MEMORANDUM

TO: Argonne National Laboratory – East Work Group
FROM: SC&A, Inc.
DATE: October 24, 2018
SUBJECT: Update: ANL-E Site Profile Finding 12

Introduction and Background

The current edition of the Argonne National Laboratory – East (ANL-E) site profile technical basis document (TBD) for environmental dose is ORAUT-TKBS-0036-4, Revision 00, *Argonne National Laboratory – East – Occupational Environmental Dose* (NIOSH 2006).

SC&A issued a review of the ANL-E TBDs in 2009 (SC&A 2009) and an updated report in 2016 (SC&A 2016). SC&A entered the ANL-E site profile primary findings into the Board Review System in February 2017.

During the June 27, 2018, ANL-E Work Group meeting, the chair of the Work Group tasked SC&A with drafting a memo to discuss information for the clarification and potential resolution of Finding 12: "Outdoor Inhalation Exposures Associated with Waste Disposal Operations in Area A and from Particulates Released during Accidents are Not Adequately Addressed" (SC&A 2009, p. 22).

SC&A analyzed Finding 12 and requested that the National Institute for Occupational Safety and Health (NIOSH) provide additional information to address the finding. This memorandum is a summary of the relevant information obtained from NIOSH's recent response (NIOSH 2018) and SC&A's current analyses of Finding 12.

Summary of Finding 12

A detailed description of SC&A's original concerns expressed in Finding 12 is provided on pages 49 and 50 of SC&A's original review (SC&A 2009). The first paragraph addressed environment intakes for Area A, and the second paragraph addressed environmental intakes for ANL-E for the period through 1953.

Area A Environmental Intakes

In SC&A's 2009 review (SC&A 2009), SC&A found that NIOSH's chronic environmental intake recommendations for Area A were reasonable. However, SC&A raised the issue of potential acute intakes from incidents and accidents for which long-term environmental analyses may not have indicated individual events.

ANL-E Environmental Intakes

In SC&A's 2009 review (SC&A 2009), SC&A found that NIOSH's chronic environmental intake recommendations for ANL-E were reasonable. However, SC&A raised the issue of potential acute intakes from incidents and accidents for which long-term environmental analyses may not have indicated individual events.

NIOSH's Response of September 25, 2018

NIOSH provided a response to the ANL-E Work Group's request for clarification on September 25, 2018. NIOSH addressed the following two areas (NIOSH 2018, p. 1):

1. *Potential for short-term (acute) inhalation exposures, including particulates, due to accidents associated with waste disposal operations at Site A and Plot M.*
2. *Potential for short-term (acute) releases due to accidents at ANL-E during the entire covered period.*

NIOSH provided a four-page discussion of the issues, with Site Research Database (SRDB) references, and a summary/conclusion that consisted of the following:

> *As a reminder: this finding is specific to environmental internal doses and a summary for how incidents and accidents are addressed; for individuals on routine bioassay monitoring, intakes from such incidents would be accounted for in the bioassay sampling.*
>
> *To date, no record of short-term, large exposure events, which would significantly affect environmental monitoring data have been identified in SRDB documents, even with the level of detail found in the records for Site A and Plot M. Based on the documented ANL-E practices at Site A and Plot M, it is reasonable to assume that individuals not participating in the routine bioassay monitoring program or involved in an incident would not have been exposed to short-term, large exposure events, and that assignment of environmental levels of intake would be appropriate. Even if unidentified incidents occurred (which would have contributed to measured environmental results), NIOSH's approach to calculating intakes from environmental monitoring yields reasonable internal dose estimates.*
>
> *Additional discussion in the TBD incorporating portions of the rationale provided above will be implemented in the TBD revision.* [NIOSH 2018, pp. 3–4]

SC&A's Review and Status of Finding 12

In SC&A's 2009 review (SC&A 2009), SC&A concurred with NIOSH that the chronic environmental intake issues for the period through 1953 for Area A (including Plot M) and ANL-E had been satisfactorily addressed. Therefore, the remaining part of the original Finding

12 to be addressed was the consideration of potential *acute* environmental intakes for *unmonitored* workers in Area A (including Plot M, which was a burial site) and ANL-E (also called Site D) for the period through 1953.

