Robert E. Schuetz
Vice President, Operations
P.O. Box 968, PE23
Richland, WA 99352-0968
Ph. 509-377-2425
reschuetz@energy-northwest.com

November 29, 2018

GO2-18-146

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Subject: **COLUMBIA GENERATING STATION, DOCKET NO. 50-397**
RESPONSE TO INSPECTION REPORT 05000397/2018003

Reference: Letter dated October 31, 2018, M Haire (NRC) to BJ Sawatzke (Energy Northwest), "Columbia Generating Station – NRC Integrated Inspection Report 05000397/2018003"

Dear Sir or Madam:

The purpose of this letter is to provide Energy Northwest's response to the Non-Cited Violation (NCV) of Technical Specification (TS) 5.7.2(b) and (e), related to the control of work activities in a locked high radiation area in accordance with the requirements of the radiation work permit and failure to determine radiological conditions in the work area prior to the start of work. It is Energy Northwest's position that this finding should be characterized as a violation of TS 5.4.1.

The attachment to this letter contains a restatement of the NCV and provides Energy Northwest's response to the NCV.

Should you have any questions or desire additional information regarding this letter, please call SA Nappi at (509) 377-4598.

Executed this 29 day of November, 2018.

Respectfully,

Robert E. Schuetz
Vice President, Operations

Attachment: Response to Non-Cited Violation

cc: NRC RIV Regional Administrator
NRC NRR Project Manager
NRC Director, Office of Enforcement
NRC Sr. Resident Inspector

GO2-18-146
Attachment

Response to Non-Cited Violation

A. Introduction

On September 19, the NRC completed a radiation safety inspection at Columbia and exited with a proposed very low safety significant "green" non-cited violation (NCV) of Technical Specifications 5.4.1 for failure to adhere to instructions in the radiation work permit (RWP) and the locked high radiation area (LHRA) brief for the requirement to have a health physics technician (HPT) present during entry into the LHRA and for failing to utilize provided shielding in the LHRA.

On October 15, Region IV staff contacted Energy Northwest (EN) and re-exited and changed the finding to a very low safety significant "green" NCV against Technical Specification (TS) 5.7.2 (b) and (e) which was subsequently documented in NRC Integrated Inspection Report 05000397/2018003 on October 31, 2018 as follows:

> *The licensee failed to control worker activities in a locked high radiation area in accordance with the requirements of the* (Radiation Work Permit) *RWP and failed to determine radiological conditions in the work area prior to the start of work.*
>
> *The inspectors concluded that two of the conditions for LHRA entry were not met. The riggers failed to understand the radiological control requirements, and entered the truck bay (impending LHRA) without continuous RP coverage, contrary to the RWP requirement. Additionally, there was no radiological survey of the truck bay with the filter vessel present to validate the calculated estimate so that the riggers could be made knowledgeable of the conditions. Further, as the filter was lowered creating the LHRA conditions, the HPT was not in position to determine the radiological conditions or to control (intervene) in the activities of the workers.*

It is EN's position that a performance deficiency occurred but the more appropriate characterization of this finding is an NCV of TS 5.4.1 in that adequate controls were established yet an individual did not follow prescribed guidance. This kind of performance deficiency is more consistent with how the NRC has traditionally issued findings against TS 5.4.1. More details are provided later in this response to the documented finding.

B. Specific Language from the Inspection Report

The following is a discussion about the specific language in the inspection report, and how EN characterizes the issues.

> *"…failed to determine radiological conditions in the work area prior to the start of work."*

The dose rates of the filter unit were determined, by direct survey and calculations, from contact on the filter unit to a distance of 30 feet, prior to the filter unit being moved from the 471' RB to the 441' RB truck bay.

> *"The riggers failed to understand the radiological control requirements, and entered the truck bay"*

Contrary to the above, the individuals were briefed and required to sign onto an RWP. The function of signing the briefing sheet and signing onto the RWP indicates that the individual has

been informed, read and acknowledges they understand the requirements and conditions for the work that is governed by the RWP; both of the riggers had done so.

> "*Additionally, there was no radiological survey of the truck bay with the filter vessel present to validate the calculated estimate so that the riggers could be made knowledgeable of the conditions*."

