UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II 245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

August 9, 2012

EA-12-157

Mr. Larry Smith
Plant Manager
Honeywell Metropolis Works
P.O. Box 430
Metropolis, IL 62960

SUBJECT: NUCLEAR REGULATORY COMMISSION'S TEMPORARY INSTRUCTION 2600-015 INSPECTION REPORT NO. 40-3392/2012-006

Dear Mr. Smith:

This letter refers to the inspection activities conducted on May 21 through 24, 2012, at your Honeywell Metropolis Works facility, using Temporary Instruction (TI) 2600-015, "EVALUATION OF LICENSEE STRATEGIES FOR THE PREVENTION AND/OR MITIGATION OF EMERGENCIES AT FUEL FACILITIES." The enclosed report documents the results, which were discussed on May 24, July 11, and August 6, 2012, with you and other members of your staff.

The objective of this TI inspection was to independently verify that Honeywell was adequately prepared to prevent and/or mitigate the consequences of selected safety/licensing basis events and to evaluate the adequacy of those emergency prevention and/or mitigation strategies for dealing with the consequences of selected beyond safety/licensing basis events.

Based on the results of this inspection, two apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC's Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The apparent violations, discussed in Paragraph 2.b.(1) of the enclosed inspection report, involved: (1) the failure to identify all relevant accident sequences related to credible seismic events and tornadoes that could result in large uranium hexafluoride (UF_6) releases for which protective actions may be needed as required by 10 CFR 40.31(j)(3); and (2) the failure to provide complete and accurate information related to Honeywell Metropolis Works' emergency response plan as required by 10 CFR 40.9(a). The circumstances surrounding the apparent violations, the significance of the issues, and the need for lasting and effective corrective actions were discussed with members of your staff at the inspection exit meeting on July 11, 2012 and during a subsequent teleconference on August 6, 2012.

Before the NRC makes its enforcement decision, a Pre-decisional Enforcement Conference (PEC) has been scheduled for August 27, 2012 as agreed during our teleconference on August 6, 2012. The PEC will be open for public observation and the NRC will issue a press release to announce the time and date of the conference. If you have any questions, please contact Omar López at 404-997-4703.

The conference will afford you the opportunity to provide your perspective on the apparent violations, the significance of the violations, information related to the identification of the violations, and information related to any corrective actions taken or planned to be taken and any other information that you believe the NRC should take into consideration before making an enforcement decision. Specifically, you should be prepared to discuss the root causes and casual factors that resulted in each of the apparent violations. Of particular note, you should be prepared to discuss prior opportunities for identification during the past license renewal, and license amendment processes.

In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Omar R. López, at 404-997-4703 or Marvin Sykes at 404-997-4629.

Sincerely,

/RA/

Anthony T. Gody, Director
Division of Fuel Facility Inspection

Docket No. 40-3392
License No. SUB-526

Enclosure:
NRC Inspection Report No. 40-3392/2012-006
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

The conference will afford you the opportunity to provide your perspective on the apparent violations, the significance of the violations, information related to the identification of the violations, and information related to any corrective actions taken or planned to be taken and any other information that you believe the NRC should take into consideration before making an enforcement decision. Specifically, you should be prepared to discuss the root causes and casual factors that resulted in each of the apparent violations. Of particular note, you should be prepared to discuss prior opportunities for identification during the past license renewal, and license amendment processes.

In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Omar R. López, at 404-997-4703 or Marvin Sykes at 404-997-4629.

Sincerely,
/RA/

Anthony T. Gody, Director
Division of Fuel Facility Inspection

Docket No. 40-3392
License No. SUB-526

Enclosure:
NRC Inspection Report No. 40-3392/2012-006
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

*see previous concurrence
☐ PUBLICLY AVAILABLE ☐ NON-PUBLICLY AVAILABLE ☐ SENSITIVE ☐ NON-SENSITIVE
ADAMS: ☐ Yes ACCESSION NUMBER: ML12222A163 ☐ SUNSI REVIEW COMPLETE

OFFICE	RII:DFFI	RII:DFFI	NMSS	RII:EICS	RII:DFFI	RII:DFFI	RII:DFFI	OE
SIGNATURE	/RA/	OL for	Olop[ez for	/RA/	/RA/	/RA/	/RA/	Via email
NAME	OLopez*	NCoovert*	JMarcano*	CEvans*	JCalle*	MSykes*	MBailey	
DATE	7/30/2012	7/30/2012	7/30/2012	8/6/2012	8/6/2012	8/6/2012	8/8/2012	8/8/2012
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\DFFI\REPORTS\Draft Inspection Report Folder\Honeywell\2012\Honeywell TI 2012006 final draft rev 2.docx

cc w/encl:
Jonathon E. Monken, Director
Illinois Emergency Management Agency
Division of Nuclear Safety
2200 South Dirksen Parkway
Springfield, IL 62704

