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U.S. Nuclear Regulatory Commission
11555 Rockville Pike
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Docket No.: 40-3392
License No.: SUB-526

SUBJECT: ADDITIONAL INFORMATION - HONEYWELL METROPOLIS WORKS SAFETY BASIS AND CORRECTIVE ACTION PLAN

Honeywell Metropolis Works hereby submits the second part of the additional information in response to the Request for Additional Information dated February 19, 2013. This request was issued upon completion of NRC's initial technical reviews of Honeywell Metropolis Works' Safety Basis and Corrective Action Plan submitted on November 30, 2012, in response to the Confirmatory Order EA-12-157 dated October 15, 2012.

Pursuant to the procedures set forth in NRC Regulatory Issue Summary 2005-31 pertaining to submitting security-related sensitive information, the enclosed submitted herewith contains security-related sensitive information. As such, certain appropriately marked parts of this document are requested to be withheld from public disclosure under 10 CFR 2.390. In addition, we also request that all attachments be removed entirely as also containing security-related sensitive information. To better meet NRC's expectations, Honeywell is providing the non-public and public versions of the documents.

If you have any questions, or require additional information please contact Mark Wolf, Nuclear Compliance Director, at (618) 309-5013.

Sincerely,

Larry A. Smith
Plant Manager

Enclosures

cc:
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RESPONSE TO
REQUEST FOR ADDITIONAL INFORMATION
HONEYWELL METROPOLIS WORKS
SAFETY BASIS AND CORRECTIVE ACTION PLAN DATED NOVEMBER 30, 2012
DOCKET: 40-3392 (TAC NO. L32788)

Emergency Response Plan

In its Safety Basis and Corrective Action Plan (SBCAP) dated November 30, 2012, Honeywell provided information regarding its facility modifications necessary to comply with the requirements described in Section IV of the Confirmatory Order dated October 15, 2012. In particular, the Confirmatory Order requested the submittal to the U.S. Nuclear Regulatory Commission (NRC) of a revised Emergency Response Plan (ERP) that defines all planning bases and articulates all necessary modifications to the Metropolis Works facility.

Honeywell is requested to provide and/or justify the following information:

RAI MN-1

In Section V of the SBCAP (pg. 27 of 29), Honeywell stated: "Assuming all modifications are implemented, no changes to the Emergency Response Plan are needed." Section 3.b.2 (pg 16 of 29) provides information related to a credible uranium hexafluoride (UF_6) release from the 4th thru 6th floors for a seismic event. Explain why the ERP will not be revised to include this accident scenario.

MTW RESPONSE:
The release consequence referenced above pertains to the worst-case credible beyond design basis EQ event up to the FMB structure's design safety margin limit. As such, it is not germane to a license basis 475-yr design basis EQ event. Following seismic upgrades as indicated in SBCAP Section III.C.3.e, all credible accident scenarios resulting from a design basis EQ are "highly unlikely". No releases are expected for a 475-yr design basis EQ event. The existing ERP is suitably designed to respond to a minor UF6 release resulting from routine operations.

RAI MN-2

As part of the license renewal application that was approved in May 11, 2007, the staff reviewed Section 7.0, "Maintaining Emergency Response Capability," of the ERP dated May 27, 2005. The ERP for the license renewal provided the information with following Sections:

7.2.1. Initial Emergency Response Organization Training
7.2.2. Refresher Training
7.2.3. Training for Personnel Who Maintain the Plans
7.2.4. Training and Orientation for Offsite Emergency Response Personnel
7.3. Drills and Exercises
7.4. Emergency Plan Audit Program
7.5. Maintenance and Inventory of Emergency Equipment, Instrumentation, and Supplies

7.5.1. Instrumentation and Supplies
7.5.2. Equipment Tests
7.6. Offsite Emergency Response Organizations

The ERP dated October 14, 2010, relocated the information provided in the above listed sections in the previous revision of the ERP to an Emergency Plan Implementing Procedure (EPIP) 0008, "Maintaining Emergency Preparedness." The licensee is requested to provide a copy of EPIP 0008 for staff's information and review.

MTW RESPONSE:
The requested documentation is attached (Attachment 1).

