

Agency Action Review Meeting April 14-16, 2004

om of Information

Honeywell International, Inc. Metropolis, Illinois Uranium Hexafluoride Release December 22, 2003

Plant Information

- Located near Metropolis, Illinois
- Part 40 Uranium Conversion Facility
- Authorized to possess up to 150 million pounds of natural uranium
- Plant has been in operation since 1959
- Sole domestic supplier of UF₆
- Manufacture other specialty chemicals including iodine, antimony pentafluoride, sulfur hexafluoride and liquid fluorine.

- UF₆ released from Feeds Material Building around 2:00 a.m.
- UF_6 cloud went beyond site boundary
- Site Area Emergency declared
- Twenty-five members of public evacuated, and seventy-five sheltered-in-place
- Four members of public reported to hospital; one held for twenty-four hours for observation

- Based on area air samples, estimated up to seventy pounds of UF_6 released
- State of Illinois and Honeywell air and environmental samples indicated release below NRC regulatory limits
- Honeywell and its contractors bioassay samples indicated release below NRC regulatory limits
- NRC concluded release had minimal impact on public health and safety

- CAL issued December 22, 2003 to confirm plant shutdown, conducting investigation, identifying corrective actions and discuss with NRC before restart
- AIT dispatched to site December 22, 2003
- AIT exited with Honeywell at public meeting on January 6, 2004
- AIT report issued February 3, 2004

- AIT determined licensee staff member made errors while performing an infrequent evolution which resulted in UF₆ release
- Licensee did not have a procedure for this evolution
- Several contributing factors identified
- Public concerns expressed at exit in areas of offsite response and coordination with licensee and emergency responders

History Prior To Event

- January 27, 1998 Three workers burned from UF₆ leak; AIT report dated March 6, 1998
- September 9, 2003 hydrofluoric acid spill resulted in injuries to maintenance mechanic (not NRC licensed activity)
- September 12, 2003 Antimony pentafluoride release that traveled past south fence line but did not go beyond Honeywell property (not NRC licensed activity)
- September 30, 2003 Small UF₆ release inside Feed Materials Building

History Prior To Event

- SIT of September, 2003 events conducted October 6 – November 26, 2003
- Report and NOV issued December 17, 2003
- Two Severity Level IV violations identified for conducting an operation without a procedure and failure to follow procedures.
- Licensee corrective actions not effectively implemented prior to December 22, 2003

- Senior management meeting with Honeywell in NRC Headquarters on February 11, 2004; open to public.
- Honeywell described results of its root cause investigation
- Honeywell described actions it planned to ensure readiness for restart and long term improvements

- Honeywell root causes similar to NRC AIT
 - No procedure for infrequent evolution
 - Corrective action program ineffective in correcting issues identified from previous events
 - No process alarms
 - No abnormal conditions procedures
 - No procedure to document equipment problems
 - Problems implementing emergency response plan

- Honeywell used site, sister plants, corporate and contractor resources to perform extensive assessment of all operations
- Identified corrective actions which went beyond the scope of those associated with the December 22, 2003 release
- Identified seven focus areas to support restart

- Emergency Response
- Policies and Procedures
- Training
- Management of Change
- Mechanical Integrity
- Engineering Controls
- Corrective Actions & Auditing

- Honeywell submitted a list of corrective actions necessary to support a safe restart on March 4, 2004
- Proposed phased restart approach (Ore Prep, Green Salt, Fluorination/Distillation)
- Corrective actions for each phase, categorized by seven focus areas

- NRC inspection of regulatory compliance issues related to event conducted February 17-19, 2004
- Inspection report issued March 16, 2004
- Two violations identified for failure to have a procedure and to properly implement Radiological Contingency Plan
- Enforcement Panel review determined two violations were Severity Level III violations
- Licensee declined to have enforcement conference

- NRC staff developed restart readiness oversight plan modeled after MC 350
- Purpose is to ensure Honeywell corrective actions are comprehensive, effective and sustained.
- NRC inspectors on site assessing development and confirming implementation of corrective actions.
- Public meeting conducted March 18, 2004

- Based on assessment, the Regional Administrator, Region II and the Director of NMSS will decide if there is no objection to restart of each phase
- Local, State and EPA stakeholders will be informed of restart decision and a press release will be issued
- NRC inspectors will be present on site during first forty-eight hours after restart

- Based on current schedule, Honeywell will restart the Ore Preparation area on March 27, 2004, Green Salt on April 1, and Fluorination/Distillation on or about April 8, 2004
- Another public meeting in Metropolis is tentatively planned for April 21, 2004

Significant Issues and Incident Investigations

HONEYWELL INTERNATIONAL, INC.

