



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

January 13, 2022

EA-21-170

Mr. Dave Brown, Site Vice President
Energy Northwest
MD 1023
P.O. Box 968
Richland, WA 99352

SUBJECT: COLUMBIA GENERATING STATION – NRC INSPECTION REPORT
05000397/2021090 AND PRELIMINARY WHITE FINDING

Dear Mr. Brown:

This letter refers to the inspection conducted from May 31 to December 02, 2021, by the U.S. Nuclear Regulatory Commission (NRC) relative to the Columbia Generating Station. The purpose of the inspection was to review the details of the May 28, 2021, airborne radioactivity event that resulted in multiple confirmed uptakes of radioactive materials to workers. On December 16, 2021, a final exit briefing was conducted telephonically with Mr. Robert E. Schuetz, Chief Executive Officer, and other members of your staff. The results of the inspection are documented in the enclosed report.

The enclosed report discusses a preliminary White finding (i.e., “a finding with low-to-moderate safety significance that may require additional NRC inspections”), with three associated apparent violations. As described in Section 71153 of the enclosed report, on May 28, 2021, your staff failed to implement and follow written procedures for radiation protection resulting in two uptakes of radioactive materials to workers resulting in doses greater than 700 millirem committed effective dose equivalent. The finding was assessed based on the best available information, using the applicable Significance Determination Process (SDP). The final resolution of this finding will be conveyed in separate correspondence.

The finding has three associated apparent violations which are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy, which can be found on the NRC website at <http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html>. The apparent violations involve the failure to: (1) use, to the extent practicable, process or other engineering controls to control the concentration of radioactive material in air; (2) control, by means of a Radiation Work Permit, the activities in a high radiation area with dose rates of greater than 1.0 rem/hour at 30 centimeters from the radiation source; and (3) make surveys of areas that were reasonable under the circumstances to evaluate the magnitude and extent of radiation levels and concentrations or quantities of residual radioactivity.

In accordance with NRC Inspection Manual Chapter 0609, we intend to complete our evaluation using the best available information and issue our final significance determination and enforcement decision, in writing, within 90 days from the date of this letter. The significance determination process encourages an open dialogue between your staff and the NRC; however, the dialogue should not impact the timeliness of our final determination.

Before we make a final decision on this matter, we are providing you with an opportunity to either: (1) attend a Regulatory Conference where you can present to the NRC your perspective on the facts and assumptions the NRC used to arrive at the finding and assess its significance; or (2) submit your position on the finding to the NRC in writing. If you request a Regulatory Conference, it should be held within 40 days of the receipt of this letter, and we encourage you to submit supporting documentation at least one week prior to the conference in an effort to make the conference more efficient and effective. The focus of the Regulatory Conference is to discuss the significance of the finding and not necessarily the root cause(s) or corrective action(s) associated with the finding. If a Regulatory Conference is held, it will be open for public observation. If you decide to submit only a written response, such submittal should be sent to the NRC within 40 days of your receipt of this letter.

If you decline to request a Regulatory Conference or to submit a written response, you relinquish your right to appeal the final SDP determination, in that by not doing either, you fail to meet the appeal requirements stated in the Prerequisite and Limitation sections of Attachment 2 of NRC Inspection Manual Chapter 0609.

If you choose to send a written response, it should be clearly marked as a "Response to Apparent Violations in NRC Inspection Report 05000397/2021090; (EA-21-170)" and should include for the apparent violations: (1) the reason for the apparent violations or, if contested, the basis for disputing the apparent violations; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previously docketed correspondence if the correspondence adequately addresses the required response.

Additionally, your written response should be sent to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Director, Division of Nuclear Materials Safety, U.S. Nuclear Regulatory Commission, Region IV, 1600 East Lamar Blvd., Arlington, Texas 76011-4511, and the NRC Resident Inspector at Columbia Generating Station, and emailed to R4Enforcement@nrc.gov, within 40 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a Regulatory Conference.

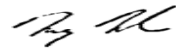
Please contact Mr. Jonathan Evans at 301-415-4024 within 10 days from the issue date of this letter to notify the NRC of your intentions. If we have not heard from you within 10 days, we will continue with our significance determination and enforcement decision. The final resolution of this matter will be conveyed in separate correspondence.

