

June 2, 2025

RADIOACTIVE MATERIALS 90001 AMENDMENT 68 MEMORANDUM

To: Allegheny Technologies (ATI)

FROM: Todd Carpenter, Licensing Manager
Radiation Protection Services (RPS)
Oregon Health Authority (OHA)

SUBJECT: Final Review for Soil Amendment Area (SAA) Decommissioning

By letters and emails dated October 18, 2023, December 14, 2023, January 8, 2024, June 24, 2024, November 18, 2024 and March 3, 2025. ATI requested that the Oregon Health Authority – Radiation Protection Services (OHA-RPS) approve the restricted release of a portion of the site from its Oregon radioactive material license, ORE-90001. The site requested was a 41-acre Soil Amendment Area (SAA), License Condition 10(B)(2), in Millersburg, Oregon [south of Conser Road NE, east of NE Wds Road, and west of Old Salem Road NE, tax lots 10S-3W-28-00100 & 00101].

This decommissioning project was classified as a “Group Six, Restricted Release; Decommissioning Plan Required” site in accordance with the guidance provided in the Nuclear Regulatory Commission’s (NRC) NUREG-1757, “Consolidated NMSS Decommissioning Guidance: Decommissioning Process for Materials Licensees,” Volume 1, Revision 2.

In summary, the OHA-RPS staff review of the Final Status Survey Report (FSSR) is complete and the SAA is approved to be removed from ATI’s license under restricted release for non-residential use only. The technical justification of this recommendation is provided in the enclosure to this memorandum. This approval confirms that the SAA property transferred to the City of Millersburg on April 18, 1991 meets the radiological criteria established in Oregon Administration Rules (OAR) 333-102-0310(7) through (11) and Code of Federal Regulations (CFR) 10 CFR Part 20, Subpart E.

License No.: ORE-90001

Amendment 68

Docket#: 23-0584

Enclosure: Technical Evaluation Report

Contact: Erin DeSemples, Licensing Reviewer

**Technical Evaluation Report for Review of Final Status Survey Report for
Soil Amendment Area (SAA)**

Letters and emails dated October 18, 2023, December 14, 2023, January 8, 2024, June 24, 2024, November 18, 2024, and March 3, 2025 were received from ATI requesting that OHA-RPS approve the release of the SAA site from the ATI radioactive materials license number ORE-90001. The site is currently owned by the City of Millersburg, Oregon.

The Teledyne Wah Chang (TWC) site consists of 225 acres, subdivided into two main areas – the Main Plant Area which consists of 110 acres and the Farm Ponds Area (FPA) containing 115 acres that includes 41 acres of the SAA in the north section of the FPA. (EPA, 2001).

In 1975, the Oregon Department of Environmental Quality (ODEQ) issued a solid waste permit to TWC, to perform a one-time application of solid waste from the wastewater treatment system as an experimental soil amendment to the FPA. The solid waste contained residue zircon sand and was spread on the 41-acre SAA parcel of the FPA. The zircon sand, naturally-occurring radioactive material (NORM) contained uranium, thorium, and radium and was the result of TWC processing of zircon sands to produce zirconium and hafnium metal products (EPA, 2001).

In 1977, RPS-OHA was made aware of the increased use of zircon sand at TWC that included the main site, the FPA and SAA in 1977. The quantity of zircon sand used (greater than 20,000 pounds per year) coupled with the radium content at or above five picocuries per gram (pCi/g) [exemption concentration limit in NORM is less than 5 pCi/g] requires a radioactive materials license. As a result, in 1978 RPS issued an amended license to TWC for the possession, use, storage, and disposal of zircon sand. The zircon sand residue in possession up to that time was required to be disposed at a licensed low-level radioactive waste disposal facility.

In 1983, due to the presence of radioactive materials and hazards chemicals at both the main plant and FPA (including the SAA), TWC was placed on the superfund National Priorities List (NPL) by the U.S. Environmental Protection Agency (EPA).

