

# Chicago North, Illinois, Site



U.S. DEPARTMENT OF  
**ENERGY**

Legacy  
Management



## SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Chicago North, Illinois, 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 Chicago North Site (formerly the National Guard Armory [NGA] site) is located in Chicago, Illinois, about 6 miles south of the downtown business district. The 290,000-square-foot concrete and stone facility consists of an area with bleachers at the center of the building as well as classrooms, offices, storage areas, and garages at the north and south ends. In 1942, the Manhattan Engineer District (MED) leased NGA to alleviate space shortages at the nearby University of Chicago, where the university and the MED Metallurgical Laboratory jointly conducted research. Records indicate that NGA was used primarily for uranium storage and processing and served as the central procurement and shipping location for the Metallurgical Laboratory. A uranium fire occurred in the northeast corner of the armory storeroom. A second fire also contaminated both the receiving area and storeroom. In 1951, the U.S. Atomic Energy Commission (AEC), which succeeded MED, terminated the use of NGA, and the property was returned to the state of Illinois. After MED ceased using the facility, contaminated soil from the arena was removed and disposed. However, records of where this soil was taken or whether radiological surveys or decontamination occurred could not be located. Because of these uncertainties, the Energy Research and Development Agency, the predecessor to the U.S. Department of Energy (DOE), conducted a comprehensive radiological survey to determine whether any contamination remained at the site. In the 1970s and 1980s, the Illinois National Guard occupied the armory.

See the [Site Overview Map](#) on page 8 for more details about the site.

### Site Remediation Timeline

**September 1977 through October 1978** — Argonne National Laboratory (ANL) performed a comprehensive radiological survey of NGA.

**January and February 1987** — Bechtel National Inc. (BNI) conducted radiological surveys of the site.

**April through June 1987** — Remedial action was conducted at NGA.

**January 31, 1989** — DOE certified the site was in compliance with DOE decontamination criteria and standards.

**February 17, 1989** — DOE published the notice of certification in the Federal Register.



*Removing sludge and placing it in drums at the Chicago North site (1987).*

### Certification Docket Contents

The [Certification Docket](#) documents the successful decontamination of NGA in Chicago, Illinois. The docket includes documents supporting certification by DOE that radiological conditions at the Chicago North site are in compliance with radiological guidelines and standards determined to apply to the site, and that use of this property will not result in any measurable radiological hazard to the general public derived from the activities of the DOE predecessor agencies.

## Remedial Action

After it was determined that NGA was contaminated, DOE designated the building for remedial action under the Formerly Utilized Sites Remedial Action Program (FUSRAP). BNI performed a radiological characterization of NGA to define the areas of contamination in preparation for remedial action and found surface contamination in 11 rooms and contaminated sludges in the catch basin system in Rooms 1, 1D, and 5. The soil in one area outside the west wall of Room 1 was found to be contaminated with uranium concentrations in excess of 150 picocuries per gram (pCi/g). Remediation activities included: (1) vacuuming or wiping surface areas; (2) sanding, grinding, or scabbling areas; (3) removing sludge in six catch basins through shoveling, pressure washing, and sandblasting; and (4) removing contaminated soil by shovel. These remediation activities were performed from April through June 1987. See the [Fact Sheet](#) for more details about the remediation.

FUSRAP objectives for the site were to:

- Identify and assess sites formerly utilized to support early MED/AEC on nuclear work to determine whether further decontamination and/or control was needed.
- Decontaminate and/or apply controls to these sites to permit conformance with current and applicable guidelines.
- Dispose of and/or stabilize all generated residues in a radiologically and environmentally acceptable manner.
- Accomplish all work in accordance with appropriate landowner agreements, local and state environmental and land use requirements to the extent permitted by federal law, and applicable DOE orders, regulations, standards, policies, and procedures.
- Certify, at the completion of the remedial action, that the radiological conditions of sites comply with guidelines and are appropriate for future use.

## Post-Remediation Sampling

DOE collected post-remedial action measurements in all areas where remedial action was performed. The primary method of ensuring that the outdoor area was cleaned up in compliance with DOE cleanup guidelines was to take soil samples, which were analyzed for radium-226, thorium-232, and uranium-238. Methods for determining the effectiveness of remedial action performed on interior surfaces of the building included measuring alpha and beta-gamma activity.

