

August 13, 2001

Mr. J. William Lessig  
Plant Manager  
Honeywell Specialty Chemicals  
P.O. Box 430  
Metropolis, IL 62690

SUBJECT: NRC INSPECTION REPORT 04003392/2001-004(DNMS)(HONEYWELL)

Dear Mr. Lessig:

On July 27, 2001, the NRC concluded a routine inspection at your Metropolis, Illinois facility. The purpose of the inspection was to determine whether activities authorized by the license were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the preliminary findings identified in the enclosed report were discussed with you and members of your staff.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of a selective examination of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of the inspection, the NRC has determined that no violations of NRC requirements occurred.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be 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)*. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/NRC/ADAMS/index.html> (the Public Electronic Reading Room).

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

***/RA by M. Phillips acting for/***

Patrick L. Hiland, Chief  
Fuel Cycle Branch

Docket No. 040-03392  
License No. SUB-526

Enclosure: Inspection Report 04003392/2001-004(DNMS)

cc w/encl: T. Orticiger, Illinois Department of Nuclear Safety

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket No: 04003392  
License No: SUB-526

Report No: 04003392/2001-004 (DNMS)

Licensee: Honeywell Specialty Chemicals

Facility: Metropolis Works

Location: P. O. Box 430  
Metropolis, IL 62960

Dates: July 23 through 27, 2001

Inspector: S. R. Caudill, Portsmouth Resident Inspector

Approved By: Patrick L. Hiland, Chief  
Fuel Cycle Branch  
Division of Nuclear Materials Safety

**EXECUTIVE SUMMARY**  
**Honeywell Specialty Chemicals**  
**NRC Inspection Report 04003392/2001-004(DNMS)**

Operations

- Operations were conducted safely in accordance with applicable procedures. Operators were cognizant of safe operating parameters, alarm responses, and current process conditions. The licensee exercised a conservative approach with respect to cylinder connects/disconnects and cool-down period verification. (Section O1.1)

Maintenance

- **Inspection Followup Item (IFI) 04003392/2001-004-01** was opened to track the evaluation of uranium hexafluoride (UF<sub>6</sub>) smoke detectors as critical equipment. The inspector identified an isolated weakness in that a scheduled preventive maintenance on critical equipment was missed. (Section M1.1)

Radiation Protection

- **IFI 04003392/2001-004-02** was opened to track improvements in the calibration program for airborne radioactivity measurement instruments, i.e., rotameters, velometers and the dry test meter. (Section R 3.2)
- The inspector identified weaknesses in the contamination self-monitoring program at the exit points, and the licensee took immediate and satisfactory corrective actions. (Section R 3.4)

Plant Support

In discussions of **IFI 040-03392/2000-005-02**, the licensee attributed leaked hard uranium ore concentrate from deteriorated 55-gallon drums as the likely cause for exceeding NRC quarterly limits for the nearest resident radioactivity concentration average. Licensee staff informed the inspector that all remaining deteriorated drums will be repackaged by the end of August, 2001.

Russian Observers

- In support of NRC and Department of Energy (DOE) International Nuclear Safety Cooperative Programs, the inspection was observed by Andrei Lavrinovich and Aleksander Sapojnikov of GAN, the Russian nuclear regulatory authority. The Russian observers saw firsthand how the NRC prepares, conducts and documents inspections at licensed facilities. The Russian observers also discussed with the Honeywell staff various matters pertaining to developing and submitting a nuclear facility license application.

## Report Details

### I. Operations

#### 01.1 Conduct of Operations

##### a. Inspection Scope (88020 and TI 2600/003)

The inspector observed operations in the Feed Materials Building (FMB), ore sampling facility, and liquid uranium hexafluoride (UF<sub>6</sub>) cylinder storage pad. In particular, the inspector observed the following activities:

- cylinder connect, disconnect, weighing, and storage;
- control room shift turnover; and
- FMB and control room routine operations.