1. SITE IDENTIFICATION

Location:	Metropolis, IL
License No.:	SUB-526
Docket No.	40-3392
License Status:	Active

2. SITE STATUS SUMMARY

The Honeywell International, Inc. uranium conversion facility is located approximately one mile northwest of the city of Metropolis, Illinois. Honeywell is licensed to possess up to 150 million pounds of natural uranium for chemical conversion. Most of the processing under the license involves conversion of uranium yellowcake to UF₆. The Honeywell plant also manufactures other specialty chemicals such as iodine and antimony pentafluoride, sulfur hexafluoride, and liquid fluorine, at the site. The UF₆ operations began in 1959. The facility is the sole domestic supplier of UF₆ and is one of a handful of such facilities in the world.

On December 22, 2003, a UF₆ release occurred from one of the plant's chemical process lines. The release lasted approximately 40 minutes. The release resulted in the declaration by Honeywell of a Site Area Emergency which was terminated approximately four hours later. About 25 people offsite were temporarily evacuated and some 75 persons remained sheltered for a time in their homes. Four individuals went to the hospital; three were examined and released. The fourth was held for observation and released the next day. One member of the public showed skin reddening on portions of his face and part of one arm, an indication of a hydrogen fluoride (HF) acid burn. Honeywell's initial estimate of a release of 7 pounds of UF₆ was later refined to be approximately 70 pounds. Based on air sample and environmental measurements by the State and a contractor for Honeywell, and urinalysis for workers and members of the public, the NRC concluded that the release was below NRC limits and had minimal impact on worker or public health and safety.

A Confirmatory Action Letter was issued on December 22, 2003, requiring Honeywell to discuss the results of its investigation and the proposed corrective actions with NRC prior to restart of the UF_6 processes.

An Augmented Inspection Team (AIT) inspected and assessed the December 22nd release and its causes. The AIT conducted an exit with Honeywell on January 6. The AIT determined that a licensee staff member conducted an infrequent operation without a procedure, making errors that resulted in the release. The mayor of Metropolis, the county sheriff, and the county emergency response director and approximately 130 members of the public attended the exit. The majority of the comments from the public at the exit focused on the off site response and the coordination between the licensee and the off site responders. The AIT report, identifying root and contributing causes, has been issued. There had been other releases at Honeywell earlier in 2003. On September 9, a hydrofluoric acid (HF) spill resulted in injuries to a

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maintenance mechanic. On September 12, a chemical release of antimony pentafluoride (SbF_5) occurred, not related to the uranium process, creating a plume that traveled past the fence line. A site Alert was declared. On September 30, a small release of UF₆ occurred from a cylinder pigtail. The release was contained on site. Honeywell took corrective actions to these events including reviewing operations and comparing existing procedures with current practices, amending the existing procedures to include all steps in the described process, retraining staff on the amended procedures and on the need to comply with the procedures, and temporarily increased management oversight of operations on all three shifts to ensure compliance with the amended procedures. These actions were not adequate in that subsequently, for an infrequent evolution on December 22, there was no procedure and there was the resultant release.

Also there had been previous instances where staff failed to follow procedures resulting in UF_6 leaks. On January 27, 1998, three workers received hydrofluoric acid burns to their skin from a UF_6 leak. An AIT reviewed the event and determined the root cause to be that management's expectations for procedural adherence were not clear in some cases and had been eroded through acceptance of site practices that contradicted procedural directions.

Honeywell successfully drained residual UF_6 from the systems in February without significant event after management review of the proposed actions and after consulting with the NRC.