In 1990, ownership of the SAA was transferred to the City of Millersburg but remained on TWC's radioactive materials license number ORE-90001.

In 1994, initial gamma scoping surveys of the SAA were performed as required by the EPA under the NPL. The initial gamma scoping surveys resulted in the EPA issuance of a Record of Decision (ROD) associated with the site. This ROD (EPA, 1995) called for the following actions for the TWC site:

- Excavation of materials exceeding gamma radiation levels of 20 microrem per hour ($\mu\text{rem/hr}$) above background measured at 1 meter above the ground surface averaged over 100 meters squared (m^2).
- Transportation of the excavated material offsite for disposal at a licensed facility

- Use of institutional controls and specific construction methods to reduce the accumulation of radon for future buildings where modeling indicated that the radon concentration in these buildings could exceed the action level of 4 picocuries/liter (pCi/L).

Based upon the above proposed remediation actions and the established action level for indoor concentrations of radon, the ROD identified that concentrations of radium in soils greater than 3 pCi/g could result in radon concentrations at or above the action level (4 pCi/L), resulting in an unacceptable dose to the public due to radon for any construction on the soils.

The EPA determined that a “no-action” remediation option was appropriate for the site based on dose modeling scenarios for restricted release based on the soil contamination levels. The ROD specifically stated that “should excavation occur as part of future development of the Main Plant or the Soil Amendment Area, excavated soils must be properly handled and disposed of.” The ROD further supported its no-action determination based on the fact that “institutional controls associated with land use remain consistent with the site’s current industrial use zoning.” The no-action decision was also applied to the remediation of the SAA despite its use for agricultural purposes. (EPA, 1996).

In October of 1996, a Consent Decree between TWC, EPA and the City of Millersburg was signed to implement the decisions of the ROD and re-recorded on December 11, 2006. The decree states that the SAA shall not be used for residential purposes and established future building construction requirements on the SAA to be radon resistant and tested to ensure radon concentrations do not exceed 4 pCi/L. If radon concentrations still exceed 4 pCi/L, additional controls or measures will be taken to reduce the indoor concentrations. If any soil is removed from the site, it must be transported and disposed at an authorized waste disposal facility following consultation with the Oregon Department of Energy (ODOE). The decree further states that building construction restrictions did not apply to open structures such as parking areas, including the covered parking structure currently being considered by the City of Millersburg. Removal of the SAA from TDY’s radioactive material license would not relinquish the City of Millersburg from the restrictions set forth by the Consent Decree.

In 1996, TWC merged with Allegheny Ludlum Corporation to become Allegheny Technologies Incorporated (ATI). ATI acquired the TWC site in 1999 (EPA, 2013).

In 2001, the EPA made significant changes to the 1995 ROD in an Explanation of Significant Differences (EPA, 2001) to modify the remedy for the Soil Amendment Area to include more protective options as follows:

- Excavated material may be bermed and covered onsite to minimize erosion and dust emissions. Long-term maintenance of the berms would be required
- In excavated areas, buildings may be constructed without radon resistant technology.

A supplemental set of gamma radiation surveys of the SAA surface soils were performed in November of 2021, when ATI contracted with GSI Water Solutions (GSI) for scoping surveys and to evaluate the need for confirmatory soil sampling (ATI, 2022). GSI classified the site as a Class Three survey unit based upon the 1994 survey and the NRC Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), established a grid of 420 survey cells covering the entire SAA, and performed the gamma walkover surveys (GWS) using an EPA action level of 20 urem/hour above background, measured at 6 cm above ground surface

(ags). Background radiation levels were taken from two adjacent parcels to the east and west of the SAA at three discrete locations within both. Background was determined to be 13 urem/hour and the action level therefore 33 urem/hour. The results of the gamma walkover survey identified 46 cells that met or exceeded this action level, ranging from 33 urem/hour to 37 urem/hour. The results also demonstrate that the SAA residual activity is relatively homogenous (no hot spots) with a general trend of decreasing dose levels approaching the property boundaries.

