**MEMORANDUM**

TO: Hanford Work Group
FROM: SC&A, Inc.
DATE: February 1, 2018
SUBJECT: Review of "Site Profile for Pacific Northwest National Laboratory," ORAUT-TKBS-0027, Revision 02, September 12, 2016

SC&A was tasked on August 17, 2017, to review ORAUT-TKBS-0027, Revision 02, *Site Profile for Pacific Northwest National Laboratory*, issued September 12, 2016. As noted by the National Institute for Occupational Safety and Health (NIOSH), this revision was made to:

> *modify the scope of the PNNL site profile to reflect the decision to make no distinction between PNNL and Hanford until the year 2005.* [It also combines] *the six technical basis documents into one site profile document for the period from 2005 to present.* [NIOSH 2016, page 2]

Essentially, the U.S. Department of Energy (DOE) and U.S. Department of Labor determined that Pacific Northwest National Laboratory (PNNL) did not constitute a separate facility from the Hanford site for purposes of the Energy Employees Occupational Illness Compensation Program Act (EEOICPA) until 2005. However, the site profile revision further clarifies that for the 300 Area at Hanford, where specific PNNL operations were conducted:

> *from 2005 forward, internal and external radiation doses received within the 300 Area of the Hanford site are considered Hanford exposures, regardless if they were received in PNNL facilities in 300 Area. Nonetheless, any occupationally derived radiation dose received at Hanford from 2005 forward is valid for inclusion in a dose reconstruction for an energy employee who worked at PNNL.* [NIOSH 2016, page 9]

Given this defined scope for the site profile, SC&A focused on the timeframe from 2005 to the present in terms of the adequacy and completeness of the revision. It should be noted that this timeframe encompasses the modern era of radiological control programs at DOE facilities, with PNNL having satisfied compliance with 10 CFR Part 835 regulatory requirements, as well as achieving Department of Energy Laboratory Accreditation Program (DOELAP) certification for its internal and external radiation dosimetry programs.

For purposes of this review, SC&A reviewed a number of information sources (in addition to the site profile itself) relevant to PNNL's radiological control program in the context of radiation protection monitoring and records:

- **DOE Noncompliance Tracking System (NTS)** – for instances of reported noncompliances with regulatory requirements. SC&A accessed and searched this tracking system for any instances of noncompliances with radiation exposure implications for the period from 2005 forward.
- **DOE Occurrence Reporting System (ORPS)** – for reported incidents and accidents involving radiation exposure. SC&A accessed and searched this compilation for radiation exposure incidents and occurrences for PNNL for the period from 2005 forward. DOE compiled and provided a report on January 23, 2018.
- **Hanford Issues Matrix** – for outstanding Special Exposure Cohort (SEC) and site profile issues from the ongoing SEC review (currently addressing 1983–1990) that may have potential relevance for PNNL post 1995. This matrix was recently updated and jointly issued by NIOSH and SC&A to the Hanford Work Group in December 2017 (NIOSH 2017).
- **DOE Nuclear Materials Management & Safeguards System (NMMSS)** – for any onsite presence of certain radiological source terms during the period in question. SC&A accessed and reviewed this secure inventory system at DOE's Germantown facility on January 24, 2018.
- **NIOSH's Site Research Database** – for site documents and data having relevance for PNNL for the period from 2005 forward.

The purpose is to ascertain whether the revised site profile (1) is adequately complete for the time period in question and (2) adequately addresses key historical and operational information needed to guide dose reconstruction under EEOICPA.

**Observations**

1. **Enriched uranium:** Based on a review of historical radiological inventories at PNNL facilities for the period from 2005 forward (via NMMSS), the only source term of any significance is enriched uranium. This figured in waste management, material stabilization, and, to a small extent, basic science research. The site profile acknowledges its presence in waste management activities, given its historical use at Hanford, but does not clearly acknowledge its ongoing, continued use and exposure potential for other activities.

2. **ORPS report, "Management Concern Regarding Missed Radiological Bioassays":** ORPS Report No. SC-PNSO-PNNL-PNNLBOPER-2009-0002 (DOE 2009) cites an occurrence reported by PNNL on February 25, 2009, that "*required bioassays have not been performed for some staff performing radiological work*." This issue arose from improper staff use of a "*bioassay waiver tool*" that was erroneously used to allow required bioassays to be eligible for waiver. This error arose from a modification (in March 2008) to PNNL's Automatic Radiological Access Control System (ARACS) that was not coupled with a corresponding modification to the Bioassay Scheduling and Waiving Tool (BSWT). Follow-up investigation of 28 workers whose bioassay had been

erroneously waived showed "*no doses in excess of monitoring levels required by 10 CFR 835 (100 mrem CEDE) were missed*." While there was apparently no consequence from these initially missed bioassays, the dose reconstructor should be aware of this reassessment and investigation affecting all PNNL workers on Radiation Work Permits.

3. **2007 Price-Anderson enforcement action (EA-2007-07):** While the site profile observes that "*there have been no known, large-scale radiological incidents at PNNL from 2005 to the present*" (page 10), it does not acknowledge a Preliminary Notice of Violation issued on January 3, 2008, based on eight violations of 10 CFR 830 and 835, at Severity Level II, with a civil penalty (ultimately waived). These involved two incidents, one involving an airborne release of plutonium at the Radiochemical Processing Laboratory and the other involving the spread of contamination (including to the public) from a leaking sealed source. While these did not constitute "large-scale" radiological incidents, DOE viewed them as significant:

   > *DOE views these violations as significant. Both radiological events resulted in uptakes and exposures to personnel.* [DOE 2008, page 2]

   While these exposures can (and should) be addressed on an individual claimant basis, it is useful to identify significant exposure incidents in site profile radiological histories.

**Conclusion**

The revised PNNL site profile (ORAUT-TKBS-0027, Revision 02) is adequately complete and comprehensive, but it can be strengthened by the inclusion of some additional historical information, as noted in our observations.

**References**

DOE 2008. Correspondence from Arnold E. Guevara, Director, Office of Enforcement, U.S. Department of Energy, to Michael Kluse, Interim Laboratory Director, Battelle Memorial Institute, Pacific Northwest National Laboratory, EA-2007-07. January 3, 2008. Available at https://energy.gov/sites/prod/files/hss/Enforcement%20and%20Oversight/Enforcement/docs/eas/EA-2007-07.pdf.

DOE 2009. U.S. Department of Energy, Occurrence Reporting Program System (ORPS), Report No. SC-PNSO-PNNL-PNNLBOPER-2009-0002, "Management Concern Regarding Missed Radiological Bioassays." February 25, 2009.

NIOSH 2016. *Site Profile for Pacific Northwest National Laboratory*, ORAUT-TKBS-0027, Revision 02, National Institute for Occupational Safety and Health, Cincinnati, Ohio. September 12, 2016.

NIOSH 2017. Email from Chuck Nelson, National Institute for Occupational Safety and Health, to James Melius, Chairman, Hanford Work Group, Subject: *Hanford Issues Matrix*. November 29, 2017.