3. MAJOR TECHNICAL OR REGULATORY ISSUES

As a result of the December 22 event, Honeywell conducted their root cause investigation. The NRC AIT and Honeywell's Root Cause Investigation Team identified similar root and contributing causes. The results of the Honeywell Root Cause Investigation Team were provided to the NRC in a meeting on February 11, 2004. Key causes were:

- The failure to have a written procedure for an infrequent evolution and thus relying on the memory of the operator to perform the required actions.
- The licensee's corrective action program had not adequately corrected previouslyidentified lack of procedures for certain activities nor had the licensee adequately aligned staff to the need for procedures for activities.
- There was no alarm to warn operators that the system was becoming pressurized.
- There were no procedures or measures to respond to abnormal conditions during operations.
- There was no procedure or process for documenting when equipment was not in proper working order.

In addition, the AIT and Honeywell identified that there were problems in implementing the emergency plan once the release was identified, including problems in communication with State and local authorities. In addition to the Root Cause Investigation Team, Honeywell chartered other teams, a Plant Engineering Team, a Triangle of Prevention Team and a

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Corporate "Deep Dive" Team, to review the facility and operations. These teams did a vertical review of certain UF₆ safety and environmental improvement items using engineering and administrative controls, a review of management processes, management of change, mechanical integrity, and the emergency plan. Plant management has interacted with State and local emergency response personnel to evaluate needed changes in those interfaces. From these reviews, Honeywell developed a list of corrective and improvement actions to be completed prior to a restart of ore processing, green salt production, and fluorination and distillation. On March 4, 2004, Honeywell submitted a listing of the actions to be taken for each phase of the restart. Honeywell conducted an NRC observed emergency drill with local agencies March 11. This drill identified items that needed to be improved including use of the dedicated phone for communicating with off site authorities. Honeywell plans to improve this method of communication. In addition, Honeywell is in the process of implementing other corrective and improvement actions.

The NRC developed a Restart Readiness Oversight Plan to review Honeywell's actions. This included review of safety and emergency preparedness improvements. The NRC has reviewed actions the licensee planned and then implemented to drain UF₆ from process equipment. This drain was completed by Honeywell without significant incident. To date, Honeywell is in the process of restarting the facility and NRC staff currently is inspecting Honeywell improvements. NRC staff is interfacing with the Environmental Protection Agency (EPA) regarding the Emergency Plan since the EPA has cognizance over emergency response for the non-NRC regulated chemicals at the site. The NRC met with the licensee on March 18 at the Metropolis courthouse to discuss Honeywell's actions to improve safety and emergency preparedness.

The event has been suggested for consideration as an Abnormal Occurrence (Criterion III.A.)

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2. SITE STATUS SUMMARY

The staff concluded that the Honeywell International, Inc. uranium conversion plant met the criteria of SECY-02-0216 for discussion at the AARM (Column 2 of Table 1). Agency actions beyond the normal inspection and enforcement processes are necessary in that senior NRC management conducted a meeting with senior Honeywell corporate management to assure that there was adequate corporate support and oversight of plant improvements. In addition, another office was required to support inspection activities in that the Office of Investigations is reviewing certain issues.

The Honeywell facility is located approximately one mile northwest of the city of Metropolis, Illinois. Honeywell is licensed to possess up to 150 million pounds of natural uranium for chemical conversion. Most of the processing under the license involves conversion of uranium concentrate (yellowcake) to uranium hexafluoride (UF₆). The Honeywell plant also manufactures other specialty chemicals such as iodine and antimony pentafluoride, sulfur hexafluoride, and liquid fluorine, at the site. The UF₆ operations began in 1959. The facility is the sole domestic supplier of UF₆ and is one of a handful of such facilities in the world.

On December 22, 2003, a release of approximately 70 pounds of UF₆ occurred from one of the plant's chemical process lines. The release resulted in the declaration of a Site Area Emergency by Honeywell. About 25 people offsite were temporarily evacuated, and some 75 persons remained sheltered for a time in their homes. Four individuals went to the hospital, and three were examined and released. The fourth individual was held for observation and released the next day. Although this release had minimal impact on worker or public health and safety, it raised concerns about the material condition of the facility and licensee staff performance.

