UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

June 22, 2011

Mr. Chris Monetta, President and CEO
GE-Hitachi Global Laser Enrichment
P.O. Box 780
3901 Castle Hayne Road
Wilmington, NC 28402

SUBJECT: OPERATIONS BUILDING DESIGN - GENERAL ELECTRIC-HITACHI GLOBAL LASER ENRICHMENT LICENSE APPLICATION

Dear Mr. Monetta:

On April 8, 2011, you provided a response to our Request for Additional Information (RAI) dated March 8, 2011, related to the design of the Operations Building. We also met with you on March 30, 2011, to discuss the RAIs and your proposed response. We reviewed your response and have determined that your Integrated Safety Analysis (ISA) approach does not properly evaluate natural phenomena events in accordance with the regulations in Title 10 of the *Code of Federal Regulations* 70.61. Without a proper evaluation of natural phenomena hazards, NRC staff cannot make a determination on whether you can meet the baseline design criterion in 10 CFR 70.64(a)(2). In addition, if the result of the natural phenomena evaluation is high consequence, we also determined that your revised Quality Assurance Program Description (QAPD) would be inconsistent with the management measures acceptance criteria in Section 11.4 of NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility" (NRC, 2002) and the baseline design criterion for quality standards and records in 10 CFR 70.64(a)(1). Therefore, we do not have the information necessary to evaluate the QAPD for the Operations Building. We are attaching our evaluation of these issues.

Please provide an amended License Application, ISA Summary, and QAPD incorporating the results of our review within 21 days of the date of this letter.

If you have any questions, please contact Timothy C. Johnson at 301-492-3121 or via e-mail at Timothy.Johnson@nrc.gov.

Sincerely,

/RA/

John D. Kinneman, Director
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

Enclosure:
RAI Response Evaluation

Docket No. 70-7016

cc: Patricia Campbell/GE-Hitachi
Jerald Head/GE-Hitachi
Julie Olivier/GE-Hitachi

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GLE Building Design Issues

Purpose

The purpose of this discussion is to present the U.S. Nuclear Regulatory Commission (NRC) staff position on whether the Operations Building design approach for natural phenomena hazards proposed by General Electric-Hitachi Global Laser Enrichment, LLC (GLE) for its uranium enrichment facility meets the performance requirements and the Baseline Design Criteria in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 70, Subpart H.

Applicable Regulations

The regulations in 10 CFR 70.61(a) require an applicant to evaluate its compliance with the performance requirements in 10 CFR 70.61(b), (c), and (d) in its integrated safety analysis (ISA) performed in accordance with 10 CFR 70.62. The regulations in 10 CFR 70.61(b) state that the risk of each credible high-consequence event must be limited. Engineered controls, administrative controls, or both, must be applied to the extent needed to reduce the likelihood of occurrence of the event so that, upon implementation of such controls, the event is highly unlikely or its consequences are less severe than those in 10 CFR 70.61(b)(1) to (4). High consequence events are those internally or externally initiated events that result in:

1. An acute worker dose of 1 Sv (100 rem) or greater total effective dose equivalent;
2. An acute dose of 0.25 Sv (25 rem) or greater total effective dose equivalent to any individual located outside the controlled area identified pursuant to 10 CFR 70.61(f);
3. An intake of 30 mg or greater of uranium in soluble form by any individual located outside the controlled area identified pursuant to 10 CFR 70.61(f); or
4. An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that:
    i. Could endanger the life of a worker, or
    ii. Could lead to irreversible or other serious, long-lasting health effects to any individual located outside the controlled area identified pursuant to 10 CFR 70.61(f). If an applicant possesses or plans to possess quantities of material capable of such chemical exposures, then the applicant must propose appropriate quantitative standards for these health effects, as part of the information submitted pursuant to 10 CFR 70.65.

