October 11, 2000

Mr. J. N. Adkins
Vice President - Production
United States Enrichment Corporation
Two Democracy Center
6903 Rockledge Drive
Bethesda, MD 20817

SUBJECT: NRC EMERGENCY PREPAREDNESS EXERCISE INSPECTION REPORT 70-7001/2000008(DNMS)

Dear Mr. Adkins:

On September 21, 2000, the NRC completed an emergency preparedness exercise evaluation inspection at your Paducah Gaseous Diffusion Plant. The purpose of the inspection was to determine whether activities authorized by the certificate were conducted safely and in accordance with NRC requirements. At the conclusion of the inspection, the inspectors discussed the findings with members of your staff as identified in the enclosed report.

Areas examined within your emergency preparedness exercise performance are identified in the report. Within those areas, the inspection consisted of a selective examination of procedures and representative records, observation of performance, and interviews with staff. The objectives of the inspection effort were to determine whether the Emergency Plan was adequate and facility personnel were capable of implementing the Emergency Plan in accordance with NRC requirements. Based on the results of this inspection, no violations of NRC requirements were identified.

Overall exercise performance was effective in that if the events had been real, the certificatee's actions would have resulted in isolation of the release and prompt notification of offsite personnel to implement protective actions. However, the plant staff critiques did not identify all areas of exercise weaknesses.

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 these observations.

Sincerely,

/RA by M. Phillips acting for/

Patrick L. Hiland, Chief
Fuel Cycle Branch

Certificate No. GDP-01
Docket No. 70-7001

Enclosure: Inspection Report 70-7001/2000008(DNMS)

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REGION III

Docket No:	70-7001
Certificate No:	GDP-1
Inspection Report:	70-7001/2000008(DNMS)
Facility Operator:	United States Enrichment Corporation
Facility Name:	Paducah Gaseous Diffusion Plant
Location:	5600 Hobbs Road P.O. Box 1410 Paducah, KY 42001
Dates:	September 19-21, 2000
Inspectors:	M. Phillips, Senior Fuel Cycle Inspector T. Ploski, Senior Emergency Preparedness Analyst K. O'Brien, Senior Resident Inspector J. Jacobson, Resident Inspector
Approved By:	Patrick L. Hiland, Chief Fuel Cycle Branch Division of Nuclear Material Safety

EXECUTIVE SUMMARY

United States Enrichment Corporation
Paducah Gaseous Diffusion Plant
NRC Inspection Report 70-7001/2000008(DNMS)

This inspection consisted of an evaluation of the certificatee's performance during the plant's biennial exercise of its Emergency Plan, observation of the certificatee's self assessment efforts in identifying exercise weaknesses, and evaluation of effectiveness of the certificatee's corrective actions for previous exercise weaknesses. The inspection was conducted by regional and resident inspectors. No violations of NRC requirements were identified.

Plant Support

The exercise was a successful demonstration of the certificatee's capabilities to implement its Emergency Plan and procedures. Event classification was correct and timely. Offsite notifications were timely and adequately detailed. Transfers of command and control were appropriately coordinated. Responding personnel performed in a manner that would have protected the workers' safety and eventually resulted in mitigation of the release.

- The exercise objectives and scenario acceptably exercised major elements of the certificatee's onsite emergency plan.

- Overall Primary Control Facility (PCF) performance was effective. Accident information was quickly passed to the PCF, and Incident Commanders (ICs) rapidly responded to both accident scenes as they occurred. The uranium hexafluoride (UF_6) release event was properly classified, and emergency notifications were made in a timely manner. The emergency response organization was promptly activated. The PCF handled two simultaneous events well. (Section P4.b.1.1)

- The Building C-315 event scenario was challenging and of sufficient depth to test the staff's capabilities to respond to a design basis accident involving a leaking cylinder. Responding personnel performed in a manner that would have protected the workers safety and eventually resulted in mitigation of the release; however, weaknesses were identified involving training, response planning, command and control, response implementation, and decon activities. Examples included the type and availability of response equipment, coordination of on scene response groups, training for some responders, and implementation of some decon functions. (Section P4.b.2.1)

- Overall command and control at the Building C-600 event scene were effective. Good communications between the IC and Emergency Operations Center (EOC) were exhibited. Although there was some delay in locating injured due to the lack of a systematic approach to search and rescue, medical conditions of victims were properly addressed via appropriate triage efforts at the scene. (Section P4.b.3.1)

