



MEMO

TO: Subcommittee on Dose Reconstruction
FROM: Steve Ostrow, SC&A
DATE: March 26, 2013
SUBJECT: Ashland Oil – Linde Waste

SC&A conducted a brief scoping investigation of the Site Research Database (SRDB) to identify documents that might bear on the issue of when radioactive waste (e.g., slag, sludge, residue, or tailings) produced at the Linde facility was shipped to the Ashland Oil (formerly known as the Haist Property) facility. Although the limited document search is not conclusive, it suggests that no such waste was shipped after the late 1940s. In addition, in a separate issue, none of the records examined discuss the isotopic composition of the waste material. The following are some excerpts from pertinent documents examined:

- An Exposure Matrix for Linde Ceramics Plant (Including Tonawanda Laboratory), ORAUT-TKBS-0025, Rev. 2, July 15, 2011.

The Linde Site Profile (aka, TBD), which is a compendium of information drawn from many sources relevant to the site and a guide to estimating radiation exposures, does not explicitly address the question of when radioactive waste might have been shipped offsite; it gives some hints, though. Section 2.3.2 summarizes the history of uranium production at the site and indicates that all production work ceased in 1949.

Step I (production of U_3O_8) took place in Building 30 from June 1943 through July 1946. Step II (production of UO_2) took place in Building 30 from April 1943 through March 1944. Step III (production of UF_4) took place in Building 38 from July 1943 to June 1946. Linde sent the U_3O_8 from Step I to DuPont and Mallinckrodt after Step II production ceased (Gates 1946).¹ Linde received UO_2 from other companies for Step III processing (AEC 1949a).² Tonawanda Laboratory might have investigated all of these processing steps in its pilot plant. Uranium production was in standby after July 1946. Preparations for Step III resumption began in September 1945. Step III operations were resumed under contract AT-30-1-GEN-165 in November 1947 (Rennich 1947).³ Linde ended uranium production for the AEC in June 1949.

¹ Gates, M. E., 1946, "Description of Uranium Producing Processes," memorandum to the Area Engineer (Madison Square, New York, New York), U.S. Army Corps of Engineers, Manhattan District, Oak Ridge, Tennessee, October 17. (SRDB Ref ID: 16979, p. 79)

² AEC (U.S. Atomic Energy Commission), 1949a, *Health Hazards in NYOO Facilities Producing and Processing Uranium (A Status Report - April 1, 1949)*, New York Operations Office, Medical Division, New York, New York, April 18. (SRDB Ref ID: 3931)

³ Rennich, G., 1947, "Uranium-Thorium Branch Semi-Annual Report to Congress," Memorandum to E. M. Velten, AECPR-21, U.S. Atomic Energy Commission, New York, New York, December 1. (SRDB Ref ID: 10256, pp. 8–11)

Table 2-1 of the Site Profile and accompanying text indicate that the site underwent a comprehensive cleanup from 1949 through 1954, which suggests, but does not prove, that any stored contaminated material that could have been present would have been removed from the site.

- Memo from F.W. Malone, Chief, Niagara Falls Branch, to F.R. Dowling, Director, Feed Materials Division, Oak Ridge Operations Office, May 29, 1956 (SRDB No 6341).

It is hoped that the following information will also help you in arriving at a decision as to whether money should be spent to conduct a survey at this time.

1. *The material stored at the Haist [Ashland Oil] Property ten acre plot is comprised of low grade Western Ore Tailings from Linde Air Operations. The material has been dormant since 1944. The inventory figures have been compiled by book records since it is impossible to take a physical inventory as the material is stored on the ground. A breakdown of this material in description and quantity is as follows: (Taken from SS Accountability Records).*

- A. *P-78 Iron Cake – This material was a byproduct of Western Ore Processing during 1944–46. Ferric and ferrous sulfate added to Moore filtrate for removal of phosphorous and vanadium. Total material at Haist Property is 852,443 kgs containing 6,372 kgs of metal.*
- B. *L-19 Sludges – 1943 Western Ore (V.O.C.) tailings from Moore filters. This is 604,178 kgs of material and 6,334 kgs of metal. This material is segregated in small piles throughout the area.*
- C. *L-19 Sludges – 1944–45 – Moore sludge from Western Ores (BJ, B, Iron Box Sludges) processed during 14-month period beginning December 1944. Storage covers greater portion of Haist area. 5,826,320 kgs of material and 24,961 kgs of metal.*
- D. *Pilot Plant Sludges – Western Sludge and miscellaneous residues originally adjacent to L.A.P. Pilot Plant produced during early experimental work and production on contracts by L.A.P. Research Group. Transferred to Government in 1945 at no cost. There is 121,640 kgs of material; 1,194 kgs of metal.*

From the above you can see that we are supposed to have somewhat around 16,290,078 pounds and assuming the material contains about 50% moisture and weighs about 85# per cu. Ft., about 7200 cu. Yds.