Brigadier General John W. Heltzel, Director
Kentucky Emergency Management Agency
EOC Building
100 Minuteman Parkway Building 100
Frankfort, KY 40601-6188

Paul Carter, Director
McCracken County Emergency Management Agency
3700 Coleman Road
Paducah, KY 42001

Keith E. Davis, Director
Metropolis Emergency Management Agency
213 West Seven Street
Metropolis, IL 62960

Matthew McKinley, Manager
Kentucky Department of Health and Family Services
Radiation Health Branch
275 East Main Street
Mail Stop HS-1CA
Frankfort, KY 40601-0001

Xavier Ascanio, Director
Office of Nuclear Materials Integration
NA-73-GTN
U. S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585-1290

Gary Bodenstein
Department of Energy
Regulatory Management Branch, NS-52
Paducah Gaseous Diffusion Plant Site
Mail Stop 103
P.O. Box 1410
Paducah, KY 42002

Letter to Mr. Larry Smith from Anthony T. Gody dated August 9, 2012

SUBJECT: NUCLEAR REGULATORY COMMISSION'S TEMPORARY INSTRUCTION 2600-015 INSPECTION REPORT NO. 40-3392/2012-006

Distribution w/encl:
PUBLIC
T. Gody, RII
J. Calle, RII
R. Gibson, RII
J. Pelchat, RII
P. Silva, NMSS
J. Sulima, NMSS
B. Reilly, NMSS
C. Evans, RII
L. Douglas, RII
J. Wray, OE
K. Mattern, NMSS
J. Kinneman, NMSS
P. Habighorst, NMSS
M. Thaggard, NSIR
R. Lewis, NSIR
OEMAIL

U.S. NUCLEAR REGULATORY COMMISSION
REGION II

Docket No.:	40-3392
License No.:	SUB-526
Report No.:	40-3392/2012-006
Licensee:	Honeywell International, Inc.
Facility:	Metropolis Works (MTW)
Location:	Metropolis, IL 62960
Dates:	May 21 through 24, 2012
Inspectors:	O. López, Senior Fuel Facility Inspector, RII N. Coovert, Fuel Facility Inspector, RII J. Marcano, Structural Engineer, NMSS
Accompanying Personnel:	M. Sykes, Chief, Fuel Facility Inspection Branch 3, Division of Fuel Facility Inspection T. Hiltz. Chief, Technical Support Branch Division of Fuel Cycle Safety and Safeguards
Approved by:	A. Gody, Director Division of Fuel Facility Inspection M. Bailey, Deputy Director Division of Fuel Facility Inspection

Enclosure

EXECUTIVE SUMMARY

Metropolis Works (MTW)
NRC Inspection Report No. 40-3392/2012-006

This report covers an announced Temporary Instruction (TI) inspection. The inspection activity was conducted by regional and headquarters inspectors. The purpose of TI 2600-015, "EVALUATION OF LICENSEE STRATEGIES FOR THE PREVENTION AND/OR MITIGATION OF EMERGENCIES AT FUEL FACILITIES," was to independently verify that Honeywell MTW was adequately prepared to prevent and/or mitigate the consequences of selected safety/licensing basis events and to evaluate the adequacy of those emergency prevention and/or mitigation strategies for dealing with the consequences of selected beyond safety/licensing basis events.

- An unresolved item (URI), URI 40-3392/2012-006-01, was opened to evaluate whether the MTW integrated safety analysis appropriately considered credible high and intermediate consequence seismic and tornado events and subsequently designated plant features and procedures and management measures to ensure that the accident sequences (public and workers health and safety) remained highly unlikely or the consequences were mitigated to acceptable levels.

- The inspectors determined that procedures and strategies credited by the licensee for responding to natural phenomena events were not adequate to mitigate potential consequences. An apparent violation (AV) of 10 CFR 40.31(j)(3), AV 40-3392/2012-006-02, was identified for the failure to identify all credible accident sequences related to seismic events and tornadoes that could result in large uranium hexafluoride (UF_6) releases for which protective actions may be needed. AV 40-3392/2012-006-003 was identified for the failure to provide complete and accurate information as required by 10 CFR 40.9(a), related to MTW's emergency response plan.

- The inspectors determined that a beyond design basis seismic or tornado event could result in a significant chemical release which could seriously challenge the licensee's ability to mitigate the event and ensure the safety of the workers and the public.

- The inspectors could not fully evaluate beyond safety/licensing basis events due to the lack of design information for buildings and structures.