- The overall emergency response by EOC management and staff was successful in appropriately responding to two simultaneous accidents. However, EOC staff had difficulty in determining when accountability was completed, and spent unnecessary time in determining if the C-600 fire necessitated an emergency classification. Once the site had declared a valid Site Area Emergency, which is the highest emergency

classification in the emergency plan, the next declaration should have been recovery, when all accident scenes were under control. (Section P4.b.4.1)

- The staff identified medical needs of the patients and responded promptly to address those needs while controlling known contamination of the patients. A problem was noted with communication of survey results to the medical staff resulting in cross contamination of the medical staff who handled the patient that had not been fully surveyed. (Section P4.b.5.1)

- The field monitoring teams (FMTs) properly performed hydrogen fluoride (HF) monitoring in the field; however, given the detectability of the instruments and lack of respiratory protection, any HF would most likely have been first identified by the nose of a team member. Only one team was dispatched, and it did not include radiation protection (RP) coverage, so no efforts were made to characterize the potential radiological contamination as a result of the release prior to going to the recovery mode. A security guard without respiratory protection was found in the center of the plume. He had been dispatched without any apparent coordination with the EOC staff monitoring the plume. (Section P4.b.6.1)

Plant staff critiques were considered a weakness in that several opportunities to identify areas for improved performance were missed. Participants did not want to verbally raise issues that they perceived may not be positive. (Section P4.b.7.1)

With only three exceptions, the multiple items that had been identified for improvement from the previous exercise and drills had been corrected, and those same items were not observed during this exercise. (Section P4.b.8.1)

Report Details

IV. Plant Support

P3 Emergency Preparedness Procedures and Documentation

P3.1 Review of Exercise Objectives and Scenario (88050)

The inspectors reviewed the 2000 exercise objectives and scenario and determined that they acceptably exercised major elements of the certificatee's onsite emergency plan. The scenario provided a challenging framework to support demonstration of the certificatee's capabilities to implement its Emergency Plan. The scenario included two un-related accidents, a large uranium hexafluoride (UF_6) release and a fire with multiple injured personnel at two accident scenes. A copy of the scenario is attached. The ruptured cylinder mock up was effective, involving the use of smoke generators for additional realism. Similarly, mannequins were used to simulate injured and trapped workers in the Building C-600 event. Controller messages properly provided additional information. Very little simulation of activities was observed. No controller conduct problems were observed.

P4 Staff Knowledge and Performance in Emergency Preparedness

P4.1 2000 Evaluated Biennial Emergency Preparedness Exercise

a. Inspection Scope (88050)

On September 20, 2000, the certificatee conducted its biennial emergency preparedness exercise involving partial county participation and full participation by the two local hospitals. The onsite emergency response organization and emergency response facilities were fully activated.

The inspectors evaluated performance of emergency response personnel in the following areas:

- Plant Control Facility (PCF);
- Incident Commanders (IC) and Command Posts (CP);
- Onsite Emergency Operations Center (EOC);
- Onsite Medical Facility; and
- Field Monitoring Teams

The inspectors assessed the certificatee's recognition of abnormal plant conditions, classification of emergency conditions, notification of offsite agencies, development of protective action recommendations, command and control, communications, conduct of field response teams, and overall implementation of the Emergency Plan and procedures. In addition, the inspectors attended the post exercise critiques in each of these areas, and the overall critique by the exercise evaluators, to evaluate the self-assessment of exercise performance.

b. Emergency Response Facility Observations and Findings

b.1 Plant Control Facility (PCF)

Promptly after receiving a report of a uranium hexafluoride (UF_6) liquid cylinder drop with an associated release at Building C-315, an operator in the PCF sounded the plant alarm and made a Public Address (PA) announcement requesting deployment of the plant's emergency squad to a location upwind of a reported UF_6 release at building C-315. The PA message included current wind speed and direction information to better ensure that plant personnel stayed upwind of the release.

The Incident Commander (IC) promptly radioed the PCF that he had made a Site Area Emergency (SAE) declaration and a protective action recommendation (PAR) to advise persons within the plant's 2-mile Immediate Notification Zone (INZ) to perform in-place sheltering and to order in-place sheltering of personnel within nearby buildings. These decisions were procedurally correct and timely (within 8 minutes of the initiation of the exercise). The PCF staff completed the required initial notification calls to McCracken County, Commonwealth of Kentucky, and the Department of Energy's (DOE) Oak Ridge Operations Office officials within the required 15 minutes of the SAE declaration using a proceduralized emergency notification form. The IC was told when these notifications were completed.