The regulations in 10 CFR 70.61(e) state that each engineered or administrative control or control system necessary to ensure compliance with 10 CFR 70.61(b), (c), or (d) must be designated as an item relied on for safety (IROFS). The safety program, established and maintained pursuant to 10 CFR 70.62, must ensure that each IROFS will be available and reliable to perform its intended function when needed and in the context of the performance requirements of 10 CFR 70.61.

The regulations in 10 CFR 70.62(c) state that each applicant must conduct and maintain an ISA, of appropriate detail for the complexity of the process that identifies:

i. Radiological hazards related to possessing or processing licensed material at its facility;
ii. Chemical hazards of licensed material and hazardous chemicals produced from licensed material;

iii. Facility hazards that could affect the safety of licensed materials and thus present an increased radiological risk;
iv. Potential accident sequences caused by process deviations or other events internal to the facility and credible external events, including natural phenomena;
v. The consequence and likelihood of occurrence of each potential accident sequence identified pursuant to 10 CFR 70.62(c)(1)(iv) and the methods used to determine the consequences and likelihoods; and;
vi. Each IROFS identified pursuant to10 CFR 70.61(e), the characteristics of its preventive, mitigative, or other safety function, and the assumptions and conditions under which the item is relied upon to support compliance with the performance requirements of 10 CFR 70.61.

The regulations in 10 CFR 70.64(a) require each applicant address baseline design criteria in the design of new facilities. The regulations in 10 CFR 70.64(a)(1) require that the design must be developed and implemented in accordance with management measures to provide adequate assurance that IROFS will be available and reliable to perform their function when needed. Appropriate records of these items must be maintained by or under the control of the licensee throughout the life of the facility. The regulations in 10 CFR 70.64(a)(2) require that the design must provide for adequate protection against natural phenomena with consideration of the most severe documented historical events for the site.

GLE Response to Requests for Additional Information

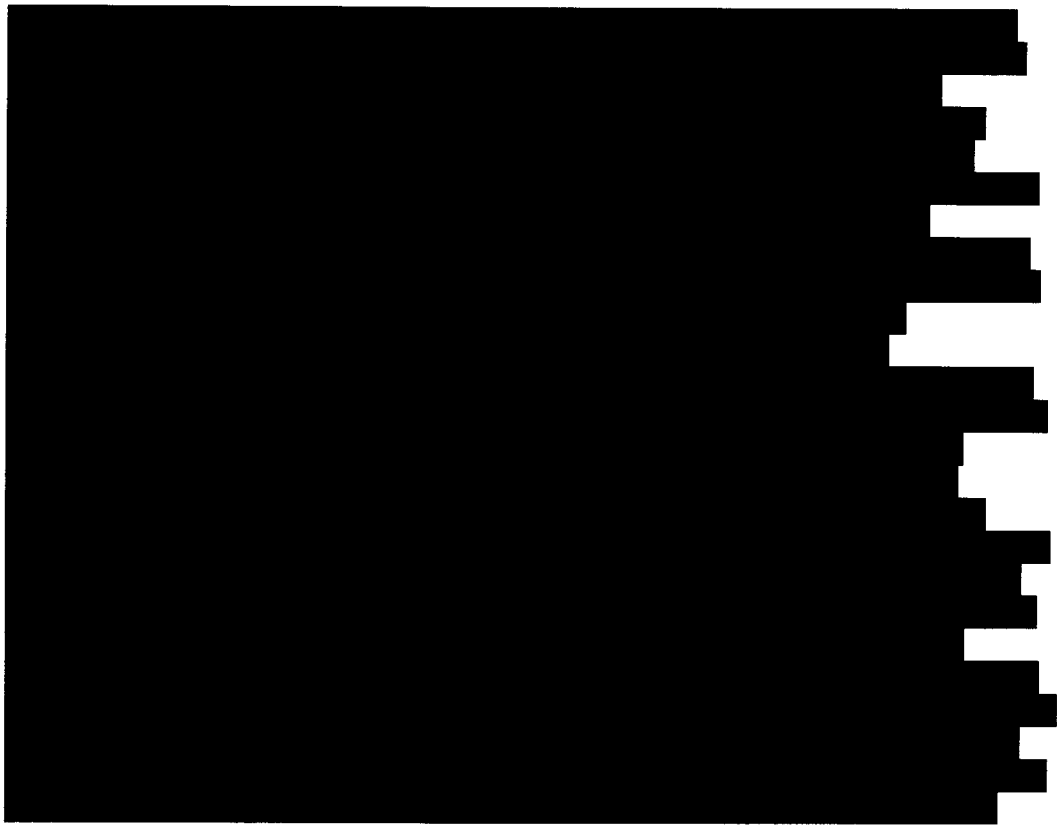
On April 8, 2011, GLE responded to a Request for Additional Information (RAI) (GLE, 2011a) from the NRC dated March 4, 2011 (NRC, 2011). [redacted]