Attachment
Report Details
List of Persons Contacted
List of Items Opened, Closed, and Discussed
Inspection Procedures Used
List of Acronyms
List of Documents Reviewed

REPORT DETAILS

1. Facility Description

The Honeywell Metropolis Works (MTW) (licensee) uranium conversion facility is located on approximately 1000 acres of land in Massac County at the southern tip of Illinois. The primary site perimeter is formed by U.S. Highway 45 to the north, the Ohio River to the south, an industrial coal blending plant to the west and privately-owned, developed land to the east. Honeywell also owns approximately 100 acres of land directly across U.S. Highway 45, N-NE of the plant.

The licensee is authorized to possess 150 million pounds of natural uranium ore and to convert this material to uranium hexafluoride (UF_6). The uranium conversion process occurs in the Feed Materials Building (FMB). The FMB is a six-story steel frame structure with a below grade basement supported on concrete spread footings.

During the inspection, operations were shut-down due to a planned maintenance outage.

2. TI 2600/015, "Evaluation of Licensees Strategies for the Prevention and/or Mitigation of Emergencies at Fuel Facilities"

a. Evaluation of licensing basis for accident sequences and consequences associated with natural phenomena hazards

(1) Scope and Observations

The inspectors performed a review of licensing basis documents, the Radiological Contingency Plan (RCP), the Emergency Response Plan (ERP), and the Integrated Safety Analysis (ISA) Summary to determine the facility design and licensing basis as they relate to natural phenomena hazards (NPHs). Specifically, the inspectors evaluated the following hazards; earthquakes, high winds, including tornadoes, flooding, and extended loss of electrical power and water.

A summary of the evaluated events and potential consequences is presented below:

Earthquake

Honeywell's Safety Demonstration Report (SDR) and ISA provided a brief general description of the seismological characteristics and how seismic events were considered at the site. The SDR indicated that the facility was located near the New Madrid Seismic Zone, which had experienced large seismic events in the past. Most notably, it referenced that this seismic zone produced the New Madrid Earthquakes of 1811 and 1812, which were Modified Mercalli Intensity scale XI events.

The ISA stated that the original plant construction did not adequately address seismic concerns. Two studies completed in the 1990's were referenced as the basis for not considering the design basis accidents associated with seismic events. A Leighton and Associates [Leighton, 1991] report calculated a site-specific earthquake with a 475-year recurrence rate. An analysis performed by EQE Engineering and Design [EQE, 1993] identified structural modifications that would assure adequate performance of the

FMB and the tank farm. These structural modifications were designed to withstand a 475-year recurrence earthquake. Honeywell implemented these safety improvements and concluded that this was reasonably consistent with NUREG-1520.

The inspectors reviewed the analyses referenced above and noted that the licensee implemented modifications to the foundations of the tank farm and the structural shell of the FMB structure. However, no modifications or improvements were made to the internal systems, structures, and components (SSCs) as recommended in the Leighton and Associates report. The report provided a list of recommendations to improve anchorage and lateral support of internal components in the FMB.

The inspectors performed walkdowns of the FMB and noted that piping and equipment used to handle liquid UF_6 lacked adequate bracing to support assumed seismic loads. The inspectors determined that further evaluation was required to determine whether a credible seismic event could threaten the integrity of UF_6 containment through piping/vessel rupture. As a result, the inspectors were not able to validate how Honeywell evaluated the consequences of credible seismic events and subsequently designated plant features and procedures (PFAPs) and management measures to minimize the risk of unacceptable consequences. In addition, the inspectors could not verify that the licensee considered all potential accident sequences as a result of credible natural phenomena events during the development of the ISA, a Honeywell license requirement. For example, the licensee had not analyzed for potential failure of internal SSCs due to ground movement and/or the seismic response of adjacent or interior SSCs.

License Condition 18.D. states, in part, that the licensee shall conduct authorized activities at the Honeywell Works Facility in accordance with the statements, representations, and conditions (or as revised by the approved configuration management program) in the ISA Summary. An unresolved item (URI) 40-3392/2012-006-01 was opened to further evaluate whether Honeywell was in compliance with Section 9 of the ISA Summary, Revision (Rev.) 7, which stated that an ISA was conducted for each process, such that it identified (i) radiological hazards, (ii) chemical hazards that could increase radiological risk, (iii) facility hazards that could increase radiological risk, (iv) potential accident sequences, (v) consequences and likelihood of each accident sequences, and (vi) PFAP including the assumptions and conditions under which they support compliance with the performance requirements of 10 CFR 70.61.

High Winds/Tornadoes

The Honeywell ISA noted that the MTW site was at the edge of a tornado active zone and the licensee has calculated the frequency of tornadoes in terms of annual tornado-days per 10,000 square miles. The licensee also stated that one F4 tornado has struck within the local counties in the last 50 years and that the peak winds velocity was 210 mile per hour. Based on the FMB and tank farm dimensions, the licensee concluded that direct tornado strikes were rare enough to be excluded on the basis of a less than 10^{-6}/year frequency, implying that the event was not credible. In addition, the licensee determined that it was unlikely that a tornado-generated missile striking the tank farm could result in a chemical release. The licensee determined that there was adequate strength in the storage tanks to prevent a chemical release.