While the response to the UF_6 release was ongoing, PCF operators received initial reports of an unrelated explosion and fire within building C-600 that involved injuries to several plant personnel. A second IC and response personnel responded to the second event.

b.1.1 Conclusions

Overall PCF performance was effective. Accident information was quickly passed to the PCF, and ICs rapidly responded to both accident scenes as they occurred. The UF_6 release event was properly classified, and emergency notifications were made in a timely manner. The emergency response organization was promptly activated. The PCF handled two simultaneous events well.

b.2 Incident Commander (IC) and Command Post (CP) at Building C-315 Event

The Building C-315 event scenario was challenging and of sufficient depth to test the staff's capabilities to respond to a design basis accident involving a leaking cylinder. Responding personnel performed in a manner that would have protected the workers' safety and eventually resulted in mitigation of the release. Procedures were correctly used by the IC to declare the Site Area Emergency after evaluation of simulated emergency conditions.

The emergency response staff responded rapidly to the accident scene. Two victims with simulated hydrogen fluoride (HF) burns walked up the access road until they were intercepted by ambulance and fire brigade (FB) response personnel. The victims were initially questioned by the IC while they were being decontaminated by FB personnel by removing their clothing. The victims were placed in an ambulance and transported to the onsite medical facility within 10 minutes of the incident.

The CP location was suitably established upwind of the UF_6 release; however, incident command and control activities appeared to have been hampered in several instances by the separate locations of the IC, the Fire Commander, the Security Commander, and the health physics staff. Initial staging of the "hot line" was hampered by communication, site familiarity, and oversight weaknesses. Although the staff was requested to set the line up at Nebraska, the staff started to set it up at Ohio. This was probably due to limited site familiarity due to location (tertiary road). In addition, security initiated roping off the Building C-315 area closer than the location specified by the IC and without direction from the Security Commander.

The IC experienced difficulty monitoring the multitude of communication methods utilizing the available tools. Specifically, the IC needed to monitor the telephone, 800 MHZ radio, plant radio, and listen to personnel at the same time. This may have contributed to the initial lack of oversight when another security team onsite set up a road block north of release directly in the path of the plume and within the emergency control zone. This action was not noticed by the IC at the scene but was somehow later corrected.

When advised of the report of an explosion and fire at Building C-600, the IC appropriately retained responsibility for the cylinder leak at Building C-315. Emergency response was effectively split, with the Assistant Plant Shift Superintendent (APSS) becoming the second IC at the Building C-600 scene. Sufficient personnel and equipment resources were retained for emergency response at Building C-315.

The first entry team used a fire extinguisher to initially mitigate the release. Due to the stored energy in the cylinder and the size of the hole, this approach may not have been effective in a real emergency. The team was unable to implement a long term mitigation strategy for the release, due in part, to design issues with some of the mitigation tools and an unfamiliarity with some of the equipment. The team was not familiar with the emergency patches and the strapping tools (come-alongs). In addition, some of the cylinder repair patches were not conducive to easy use (absence of connecting points on a patch, miss-match between patches and strapping methods).

While appropriate monitoring of the area using survey meters and Drager tubes were conducted, decon team members were not always in consistent personal protection equipment (PPE). In addition, decon activities were not always carried out consistent with the conditions. For example, there was no indication that decon of the plant security personnel that inadvertently entered the area had been properly conducted.

b.2.1 Conclusions

The Building C-315 event scenario was challenging and of sufficient depth to test the staff's capabilities to respond to a design basis accident involving a leaking cylinder. Responding personnel performed in a manner that would have protected the workers' safety and eventually resulted in mitigation of the release; however, weaknesses were identified involving training, response planning, command and control, response implementation, and decon activities. Examples included the type and availability of response equipment, coordination of on scene response groups, training for some responders, and implementation of some decon functions.

b.3 Incident Commander (IC) and Command Post (CP) at Building C-600 Event

During the above incident, an explosion with fire was reported to have occurred at Building C-600, requiring the establishment of an additional incident command post, which was manned by the Assistant Plant Shift Superintendent as the IC. Although a new PA announcement was made concerning the fire, the emergency tones were not used, causing some minor confusion among responders.

Overall command and control exhibited by the IC and Safety Officer were effective. The IC effectively communicated with the EOC to ensure that power to the building was cut to reduce potential electrocution threat and ensured that the oil and gas for boilers were shut off to control combustibles in the vicinity of the simulated fire.

Entries by firefighters were made with appropriate backup teams ready and fire hoses laid and charged. Initial responses and identification of victims was somewhat delayed because a methodical search and rescue was not initiated. In addition, firefighters eventually ran out of compressed air and would have needed more from other locations had the event been real. Also, the firefighters needed an air bag to rescue a simulated injured person under the Number 2 boiler and it took some 40 minutes to locate one.

