



## SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Attleboro, Massachusetts, 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 Attleboro, Massachusetts, Site (formerly the Shpack Landfill Superfund Site) is a 9.4-acre property located on the border between Norton and Attleboro, Massachusetts.

About 6 acres are located in the town of Norton, and the remainder is located in the city of Attleboro. A private landfill operated at the site from 1946 through the 1970s, accepting domestic and industrial waste, including chemical and low-level radioactive waste.

The U.S. Nuclear Regulatory Commission (NRC) initiated an investigation of the Shpack landfill site on November 14, 1978, after receiving a telephone call from a concerned citizen. NRC's investigation concluded that material associated with nuclear fuel had been disposed of at the site from about 1957 to 1966. NRC found depleted uranium as well as natural and enriched uranium at the landfill. NRC determined that the source of the uranium materials was probably contract work performed for the U.S. Atomic Energy Commission (AEC) by M&C Nuclear Inc., which merged with Texas Instruments Inc. in 1959.

### Site Remediation Timeline

**September 1978** — NRC received a phone call from a concerned Attleboro citizen.

**November 14, 1978** — NRC initiated an investigation of the site.

**August 1980** — The U.S. Department of Energy (DOE) initiated a radiological survey at the site. The survey indicated the presence of radioactive materials throughout the landfill.

**January 1981** — The site was added to the Formerly Utilized Sites Remedial Action Program (FUSRAP) for radiological cleanup.

**October 1981** — DOE repaired, replaced, and added security fencing around the Shpack landfill site.

**August through September 1982** — Bechtel National Inc. performed a radiological characterization survey of the site for DOE.

**June 14, 1986** — The U.S. Environmental Protection Agency (EPA) added the site to the National Priorities List (NPL).

**October 13, 1997** — Congress transferred the responsibility of administering and executing FUSRAP cleanup of contaminated sites from DOE to the U.S. Army Corps of Engineers (USACE).

**2002** — USACE initiated a detailed gamma walkover survey, environmental sampling, and analysis effort to characterize the radiological contaminants of concern. USACE determined that some of the radiological contamination was not a result of AEC activities and, therefore, not eligible for FUSRAP.

**September 2004** — The EPA Region 1 Shpack Landfill Superfund Site Record of Decision (ROD) was signed. The ROD was comprised of two parts: 1, where USACE remediated radioactive contaminated waste per FUSRAP; and 2, where remedial action was necessary for non-FUSRAP, non-radioactive contamination.

**August 2005** — Phase 1 of remedial action at the Shpack site commenced with OU1.

**July 2006** — USACE suspended Phase 1 of remedial action based on insufficient funding to cover the extensive contamination.

**June 2007** — Phase 2 of remedial action began at the site, which resumed the activities initiated under Phase 1.

**October 2011** — USACE completed FUSRAP cleanup operations.

**December 2013** — USACE completed the cleanup operations for OU 2's non-radioactive contamination.

**November 2016** — EPA declared that the entire site met cleanup requirements.

**September 2017** — EPA removed the site from the NPL. DOE did not compile a Certification Docket for this site as it was remediated by USACE. The Attleboro ROD and Site Closeout Report document site information.

## Remedial Action

The ROD identified total uranium, uranium-234 (U-234), uranium-235 (U-235), uranium-238 (U-238), and radium-226 (Ra-226) as radiological contaminants of concern in the site's soils. See the [Data Summary Worksheet](#) on pages 4-5 for a table of the ROD Derived Concentration Guideline Levels (DCGLs). EPA developed cleanup levels for radionuclides of concern that were consistent with EPA's acceptable risk of  $1 \times 10^{-5}$  Excess Lifetime Cancer Risk and the Massachusetts Department of Environmental Protection's (MADEP) 10 millirem per year allowable dose limit for unrestricted site release for the selected future use scenario.