Seismic Hazard

RAI JS-1

Explain why the 2010 ABS Consulting Group recommendations (Preliminary Seismic Risk Assessment, August, 2010), which recommends a maximum considered earthquake and design earthquake response spectrum (Table 2-3, Figure 2-3 of ABS Consulting, 2010) derived from ASCE 7 and the 2500-year return period ground motions (USGS, 2002), were not considered in the 2012 SBCAP.

MTW Response:
First, the 475-year EQ is the licensing basis seismic event for MTW. Second, the 2010 ABS Consulting Group preliminary seismic recommendations (Preliminary Seismic Risk Assessment, August, 2010) were based on an initial, limited seismic review and assessment of the entire site, including the FMB. The Maximum Considered Earthquake (MCE) ground motion was considered in ABS Consulting Group's more detailed analysis of the FMB (Feed Materials Building Structural Seismic Evaluation, 2011). Based on this more detailed analysis, the magnitude and quantity of structural deficiencies resulting from the design earthquake response spectrum derived from ASCE 7 as well as the 2,500-year return period (MCE) ground motions per USGS 2002 mapping were determined. [redacted]

RAI JS-2

Explain how the site seismic amplification effects of these soft soils were accounted for in determining the design basis ground motion values given that the 1991 report by Leighton and Associates, Inc. indicates that the site soils are relatively soft and fall into the soil Site Class D.

MTW Response:
The site seismic amplification effects of the site soils was considered in analysis and retrofit design of the FMB structure through use of the soil site class adjustment factors, F_a and F_v, as specified in ASCE 41. The site class adjustment factors used are based on the soil Site Class D and the mapped spectral accelerations at the short period and one-second periods (S_s and S_1, respectively).

RAI JS-3

Explain how potential liquefaction effects of the soft soils were evaluated and determined not to be a potential hazard at the site.

MTW Response:
Potential liquefaction effects at the site were addressed in the 1991 Leighton & Associates report; Section 6.4 (pg 14) of this report addresses liquefaction potential. Per that section, "the liquefaction potential of the soils at the site is considered to be negligible".

RAI JS-4

Provide additional information on how the three seismographs, to be installed on site and used to trigger valve closures, will be maintained, calibrated, and tested.

MTW Response:
Our intention for preventative maintenance, calibration, and testing of the seismographs and associated trip functionality is described in Appendix A of the "MTW Process Scope Package Seismic Monitoring and Shutdown System" (Rev. D) as follows:

Preventative Maintenance / Proof of Operability Testing:
The Seismic Stations and the overall trip system shall undergo routine testing and verification (continuous, monthly, and annually).

Continuous Testing:
The seismic recorder at each station shall be designed to undergo continuous self-monitoring tests to identify Irregularities. These shall include: power supply interruption and testing of the batteries, zero level test on each channel (offset verification), processor testing, clock testing, EEPROM (parameter) testing, and SD card (read/write/capacity) testing. The fault contacts on the sensor shall immediately alarm when a warning or error is identified with the continuous testing. The common fault alarm will be wired to the plant DCS. Operations group will be required to log these alarms and to work with the Maintenance group to identify and correct the cause of the alarms.

Monthly Testing:
Each seismic station (sensor and recorder) shall be configured for automatic pulse testing on a periodic basis (monthly minimum). Automatic pulse testing shall include a trigger test, a noise test, and a filter response test on each channel (XIV, and Z). This type of surveillance test will detect a gross failure of the instrumentation. The fault contacts on the sensor shall immediately alarm when a warning or error is identified with the periodic pulse testing. Again, the Operations group will be required to log these alarms and to work with the Maintenance group to identify and correct the cause of the alarms.

Each seismic station shall be given a visual inspection on a monthly basis to review status of LED lamps (Power, Run, Error, and Data). Issues with Power status shall be verified by voltage measurements and inspection of the connections. Issues with Run Status or presence of Error Status shall be investigated by connecting a laptop to seismic station. New Data records shall be pulled by connection of a laptop to the seismic station. Defects shall be corrected by repair or replacement of components.

Annual Testing:

Each seismic station shall be given a visual inspection to verify the following: (1) the condition of the seismic station (physical damage, gasket integrity, condensation, corrosion on housing/sockets/plugs, etc.),

The battery backup operation of each seismic station shall be verified by shutting off the power supply, and verifying that the unit will operate off of the battery alone. Main battery and back-up battery at each unit shall also be voltage tested annually and verified against vendor design.