Coordination with offsite fire and medical staff was generally effective, although some delays with positioning ambulances in best locations to receive injured were noted. Medical attention to victims was done via triage, which effectively ensured that limited resources were appropriately applied.

b.3.1 Conclusions

Overall command and control at this event scene were effective. Good communications between the IC and EOC were exhibited. Although there was some delay in locating injured due to the lack of a systematic approach to search and rescue, medical conditions of victims were properly addressed via appropriate triage efforts at the scene.

b.4 Emergency Operations Center (EOC) in Building C-300

The overall emergency response by EOC management and staff was successful. However, concerns were noted regarding onsite accountability and emergency re-categorization.

Required staffing of the EOC was orderly and timely following the SAE declaration. The EOC staff responded to a plant PA announcement before their pagers activated. The EOC's Crisis Manager (CM) announced that he had assumed overall command of the event response from the IC 20 minutes after the exercise began. By this time, the CM was aware that all key EOC staff were present and virtually all EOC support staff had arrived.

Initial notifications to the Nuclear Regulatory Commission (NRC), the National Response Center, and the United States Enrichment Corporation's (USEC's) Headquarters were completed well within the 60 minute time limit after SAE declaration.

Priority actions associated with the C-315 event response were appropriate and were conspicuously posted on a status board. Response priorities were expanded, revised,

and posted following the event at C-600. The CM led update briefings about every 20-30 minutes involving participation by all his key aides, to better ensure that event response actions were understood by EOC staff and to determine if other information was available that should be shared. The EOC staff were attentive to these briefings. Topics included: damage assessment and repairs, progress at both accident scenes, status of injuries and transporting victims to various locations, status of the FMT, and the status of press releases and press briefings.

Although the Operations Support Group (OSG) could not view the EOC status boards from their work room, they were in frequent communication with the Enrichment Advisor, who was readily able to view all status boards and who conferred with the CM and other nearby key EOC staff as needed. In contrast, the Technical Assessment Group (TAG) could view the EOC's status boards more directly. The Environmental Safety and Health (ES&H) Advisor communicated with them either by phone or in person. Status boards were generally well maintained and effectively used to indicate when the Immediate Notification Zone's sirens were re-sounded at 15 minute intervals and when update messages were periodically transmitted to offsite officials. A map was also effectively used to display the estimated location of the plume.

The EOC staff were diligent in their efforts to monitor progress at both accident scenes in locating and identifying victims and in tracking where each victim was sent for care. They were also aware of the fatality and the need for a coroner to be on the scene. The EOC's public information staff were in frequent contact with Joint Public Information Center (JPIC) counterparts and made good efforts to consult other EOC staff to verify information before they communicated it to JPIC counterparts.

Although the relevant procedures to address accountability included clearly stated criteria for completion of accountability and a timeliness goal, the timeliness of completing onsite accountability was uncertain. Site-wide accountability was ordered by the CM a few minutes after the initial report of the C-600 event was received. Approximately 38 to 43 minutes later, the CM was informed that accountability had been completed. Then, a PA announcement was made requesting that 19 named personnel contact C-300 staff to report their whereabouts. These 19 names included victims from both events. Plant PA messages indicated progress in reducing the number of "missing" onsite personnel. By 10:10 a.m. (the request for accountability was initiated at approximately 9:20 a.m.), only 3 persons were named in a PA announcement requesting that they contact C-300 staff. All three persons were C-600 accident victims. Since the CM was told at 10:00 am that accountability was complete, it is unclear why PA messages continued to be made until 10:41 a.m. stating that the aforementioned three persons still needed to contact C-300 staff to report their whereabouts. At 10:41 a.m., a PA message indicated that onsite accountability was now complete.

While the initial emergency classification was appropriate and timely, the EOC staff spent time in determining if the C-600 explosion and fire warranted an additional emergency classification. Also, later in the scenario, the ES&H Advisor and some TAG staff attempted to quickly re-categorize the emergency to something other than an SAE prior to going to recovery. Terminating the SAE would not lessen accident scene response activities, FMT activities, or EOC and JPIC activities. Instead, the CM assured an offsite official during a telephone call that the EOC would remain staffed for event response as long as necessary to support accident scene activities and to address

Commonwealth and county concerns. To avoid potential confusion to offsite officials and the media, it may have been more appropriate to indicate that the UF_6 release was terminated but that response and assessment activities remained ongoing for the C-315 and C-600 events until they were sufficiently under control to warrant going to a recovery mode. Classifying the emergency per the EALs ensures prompt deployment of necessary resources to address the emergency. Once the EAL has properly been classified, there is no need to re-classify an emergency downward, as the next phase of the response is recovery. The EOC staff properly determined that recovery could not be initiated if the C-600 event was ongoing. While the CM and several key staff reviewed the EALs and correctly concluded that the C-600 event was an "unclassified emergency"; the value of making this assessment was limited, as this assessment had no impact on ongoing emergency response activities.