Because the NRC has not made a final determination in this matter, a Notice of Violation is not being issued at this time. In addition, please be advised that the number and characterization of the apparent violations described in the enclosed inspection report may change as a result of further NRC review.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, will be made available electronically for public inspection in the NRC Public Document Room and from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC website at <http://www.nrc.gov/reading-rm/adams.html>.

If you have any questions concerning this matter, please contact Mr. Jonathan Evans of my staff at 301-415-4024.

Sincerely,



Signed by Muessle, Mary
on 01/13/22

Mary C. Muessle, Director
Division of Nuclear Materials Safety

Docket No. 05000397
License No. NPF-21

Enclosure:
Inspection Report 05000397/2021090

SUBJECT: COLUMBIA GENERATING STATION NRC INSPECTION REPORT
05000397/2021090 AND PRELIMINARY WHITE FINDING – DATED JANUARY 13,
2022

DISTRIBUTION:

SMorris, RA
JMonninger, DRA
NO'Keefe, DNMS
MHay, DRP
NTaylor, DRP
RLantz, DRS
JDixon, DRS
DCylkowski, RC
LHowell, RIV/OEDO
VDricks, ORA
LWilkins, OCA
MChawla, NRR
AMoreno, RIV/OCA
RAlexander, RSLO
JJosey, DRP
HFreeman, DRP
DBryen, DRP
PNiebaum, DRP
ADonley, DRP
MBennett, DRP
BCorrell, IPAT
LFlores, IPAT
FRamirez, IPAT
R4Enforcement

DOCUMENT NAME: RWCU Uptake Event Prelim White Choice Letter

ADAMS ACCESSION NUMBER: **ML21347A988**

<input checked="" type="checkbox"/> SUNSI Review By: NAG		ADAMS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Sensitive <input checked="" type="checkbox"/> Non-Sensitive		<input type="checkbox"/> Non-Publicly Available <input checked="" type="checkbox"/> Publicly Available		Keyword NRC-002
OFFICE	RxIB	RxIB	ORA/ACES	ORA	OE	NRR		
NAME	NGreene	JEvans	JGroom	DCylkowski	GGulla	N/A		
SIGNATURE	/RA/ E	/RA/ E	/RA/ E	/RA/ E	/RA/ E	/RA/ E		
DATE	12/16/2021	12/16/2021	12/15/2021	12/15/2021	1/12/22			
OFFICE	DRP	DNMS						
NAME	MHay	MMuessle						
SIGNATURE	/RA/ E	MCM						
DATE	1/13/22	01/13/2022						

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number: 05000397

License Number: NPF-21

Report Number: 05000397/2021090

Enterprise Identifier: I-2021-090-0008

Licensee: Energy Northwest

Facility: Columbia Generating Station

Location: Richland, Washington

Inspection Dates: May 31, 2021 to December 2, 2021

Inspectors: D. Antonangeli, Health Physicist
N. Greene, PhD, Senior Health Physicist

Approved By: Jonathan Evans, Chief
Reactor Inspection Branch
Division of Nuclear Materials Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a NRC inspection at Columbia Generating Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Failure to Follow Procedures Results in an Airborne Contamination Event with Multiple Uptakes			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Preliminary White AV 05000397/2021090-01 Open EA-21-170	[H.5] - Work Management	71153
The licensee failed to implement and follow its written procedures, associated Radiological Work Permit, and ALARA Plan instructions for job tasks associated with the Reactor Water Cleanup Heat Exchanger piping. These failures to follow procedural instructions resulted in an airborne radioactivity event with multiple confirmed uptakes of radioactive materials to workers, including two uptakes resulting in doses greater than 700 millirem committed effective dose equivalent. The inspectors reviewed actions associated with this event and are proposing a finding of low-to-moderate safety significance (Preliminary White) and associated apparent violations, as a result of the licensee's failures to follow its Radiation Protection Program.			

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

OTHER ACTIVITIES – BASELINE

71153 - Follow Up of Events and Notices of Enforcement Discretion

Event Follow up (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated an airborne radioactivity event that occurred on May 28, 2021, which resulted in multiple confirmed uptakes of radioactive material. The inspectors assessed the licensee's response and evaluations, which were submitted to the NRC via its Investigation Template, dated June 16, 2021 and updated on October 21, 2021, and via its Final Dose Assessment, dated August 23, 2021.

