



## SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Indian Orchard, 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 Indian Orchard, Massachusetts, Site (formerly the Chapman Valve site) is located on Pinevale Street in Indian Orchard, a suburb of Springfield, Massachusetts. In January 1948, the Chapman Valve Manufacturing Company set aside an area in the western end of Building 23 to machine uranium rods for the U.S. Atomic Energy Commission Brookhaven National Laboratory. The work area was segregated from the rest of the facility by a floor-to-ceiling wooden partition, more than 50 feet high. The area was equipped with building shields, quenching tanks, suction systems, cranes, and special ducts. Uranium operations ended on November 8, 1948. The metal scraps, oxides, and refuse material were removed from the site several months after the contract was completed, and the building was decontaminated to standards in effect at that time.

### Site Remediation Timeline

**1991** — Oak Ridge National Laboratories conducted radiological surveys of the site that identified residual uranium contamination in the segregated area of Building 23.

**December 1992** — Site was designated for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

**November and December 1994** — Additional radiological surveys were performed in Building 23.

**July to September 1995** — DOE remediated Building 23.

**January 14, 2004** — The U.S. Department of Energy (DOE) certified that the property complied with applicable DOE standards and criteria for use of the property without radiological restrictions.

**January 21, 2004** — DOE published a notice of certification for the site in the Federal Register.

### Certification Docket Contents

The [Certification Docket](#) includes information and documents supporting certification that conditions at the property comply with radiological guidelines in effect at the conclusion of remedial action. Furthermore, the docket substantiates that the future use of the property will not produce any significant radiological hazard or dose to the general public as a result of residual radioactivity remaining on-site that originated during activities conducted by DOE or its predecessor agencies.

### Remedial Action

DOE remediated the Indian Orchard site from July to September 1995 as part of FUSRAP. The remedial action followed an expedited protocol, which was an efficient, cost-effective, and environmentally acceptable approach for this small site. Areas requiring remediation included a 10-ton bridge crane, overhead trusses, horizontal wall surfaces, the floor, and drain lines. See the [Fact Sheet](#) for details.

FUSRAP objectives for the site were to:

- Remove or otherwise control radioactive contamination above current DOE guidelines.
- Achieve and maintain compliance with applicable criteria for the protection of human health and the environment.

### Post-Remediation Sampling

DOE applied residual contamination guidelines in DOE Order 5400.5 *Radiation Protection of the Public and the Environment* to the crane, floor, and drain lines. Supplemental guidelines were developed for the roof trusses based on information contained in a technical study and preliminary hazard assessment. The supplemental guideline for the surfaces met an average surface level activity of no more than 15,000 disintegrations per minute (dpm)/100 square centimeters (cm<sup>2</sup>) of uranium activity for the entire truss.

## Bridge Crane

Post-remedial action activities on the crane included surveys of direct and removable contamination and sampling of paint and dust residues to determine whether the waste should be classified as Resource Conservation and Recovery Act (RCRA) mixed waste. A total of 169 locations were surveyed. Direct alpha and beta-gamma average surface contamination readings were 44 and 520 dpm/100 cm<sup>2</sup>, respectively. Average removable alpha and beta-gamma readings were 3 and 42 dpm/100 cm<sup>2</sup>, respectively. Toxicity characteristic leaching procedure (TCLP) lead and TCLP cadmium results from samples of paint and dust residues were 338 micrograms per liter (µg/L) and 3.0 µg/L, respectively. Both results were well below the RCRA limits of 5,000 µg/L for lead and 1,000 µg/L for cadmium.

## Overhead Trusses

Surveys of fixed and removable contamination were conducted on the trusses to determine the effectiveness of the decontamination effort. The maximum fixed averages per truss for alpha and beta-gamma contamination were 2,114 and 12,261 dpm/100 cm<sup>2</sup>, respectively. Both of these readings were below the supplemental limit of 15,000 dpm/100 cm<sup>2</sup> average per truss. All readings for removable contamination were below 1,000 dpm/100 cm<sup>2</sup>. An additional survey, conducted on non-horizontal surfaces and between welded angle of the trusses, confirmed that the supplemental limits had not been exceeded and that these areas did not require decontamination.