After the CM announced that Kentucky officials had concurred in his decision to terminate the SAE and transition to Recovery, the CM announced the appointment of a Recovery Manager (RM). The RM, who was the Assistant CM, announced his intent to form two multi-disciplinary, root cause investigation teams: one for the C-315 event and one for the C-600 event. The need to coordinate with an NRC Incident Investigation Team was not mentioned.

b.4.1 Conclusions

The overall emergency response by EOC management and staff was successful in appropriately responding to two simultaneous accidents. However, EOC staff had difficulty in determining when accountability was completed, and spent unnecessary time in determining if the C-600 fire necessitated an emergency classification. Once the site had declared a valid Site Area Emergency, which is the highest emergency classification in the emergency plan, the next declaration should have been recovery, when all accident scenes were under control.

b.5 Onsite Medical Facility

The two individuals with simulated HF burns were promptly transported by ambulance to the onsite medical facility after initially having their clothing removed at the accident scene. An RP technician accompanied the individuals in the ambulance, and performed some preliminary contamination surveys of the victims; however, the extent of the survey information was not clearly communicated to medical staff, resulting in cross contamination by the medical staff. The medical staff had assumed that no contamination was present on a victim's hands when contamination was present, but no survey had been performed of the area to detect the contamination.

The medical facility was well set up (floor coverings, treatment table designed to capture effluents, etc.) to handle one contaminated injured patient; however, the second patient was required to go to an area that had not been set up for contamination. In addition, the entryway to the facility was partially covered for contamination control (half the area was covered for contamination control, and the other half constituted a "clean" area). As a result, the RP technician performed several swipes and surveys to ensure that the clean portions of the entryway and second treatment room to look for the spread of any contamination.

The facility demonstrated good coordination in notifying the hospitals of pending transport of the victims, including medical and radiation contamination information on each victim. The staff identified medical needs of the patients and responded promptly to address those needs.

As noted above, the setup of the facility was good for controlling the spread of contamination; however, there were problems noted with overall contamination control. The gurney was released back to the ambulance without a survey; however, this became a moot point when the gurney was subsequently retrieved to transport one of the victims to a local hospital. Surveys were conducted in both rooms and the entryway to check for contamination. The victims were also surveyed when it became known to the medical staff that this had not been completed for both victims prior to arrival at the medical facility. The ambulance used a body bag to control the spread of contamination from the victims. This prevented the spread of contamination from the victim to surrounding areas.

b.5.1 Conclusions

The staff identified medical needs of the patients and responded promptly to address those needs while controlling known contamination of the patients. A problem was noted with communication of survey results to the medical staff resulting in cross contamination of the medical staff who handled the patient that had not been fully surveyed.

b.6 Field Monitoring Teams

The Field Monitoring Teams (FMTs) were staged in the basement of the C-300 (PCF) building, and consisted of an environmental technician, radiation protection technician, and industrial hygiene technician each for two teams. Well into the UF_6 release (about an hour after it initiated), the ES&H advisor came down to brief the teams, and deployed one team. The team was dispatched offsite without a radiation protection technician and instructed to monitor for HF only along a road north of the plant boundary, but within two miles of the release point. By the time the team was deployed, the release was over, and given the meteorology (15 mph southerly wind), almost all of the material would have been well north of the site.

The team was dispatched without a requirement to don respiratory protection. Given that the team was monitoring for HF, which can be detected by the nose at concentrations lower than the minimum detectable from the monitoring equipment, this deployment of the team appears to be unwarranted. Had it been the goal to monitor the environs for HF and any uranium presence to ensure that the original protective action recommendations were adequate, the team should have been dispatched as soon as possible after assembling, been placed in respiratory protection, and dispatched with all three members to identify plume boundary based on the current meteorology.

The team properly used the monitoring instrumentation and appropriately followed the sampling procedure, which resulted in no detectable HF. As noted above, this is not surprising given the timing of the dispatch of the team. The team was unable to determine if the plume had deposited any uranyl fluoride (UO_2F_2) since there was no radiation protection technician on the team, and the sampling equipment for detecting UO_2F_2 had been left at the team deployment area in C-300.

Deployment of two FMTs would have been more appropriate to attempt to better define the extent of HF and UO_2F_2 impact zones from a release from a heated 14-ton UF_6 cylinder into areas accessible to the public. Only one FMT was deployed, although staff resources were available for two FMTs.