The remedy detailed in the Attleboro ROD is Alternative SC-3B, which included excavation and off-site disposal of material exceeding cleanup levels. The remedy provided both short-term and long-term protection of human health and the environment, attained all federal and state applicable or relevant and appropriate environmental requirements (ARARs), reduced the volume and mobility of contaminated soil and sediment, and utilized permanent solutions to the maximum extent practicable. The EPA-selected remedy is based on a future scenario in which a resident living next to the site is connected to a public water supply and does not drink the groundwater at the site. In addition, institutional controls (ICs) prevent disturbance of the landfill site, which allows the release of the site from radiological controls. The required ICs included the following:

- Implement restrictions to prevent residential use or other uses that present unacceptable risk.
- Implement groundwater restrictions for the site and for Union Road House 1 and Union Road House 2 in the form of deed restrictions.
- Conduct a review within five years of initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

The Shpack ROD encompassed two response actions: one managed by USACE under FUSRAP and the other managed by EPA under the Comprehensive Environmental Response, Compensation, and Liability Act. EPA identified 14 potentially responsible parties who, in June 2008, agreed to perform the site-wide cleanup of non-radiological contaminants. USACE and DOE were not among the responsible parties.

The Remedial Action Objectives for both the radiological and non-radiological remedial actions at the Attleboro site were:

### Soil

- Prevent ingestion or direct contact with soil having non-carcinogens in excess of a Hazard Index (HI) of 1

or with soil having carcinogens posing excess cancer risk above  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  and meet ARARs.

- Prevent inhalation of carcinogens posing excess cancer risk levels above  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  or a HI of 1 and meet ARARs.
- Prevent exposure to contaminants in soil that present an unacceptable risk to the environment.

### Sediment

- Prevent exposure to sediment having carcinogens posing excess cancer risk above  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  or a HI of 1.
- Prevent exposure to contaminants in sediment that present an unacceptable risk to the environment.

### Surface water

- Prevent migration of contamination from site to surface water to reduce, to the extent practicable, the contribution of contamination, from the site to surface waters that presents an unacceptable risk to human health and the environment.

### Management of migration

- Prevent ingestion of groundwater having carcinogens in excess of maximum contaminant levels (MCLs) and non-zero MCL goals (MCLGs) and a total excess cancer risk for all contaminants in groundwater greater than  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ .
- Prevent ingestion of groundwater having non-carcinogens in excess of MCLs or non-zero MCLGs or a HI of 1.
- Prevent exposure to contaminants in groundwater that present an unacceptable risk to the environment.

See the [Fact Sheet](#) or the [Site Closeout Report](#) for details of remedial action.

## Post-Remediation Sampling

### Final Status Surveys

The Final Status Survey (FSS) determines whether concentrations of residual radioactivity comply with cleanup criteria. The Attleboro site was divided into FSS units, and the following activities were performed for all areas of the site:

- Gamma walkover surveys (GWS) measured surface gamma radiation, with results plotted against geographic locations.
- GPS receivers provided positional accuracy for sample locations.
- USACE performed quality assurance checks on the GWS scans.

- An off-site USACE-validated laboratory analyzed systematic and biased soil samples.
- An independent agency validated data on 10% of all post-excavation verification analytical reports.
- Statistical analysis demonstrated that the majority of residual concentrations of radionuclides of concern in soils and soil-like materials at the site meet the DCGLs.
- Data packages demonstrated that each survey unit did not exceed the site-cleanup criteria.

See the Data Summary Worksheet for summaries of the GWS results and FSS soil results. In the FSS soil results summary, the Sum of Ratios (SOR) for the 23 survey units, which demonstrate if the DCGLs were achieved in each survey unit, were less than 0.5. SOR values must be less than 1, so the remaining levels of the radionuclides of concern met the ROD requirements.

For a more detailed map of the site and sampling locations, see the [Site Overview Map](#) on page 6.

## Current Site Conditions

The implemented remedy achieved the degree of cleanup and protection specified in the ROD for all pathways of exposure. The ROD states that ICs are required to restrict future use of the property and groundwater for the site due to hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure. These remaining hazardous substances in soils are due to the National Grid utility poles located on-site, which prevented the excavation of a few small areas of contamination. National Grid is aware of this issue and will be required to comply with the ICs should the need occur to excavate the utility poles in the future.

DOE Office of Legacy Management (LM) responsibilities at the site are limited to managing site records and responding to stakeholder inquiries. Other long-term stewardship requirements, which are not the responsibility of LM, consist of groundwater monitoring, five-year reviews, and monitoring ICs. The city of Attleboro will perform groundwater monitoring, enforce the groundwater ICs, and submit annual reports to EPA and MADEP. The ROD states that EPA will conduct the five-year reviews.

In January 2019, USACE transferred long-term stewardship for the Attleboro site to LM. 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/attleboro-massachusetts-site](http://www.energy.gov/lm/attleboro-massachusetts-site)).



## ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Attleboro, Massachusetts, Site are available on the LM website at [Impublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Attleboro](http://Impublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Attleboro).

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

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# Attleboro, Massachusetts, Site Certification Data Summary Worksheet

Two tables in the Final Site Closeout Report provide evidence used to certify the site as clean.

One table in the Final Status Survey Report provides evidence used to certify the site as clean.

When the tables refer to the “Final Site Closeout Report,” that is the “Final Site Closeout Report for Operable Unit 1 Radiological Remediation Shpack Landfill FUSRAP Superfund Site, Norton/Attleboro, Massachusetts” (dated December 2016).

When the tables refer to the “Final Status Survey Report,” that is the “Final Status Survey Report, Shpack FUSRAP Superfund Landfill Site, Norton/Attleboro, Massachusetts” (dated May 2012).

Shpack ROD Derived Concentration Guideline Levels <sub>w</sub>		
Table 2 in Final Site Closeout Report		
Radionuclide of Concern	Derived Concentration Guideline Level <sub>w</sub> (DCGL <sub>w</sub> )	Excess Lifetime Cancer Risk (ELCR)
Ra-226	3.1 pCi/g*	9.25 x 10 <sup>-6</sup>
U-234	220 pCi/g	1.34 x 10 <sup>-7</sup>
U-235	52 pCi/g	9.95 x 10 <sup>-6</sup>
U-238	110 pCi/g	4.43 x 10 <sup>-6</sup>

\*pCi/g = picoCuries per gram  
 Note from report text: All ELCR values met EPA's acceptable risk of 1 x 10<sup>-5</sup>.

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

Table 5 in Final Site Closeout Report

FSS Unit	Number of FSS Samples	Ra-226 (pCi/g)			U-234 (pCi/g)			U-235 (pCi/g)			U-238 (pCi/g)			Average SOR (DCGL)
		MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	MIN	AVG	MAX	
1	36	0.04	0.85	3.63	0.08	0.76	2.46	-0.10	0.04	0.32	-0.01	0.69	1.24	0.14
2	28	0.00	0.55	1.76	0.04	0.51	2.41	-0.11	0.04	0.29	0.01	0.44	1.94	0.07
3	31	0.02	0.96	1.83	0.19	1.93	26.30	0.00	0.09	0.99	0.11	1.17	5.20	0.18
4	37	-0.07	0.95	3.38	0.06	11.53	88.00	-0.08	0.65	5.94	0.06	2.53	14.60	0.26
5	31	-0.08	0.21	0.60	-0.06	1.20	19.80	-0.13	0.08	1.32	-0.09	1.22	28.00	0.02
6	28	0.02	0.46	2.24	-0.10	0.82	5.80	-0.09	0.06	0.33	-0.06	0.45	1.98	0.08
7	31	-0.11	0.47	1.55	0.21	10.10	64.00	0.01	0.44	3.24	0.09	3.06	35.60	0.14
8	29	-0.02	0.58	2.04	0.06	16.14	<b>284.00</b>	0.01	0.88	12.90	0.04	1.69	6.28	0.10
9	29	-0.18	0.25	1.10	0.15	3.46	65.00	-0.05	0.14	2.52	0.04	1.28	17.80	0.06
10	26	-0.03	0.21	0.91	0.04	0.37	2.41	-0.04	0.02	0.16	0.02	0.22	0.91	0.02
11	27	0.02	0.52	1.12	0.07	6.23	60.80	-0.03	0.27	2.50	-0.02	1.59	21.60	0.08
12	31	-0.07	0.32	1.04	0.34	10.86	<b>202.00</b>	-0.08	0.47	7.70	0.27	3.45	35.20	0.11
13	29	-0.40	0.32	1.82	0.45	13.55	<b>234.00</b>	0.01	0.54	8.00	0.43	5.60	25.60	0.16
14	30	-0.15	0.27	1.24	0.11	1.84	8.30	0.00	0.10	0.43	0.02	3.18	19.50	0.06
15	31	-0.09	0.29	0.76	0.04	1.09	3.66	-0.01	0.08	0.31	0.03	1.37	10.90	0.05
16	23	0.08	0.49	2.14	0.16	1.51	10.10	-0.12	0.08	0.34	0.36	1.60	17.30	0.06
17	24	0.04	0.45	2.13	0.83	16.40	112.00	0.04	0.60	3.62	0.61	3.98	15.90	0.17
18	23	0.14	0.67	1.45	0.13	1.05	2.05	-0.12	0.09	0.40	0.32	1.00	2.09	0.09
19	24	0.33	0.64	1.30	0.55	3.55	11.30	-0.08	0.21	1.11	0.38	4.47	48.60	0.11
20	41	0.03	0.87	3.68	0.29	19.36	83.00	-0.08	0.76	3.80	0.44	7.20	27.60	0.28
21A	24	0.39	0.76	1.51	4.90	30.59	114.00	0.06	1.50	5.30	3.30	14.94	30.60	0.38
21B	24	0.37	0.79	1.57	6.80	33.33	132.00	0.13	1.40	6.40	4.70	13.21	22.00	0.38
21C	24	0.31	0.84	1.66	5.60	31.78	96.00	0.23	1.48	3.50	4.00	13.84	23.90	0.40

