

**REVIEW OF HONEYWELL'S REVISED INTEGRATED SAFETY ANALYSIS SUMMARY
FOR SEISMIC AND HIGH WIND/TORNADO EVENTS SAFETY BASIS**

**Honeywell Metropolis Works Facility
Uranium Hexafluoride Conversion Plant
Metropolis, Illinois
Source Materials License SUB-526
Docket 40-3392**

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Introduction

The Confirmatory Order EA-12-157 (Agencywide Documents Access and Management System Accession Number ML12289A800) required Honeywell to “submit a revised Integrated Safety Analysis (ISA) Summary to the U.S. Nuclear Regulatory Commission (NRC) no later than six months after resuming licensed operations at the Metropolis Works (MTW) facility.” This document summarizes the staff’s review of the revised ISA Summary, submitted by letter dated October 28, 2013 and supplemented by letter dated May 22, 2014. The staff’s review focused on the events for the seismic and high wind/tornado hazards. The primary purpose of the staff’s review was to determine if the safety basis for seismic and high wind/tornado events is adequately represented in the revised ISA Summary and is consistent with the safety basis previously reviewed by the staff as documented in the Technical Evaluation Report (TER) (ML13168A187).

The staff’s review for the TER is based primarily on the information from the Safety Basis and Corrective Action Plan (SBCAP) Leading to Restart (ML131550608) submitted by Honeywell to support their restart. In performing this review, the staff considered that the safety basis is the current physical configuration of the facility and components. The staff reviewed the calculations and analyses upon which Honeywell relied in concluding that seismic and high wind events have acceptable risks that meet applicable safety requirements. In addition, the staff considered whether Honeywell’s change control process would adequately maintain the safety basis which was approved in the TER by providing adequate definition of the safety basis and by retaining the commitments to maintain the safety basis described in the ISA Summary for changes to items associated with the seismic and high wind/tornado events.

Background

Honeywell is licensed under Title 10 of the *Code of Federal Regulations* (10 CFR) Part 40, “Domestic Licensing of Source Material.” Part 40 of 10 CFR does not require that an ISA be performed to meet licensing requirements. However, during the last license renewal, the NRC added a condition, namely License Condition (LC) 18.D,¹ to Honeywell’s license incorporating a requirement for Honeywell to perform an ISA. Honeywell performed the ISA using methodologies, performance criteria, and staff guidance similar to that applied to 10 CFR Part

¹ License Condition 18 is a tie-down condition and states that Honeywell shall conduct activities at the Honeywell MTW Facility in accordance with the statements, representations and conditions in the listed documents (identified as 18.A through 18.K) unless a document has been revised by the approved configuration management process as described in Item 18.J. License Condition 18.D identifies the ISA Summary.

Enclosure

70 licensees to evaluate relevant hazards and their associated accident sequences. The ISA also identified safety controls designated as plant features and procedures (PFAPS), where necessary to demonstrate that acceptable risk criteria were met. To meet the requirements of the Confirmatory Order EA-12-157, Honeywell used its ISA methodology as the means to demonstrate, in a risk-informed way, that the safety basis for seismic and high wind/tornado events at the MTW facility was acceptable.

Honeywell documented its safety demonstration and design basis for seismic and high wind/tornado events in Revision 3 of the SBCAP. In reaching its overall conclusion that potential high consequence events due to a seismic or tornado missile event will be highly unlikely, Honeywell used several analysis types and assumptions that support their evaluations. They also followed the methodologies for performing an ISA as reflected in their ISA Summary. Key ISA information included:

- The design of the facility and structures and the recent modifications to the facility and structures;
- the assumed parameters associated with the seismic analysis of the facility, structures, and components;
- the assumed frequency and magnitude of the seismic event;
- the structural response of systems and components, including the building structure and the analytical conservatisms and margins associated with the structural analyses;
- the assumptions on the parameters associated with the analysis and the design of tornado missile barriers;
- the maximum quantities and locations of liquid uranium hexafluoride (UF_6) at risk;
- the assumed parameters associated with the modeling of releases and determination of possible impacts to the public from the expected reactions and release rates of UF_6 /hydrogen fluoride (HF); and
- the calculated consequences of various UF_6 /HF release scenarios resulting from a seismic event as well as the impact of a variety of meteorological conditions that could affect the consequences.