## Horizontal Wall Surfaces

The maximum and average removable alpha measurements for the west wall were 164 and 17 dpm/100 cm<sup>2</sup>, respectively. Measurements for the north wall were 850 and 35 dpm/100 cm<sup>2</sup>, and measurements for the south wall were 111 and 17 dpm/100 cm<sup>2</sup>, respectively. The maximum and average removable beta-gamma measurements for the west wall were 191 and 70 dpm/100 cm<sup>2</sup>, respectively. Measurements for the north wall were 3,197 and 58 dpm/100 cm<sup>2</sup>, and measurements for the south wall were 319 and 45 dpm/100 cm<sup>2</sup>, respectively. Except for a single reading on the north wall, all measurements were below the criterion of 1,000 dpm/100 cm<sup>2</sup> for removable contamination.

## Floor

Nearly 1,600 survey readings were taken on the floor of Building 23, and all results were below criteria from DOE Order 5400.5. The average fixed beta-gamma measurement was 914 dpm/100 cm<sup>2</sup>, the minimum was -872 dpm/100 cm<sup>2</sup>, and the maximum was 4,934 dpm/100 cm<sup>2</sup>. Negative numbers indicate that the measurement was less than the minimum detectable activity and that, after background was subtracted, the numerical value was negative. A soil sample was also collected in the area where part of the west equipment door ramp was removed. The analytical result for uranium-238 (U-238) was 2.0 picocuries per gram (pCi/g), which is below the typical U-238 guideline of 35 to 50 pCi/g for a FUSRAP site. The radium-226 (Ra-226) and thorium-232 (Th-232) results were 0.47 and 0.41 pCi/g, respectively, which were

below the DOE Order 5400.5 criterion of 5 pCi/g for surface soils.

## Drain Line

Following the removal of 145 feet of the drain line in room B-4, three composite samples were collected in the trench to determine whether the decontamination effort was successful. The maximum levels for U-238, Ra-226, and Th-232 were 0.62, 0.47, and 0.50 pCi/g, respectively, which all met DOE guidelines.

For more detailed results of the post-remediation sampling, see the [Site Certification Data Summary Worksheet](#) on pages 4-7. For a detailed map of the site and sampling locations, see the [Site Overview Map](#) on page 8.

## Current Site Conditions

Analytical results from post-remedial action surveys indicate that the levels of radioactivity in the remediated areas at the Indian Orchard site meet applicable DOE cleanup guidelines. No areas of contamination above DOE guidelines or supplemental limits remain at the site. The site was released for unrestricted use. DOE has been responsible for long-term stewardship of the Indian Orchard site since 2004. 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/indian-orchard-massachusetts-site](http://www.energy.gov/lm/indian-orchard-massachusetts-site)).

At some point between 1995 and 2001, the property owner demolished Building 23 and removed all demolition debris from the property.



## ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Indian Orchard, Massachusetts, Site are available on the LM website at [lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Indian\\_Orchard](https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Indian_Orchard).

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

**U.S. Department of Energy**  
**Office of Legacy Management**  
**2597 Legacy Way**  
**Grand Junction, CO 81503**

Email:

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DOE Office of Legacy Management  
**(970) 248-6070**



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# Indian Orchard, Massachusetts, Site Certification Data Summary Worksheet

Six tables referenced in the Indian Orchard Certification Docket provide the evidence used to certify the site as clean.

The "Post-Remedial Action Report" is the DOE report "Post-Remedial Action Report for the Chapman Valve Site, Indian Orchard, Massachusetts" (November 1996).

The "Certification Docket" is the DOE report "Certification Docket for the Remedial Action Performed at the Chapman Valve Site, Indian Orchard, Massachusetts" (August 2003).

