AREVA

October 2, 2008
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U.S. Nuclear Regulatory Commission
Director, Office of Nuclear Material
Safety and Safeguards
Attn: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

Subject: Request for Additional Information (RAI) Responses Pertaining to Fire Safety and Environmental Protection (Chapters 7 and 9, respectively, of License No. SNM-1227 Renewal Application)

Ref.: 1. Letter, P.J. Habighorst, "Request for Additional Information Regarding the Safety Evaluation Report for AREVA NP Inc. Richland Fuel Fabrication Facility License Renewal; License No. SNM-1227, Docket No. 70-1257 (TAC L31975)"; July 31, 2008.

Ref.: 2. Letter, R.E. Link to USNRC Document Control Desk, "Submittal of License Renewal Application and Environmental Report for AREVA NP Inc. Richland Fuel Fabrication Facility; License No. SNM-1227, Docket No. 70-1257," October 24, 2006.

Ref.: 3. Letter, R.E. Link to USNRC Document Control Desk, "RAI Request dated July 31, 2008 (TAC L31975)"; August 21, 2008.

Via Reference 1, the NRC conveyed RAIs pertaining to a number of chapters in AREVA NP's pending license renewal application for License No. SNM-1227, submitted to the NRC via Reference 2. Via Reference 3, AREVA requested that the due date for submitting all the RAIs be extended to October 3, 2008, however the NRC has since indicated that they would be receptive to AREVA's submittal of RAI responses prior to that date on a chapter-by-chapter basis as they are completed. Accordingly, attached please find AREVA's responses to RAIs pertaining to Chapter 7, Fire Safety, and Chapter 9, Environmental Protection, of the Richland license renewal application.

If you have questions, please contact me on 509-375-8409.

Very truly yours,

R. E. Link, Manager
Environmental, Health, Safety & Licensing

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RAI RESPONSES - AREVA NP RICHLAND (SNM-1227); October 2, 2008

Chapter 7: Fire Safety

1. AREVA clarified, with the NRC staff, in a June 11, 2008, call that they do not use the National Fire Protection Association (NFPA) Code 801, "Standard for Facilities Handling Radioactive Materials." What other codes and standards are used by AREVA to meet the intent of NFPA 801 and ensure adequate fire protection measures for the entire facility? This information is necessary to determine compliance with the requirements in 10 CFR 70.23(a)(3 and 4), and 70.64(a)(3).

   Response:

   All buildings and facilities on the AREVA site were designed, constructed and inspected in accordance with the edition of the Uniform Building Code (UBC) current at the time of construction, the then-current City of Richland Municipal Code, plus any special requirements as may have been dictated by their intended use. The UBC and City of Richland Municipal code contain various codes and standards, incorporated by reference, that apply to the fire protection features utilized at the AREVA facility.

   The intent of NFPA 801 is to reduce the risk of fires and explosions at facilities handling radioactive materials using a defense-in-depth approach. The codes and standards referenced in NFPA 801 are largely the same fire protection codes and standards referenced in the Uniform Building Codes and Richland Municipal Codes. These codes include the following as applicable to the AREVA Horn Rapids Road facility:

   - NFPA 10, Standard for Portable Fire Extinguishers.
   - NFPA 13, Standard for the Installation of Sprinkler Systems.
   - NFPA 14, Standard for the Installation of Standpipe and Hose Systems.
   - NFPA 15, Standard for Water Spray Fixed Systems for Fire Protection.
   - NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.
   - NFPA 72, National Fire Alarm Code.
   - NFPA 80, Standard for Fire Doors and Other Opening Protectives.

   These codes referenced by both NFPA 801 and the codes of record (UBC and Richland Municipal Code) ensure that the fire protection features were adequately designed and installed. AREVA uses the recommendations of these NFPA standards as guidance in establishing the inspection, testing, and maintenance program for the fire features at this facility.

   Additional NFPA standards were discussed in the AREVA/NRC teleconference of September 19, 2008. These standards are also utilized as guidance in the following areas:

   - NFPA 241 - construction, modification, demolition
   - NFPA 51B - hot work

- NFPA 25 - inspection, testing, and maintenance of water-based suppression systems, and
- NFPA 801 Annex B - fire hazards analyses

Relative to AREVA's pre-fire plan submitted to the City of Richland, the city evaluates the plan versus International Fire Code recommendations; they do not directly apply NFPA 1620.

2. Provide the types, locations, and purposes of fire suppression systems at the facility used to meet the requirements of 10 CFR 70.23(a)(3) and the performance requirements in 10 CFR 70.61. What NFPA (or other codes) are used for the design, inspection, testing, and maintenance of engineered fire protection systems? Appropriate ISA sections may be referenced as part of the response.