As part of annual testing, each unit shall be individually shut down (main switch inside the recorder turned to OFF position). It shall be verified that the relay outputs at each station drop out upon loss of power. The station shall be restarted, and it shall he verified that all LEDs blink upon startup. It shall he verified that LEDs return to normal status (power on and running with no errors).

The calibration of the seismic sensors shall be certified on a rotating annual basis (each sensor to be certified on a 3 year cycle, with one sensor to be done each year). The reason for this extended cycle is because the sensors are factory calibrated and by design are not expected to drift. The continuous and periodic automatic testing will also detect and alarm if drift is experienced, allowing for immediate correction. Sensor calibration shall be verified in one of the following 2 manners: (1) returning to the factory for recertification or (2) removal of the sensor from the field station, placing it on a tilt-table to simulate motion/acceleration, and analyzing it via a spare recorder at the site I&E shop. Any on-site testing shall adhere to a calibration procedure specific to the sensors and consistent with factory recommendations. If a sensor is removed for calibration (or for repair at any point during the year), a new (or previously re-certified) spare sensor shall be installed in its place and a 3-year clock started for that installation.

The seismic trip function shall also be tested at least once annually. A complete system test shall be performed - where each grouping of 2-out-of-3 sensors is tripped and all output relays are verified as being de-energized and the final elements are verified as being de-energized and incapable of being actuated. The testing will be completed in an end-to-end and dynamic manner as much as possible. The sensors shall be tested by shaking locally (in groups of two). Shutdown valves shall be opened prior to the commencement of the test and then witnessed to close during the test. To the extent that certain valves cannot be open prior to the test, then the function of the output relays will be verified during the test, and then piece-meal functionality tests will be employed when the valves are available to confirm that de-energizing the relay causes each associated valve to close. Procedures and checklists shall be developed to cover the annual trip function testing.

The Seismic trip system will not contain any bypass functionality. Removal of one sensor from service will result in a trip of that sensor and will (in effect) leave the remaining sensors in a l-out-of-2 architecture.

As described in these sections, the seismographs have continuous diagnostics and periodic (monthly) diagnostics which generate alarms on detection of abnormal conditions and shall require Honeywell operator response. There shall also be monthly and annual PM inspections performed by Honeywell, including visual and hands-on verifications at each station. There shall also be an annual dynamic test performed by Honeywell to prove that the combinations of 2-out-of-3 seismographs shall initiate shutdown of the valves in the field.

The sensors will be factory-calibrated by [redacted] upon receipt at MTW. They will be re-calibrated on a staggered 3-year cycle or on an as-needed basis (if excessive drift is identified as part of any periodic checks). Re-calibrations will be done at the [redacted] factory or by MTW site maintenance (yet to be determined) utilizing factory instructions. Preventive Maintenance (PM) and re-calibration frequencies (monthly, annual, triennial) may be adjusted in the future based on operating experience.

Structural

The selection of seismic design basis and performance criteria and mitigation of seismic risk through analysis, design, and construction of a nuclear facility using appropriate site characterization data and design codes and standards are complex problems. For the methodologies that Honeywell has chosen to use, it is necessary to demonstrate their appropriateness and acceptability.

The following Requests for Additional Information (RAI) from the staff seek to understand how the seismic design basis and performance criteria have been selected and the mitigation of seismic risk has been addressed.

Honeywell is requested to provide and/or justify the following information:

RAI AC-1

Provide details for reconciling the difference between the definition of "Highly Unlikely" for seismic events as "Less than 10^{-4} per event, per year" (SBCAP, pg. 7 of 29) and using "475-yr return period" earthquake as the "Design Basis Earthquake" (SBCAP, pg. 8 of 29).

MTW Response:
The current MTW NRC license design basis earthquake is a 475-yr return period seismic event (SBCAP at 8; Confirmatory Order at 3; EA-12-157, Enclosure, at 1-2). This event, which is incorporated into the MTW licensing basis, is defined as the Maximum Credible Earthquake (MCE) in both the 1991 Leighton & Associates Report (at 1-2) and the 1993 EQE Engineering and Design Report (at 5).