INSPECTION RESULTS

Failure to Follow Procedures Results in an Airborne Contamination Event with Multiple Uptakes			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Occupational Radiation Safety	Preliminary White AV 05000397/2021090-01 Open EA-21-170	[H.5] - Work Management	71153
The licensee failed to implement and follow written procedures, associated Radiological Work Permit, and ALARA Plan instructions for job tasks associated with the Reactor Water Cleanup (RWCU) Heat Exchanger (HX) piping. The failure to follow procedural instructions resulted in an airborne radioactivity event with multiple confirmed uptakes, including two uptakes of greater than 700 millirem committed effective dose equivalent (CEDE). The inspectors reviewed actions associated with this event and are proposing a finding of low-to-moderate safety significance (Preliminary White) and associated apparent violations, as a result of the licensee's failures to follow its Radiation Protection (RP) Program.			
<u>Description:</u> During the nightshift on May 28, 2021, radworkers/pipefitters and RP technicians deviated from the approved engineering controls and ALARA work plans while performing tasks associated with weld preparation work on the highly contaminated RWCU system piping. These deviations caused an airborne radioactivity event that resulted in 22 individuals receiving positive whole-body counts. Two of the individuals received uptakes of radioactive material resulting in doses greater than 700 mrem CEDE. On May 29, 2021, the licensee informed the NRC about the event.			

The licensee conducted weld preparation work under Radiation Work Permit (RWP) 30004732, "R25 RX RWCU HX RM - INSTALL NEW HX & PIPING," on pipe cut #3, with the nightshift crew.

The nightshift crew failed to follow multiple instructions of this RWP relative to hold points and the associated ALARA work plan. The licensee's investigation, via its Investigation Template, concluded that the work crew relied on "skill of the craft" rather than mockup training. The specific aspects where the nightshift crew failed are addressed in the paragraphs below.

RP technician #1 (RP tech #1) was the individual who attended the required formal briefing and was assigned to provide line-of-sight job coverage in the RWCU HX room, which was posted and controlled as a locked high radiation area (LHRA). A radiological survey of the area, M-20210528-13, dated May 27, 2021, documented dose rates as high as 3000 millirem per hour on contact and 1300 millirem per hour at 30 cm in the work area. After the workers and RP tech #1 were briefed for the job; they entered the work area and immediately encountered an issue when RP tech #1 was unable to physically fit on the work area platform attached to scaffolding. Contrary to the RWP requirements for continuous job coverage, RP tech #1 left the workers unattended at the workstation to go find a different RP technician (RP tech #2) to replace him. RP tech #2 was not a part of the required formal briefing for this job, which was a missed requirement and a stop work condition that the workers failed to realize. When RP tech #2 arrived in the work area to provide continuous job coverage, the workers had already started work on pipe cut #3.

Performing weld preparations and grinding on the RWCU system piping, for this RWP, required the use of a glove bag. The glove bag was being used to control the airborne radioactivity when working on the highly contaminated RWCU piping. The workers encountered additional problems due to their use of the wrong glove bag inlet attachment for use with a high efficiency particulate air (HEPA) vacuum. As a result, the glove bag collapsed when the vacuum was started. To prevent further collapse of the glove bag and to allow work to continue, the workers loosened the straps and turned off the vacuum. Turning off the vacuum was a stop work condition that the workers and RP tech #2 failed to realize. After turning the vacuum off, the workers proceeded to use a "flapper wheel," a form of grinding/sanding known to create airborne radioactivity, on the end of the contaminated RWCU piping. This created airborne radioactivity within the glove bag since the vacuum and HEPA unit were not removing the airborne radioactive material.

Once the usage of the "flapping wheel" was completed, the workers removed the glove bag off the end of the piping (another stop work condition that was not realized by RP tech #2 providing continuous job coverage). Airborne radioactive material was released from the glove bag and dispersed into the RWCU HX room. Not having been part of the formal pre-job briefing, RP tech #2, did not recognize the loss of airborne controls and failed to stop the work. Additionally, the airborne radioactive monitoring (i.e., sampling) was not capable of providing real-time monitoring and alarming functions; therefore, the workers were not aware of the changing radiological airborne conditions. In Calculation 21-02, "Estimated Air Concentration for Intake (DAC Evaluation of CGS Uptake Event)," the licensee indicated there was an air sample collected from a sample head attached to scaffolding in the RWCU HX room, on the handrail, but NRC determined this sample was not in the work/breathing zone of the pipefitters.

