Painesville, Ohio, Site

U.S. DEPARTMENT OF ENERGY | Legacy Management

SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Painesville, Ohio, Site**. The U.S. Department of Energy Office of Legacy Management is responsible for long-term stewardship of the site under the **Formerly Utilized Sites Remedial Action Program**.

Site Description and History

The Painesville, Ohio, Site is a privately owned, 30-acre lot located at 720 Fairport Nursery Road in the township of Painesville, Lake County, Ohio, about 22 miles northeast of Cleveland. The Diamond Magnesium Company operated the facility under contract with the federal government from 1942 to 1953. Between 1952 and 1953, Diamond Magnesium received about 1,650 tons of radioactively contaminated scrap steel from the Lake Ontario Storage Area (now the Niagara Falls Storage Site) for use in the magnesium-production process. There is no known history of processing or production of radioactive materials at the site. The radioactivity present at the site resulted from the use of scrap ferrous metal to scrub chlorine gas released during the magnesium-production process. During active operations, the Painesville site included production buildings, warehouses, office buildings, aboveground storage tanks, and rail spurs. However, only one structure remains at the site. Chemtura Corporation currently owns the site.

Aerial view of remedial actions at the Painesville site (1998-2011). (Click map to enlarge.)

Site Remediation Timeline

October 10 and 11, 1988 — Oak Ridge National Laboratory conducted a preliminary radiological survey of the site.

September 1992 — The site was designated for remediation under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

1996 — Bechtel National Inc., Science Applications International Corporation, and Argonne National Laboratory, under contract to the U.S. Department of Energy (DOE), performed a detailed investigation of the site.

1997 — Congress transferred the responsibility of identifying and implementing the remedial actions for FUSRAP sites from the DOE to the U.S. Army Corps of Engineers (USACE).

June 1998 — USACE completed an engineering evaluation/cost analysis to support a removal action at the site.

September to November 1998 — The first removal of contaminated material took place.

May 2003 — USACE completed a Remedial Investigation/Feasibility Study (RI/FS) for the site.

June 2005 — USACE completed a Feasibility Study Addendum, which amended the cleanup goals and remedial alternatives first presented in the RI/FS.

July 18, 2005 — USACE issued a proposed plan for public comment, describing the preferred remedial action alternative for cleanup of the site.

Fall 2005 — USACE conducted pre-remediation sampling to refine parts of the site conceptual model defined in the RI/FS.

April 2006 — USACE signed the Record of Decision (ROD) for the site, documenting the selected cleanup remedy of excavation and off-site disposal.

April 2007 to April 2008 — Phase I of remedial action and final status survey occurred.

April 2010 to August 2011 — Phase II of remedial action and final status survey occurred.

January 2014 — USACE completed the site closeout report.

Remedial Action

USACE conducted fieldwork for a non-time-critical removal action and two phases of remedial action at the Painesville site from September to November 1998, April 2007 to April 2008, and April 2010 to August 2011, respectively. USACE excavated about 4 acres of surface soil during the three remediation phases.

The remedial action objectives for the Painesville Site were as follows:

1. To comply with the identified applicable or relevant and appropriate requirements: Title 10 Code of Federal Regulations Section 20.1402, "Radiological Criteria for Unrestricted Use," and Ohio Administrative Code 3701:1-38-22(B), "Decommissioning."
2. To ensure protection of human health and the environment by reducing exposure by external gamma, inhalation, and ingestion of the FUSRAP contaminants of concern — radium-226 (Ra-226), thorium-230 (Th-230), thorium-232 (Th-232), and total uranium (U) — in site soils.
3. To remediate the site soils so that the following site-wide area average derived concentration guideline levels ($DCGL_w$), exclusive of background, were not exceeded:
   - Ra-226 = 9 picuries per gram (pCi/g).
   - Th-230 = 25 pCi/g.
   - Th-232 = 6 pCi/g.
   - Total U = 482 pCi/g.

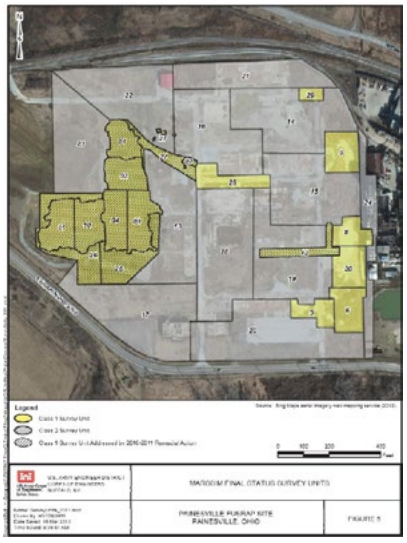
See the Fact Sheet or the Site Closeout Report for remediation details.