Post-Remedial Action Survey Data - Crane*									
Table 4 in the Post-Remedial Action Report									
Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>		Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma		Alpha	Beta/Gamma	Alpha	Beta/Gamma
1	16	201	2	84	86	62	3137	5	107
2	1	513	2	110	87	-3	633	b	b
3	-6	313	-1	-19	88	19	481	b	b
4	9	223	2	20	89	4	708	b	b
5	1	335	-1	-53	90	33	25	b	b
6	-6	112	-1	-45	91	12	329	b	b
7	-6	201	-1	15	92	12	506	b	b
8	-6	402	-1	41	93	4	177	b	b
9	-6	380	-1	110	94	12	582	b	b
10	16	491	2	3	95	12	724	b	b
11	9	313	5	80	96	4	531	b	b
12	1	134	-1	50	97	-3	405	b	b
13	9	357	2	114	98	12	304	b	b
14	9	201	2	11	99	112	2758	8	80
15	1	290	-1	-15	100	4	455	b	b
16	37	0	2	33	101	19	354	b	b
17	9	112	2	20	102	40	810	b	b
18	-6	290	-1	24	103	26	810	b	b
19	15	1670	-2	7	104	19	683	b	b
20	-5	-329	b	b	105	55	860	b	b
21	48	1771	4	15	106	-43	-578	b	b
22	15	177	b	b	107	-43	-509	b	b
23	21	607	b	b	108	-33	-254	b	b
24	1	633	b	b	109	-43	-462	b	b
25	21	253	b	b	110	-43	-185	b	b
26	55	3416	1	45	111	-43	-162	b	b
27	15	329	b	b	112	-24	-624	b	b
28	8	2049	1	-53	113	-43	-509	b	b
29	21	-278	b	b	114	-43	-971	b	b
30	35	1619	10	63	115	-33	-948	b	b
31	28	1569	4	11	116	-24	-879	b	b
32	48	531	b	b	117	-24	-462	b	b
33	8	-177	b	b	118	-43	-486	b	b
34	15	25	b	b	119	-33	-832	b	b
35	15	-354	b	b	120	22	-254	b	b
36	15	-76	b	b	121	-43	-624	b	b
37	1	354	b	b	122	-43	-555	b	b
38	-5	-101	b	b	123	-24	-786	b	b
39	8	-380	b	b	124	4	-809	b	b
40	21	708	b	b	125	13	-439	b	b
41	26	101	b	b	126	-43	-254	b	b
42	12	557	b	b	127	-24	-786	b	b
43	19	-127	b	b	128	-33	-647	b	b
44	-3	177	b	b	129	689	-324	b	b
45	4	633	b	b	130	198	-69	b	b
46	4	481	b	b	131	143	23	b	b
47	134	1493	8	73	132	319	-92	b	b
48	220	2278	5	87	133	87	-370	b	b
49	163	2606	-2	77	134	235	3237	-1	-3
50	55	708	b	b	135	161	671	b	b
51	4	936	b	b	136	13	1156	-1	-10
52	12	354	b	b	137	4	324	b	b
53	19	734	b	b	138	-43	69	b	b
54	19	911	b	b	139	-33	-254	b	b
55	19	405	b	b	140	-43	-925	b	b
56	-3	607	b	b	141	-43	-416	b	b
57	12	531	b	b	142	13	-879	b	b
58	148	1695	8	77	143	172	651	b	b
59	91	2075	12	39	144	24	311	b	b
60	26	253	b	b	145	43	481	b	b
61	19	0	b	b	146	6	1471	12	17
62	62	354	b	b	147	89	396	b	b
63	12	177	b	b	148	302	283	b	b
64	-3	633	b	b	149	459	736	b	b
65	4	860	b	b	150	552	5348	9	-17
66	19	734	b	b	151	274	4641	1	58
67	26	961	b	b	152	98	368	b	b
68	270	3238	5	83	153	43	-57	b	b
69	83	1189	5	90	154	15	85	b	b
70	-3	886	b	b	155	-4	-170	b	b
71	-3	759	b	b	156	24	538	b	b
72	148	3669	-2	60	157	24	-311	b	b
73	40	3087	5	46	158	24	-226	b	b
74	12	202	b	b	159	70	1585	1	31
75	62	936	b	b	160	256	538	b	b
76	19	101	b	b	161	89	198	b	b
77	4	582	b	b	162	61	-113	b	b
78	12	127	b	b	163	98	311	b	b
79	-3	329	b	b	164	172	1330	12	20
80	199	3719	8	87	165	80	-170	b	b
81	98	1645	12	107	166	43	-85	b	b
82	40	1113	2	90	167	33	283	b	b
83	26	961	b	b	168	70	-198	b	b
84	12	810	b	b	169	61	-198	b	b
85	91	1898	-2	63					
					<b>Average</b>	<b>44</b>	<b>520</b>	<b>3</b>	<b>42</b>
					<b>DOE Guideline</b>	<b>5000</b>	<b>5000</b>	<b>1000</b>	<b>1000</b>