The installation of the glove bag was not performed according to the licensee's instruction

manual HPI-12.90, Revision 002, "Contamination Control Containment Devices." HPI-12.90 provides guidance for the use of radiological containment devices. Specifically, glove bags used with negative ventilation (vacuums) should have a sufficient inlet filter (20 to 40 cubic feet per minute (cfm)). The glove bag was installed with a small 2-cfm inlet filter which when connected to a HEPA unit caused the collapse of the glove bag. Additionally, a supervisor did not perform a verification of the glove bag's installation as recommended by HPI-12.90. The section on "Guidance for Installation and Removal of Glove Bags" in procedure HPI-12.90 states that installing a glove bag inlet filter that is too small could result in the glove bag collapsing due to negative pressure.

At the remote monitoring station, RP Tech #3 was assigned to monitor telemetry data of external dose. Also, at this location, the lead RP tech, who is an RP Supervisor but was not assigned to provide continuous coverage, happened to be watching work occur within the RWCU HX room remotely via cameras. The lead RP tech was familiar with this task and quickly recognized the abnormal situation of removing the glove bag post grinding. The lead RP tech immediately left the remote monitoring station, traveled to the RWCU HX work room, and announced a stop work order to the pipefitters. The pipefitters were frisked, and contamination was found on their faces. The lead RP tech then evacuated the additional 20 individuals within the RWCU HX room.

The NRC deemed it fortuitous that the failure to follow licensee procedures resulting in the loss of airborne radioactivity control was quickly identified by the lead RP tech watching the work remotely via the video surveillance cameras. RWP 30004732, and its associated ALARA Work Plan, did not *require* remote video job coverage for the task, only remote monitoring by telemetry of the external dose and dose rate. The external dose and dose rate monitoring telemetry would not have provided any indications of airborne radioactivity levels in the work area and its impacts. The licensee stated that at the time of the event, they were not providing remote job coverage via installed cameras; the job coverage was in-field on the scaffold platform within the RWCU HX room. The NRC also considered the additional opportunities to implement stop work orders prior to the glove bag being removed that were missed by all RP techs involved, including the lead RP tech who intervened while watching remotely, indicates there were multiple breakdowns in their radiological control barrier illustrating inadequate radiological oversight.

Step 4.4 of HPI-12.90 also instructs the licensee to perform a total effective dose equivalent (TEDE) ALARA evaluation when planning the use of containment devices (i.e., glove bag) in high dose rate areas to evaluate the projected additional dose that could result from installing, using, and removing the glove bag. The licensee failed to perform a TEDE ALARA evaluation prior to this job activity on pipe cut #3, which was performed in a posted LHRA. The licensee did complete a TEDE ALARA evaluation following the airborne radioactivity event for the next assigned work on the cut. This TEDE ALARA evaluation, dated May 30, 2021, demonstrated that respiratory protection was required. This was based on general area dose rates of 400 millirem per hour and smear results of 200,000 disintegrations per minute (dpm) per 100 cm² beta-gamma for inside of pipe cut #3 (as shown on survey M-20210529-13). Based on the assumptions made in the assessment for RWP 30004732, Task 02145907-01-01; this TEDE ALARA evaluation also showed that the estimated TEDE dose for workers without a respirator on this task would have exceeded 5000 millirem. Therefore, this additional survey data, as provided by the licensee, supports an even higher estimated dose for the workers without respirators.

All of the other workers that were in the RWCU HX room that were directed to evacuate,

passed by the general area where this airborne radioactivity event occurred. This resulted in 18 additional workers receiving unintended uptakes (less than 1 millirem). The two pipefitters received internal doses of 961 millirem and 711 millirem CEDE, respectively, and one RP tech received an internal dose of 14 millirem CEDE. These internal doses plus the external radiation doses received resulted in 1,299 millirem TEDE, 1,147 millirem TEDE, and 403 millirem TEDE, respectively.