Areas of remediation and an old school building outside the Painesville site boundary (2013).

Post-Remediation Sampling

After the initial excavation of about 1,014 cubic meters of low-level radioactively contaminated soil in 1998, the non-time-critical removal action was suspended due to winter conditions and the discovery that the extent of contamination was greater than anticipated. USACE then identified the need to remediate radiological soil contamination at eight areas of concern based on historical site usage and characterization data. Five of these eight areas were completely remediated during the 2007-2008 remedial action. The remaining three areas, plus a fourth area that was identified during the 2007-2008 remedial action, were successfully remediated during the 2010-2011 remedial action.

After each area was decontaminated (in both the 2007-2008 and 2010-2011 remediation phases), a final status survey (FSS) was conducted to determine whether concentrations of residual radioactivity complied with the ROD-defined cleanup criteria. FSS included gamma walkover scans and surface soil samples within 30 numbered survey units (see figure below). Nineteen of these thirty units were successfully remediated during the 2007-2008 remedial action. The gamma walkover results and results for Ra-226, Th-230, Th-232, and total U met ROD criteria. The average systematic surface soil activity concentrations for Ra-226, Th-230, Th-232, and total U were 1.17, 1.11, 0.77, and 2.17 pCi/g, respectively — well below the $DCGL_w$ for the site. The remaining 11 units were successfully remediated during the 2010-2011 remedial action. The residual site-wide average concentrations of Ra-226, Th-230, Th-232, and total U in the soil were 1.40, 1.17, 0.82, and 2.33 pCi/g, respectively — also well below the $DCGL_w$ for the site.



The 30 final status survey units at the Painesville site. (Click map to enlarge.)

Excavated soils at the Painesville site were processed by a soil-segregation system to reduce the cost of transporting and disposing of contaminated soils. The soils that met the cleanup limits were used as place-back soils used to backfill remediated excavation areas. All soils used as backfill met the ROD cleanup requirements.

The northwestern section of Area A (FSS units 01, 02, and 23) was surveyed and documented to be above the gamma walkover survey scan threshold criteria (see figure below). Cemtura owns and operates Landfill III, which is located immediately west of the Painesville site and regulated by the Ohio Environmental Protection Agency. A geosynthetic clay liner was installed over the above-ROD criteria material to ensure that the integrity of the closed Landfill III cap was not compromised.

The extent of Area A west wall excavation. (Click map to enlarge.)

For more detailed results of the post-remediation sampling, see the Site Certification Data Summary Worksheet on pages 4-5. For a more detailed map of the site and sampling locations, see the Site Overview Map on page 6.

Current Site Conditions

USACE remediated the site under FUSRAP in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act. In January 2016, USACE transferred responsibility for long-term stewardship of the Painesville site to the DOE Office of Legacy Management (LM). No monitoring, maintenance, or site inspections are required by the Painesville site ROD. The stewardship requirements and protocols are captured in the Long-Term Stewardship Plan for Completed FUSRAP Sites, which is available on the DOE Office of Legacy Management website (www.energy.gov/lm/painesville-ohio-site).

ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Painesville, Ohio, Site are available on the LM website at lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Painesville.

For other information on site history or current long-term stewardship activities, please contact us at:

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11/2023

Painesville, Ohio, Site Certification Data Summary Worksheet

Three tables in the Painesville Site Closeout Report provide evidence used to certify the site as clean.

When the tables refer to the "Site Closeout Report," that is the "Site Closeout Report for the Painesville Site, Painesville, Ohio" (dated January 2014).

Results Summary for Class 1 and Class 2 Final Status Survey Units

Table 6 of the Site Closeout Report (page 21)