The inspectors noted that the method used by the licensee to evaluate tornadoes did not follow the guidance provided in NUREG/CR-4461, "Tornado Climatology of the Contiguous United States" and industry codes and standards. The analysis presented in the ISA only considered tornado strikes probability per square mile with respect to the actual physical area of the facility, which only considered the frequency aspect of the event. The guidance provided in NUREG/CR-4461 and in codes and standards considered the probability of a tornado striking a point and the conditional probability of exceeding a given wind speed assuming that a tornado strike occurred, which is used to estimate the total probability of a structure being struck by a tornado with winds exceeding the design wind speeds.

Flooding

The licensee stated in their ISA that the MTW site borders the Ohio River. The river pool elevation is 290 feet above sea level and the banks of the river are about 310 feet in elevation. The MTW operations buildings are sited on a flat area at an elevation of 375 feet above sea level. The historic maximum elevation flood at Metropolis was 342 feet in 1937. The licensee evaluated impacts from the 100-year or 500-year flood events and concluded that there were no impacts to the site. The licensee also evaluated the impacts from floods due to dam failures. Based on the above, the licensee concluded that the MTW site was not susceptible to impacts from flooding events and considered the event not credible.

The inspectors reviewed drawings that showed the elevation of the site as well as drawings with the elevation 100-year and 500-year flood plains for the area. No safety concerns were identified.

Loss of Electrical Power

The inspectors evaluated loss of electrical power events and did not identify any new accident sequences or greater consequences than the licensee had already evaluated in their ERP and their ISA Summary. Emergency generators, uninterruptible power supplies, and electrical configuration capabilities were available to address an extended loss of power event in order to provide backup power for critical loads, including crucial process equipment; emergency lighting systems; chemical hazard alarms; and other designated safety alarm systems. In addition, the licensee stated that their process interlocks were designated to fail to safe positions upon loss of power, and plant procedures were in place to secure hazardous materials and shutdown the process. Examples would be during a loss of all electrical power, material or chemical supply valves would reposition to stop flow in order to prevent overfilling or over-pressurization.

At the time of the inspection, the licensee had not validated all fail safe functions would perform as designed, however they stated as part of the new ISA project, they were validating each fail safe scenario and the plant response. The inspectors evaluated a sample of the fail safe modes and did not identify any specific valve or function that would not perform as the licensee had designed.

The inspectors concluded that for loss of electrical power events that were not associated with other natural phenomena, the licensee's ability to place the systems in safe condition was adequate.

Loss of Water (Well and Fire Protection)

Fire water was primarily supplied from the 250,000 gallon fire water tank via the single shaft, dual feed (diesel and electric) fire pump. The alternate fire water supply was well water through the well water pump. During a loss of electrical power, the primary water system would likely remain operational. However, the alternate supply would not be available as a backup water source for fire protection or for the hydrofluoric acid (HF) mitigation towers used during a chemical release because the well water pump power supply had not been identified as a critical load and did not have a backup power supply. During a loss of offsite electrical power or loss of well water event, scrubber systems that could potentially be used to mitigate the consequences of a hazardous chemical release would also be unavailable.

In addition, the team determined that the fire system piping and associated pump house were not fitted with seismic restraints and the licensee had not established plans or procedures in place to utilize portable pumping equipment or other nearby water sources during credible seismic events that could render normal water sources or equipment unavailable.

(2) Conclusion

URI 40-3392/2012-006-01 was opened to evaluate whether the MTW's ISA appropriately considered credible high and intermediate consequence seismic and tornado events and subsequently designated PFAPs and management measures to ensure that the accident sequences (public and workers health and safety) remained highly unlikely or the consequences were mitigated to acceptable levels.

b. Verification of the adequacy of emergency prevention and/or mitigative strategies for the consequences for safety/licensing basis events

(1) Scope and Observations

The inspectors reviewed procedures, personnel, and equipment credited in the licensee's mitigation strategies to determine if the actions could be reliably implemented for each of the licensing basis events and the established emergency prevention and/or mitigation strategies were appropriate for the potential consequences for selected licensing basis events.

Emergency Response Plan (ERP)

The inspectors reviewed the ERP to determine if the licensee had appropriately considered credible accident scenarios related to NPHs. The licensee had identified a UF_6 cylinder pigtail failure as the maximum credible accident. The licensee also considered a dropped liquid UF_6 cylinder as a hypothetical UF_6 release but determined this event was no longer credible because of added safety controls. For the postulated accident scenarios that resulted in a possible release of licensed material to areas beyond the plant boundary, a Site Area Emergency would be declared with a protective action recommendation (PAR) to shelter-in-place all members of the public within a 1.3-mile radius of the facility.