A separate issue concerned the inability of the TAG to readily discern data points from the FMT. When the FMT was dispatched, he was instructed to take samples approximately every 500 feet. There were no good markers in the field or accessible to the TAG to delineate where the samples were being taken.

During monitoring by the FMT, a location within two miles of the release was found to be occupied by a previously-dispatched security individual to block public access. This individual had been placed directly into the middle of the simulated plume while the plume was present without any respiratory protection or co-ordination with health physics or industrial hygiene. As a result, had the emergency been real and the individual had his windows up, he could have entered an area of fairly high HF concentration before he would have become aware of the presence of the HF.

Although EOC staff monitored the progress of the deployed FMT, it appeared that the team had completed only one traverse of the plume along a road and only made some HF concentration measurements before the TAG, per the ES&H Advisor's request, began assessing the potential to recommend downgrading the SAE declaration. The extent of deposition of UO_2F_2 in areas that could be accessible to the public should have been factored into the decision to enter the recovery mode.

b.6.1 Conclusions

The FMTs properly performed HF monitoring in the field; however, given the detectability of the instruments and lack of respiratory protection, any HF would most likely have been first identified by the nose of a team member. Only one team was dispatched, and it did not include RP coverage, so no efforts were made to characterize the potential radiological contamination as a result of the release prior to going to the recovery mode. A security guard without respiratory protection was found in the center of the plume. He had been dispatched without any apparent coordination with the EOC staff monitoring the plume.

b.7 Critiques

Critiques were held in each facility immediately following the exercise. Participants remained in the facility, and were actively encouraged to identify positive and negative issues. Critique sheets were provided for written comments. A controller critique was conducted following the participant critiques.

For the most part, critiques missed opportunities to identify exercise deficiencies while identifying areas where personnel performed well. Participants did not want to verbally raise issues that they perceived may not be positive. In one case during the responder's critique, the individual prefaced his remarks with "I don't want to step on anyone's toes..."

Several of the weaknesses discussed above were not brought up during the certificatee critiques. The critique of the Building C-315 field activities missed several opportunities

to identify weaknesses in training, response planning, command and control, response implementation, and health physics activities. Examples included the type and availability of response equipment, coordination of on scene response groups, training for some responders, and implementation of some decon functions. Similarly, neither the TAG nor EOC critique picked up on the positioning of an onsite and an offsite security control point in the center of the plume.

b.7.1 Conclusions

Plant staff critiques were considered a weakness in that several opportunities to identify areas for improved performance were missed. Participants did not want to verbally raise issues that they perceived may not be positive.

b.8 Correction of Previous Exercise/Drill Weaknesses

The inspector reviewed the weaknesses identified from the previous exercise that had been placed in the certificatee's tracking system, and also reviewed weaknesses identified in the previous NRC exercise inspection report. Of the approximately 100 items being tracked for improvement, only three items occurred again during this exercise. Those items were: failure to put the times on messages transmitted throughout the EOC; the late dispatch of Field Monitoring Teams; marking of identifying information on the roadway for field teams.

b.8.1 Conclusion

With only three exceptions, the multiple items that had been identified for improvement from the previous exercise and drills had been corrected, and those same items were not observed during this exercise.

P4. c. Overall Exercise Conclusions

The exercise was a successful demonstration of the certificatee's capabilities to implement its Emergency Plan and procedures. Event classification was correct and timely. Offsite notifications were timely and adequately detailed. Transfers of command and control were appropriately coordinated. Responding personnel performed in a manner that would have protected the workers safety and eventually resulted in mitigation of the release.

V. Management Meetings

X1 Exit Meeting Summary

The inspector presented the inspection results to members of the plant staff and management at the conclusion of the inspections on September 21, 2000. The plant staff acknowledged the findings presented. The certificatee did not identify any of the information discussed as proprietary.

Attachment: As stated

PARTIAL LIST OF PERSONS CONTACTED

United States Enrichment Corporation (USEC)

*D. Elrod, Emergency Management
*A. Grace, Nuclear Regulatory Affairs
*A. Fisk, Emergency Management
*L. Jackson, Manager, Nuclear Regulatory Affairs
*M. Maurer, Plant Shift Superintendent
*J. Millsfield, Emergency Management
*V. Shanks, Production Superintendent
*H. Pulley, Plant General Manager
*L. McKinney, Emergency Management
*P. Jenny, Plant Services Manager
*W. Halicks, General Production Services Maintenance Manager
*R. Starkey, Training Manager
*G. Lookofsky, Public Affairs

*Denotes those present at the September 21, 2000 exit meeting. Other members of the plant staff were also contacted during the inspection.