Note: Results summary of survey units 22 & 23 were not included in Table 5 because the Final Status Survey Report did not have any systematic measurements for SU22 and did not provide summary tables for the systematic measurements of SU 23.

Note from author of Data Summary Worksheet: Individual soil sampling results (rather than summary results) are available in Appendix C of the Final Site Closeout Report.

Note from author of Data Summary Worksheet: Values in the table are bolded as they are in the Final Site Closeout Report.

# Attleboro, Massachusetts, Site Certification Data Summary Worksheet

## Gamma Walkover Survey (GWS) Results Summary

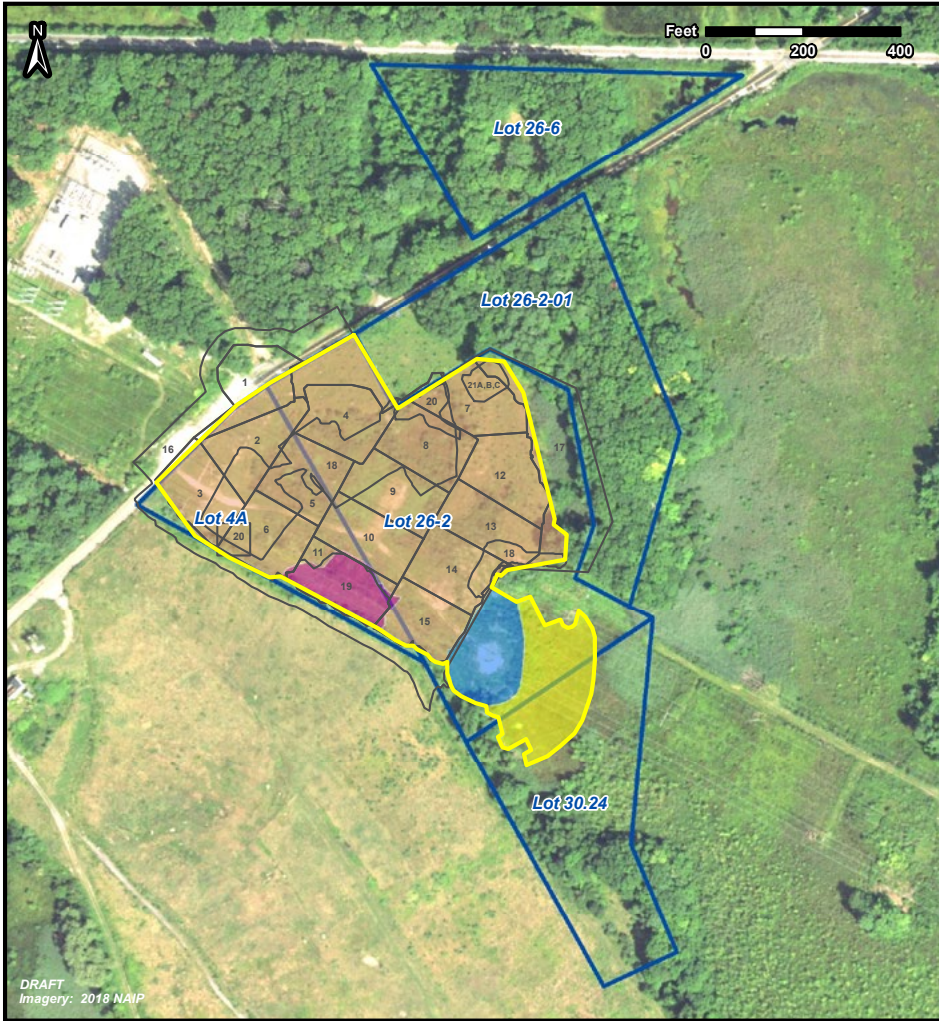
Table 8 in Final Status Survey Report

Survey Unit		GWS Coverage		GWS Count Rate (cpm)					GWS Data Z Score			
No.	Area (m <sup>2</sup> )	Area (m <sup>2</sup> )	%	Mean	Less than 2,500 (%)	2,501 to 5,000 (%)	5,001 to 10,000 (%)	Greater than 10,001 (%)	Less than 1 (%)	1 to 2 (%)	2 to 3 (%)	Greater than 3 (%)
RA	2,010.0	1,969.8	98.0	10,205.8	0.0	0.0	39.2	60.8	82.9	15.0	2.1	0.04
1	1,988.7	704.3	35.4	3,543.2	51.7	30.2	12.4	5.7	93.1	1.8	2.4	2.7
2	1,931.3	1,778.6	92.1	2,421.1	66.7	25.8	7.3	0.2	85.8	10.8	2.8	0.7
3	1,944.3	1,888.6	97.1	4,345.4	12.9	57.5	29.4	0.2	83.3	12.6	3.7	0.4
4	1,967.2	1,868.0	95.0	5,783.9	30.7	18.1	32.4	18.8	77.9	20.7	1.0	0.8
5	1,957.1	1,638.5	83.7	1,882.6	86.0	13.0	0.8	0.3	89.8	6.1	2.8	1.3
6	1,958.9	1,655.0	84.5	3,928.0	63.2	11.1	25.5	0.2	75.7	19.0	5.2	0.1