The staff previously reviewed the SBCAP to evaluate whether Honeywell's design and proposed operations met acceptable risk performance criteria as defined by Honeywell and accepted by the staff. The staff's findings and basis for the findings are described in the TER which was prepared to support the NRC decision on the restart of the facility operations.

Staff Review of ISA Summary Revision

Honeywell submitted its revised ISA Summary on October 28, 2013, prior to the required six month due date of December 20, 2013. The staff reviewed Honeywell's revised ISA Summary to ensure that it adequately described the consequences, likelihoods, safety controls, and conclusions for facility performance following seismic and tornado events given the modifications and safety basis information provided in Revision 3 of the SBCAP. The staff conducted a general review of the revised ISA Summary to evaluate whether the update provided:

- the appropriate level of detail to summarize the safety basis for seismic and wind events, consistent with the requirements for performing an ISA and with the level of detail expected for documenting the ISA results in an ISA Summary as required by Honeywell license commitments, and

- details consistent with the information provided to the staff for their recently performed safety evaluation of these events.

The staff also evaluated whether the proper management controls are available and would be implemented by Honeywell's change control processes for evaluations of potential changes to the safety basis. In addition, the staff evaluated whether the change control processes would assure that the safety basis, as approved by staff, would be maintained in the future.

The staff used the TER for the Honeywell restart as a guide to identifying the elements of the safety basis that should be included in the revised ISA Summary. The safety basis must be clearly identified in the ISA Summary so that future proposed changes in the safety basis can be evaluated in situations where Honeywell may propose changes to the seismic and high wind/tornado facility features and safety controls, or where features or controls may degrade or fail. Even though the information in the revised ISA Summary for these events is a summary of the detailed process safety documents that support Honeywell's analyses of these events, the staff believes that the safety basis for these events should be detailed enough such that the safety basis is clear and well understood. The staff used the acceptance criteria found in the Standard Review Plan (NUREG-1520) as the means to determine whether the revised ISA Summary contained sufficient information.

Content of Revised ISA Summary

The staff reviewed the revised ISA Summary information supporting the analysis of seismic and high wind/tornado events to determine whether Honeywell:

- (1) Conducted an ISA for seismic and wind events of adequate detail for each applicable process, using methods and staff adequate to achieve the requirements similar to those described in 10 CFR 70.62(c)(1) and (2).
- (2) Identified and evaluated, in the ISA, all credible events (accident sequences) involving deviations initiated by seismic or high wind events that could result in facility-induced consequences to workers, the public, or the environment, that could exceed the performance requirements provided by the licensee and approved by the staff.
- (3) Designated engineered and administrative PFAPS, and acceptably evaluated the set of PFAPS addressing each accident sequence, as providing reasonable assurance, through preventive or mitigative measures, and through application of supporting management measures that the performance requirements were met.

The staff's also evaluated Honeywell's ISA Summary revision in the following specific areas: (a) hazard identification; (b) process hazard analysis (accident identification); (c) accident sequence construction and evaluation; (d) consequence determination and comparability to performance requirements; and (e) likelihood categorization for determining compliance with performance requirement limits.

The areas of the staff's review for the revised ISA Summary used guidance from NUREG-1520 and included the following criteria:

- (1) Whether the site description in the ISA focused on those factors that could affect safety, such as geography, meteorology (e.g., high winds and flood potential), seismology, demography, and nearby industrial facilities and transportation routes.
- (2) Whether the facility description in the ISA Summary focuses on features that could affect potential accidents and their consequences. Examples of these features are facility location, facility design information, and the location and arrangement of buildings on the facility site.
- (3) Whether the process descriptions in the ISA Summary addressed each process that was analyzed as part of the ISA. Specific areas reviewed include basic process function and theory, functions of major components and their operation, process design and equipment, and process operating ranges and limits. This description must also include a list of the hazards (and interactions of hazards) for each process and the accident sequences that could result from such hazards and for which unmitigated consequences could exceed the performance requirements.
- (4) Whether demonstration of compliance with performance requirements for each applicable process was developed in the ISA to demonstrate compliance with the performance criteria, including:
 - a. postulated consequences and comparison to the consequence levels identified by the licensee, as well as information, such as inventory and release path factors supporting the results of the consequence evaluation,
 - b. information showing how the applicant established the likelihoods of accident sequences that could exceed the performance requirements,
 - c. information describing how designated PFAPs protect against accident sequences that could exceed the performance requirements, and
 - d. information on management measures applied to the PFAPs.
- (5) Whether the list of PFAPs described the controls for all intermediate- and high-consequence accidents in sufficient detail to understand their safety function(s).
- (6) Whether acceptable chemical consequence standards were identified by the licensee and that the quantitative standards for assessing the chemical consequence levels specified by the licensee, were described in the ISA Summary.
- (7) Whether the list of sole PFAPs were created as applicable and those PFAPs that are the sole item preventing or mitigating an accident for which the consequences could exceed the performance requirements were documented in the ISA Summary.
- (8) Whether the definitions of “Unlikely,” “Highly Unlikely,” and “Credible” were identified by the licensee and documented in the ISA Summary.