FSS Unit	Number of FSS Samples	Ra-226[a]			Th-230[b]			Th-232[c]			Total U[d]			Average SOR $DCGL_w$[e]
		Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	
01	17	0.84	**1.37**	**2.14**	1.11	1.34	**1.71**	1.03	**1.33**	**1.55**	1.89	2.64*	**4.14**	0.010
02	17	**1.23**	**1.53**	**2.22**	0.76	1.04	**1.49**	0.79	1.01	**1.20**	1.56	2.34	**6.50**	0.020
03	19	0.81	**1.40**	**1.87**	0.80	1.33	**1.65**	0.49	**1.27**	**1.58**	1.67	2.54*	**5.50**	0.010
04	17	**1.04**	**1.40**	**1.65**	0.81	1.02	1.21	0.66	0.99	**1.27**	1.81	2.39	**3.81**	0.010
05	17	0.53	**1.78**	**4.75**	0.86	**1.74**	**6.29**	0.35	0.85	**1.15**	1.60	2.43*	**3.84**	0.080
06	19	0.74	**1.65**	**4.22**	0.35	1.22	**2.00**	0.27	0.84	**1.14**	0.57	**3.06**	**17.48**	0.050
07	17	**1.24**	**1.82**	**2.90**	0.81	1.20	**1.87**	0.67	0.95	**1.17**	1.42	2.22	**3.31**	0.050
08	18	0.76	**1.67**	**5.10**	0.73	1.16	**1.65**	0.11	0.81	**1.27**	1.34	2.42	**3.57**	0.040
09	18	0.40	**1.76**	**4.59**	0.51	1.21	**2.77**	0.19	0.80	**1.37**	1.16	2.40	**5.86**	0.060
10	17	**1.18**	**1.62**	**2.56**	0.99	1.21	**1.46**	0.90	**1.19**	**1.39**	1.79	2.38	**3.59**	0.030
11	19	**1.08**	**1.63**	**2.32**	0.99	1.24	**1.70**	0.83	**1.11**	**1.27**	1.55	2.35	**3.75**	0.030
12	23	0.06	**1.49**	**3.17**	0.43	1.04	**1.63**	0.22	0.79	**1.10**	0.86	1.89	**3.18**	0.020
13	14	0.68	**1.16**	**2.38**	0.65	1.07	1.43*	0.43	0.77	1.02	1.63	2.04	2.32	0.010
14	14	0.07	0.90	**3.58**	0.68	1.18	**2.36**	0.23	0.71	**1.33**	1.23	2.23	**5.90**	0.020
15	14	0.05	0.60	**1.22**	0.38	0.89	**1.54**	0.17	0.62	**1.65***	0.71	1.82	2.62*	0.000
16	12	-0.04	0.83	**1.85**	0.57	0.98	1.35	0.11	0.68	1.04	1.12	1.90	2.44*	0.010
17	17	0.35	0.89	**1.57**	0.64	1.11	**1.53**	0.36	0.89	**1.24**	1.42	1.91	2.32	0.000
18	15	0.72	**1.30**	**3.20**	0.71	1.11	**2.57**	0.09	0.81	**1.32**	1.13	2.22	**6.31**	0.020
19	15	-0.11	0.80	**2.60**	0.41	0.80	1.22	0.05	0.54	**1.17**	1.10	1.69	**3.28**	0.010
20	14	0.65	**1.09**	**2.59**	0.42	1.01	**1.78**	0.38	0.70	**1.16**	1.42	2.09	**4.15**	0.010
21	17	0.22	0.65	**1.10**	0.26	0.75	1.17	0.10	0.50	**1.09**	0.27	1.52	2.49	0.000
22	16	0.42	**1.32**	**4.08**	0.57	1.24	**2.84**	0.24	0.80	**1.42**	1.13	2.50	**4.17**	0.040
23	16	0.00	**0.99**	**2.10**	0.61	1.08	1.40	0.59	0.94	**1.49**	1.35	2.16	2.58	0.010
24	17	0.02	0.87	**1.36**	0.50	1.04	1.32	0.29	0.89	**1.24**	0.90	2.09	2.47	0.000
25	22	0.80	**1.89**	**3.77**	0.80	1.33	**1.86**	0.13	1.00	**1.29**	1.30	2.23	**3.02**	0.060
26	23	**1.08**	**1.54**	**2.36**	0.83	1.15	**1.58**	0.58	0.96	**1.19**	1.60	2.04	2.63	0.020
27	17	0.56	**2.64**	**8.13**	0.29	**1.89**	**5.77**	0.19	0.68	**1.23**	0.78	**3.42**	**7.64**	0.160
28	17	0.59	**1.09**	**1.55**	0.63	1.06	**1.57**	0.40	0.87	**1.47**	1.29	2.09	**2.93**	0.000
29	15	0.35	**1.23**	**2.21**	0.56	1.11	**1.53**	0.18	0.77	**1.33**	1.27	2.17	**3.05**	0.010
30	17	0.59	**1.09**	**1.55**	0.63	1.06	**1.57**	0.40	0.87	**1.47**	1.29	2.09	**2.93**	0.030

Note: Above background FSS results are **bold**.

*These numbers were either mistakenly bolded or mistakenly non-bolded in the original table in the Site Closeout Report, according to the average site background concentrations written below.