While no survey was completed on the Reactor Building (RB) 441' with the filter unit in the area, a complete survey of the filter unit was performed on the RB 471'. The dose rates were obtained around the unit from the floor to the top of the unit. From the highest contact dose rate obtained in the physical survey, dose rates were calculated out to a distance of 30 feet, and those dose rates were included in the RWP and pre-job briefing. The dose rates that would be present in the RB 441' would be consistent with the dose rates obtained on the RB 471', as the source of those dose rates was what was being moved. The filter was then continuously lowered through a hatch into the shielded container below. The filter was suspended in the overhead as it was continuously lowered directly into the shielded cask to significantly reduce the accessible dose rates. Accordingly, there was not an opportunity to perform an additional survey under the suspended load while the filter was in transit. Stopping the load and performing further surveys would not have been consistent with the As Low As Reasonably Achievable (ALARA) principle.

> *"…the HPT was not in a position to determine the radiological conditions or to control (intervene) in the activities of the workers."*

The briefing for the work included direction for the workers to be positioned at a far enough distance from the filter unit such that no worker should have been in a dose field greater than or equal to 800 mrem/hr. While the HPT was not in the truck bay, he was in radio contact with the HPT monitoring the worker's telemetric dosimetry during his transition from the RB 471' to the RB 441'. During his transition he was informed of the workers increasing dosimeter activity and instructed the workers to exit the area immediately upon his arriving at the RB 441'. The period in which the dosimeter experienced increased dose rates, calculated to be above the 800 mrem/hr that required continuous coverage, was approximately 9 seconds. The workers were briefed on the expected radiological conditions, and the actual conditions were well within the bounds of the conditions previously briefed. Had the worker who received the dosimeter rate alarm been positioned where he was required to be by the RWP briefing, he would not have experienced the dosimeter alarm. This is evidenced by the fact that the second worker, who was further from the filter unit, did not experience a dosimeter rate alarm.

C. Synopsis of Event

On June 20, 2017 preparations began for a wetwell filter vessel move. At 13:30, an LHRA/ High Risk Brief was conducted which was attended by the riggers involved with this activity. Items discussed during the brief included:

- Expected radiological conditions, which included various measured and calculated dose rates at different distances from the unshielded wetwell filter vessel.
- Requirement for continuous Health Physics (HP) coverage <u>when</u> workers were to be exposed to whole body dose rates ≥ 800 mrem/hr.

- Use of shielding and long handled tools for guiding the filter vessel into the shielded container.
- Direction to the workers not to approach any closer than 30 feet of the filter unit without an HPT present.
- By signing the briefing sheet and logging into the RWP, workers acknowledge that they understand the requirements to perform their work.

After the brief concluded, between 14:21-14:51, workers logged onto RWP 30001279 which was developed for this activity. Items on the RWP pertinent to this event were:

- Continuous HP coverage is required for working in whole body dose rates ≥ 800 mrem/hr.
- Back out condition at an expected dose rate of 1.188 rem/hr at 10ft from the unshielded filter vessel.
- Back out condition upon any unanticipated dose rate alarms.

Following the briefing, workers began to prepare their respective work areas for the transfer of the filter vessel when radio communication issues were experienced. During the time of troubleshooting the radio issues, two riggers who had been briefed to the expected LHRA conditions and were on the LHRA RWP entered the RB 441' truck bay. Turnover of the LHRA door guard duties due to shift change also occurred during the period that radio issues occurred. The new LHRA door guard had been briefed to the conditions and responsibilities. The new LHRA door guard questioned the presence of the two riggers and called the Radiological Operations Supervisor to verify their ability to remain in the truck bay and was given permission from the Radiological Operations Supervisor. During discussion with the door guard, the Radiological Operations Supervisor did not reaffirm the expectation that HPT coverage be present during the actual filter move. As a result of the incomplete direction, the personnel remained in the truck bay during the vessel move. While continuous HPT coverage in the truck bay during the LHRA conditions was an expectation set forth in the briefing, this was not an RWP requirement. The two riggers' accumulated dose and dosimeter dose rates were being monitored remotely via telemetry while they were in the truck bay.

Once the vessel was in motion, the job coverage HPT left the RB 471' and proceeded to the RB 441' truck bay to meet up with the riggers. An LHRA condition in the RB 441' truck bay existed during transfer of the wetwell filter vessel from RB 471' while the filter was continuously lowered via a crane from the upper elevation into a shielded container in the truck bay. The interior truck bay door (from RB into the truck bay) was closed shut and guarded, during the transfer activity, by a Junior Health Physics Technician (JHPT). When the job coverage HPT arrived at the truck bay door, the HPT asked the posted LHRA door guard where the riggers were. The JHPT responded that they were inside the truck bay. No unauthorized individuals entered the room while the JHPT was performing LHRA door guard duties.