It should be noted that the 2021 survey results that were obtained from the GSI gamma walkover are not comparable with the 1994 gamma surveys due to the geometry at which they were conducted, the difference in the grid sizes and the survey techniques. The 1994 surveys were conducted at 1-meter ags used a 100 m² grid size and a mixture of static and scanning measurements. The 2021 surveys were conducted at 6.0 cm ags, had 400 m² grids and were scanning measurements only. A correction factor of 0.46 can be applied to the highest 2021 survey result to provide a rough approximation for the difference between the 6 cm ags (2021) and the 1-meter ags (1994) as detailed in the Radian Scientific Report (Radian Scientific, 2022). This correction factor ignores the difference in gamma measurement techniques and the grid size. The resulting 11 µR/hr above background resulting from applying the correction factor to the highest scanning measurement is more in line with the 1994 survey results but slightly lower indicating that 2021 survey results were in line with the 1994 gamma survey release criteria of 32 µR/hr (or 20µR/hr above background.)

Following completion of the GSI gamma walkover surveys, ATI personnel used a random number generator to select 8 grids for the collection of soil samples. The top 2 inches of soil was scraped away and approximately 2 ounces of soil was collected per sample at each corner of the selected grid for a combined total of 8 ounces for 4 samples. The soil was blended for each grid and shipped offsite to a certified laboratory for analysis. Samples were screened and analyzed using EPA Method 901.1, Gamma Emitting Radionuclides in Drinking Water (gamma spectroscopy) as well as Department of Energy Method Ga-01R, Gamma Radioassay. Radium results ranged from 3.52 pCi/g to 19.32 pCi/g. Based on the information in Table 1 of the ATI report (ATI, 2022) all the soil samples exceeded the 3 pCi/gm remediation limit established in the EPA ROD. In addition, Table 3 of the ATI report (ATI, 2022) shows radium leachability from soil ranged from non-detect (-0.0544 pCi/L) to 0.651 pCi/L. These concentrations are less than 1 pCi/L and indicative that radium will not migrate from the soil. OAR 345-050-0035 states material must not result in exposures exceeding 500 mrem/year nor exceed an annual release to water of 5 x 10⁻⁸ microcuries/milliliter (uCi/mL) and the results show the SAA soil is eligible for a ODOE Pathway Exemption for disposal within Oregon.

In 2023, ATI contracted with Chase Environmental (Chase) to perform a dose assessment to workers and the public based on the GSI gamma survey information and the soil sampling results from 2021. Chase performed site-specific dose modeling for restricted release using the following assumptions:

- industrial worker use scenario (2000 hours/year in the building and 500 hours/year outside but near the building, no pathways for dose from living onsite, or consumption of food or water from the site)
- minimum building slab thickness of 6 inches of concrete sitting on 4 inches of compacted gravel base

- no subsurface occupied structures; and
- contamination did not go deeper than surface soils (i.e., 6 inches).

Using the RESRAD Version 7.2, Chase calculated a Total Effective Dose Equivalent (TEDE) for non-residential (industrial) site use of 10.9 mrem/year for a worker at a building constructed on the SAA. This modelled dose is 43.6% of the 25 mrem/year allowed for license termination under OAR 333-102-0310 (11), OAR 333-117-0120 (Protection of the General Population from Releases of Radioactivity) and 10 CFR 20.1403 (Criteria for license termination under restricted conditions).

Chase also modelled a resident farmer scenario (onsite 24/7/365), residential, and agricultural pathways including potential doses from a loss of all institutional controls. This dose modeling resulted in a projected dose of 93.7 mrem/year which is above the 25 mrem/year TEDE. (Chase 2023a, 2023c) This exceeds the TEDE dose limit of 25 mrem/year described in 10 CFR 20 Subpart E and in OAR 333-102-0310(11). Note, the 1996 Consent Decree previously stated that the SAA will not be used for residential purposes, therefore, this restriction applies as well to OHA-RPS restricted release of the 41-acre site. However, this projected dose is 6.3% below the 100 mrem/year TEDE dose limit to members of the public from a licensed entity exclusive of background dose as given in OAR 333-120-0180(1) as well as OAR 33-102-0310(11). Therefore, since the projected dose demonstrates assurance that the public health and safety shall continue to be protected, and unlikely that the TEDE from all sources shall not exceed the limits, the site may be used by members of the public.

