

Department of Energy

Washington, DC 20585

September 1, 2011

CERTIFIED MAIL RETURN RECEIPT REQUESTED

Mr. James Smith Vice President URS Global Management & Operations Services 106 Newberry Street, SW Aiken, South Carolina 29801

NEA-2011-04

Dear Mr. Smith:

This letter refers to the Office of Health, Safety and Security's Office of Enforcement and Oversight investigation into the facts and circumstances associated with the September 29, 2010, radiological contamination during Separations Process Research Unit Building H2 demolition. This occurrence was reported in Noncompliance Tracking System (NTS) report NTS--SPRU-URSWD-SPRU-2010-0001, *Contamination During Demolition*. The results of the investigation were provided to URS Global Management & Operations Services in an Investigation Report dated May 17, 2011. An enforcement conference was held on July 21, 2011, with you and members of your staff, to discuss the report's findings. A summary of the enforcement conference and list of attendees are enclosed.

The Department of Energy (DOE) considers the radiological contamination event to be of high safety significance. Although actual consequences were limited, the potential consequences were significant and the event reflected fundamental program breakdowns in all five core elements of integrated safety management, with multiple failures in the contamination controls, operating procedures, and other work processes employed by the contractor to keep employees from being exposed to radioactive materials.

Based on an evaluation of the evidence in this matter, including information presented during the enforcement conference, DOE has concluded that violations of 10 C.F.R. Part 830, *Nuclear Safety Management*, subpart A, *Quality Assurance Requirements*, and 10 C.F.R. Part 835, *Occupational Radiation Protection*, have occurred. The enclosed Preliminary Notice of Violation (PNOV) cites seven Severity Level II violations and three Severity Level III violations with a total proposed base civil penalty of \$525,000.



Because the violations were identified as a result of an operational event, they are considered self-disclosing and no mitigation credit for timely self-identification is deemed appropriate. DOE has chosen to award partial mitigation of 25 percent for corrective actions associated with six of the Severity Level II violations. The remaining Severity Level II violation is associated with quality improvement; historically, DOE has not granted mitigation for corrective actions taken for such violations. As a result, the total proposed civil penalty is reduced to \$412,500.

Pursuant to 10 C.F.R. § 820.24, *Preliminary Notice of Violation*, you are required to file a reply within 30 calendar days after the date of filing of the enclosed PNOV and to follow the instructions specified in the PNOV when preparing your response.

After reviewing your response to the PNOV, including any additional corrective actions entered into NTS, the Office of Enforcement and Oversight will determine whether further enforcement activity is necessary to ensure compliance with DOE nuclear safety requirements. DOE will continue to monitor the completion of corrective actions until these matters are fully resolved.

Sincerely,

John S. Boulden III Director Office of Enforcement and Oversight Office of Health, Safety and Security

Enclosures: Preliminary Notice of Violation, NEA-2011-04 Enforcement Conference Summary

 cc: Steven Feinberg, SPRU FO David Hall, WGI Michael Lempke, Naval Reactors Laboratory Field Office Richard Azzaro, DNFSB

Enclosure 1

Preliminary Notice of Violation

Washington Group International, Inc. Separations Process Research Unit

NEA-2011-04

As a result of a U.S. Department of Energy (DOE) investigation into the facts and circumstances associated with the September 29, 2010, radiological contamination event that occurred during demolition of Building H2 at the Separations Process Research Unit (SPRU) in Niskayuna, New York, multiple violations of DOE nuclear safety requirements were identified. Violations committed by Washington Group International, Inc. (WGI), a subsidiary of URS Corporation, include: (1) failure to provide adequate staffing resources for the work; (2) failure to identify processes needing improvement; (3) procedural inadequacies and failure to follow procedures; (4) failure to effectively perform management assessments; (5) failure to monitor areas for contamination; (6) failure to perform real-time air monitoring; (7) failure to record survey results; and (10) failure to control the spread of contamination.