The job coverage HPT entered the truck bay to find one of the two riggers standing approximately 10-15 feet away from the unshielded filter vessel and this individual's electronic dosimeter (ED) was alarming. The ED dose rate alarm was received at 17:38:21 and cycled in and out of alarm every second, for approximately 9 seconds. The highest calculated dose rate that the ED logged was 1,520 mrem/hr.

It should be noted that the dose rate function of the MGP Instruments Model DMC 2000s (the ED used at Energy Northwest), is designed for integrating dose- it is not a calibrated dose rate

instrument. Previous testing revealed that for short duration exposure times (i.e. <5 seconds), the dose rate function of the instrument provides an overly conservative value. In some cases this can be as much as 150% to 170% of actual value of a particular radiation field. The accumulated dose function of the instrument has been found to be more accurate. A more accurate approximation of the dose field encountered would be obtained by calculating the integrated dose received in unit time, converted to an hourly rate. The histogram information for the rigger's ED showed that the rigger received 14.8 mrem in two minutes, which calculates to 444 mrem/hr. The second individual's dosimeter logged a maximum rate of 612 mrem/hr.

The HPT stationed in the remote monitoring room, who was monitoring the riggers dose rates via telemetry, also saw the rigger's dose rates increasing and subsequent dose rate alarm. The in the field HPT instructed the riggers to exit the truck bay as soon as he entered the truck bay. Stop work criteria was met; the job coverage HPT contacted the Radiological Operations Supervisor. The two riggers received 21 mrem and 14 mrem respectively from the time they logged into the Radiologically Controlled Area (14:29 to 18:21), against an RWP dose limit of 200 mrem.

D. Energy Northwest's Position

Compliance with TS 5.7.2(b) and (e) were met and TS 5.4.1 was not met based on the following analyses:

a. Technical Specification 5.7.2 Analysis

Technical Specification 5.7.2 (b) states the following:

Access to, and activities in, each such area shall be controlled by means of an RWP or equivalent that includes specification of radiation dose rates in the immediate work area(s) and other appropriate radiation protection equipment and measures

The following details apply:

- A Specific RWP was created (RWP 30001279) that included the specification of radiation dose rates in the expected work area and included other appropriate radiation protection equipment and measures- telemetric dosimetry, alarming dosimeters, long handled tools, shielding, etc.

- These measures and controls, consistent with the requirements of TS 5.7.2 (b), were sufficient to control exposure had they been adhered to by the workers involved with this finding.

- The control established in the RWP for continuous HPT coverage when workers will be exposed to whole body dose rates ≥ 800 mrem/hour is required by Energy Northwest procedure PPM 11.2.7.3, High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Control and is not a specific requirement of TS 5.7.2 for entry into a LHRA.

- The HPT providing coverage was in route to the 441' RB truck bay when he was contacted by the telemetric monitoring personnel via radio that the rigger was

experiencing a dosimeter rate alarm. The HPT entered the area and instructed the riggers to leave upon hearing the dosimeter rate alarm.

- This event is similar to an event at another station (Reference ML17313A039) in that the HPT responded after being contacted by telemetric monitoring personnel that workers, who failed to follow the requirements of a job specific RWP, were experiencing increasing dose rates. That event was characterized as a TS 5.4.1 finding.

Technical Specification 5.7.2(e) states the following:

Except for individuals qualified in radiation protection procedures, or personnel continuously escorted by such individuals, entry into such areas shall be made only after dose rates in the area have been determined and entry personnel are knowledgeable of them. These continuously escorted personnel will receive a pre-job briefing prior to entry into such areas. This dose rate determination, knowledge, and pre-job briefing does not require documentation prior to initial entry.

The following details apply:

- The dose rates of the filter unit were determined, by direct survey and calculations, prior to the filter unit being moved from the 471' RB to the 441' RB truck bay.

- The individuals involved were briefed on the radiological conditions of the filter unit and had read and signed that they understood the conditions of the Radiation Work Permit (RWP), and would comply.

- The conditions in the RB truck bay did change, however, the change in conditions was created by a known quantity, and not similar to system operations that have the potential to change conditions beyond a known quantity.

- The conditions that the workers encountered were bounded by the conditions that were previously briefed, which were obtained through a physical survey: dose rates at multiple distances were calculated, indicating that the conditions were fully understood and briefed upon prior to the entry.

- The survey of the filter occurred on the RB 471'. The filter was then lowered through a hatch into the shielded container below. The filter was suspended in the overhead as it was continuously lowered directly into the shielded cask that significantly reduced the accessible dose rates. Accordingly, there was not an opportunity to perform an additional survey under the suspended load while the filter was in transit.