The inspectors reviewed the basis for the PAR and identified that the estimated UF_6 source term for the maximum credible accident used in the ERP was substantially less than the source term derived from other credible scenarios involving releases of licensed material from process system piping. As previously noted, process equipment in the FMB lacked seismic restraints, supports, and bracing that would be needed to assure process equipment integrity. The inspectors had concluded that equipment would likely be damaged during a credible seismic event resulting in a significantly higher source term than a pigtail failure on a UF_6 cylinder.

The inspectors conducted an inventory of system volumes that could be breached during a credible seismic event and determined that the UF_6 source term could be as much as 200,000 pounds. This significantly higher source term raised concerns about the adequacy of the licensee's ERP, required by 10 CFR 40, which was developed using a lower source term. Specifically, the concern was that the potential public impact could go beyond the current 1.3-mile zone for a credible seismic event.

In addition, the inspectors identified that the licensee did not have a procedure to provide direction for specific shelter-in-place actions that onsite personnel needed to perform during a large UF_6 release. The inspectors noted that in procedure, "Personnel Evacuation and Accountability," MTW-ADM-EPIP-0006, Rev. 5, the licensee had identified locations for workers to muster during a hazardous chemical release, however, actions like shutting windows and securing air conditioning units were not directed. Based on interviews, the inspectors determined that the vulnerability existed that onsite employees and contractors in non-processing buildings were not knowledgeable of the need to secure air flow into these buildings. In a large seismic or tornado event, a hazardous chemical release could be potentially at life threatening levels on the site. As a result, the inspectors concluded that the licensee was not adequately ensuring that the workers were safe in a hazardous chemical release scenario.

The inspectors determined that Honeywell's estimate of the maximum credible UF_6 release did not consider the impacts of credible natural events, specifically for seismic and tornado events. The inspectors also determined that the licensee had not developed assessment criteria or assigned measures to assess the severity of an event and ensure protective action recommendations were communicated to potentially affected workers and members of the public necessary to mitigate the consequences of the event and ensure worker and public health and safety.

10 CFR 40.31(j)(1)(ii) requires, in part, that each application to possess UF_6 in excess of 50 kilograms in a single container or 1000 kilograms total, and who do not submit an evaluation showing that the maximum intake of uranium by a member of the public due to a release would not exceed 2 milligrams; must contain an emergency plan for responding to the radiological hazards of an accidental release of source material and to any associated chemical hazards directly incident thereto.

10 CFR 40.31(j)(3) requires, in part, that an emergency plan submitted under paragraph (j)(1)(ii) of this section must identify each type of accident for which protective actions may be needed. Contrary to the above, the inspectors determined that Honeywell's ERP did not identify accident sequences related to credible seismic and tornado events that could result in large UF_6 releases for which protective actions may be needed. The failure to identify accident sequences related to credible seismic and tornado events was

identified as an apparent violation, AV 40-3392/2012-006-02.

An additional apparent violation was identified involving the requirements of 10 CFR 40.9(a). Specifically, 10 CFR 40.9(a), Completeness and Accuracy of Information, states that information provided to the Commission by an applicant for a license or by a licensee or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant or the licensee shall be complete and accurate in all material respects. Honeywell Special Nuclear Material No. SUB-526, License Condition 24, states in part "The licensee shall maintain and execute the response measures in the ERP dated May 27, 2005."

Contrary to the above, prior to an NRC inspection conducted on May 21 through 24, 2012, Honeywell failed to maintain an ERP that was complete and accurate in all material respects. The Honeywell ERP did not include an identification of each type of accident for which protective actions may be needed.

Specifically, section 2.1.1, Maximum Credible UF_6 Release, of the Honeywell ERP, dated May 27, 2005, states, in part, that the maximum credible UF_6 release is believed to result from a UF_6 "pigtail" failure. The inspectors determined that accident sequences related to credible seismic or tornado events could result in UF_6 releases substantially larger than the release used as the maximum credible UF_6 release in the ERP.

This inaccurate information was material to the NRC because it was used by the NRC as the basis for concluding the adequacy of Honeywell Metropolis Works' emergency response during accidents. The failure to provide complete and accurate information related to MTW's ERP was identified as AV 40-3392/2012-006-003.

Emergency Response Equipment

The inspectors verified through walkdowns and inspection that selected emergency response equipment was properly staged, tested, and maintained to assure reliability. The offsite public announcement (PA) system contained two sirens that were capable of providing audible warnings within a 1.21 miles radius, as stated in the system user's manual. The licensee had also conducted annual PA siren surveillance tests to demonstrate that the system was adequately maintained, along with monthly siren audibility checks. No other communication systems or contingencies had been established to alert the public beyond the 1.3-mile radius.