7	1,995.0	1,878.1	94.1	3,924.0	34.8	43.5	19.0	2.7	85.5	8.1	5.9	0.5
8	1,981.1	1,827.0	92.2	5,627.5	2.9	45.9	44.6	6.7	83.0	13.0	3.3	0.6
9	1,971.1	1,695.0	86.0	4,275.5	34.3	36.5	23.7	5.5	92.1	4.4	2.6	0.9
10	1,956.8	1,838.3	94.0	2,523.6	67.0	28.8	4.2	0.0	87.1	7.2	3.0	2.8
11	1,981.0	415.62	21.0	1,905.7	80.81	11.95	7.2	0.0	88.4	3.0	8.5	0.1
12	1,996.3	1,750.1	87.7	4,453.1	38.4	32.5	23.7	5.3	96.4	3.3	0.1	0.3
13	1,921.7	1,543.7	80.3	4,989.4	21.7	40.1	34.3	3.9	93.2	5.9	0.2	0.8
14	1,988.6	1,763.0	88.7	4,416.3	8.5	67.9	22.5	1.0	87.7	10.4	1.1	0.8
15	1,750.8	1,485.5	84.8	3,736.2	21.2	60.7	16.9	1.3	86.6	10.1	1.4	2.0
16	7,142.7	3,315.1	46.4	4,505.5	41.5	16.5	31.2	10.9	79.8	19.8	0.5	0.0
17	5,068.2	2,916.7	57.5	2,809.3	51.9	44.9	3.3	0.0	78.0	20.5	1.5	0.0
18	8,139.1	7,894.5	97.0	7,496.3	0.29	0.53	96.4	2.78	85.1	12.8	1.6	0.5
19	1,983.6	1,965.7	99.1	3,900.8	38.7	25.7	35.4	0.2	99.8	0.08	0.02	0.06

Note: RA = Reference Area



# Attleboro, Massachusetts, Site Map



U.S. DEPARTMENT OF ENERGY  
OFFICE OF LEGACY MANAGEMENT

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

### Attleboro, MA, Site

- SU12 Survey Units
- ALI Landfill Debris Area
- FUSRAP Excavation Area
- Inner Rung
- Tongue Area
- Property Boundaries
- FUSRAP Boundary

DATE PREPARED:  
December 11, 2019

FILE NAME:  
ATT\_Map

DRAFT  
Imagery: 2018 NAIP

C:\Users\spinelm\Desktop\ATT\ATT\_Map.mxd 12/11/2019 Source: Site Closeout Report for Operable Unit 1 Radiological Remediation Shpack Landfill FUSRAP Superfund Site (USACE)