\*Negative numbers indicate that the measurement was less than the minimum detectable activity and that after background was subtracted, the numerical value was negative.  
<sup>b</sup>Transferable surface readings were not taken because direct readings were less than the transferable criterion of 1,000 dpm/100 cm<sup>2</sup> for that location.

# Indian Orchard, Massachusetts, Site Certification Data Summary Worksheet

Post-Remedial Action Survey Data - Trusses and Overheads*														
Table 5 in the Post-Remedial Action Report														
Truss Number	Number of Locations		Horizontal Surfaces (dpm/100 cm <sup>2</sup> )				Non-Horizontal Surfaces (dpm/100 cm <sup>2</sup> )				Light Fixtures (dpm/100 cm <sup>2</sup> )			
			Direct		Removable		Direct		Removable		Direct		Removable	
			Alpha	Beta/Gamma	Alpha	Beta/Gamma	Alpha	Beta/Gamma	Alpha	Beta/Gamma	Alpha	Beta/Gamma	Alpha	Beta/Gamma
1	160	Average	452	5657	24	112	702	3173	27	128	859	3758	65	227
		Maximum	2221	27841	101	302	1776	7330	78	244	1471	4810	117	339
		Minimum	4	139	-2	0	4	-277	-2	41	161	2798	35	132
2	101	Average	2114	12261	18	125	1869	6175	20	107	794	2336	2	62
		Maximum	17577	11967	193	539	17397	18280	88	573	1300	3677	7	79
		Minimum	-9	277	-2	-25	102	948	-2	-17	59	-185	-2	44
3	69	Average	907	4266	29	70	889	5383	17	61	b	b	b	b
		Maximum	9973	28806	368	634	5916	27419	55	129	b	b	b	b
		Minimum	26	113	-2	-20	7	-85	-2	0	b	b	b	b
4	68	Average	361	1773	11	55	483	2221	21	48	b	b	b	b
		Maximum	1024	17827	42	180	1450	10017	192	502	b	b	b	b
		Minimum	26	-792	-2	14	7	-481	0	-19	b	b	b	b
5	150	Average	422	1783	7	27	316	1245	3	19	432	1186	18	17
		Maximum	4727	14591	58	98	741	4185	9	62	808	4324	35	49
		Minimum	17	-347	-2	-36	-7	-162	-1	-19	4	-254	-1	-39
6	67	Average	243	1395	9	27	114	815	1	10	b	b	b	b
		Maximum	1400	17940	131	310	715	8319	8	76	b	b	b	b
		Minimum	-8	-453	-1	-16	-7	-283	-1	-29	b	b	b	b
7	71	Average	329	1923	3	36	201	865	2	18	b	b	b	b
		Maximum	1773	12507	15	173	902	5263	9	156	b	b	b	b
		Minimum	13	-509	-1	-31	-6	-509	-1	-14	b	b	b	b
8	43	Average	344	2567	14	32	287	1592	10	-10	b	b	b	b
		Maximum	1389	20141	42	123	556	5388	28	42	b	b	b	b
		Minimum	0	-439	0	-33	93	-90	-1	-114	b	b	b	b
1 to 8 <sup>c</sup>	40	Average	161	627	2	8	c	c	c	c	c	c	c	c
		Maximum	1895	11084	25	256	c	c	c	c	c	c	c	c
		Minimum	-22	-315	0	-62	c	c	c	c	c	c	c	c
<b>Supplemental Limit<sup>d</sup></b>			<b>15000</b>	<b>15000</b>	<b>1000</b>	<b>1000</b>	<b>15000</b>	<b>15000</b>	<b>1000</b>	<b>1000</b>	<b>15000</b>	<b>15000</b>	<b>1000</b>	<b>1000</b>

\*Negative numbers indicate that the measurement was less than the minimum detectable activity and that after background was subtracted, the numerical value was negative.  
<sup>b</sup>These truss areas did not contain light fixtures.  
<sup>c</sup>This survey was performed on the underside of horizontal surfaces and in the area between back-to-back welded angles on all eight trusses. Non-horizontal surfaces and light fixtures were not surveyed.  
<sup>d</sup>The supplemental limit is an average for the truss; there is no maximum limit.