The first paragraph of the quotation from this 1956 memo states that, “The material has been dormant since 1944.” The following lettered points indicate that the sources of waste from Linde stored at Ashland were all produced beginning in or before 1944. This suggests that only early Linde waste was shipped to Ashland, and that no shipments were made after 1944.

- U.S. Department of Energy, *Formerly Utilized MED/AEC Sites Remedial Action Program: Radiological Survey of the Ashland Oil Company (Former Haist Property), Tonawanda, New York*, Final Report, DOE/WV-0005/4, May 1978. (SRDB No: 6345)

The following, taken from the “Introduction” of the DOE FUSRAP report (written in 1978), states that Linde residues “were deposited on the Haist property during the period 1944–46.” While the report does not explicitly say that no deposits occurred at any time thereafter, it does not seem reasonable that such an occurrence would not have been noted had it actually happened.

At the request of the Department of Energy (DOE)... a radiological survey was conducted in Tonawanda, New York at the former Haist Property. This 10-acre tract served as a disposal site for refinery residues generated by Linde Air Products... in Tonawanda, New York, during their period of participation in the ore refinery operations program of the Manhattan Engineering District. The site, now owned by Ashland Oil, Inc., occupies a corner of the total Ashland property...

Residues comprised essentially of low-grade uranium-ore tailings were deposited on the Haist property during the period 1944–46. Records indicate that about 8000 tons of residues containing approximately 0.54% uranium were spread out over roughly two-thirds of the site to a depth of 1 to 5 ft...

- *Dose Assessment Evaluation Former Haist Property, Tonawanda, New York*. Handwritten annotation on document: “Handed to me by CAK in Albany 5/11/78 (for info I assume).” No date or citation given. (SRDB No: 15433)

The following quotation from an information document indicates that waste products were dumped at Ashland from 1944 through 1946.

The following information is presented as an evaluation of the potential radiation hazards at the former Haist property, Tonawanda, New York, which result from uranium ore tailings dumped on the site during the period 1944 through 1946.

- Argonne National Laboratory (ANL), *Long-Term Management of Existing Radioactive Materials Currently Located at Four FUSRAP Sites in New York*, June 1987. (SRDB No. 15435)

The following quotations from a 1987 ANL report on FUSRAP sites in New York clearly state that the Linde tailings were removed from the Linde site after processing stopped in 1948 (not necessarily all going to Ashland), and that shipments to Ashland took place from 1944 to 1946.

2.2 Linde Site: Following cessation of uranium processing in 1948, the uranium tailings were removed from the Linde site. In 1953, the site was decontaminated in accordance with then-current criteria

2.3 Ashland 1 Site: The Ashland 1 site is located in the southern corner of the Ashland 1 property... The Ashland 1 site, which covers a 4-ha (10 acre) tract of land, was under Haist ownership when used as a repository for uranium tailings in the 1940s. The tailings were generated at the Linde site during Linde Air Product's participation in the MED ore processing program. From 1944 to 1946, an estimated 7,300 t (8,000 short tons) of ore residues containing about 0.54% uranium-238 (by weight) were spread to a depth of...

- Memo from F. Coffman, Director Office of Terminal Waste Disposal and Remedial Action, Office of Nuclear Energy, U.S. Department of Energy, to J. LaGrone, Manager Oak Ridge Operations Office, *Authorization for Remedial Action at the Seaway Industrial Park and Ashland Oil Co. (I) Sites at Tonawanda, NY, and Mallinckrodt Chemical Co., St. Louis, MO*, June 22, 1984. (SRDB No: 7329)

Attachment: "Factsheet for the Ashland Oil Co. (Formerly Haist Property), Tonawanda, New York."

The MED first leased the 10.8 acre property on June 25, 1943 and later bought it in August 1944. The property was used by MED between June 1943 and 1946 when Linde Operations were terminated.

This factsheet strongly suggests that no shipments from Linde to Ashland were made after 1946.

- Letter from William Mott, Director Environmental Division, Ashland Oil Company, to R. Wilson, Plant Manager Tonawanda Refining, Ashland Oil Company, January 23, 1979. Attaching preliminary summary of MED/AEC activities at the former "Haist Property." (SRDB No. 65074)

Site Function: The site was used by MED from 1943 to 1946 for residue storage. The property served as a disposal site for refinery residues generated by Linde Air Products (Division of Union Carbide). Linde Air Products participated in the refinery program of the MED project.

This summary indicates that Linde waste shipping to Ashland must have ceased no later than 1946.