##### b. Observations and Findings

Operations were conducted in accordance with applicable procedures and postings. During cylinder connects/disconnects, operators used appropriate protective clothing and equipment. A first-line manager personally supervised the cylinder connect/disconnect operations. The ore preparation, hydrofluorination, fluorination, and distillation processes operated normally during the inspection. Control room operations were conducted with attention focused on equipment important to safety, e.g., UF<sub>6</sub> cylinder scales, liquid UF<sub>6</sub> flow rate meters, and video monitors of the process area. Operations log books were current and descriptive for activities conducted during the shift. During shift turnover, first line managers and operators conveyed relevant process conditions to on-coming personnel, who reviewed the log books prior to assuming duties. Operators were aware of the procedure reference manual location and contents.

The inspector discussed procedures with the material handling foreman to ensure that newly filled liquid UF<sub>6</sub> cylinders were not moved until after a 96 hour cool-down period. The operators placed a sticker on the cylinder denoting the date and shift that the cylinder was disconnected. Before a cylinder could be moved from the liquid UF<sub>6</sub> cylinder cooling area, the fill date and shift were verified by the material handlers to be at least four days and one shift prior to the current shift. In cases where a sticker was missing, the log books were consulted for cooling time verification. In the event that a cylinder was needed immediately after the 96 hour cooling period, the exact date and time of disconnection was written on the sticker.

##### c. Conclusions

For those tasks observed by the inspector, operations were conducted safely in accordance with applicable procedures. Operators were cognizant of safe operating parameters, alarm responses, and current process conditions. The licensee exercised a conservative approach with respect to cylinder connects/disconnects and cool-down period verification.

## II. Maintenance and Surveillance

### M1.1 Conduct of Maintenance

#### a. Inspection Scope (88025)

The inspector reviewed selected 2000 and 2001 preventive maintenance/ surveillance records for the following safety-related equipment:

- Emergency UF<sub>6</sub> PP16 line shutoff;
- Emergency shutdown system UF<sub>6</sub> valve to auto-sampler E-422;
- Emergency shutdown system to close UF<sub>6</sub> in hotboxes;
- Emergency shutdown system for distillation ventilation blower; and
- UF<sub>6</sub> release smoke detectors.

The inspector walked through the procedure for UF<sub>6</sub> smoke detector surveillance with a maintenance mechanic and foreman. The inspector also observed maintenance activities related to the entry/inspection on the Number 4 Low Boiler Condenser, and observed health physics personnel conduct a pre-maintenance survey of a hydrogen fluoride (HF) scrubber liquid storage tank.

#### b. Observations and Findings

The inspector reviewed the maintenance management system with the Maintenance Planner and discussed the progress of implementing the new maintenance database. The inspector reviewed the list of "critical equipment," defined by Procedure MP-118, "MTW Mechanical Integrity Program," Rev. 0, 8/25/98, as equipment essential to preventing or minimizing the consequences of catastrophic releases of hazardous chemicals. The inspector noted that the UF<sub>6</sub> smoke detectors were not on the critical equipment list, although their function was to help mitigate a UF<sub>6</sub> release by alerting the control room operators to close the cylinder pigtail valves.

In response to this finding, the licensee will evaluate the need to put UF<sub>6</sub> smoke detectors on the critical equipment list during the next UF<sub>6</sub> Process Hazards Analysis meeting. The results of this review and analysis will be tracked as **IFI 04003392/2001-004-01**.

The inspector verified that the scheduled work on the reviewed systems was performed in a timely manner, with no significant problems. One exception was the failure to perform the bi-annual preventive maintenance of the emergency shutdown system hot box stop/reset buttons and valves. This activity was due by June 7, 2001, with a one month grace period not to exceed July 7, 2001. The licensee stated that during the June time-frame this equipment was out of service and could not be tested. However, at the time of the inspection, the equipment had already been placed back in service, and this maintenance was forgotten until discovered by the inspector. When informed of this, the licensee immediately tested the system, and no problems were discovered. The inspector identified this as an isolated weakness in the maintenance planning system, since no other discrepancies were found during the review.

For the maintenance on the Number 4 Low Boiler Condenser, the required permits for special work, confined space entry, health physics survey, and hot work had been appropriately reviewed by relevant supervisors and maintenance employees. The work

was coordinated with operations management, who readily provided information on the lockout/tagout status of valves and piping and who could readily locate all associated permits. The inspector verified that the work package included all appropriate tags and that the tags were installed properly, and were in a safe place. The maintenance employees were also familiar with the task procedure and protective measures. The inspector also observed that the licensee appropriately delayed work on the HF scrubber liquid storage tank due to excessive HF concentrations.