Post-Remedial Action Survey Data - West Wall*									
Table 6 in the Post-Remedial Action Report									
Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>a</sup>		Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma		Alpha	Beta/Gamma	Alpha	Beta/Gamma
1	100	4075	-1	18	22	989	8263	19	187
2	82	3792	-1	24	23	878	80985	9	119
3	193	8489	-1	4	24	322	5490	-1	-6
4	137	14375	5	45	25	626	23147	19	52
5	1304	37295	12	119	26	774	11149	2	65
6	878	61743	42	401	27	4470	14544	108	170
7	2508	15903	9	123	28	6	2999	2	-30
8	693	22977	5	106	29	6	6112	12	18
9	600	59479	75	221	30	70	4980	2	18
10	2230	130787	164	919	31	43	1471	-1	18
11	4824	60045	9	113	32	61	170	b	b
12	3731	5433	138	594	33	6	1075	9	18
13	44	5999	5	38	34	154	30730	2	-37
14	248	4301	-1	28	35	302	12620	2	-16
15	359	34692	2	89	36	395	26033	15	4
16	433	10922	2	14	37	376	10413	9	31
17	174	14997	9	31	38	24	4075	9	4
18	63	16921	5	92	39	43	3679	5	-9
19	137	22354	5	102	40	43	1585	2	-64
20	433	6508	5	18	41	61	6452	-1	-57
21	878	15167	2	85	42	24	2999	2	-30
					<b>Average</b>	<b>708</b>	<b>19410</b>	<b>17</b>	<b>70</b>
					<b>DOE Guideline</b>	c	c	c	c

\*Negative numbers indicate that the measurement was less than the minimum detectable activity and that after background was subtracted, the numerical value was negative.  
<sup>a</sup>Removable surface readings were not taken because direct readings were less than the removable criteria of 1,000 dpm/100 cm<sup>2</sup> for that location.  
<sup>b</sup>The walls were decontaminated to comply with DOE's as low as reasonably achievable (ALARA) policy, and the data collected are intended to be used in the final hazard assessment calculation; therefore, there are no specific surface criteria that apply to the walls.

