

November 8, 2004

MEMORANDUM TO: Jack R. Strosnider, Director
Office of Nuclear Material Safety
and Safeguards

FROM: Robert C. Pierson, Director **/RA/**
Division of Fuel Cycle Safety
and Safeguards
Office of Nuclear Material Safety
and Safeguards

SUBJECT: RESULTS OF THE AGENCY'S REVIEW OF THE DECEMBER 22,
2003, UF₆ RELEASE AT THE HONEYWELL URANIUM
CONVERSION FACILITY

BACKGROUND:

On December 22, 2003, during changes in operations, a uranium hexafluoride (UF₆) leak occurred at the Metropolis Works (Honeywell) site in Metropolis, Illinois, that led to an offsite release and a declaration of a Site Area Emergency (SAE). This declaration resulted in the evacuation and sheltering of members of the public, with several being transported to local hospitals, although no one suffered a serious injury.

The U.S. Nuclear Regulatory Commission (NRC)-regulated activity of Honeywell International, Inc., under Materials License SUB-526, is the conversion of uranium ore concentrates (U₃O₈) to UF₆. The UF₆ product is used as feed material for uranium enrichment plants. Operations at the site were first authorized on December 17, 1958. The license was last renewed in 1995, and its 10-year term will expire on June 30, 2005. The licensee has indicated that it will submit the renewal request in December 2004.

In April 2004, Honeywell resumed operation, and this memorandum documents the results of the NRC's staff review of this event and future staff actions planned.

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THE DECEMBER 22, 2003, EVENT:

Shortly after midnight on December 22, 2003, the licensee staff, working in the Feed Materials Building (FMB), were in the process of reconfiguring the piping in the fluorination and pollution control systems so that they could change from operating just one of the three available lines (lines A, B, and C) to operating two lines simultaneously (A and C lines). The plant was in a hot stand-by condition and was not in the process of producing uranium hexafluoride (UF_6). During the second part of the reconfiguration process, a licensee employee failed to place two valves (dust collector and system valves) on each line in the appropriate positions (e.g., open or closed) and as a result, the equipment and piping running from the fluorinators to the valves downstream of the cold traps became pressurized with fluidizing air and UF_6 . The UF_6 came from the distillation units which were in the recycle mode. When in recycle approximately 300 pounds per hour of UF_6 enters the system, and under normal operating conditions (system under negative pressure), flows into the cold traps.

At approximately 2:00 a.m., the increasing pressure caused the C-minus control valve to leak UF_6 into the FMB. A shift supervisor observed evidence of the leak and initiated the licensee's emergency response procedures. The first team sent in to stop the UF_6 release opened the dust collector valves and closed the system valves, which was the position these valves should have been in during the second part of the reconfiguration process. When the dust collector valves were opened, the UF_6 that migrated into the piping and equipment from the distillation system overcame the dust collection system and was exhausted out of the building. The UF_6 cloud that formed after the release was observed going beyond the site boundary, and the licensee declared a SAE.

As a result of this event, there were no injuries to plant employees. However, four members of the public who were in the release cloud path reported to the local hospital. Three were examined and released. The fourth individual, who exhibited some skin reddening, was treated for symptoms due to potential low level exposure to hydrofluoric acid (HF) and was released after 24 hours. It remains inconclusive as to whether that individual was actually exposed to HF.

AGENCY ACTIONS TAKEN:

The agency responded on December 22, 2003, by issuing a Confirmatory Action Letter (CAL) (Attachment 1), and dispatching an augmented inspection team (AIT). The report from the AIT (Attachment 2) concluded in part:

....The licensee's initial response actions were consistent with the Emergency Response Plan and Radiological Contingency Plan (ERP/RCP). Communications to off-site agencies regarding the SAE declaration were made within the required time frame. The licensee informed the local emergency responders to evacuate everyone in the surrounding area. However, communications with local emergency responders were not maintained and were not complete in that they did not provide additional information that would have assisted local authorities in their response decisions. In addition, the individual designated to make recommendations regarding the SAE declaration was unaware of his responsibilities, and the licensee did not apply any further assessment to determine further recommendations.....

In the weeks immediately following the event, Honeywell implemented improvements in the areas of: emergency planning; policies and procedures; training; management of change; mechanical integrity; engineering controls; and a corrective action program.