The retrofits defined in SBCAP Section III.C.2.b, *TI Compliance Seismic Scope Items*, combined with other layers of protection described in the SBCAP report, are currently being implemented to enhance the facility's seismic capability as discussed in SBCAP, Section II.C.3.d. Following implementation of these retrofits and through the combined application of the PFAPs listed in Table 7 in Section III.C.3, the probability of failure of the building at the design EQ level is conservatively estimated [redacted]

As shown in Figure 2 – FMB Seismic Event Tree (the lower-most branch) (SBCAP at 17), the seismic total risk resulting from the Maximum Credible Earthquake = (Initiating Event Frequency of MCE) x (Probability of Failure of FMB) = [redacted] which is less than the seismic total risk threshold for Highly Unlikely ([redacted] (SBCAP at 8, Table 2 – Seismic Total Risk Likelihood Categories). This confirms that credible high-consequence events are Highly Unlikely.

Additional seismic safety margin above a 475-yr EQ event is built into all FMB, Tank Farm, and Pipe Rack retrofit designs through (1) specification of a 1.5 Importance Factor in accordance with ASCE 41 design codes; (2) implementation of additional safeguards ([redacted]), and; (3) utilization of conservative 2002 USGS Mapping ground motion values relative to the 1991 licensing basis ground motions or the 2008 USGS Mapping ground motion values.

RAI AC-2

Provide detailed analyses and design of the confinement shell (SBCAP, pg. 13 of 29) of the UF_6 distillation process area, specifically, from basement through the 3rd floor that will be used to seal-off this area from the remaining Fuel Manufacturing Building (FMB) process space and the exterior environment as a secondary means of confinement to protect both workers and public from toxic hydrogen fluoride (HF) and uranyl fluoride (UO_2F_2) plumes resulting from a UF_6 release during a seismic event.

MTW Response:
The confinement shell consists of metal siding that is attached to steel girts [redacted] This metal siding has a relatively low mass and the attachments are adequate for the loads resulting from seismic inertia forces by observation. For the 475-yr licensing basis EQ, building displacements are small and the siding will remain attached based on observation. For the FMB structure seismic design safety margin limit assessment (non-linear static push-over analysis work in-progress), the maximum permissible displacement (story drift) is controlled by the structural integrity of the building rather than by the integrity of the siding or piping.

Unreinforced masonry (URM) walls surrounding the 1st floor of the FMB confinement area on three sides will be reinforced [redacted] and other required structural modifications to ensure these URM walls are capable of withstanding seismic ground forces up to the design safety margin of the structure.

The design package for these improvements will provide full details on the building's siding and masonry wall support components and configuration. This package will be provided to NRC as soon as possible.

RAI AC-3

Demonstrate that the piping fragility values presented in Table 8 (SBCAP, pg. 19 of 29) are consistent with the piping fragility values that could be developed using one of the quantitative methodologies used in the industry.

MTW Response:
Piping fragility values shown in Table 8 represent "typical" values and have not been validated via specific engineering calculations. In lieu of quantitative analyses, these values are approximations developed with input from MTW's consulting seismic capability engineer ([redacted]) and expert piping design engineers in support of the Event Tree analysis (SBCAP - Figure 2). [*Note: Refer to Enercon report MTW-RPT-GEN-0009 MTW FMB Piping Assessment, 19 Dec 2012 (Attachment 2) for additional details on the piping system expert walk-down assessment and participant qualifications.*] The SBCAP Event Tree (SBCAP Section III.C.3.b, Figure 2) is provided solely to demonstrate qualitatively risk sensitivities at various seismic damage conditions for the multiple layers of protection being installed. It is not intended to definitively establish the FMB's hazardous material release frequencies following installation of all retrofit projects.

RAI AC-4

Provide detailed design of protective shielding (metal or composite) that will be installed to mitigate the effects of tornado missile strikes on piping systems, vessels, storage tanks, FMB structure, and other "weak points" (SBCAP, pg. 23-25 of 29).

MTW Response:
Details for the FMB equipment protection panels are provided in Tornado Protection Liquid UF6 Containment – Vessels, Issue for Construction, 12 Feb 2013 (Attachment 3).

Details for the NH3 storage tank area are provided in Ammonia Tank Platform – Tornado Protection Project, 1 Mar 2013 (Attachment 4).

RAI AC-5

Provide details showing how the aging effects on piping systems, vessels, storage tanks, FMB structure, and other components have been considered.