Prior to December 2003, several incidents involving hazardous chemicals occurred at the Honeywell facility. These involved a January 27, 1998, incident in which three workers received hydrofluoric acid (HF) burns to their skin from a UF₆ leak; a September 9, 2003, HF spill which resulted in injuries to a maintenance mechanic; a September 12, 2003, chemical release of antimony pentafluoride (SbF₅), not related to the uranium process, creating a plume that traveled past the fence line and resulting in an Alert declaration; and a September 30, 2003, small release of UF₆ from a cylinder pigtail which was contained on-site.

The NRC conducted a Special Inspection into the September 2003 events and an Augmented Team Inspection (AIT) into the December 2003 event. Two Severity Level III violations were issued as a result of the AIT findings.

In response, Honeywell implemented a Performance Improvement Plan which focused on plant material condition, worker performance (procedures and training), emergency procedures and response, and the corrective action/auditing processes. As a result of Honeywell's reviews, over one hundred action items necessary for restart were implemented and included substantial upgrades to its processes, procedures, and programs.

The NRC implemented a Honeywell Upgrade and Restart Oversight Plan taking elements from Inspection Manual Chapter 0350 to monitor Honeywell improvements. On April 17, 2004, the NRC staff authorized full restart of the conversion process.

The NRC staff increased the inspections and is continuing to follow the licensee's longer term corrective actions. These inspections have continued to identify issues related to procedural adequacy and adherence, control room conduct of operations, radiation protection controls and practices, and the corrective action program. Weaknesses in the license have also been identified which will be addressed during the upcoming license renewal.

In addition, in November 2004, the NRC became aware of operator attentiveness issues at the site. As a result of these issues, the licensee implemented immediate actions to establish performance expectations and increase management oversight. In addition, the NRC is performing random off-hour inspections to monitor operator attentiveness and the effectiveness of the licensee's corrective actions.

As of February 1, 2005, the licensee appointed a new plant manager. Subsequently, the Manager of Human Resources and Training as well as the Manager of Engineering/Maintenance were replaced. The corporate office is also exercising increased involvement in site activities, and the services of two outside consultant groups have been employed to audit ongoing operations and to do a comprehensive evaluation of plant operational and management processes.

Meetings open to the public continue to be conducted to discuss Honeywell's corrective actions and NRC inspection results. The latest meeting was held on February 7, 2005, to discuss the results of the Licensee Performance Review for the period February 1, 2003, to November 20, 2004. The licensee discussed their longer-term corrective actions including improvements in plant material condition, human performance, and their problem identification and corrective action program. Substantially less public interest was expressed at this meeting as compared to those held following the December 2003 release. There has been public interest at these meetings regarding the storage, in the city of Metropolis, of chemical rail cars destined for or from Honeywell. NRC staff is working with Honeywell, the railroad, and the National Railway Administration to respond to these concerns. The NRC has received congressional staff questions on the issue. Honeywell is working with the railroad to assure that chemical tank cars will be stored in a rail yard rather than being left on tracks in the city.

The NRC will participate with Honeywell in an emergency exercise on May 25, 2005.

3. MAJOR TECHNICAL OR REGULATORY ISSUES

The major issues are:

1. Assuring continuing safety performance.

- 2. Assuring adequate and timely implementation of the long-term improvement actions, including plant material condition, human performance, and problem identification and resolution programs.
- 3. Renewal and update of license.

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MATERIALS PROGRAMS: PROJECT	OBJECTIVES	NEAR TERM MILESTONES AND TIMING
Honeywell Performance Improvements	Monitor Honeywell's Performance Improvement Plan in light of recent events and findings: - Uranium hexafluoride release occurred on December 22, 2003	 An AIT was conducted following the December release with a public exit meeting conducted on January 6, 2004. Escalated enforcement action was taken related to the AIT findings (2 SL III/No civil penalties).
	resulting in a Site Area Emergency - Follow-up inspections continue to Identify issues with procedure	- Licensee has implemented substantial upgrades to its processes, procedures, and programs.
	Implementation and adherence - Recent issues regarding operator attentiveness have resulted in employee terminations and senior management changes.	 A public meeting with the licensee was held on February 7, 2005, for the Licensee Performance Review. Areas for improvement were identified relative to adherence to and quality of procedures for operations, control room conduct of operations, Implementation of radiation
	Areas to be addressed in the Plan include procedures and training, material condition, emergency preparedness, and corrective actions/auditing.	protection controls, implementation of the emergency plan, implementation of the corrective action program, and procedural adequacy for assuring license requirements were implemented.