The inspectors noted that the primary causes were non-compliances with procedural instructions, and not complying with the ALARA Work Plan associated with RWP 30004732. The ALARA Work Plan included specific instructions such as using powered air purifying respirators (PAPRs) on highly contaminated components, using full face respirators for grinding, and performing air sampling (air sampling was not in the work breathing zone). Additionally, there were inadequate surveys used to support down-posting the RWCU HX area from a high contamination area to a contamination area. There was inadequate radiological risk assigned to and documented in the RWP due to the inadequate surveys, inadequate job oversight for in a LHRA, and inadequate resources with staffing and equipment for the assigned tasks.

Corrective Actions: As immediate corrective actions, the licensee entered this issue into the corrective action program and implemented the following:

- immediately stopped work in the RWCU HX room and evacuated all personnel
- conducted whole body counts of individuals that were impacted
- held a stand-down meeting to discuss the event
- contacted the NRC Residents and NRC RIV staff
- initiated an Investigation Template via Action Request (AR) 00420829
- initiated a dose evaluation for individuals identified with significant uptakes of contaminants

Corrective Action References: AR 00420829

Performance Assessment:

Performance Deficiency: The licensee failed to implement and follow written procedures for radiation protection. Specifically, the licensee failed to implement and follow Sections 4.4, 5.1.1, and 5.2.2 of licensee instruction manual HPI-12.90, "Contamination Control Containment Devices." These sections state, in part, that (Section 4.4) a TEDE ALARA evaluation is [to be] performed; (Section 5.1.1.) the licensee should specify the type of containment device to be used (i.e., glove bag with a 20 to 40 cfm filter) in the ALARA pre-job planning documents or in the RWP; and (Section 5.2.2) that glove bags with a negative ventilation should have a 20 to 40 CFM HEPA breather filter installed. The licensee failed to specify this information in the ALARA planning documents or in the RWP 30004732 used for the job, which ultimately resulted in the selection of the wrong glove bag inlet filter, the subsequent collapse of the glove bag, the release of the airborne radioactive material, and not using respiratory protection to mitigate the consequences.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Program & Process attribute of the Occupational Radiation Safety cornerstone and adversely affected the cornerstone objective to ensure the adequate protection of the worker health and safety from exposure to radiation from radioactive material during routine civilian nuclear reactor operation. Additionally, there was a potential this performance deficiency could lead to a more significant radiation safety concern

because of an ineffective radiation program barrier. Specifically, one or more errors of consequence to radiological safety were made by the RP technician such that the work performed did not provide an adequate level of radiological protection. Specifically, RP technician #2 was providing job oversight but failed to stop work because they were not aware of the relevant instructions to be followed from licensee procedures and ALARA work plan.

Significance: The inspectors assessed the significance of the finding using IMC 0609 Appendix C, "Occupational Radiation Safety Significance Determination Process." Using IMC 0609, Appendix C, the finding was determined to be of low to moderate safety significance (WHITE) because: (1) it was not a finding in ALARA Plans or Work Controls, (2) it was not an overexposure, (3) there was a substantial potential for overexposure, but it was not a shallow dose exposure or discrete radiation particle exposure, and (4) it was not a whole-body exposure within a VHRA.

The inspectors evaluated the exposure as a "substantial potential for overexposure" in accordance with IMC 0609, Appendix C, Section III.C based on the following:

Substantial potential for overexposure definition: an event presents a substantial potential when it was fortuitous that the resulting exposure did not exceed the limits of 10 CFR Part 20. The concern is not the significance of the resulting, or potential, exposure, but whether the licensee provided adequate controls over the situation, as required, to ensure the 10 CFR Part 20 dose limits are not exceeded. No credit is given for luck. When assessing whether a finding constitutes a substantial potential for overexposure, consider if it is possible to construct a reasonable scenario in which a minor alteration of circumstances (as they actually happened) would have resulted in a violation of the 10 CFR Part 20 limits. The following circumstances should be considered: timing, source strength, distance, and shielding.

As described above, the licensee failed in several instances to provide adequate radiological controls over the situation. The NRC determined that it was fortuitous in multiple circumstances that the RP tech who intervened, did so in a manner that prevented overexposure to the workers. Specifically, (1) the RP tech (not credited as job coverage) was at the remote monitoring station with a view of the glove bag activity, (2) the RP tech viewed the grinding activity at the right point in time on the correct monitor and camera, (3) the RP tech had enough background information and/or experience to recognize the abnormal situation, and (4) the RP tech only had a "40 foot/30 second" walking path to the entrance of the RWCU HX room from the remote monitoring station.