MTW Response:
Expert walk-downs of piping systems and equipment were conducted by a seismic capability engineer and consulting piping/structural engineers to assess seismic capability of liquid UF6 piping in the FMB and anhydrous HF and anhydrous NH3 piping in the tank farm and HF rail car unloading area. These walk-downs also included a mechanical integrity assessment to determine the aging effects of these systems and components. [redacted] In all cases liquid UF6 piping was found to be in good condition which substantiates the plant's mechanical integrity program survey findings/expectations.

Vessels and other equipment in UF6, HF and NH3 service accessible to the walk-down team appeared to be in good condition. MTW mechanical integrity inspections are routinely performed on these items and records maintained per the MTW Mechanical Integrity Program. A review of mechanical integrity records confirmed that all inspections and testing requirements are up-to-date and this equipment is fit for intended service.

The FMB, tank farm and pipe rack structures were assessed to be in good condition. Minor repairs are being addressed as necessary as part of the seismic retrofit project. [redacted]

RAI JM-1

Provide additional information on the level of knowledge and knowledge factor used for the seismic retrofit of the FMB. (Ref. 10, ABS Report "Feed Materials Building Structural Seismic Evaluation," 17 June 2011.)

MTW Response:
For the FMB analysis, the design team had a significant "level of knowledge" with respect to the structural configuration, elements and materials used in the design of the FMB. The level of knowledge as related to the seismic analysis and retrofit design is typically expressed as a Knowledge Factor. Given that detailed structural design drawings are available for the original building and major additions, and that numerous field reviews determined that the structural drawings typically reflect the as-built condition, the design team determined that a Knowledge Factor of 1.0 would adequately represent the level of knowledge for the seismic analysis and retrofit design of the FMB. Where required information is not documented on original design drawings, typical standards and practices in-use during the same time-period during which the FMB was constructed were assumed.

RAI JM-2

Provide design to capacity ratios for the structural elements of the FMB after the implementation of retrofits. If the calculations are dependent on additional analysis, provide a timeframe for providing this information to NRC.

MTW Response:
Following development of the FMB structural retrofits, the finite element analysis model used for the FMB seismic analysis is updated to reflect the retrofitted elements. The Demand to Capacity ratios for all modeled elements to-date have been verified to be less than 1.0 The final updated version of the linear finite element analysis model developed by ABS Consulting will be provided to NRC following completion of all remaining structural retrofit designs ([redacted]

RAI JM-3

Provide a summary and detailed evaluation of the impact of loss of all power to the plant. Reference 9 of the Honeywell submittal states that "An evaluation of the impact of loss of all power to the plant is currently being performed. This evaluation will determine if any of the structures, systems or components associated with these systems is required to prevent an unacceptable release of hazardous materials."

MTW Response:
[redacted]

[redacted] Details pertaining to specific process safety system designs are described in individual process area hazard reviews (Distillation, Fluorination and Tank Farm).

RAI JM-4

Provide a copy of the latest revision of Honeywell fire hazards analysis described in the Integrated Summary Analysis Section 10.3.

MTW Response:
The requested analysis is provided in the following document: *Fire Hazards Analysis,* [redacted], *2 Dec 2012* (Attachment 6).

RAI JM-5

Provide the amount of residual natural gas that remains in the pipe line after closure of the seismic shutoff valve. (Ref. MTW-CALC-GEN-0013)

MTW Response:
The Natural Gas (NG) supply to the MTW plant-site is automatically shut-off at the incoming plant metering station via a seismically actuated shut-off valve triggered by the Seismic Safety System (see RAI JS-4). [redacted]

MTW-CALC-GEN-0014 Natural Gas Pipe Volume / Flammability (Attachment 7) determined the total natural gas (NG) volume in the plant-wide supply header system, [redacted]

RAI JM-6

Provide an evaluation of the consequences of an explosion or fire with the remaining amount of natural gas in the pipe line. (Ref. MTW-CALC-GEN-0013)

MTW Response:

[redacted]

[redacted]

[redacted]

[redacted] **Transient flammables are controlled via a site-wide fire protection procedure MTW-ADM-FPP-0001 Control of Transient Combustibles and Ignition Sources (Attachment 8).**

RAI JM-7

Provide additional information associated to the potential consequences of failures to the fire water tank and fire pump under a seismic event. (Reference 9 of SBCAP, Attachment C.)

MTW Response:

[redacted]

[redacted]

[redacted]