The staff also compared the information in the revised ISA Summary with information from the staff's TER and with information provided by Honeywell in their SBCAP describing the safety basis information for seismic and high wind/tornado events. The staff reviewed whether the information was consistent between these documents. The staff found that the ISA Summary revision was acceptable for the events of interest and that the safety basis was provided in sufficient detail to provide an adequate understanding of the safety basis.

Based on this review, the staff finds that the revision of the Honeywell ISA Summary meets the staff's criteria for level of detail and content for the seismic and high wind/tornado events and is acceptable from that perspective.

Maintaining the Safety Basis

In implementing the modifications described in the SBCAP, Honeywell achieved compliance with risk goals by strengthening the structure, piping supports, and vessel restraints to prevent possible releases of UF₆/HF; increasing the protection of the liquid UF₆ inventory through implementation of seismic actuated shutoff valves and tornado missile shielding; and providing additional measures to confine the distillation area to reduce the release rate of any UF₆/HF releases. With the implementation of these modifications, damage leading to significant releases of UF₆ equipment or piping was determined to be highly unlikely. Given that the likelihood of releases is highly unlikely because of the structural modifications, the consequence analyses were not the primary factor in achieving compliance with the risk goals. Thus, it is essential that any changes to the modifications described in the SBCAP be controlled so as not to reduce their performance. Therefore, the staff further reviewed whether Honeywell's current license commitments ensure that any changes over time to PFAPS and other safety controls associated with seismic and high wind/tornado events do not invalidate the underlying assumptions of the safety basis presented in the SBCAP and summarized in the ISA Summary. The staff also reviewed whether Honeywell will adequately evaluate facility changes versus that safety basis to ensure that the likelihoods, consequences and conclusions in the ISA are maintained and not diminished.

The staff reviewed the programs used by Honeywell to evaluate, implement and document changes to site, structures, components and other areas associated with the safety basis of the facility. A teleconference with Honeywell was held to discuss the revised ISA and how possible changes related to the seismic and tornado modifications will be evaluated and the safety basis maintained in the future by Honeywell. The staff reviewed Honeywell's internal procedures related to the management of change process. The procedures reviewed included Honeywell's *Management of Change Procedure*, Revision 2 (MTW-ADM-REG-120) and *Right of Approval for Changes Impacting the NRC Licensing Documents*, Revision 6 (MTW-ADM-REG-0122). The staff also reviewed the draft criteria for seismic evaluations, including the draft *Seismic Evaluation and Design Criteria Procedures* (MTW-ADM-ENG-0016) and the draft *Seismic Evaluation and Design Criteria*, Revision 2. The purpose of this review was to determine, with reasonable assurance, if sufficient programs and commitments were in place by Honeywell to evaluate and implement changes to items associated with the seismic and high wind/tornado safety basis.

Evaluations of modifications associated with seismic and high wind/tornado events require determinations that the safety basis for these events is maintained as supported in current process safety documentation and that the level of risk from any modifications is not increased. The evaluations need to address the detailed design safety basis, including design parameters

and analysis assumptions, as documented in the SBCAP (Rev 3). The staff finds that Honeywell's commitment in the ISA Summary, Section 9, "Seismic and High Wind/Tornado Events," to perform evaluations and maintain the safety basis documented in the ISA Summary is acceptable. This commitment states:

"As a final requirement of the Confirmatory Order (EA-12-157), this ISA Summary has been updated to reflect the modifications and improvements to plant structures, systems and components. It is the commitment of Honeywell to maintain the plant's design bases, described in this section, by applying the existing configuration management process as described in License Condition #18, Item J, including documentation and reporting requirements associated with this process, to future changes to plant structures, systems and components."