The inspector verified that UF<sub>6</sub> cylinder scale check weights had certification documents and were traceable to national standards.

c. Conclusions

**Inspection Followup Item 04003392/2001-004-01** will track the licensee's evaluation of UF<sub>6</sub> smoke detectors as critical equipment. The inspector identified an isolated weakness with regard to a missed preventive maintenance on critical equipment.

### III. Radiation Protection

R3.2 Respiratory Protection Program

a. Inspection Scope (83822)

The inspector reviewed the licensee's procedures and practices for determining airborne radioactivity concentrations, including the air sampling program, the daily airborne radioactivity alpha counting program, and calibrations of measurement instruments. The inspector also reviewed the hood face air velocity survey program.

b. Observations and Findings

On a daily basis, the licensee took air filter samples from 74 continuous air samplers located in the process buildings. After allowing 90 minutes for radon/thoron decay, these were measured in an automatic alpha counter, and the results were then reviewed by a health physics technician.

Respirators were required for areas in which a floor average or any four floor samples exceeded 30 percent of the licensee's calculated derived air concentration (DAC) for uranium tetrafluoride (UF<sub>4</sub>). The licensee had determined, from internal studies, that the UF<sub>4</sub> DAC to be 1.7 E-10  $\mu$ Ci/ml. Using the UF<sub>4</sub> DAC was the most conservative approach, given the various inhalation transportability/solubility classes of uranium compounds at the licensee's facility.

An additional investigation and health physics incident report was required when any single air sample exceeded one DAC. The licensee tracked respirator-required areas using a log book, and the process operators were alerted to wear respirators through a flashing warning light in the affected area.

The inspector verified that the licensee calibrated the rotameters for regulating sampler air flows on a quarterly basis, using a secondary standard rotameter calibrated by a dry test meter. However, the standard rotameter was not calibrated on a regular basis, and

there was no procedural requirement to do so. The inspector observed that the standard rotameter was calibrated once in 1994, but not again until 2001. Also, the dry test meter used to calibrate the standard rotameter was not traceable to national standards. In response to this finding, the licensee committed to a more frequent and regular calibration of the rotameter, and will ensure that the dry test meter is traceable to national standards. This may require the purchase of a new dry test meter with documented traceability. These improvements will be tracked as **IFI 04003392/2001-004-02**.

As for the hood air velocity measurements, the inspector reviewed velometer measurement data from the last 12 months. By procedure, if the average face velocity was less than 100 linear feet per minute, the hood was taken out of service. No discrepancies were found in this review. Velometer calibration issues will also be investigated as part of **IFI 04003392/2001-004-02**.

c. Conclusions

The airborne radioactivity survey program complied with license commitments. **IFI 04003392/2001-004-02** was opened to track improvements in the calibration program for rotameters, velometers and the dry test meter.

R3.4 Contamination Monitoring

a. Inspection Scope (83822)

The inspector observed employees, visitors and contractors performing self-monitoring for contamination prior to leaving the Restricted Area.

b. Observations and Findings

Survey instrumentation used for exit self-monitoring satisfied the required calibration frequency. The inspector observed that the licensee employees monitored correctly at the exit stations, except for a few isolated instances. When informed of these discrepancies, the Health Physics supervisor took immediate corrective actions to correct the employees and to reinforce the appropriately method for self-monitoring.

The inspector also observed some contractors and truck drivers who were incorrectly self-monitoring prior to exiting the plant. For example, two truck drivers waved the survey probe over their hands in a cursory manner, neglecting to monitor their feet. When the inspector informed the security guard, he directed them to return to the Restricted Area and monitor correctly. On two other occasions, the inspector also had to notify the guard to request that visitors monitor themselves again. The security guards, when not distracted, were diligent in enforcing the correct procedure for contamination self-monitoring. However, the inspector identified a weakness in the procedure. When the guards were distracted by other activities near the plant exit, they were unable to observe the survey instrumentation, and therefore, were unable to enforce the correct exit monitoring procedure. The Health Physics supervisor acknowledged a need to reinforce training for visitors on contamination control and will address this issue. This response was satisfactory to the inspector.

c. Conclusions

The inspector identified weaknesses in the licensee's exit self-monitoring program, and the licensee took immediate and satisfactory corrective actions. The NRC will continue to evaluate exit contamination controls during future inspections.