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Honeywell (continued)	See above	 Increased FY 2005 Inspections above the core inspection program. Continuing to follow the licensee's corrective actions during routine and regional initiative inspections.
		NRC is performing random off-hour inspections to monitor operations activities and management oversight due to recently identified issues of operator inattentiveness.
		- As of February 10, 2005, through-wall circumferentia cracking was identified in a fluorinator. This fluorinator had been installed within the last yea The licensee also removed a similar fluorinator from service and is inspecting it for any similar indications.

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Monitor Westinghouse's performance	- Escalated enforcement was issued for incinerator
Improvement focus in light of recent	issue.
events and inspection findings	
Including:	- An Information Notice was issued to fuel cycle licensees regarding the use of less than optimal
Operation of the waste Incinerator outside of analyzed and approved safety basis	bounding assumptions in criticality safety analysis at fuel cycle facilities.
- Multiple examples of operators failing to follow procedures and/or conducting activities not covered by procedures.	- Management meetings were held with the licensee to discuss the licensee's upgrades in their Human Performance and Nuclear Criticality Safety Analysis Programs.
The focus is on assessing Improvements and upgrades in the licensee's Human Performance and	- FY 2005 inspections were increased above the core Inspection program.
Nuclear Criticality Safety Analysis Programs	- NRC is continuing to follow the licensee's corrective actions during routine and regional initiative inspections.
	 Improvement focus in light of recent events and inspection findings including: Operation of the waste incinerator outside of analyzed and approved safety basis Multiple examples of operators falling to follow procedures and/or conducting activities not covered by procedures. The focus is on assessing improvements and upgrades in the licensee's Human Performance and Nuclear Criticality Safety Analysis

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Key Messages:

- NRC staff has continued its heightened oversight of the Honeywell International, Inc., uranium conversion facility in Metropolis, IL, as a result of previous events involving the release of hazardous chemicals.
- On December 22, 2003, a release of approximately 70 pounds of uranium hexafluoride (UF6) occurred from one of the plant's chemical process lines. The release lasted approximately 40 minutes, and resulted in the declaration of a Site Area Emergency by Honeywell which was terminated approximately four hours later. About 25 people offsite were temporarily evacuated, and some 75 persons remained sheltered for a time in their homes. Four individuals went to the hospital, and three were examined and released. The fourth individual was held for observation and released the next day. Although this release had minimal impact on worker or public health and safety, it raised concerns about the material condition of the facility and licensee staff performance.
- As a result if the December release, Honeywell implemented a Performance Improvement Plan which has focused on plant material condition (hardware), worker performance (procedures and training), emergency procedures and response, and the corrective action/auditing process.
- Honeywell has implemented substantial upgrades to its process, procedures, and programs, and the licensee was authorized to restart conversion activities using a phased approach between March 26, and April 17, 2004; however, follow-up inspections have continued to identify issues related to procedural adequacy and adherence, control room conduct of operations, radiation protection controls and practices, and an ineffective corrective action program.

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Background/Context:

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Prior to December 2003, several incidents involving hazardous chemicals occurred at the Honeywell facility. These involved a January 27, 1998, incident in which three workers received hydrofluoric acid (HF) burns to their skin from a UF6 leak; a September 9, 2003, HF spill which resulted in injuries to a maintenance mechanic; a September 12, 2003, chemical release of antimony pentatluoride (SbF5), not related to the uranium process, creating a plume that traveled past the fence line and resulting in an Alert declaration; and a September 30, 2003, small release of UF6 from a cylinder pigtall which was contained on site.