[redacted]

[redacted]

[redacted]

1 [redacted]



As stated above in the response to RAI 01 (GLE, 2011a), GLE's proposed responses were based on the Operations Building not being identified as an IROFS. As an alternative, GLE proposed an approach for designing the Operations Building to meet the baseline design criteria and treating the design as an initial condition when performing the ISA (GLE, 2011a). As described in Interim Staff Guidance (ISG) ISG-FCSS-01, "Qualitative Criteria for Evaluation of Likelihood" (NRC, 2005a), an initial condition is a facility or process feature that can affect the likelihood of an internal initiating event. Initial conditions must be identified and, if susceptible to change over the lifetime of the facility, must be appropriately maintained. For example, an initial condition might be the volume of radioactive material in a tank that would be available for release during an accident. Because GLE considered the Operations Building an initial condition, it did not identify it as an IROFS.

In addition, in Table 1-7 of the ISA Summary (GLE, 2010a), GLE indicated that it will use guidance in ISG-FCSS-08, "Natural Phenomena Hazards" (NRC, 2005b) to define the Design Basis Earthquake (DBE) in accordance with the deterministic Safe Shutdown Earthquake (SSE) approach.[2] As stated in the response to RAI 01 (GLE, 2011a), GLE also proposed the use of

the International Code Council (ICC) "International Building Code" (IBC) (ICC, 2006), American Society of Civil Engineers (ASCE) 43-05, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities" (ASCE, 2005), and ASCE 4, "Seismic Analysis of Safety-Related Nuclear Structures" (ASCE, 2000) for the Operations Building design, and provided a classified consequence analysis of the building under natural phenomena events (GLE, 2011a). [redacted] but did not evaluate the consequences of a building collapse because GLE determined that that was not a credible accident scenario (GLE, 2011a). Relying on its low consequence analysis, GLE did not identify any portion of the Operations Building as an IROFS in its April 8, 2011, submittal (GLE, 2011a).

In addition, in its April 8, 2011, letter (GLE, 2011a), GLE also proposed a graded system of management controls (similar to management measures) to ensure that the Operations Building, indentified as an initial condition, is maintained during design, construction, and operations in a revised Quality Assurance Program Description (QAPD) (GLE, 2011b). The proposed quality assurance controls for the building were applied in a graded fashion based on the building being designated as an initial condition rather than as an IROFS (GLE, 2011b).

NRC Evaluation

In this section, the NRC staff evaluation addresses GLE's compliance with the performance requirements in 10 CFR 70.61(b), (c), and (d) and how GLE addressed credible accidents in its ISA Summary. As discussed below, the NRC staff's position is that: 1) GLE should have evaluated building failure [redacted] as a credible accident; 2) if GLE had done so, the accident would have been classified as a high consequence event; 3) as a high consequence event, GLE would be required to identify the Operations Building as an IROFS; and 4) if the Operations Building is identified as an IROFS, the proposed QA approach in the QAPD is insufficient to meet the requirements of 10 CFR 70.62, which requires the applicant to establish and maintain a safety program and ensure that each IROFS will be available and reliable to perform its intended function when needed and in the context of the performance requirements of 10 CFR 70.61.