- The *continuously escorted personnel* that are referred to in the TS describes personnel who have not been briefed on the radiological conditions prior to the entry and who are not covered by an RWP, at which point they would need continuous escort. Since the workers in this case were briefed on the potential dose rates and acknowledged this through their signature, entry requirements were met.

b. Technical Specification 5.4.1 Analysis

Technical Specification 5.4.1 states the following:

Written procedures shall be established, implemented, and maintained covering the following activities:
a. The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978;

(RG 1.33, R2, App A, Section 7, e outlines the RP program procedures)

The following details apply:

- The implementation of the following procedures were not performed by the workers involved which led to one rigger receiving a dose rate alarm:
  - PPM 11.2.7.3, High Radiation Area, Locked High Radiation Area, and Very High Radiation Area Control which requires HPT coverage before entering an area of ≥800 mrem/hr
  - GEN-RPP-11, Use of the Total Exposure System (TES) for Access Control which requires compliance with the work associated RWP
- In reviewing similar occurrences throughout the industry, similar events have been characterized as violations of TS 5.4.1 , as demonstrated by the following examples:
  - **ML17313A039**
    A finding of very low safety significance and an associated NCV of TS 5.4.1 was self-revealed when individuals failed to adequately control access in locked high radiation areas (LHRAs). Specifically, the failure to meet all of the requirements of *the governing procedure* represented a failure to comply with the Radiation Work Permit. This resulted in four individuals entering a LHRA that they had not been specifically authorized to enter. These individuals entered the incorrect location and were inside the area for approximately 2-3 minutes before they noticed that they were in the incorrect area. The individuals knew that they were in the incorrect location when they could not find the nozzles that they planned on inspecting. The individuals exited the area and were simultaneously told to exit the area by the radiation protection technician (RPT) providing remote coverage which demonstrated that the four workers were not in the authorized work area.
  - **ML16208A389**
    A self-revealed finding of very low safety significance (Green) and an associated non-cited violation (NCV) of Technical Specification 5.4.1 was identified when an engineer violated a RWP by entering an area that was outside the scope of the RWP.

    Description: On April 13, 2016, the Radiation Protection staff provided an RWP brief to an engineer that was performing a VT2 Inspection in what is known as

"Area 7" in the facility. *Procedures* specified that a Radiation Protection brief was required prior to accessing areas greater than seven feet. The engineer informed the Radiation Protection staff of the areas that the he would be inspecting and based on this information, it was determined that a high radiation area brief would not be required.

During the Radiation Protection brief, the Radiation Protection Technician informed the engineer that he would need to avoid Penetration 41, which was the Chemical and Volume Control System letdown line. Penetration 41 was posted as a high radiation area based on surveys that were conducted. When presented with this information by the Radiation Protection Technician, the engineer informed the technician that his travel path would be near Penetration 54 to identify the line that was needed for the VT2 Inspection. When this portion of the VT2 Inspection was completed, the engineer informed the Radiation Protection Technician that he would climb down to elevation 364', traverse past the transfer canal, and continue to the other side of the canal while avoiding Penetration 41.

During the VT2 Inspection, the engineer climbed off the platform, which is past the hand railing and on to a number of 3-inch unistruts. This inaccessible area, located near Penetration 53 and adjacent to Penetration 41 was a high radiation area at the time. The Radiation Protection Staff considered this area past the hand railing to be inaccessible and did not perform routine surveys there. Factors that led to the Radiation Protection Staff declaring that this area was inaccessible included the area in question being approximately 25–30 feet from ground level and the area being comprised of unistruts that were not designed to be walked on without proper fall protection. While the engineer was performing tours in this overhead area (near the Chemical and Volume Control System line), he received an unplanned dose rate alarm. The unplanned dose rate alarm was 142 mrem/hour with an alarm set point of 100 mrem/hour. The engineer immediately exited the area upon receiving the unplanned dose rate alarm and reported to the Radiation Protection Staff. The engineer had a cumulative dose of 2.9 mrem from this entry.

- These examples are similar to the event at Columbia in that both of these instances detail events where individuals failed to follow controls that were established in RWPs that would have been sufficient to prevent unintended exposure if followed.

E. Conclusion

The event that occurred at Columbia clearly demonstrates a performance deficiency in that a rigger failed to comply with RWP and procedural guidance. The rigger did not adhere to the controls that were established during the movement of the filter unit resulting in him being in a location outside of the controls that were established. As such, and consistent with similar events, this demonstrates a failure to comply with TS 5.4.1 and Energy Northwest respectfully requests that the NRC staff reconsider the characterization of this finding as documented in NRC Integrated Inspection Report 05000397/2018003 on October 31, 2018.