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- A special inspection was conducted on October 6, through November 26, 2003, to review the circumstances regarding these events, and the root cause of the latter events was determined to be similar to that of the 1998 release, e.g., management's expectations for procedural adherence were not clear in some cases and had been eroded through acceptance of site practices that contradicted procedural directions. Inspections were also conducted prior to and during start-up of the UF6 operations to verify corrective actions. Non-escalated enforcement was issued for failure to use and/or follow required procedures, but no enforcement action was taken for the SbF5 release or the HF spill because those events did not have the potential to affect the safety of radioactive material and the HF involved in the spill was material used prior to the addition of the uranium.
- For the December 22, 2003, release, a Confirmatory Action Letter was issued that day requiring Honeywell to discuss the results of its Investigation and the proposed corrective actions with NRC prior to restart of the UF6 processes. In addition, an Augmented Inspection Team (AIT) was immediately chartered to inspect and assess the release. Two Severity Level III violations were issued as a result of the AIT findings. As a result of Honeywell's reviews, Honeywell identified and corrected over one hundred action items necessary for restart.
- Honeywell also identified several longer-term corrective actions such as improved process monitoring and control and improvements in the control room.

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Accomplishments:

- The NRC implemented a Honeywell Upgrade and Restart Oversight Plan taking elements from Inspection Manual Chapter 0350. This plan included determination of the sufficiency of proposed corrective actions, inspection of corrective actions to determine their effectiveness, observation of a table top drill of the revised Emergency Plan, and coordination with the State and local agencies and the Environmental Protection Agency. This process included comprehensive verification inspections by the NRC staff.
- Using a phased approach, between March 26, and April 17, 2004, the NRC staff authorized restart of the conversion process based on its determination that adequate near term corrective actions had been implemented and sufficient plans for longer term actions were in place.
- A number of public meetings continue to be conducted to discuss Honeywell's corrective actions and NRC inspection results. Public Interest has reduced over time.
- The NRC staff completed the Licensee Performance Review for the period February 1, 2003, to November 20, 2004, which included the conduct of a public meeting on February 7, 2005. Areas for improvement were identified relative to adherence to and quality of procedures for operations, control room conduct of operations, implementation of radiation protection controls, implementation of the emergency plan, implementation of the corrective action program, and procedural adequacy for assuring license requirements were implemented. Substantially less public interest was expressed at this meeting as compared to those held following the December 2003 release. There has been public interest in these meetings regarding the storage of chemical rail cars destined for or from Honeywell in the city of Metropolis.

Current Status:

 The NRC staff increased the FY 2005 inspections above the core inspection program and is continuing to follow the licensee's corrective actions during routine and regional initiative inspections.

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- In November 2004, the NRC became aware of operator attentiveness issues at the site. As a result of these issues, the
 licensee implemented immediate actions to establish performance expectations and increase management oversight. In
 addition, the NRC is performing random off-hour inspections to monitor operator attentiveness and the effectiveness of the
 licensee's corrective actions. This issue is under investigation.
- As of February 1, 2005, the licensee implemented management changes at the site, hiring a new plant manager. Corporate
 is also exercising increased involvement in site activities, and the services of two outside consultant groups have been
 employed to audit ongoing operations and to do a comprehensive evaluation of plant operational and management
 processes.
- On February 10, 2005, the licensee identified through-wall circumferential cracking on a fluorinator. This fluorinator had been
 installed within the last year. The licensee also removed a similar fluorinator from service and is inspecting it for any similar
 indications. The plant continues to operate using a third fluorinator of a different vintage.

Pending Actions:

- Continue current level of inspection for the performance period to monitor the effectiveness of the licensee's corrective actions and impacts of recent management changes.
- Assess operator attentiveness issues for any appropriate enforcement action.
- Complete assessment of the cause of the fluorinator cracking.

Stakeholders and Their Interest

Local interest following the December 2003 release was very high; however, it has subsided with time, as evidenced by the
public turn-out at the recent Licensee Performance Review Meeting.

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 One issue raised at two public meetings involve local citizens' concerns regarding the staging of chemical railcars destined for or from Honeywell within the city of Metropolis. NRC staff is working with Honeywell, the railroad, and the National Railway Administration to respond to these concerns. The NRC has received congressional questions on the issue.

Challenges:

- Assessing the effectiveness of licensee actions to improve regulatory and safety performance.

Policy Issues:

- Potential licensing issues as part of the license renewal.

<u>Risks</u>:

- When UF6 is released to the atmosphere, it forms uranyl fluoride and HF. It is the HF that presents the greatest hazard.

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