Satellite phones were also available onsite as a backup in case of a loss of normal communications systems. However, at the time of the inspection, the licensee had not established a testing program or other operational checks to assure the reliability and availability of the phones.

Emergency Response Procedures

The inspectors verified that the licensee had established procedures to respond to natural phenomena events. The procedures reviewed included, but were not limited to, procedures credited for safe shutdown of the facility during emergencies; and event based emergency response procedures for severe weather, radiological, chemical hazards, fire, and explosion. The inspectors also reviewed emergency response organization (ERO) procedures and performed interviews with crisis mangers and

incident commanders regarding response to natural phenomena events, ERO activation, and site-wide accountability, specifically during multiple site-wide emergencies as a potential result of the natural phenomena events.

The inspectors noted that the licensee had developed abnormal operating procedures for rapid, controlled shutdown of the process equipment. The plant equipment had also been designed to fail safe during loss of power or instrument air events. The inspectors evaluated a sampling of the fail safe modes and did not identify any specific valve or function that would not perform as the licensee had designed. However, the inspectors identified sections of piping and components that contained liquid UF_6 with limited isolation capabilities. The inspectors determined this configuration could potentially prevent the isolation of the system or the fail safe design from being effective during a natural phenomena event.

The inspectors identified that certain abnormal operations did not provide specific instructions for evaluating the immediate consequences of the particular event and specific actions to take based upon the assessments. The inspectors identified that although the systems were designed to have an automatic fail safe feature, operators were still required to take manual actions in case of a total loss of power.

Onsite Emergency Response Team (ERT) Response

The inspectors noted that the licensee had previously determined they would no longer maintain an onsite fire brigade. Instead, the licensee maintained a Red Hat team that was comprised of operations and maintenance staff members who were trained, using Occupational Safety and Health Administration requirements, to utilize fire extinguishers for incipient fires. The licensee removed all firefighting equipment, including turn out gear, additional hoses, and tools that were kept for a fire brigade.

The site now relied solely on local fire departments for larger fires that could not be extinguished or controlled by a fire extinguisher. In the case of a fire physically located near hazardous chemicals, or a fire involving a non-life threatening hazardous chemical leak, the Red Hats were directed to dress out in hazardous material (HAZMAT) gear and escort the offsite fire departments through the site. The Red Hats would manage the chemical aspect while the fire departments handled the fire. For large chemical releases combined with a fire or multiple fires, the State of Illinois' HAZMAT Team would be contacted since the onsite ERT or the local responsders solely were not equipped or trained to handle these events.

The inspectors interviewed various ERT leaders including crisis managers and incident commanders, which had varying levels of plant and event response experience. The inspectors discussed multiple event scenarios as a potential result of a large seismic or high winds (tornado) event. The inspectors determined that the licensee needed to perform additional training regarding the development of mitigation strategies during multiple events to improve their response.

Offsite Support Organizations

The inspectors verified that agreements with offsite authorities were in place for establishing conditions needed to mitigate the consequences of natural phenomena events. Although both fire departments signed an Interface Agreement with the licensee

regarding roles and responsibilities, some actions such as licensee provided HAZMAT training had yet to be completed, at the time of the inspection, for two consecutive agreements.

The inspectors interviewed the Massac County and City of Metropolis fire department chiefs and the associated emergency directors. During the discussion, the inspectors confirmed that both fire departments were equipped and adequately prepared to handle a non-chemical related fire and there was varying levels of HAZMAT experience and equipment, but the county and city departments confirmed that they were not currently equipped or adequately trained to conduct firefighting activities coincident with a large chemical release. The licensee, when asked, concurred with their response. In the case of a large hazardous chemical release, offsite HAZMAT support would not be available for approximately one hour since the closest response team is located in Marion, Illinois.

In addition, the issues identified in this section of the report are considered supporting observations for AV 040-3392/2012-006-02, which wil be addressed, as applicable, as part of the licensees proposed corrective acitons.

(2) Conclusion

The inspectors determined that procedures and strategies credited by the licensee for responding to natural phenomena events were not adequate to mitigate potential consequences. AV 40-3392/2012-006-02 was identified for the failure to identify accident sequences related to credible seismic and tornado events that could result in large UF_6 releases for which protective actions may be needed. AV 40-3392/2012-006-003 was identified for the failure to provide complete and accurate information related to MTWs' ERP.

c. Evaluation of beyond licensing basis for accident sequences and consequences associated with natural phenomena hazards

(1) Scope and Observations

The inspectors postulated a sample of beyond safety/licensing basis events. The reviewed events were selected based on licensee's safety analysis, engineering analyses, and safety/licensing information. The postulated events included:

- An event that resulted in the extended loss of electrical power and plant water and the inability of the local fire department to respond to the facility.