INSPECTION PROCEDURES USED

IP 82301:*	Evaluation of Exercises for Power Reactors
IP 82302:*	Review of Exercise Objectives and Scenarios for Power Reactors
IP 88050:	Emergency Preparedness

*Used as guidance only to focus evaluation resources effectively.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None.

Discussed

None.

LIST OF ACRONYMS USED

ACM	Assistant Crisis Manager
APSS	Assistant Plant Shift Superintendent
CFR	Code of Federal Regulations
CM	Crisis Manager
CP	Command Post
DNMS	Division of Nuclear Materials Safety
DOE	Department of Energy
EAL	Emergency Action Level
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
EPIP	Emergency Plan Implementing procedure
ES&H	Environmental Safety and Health
FB	Fire Brigade
GDP	Gaseous Diffusion Plant
HF	Hydrogen Fluoride
IC	Incident Commander
I&C	Instrumentation and Control
IFI	Inspection Followup Item
INZ	Immediate Notification Zone
IP	Inspection Procedure
JPIC	Joint Public Information Center
NRC	Nuclear Regulatory Commission
PA	Public Address
PAG	Protective Action Guideline
PAR	Protective Action Recommendation
PCF	Plant Control Facility (Building C-300)
PGDP	Paducah Gaseous Diffusion Plant
PIO	Public Information Officer
PSS	Plant Shift Superintendent
PWS	Public Warning System
RM	Recovery Manager
TAG	Technical Assessment Group
UF_6	Uranium Hexafluoride
USEC	United States Enrichment Corporation

ATTACHMENT

PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
08:30	00:00:30 Sec.	1	The event is reported to C-300.
08:31	00:01*		Plant Emergency Squad called out and dispatched to C-315.
08:34	00:04*	2	The PSS/Incident Commander (IC) and Plant Emergency Squad are arriving on-scene and observe the leaking cylinder.
		3, 4	The operators who were injured while escaping present themselves to the E-squad. The operators have inhaled some of the vapor and are complaining of burning in the throat, chest, and eyes with slight burning of the skin. The injured operators describe to the E-squad members that a liquid UF_6 cylinder was dropped as a result of a crane failure.
	00: I0*	II	The PSS, as Crisis Manager, classifies the event as a **SITE AREA EMERGENCY** (ruptured liquid UF_6 cylinder), orders near-scene protective actions, initiates emergency notifications, including activation of the PWS and EAS, and activates the EOC.
		CI#1-1, CI#2-1	The Plant Emergency Squad begins decon, treatment, and monitoring of injured/contaminated patients and prepares for HAZMAT entry to mitigate the leaking cylinder.
	00:15*	CI#l-l thru CI#1-3, CI#2-1 thru CI#2-3, CI#1-5X CI#2-5X	Ambulance(s) are arriving at the Plant Medical Facility with contaminated/injured. Medical will treat/stabilize patients while maintaining contamination controls and preparing to send patients to off-site hospitals.

* - denotes expected action or time.

NOTE: Many of the problems listed in the time line will occur simultaneously but may not (actually cannot) be checked-out and reported in any specific order.

PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
08:45	00:15	10X	Contingency Message: A SITE AREA EMERGENCY is declared by the PSS. Initial emergency notifications to offsite authorities provide recommended protective actions to shelter-in-place the population downwind and the off-site warning sirens are activated (simulated) by C-300.
	00: 17*	8X, 9X	Air compressors and their intakes in C-620 are shut down to avoid contaminating the plant air system. C-600 will have to pick up the load.
08:50	00:20		E-Squad is totally committed to the UF_6 response at C-315.
08:55	00:25*		EOC is declared OPERATIONAL. Onsite/Offsite protective actions are being reviewed/analyzed.
09:01	00:31	5	Haz Mat entry team makes entry to patch/plug damaged UF_6 cylinder.
		5	(Upon entry to the leaking cylinder, team members should report description of hole and location to the IC. Entry team may attempt to freeze out UF_6 release with $C0_2$ and then patch/plug cylinder. When successfully patched/plugged, determined by HAZMAT Controller, cylinder and material on ground should be covered by tarp to limit plume formation.)
09:10	00:40*	Cl#l-l thru C#1-4, Cl#2-1 thru Cl#2-4	Contaminated/injured operators from the C-315 UF_6 release incident are arriving at Western Baptist Hospital and Lourdes Hospital.