A. Evaluation of Operations Building Failure

The GLE approach considering engineered features, such as the GLE Operations Building, to be an initial condition is not explicitly addressed in NRC guidance for external events at fuel cycle facilities, although initial conditions are described in ISG-FCSS-01 (NRC, 2005a) for internal initiating events. Because there is no explicit guidance on this topic for external events, the NRC staff evaluated the proposed approach in accordance with the performance requirements in 10 CFR 70.61. To meet these performance requirements, an applicant must identify credible accident sequences and evaluate the consequences and likelihoods of these accident sequences.

In evaluating most accident sequences in its ISA, GLE performed a "What If/Checklist" approach for identifying facility hazards and accident sequences. GLE then determined the unmitigated consequences of each accident sequence and rated the consequences as high, intermediate, and low. The unmitigated likelihood of the accidents was then determined and IROFS were considered to prevent or mitigate the accidents where the consequences exceeded the performance requirements. For the Operations Building, however, GLE took a different

approach and considered the Operations Building to be an initial condition. GLE, in its response to RAI-02 in its April 8, 2011, letter (GLE, 2011a), stated the following:

> For the building, the highly unlikely deterministically defined DBE, having a magnitude of approximately ½ of the design basis of the building, as required by the code, and at a magnitude that by definition causes "at most slight damage to well-designed buildings," does not lead to a credible response of catastrophic failure base on the design goal of IBC. Without catastrophic failure of the building, this event does not create an accident sequence to be evaluated; the event is of low consequence. Consequently, there is no "structural failure" analysis of the building needed for this event. Based on building design criteria, the ISA does not identify a high or intermediate consequence event in response to the seismic initiator and, therefore, no further analysis is required. Therefore, the building was determined not to be an IROFS since its impact did not exceed the 10 CFR 70.61 performance requirements and other previously identified IROFS would be designed appropriately to function, as necessary, through the NPH event.

Therefore, GLE did not evaluate collapse of the building [redacted]. GLE did this because it considered that the guidance in ISG-FCSS-08 (NRC, 2005b) was a conservative approach for evaluating natural phenomena hazards. In particular, ISG-FCSS-08 (NRC, 2005b) states that:

> For natural phenomena, deterministically defined events such as the probably maximum flood (PMF) or safe-shutdown earthquake (SSE), which is used as reactor design bases, can also be applied to 10 CFR Part 70 facilities as "highly unlikely" events. The actual probability (or likelihood) of such events may be difficult to define quantitatively and varies from site to site.

In addition, in the response to RAI-01 (GLE, 2011a), GLE proposed to use the IBC for calculating its design earthquake loads. For the Wilmington, North Carolina, site, the design earthquake loads computed under the IBC would add a conservative margin of approximately a factor of two over the SSE DBE. In the response to RAI-02 (GLE, 2011a), GLE stated that using the code at most slight damage to well-designed buildings would result and, therefore, concluded that without catastrophic failure of the building, the earthquake event would not create an accident sequence that would need to be evaluated. As a result of the assumption that the Operations Building, designed to the IBC, cannot collapse, as described in "Analysis of Building and Equipment Response to Design Basis Natural Phenomena Events" (GLE, 2011c), the consequences of a natural phenomena event would be limited [redacted] Therefore, as stated in the response to RAI-02 (GLE, 2011a), GLE determined that it was unnecessary to address natural phenomena event accident sequences involving the collapse of the Operations Building to comply with the requirements in 10 CFR 70.61(b).

