

Handwritten notes in the top right corner: "Uranium", "UF<sub>6</sub>", "UF<sub>4</sub> → UF<sub>6</sub>", "Fluorine", "a. st. John", and other illegible scribbles.

## HONEYWELL

**PURPOSE:** To provide an overview of the Honeywell facility, its operations, and NRC/licensee response to recent events

**EXPECTED OUTCOMES:** An understanding of the staff's response to the December 22, 2003, release and plans for heightened inspections at this facility.

### DISCUSSION:

#### Overview

- Originally build at this location to supply UF<sub>6</sub> conversion for the AEC under a 5-year contract (1959-1964). Presently, however, the Honeywell facility supplies conversion services for the commercial nuclear power industry.
- The primary product at Honeywell is uranium hexafluoride (UF<sub>6</sub>). UF<sub>6</sub> is produced by processing source material that is received as uranium ore concentrates. The Plant also produces: sulfur hexafluoride; iodine; antimony pentafluoride; liquid fluorine; and synthetic calcium fluoride
- The production of uranium hexafluoride is the only operation requiring licensing by the NRC

#### Location:

- The plant is located on 1000 acres in Massac County, Illinois, along the north bank of the Ohio river (see map) in the city of Metropolis.
- There are about 500,000 people living within a 50 mile radius of the plant, 5000 within 2 miles and about 500 within 1 mile. The plant has about 280 day employees, and about 40 on swing & back shifts.

#### Key Messages:

- The primary hazards of this facility are chemical, and these are very real and significant hazards. We only regulate the chemical hazards after the source material has been added to the mix. However, other operations at the facility can and do affect UF<sub>6</sub> operations, and that fact allows us some flexibility in oversight. EPA and OSHA have ceded first response to NRC.
- When UF<sub>6</sub> is released to the atmosphere, it forms uranyl fluoride and HF. It is the HF that presents the greatest chemical hazard. HF is also used in the conversion process.
- The facility has three classification for emergencies: Plant Emergency (minor incident), Alert (potential release), Site Area Emergency (event that could lead to a significant release).
- As a result of several recent releases of hazardous chemicals, NRC staff has had significant oversight activities at this facility.

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**Most Recent Event:**

- On December 22, 2003, a UF<sub>6</sub> release occurred from one of the plant's chemical process lines when an operator during the back shift, performed a non-routine operation without a written procedure. The result was the release of about 76 lbs of UF<sub>6</sub>. Operations ceased at the facility and operations were placed in a safe shutdown mode.
- 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.
- 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 response.
- 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<sub>6</sub> processes.
- An Augmented Inspection Team (AIT) was chartered to inspect and assess the December 22nd release.
- The AIT report was issued on February 3, 2004. The root and contributing causes identified by the Honeywell investigation were consistent with the AIT's findings.
- A Notice of Violation was issued on May 10, 2004, involving two Severity Level ~~IV~~ **III** violations
- The violations involve: (A) the reconfiguration of the fluorination system without detailed instructions, contrary to the requirements of the license and license application; and (B) the failure to maintain and execute various response measures in the Radiological Contingency Plan (Emergency Response Plan) or 10 CFR 40.35(f).
- A civil penalty was averted because of aggressive actions by the licensee.
- Another unrelated Severity Level IV violation is pending which relates to the failure of the licensee to request permission before changing a engineered barrier that was put in place per the ICM's.
- NRC has held three public meetings related to this release.

**Restart Status:**

- As a result Honeywell's reviews, Honeywell identified over one hundred action items necessary for restart, ranging from dedicated offsite communication systems, improved process monitoring, equipment upgrade, identification of processes that do not have

procedures, to upgrade of its training program. Honeywell divided the actions into seven areas with managers in charge of each area.

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

(Honeywell invested over 3 Million dollars in the effort)

- The facility proposed a phased restart plan starting on March 4, 2004. Restart was completed on April 4, 2004
- Heightened oversight will continue, with follow-up inspections at 3 and 6 months... *under 3 months*

#### Challenges:

- Our ability to assess the effectiveness of changes made to require the use of written procedures for infrequent operations. (Culture of Change Issue)
- Our ability to monitor the upgrade equipment put in place to increase process monitoring of safety parameters and remote actuation of certain safety equipment. (Staff resources)
- Our ability to monitor the Improvements of the emergency planning and emergency response capabilities of the plant. (Staff Resources)
- Development of a Commission Paper on Lessons Learned for this event. (Underway)

## PRECURSOR EVENTS

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.

On September 9, 2003, a hydrofluoric acid (HF) spill resulted in injuries to a maintenance mechanic.

On September 12, 2003, 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, 2003, a small release of uranium hexafluoride ( $UF_6$ ) occurred from a cylinder pigtail. The release was contained on site.

These events resulted in a special inspection which was conducted on October 6 through November 26, 2003, to review the circumstances regarding the September 2003, events and to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. The root cause of these events was similar to that in the 1998 release.

A special inspection was conducted prior to and during start up of the  $UF_6$  operations to verify corrective actions.

An inspection report was issued on December 17, 2003, citing two severity Level IV violations: for failure to use and/or follow required procedures for the  $UF_6$  release. No enforcement action was taken for the  $SbF_5$  release or the HF spill because the inspection team determined that the events did not have the potential to affect the safety of radioactive material and the HF spill was material used prior to the addition of the uranium.

Honeywell took corrective actions to the first three 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.

Inspections were conducted to observe and assess these corrective actions.