   Response:

   Automatic sprinkler systems in the following facilities are credited as Items Relied on for Safety (IROFS):

   - Warehouse 2 (IROFS 4535)
   - Area housing the Solid Waste Uranium Recovery (SWUR) incinerator within the SF Building (IROFS 4535.20)
   - North end of Warehouse 6 (IROFS 4535.10).

   These IROFS sprinkler systems are used to prevent fires that could occur in areas adjacent to SNM-processing areas from becoming large fires. [Reference: Integrated Safety Analysis – ISA Summaries, Part 1 - Chapters 1-8 - Richland Facility ISA Program, E15-01-1, Ver. 7.0]

   Automatic sprinkler systems were designed and constructed in accordance with the edition of the Uniform Building Code (UBC) current at the time of construction and the then-current City of Richland Municipal Code. AREVA utilizes the guidance provided in NFPA 25 for the inspection, testing, and maintenance of water-based suppression systems. NFPA 25 consolidates these requirements from original system codes of record (NFPA 13, 14, 15, and 24).

3. NFPA 801 recommends that buildings containing radioactive material be fire resistive or noncombustible (Type I or Type II in accordance with NFPA 220, "Standards on Types of Building Construction"). AREVA clarified, with the NRC staff, in a June 11, 2008, call that they do not follow NFPA 801 recommendations. Do the facility buildings meet the intent of this recommendation, based on their construction? If not, what is the estimated fire resistance of exterior walls, interior walls (fire barriers and load bearing walls), and floors? How does the building construction assist the facility in meeting the performance requirements in 10 CFR 70.61 in regard to internal and external fires?

Response:

The facility buildings that contain radioactive material are Type II non-combustible construction as specified by the Uniform Building Code (UBC). The use of UBC Type II non-combustible construction meets the intent of NFPA 801. Individual fire resistance ratings vary and are detailed in individual building fire hazards analyses. AREVA does not however credit exterior building walls in meeting 10 CFR 70.61 performance requirements. The outdoor storage of combustible solids and flammable and/or combustible liquids in the vicinity of SNM-containing buildings and storage areas is administratively limited by a plant safety requirement. Such storage is not to occur within 25 feet of such facilities, except when contained in an approved container and stored in EHS&L-approved locations. [References: Integrated Safety Analysis – ISA Summaries, Part 1 - Chapters 1-8 - Richland Facility ISA Program, E15-01-1, Ver. 7.0; ELO Building FHA, E14-02-001, Ver. 1.0; LUR/SPF Building FHA, E14-02-002, Ver. 1.0; SF Building FHA, E14-02-003, Ver. 1.0; UO2 Building FHA, E14-02-004, Ver. 4.0; Dry Conversion Building FHA, E14-02-005, Ver. 1.0; Facility Support Storage Building FHA , E14-02-006, Ver. 1.0]

4. What is the training level of the operators (i.e., portable fire extinguishers, interior house lines, personal protective equipment, etc.)? This information is necessary to determine compliance with the requirements in 10 CFR 70.23(a)(3).

Response:

All employees receive basic fire safety training as part of their annual site access training. In addition, voluntary training in the use of hand-held portable fire extinguishers is offered annually to all employees.

Employees who are members of the Plant Emergency Response Team (PERT) receive annual training in incipient fire-fighting techniques and other response actions. This training considers guidance in NFPA-600 and includes:

- fire extinguisher use (hands on)
- self-contained breathing apparatus (SCBA) usage
- incident command system
- advanced first aid/employee decontamination
- radiological and chemical field team procedures
- hazmat spill response and decontamination
- facility re-entry/termination procedures

Typical PERT staffing on a normal dayshift is 15-20, with reduced numbers on back shifts and weekends as dictated by plant activities.

The facility summons the Richland Fire Department for fires and relies on them for response to plant fires that escalate beyond the incipient level. Facility staff support this response through consultation with the RFD Incident Commander regarding specific hazards in the plant. Typical RFD response time to the plant is less than 15 minutes.

5. Please discuss any combustible (or flammable) liquids used in the uranium recovery dissolution process. What are the safety consequences due to fire relative to the requirements in 10 CFR 70.61? What types of fire protection measures are provided? Appropriate sections of the ISA may be referenced.

   Response:

   Dodecane (F.P. 165 degrees F) is used in the Gadolinia Scrap Uranium Recovery Facility (ELO/GSUR). Fire involving ignition of dodecane was analyzed in the ELO/GSUR hazards analysis, E14-01-002, Ver. 1.0. The hazards analysis determined that the possibility of even a small fire is very slight since the temperature of the dodecane is controlled to well below its flash point. The hazards analysis concluded that the dodecane fire scenario was a low impact event and that no IROFS or additional fire protection features were required. It should be noted that the ELO GSUR area is well stocked with portable ABC fire extinguishers. Furthermore, a number of large dry chemical wheeled units can be brought to the area very rapidly.