SC&A reviewed ORAUT-TKBS-0036-4, the original Finding 12, NIOSH's recent response (NIOSH 2018), and associated SRBD references. The most applicable SRDB documents for this review were:

- *Health Physics Division, Report of Activities,* Argonne National Laboratory (ANL 1948, PDF pp. 15–17). This document provides an example of the activities and health physics monitoring practices at Site A in 1948.
- *Draft Environmental Impact Statement,* Argonne National Laboratory (ANL 1979). Major accidents and incidents prior to 1954 are described on PDF pages 246–247. This information indicates that any exposures resulting from accidents and incidents were confined to the local operating area.
- *Formerly Utilized MED/AEC Sites Remedial Action Program, Radiological Survey of Site A, Palos Park Forest Preserve, Chicago, Illinois,* DOE/EV-0005/7 UC-70, Final Report, U.S. Department of Energy (DOE 1978). This document provides the results of the 1978 environmental surveys of Site A and Plot M (PDF pp. 16–93). PDF page 16 states that, "By the summer of 1956, all demolition and restoration work was complete at both Site A and Plot M. A radioactivity survey of the site indicated no detectable surface contamination." This indicates a low potential for prior environmental contamination.
- *Environmental Review for Site A/Plot M, Palos Forest Preserve, Cook County, Illinois,* ANL/EAIS/TM-99, Argonne National Laboratory (ANL 1993). Air monitoring was conducted and indicated that respirators were not needed during cleanup of Site A (PDF p. 18), indicating low potential for contamination to the environment. Examples of Plot M activity and cleanup during the period 1944 – 1948 are provided on PDF pages 111–124.

According to the information in the SRBD references, the handling of the removal of the waste from Plot M and the decontamination and decommissioning of Area A was documented and included heath physics coverage and monitored workers, including monitoring of non-Argonne personnel (ANL 1993, PDF p. 19). Spread of contamination was minimal and air monitoring showed little air contamination that would result in exposure to unmonitored workers outside the immediate operating area. The SRBD documents did not note any major incidents or accidents that would result in the release of relatively large amounts of radioactive material that would have presented an acute intake potential for unmonitored workers.

While, in general, it cannot be absolutely ascertained that there were no occurrences that would lead to acute environmental intakes for unmonitored workers, a review of the available documents indicates that incidents and accidents at both Area A (including Plot M) and ANL-E were fairly well documented, even in the early years of operations through 1953. Most of the incidents and accidents involving radioactive material were isolated to a local area of operation, where personnel would have been monitored, and the operations would not have impacted wide

areas of the environment where unmonitored workers could have received measurable acute intakes. Residual environmental contamination would have been expected if significant incidents or accidents had occurred prior to 1954. However, data from environmental monitoring beginning in 1954 did not indicate significant radionuclides present in the environment at Area A (including Plot M) or ANL-E.

Conclusion

SC&A did not find indications of the potential for significant unmonitored acute intakes in Area A (including Plot M) or ANL-E through 1953.

References

ANL 1948. *Health Physics Division, Report of Activities,* Argonne National Laboratory, Health Physics Division, Argonne, IL. December 1948. [SRDB Ref. ID 16426, PDF pp. 15–17]

ANL 1979. *Draft Environmental Impact Statement*. Argonne National Laboratory, Argonne, IL. March 1979. [SRDB Ref. ID 17809]

ANL 1993. *Environmental Review for Site A/Plot M, Palos Forest Preserve, Cook County, Illinois,* ANL/EAIS/TM-99, Argonne National Laboratory, Environmental Assessment and Information Sciences Division, Argonne, IL. June 1993. [SRDB Ref. ID 40591]

DOE 1978. *Formerly Utilized MED/AEC Sites Remedial Action Program, Radiological Survey of Site A, Palos Park Forest Preserve, Chicago, Illinois*, DOE/EV-0005/7 UC-70, Final Report, U.S. Department of Energy, Washington, DC. April 1978. [SRBD Ref. ID 17289]

NIOSH 2006. *Argonne National Laboratory – East – Occupational Environmental Dose*, ORAUT-TKBS-0036-4, Revision 00, National Institute for Occupational Safety and Health, Cincinnati, OH. February 9, 2006.

NIOSH 2018. *ORAUT Follow-up Response to SC&A Finding 12 – Outdoor Inhalation Exposures Associated with Waste Disposal Operations in Area A and from Particulates Released During Accidents Are Not Adequately Addressed*, National Institute for Occupational Safety and Health, Cincinnati, OH. September 25, 2018.

SC&A 2009. *Review of the NIOSH Site Profile for the Argonne National Laboratory – East*, SCA-TR-TASK1-0023, Revision 0, SC&A, Inc., Vienna, VA, and Saliant, Inc., Jefferson, MD. March 11, 2009.

SC&A 2016. *SC&A Recommendations Regarding Issues Resolution for the Site Profile for Argonne National Laboratory–East*, SCA-TR-2016-SP005, Revision 1, SC&A, Inc., Vienna, VA, and Saliant, Inc., Jefferson, MD. June 5, 2016.