# Indian Orchard, Massachusetts, Site Certification Data Summary Worksheet

Post-Remedial Action Survey Data - North Wall <sup>a</sup>									
Table 7 in the Post-Remedial Action Report									
Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>		Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma		Alpha	Beta/Gamma	Alpha	Beta/Gamma
1	20	5018	5	-16	49	1104	3839	65	265
2	48	2428	15	-3	50	965	6914	-1	-43
3	104	2914	22	-3	51	11	1781	5	46
4	187	2336	9	11	52	11	1017	-2	-28
5	2	3839	-1	-13	53	30	185	<sup>c</sup>	<sup>c</sup>
6	39	2243	2	-9	54	2	1295	1	39
7	2	2752	2	-16	55	215	1457	11	19
8	57	2613	12	-16	56	30	925	<sup>c</sup>	<sup>c</sup>
9	2	2729	-1	-37	57	11	1226	1	-15
10	113	3839	22	-23	58	11	647	<sup>c</sup>	<sup>c</sup>
11	39	2312	9	-57	59	76	139	<sup>c</sup>	<sup>c</sup>
12	30	2567	5	11	60	11	439	<sup>c</sup>	<sup>c</sup>
13	104	2798	15	-43	61	48	69	<sup>c</sup>	<sup>c</sup>
14	94	1896	2	45	62	150	1017	11	-8
15	113	2613	12	-30	63	530	1503	28	-28
16	57	2891	5	-9	64	307	717	<sup>c</sup>	<sup>c</sup>
17	11	3908	2	4	65	30	301	<sup>c</sup>	<sup>c</sup>
18	57	2359	15	-6	66	104	856	<sup>c</sup>	<sup>c</sup>
19	11	2474	2	-9	67	363	740	<sup>c</sup>	<sup>c</sup>
20	178	1734	-1	4	68	132	763	<sup>c</sup>	<sup>c</sup>
21	94	2914	5	11	69	539	1434	-2	33
22	85	2497	2	-23	70	11	2127	5	-5
23	2	2289	-1	31	71	178	1064	8	22
24	48	3006	12	-64	72	280	1202	18	39
25	233	12071	32	-40	73	243	2428	21	9
26	919	10082	15	4	74	94	555	<sup>c</sup>	<sup>c</sup>
27	243	3422	25	48	75	30	1804	11	-59
28	122	856	9	18	76	169	532	<sup>c</sup>	<sup>c</sup>
29	39	5272	5	-9	77	85	2405	18	-28
30	326	5365	35	72	78	94	-185	<sup>c</sup>	<sup>c</sup>
31	345	1688	5	-43	79	910	2012	38	-45
32	317	1526	2	-9	80	11	1526	-2	39
33	919	1503	22	79	81	335	1896	11	46
34	419	1711	19	-16	82	169	1064	18	-35
35	270	2844	22	18	83	39	509	<sup>c</sup>	<sup>c</sup>
36	622	2960	12	18	84	548	6544	31	185
37	270	3908	29	68	85	132	1572	21	29
38	761	2567	22	24	86	48	23	<sup>c</sup>	<sup>c</sup>
39	270	3307	2	-37	87	1021	14268	31	155
40	94	3422	2	-23	88	48	3645	15	39
41	187	4902	12	62	89	576	3076	15	-62
42	215	4394	32	18	90	20	-416	<sup>c</sup>	<sup>c</sup>
43	57	1156	9	126	91	1437	27749	25	243
44	743	3006	5	143	92	2595	4648	213	266
45	919	8949	12	11	93	345	-46	<sup>c</sup>	<sup>c</sup>
46	1762	36698	850	3197	94	372	2359	34	100
47	39	301	<sup>c</sup>	<sup>c</sup>	95	446	7307	101	209
48	947	25714	15	45	96	48	4116	5	-32
					<b>Average</b>	<b>1001</b>	<b>2823</b>	<b>35</b>	<b>58</b>
					<b>DOE Guideline</b>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>	<sup>c</sup>

<sup>a</sup>Negative numbers indicate that the measurement was less than the minimum detectable activity and that after background was subtracted, the numerical value was negative.  
<sup>b</sup>Removable surface readings were not taken because direct readings were less than the removable criterion of 1,000 dpm/100 cm<sup>2</sup> for that location.  
<sup>c</sup>The walls were decontaminated to comply with DOE's ALARA policy, and the data collected are intended to be used in the final hazard assessment calculation; therefore, there are no specific surface criteria that apply to the walls.