DOE has categorized the violations as seven Severity Level II violations and three Severity Level III violations and, in consideration of the mitigating factors, proposes a total civil penalty of \$412,500. According to 10 C.F.R. Part 820, Appendix A, *General Statement of Enforcement Policy*, § VI(b), "[s]everity level II violations represent a significant lack of attention or carelessness toward responsibilities of DOE contractors for the protection of public or worker safety which could, if uncorrected, potentially lead to an adverse impact on public or worker safety at DOE facilities. Severity Level III violations are less serious but are of more than minor concern: i.e., if left uncorrected, they could lead to a more serious concern."

As required by 10 C.F.R. § 820.24(a) and consistent with Part 820, appendix A, the violations are described below. Citations specifically referencing the quality assurance (QA) criteria of 10 C.F.R. § 830.122 also constitute a violation of § 830.121(a), which requires compliance with those QA criteria.

VIOLATIONS

- A. Quality Assurance
 - 1. Program

Title 10 C.F.R. § 830.122(a), *Management/Program*, at Subsection (2), requires DOE contractors to "[e]stablish management processes, including planning, scheduling, and providing resources for the work."

Contrary to this requirement, WGI failed to provide adequate staffing resources to support the Building H2 demolition. Specific examples include:

- a) WGI failed to provide sufficient radiation control technician (RCT) coverage to provide support for the surveys, analyses, and work planning required for applying fixatives, bulk demolition and equipment removal, size reduction, and loading for shipment. As documented in the URS Safety Management Solutions review, Final Report - Expert Review of the Separations Process Research Unit (SPRU) Disposition Project, Radiation Protection Program Review, dated October 14, 2010, "[i]nterviews with radiation protection management, waste superintendent, and SPRU project management all confirm that the number of RCTs at SPRU is inadequate to properly support operations and demolition." According to the radiation work permit (RWP) in effect during the demolition work on September 29, RWP-SPRU-DP-10-059, Prep and Demolish and Stage for Disposal the H2 Building and All Associated Waste, revision 0, only "intermittent" RCT coverage was required. The RCT responsible for covering the work did not perform any radiological surveys after a white "puff" was observed during size reduction of a condenser column; instead, the RCT checked for explosive gases and allowed the crew to resume demolition. Later that morning, when an equipment operator heard a personnel contamination monitor (i.e., frisker) alarming, the RCT was not present and had to be summoned for assistance.
- b) WGI failed to provide a sufficient number of work planners to support adequate development of work packages with an adequate level of detail to provide effective direction to the work crews, as documented in the WGI apparent cause analysis, *Separations Process Research Unit Disposition Project Apparent Cause Analysis of Management Concern: Operational Weaknesses*, dated October 28, 2010.

Collectively, these noncompliances constitute a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

2. Quality Improvement

Title 10 C.F.R. § 830.122(c), *Management/Quality Improvement*, at subsection 2, requires DOE contractors to "[i]dentify, control, and correct items, services, and processes that do not meet established requirements."

Contrary to these requirements, WGI failed to effectively and comprehensively review known quality issues associated with the processes used to control contamination at Building H2 and, as a result, failed to identify needed improvements in the demolition work. Specific examples include:

a) WGI procedure SPRU-ISM-002, *SPRU DP Integrated Work Control Program*, section 6.5, revision 11, states that "Type I Work Packages require a post-job review soon after completion to close out the job and capture any lessons learned." Work

package STW-FWP-1990, *H2 Demo Prep*, (a Type I work package) provided instruction for "performing the inventory, decontamination and/or lock-down activities necessary to prepare the H2 Building for open air demolition." However, WGI failed to conduct a post-job review upon completion of STW-FWP-1990, as required. Such a review would have provided an opportunity to identify hazards to the safe performance of the subsequent size-reduction task, which included the fact that fixative coverage within components known to have significant levels of internal contamination was incomplete.