The licensee instituted a permanent integrated program for tracking and review of all safety and corrective action items for all areas of the facility so that adverse trends could be identified and corrected as soon as possible. The facility is making a significant investment in active engineering controls such as interlocks and alarms. Honeywell also revised its ERP/RCP to include a wide range of enhancements and coordinated this revision with local and State emergency response organizations. Although not required to do so, Honeywell submitted the revised ERP/RCP to the NRC for approval in the form of a license amendment request¹.

A second inspection was conducted February 17 - 19, 2004, and the report was issued March 16, 2004, (Attachment 3). The restart of the facility was controlled by the Honeywell International Conversion Facility Restart Readiness Oversight Plan which was provided to the licensee by staff in a letter dated March 26, 2004 (Attachment 4). The NRC staff documented its review and concurrence with each phase of the restart. As a result of the NRC inspections, two notices of violation were issued. They consisted of two Severity Level III violations and one Severity Level IV (Attachments 5 and 6).

The NRC has had a total of 5 public meetings since the event: January 16, 2004, to brief the AIT results; February 11, 2004, Management meeting at Headquarters; March 18, 2004, to brief restart issues; April 21, 2004, to brief completion of restart inspections and restart of operations; and September 30, 2004, to hear Honeywell discuss long term corrective actions.

The plant resumed normal operations in late April 2004, and staff conducted a post-restart inspection that concluded on June 10, 2004. No violations were identified.

The most recent inspection, concluded on August 13, 2004, noted two Severity Level IV violations. Also, the staff met with Honeywell in a public meeting on September 30, 2004, to discuss the status of the licensee's long-term corrective actions.

The staff has reviewed the licensing requirements contained in 10 CFR Part 40 applicable to this facility. The staff has determined that these regulations focus on the use of source material, not hazardous chemicals. It is the hazardous chemicals that dominate the risk at this facility. However, the staff recommends that since this is a one-of-a-kind facility, regulatory changes applicable to this facility cannot be directly applied to other Part 40 licensees, therefore, rule-making to strengthen 10 CFR Part 40 to address the use of source material at facilities using hazardous chemicals, would be neither an efficient or effective use of staff resources.

¹The staff completed its review of the revised ERP/RCP and issued the corresponding license amendment on July 28, 2004. The amendment establishes a new enforceable baseline for emergency planning and response at this facility.

AGENCY ACTIONS PLANNED :

A final post-restart inspection will be conducted in the November- December 2004 time frame. The staff will evaluate the return to a normal inspection schedule based on the cumulative results of all the post-restart inspections. The staff plans to continue its evaluation of the improvements implemented by Honeywell in future inspections.

The staff will observe the next site area emergency exercise, which is tentatively scheduled for the week of December 6, 2004. A full participation exercise is planned for calendar year 2005.

Finally, the staff will perform a comprehensive review of the license renewal application currently scheduled for submission in December 2004. This staff review will focus on enhancements to the Safety Analysis Report, and the consolidated ERP/RCP. The staff will also ensure the commitments made by the licensee as part of their restart plan are reflected in the application.

CONCLUSION:

Following some initial missteps immediately after the December 22, 2003, event, Honeywell took immediate and significant steps to correct the root and contributing causes identified by its staff as well as those identified by the NRC.

As Honeywell continues to recover from this event, the actions currently planned by the agency, which include an enhanced inspection schedule, and significant involvement in the upcoming ERP/RCP drill, will ensure appropriate oversight of operations at the facility.

The staff does not recommend that the NRC undertake rulemaking to strengthen 10 CFR Part 40. The staff believes that adequate measures have already either been voluntarily implemented by the licensee, or incorporated into the license as license conditions, to ensure adequate safety. Further, the upcoming staff review associated with the license renewal should continue to provide an appropriate level of oversight for the Honeywell facility.

Attachments:

1. Confirmatory Action Letter, December 22, 2003
2. AIT Report, February 3, 2004
3. NRC Inspection Report, March 16, 2004
4. Honeywell International Conversion Facility Restart Readiness Oversight Plan
5. NRC Notice of Violation, May 10, 2004
6. NRC Inspection Report and Notice of Violation June 2, 2004

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