# Indian Orchard, Massachusetts, Site Certification Data Summary Worksheet

Post-Remedial Action Survey Data - South Wall <sup>a</sup>									
Table 8 in the Post-Remedial Action Report									
Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>		Location Number	Direct (dpm/100 cm <sup>2</sup> )		Removable (dpm/100 cm <sup>2</sup> ) <sup>b</sup>	
	Alpha	Beta/Gamma	Alpha	Beta/Gamma		Alpha	Beta/Gamma	Alpha	Beta/Gamma
1	2564	41709	22	265	40	483	7538	28	-5
2	7	283	b	b	41	122	971	11	-25
3	2230	7074	5	102	42	539	2451	8	-56
4	44	12677	-1	11	43	215	694	b	b
5	304	7866	5	52	44	85	971	b	b
6	82	3056	-1	1	45	122	2336	1	-25
7	545	2264	-1	-23	46	641	2497	28	-1
8	3710	17714	5	55	47	122	6428	8	-8
9	191	849	39	150	48	132	1873	1	-35
10	3358	9508	111	319	49	30	1734	5	-1
11	691	26005	9	31	50	39	3214	8	26
12	209	3735	5	24	51	67	-162	b	b
13	1450	9508	22	153	52	446	4509	38	56
14	135	2490	15	52	53	558	925	b	b
15	432	2490	72	252	54	1947	5758	68	161
16	80	1471	9	-3	55	-7	-324	b	b
17	7804	20543	88	241	56	354	1665	5	-76
18	784	14488	12	72	57	169	902	b	b
19	580	44822	19	126	58	409	5943	44	175
20	2228	67572	32	153	59	48	-370	b	b
21	5414	11375	25	99	60	261	2127	5	49
22	691	13639	22	24	61	372	2197	21	16
23	11	2867	1	-59	62	187	2359	18	138
24	196	4671	1	-62	63	30	763	b	b
25	67	324	b	b	64	2	-624	b	b
26	187	2428	11	-15	65	169	694	b	b
27	39	2960	-2	-45	66	104	578	b	b
28	67	2035	5	-12	67	283	1188	32	106
29	1067	1202	8	26	68	6	4358	2	-50
30	104	2821	1	16	69	1469	3452	12	45
31	178	5319	15	-52	70	580	1075	9	-30
32	-7	7215	-2	2	71	265	1981	9	85
33	567	4278	11	121	72	450	10696	12	75
34	354	740	b	b	73	450	22864	2	11
35	261	1272	21	33	74	43	3679	2	-23
36	761	8140	34	134	75	98	2320	15	-6
37	67	1665	11	-39	76	43	2037	5	-9
38	428	4255	18	5	77	6	1358	-1	-37
39	196	5850	15	94					
					<b>Average</b>	<b>642</b>	<b>6387</b>	<b>17</b>	<b>45</b>
					<b>DOE Guideline</b>	c	c	c	c

<sup>a</sup>Negative numbers indicate that the measurement was less than the minimum detectable activity and that after background was subtracted, the numerical value was negative.  
<sup>b</sup>Removable surface readings were not taken because direct readings were less than the removable criterion of 1,000 dpm/100 cm<sup>2</sup> for that location.  
<sup>c</sup>The walls were decontaminated to comply with DOE's ALARA policy, and the data collected are intended to be used in the final hazard assessment calculation; therefore, there are no specific surface criteria that apply to the walls.

Post-Remedial Action and Bench - Scale Sampling Results <sup>a</sup>					
Table 9 in the Post-Remedial Action Report					
Location	TCLP Pb (µg/L)	TCLP Cd (µg/L)	U-238 pCi/g	Ra-226 pCi/g	Th-232 pCi/g
Dust from crane (mixed with concrete)	338	<3.0	b	b	b
Bench Scale Test (Ratio 2)	315	<3.0	b	b	b
Bench Scale Test (Ratio 4)	102	<3.0	b	b	b
Bench Scale Test (Ratio 6)	302	<3.0	b	b	b
Bench Scale Test (Ratio 3)	94.2	<3.0	b	b	b
Bench Scale Test (Ratio 5)	<46.6	<3.0	b	b	b
Bench Scale Test (Ratio 1)	177	<3.0	b	b	b
West Equipment Door Ramp	b	b	<2.00	0.47	0.41
Room B4	b	b	0.26	0.47	0.50
Room B4	b	b	<0.62	0.38	0.39
Room B4	b	b	<0.54	<0.3	0.42
<b>DOE Soil Guideline</b>	c	c	d	e	e
<b>RCRA TCLP Limits</b>	<b>5000</b>	<b>1000</b>	c	c	c

<sup>a</sup>Less than values (<) are results less than the minimum detectable activity, and the number reported is less than the minimum detectable activity.  
<sup>b</sup>Sample was not analyzed for this analyte.  
<sup>c</sup>This set of guidelines does not apply to this analyte.  
<sup>d</sup>There was no site-specific uranium guideline developed for CHV. A typical U-238 guideline for FUSRAP sites ranges from 35 to 50 pCi/g.  
<sup>e</sup>DOE soil cleanup guideline for radium and thorium is 5 pCi/g in the top 6 inches of soil and 15 pCi/g greater than 6 inches below the surface of the soil.

# Indian Orchard, Massachusetts, Site Map