GLE's approach, which relies on the guidance in ISG-FCSS-08 (NRC, 2005b) quoted above, is not acceptable in this case to meet the performance requirements in 10 CFR 70.61. The SSE determined for the GLE site has a likelihood of 10^{-3}, which is substantially more likely than the "highly unlikely" definition of 10^{-5} proposed by GLE in Section 3.2.5.5.1 of its License Application (LA) (GLE, 2011d). This likelihood is based on site seismic hazard curve in Figure 1 of GLE's "Design Analysis Calculation for Natural Phenomenon Analysis of the GLE Commercial Facility"

(GLE, 2011c). This curve was derived from United States Geological Survey (USGS) data for the specific proposed facility site location in Wilmington, North Carolina (GLE, 2011e). As described in Section 3.4.3.2(4) of NUREG-1520 (NRC, 2002):

> The performance requirements of 10 CFR 70.61 have three elements, including (a) completeness, (b) consequences, and (c) likelihood. Completeness refers to the fact that the ISA must address *each* credible event.

In Section 3.2.5.5.4 of the LA (GLE, 2011d), GLE defines a credible accident as any event that does not meet the definition of "Not Credible." In Section 3.2.5.5.3 of the LA (GLE, 2011d), GLE defines "Not Credible" as an external event for which the frequency of occurrence can conservatively be estimated as less than once in a million years. Because the frequency of occurrence of the SSE (10^{-3}) is greater than once in a million years, the SSE would be a credible accident. Therefore, NRC staff has determined that earthquakes exceeding the SSE are credible events and need to be considered in the ISA as required under 10 CFR 70.61(b), (c), and (d).

GLE also indicated that the actual seismic design load basis is the IBC requirement, which is based on the USGS seismic hazard ground motions with a 2 percent probability of exceedence in 50 years (approximately equal to the 4×10^{-4} or 2,500 year return period earthquake). This is based on use of the seismic hazard maps in the IBC (ICC, 2006), which references ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures" (ASCE, 2006). The seismic hazard maps are based on a probabilistic evaluation based on 2 percent exceedence in 50 years (see Section 21.2 of ASCE 7-05 (ASCE, 2006)). However, the 2,500 year return period earthquake used in the IBC would also be considered a credible earthquake that would require evaluation under 10 CFR 70.61(b), (c), and (d) as its occurrence frequency is greater than the definition of "Not Credible" in Section 3.2.5.5.3 of the LA (GLE, 2011d), that is, once in a million years.

Although GLE is interpreting the guidance in ISG-FCSS-08 to say otherwise, the NRC staff has determined that building collapse during a natural phenomena event at the GLE facility is a credible accident that is required to be evaluated in the ISA because the occurrence frequency of the proposed SSE DBE substantially exceeds GLE's definition of a "Not Credible" event. Therefore, the NRC staff determined that GLE did not properly evaluate credible natural phenomena events in accordance with 10 CFR 70.61(b), (c), and (d) and 10 CFR 70.62.

An approach acceptable to NRC for addressing seismic accident sequences as "highly unlikely" would be for GLE to use the IBC earthquake as its DBE rather than the SSE. This approach would be consistent with the seismic hazard design approach described in U.S. Department of Energy (DOE) DOE-STD-1020, "Natural Phenomena Hazards Design and Evaluation Criteria of Department of Energy Facilities" (DOE, 2002). DOE-STD-1020 (DOE, 2002) is based on a graded approach based on the hazards presented by different facilities. Under the DOE document, "Guide for the Mitigation of Natural Phenomena Hazards for DOE Nuclear Facilities and Nonnuclear Facilities," DOE G 420.1-2 (DOE, 2000), DOE grades facilities by assigning a Performance Category (PC) to it based on its overall hazard. The categories range from PC-0 for facilities that require no natural phenomena hazard protection to PC-4 for facilities with reactor-like hazards. The proposed GLE facility would be a PC-3 facility under DOE G 420.1-2. DOE G 420.1-2 (DOE, 2000) defines a PC-3 facility as follows:

> PC-3 SSCs [systems, structures, and components] are those for which failure to perform their safety function could pose a potential hazard to public health,

> safety, and the environment because radioactive or toxic materials are present and could be released from the facility as a result of that failure. PC-3 SSCs would prevent or mitigate criticality accidents, chemical explosions, and events with the potential to release hazardous materials outside the facility. Design considerations for these categories are to limit facility damage as a result of design basis natural phenomena events so that hazardous materials can be controlled and confined, occupants are protected, and the functioning of the facility is not interrupted. When safety analyses determine that local confinement of high-hazard materials is required for worker safety, PC-3 designation may be appropriate for the SSCs involved. PC-3 NPH [natural phenomena hazard] provisions are consistent with those used for reevaluation of commercial plutonium facilities with conservatism in between that of model building code requirements for essential facilities and civilian nuclear power plant requirements.

Under DOE-STD-1020 (DOE, 2002), Table 2-1, for PC-3 facilities, the mean seismic hazard exceedance level is 4×10^{-4}.

As discussed in ISG-FCSS-08 (NRC, 2005b) relative to the use of DOE-STD-1020 (DOE, 2002):

> DOE has also recognized the difference between earthquake design probability and the probability that a safety component cannot perform its function. To quantify this difference, DOE has developed a risk reduction factor, R, as the ratio between the seismic hazard exceedance probability and the performance goal probability. Conservatism in nuclear facility design arising from factors such as use of prescribed analysis methods, specification of material strengths, and limits on inelastic behavior explains at least part of this apparent reduction in actual risk.

Therefore, the 2500-year earthquake IBC design approach associated with commitments to nuclear-grade construction in ASCE 43-05 (ASCE, 2005) and ASCE 4 (ASCE, 2000) yields sufficient design margin such that risk reduction factors on the order of 4 to 10 can be achieved. This range of risk reduction leads to performance failure probabilities for the GLE site of 1×10^{-4} to 4×10^{-5}, which satisfy the conclusion that seismic accident sequences could be considered to be "highly unlikely" if appropriate nuclear-grade construction practices and mitigation measures, such as implementation of an acceptable emergency plan, are implemented. In the approach discussed above, the Operations Building must be designated as an IROFS because it is an engineered feature that is needed to ensure performance requirements are met. This is further discussed in Section C below.

In Section 2.5 of the ISA Summary (GLE, 2010a), GLE provided site characterization information on other natural phenomena hazards. In addition to seismic events, this information addressed floods, tsunamis, hurricanes, tornadoes, and weather and climate extremes. However, GLE did not explicitly evaluate or present bounding analyses of the consequences of a building collapse from these natural phenomena hazards for the same reasons that it did not consider the seismic impacts. NRC staff evaluated these hazards in terms of the design criteria proposed by GLE. NRC staff also evaluated the information, in accordance with the acceptance criteria in Section 3.4.3.2(1)(c) of NUREG-1520 (NRC, 2002), which state that the applicant needs to provide a characterization of natural phenomena and other external events sufficient to assess their impact on facility safety, including a discussion of which events are incredible and

the basis for that determination. Based on the evaluations of natural phenomena events, including seismic events, the NRC staff concludes that these events are credible events. NRC staff considers that the consequences of a seismic event would bound the consequences of the other natural phenomena events due to considerations such as: 1) lack of forewarning and the ability to take precautionary operation shutdown actions that would be applicable to hurricanes, tornadoes, tsunamis, floods, and extreme weather events; or 2) reduced potential for dispersion of released materials that would be applicable during hurricanes and tornadoes.