- b) A URS corporate assessment of WGI's implementation of integrated safety management system programs identified that "[w]ork instructions reviewed appear to be written at a low level of detail and do not always specify the hazards or controls identified in the associated JHAs [job hazard analyses]. For work that does not require specific work instructions, the JHAs are also written at a very broad level and do not always clearly cover the unique environmental or job site conditions and associated hazards. The use of generic JHAs is a convenient and simple method of hazard control, but their excessive use is not conducive to application by some of the workforce present at the SPRU project (inexperienced in the DOE expectations for safety performance)[.]" The issue of inadequate work instructions was also raised in the subsequent DOE assessment SPRU Project Integrated Safety Management System Phase 2 Assessment Report, dated July 2010, which documented that work package CNS-FWP-0409, Move Hillside Drain System, had vague work instructions and unspecified equipment. However, WGI failed to adequately address these qualityrelated problems in the work package and job hazard analyses for Building H2 demolition, which lacked necessary details for this job evolution and the associated hazards.
- c) WGI procedure SPRU-ISM-002, *SPRU-DP Integrated Work Control Program*, revision 11, states in section 4.0 that the WGI work planner "[p]articipates in the development of the JHA with the planning team" and "[e]nsures that required controls are incorporated into the task instructions." However, WGI failed to take any action to address concerns raised by WGI work planners over the lack of detail in work package PPP-FWP-2130, *G2 & H2 Buildings and G2/H2 Tunnel Demolition*.

Collectively, these noncompliances constitute a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty – \$75,000

3. Work Processes

Title 10 C.F.R. § 830.122(e), *Performance/Work Processes*, at subsection (1), requires DOE contractors to "[p]erform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."

Contrary to these requirements, WGI used procedures that were inadequate to effectively control the intended activity, and failed to ensure that work was performed consistent with the administrative controls and other hazard controls for demolition work. Specific examples include:

- a) Work package PPP-FWP-2130, *G2 & H2 Buildings and G2/H2 Tunnel Demolition*, revision 0, was the primary document used by WGI to control the work associated with the safe demolition of Building H2. However, the work package did not sufficiently identify the radiological hazards associated with the work and did not address the radiological controls needed to protect workers and prevent the spread of radiological contamination. Further, the work package did not provide sufficiently detailed instructions on how the demolition work was to be done or specify the sequence in which the work was to be accomplished.
- b) Work package STW-FWP-1990, *H2 Demo Prep*, was used by WGI to ensure that all the process vessels in Building H2 were sufficiently characterized. STW-FWP-1990 established hold points to ensure that the facility was sufficiently characterized to determine whether decontamination or lock-down was necessary before work continued. However, WGI failed to document completion of these characterizations in the work package, and work activities proceeded beyond the hold points. As documented in the Type B accident investigation report, *Radiological Contamination Event During Separations Process Research Unit Building H2 Demolition, September 29, 2010*, the demobilization section (5.12) of work package STW-FWP-1990 contained only one of the 13 hold point signatures required for approval of the H2 Demo Ready Checklist.
- c) Sections 6.6 and 6.7 of SPRU-ISM-002, SPRU-DP Integrated Work Control Program, revision 11, were used by WGI to ensure that authorized work tasks were reviewed by the appropriate subject matter experts. However, these sections give conflicting direction for authorizing work. Section 6.6 of that document states that emergent work "shall be identified" in the plan-of-the-day (POD) meeting and scheduled accordingly, while section 6.7 states that the operations manager can independently authorize work outside of the POD meeting. As documented in the Type B accident investigation report, the removal and size reduction of the evaporator system components in Building H2 were not discussed during the POD meeting held on September 28, 2010. On the morning of September 29, the operations manager directed the removal and size reduction of the Building H2 evaporator system components, without the knowledge and consent of the deputy project director, the work planner, or the radiation protection superintendent.
- d) The August 24, 2010, contamination event at the H2 Tank Farm Weather Enclosure also identified WGI weaknesses in work control, as documented in the March 9, 2011, report CTS 090919, Root Cause Analysis of Management Concern: Higher Than Expected Contamination Levels Inside H2 Tank Farm Weather Enclosure and Root Cause Analysis of Potential Personnel Contamination. Work packages H2V-FWP-0409, Setup Waste Retrieval and Solidification System, and

H2V-FWP-0709, *Operate Waste Retrieval System* were the work packages used by WGI to set up and operate the waste retrieval system. However, the scopes of these work packages were too general, and they did not provide adequate guidance with respect to response to abnormal conditions.