[a]The average site background concentration and ROD cleanup criteria for Ra-226 were 0.95 and 9 pCi/g, respectively.

[b]The average site background concentration and ROD cleanup criteria for Th-230 were 1.45 and 25 pCi/g, respectively.

[c]The average site background concentration and ROD cleanup criteria for Th-232 were 1.07 and 6 pCi/g, respectively.

[d]The average site background concentration and ROD cleanup criteria for Total U were 2.72 and 482 pCi/g, respectively.

[e]A Sum of Ratio (SOR), excluding contribution from background, of less than 1 indicates ROD cleanup criteria were met.

–continued to page 5–

–continued from page 4–

Painesville, Ohio, Site Certification Data Summary Worksheet

Summary of Final Status Survey-Like Samples for the Place Back Soils							
Table 7 of the Site Closeout Report (page 23)							
Stockpile Number	Place Back Location	Number of Systematic Samples	Average Ra-226 Result (pCi/g)	Average Th-230 Result (pCi/g)	Average Th-232 Result (pCi/g)	Average Total U Result (pCi/g)	Average SOR $DCGL_w$ [a]
01	Area A	17	1.98	1.51	1.12	3.20	0.06
02	Area A	17	1.86	1.22	0.99	2.74	0.05
03	Area A	17	1.80	0.93	0.82	2.16	0.04
04	Area A	17	1.75	1.13	1.01	2.74	0.04
05	Area A	17	2.31	1.44	1.05	3.52	0.10
06	Area A	19[b]	2.93	1.47	1.06	3.74	0.17[b]
07	Area A	17	2.59	1.33	1.00	3.28	0.13
08	Area A/H	17	2.60	1.46	1.04	4.09	0.13
09	Area GG	17	2.85	1.60	0.93	3.31	0.16
10	Area A West Wall (Below GCL)	20	1.96	1.30	1.01	3.24	0.06
11	Area H Landfill (Below GCL)	20	2.07	1.28	0.97	3.23	0.07
12	Area C - Pipe	20	1.60	1.13	0.81	2.64	0.02
13	Area C - Pipe	17	1.83	1.27	0.88	2.78	0.05
14	Area A/H	17	1.75	1.24	0.85	2.92[b]	0.04[b]
15	Area A/H	17	1.95	1.27	0.94	3.41	0.06

[a]A Sum of Ratio (SOR), excluding contribution from background, of less than 1 indicates ROD cleanup criteria were met.
[b]Values were revised after further review and therefore are inconsistent with those presented in Table 4-13 of the Final Completion Report (USACE 2012).

Sample Results from the Western Boundary of Area A					
Table 8 of the Site Closeout Report (page 24)					
Sample Location	Ra-226a (pCi/g)	Th-230a (pCi/g)	Th-232a (pCi/g)	Total Ua (pCi/g)	Average SOR $DCGL_w$ [b]
OT59	**22.7**	**10.2**	**0.89**	**15.43**	**2.69**
OT60	6.94	4.44	0.87	7.99	0.69
OT61	**17.1**	**8.67**	**0.82**	**16.51**	**2.01**
OT62	**18.4**	**10.4**	**0.78**	**19.57**	**2.23**
A109	1.85	1.74	1.03	3.41	0.05
A110	4.35	3.41	1.05	5.59	0.36
A111	4.42	5.26	1.02	6.15	0.44
A112	1.01	1.81	0.50	2.77	0.00
A113	**13.85**	**8.71**	**0.96**	**7.68**	**1.63**
A114	**11.37**	**8.41**	**0.99**	**5.58**	**1.34**
A115*	**16.11**	**10.87**	**1.14**	**3.97**	**1.97**
A116	**14.41**	**11.08**	**1.17**	**8.33**	**1.79**

* This sample location was labeled “A116” in the Site Closeout Report; however these data should be associated with sample location A115 (discrepancy discovered September 2016).
[a]Results include contribution from background (i.e. background is not subtracted).
[b]A Sum of Ratio (SOR), excluding contribution from background, of less than 1 indicates ROD cleanup criteria were met. Samples exceeding a SOR of 1 are **bold**.

Painesville, Ohio, Site Map

U.S. DEPARTMENT OF ENERGY
OFFICE OF LEGACY MANAGEMENT

Work Performed by
Navarro Research & Engineering, Inc.
Under DOE Contract Number DE-LM0000421

Painesville, OH, Site

Final Site Survey Units
(Class 1 and Class 2)

FUSRAP Site Pin

FUSRAP Certified Site Boundary

Original Site Boundary

DATE PREPARED:
June 12, 2017

FILE NAME:
PAI_DELIVERABLE

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