This commitment for maintaining the documented safety basis along with Honeywell's system for evaluating and implementing changes meets the requirements of Section IV, Item 6, of the Order.

Conclusion

The staff has performed a review of the revision to the Honeywell ISA Summary regarding seismic and high wind/tornado events to ensure that the safety basis is adequately represented and will be maintained in the future.

The staff finds that the information in the ISA Summary for these events is consistent with the safety basis information provided to the staff for their previous review and that the level of detail and content in the ISA Summary is generally consistent with the current Part 70 safety program requirements. Given that the safety basis information in the ISA Summary represents only a summary of the detail required to evaluate the safety basis of these events, the staff finds that an explicit reference in the ISA Summary to other more-detailed process safety information is met by inclusion, through reference, of the SBCAP. The staff therefore finds that Honeywell's current programs for evaluating changes and modifications to the safety basis are adequate to evaluate changes that may impact the safety basis for seismic and high wind/tornado events.

In addition, the staff finds that Honeywell has acceptable management commitments and oversight programs to ensure that it will evaluate whether the changes to the current configuration are properly understood in terms of safety and maintained. The staff finds that these aspects of the safety bases, and whether the safety bases for these events can be acceptably evaluated, is supported by Honeywell's commitment in the ISA Summary to maintain the safety basis at the facility. These are key points in the staff's finding that this revision to the ISA Summary is acceptable. The staff finds that there is reasonable assurance that the seismic and tornado safety basis will be adequately maintained for future operation once the Order is closed.

To improve clarity in LC 18, the staff is planning to remove the specific dates for documents that can be revised by Honeywell through the approved configuration management process (e.g. ISA Summary) and adding language indicating that for undated documents, the current version as amended under the approved configuration management process is considered to be the reference in the tie-down condition.

The planned changes to LC 18 are provided below:

The licensee shall conduct authorized activities at the Honeywell Metropolis Works Facility in accordance with the statements, representations, and conditions in the following documents. Where a document is undated, the respective reference is to the current version of the particular document. The current version of the document includes any revisions that have been made in accordance with ~~(or as revised by~~ the approved configuration management process as described in License Condition, Item J) ~~in~~:

- A. License Application dated May 12, 2006, as supplemented by letters dated March 20, 2007, May 12, 2008, July 12, 2010, and February 15, 2011;
- B. Safety Demonstration Report ~~dated May 12, 2006~~;
- C. Emergency Response Plan (ERP) ~~dated May 27, 2005~~;
- D. Integrated Safety Analysis (ISA) Summary ~~transmitted by letter dated September 30, 2008~~;
- E. Site Reclamation Cost Estimate for Metropolis Plant ~~dated January 10, 2007~~;
- F. Amendment Request dated December 27, 2006, to possess and use sealed sources;
- G. [Deleted]
- H. Amendment Request dated July 17, 2008, as supplemented by letters dated October 1, 2008, and December 3, 2008, regarding new process for filling small UF₆ cylinders
- I. Amendment Request dated March 27, 2009, as supplemented by letters dated May 11 and July 21, 2009, regarding changes to the facility's surface contamination levels; ~~and~~
- J. Amendment Request dated July 12, 2010 and supplemented on February 15, 2011, regarding process description of the facility's configuration control system;
- K. Amendment Request dated December 2, 2010, as supplemented by letters dated February 25, 2011, and March 4, 2011, regarding surface impoundment decommission plan, with Condition 30 below.

NRC is currently working on updated ISA guidance concerning natural phenomena events (which include seismic and high wind events). The staff discussed with Honeywell staff that the guidance for natural phenomena is undergoing revision. Once the revision is issued, Honeywell should consider the revised guidance with respect to their ISA summary to ensure that their demonstration of compliance with the performance standards continues to be acceptable.

In conclusion, with this recommended administrative revision to the license, the staff finds that the requirement to revise the ISA Summary as delineated in the NRC order has been met by Honeywell and that adequate commitments are in place to maintain the safety basis for seismic and high wind/tornado events as described in the reference documents.

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