commissioners  
P.O. Box 190  
Prosser, WA 99350-0190

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
P.O. Box 69  
Richland, WA 99352-0069

Mr. Dale K. Atkinson (Mail Drop PE08)  
Vice President, Nuclear Generation  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Mr. William A. Horin, Esq.  
Winston & Strawn  
1700 K Street, N.W.  
Washington, DC 20006-3817

Mr. Matt Steuerwalt  
Executive Policy Division  
Office of the Governor  
P.O. Box 43113  
Olympia, WA 98504-3113

Ms. Lynn Albin  
Washington State Department of Health  
P.O. Box 7827  
Olympia, WA 98504-7827

Technical Services Branch Chief  
FEMA Region X  
130 228<sup>th</sup> Street S.W.  
Bothell, WA 98201-9796

Cheryl M. Whitcomb (Mail Drop PE03)  
Vice President, Organizational  
Performance & Staffing/CKO  
Energy Northwest  
P.O. Box 968  
Richland, WA 99352-0968

Assistant Director  
Nuclear Safety and Energy Siting Division  
Oregon Department of Energy  
625 Marion Street NE  
Salem, OR 97301-3742

August 2006