On October 18, 2023, ATI submitted a license amendment request to Oregon Health Authority to remove the SAA from Radioactive Material License ORE-90001.

In February 2024, EPA determined that the 2021 scan survey was acceptable, but requested ATI reevaluate survey unit classification and complete a gamma dose rate survey of the SAA with measurements taken at 1-meter ags. A survey plan was developed by Chase using MARSSIM guidance using the same dose rate action level of 20 urem/hour above background and the same 420-unit grid pattern used in the 2021 survey. The SAA was divided into four Class 2 survey units and one Class 3 survey unit. A non-impacted background survey unit with 15 survey locations was established southeast of the SAA in an agricultural section with similar geology and hydrology. (Chase, 2024)

In March 2024, Chase conducted a final status dose rate survey in accordance with the February survey plan. The highest gross counting (background counts not subtracted) result of any measurement within the SAA was 12 urem/hour which meets the established EPA release criteria of a gamma dose no greater than 20 urem/hour above background measured at 1-meter ags. (ATI, 2024) This result satisfied the EPA 1994 ROD requirements.

CONCLUSION

OHA-RPS have reviewed all documentation submitted by ATI for the amendment request to release the 41-acre site known as the SAA from Oregon Radioactive Materials License Number ORE-90001. Based on our review, RPS has determined that ATI has adequately demonstrated that the SAA radiation level falls below the 25 mrem/year as required under OAR 333-102-0310(11)(c)(A) applied to non-residential use. In addition, the SAA falls below the 100 mrem/year TEDE public dose limit as given in OAR 333-102-0310(11)(c)(C) and thus may be released for nonresidential use.

References

ATI, 2022a. Letter from Allegheny Technologies Inc to Mr. Chan Pongkhamsing, Project Manager, EPA Region 10, January 28, 2022. Soil Amendment Area Scoping Survey Summary, [GSI Water Solutions summary dated January 28, 2022 included as Enclosure]

ATI, 2022b. Letter from ATI Millersburg to Oregon Department of Energy. Soil Amendment Area Soil Characterization. May 11, 2022 [Included as Attachment 2 to the Chase SAA Dose Assessment Rev 1 dated November 30, 2023]

ATI, 2024. Letter from ATI Millersburg to Taylor Law, Remedial Project Manager, EPA Region 10. Soil Amendment Area Dose Rate Survey Report, May 2, 2024. [Chase report dated April 17, 2024 included as Enclosure]

Chase, 2023a. ATI Millersburg Soil Amendment Area Dose Assessment Report, Revision 0; October 11, 2023.

Chase, 2023b. ATI Millersburg Soil Amendment Area Derived Concentration Guideline Levels for Soil Amendment Area, Revision 0; October 11, 2023.

Chase, 2023c. ATI Millersburg Soil Amendment Area Dose Assessment Report, Revision 1, November 30, 2023.

Chase, 2023d. ATI Millersburg Soil Amendment Area Derived Concentration Guideline Levels for Soil Amendment Area, Revision 1, November 30, 2023.

Chase, 2024. ATI Millersburg Soil Amendment Area Dose Rate Survey Plan, February 2, 2024.

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Chase, 2024. ATI Millersburg Decommissioning Cost Estimate; November 15, 2024.

Chase, 2023. ATI Millersburg Soil Amendment Area Derived Concentration Guideline Levels for Soil Amendment Area, Revision 1; November 30, 2023.



OHA, RPS Review Completed by: Daryl Leon, Rama Wusirika, Richard Patterson, Erin DeSempole and Hillary Haskins.