- A seismic or tornado event resulting in the simultaneous chemical releases in the tank farm and the FMB.

For the postulated beyond safety/licensing basis events, the inspectors evaluated:

- Whether the emergency equipment needed to prevent and/or mitigate the consequences for the selected beyond safety/licensing basis events would be available and functional.

- Whether existing procedures would be sufficient to prevent and/or mitigate the consequences for the selected beyond safety/licensing basis events.

- Training and qualifications of operators, onsite emergency response personnel, and support staff needed to implement procedures for the selected beyond safety/licensing basis events.

- Whether the requirements or commitments for offsite support or assistance, including agreements and contracts would be sufficient to address the consequences for the selected beyond safety/licensing basis events.

For beyond safety/licensing basis events that involved extended loss of power, the inspectors did not identify any issues of significance. However, the inspectors could not fully evaluate other beyond safety/licensing basis events due to the lack of design information for buildings and structures.

(2) Conclusion

The inspectors could not fully evaluate other beyond safety/licensing basis events due to the lack of design information for buildings and structures. The inspectors did conclude that a beyond design basis seismic or tornado event could result in a significant chemical release which could seriously challenge the licensee's ability to mitigate the event and ensure the safety of the workers and the public.

3. Exit Meeting

The inspection scope and results were summarized on May 24, 2012, July 11, 2012, and teleconference on August 6, 2012, with you and other members of his staff. Although proprietary information and processes were reviewed during this inspection, proprietary information was not included in this report.

SUPPLEMENTAL INFORMATION

1. LIST OF PERSONS CONTACTED

J. Assad, Corrective Action Program Coordinator
T. Barnes, Maintenance Manager
D. Bilski, Security Manager
L. Litinski, Regulatory Affairs
S. Patterson, Health Physics Supervisor
J. Smith, Maintenance Superintendent
L. Smith, Plant Manager
B. Stokes, Regulatory Assurance Manager
M. Wolf, Nuclear Compliance Director
B. Stephenson, Emergency Preparedness Coordinator
T. Noll, Integrated Safety Analysis, Director
S. Jimenez, Capital Leader
L. Parscale, Integrated Safety Analysis Project Manager
B. Bass, Reliability Engineer
K. Davis, Emergency Director, City of Metropolis
L. Douglas, Emergency Director, Massac County
J. Morris, Fire Department Chief, City of Metropolis
M. Childers, Fire Department Chief, Massac County
K. Davis, Shift Supervisor
E. Robinson, Process Specialist
J. Cybulski, Site Services Manager

Other licensee employees contacted included operations, management staff, engineers, HP-technicians, security, and office personnel.

2. LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Status	Description
URI 40-3392/2012-006-01	Open	Further evaluate whether the licensee evaluated credible high and intermediate consequence seismic events and subsequently designate PFAPs and management measures to ensure that the accident sequence (public and workers health and safety) remained highly unlikely.
AV 40-3392/2012-006-02	Open	Failure to identify accident sequences related to credible seismic and tornado events that could result in large UF_6 releases for which protective actions may be needed.
AV 40-3392/2012-006-03	Open	Failure to provide complete and accurate information related to the ERP.

Attachment

3. INSPECTION PROCEDURES USED

TI 2600-015 EVALUATION OF LICENSEE STRATEGIES FOR THE PREVENTION AND/OR MITIGATION OF EMERGENCIES AT FUEL FACILITIES

4. LIST OF ACRONYMS

ADAMS	Agency wide Documents Access and Management System
AV	Apparent Violation
CFR	Code of Federal Regulations
EP	Emergency Preparedness
ERO	Emergency Response Organization
ERP	Emergency Response Plan
ERT	Emergency Response Team
FMB	Feed Materials Building
HAZMAT	Hazardous Material
HF	Hydrofluoric Acid
ISA	Integrated Safety Analysis
MTW	Metropolis Works
NPH	Natural Phenomena Hazards
NRC	Nuclear Regulatory Commission
PA	Public Announcement
PAR	Protective Action Recommendation
PEC	Pre-decisional Enforcement Conference
PFAPs	Plant Features and Procedures
RCP	Radiological Contingency Plan
Rev.	Revision
SDR	Safety Demonstration Report
SSCs	Systems, Structures, and Components
TI	Temporary Instruction
UF_6	Uranium Hexafluoride
URI	Unresolved Item