Collectively, these noncompliances constitute a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

4. Management Assessments

Title 10 C.F.R. § 830.122(i), *Assessment/Management Assessment*, requires DOE contractors to "[e]nsure managers assess their management processes and identify and correct problems that hinder the organization from achieving its objectives."

Contrary to these requirements, WGI failed to ensure that managers effectively assessed their management processes. As documented in the WGI apparent cause analysis, the WGI management assessment procedure, SPRU-PQP-019, did not mandate an assessment frequency that adequately met the needs of the project to ensure that key elements were properly executed. In addition, not all managers completed the required minimum of one assessment per year.

This noncompliance constitutes a Severity Level III violation. Base Civil Penalty – \$0 Proposed Civil Penalty – \$0

- **B.** Occupational Radiation Protection
 - 1. Monitoring Areas for Contamination

Title 10 C.F.R. Part 835, Subpart E, *Monitoring of Individuals and Areas*, § 835.401, *General requirements*, at Subsection (a), requires that "[m]onitoring of individuals and areas shall be performed to ...(3) [d]etect changes in radiological conditions."

Contrary to this requirement, WGI failed to detect changes in the radiological conditions during the demolition work. The controlling RWP, RWP-SPRU-DP-10-059, revision 0, identified limiting conditions for contamination which, if exceeded, would require the temporary suspension of the RWP and stopping all Building H2 demolition work. However, WGI did not perform sufficient real-time contamination monitoring to identify that the limiting conditions for contamination in the RWP had been exceeded. Only intermittent RCT coverage was provided during the removal and size reduction of the Building H2 evaporator system components. RCTs did not perform any contamination surveys inside the Building H2 demolition area during the morning of September 29. As documented in the Type B accident investigation report, RCTs did survey one bolt that was ejected from the demolition area during demolition, and found elevated levels of fixed contamination. However, despite this indication of radioactive material in the

demolition area, no corrective actions were taken. The release and spread of contamination inside the demolition area was first identified at approximately noon, when a frisker alarmed as workers were exiting. Following that alarm, RCTs were summoned and contamination was found on the work boots of the equipment operators inside the demolition area. Surveys of the demolition area identified contamination levels as high as 500,000 disintegrations per minute (dpm)/100 cm² beta/gamma in the debris piles, and 16,000 dpm/100 cm² beta/gamma on an excavator shear. Subsequent surveys on October 5 and 6, 2010, identified contamination levels of approximately 1,700,000 dpm/100 cm² beta/gamma on the debris pile.

This noncompliance constitutes a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

2. Air Monitoring

Title 10 C.F.R. § 835.403, *Air monitoring*, at Subsection (b), requires that "[r]eal-time air monitoring shall be performed as necessary to detect and provide warning of airborne radioactivity concentrations that warrant immediate action to terminate inhalation of airborne radioactive material."

Contrary to this requirement, WGI failed to perform real-time air monitoring to detect and provide early warning to individuals of events that could lead to substantial unplanned exposures to airborne radioactivity. RWP-SPRU-DP-10-059 was used by WGI to control radiological work during the demolition of Building H2. However, RWP-SPRU-DP-10-059 did not require real-time air monitoring for the demolition work on September 29, 2010, but only required general area radiological air samplers at the perimeter of Building H2 and along the SPRU fence line. The perimeter air monitoring indicated elevated airborne radioactivity levels that exceeded the RWP limit of 0.3 DAC (derived air concentration); however, the results were not available in time to warn the exposed workers that high levels of airborne radioactivity were present during the radiological contamination event on the morning of September 29, 2010.

This noncompliance constitutes a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

3. Entry and Work Control in Radiological Areas

Title 10 C.F.R. § 835.501, *Radiological Areas*, at Subsection (d), requires that "[w]ritten authorizations shall be required to control entry into, and perform work within, radiological areas. These authorizations shall specify radiation protection measures commensurate with the existing and potential hazards."

Title 10 C.F.R. § 835.104, *Written Procedures*, requires that "[w]ritten procedures shall be developed and implemented as necessary to ensure compliance with this part,

commensurate with the radiological hazards created by the activity and consistent with the education, training, and skills of the individuals exposed to those hazards."