Based on the inspector's derived air concentration (DAC) estimate, the pipefitters could have reasonably received greater than 5 rem if they had remained in the work area for an additional five minutes. These estimates were confirmed by the results of the licensee's Calculation 21-02. If the lead RP tech had not intervened, the additional time needed to clean up the area, gather tools, and leave the job in a safe work condition is a reasonable scenario with minor alterations could have led to overexposure. Due to there being no real-time alarm indication of airborne radioactivity conditions in the work area, the workers would have had no reason to quickly remove themselves from the impacted work zone. It is noteworthy to mention that these values are estimates and based on the best available data to the inspectors to assess the airborne radioactivity levels workers may have been exposed to during the event in order to estimate potential internal dose with a minor alteration of circumstances.

Additionally, this job did not require remote job coverage. It required continuous line-of-sight coverage and external dose rate monitoring via telemetry. Specifically, based on documented requirements, this job could have occurred if there was no continuous observation of the installed cameras/monitors. Therefore, removing the remote job observations, the lead RP tech stop work order, and subsequent evacuation from the scenario, it is reasonable that the workers would have continued the job for a short period of time and within 5 minutes, would have received an overexposure.

The inspectors considered multiple factors that could affect the potential for overexposure. The reasonable scenario in this case focuses primarily on the timing factor due to its significance. The distance factor remained unchanged due to the nature of the work and the proximity to the piping. The shielding factor, which was the glove bag, remained unchanged because it was removed during the event.

The source strength factor remained unchanged because the licensee states the workers had completed flapping of the internal piping at the time of the stop work order, which released contaminants to create the airborne event. The inspectors reviewed the licensee's post event survey M-20210529-13, which showed the maximum contamination level via a touch smear for inside of pipe cut #3 as 1,800,000 dpm per 100 cm² beta-gamma. Thus, a significant level of contamination remained inside of the piping which could have been released with additional flapping.

Additionally, the inspectors reviewed the licensee's TEDE ALARA evaluation, dated May 30, 2021, which determined that respiratory protection was warranted and that the estimated internal dose without a respirator could potentially yield greater than 5000 millirem for the work associated with RWP 30004732, ALARA Task 02145907-01-01. In this case, respirators were not worn.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the licensee failed to implement written instructions, appropriate engineering controls, as well as failed to execute the job activity with appropriate radiological controls. The incorrect radiological risk was assigned to this work activity, and inadequate coordination between the day and night shifts on the job associated with RWP 30004732, ALARA Task 02145907-01-01 contributed to the event.

Enforcement:

Violation: The inspectors identified three apparent violations of requirements relative to the licensee's airborne radioactivity event.

Apparent Violation #1: Title 10 CFR 20.1701 requires, in part, that licensees shall use, to the extent practicable, process or other engineering controls to control the concentration of radioactive material in air.

Contrary to the above, on May 28, 2021, the licensee failed to use, to the extent practicable, process or other engineering controls to control the concentration of radiation material in air. Specifically, the licensee did not use appropriate engineering controls to ensure that grinding on the internals of highly contaminated piping would not result in airborne radioactive material

because the glove bag was not sufficient to meet its intended purpose. As a result, an airborne contamination event caused two individuals to receive internal doses of greater than 700 millirem CEDE.

Apparent Violation #2: Technical Specification 5.7.2.b requires, in part, that access to, and activities in, each high radiation area with dose rates greater than 1.0 rem/hour at 30 centimeters from the radiation source shall be controlled by means of an RWP.

RWP 30004732, created to control activities in a Technical Specification 5.7.2.b high radiation area, required, in part, that continuous Health Physics job coverage is provided when personnel are entering and working in areas with dose rates greater than 0.8 rem/hour.

Contrary to the above, on May 28, 2021, the licensee failed to control, by means of an RWP, the activities in a high radiation area with dose rates of greater than 1.0 rem/hour at 30 centimeters from the radiation source. Specifically, the licensee failed to ensure that there was continuous Health Physics job coverage in a posted high radiation area with dose rates of 1.3 rem/hour at 30 centimeters from the radiation source. An RP technician, scheduled and briefed to provide the continuous Health Physics job coverage, was unable to fit on the work area platform and left two pipefitters unattended in the area. A second RP technician subsequently replaced the original technician.