5. LIST OF DOCUMENTS REVIEWED

Procedures

- MTW-CALC-GEN-0005, “Metropolis Works Tornado Strike Likelihood,” Rev. 0
- MTW-CALC-GEN-0003, “Metropolis Works Barge Accident Analysis,” Rev. 0
- MTW-RPT-GEN-000, “Project for Metropolis Works Facility Flooding Analysis,” Rev. 1
- MTW-CALC-GEN-0011, “Metropolis Works Railroad Accident Analysis,” Rev. 0
- MTW-EOP-DIS-0600, “Distillation Emergency Operation,” Rev. 2
- MTW-EOP-F2N-0600, “Fluorination Emergency Operation, “ Rev.4
- MTW-EOP-GSO-0600, “Green Salt Emergency Operation,” Rev. 4
- MTW-EOP-KOH-0600, “KOH Emergency Operation,” Rev. 0
- MTW-EOP-ORE-0600, “ORE Preparation Emergency Operation,” Rev. 4
- MTW-EOP-TFO-0600, “Tank Farm Emergency Operations,” Rev.3
- MTW-EOP-WTP-0600, “Pond MUOS Calciner Emergency Operation,” Rev. 0
- MTW-CALC-GEN-0012, “Metropolis Works Highway Accident Analysis,” Rev. 0
- MTW-AOP-GSO-0500, “Green Salt Abnormal Operations,” Rev. 11

- MTW-AOP-ORE- 500, “Ore Preparation Abnormal Operations,” Rev. 8
- MTW-SOP-DIS-0708, “Quarterly Test of Distillation Emergency Shutdown System and Cylinders Valve Closures,” Rev. 1
- MTW-SOP-DIS-0713, “Draining Crude UF6 Primary Cold Traps to Cylinder,” Rev. 1
- MTW-MAN-F2N-0010, “Fluorination System Manual-PFAP-Related,” Rev. 0
- MTW-ADM-EPIP-0001, “Identification and Reporting of Emergency Conditions,” Rev. 2
- MTW-ADM-EPIP-0002, “Emergency Classification and Notification,” Rev. 3
- MTW-ADM-EPIP-0003, “Crisis Management and Incident Command Staff Responsibilities,” Rev. 3
- MTW-ADM-EPIP-0004, “Emergency Response Organization Activities,” Rev. 2
- MTW-ADM-EPIP-0005, “Personnel Evacuation and Accountability,” Rev. 5
- MTW-ADM-EPIP-0007, “Personnel and Equipment Decontamination Under Emergency Conditions,” Rev. 0
- MTW-ADM-EPIP-0008, “Maintaining Emergency Preparedness,” Rev. 3
- MTW-ADM-EPIP-0009, “Chemical Release Control,” Rev. 2
- MTW-ADM-EPIP-0010, “Standby Power Action Plan,” Rev. 3
- MTW-ADM-EPIP-0012, “Transportation Emergency Response,” Rev. 0
- MTW-ADM-EPIP-0013, “Natural Disaster: Tornado, Thunderstorm, Flooding, and Earthquake,” Rev. 0
- MTW-SAF-IP-0028, “Testing of HF Mitigation Spray Towers and HF Vaporizer Spray Rings,” Rev. 1

Other Documents

- Leighton and Associates, INC. “Report of Seismic Risk Assessment”. July 1991
- EQE, Engineering and Design, “Presentation of conceptual modifications for the Feed
- Material Building and Tank Farm, Allied Signal Facility, Metropolis, Illinois, January 1993
- ENERCON No. MTW-RPT-GEN-0003 Rev. 1, “Project Report for Metropolis Works (MTW) Facility Flooding Analysis”
- Integrated Safety Analysis, Rev. 4, dated December 22, 2011
- Honeywell Metropolis Works Safety Demonstration Report, Rev. 10
- Emergency Response Plan, dated March 9, 2012
- MTW-MAN-RMP-001, Risk Management Program, Rev. 1
- Letter of Agreement, Massac Memorial Hospital, dated December 14, 2011
- Letter of Agreement, Western Baptist Hospital, dated December 14, 2011
- Mutual Assistance Agreement, City of Metropolis Emergency Services, dated October 19, 2011
- Mutual Assistance Agreement, Massac County Emergency Services, dated October 19, 2011
- Mutual Assistance Agreement, Massac County Fire District Board, dated October 21, 2011
- Mutual Assistance Agreement, City of Metropolis Fire Department, dated October 21, 2011
- Honeywell Community Bulletins
- 2001-130 Electro-Mechanical Siren User Manual, Federal Signal Corporation
- Process Description, Metropolis HF Mitigation; dated April 2002
- Project Overview and Objective, Metropolis HF Mitigation; dated April 2002

Drawings

- MTW-B4013, Rev. A
- MTW-B4014, Rev. A
- MTW-B4015, Rev. B
- MTW-B4017, Rev. A
- MTW-B4018, Rev. A
- MTW-1520, Rev. N
- FSC-20891, Rev. 1
- 516056-1, Sheet 1 of 2, Rev. CJ
- MTW-4491, Rev. AG
- AD-968, Sheet 1 of 2, Rev. 1
- MTW-437632, Sheet 1 of 3, Rev. E
- MTW-2887, Rev. Q