B. Consequences of an Accident Involving Building Failure

Based on the evaluation in Section A, natural phenomena events at the GLE site are credible accident sequences. Credible natural phenomena events need to be evaluated for compliance with the performance requirements in 10 CFR 70.61(b), (c), and (d) using an ISA performed in accordance with 10 CFR 70.62. Therefore, GLE would have to determine the consequences of unmitigated natural phenomena events. [redacted]

C. Identification of Operations Building as an IROFS

Under 10 CFR 70.61(e), each engineered or administrative control or control system necessary to comply with the performance requirements in 10 CFR 70.61(b), (c), and (d) must be designated as an IROFS. To meet the performance requirements for a high consequence event, in accordance with 10 CFR 70.61(b), the risk of each credible accident sequence must be limited. Engineered controls, administrative controls, or both must be applied to the extent needed to reduce the likelihood of the occurrence of the event so that, upon implementation of such controls, the event is highly unlikely or its consequence is mitigated to less severe than those in 10 CFR 70.61(b)(1)-(4). But because the Operations Building prevents the accident and would be an engineered feature necessary to reduce the likelihood of the consequences of the event or, upon implementation of the engineered feature, to limit the consequences to those less severe than prescribed in 10 CFR 70.61(b)(1)–(4), the Operations Building would need to be designated an IROFS as required by 10 CFR 70.61(e).

D. Management Measures Required if Operations Building is an IROFS

In the April 8, 2011, GLE response to NRC RAIs (GLE, 2011a), GLE provided a revised QAPD with a separate Appendix B addressing a graded management controls system for the Operations Building. [redacted]

GLE would be required, in accordance with 10 CFR 70.62(d), to implement management controls commensurate with the IROFS' high level of importance to safety. As presented in the GLE QAPD (GLE, 2011b), GLE assumed that the Operations Building would not be an IROFS and, as such, applied a graded set of quality elements that are less robust than what would be required to be applied to IROFS credited with mitigating high or intermediate consequence events. Given that the QA Program and management controls proposed by GLE were

developed in a manner to preserve the design basis associated with the design, construction, and maintenance of the building and support structures rather than to ensure the availability and reliability of the building as an IROFS commensurate with its safety function, there is insufficient information for NRC staff to evaluate the proposed Appendix B in accordance with Section 11.4 of NUREG-1520 (NRC, 2002).

For evaluation of the Operations Building as an IROFS, NRC staff would use the acceptance criteria identified in Chapter 11 of NUREG-1520 (NRC, 2002) as the basis for making the determination required by 10 CFR 70.62(d) that IROFS will be designed, implemented, and maintained, as necessary, to ensure they are available and reliable to perform their function when needed, to comply with the performance requirements of 10 CFR 70.61. To meet the acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002), GLE may apply graded QA controls to the building provided: 1) a justification is provided to determine that the building is of low or lower safety significance than other IROFS categorized as QL-1 or QL-2 IROFS; 2) GLE identifies and implements appropriate graded QA controls, according to the building's safety function and safety significance, sufficient to provide reasonable assurance that the building is constructed as designed and maintained in a manner that will ensure that the building will perform its intended safety function; and 3) the graded QA controls identify a means for reassessing the building's safety significance and QA controls when new information becomes available through operating experience, or based on changes in building design.

E. Baseline Design Criteria

The regulations in 10 CFR 70.64(a)(1) address the quality standards and records baseline design criteria that the design must be developed and implemented in accordance with management measures to provide adequate assurance that IROFS will be available and reliable to perform their function when needed. Appropriate records of these items must be maintained by or under the control of the licensee throughout the life of the facility. Because GLE has not provided sufficient information in Appendix B of the GLE QAPD to evaluate management measures of the Operations Building as an IROFS in accordance with the acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002), NRC staff is unable to make a determination with respect to 10 CFR 70.64(a)(1) for this IROFS.