6. Justify the combined failure index of -4 for IROFS 4502 (limits on storage of combustible solids) and IROFS 4503 (monthly surveillance program). At least one more IROFS appears to be required to result in a finding of a highly unlikely consequence. This information is necessary to demonstrate compliance with 10 CFR 70.62(c)(vi) and 10CFR 70.65(6)(6).

   Response:

   Normally in an ISA fire scenario, if the index method is used to indicate the reliability of a combustible loading control, that index may range from -1 to -3, with -1 assigned to a simple administrative control (e.g. monthly surveillances only) and -3 assigned to an enhanced administrative control (e.g. combustible permitting procedure, signs, worker training, and frequent surveillances). Therefore, even with a -3 index, another IROFS is normally required to meet the performance requirements in 10 CFR 70.61.

   A small fire growing into a large fire potentially impacts one or more processing systems in the facility. IROFS 4502 and 4503 are relied upon as safeguards for multiple potential accident sequences at the AREVA NP facility. Process area fires within the facility have been infrequent and most have been sufficiently small such that they have or would have safely self-extinguished without human intervention. The initiating event small fire has been conservatively assigned a frequency of one time in 10 years in a given process area.

   <u>IROFS 4502</u> Moderator control: Administrative procedures control ignition sources and minimize the use and storage of combustible/flammable materials.

   The performance characteristic of this IROFS is to prevent the small initiating event fire from becoming a significant facility fire. This IROFS is well integrated into site culture as all operations personnel are aware that large combustible/flammable loads are not allowed and are unacceptable. Combustible controls are implemented through SOP-40486, "Richland Operations General Rules," and proper storage of flammable/combustible liquids per MCP-30031, Flammable and Combustible Liquids Storage and Handling." IROFS 4502 has been assigned a probability of failure on demand of 10^{-3} consistent with an enhanced administrative control.

IROFS 4503 Moderator control: Monthly surveillance ensures that ignition sources and the use and storage of combustible/flammable materials are minimized as required by SOP. This IROFS has been assigned a probability of failure on demand of 10^{-1} consistent with an administrative control.

These IROFS are judged functionally independent because their actions are separate in time and distinct in character; they also involve multiple personnel. The ISA team could find no single error that would lead to the failure of both IROFS. Failure of IROFS 4502 would result from a trained and qualified individual worker failing to follow procedure and purposefully accumulating unacceptable amounts of combustible and/or flammable materials. This failure would also have to go unnoticed by co-workers in the area. Failure of IROFS 4503 would result due to an independent trained and qualified individual worker failing to adequately perform the specified task of a separate and independent walk through of applicable work areas to identify (and remove if found) excess amounts of combustibles in any given work area.

7. Provide more details about IROFS 4530 (HEPA filters) regarding resistance of HEPA filters to fires including, but not limited to, temperature limits, duct lengths, interior combustibles, and maximum postulated temperatures. This information is necessary to demonstrate compliance with 10 CFR 70.62(c)(vi) and 10 CFR 70.65(b)(6).

Response:

IROFS 4530 HEPA filters meet the resistance to heated air and spot flame resistance requirements, Sections FC-5150 and FC-5160 respectively, of ASME AG-1. Section FC 5150 exposes the filter to air heated to 700 +/- 50 degrees F for not less than 5 minutes. Section FC-5160 exposes the frame, filter media, filter pack, and sealing materials to a 2 ½" blue flame (1750 +/- 50 degrees F) for not less than 5 minutes. A fire at a Blended Low-Enriched Uranium (BLEU) primary HEPA filter and/or duct in its immediate vicinity, started from a small building fire or from maintenance activity, was postulated as the initiator of this scenario. [ISA Summary, Part 2 - Chapter 18 - Ventilation Systems (Plantwide), E15-01-2.18, Ver. 5.0] Duct lengths were not credited in this scenario.

Chapter 9: Environmental Protection

1. Sections 9.2 and 9.3 of the license application discuss gaseous and liquid effluent controls. However, the license application does not discuss how these effluents will be kept as low as reasonably achievable (ALARA). Consistent with 10 CFR 20.1101(b) and 10 CFR 20.2001(a)(3), provide a detailed description of the ALARA goals for effluent controls.