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PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
09:15	00:45*	6	Entry team attempts to patch the cylinder and/or uses other mitigating tactics.
09:15	00:45	B-1	C-300 receives multiple C-600 sprinkler alarms.
09:16	00:46*		C-300 reports C-600 sprinkler alarms to the PSS/IC, who then assigns an IC for C-600 incident.
09:16	00:46	B-2	C-600 operator reports the explosion, several small fires, and multiple injuries at C-600.
09:17	00:47*		EOC/TAG is developing sampling strategy for FMT.
09:20	00:50*	B-4, B-23	Responders arriving on-scene at C-600 report several injuries, trapped workers, multiple small fires, electrical arcing, and a moderate amount of smoke.
09:20	00:50	B-3, B-5X B-6 thru B-6-4, B-7 thru B-8X thru B- I5X	Because of the fire/explosion in C-600, C-300 Power Operator is asked to clear ABCs 24D62 and 25A6A. However, breaker 24D6D will not open, therefore requiring the clearing of Bus 2D.
09:21	00:51*		IC at C-600 requests mutual aid fire and medical support. Plant steam is now lost. Backup air to replace C-620 is lost. Electrical equipment problems associated with the C-600 explosion are impacting cells and other systems.
09:21	00:51	B-16	C-300 Cascade Operators receive CAAS trouble alarms from C-720, and C-409.

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PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
		B-17X	(*C-300 Controller will not allow the plant to go into an actual LCO because of the CAAS trouble alarms. Planning by C-300/EOC will be sufficient*.)
09:22	00:52	B-18 -	Load indicators and amp gages show the following: Loss of C-331 Cells: 2-1, 2-3, 2-5, 3-1, and 3-3.
09:30	01:00	B-19	C-300 Operator receives Low Plant Air alarm on C-300 panel. The C-300 air pressure gage indicates 77 psig.
09:35	01:05	B-20, B-21	C-300 Operators receive calls from C-3 IO and C-315 buildings reporting that low plant air pressure has caused the emergency cylinder valve closure systems to throw over to nitrogen backup.
09:40	01:10	B-22	C-300 receives a call from Post 15 reporting that there is no electrical power in Post 15 and the gate is working off diesel power from C-200.
09:41	01:11		First arriving mutual aid companies are on-scene at C-600 to begin rescue/medical/firefighting.
09:43	01:13	7XC	UF_6 release has slowed to small vapor puffs and whiffs. The cylinder has released almost all of its contents.
09:50	01:20*	M-4-1	McCracken County Coroner and Sheriff are called to the scene of the fatality. The EOC/Operations Assessment Group (OAG) is working through the problems of: ● Stabilizing the cascade with the lost cells and equipment ● Loss of steam ● Operability/TSR issues ● Loss of steam

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PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
09:50	01:20*		Injured personnel from the C-600 fire/explosion begin arriving in the Plant Medical Facility.
		FMT-1	FMT teams are in the field collecting air, soil, vegetation, water, and other samples.
			The EOC is preparing a list of needs to meet event termination criteria for the C-315 UF_6 release.
		B-26	Responders at the C-600 report heavy runoff of oil contaminated water from the firefighting effort.
			EOC/TAG is developing a sampling strategy for the outfall problem and reporting the incident to the EPA.
10:10	01:40*		Patients from the C-600 fire/explosion are arriving at area hospitals.
10:25	01:55	B-27	An oil sheen is reported at Outfall #008.
10:30	02:00*		The Coroner and Sheriff have taken control of the fatality scene which has been secured along with the assistance of Security Police Officers.
10:30	02:00*		A Recovery Manager is appointed.
			The Crisis Manager, PSS, IC, and Recovery Manager discuss any further actions needed to meet event termination criteria.
10:20	01:50*		Discussions on event termination begin with State and local authorities.

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PADUCAH GASEOUS DIFFUSION PLANT
2000 EMERGENCY MANAGEMENT EXERCISE

Actual Time	Drill Time	Message No.	Event Description
10:45	02:15*	B-24	● Fire is out at C-600 Steam Plant. ● The C-315 scene if stable with no detectable HF/UF_6 near scene or offsite. ● The 008 Outfall has been boomed.
10:45	02:15*		Event termination and recovery planning begins. Assignments and outline of initial recovery plan are completed.
10:50	02:20*		Event is formally terminated in accordance with CP2-EP-EPS042. (Termination time as all parties agree have been met.)
10:55	02:25*		Recovery planning, briefings, and notifications take place. (Recovery planning time is determined by Lead EOC Controller based on extent of planning, briefings, and interface with NRC Advance Team, etc.)
11:00	02:30*		Press release is made for event termination. (JPIC time may be extended by the Lead JPIC Controller beyond official exercise termination time in order to test additional JPIC objectives and/or to allow interface with and press release by the NRC representative.)
11:00-11:30	02:30-03:00*		Exercise is terminated by controllers.

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