#### IV. Plant Support

##### Followup

a. Inspection Scope (92904)

The inspector discussed **IFI 040-03392/2000-005-02** with the Health Physics Supervisor. This was opened in November 2000 to track the As-Low-As-Reasonably-Achievable (ALARA) sub-team's corrective actions regarding approximately six hundred deteriorated and leaking 55-gallon drums of hard uranium ore concentrate. The inspector toured the drum storage pad to observe the physical condition of the leaking 55-gallon drums.

b. Observations and Findings

The licensee was putting the relatively intact drums into new 85-gallon drums, and the contents of severely deteriorated drums into new 55-gallon drums. When the IFI was opened, approximately 100 out of the 600 leaking drums had been repackaged. Since then, about 350 more had been repackaged, leaving approximately 150 leaking drums.

The ALARA committee meeting minutes for the first Quarter of 2000 scheduled the completion of uranium concentrate repackaging from leaking drums to new drums by September 1, 2000. The ALARA sub-team identified that completion of the above items in a short time-frame would prevent, or reduce, the possibility of exposure to the public, as well as reduce the possibility of employee exposure. However, due to budgetary constraints, this repackaging work was still incomplete. Furthermore, the licensee attributed this leaked uranium ore as the cause for recently exceeding NRC limits for the nearest resident radioactivity concentration average. As stated in a July 13, 2001 notification letter to NRC, the licensee's 2001 second quarter nearest resident radioactivity concentration average was  $3.73\text{E-}14 \mu\text{Ci/ml}$ , or 124.3 percent of the quarterly limit as specified in section 4.1.1 of the license.

c. Conclusions

Failure to meet the ALARA sub-team's scheduled repackaging date by nearly a year is needlessly increasing the public's risk of exposure to airborne radioactivity. Licensee staff informed the inspector that new 85-gallon drums were expected to arrive by mid-August, and repackaging of all remaining deteriorated drums of uranium hard ore concentrate would be completed by the end of August, 2001. The NRC will review the final progress of this during the next inspection.

## V. Management Meeting

### Exit Meeting Summary

The inspector presented the inspection results to members of the plant staff and management at the conclusion of the inspection on July 27, 2001. The plant staff acknowledged the findings presented. The inspector asked the plant staff whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

### PARTIAL LIST OF PERSONS CONTACTED

#### Honeywell Specialty Chemicals

K. Benard, Maintenance Work Scheduler  
C. Blanden, Yard Area Day Foreman  
M. Davis, Health Physics Supervisor  
J. Ellerbusch, Electrical Maintenance Foreman  
L. Hemphill, Instrument Mechanic  
D. Heine, Production Supervisor  
K. Keene, Maintenance Supervisor  
W. Lessig, Plant Manager  
H. Roberts, Health Physics Manager  
M. Shepherd, Manager, Environmental and Regulatory Affairs

Other members of the licensees' staff were also contacted during the inspection.

### INSPECTION PROCEDURES USED

TI 2600/003: Operational Safety Review  
IP 88020: Operations Review  
IP 88025: Maintenance and Surveillance  
IP 83822: Radiation Protection  
IP 92904: Followup - Plant Support

### ITEMS OPENED, CLOSED, AND DISCUSSED

#### Opened:

04003392/2001004-01	IFI	Evaluation of UF <sub>6</sub> smoke detectors as critical equipment.
04003392/2001004-02	IFI	Track improvements in licensee's calibration program.

#### Closed:

None

#### Discussed:

04003392/2000-005-02	IFI	Address breaching natural uranium ore from 55-gallon drums.
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## LIST OF ACRONYMS USED

ADAMS	Agency Document Access and Management System
ALARA	As-Low-As-Reasonably-Achievable
CFR	Code of Federal Regulations
DAC	Derived Air Concentration
DNMS	Division of Nuclear Material Safety
FMB	Feed Materials Building
HF	Hydrogen Fluoride
IFI	Inspection Followup Item
IP	Inspection Procedure
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
UF <sub>4</sub>	Uranium Tetrafluoride (Green Salt)
UF <sub>6</sub>	Uranium Hexafluoride