   Response:

   Gaseous and liquid effluents are maintained ALARA via a combination of engineering controls, inspection/maintenance activities, and effluent monitoring. Gaseous effluents with potential concentrations of radioactive materials that are significant with respect to the site's compliance with 10 CFR 20 are passed through at least one stage of HEPA filtration prior to release via an exhaust stack. In practice, most systems are provided with two banks of HEPA filters in series. HEPA filtration is considered to be Best Available Radioactive Control Technology (BARCT) with respect to radioactive particulates. Final HEPA filters are provided with an in-place efficiency test upon installation and under additional conditions as specified in Section 9.2.2. Final HEPAs are also provided with ongoing surveillances as described in Section 9.2.3. And lastly, all applicable stacks are continuously sampled for radioactive emissions in accordance with Section 9.2.1; results are compared to action levels that are conservative with respect to 10 CFR 20 limits. Conservatively calculated dose to a hypothetical maximally exposed individual (MEI) located continuously at the property boundary remains well below 0.01 mrem/yr and is considered by AREVA to be ALARA.

   With respect to radioactive liquid effluents, a variety of end-of-process treatment approaches are utilized to minimize radioactivity leaving the process and entering the liquid effluent, including but not limited to pH control, precipitation, filtration, and ion exchange (IX). Certain liquid effluents with higher uranium concentrations, as well as uranium recovered via end-of-process treatment techniques, are re-routed to uranium recovery processes for recycle into the plant's product production lines. Utilization of the plant's dry conversion process for all gaseous UF_6 conversion constitutes a major ALARA initiative with respect to both chemical and radiological liquid effluents. Historic floor drains in uranium processing areas have been eliminated or capped. Lastly, the final effluent from the plant's wastewater treatment process is routed through a final set of IX columns to reduce uranium to trace concentrations. As in the case of gaseous effluents, the plant's final combined liquid effluent is monitored on a continuous basis for radioactivity, with results compared to action levels conservative with respect to 10 CFR 20 Appendix B, Table 3 limits.

2. Chapter 9 of the license application does not discuss any waste minimization practices or procedures conducted by AREVA. Consistent with 10 CFR 20.1101(b) and 10 CFR 70.22 (a)(8), discuss what procedures and practices AREVA has to minimize waste generation, and specify how these procedures

and practices will be implemented over a period of 40 years. Discuss what methods are used to minimize waste in gaseous and liquid effluents.

Response:

Methods to minimize wastes in gaseous and liquid effluents were discussed in Item No. 1, above. A number of procedures and practices are utilized to minimize the generation of solid radioactive wastes. These include but are not limited to:

- limiting the introduction of unnecessary material into contamination-controlled areas, e.g. packaging materials, containers, plastic, extra parts/components;
- evaluation of contaminated used equipment and parts for potential re-use;
- evaluation of items with no, or low, suspected contamination for decontamination and/or survey, prior to release;
- collection of certain contaminated metals for off-site recycling;
- practices to minimize the generation of contaminated HEPA filters (pre-filtration, process controls, hood re-design, etc.);
- re-utilization of containers and drums, on-site and via transfer to an off-site LLRW processor;
- volume reduction for contaminated wastes already generated (disassembly, compaction, incineration, etc.); and
- prevention of soil contamination through practices such as double containment of outdoor piping and tanks, minimization of underground lines carrying process effluents, and regular inspection of outdoor container storage areas.

Waste minimization offers significant cost incentives relative to avoiding escalating disposal fees, generating recycling revenues, limiting purchases of replacement items (HEPA filters, equipment, etc.), and minimizing waste handling/storage costs. Furthermore, waste minimization is an AREVA corporate (AREVA Way) objective, that is consistent with effective implementation of the Richland site's ISO 14001-certified Environmental Management System (EMS). Continuation of these efforts throughout the term of the license will proceed based on both cost incentives and corporate environmental initiative.

3. In the Supplement to Applicant's Environmental Report, Chapter 3.0 "Analysis of Environmental Effects", Table 11 reports fluoride air emission samples from 2000 through 2005. Samples collected in 2004 and 2005 shown an order of magnitude increase in the fluoride emission rate which approaches the 0.5 ug/m3 emission limit.

i) Please provide an explanation for the increase in fluoride emissions in 2004 – 2005. Also provide recent data (2006 – 2008) so the NRC can determine if the increasing trend continues.

ii) Based on a recent conversation, AREVA NP indicated that the emission data may need correction. Please explain the method used to re-analyze ambient air fluoride samples and include in this explanation the approach used to adjust prior year data. Based on the low concentration levels, how did AREVA NP identify that acetate caused the ion interference? By what process will AREVA NP apply to correct future ion chromatographic readings?

iii) Discuss what procedures AREVA will use to ensure that the HF concentration in the forage will remain below the regulatory limits during a period of 40 years, including the steps implemented if an increasing trend of this chemical is identified.

Response:

AREVA's response to this RAI was previously provided to the NRC on July 31, 2008.