Contrary to this requirement, WGI failed to use written authorizations effectively to control personnel entry into and performance of work within radiological areas. Specific examples include:

- a) As documented in the Type B accident investigation report, the DOE Accident Investigation Board reviewed the RWP sign-in sheets that listed dates and times that RCTs were in the area conducting surveys. The Board concluded that after the release of radiological contamination, RCTs entered the radiological area many times without signing in on the RWP.
- b) RWP-SPRU-DP-10-059 requires breathing zone analyzers (BZA) for all equipment operators. However, as documented in the Type B accident investigation report, two equipment operators were not issued BZAs during the demolition work on September 29, 2010.
- c) RWP-SPRU-DP-10-059 contains a Special Instruction stating: "[c]ontinuous RCT coverage required when handling or demolishing areas below the 332' elevation with greater than 100 mR/hr [milliroentgen per hour] dose rates." Before the radiological contamination event, at least one evaporator was removed from the west evaporator bay; at the 319' elevation of Building H2. As documented in the Type B accident investigation report, a 1989 survey of the west evaporator bay identified a maximum reading on the west evaporator of 150 mR/hr. Because continuous RCT coverage was not provided during this work evolution, the handling of this column from an area below the 332' elevation, with a dose rate greater than 100 mR/hr, constitutes a violation of RWP-SPRU-DP-10-059.

Collectively, these noncompliances constitute a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

4. Posting

Title 10 C.F.R. § 835.603(e), *Contamination area*, requires that '[t]he words "Caution, Contamination Area" shall be posted at each contamination area.' The only exception to this requirement is found in 10 C.F.R. § 835.604, *Exceptions to Posting Requirements*, which states at Subsection (a) that "[a]reas may be excepted from the posting requirements of § 835.603 for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures."

Contrary to these requirements, WGI failed to post access points to contamination areas in Building H2, and also failed to place these same contamination areas under the

continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures. Specific examples include:

- a) Radiological postings for contamination areas in Building H2 were removed before the demolition work on September 29, 2010. As documented in the Type B accident investigation report, the postings were removed with the intent that anyone who needed to enter the building would notify the RCT before entry. However, the requirement to notify the RCT before entry was not documented on the RWP.
- b) A contamination survey, dated September 16, 2010, documented that the evaporator components removed on September 29, 2010, came from an area with contamination levels of over 900,000 dpm on the floor. Before initiation of Building H2 demolition activities, the contamination area postings were removed. The radiological conditions of the area had not changed (i.e., they were not transient), and the area was not under WGI's continuous observation to restrict unauthorized access to the area. At the time of the event, equipment operators were not made aware that the evaporator system components came from a location that was previously posted as a contamination area.

Collectively, these noncompliances constitute a Severity Level III violation. Base Civil Penalty – \$0 Proposed Civil Penalty – \$0

5. Recordkeeping

Title 10 C.F.R. § 835.703, *Other Monitoring Records*, requires that "[t]he following information shall be documented and maintained ...(a) [r]esults of monitoring for radiation and radioactive material as required by subparts E and L of this part, except for monitoring required by § 835.1102(d)." The excepted monitoring results from 10 C.F.R. § 835.1102(d) that are not required to be documented and maintained is appropriate monitoring of "[i]ndividuals exiting contamination, high contamination, or airborne radioactivity areas... for the presence of surface contamination."

Contrary to this requirement, WGI failed to document and maintain results of monitoring radioactive contamination. Specific examples include:

a) As documented in the Type B accident investigation report, a contamination survey of a bolt ejected into the air during removal of the separator column on September 29, 2010, was not documented until approximately one week later. The contamination survey was subsequently documented by the surveyor's supervisor, indicating fixed beta/gamma contamination levels of less than 5,000 dpm/100 cm². The supervisor who documented the survey recorded the wrong type of instrument, resulting in underestimation of the contamination levels. If the appropriate instrument had been recorded, the results would have been approximately 24,000 dpm/100 cm² for beta/gamma contamination.

b) The Type B accident investigation report also documented that two removable contamination surveys conducted on September 10, 2010, had the exact same contamination count readings for the first 18 results. This anomaly led the Accident Investigation Board to conclude that the wrong data was recorded for one of the surveys. In addition, numerous other surveys reviewed by the Board included handwritten changes made after the survey was signed off by the original surveyor, with no documentation of who made the changes or when the change was made.