Apparent Violation #3: 10 CFR 20.1501(a)(2) requires, in part, that licensees shall make surveys of areas that are reasonable under the circumstances to evaluate the magnitude and extent of radiation levels; and concentrations or quantities of residual radioactivity.

Contrary to the above, on May 27, 2021, the licensee failed to make surveys of areas that were reasonable under the circumstances to evaluate the magnitude and extent of radiation levels; and concentrations or quantities of residual radioactivity. Specifically, the licensee failed to adequately determine the work area radiation levels. Additionally, as documented in the survey M-20210528-13, which stated, the survey “was not an extensive search for the highest exposure rate.” In addition, the licensee failed to adequately evaluate the contamination levels on the pipe prior the work activity. As a result, surveys completed prior to the event did not adequately identify work area dose rates and did not identify appropriate contamination levels, which may have increased the rigor of the job’s radiological and engineering controls.

Enforcement Action: These violations are being treated as apparent violations pending a final significance (enforcement) determination.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

On December 16, 2021, the inspectors presented the NRC inspection results to Mr. Robert E. Schuetz, Chief Executive Officer, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71153	Calculations	21-02	Estimated Air Concentration for Intake (DAC Evaluation of CGS Uptake Event)	10/28/2021
71153	Corrective Action Documents	Action Requests (ARs)	00420829, 00421167	
71153	Miscellaneous		RWCU Event Dose Log 2021: Summary of Exposure for RWCU Contamination Event (AR 00420829)	07/12/2021
71153	Miscellaneous		Columbia RWCU HX Airborne Event	06/22/2021
71153	Miscellaneous		R25 RWCU Heat Exchanger (HX) Replacement Project ALARA Plan	05/25/2021
71153	Miscellaneous		Personnel Exposure Report for Contamination Event (AR 00420829)	08/23/2021
71153	Miscellaneous	ALARA Task 0214590701-01	TEDE ALARA Evaluation, RWP 30004732: Welding new pipe to existing contaminated piping	05/30/2021
71153	Miscellaneous	AR 420829	Investigation Template: Airborne Radioactivity Event Results in 21 Positive Whole Body Counts	06/16/2021
71153	Miscellaneous	AR 420829	(Updated) Investigation Template: Airborne Radioactivity Event Results in 21 Positive Whole Body Counts	10/21/2021
71153	Procedures	GEN-RPP-06	Dosimetry Program Description	13
71153	Procedures	HPI-12.90	Contamination Control Containment Devices	2
71153	Procedures	HPI-5.9	The Evaluation of In-Vivo BioAssay Results following a Potential Intake	15
71153	Procedures	PPM 11.2.2.12	Radiological Risk Assessment and Management	8
71153	Procedures	PPM 11.2.4.5	Whole Body Counts and Daily Checks Using the Renaissance Fastscan	16
71153	Procedures	PPM 11.2.4.6	In Vitro BioAssay Sampling and Analysis	3
71153	Procedures	PPM 11.2.7.3	High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Controls	42
71153	Procedures	SWP-RPP-01	Radiation Protection Program	16
71153	Radiation Surveys	M-20210513-33	RB 548 Cut and Remove RWCU Piping in RWCU HX Room	05/13/2021
71153	Radiation Surveys	M-20210527-16	RB 548' Downpost Survey	05/27/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71153	Radiation Surveys	M-20210527-23	RB 548' RWCU HX Room	05/27/2021
71153	Radiation Surveys	M-20210528-13	RB 548' RWCU HX Room Positioning New Pipe	05/27/2021
71153	Radiation Surveys	M-20210528-15	RB 548' RWCU HX Room	05/28/2021
71153	Radiation Surveys	M-20210529-13	RB 548 RWCU HX Room Post Post Decon	05/29/2021
71153	Radiation Surveys	M-20210529-6	Event Follow-Up: RB 548 RWCU HX room Post Decon	05/29/2021
71153	Radiation Work Permits (RWPs)	30004732	R25 RX RWCU HX Room - Install New HX and Piping - LHRA	3