The regulations in 10 CFR 70.64(a)(2) require that the design must provide for adequate protection against natural phenomena with consideration of the most severe documented historical events for the site. Without a proper evaluation of natural phenomena hazards, NRC staff cannot make a determination on whether you can meet the baseline design criterion in 10 CFR 70.64(a)(2). However, an Operations Building design using the IBC (ICC, 2006), ASCE 43-05 (ASCE, 2005), and ASCE 4 (ASCE, 2000) would be a sufficient basis for determining that the Operations Building design meets the baseline design criteria in 10 CFR 70.64(a)(2) if appropriate management measures meeting the acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002) are implemented for the design, construction, and maintenance of the building and an acceptable emergency plan is implemented consistent with the Operations Building being designated as an IROFS.

Conclusion

Based on the April 8, 2011, submittal from GLE in response to NRC staff RAIs (GLE, 2011a), the NRC staff determined that GLE has not demonstrated compliance with the performance

objectives in 10 CFR 70.61 because it has not properly evaluated natural phenomena events in its ISA in accordance with 10 CFR 70.62(c) and properly identified IROFS for engineered or administrative features needed to comply with the performance objectives as required under 10 CFR 70.61(e). Specifically, GLE did not evaluate the consequences of the Operations Building collapse due to natural phenomena events, which for at least a seismic event, the staff expects would be a high consequence event requiring designation of the Operation Building as an IROFS. If the Operations Building is an IROFS, the NRC staff determined that the revised QAPD would be inconsistent with the management measures acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002).

For the baseline design criteria in 10 CFR 70.64(a)(1), NRC staff determined that GLE provided insufficient information to evaluate compliance with the management measures acceptance criteria in Section 11.4 of NUREG-1520 (NRC, 2002) and, therefore, has not demonstrated compliance with 10 CFR 70.64a)(1). For the baseline design criteria in 10 CFR 70.64(a)(2), NRC staff determined that the natural phenomena hazard criteria can be met using the proposed Operations Building design approach if appropriate management measures and an acceptable emergency plan are implemented consistent with the designation of the Operations Building as an IROFS.

References

(ASCE, 2000) American Society of Civil Engineers (ASCE). ASCE 4, "Seismic Analysis of Safety-Related Nuclear Structures," 2000.

(ASCE, 2005) American Society of Civil Engineers (ASCE). ASCE 43-05, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," 2005.

(ASCE, 2006) American Society of Civil Engineers (ASCE). ASCE 7-05, "Minimum Design Loads for Buildings and Other Structures," 2006.

(DOE, 2000). U.S. Department of Energy (DOE). DOE G 420.1-2, "Guide for the Mitigation of Natural Phenomena Hazards for DOE Nuclear Facilities and Nonnuclear Facilities," 2000.

(DOE, 2002) U.S. Department of Energy (DOE). DOE-STD-1020, "Natural Phenomena Hazards Design and Evaluation Criteria of Department of Energy Facilities," 2002.

(GLE, 2010a) General Electric-Hitachi Global Laser Enrichment LLC (GLE). "Integrated Safety Analysis Summary for the GE-Hitachi Global Laser Enrichment LLC Commercial Facility," Revision 2. November 2010.

(GLE, 2010b) General Electric-Hitachi Global Laser Enrichment LLC (GLE). "Design Analysis Calculation for Natural Phenomenon Analysis of the GLE Commercial Facility," June 2010.

(GLE, 2011a) General Electric-Hitachi Global Laser Enrichment LLC (GLE). Letter from J. Olivier to B. Smith, "Documents Supporting the Response to NRC Request for Additional Information Dated March 4, 2011, for Global Laser Enrichment License Application," April 8, 2011.

(GLE, 2011b) General Electric-Hitachi Global Laser Enrichment LLC (GLE). "Quality Assurance Program Description for the GE-Hitachi Global Laser Enrichment LLC Commercial Facility," Revision 5, March 2011.

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(GLE, 2011d) General Electric-Hitachi Global Laser Enrichment LLC (GLE). "GLE Commercial Facility License Application," Revision 4. March 2011.

(ICC, 2006) International Code Council (ICC). "International Building Code," 2006.

(NRC, 2002) U.S. Nuclear Regulatory Commission. NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility," March 2002.

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