Collectively, these noncompliances constitute a Severity Level III violation. Base Civil Penalty – \$0 Proposed Civil Penalty – \$0

6. Contamination Control

Title 10 C.F.R. § 835.1102, *Control of Areas*, at Subsection (a), requires that "[a]ppropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal operating conditions." The demolition work at SPRU was conducted under normal operating conditions; that is, it was not performed during an emergency.

Contrary to this requirement, WGI failed to maintain and verify appropriate controls to prevent the inadvertent transfer of removable contamination. WGI identified a specific engineering control for the demolition work in SPRU-RC-302, *Conditions for Demolition Technical Basis*, revision 1, which states that a "Dust Boss will provide a mist during demolition of contaminated structures. A surfactant or tacking agent may be added to the water to improve dust suppression during load out operations." However, RWP-SPRU-DP-10-059 did not require the use of a "Dust Boss" mister to control airborne contamination during demolition of contaminated structures. As documented in the Type B accident investigation report, the construction area was wetted with a fire hose, instead of the required "Dust Boss" mister or an equivalent water mister system. In addition, although the fire hose was used for wetting during part of the work evolution, it was redirected to wash the mud off of a truck. Misting was not used for contamination control, as required, and radioactive contamination was not prevented from spreading outside of radiological areas.

This noncompliance constitutes a Severity Level II violation. Base Civil Penalty – \$75,000 Proposed Civil Penalty (as adjusted) – \$56,250

REPLY

Pursuant to 10 C.F.R. § 820.24(b), WGI is hereby obligated, within 30 calendar days after the date of filing of this Preliminary Notice of Violation (PNOV), to file a written reply, signed by the person filing it. The reply should be clearly marked as a "Reply to the Preliminary Notice of Violation."

If WGI chooses to terminate this enforcement action by not contesting the PNOV, then pursuant to 10 C.F.R.§ 820.24(d): (1) the reply should state that WGI agrees to comply with the proposed remedy and waives any right to contest the PNOV or the remedy; and (2) this PNOV will constitute a Final Order upon the filing of the reply. In such cases and in accordance with 10 C.F.R. § 820.32(c), the total civil penalty of \$412,500 must be remitted within 30 calendar days after the PNOV becomes a Final Order. Payment of the civil penalty must be made by check, draft, or money order payable to the Treasurer of the United States (Account 891099) and mailed to the address provided below.

If WGI chooses to contest any aspect of this PNOV or the proposed remedy, then as applicable and in accordance with 10 C.F.R. § 820.24(c), the reply should include: (1) any facts, explanations, and arguments which support a denial that a violation has occurred as alleged; (2) any extenuating circumstances or other reason why the proposed remedy should not be imposed or should be mitigated; (3) a discussion of the relevant authorities which support the position asserted, including rulings, regulations, interpretations, and previous decisions issued by DOE. In addition, 10 C.F.R. § 820.24(c) requires that the reply include copies of all relevant documents.

Corrective actions that have been or will be taken to avoid further violations should be delineated with target and completion dates in DOE's Noncompliance Tracking System.

Please send the appropriate reply by overnight carrier to the following address:

Director, Office of Enforcement and Oversight Attention: Office of the Docketing Clerk U.S. Department of Energy 19901 Germantown Road Germantown, MD 20874-1290

A copy of the reply should also be sent to the Assistant Secretary for Environmental Management and the DOE SPRU Federal Project Director.

Pursuant to 10 C.F.R. § 820.33(a), if WGI does not submit a written reply within 30 calendar days after the date of filing of this PNOV, the Director will request that a Default Order be issued against WGI.

John S. Boulden III

Director Office of Enforcement and Oversight Office of Health, Safety and Security

Washington, D.C. this 1st day of September 2011