### The Catch Basin System

The part of the catch basin system where remedial action was performed consists of six interior catch basins connected by a cast-iron mainline with a 6-inch interior diameter. DOE found no contamination in catch basin 7 (the exterior maintenance hole). DOE also collected post-remedial action measurements inside all catch basins except catch basin 3, which was

removed and replaced. Measurements consisted of direct alpha and beta-gamma readings. In addition to these direct readings, the entire inside surface of each catch basin was scanned to ensure that the surface readings were below DOE guidelines. After removing catch basin 3, DOE collected samples to verify that the soil around and underneath the catch basin had not become contaminated. Analysis results of these samples indicated that the soil was uncontaminated.

DOE collected post-remedial action measurements inside the mainline between all catch basins except for part of a section between catch basins 3 and 4, which was removed and replaced. All direct beta-gamma measurements taken along the mainline averaged less than 0.2 milliradians per hour per square meter (mrad/h/m<sup>2</sup>). Post-remedial action measurements were also taken inside most of the lateral pipes connected to the catch basins. [Catch basin](#) measurements are listed in the data summary worksheet on pages 5-7.

### Rooms Where Remedial Action Was Performed

Remedial action was performed in 11 rooms and one hallway.

#### Room 1

In Room 1, remedial action was performed to decontaminate the ceiling, portions of the floor, portions of the walls, and sections of three columns. A total of 2,576 direct alpha and beta-gamma readings were taken on the honeycomb section ceiling in Room 1, which covers nine bays. The average, maximum, and minimum readings for each bay were calculated by averaging the measurements from all the sections in each respective bay (measurements listed in data summary worksheet). In addition to the large number of direct readings taken, the entire ceiling was scanned for both alpha and beta-gamma activity to ensure that no hot spots remained. Areas in which contact readings indicated concentrations in excess of guidelines for removable contamination were wiped to ensure that the activity was not removable. Removable alpha activity concentrations measured with the wipes ranged from 3 to 132 disintegrations per minute (dpm), which were below DOE guidelines for removable activity on surfaces.

Post-remedial action measurements on the floor of Room 1 consisted of 3,438 direct alpha and beta-gamma measurements. The average, maximum, and minimum alpha activity readings were 45, 331, and 22 dpm/100 square centimeters (cm<sup>2</sup>), respectively. The average, maximum, and minimum beta-gamma level readings were 0.03, 0.13, and 0.02 millirad per hour (mrad/h), respectively, without subtracting the background level (0.02 mrad/h).

Remedial action was performed on several small areas on three columns in Room 1. The average, maximum, and minimum alpha activity readings for Column 1 were 22, 101, and 18 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings for Column 1 were 0.03, 0.1, and 0.02 mrad/h, respectively. For Column 2, the average, maximum, and minimum alpha activity readings were 19, 35, and 18 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings for

Column 2 were 0.03, 0.04, and 0.02 mrad/h, respectively. For Column 3, the average, maximum, and minimum alpha activity readings were all 18 dpm/100 cm<sup>2</sup>. The average, maximum, and minimum beta-gamma levels for Column 3 were 0.03, 0.03, and 0.02 mrad/h, respectively, without subtracting the background level (0.03 mrad/h). No data summary tables exist for these areas.

### Room 1A

Two areas on the floor in Room 1A required remedial action. After remedial action, the average, maximum, and minimum alpha activity readings were 69, 153, and 20 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings in Room 1A were 0.03, 0.08, and 0.03 mrad/h, respectively, without subtracting the background level (0.02 mrad/h). No data summary tables exist for this area.

### Room 1E

Two areas on the floor in Room 1E required remedial action. After remedial action, the average, maximum, and minimum alpha activity readings were 32, 108, and 25 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings in Room 1E were 0.03, 0.06, and 0.02 mrad/h, respectively, without subtracting the background level (0.02 mrad/h). No data summary tables exist for this area.

### Room 5

Three areas on the floor in Room 5 required remedial action. After remedial action, the results of all alpha measurements taken in this room were indistinguishable from background count rates. Similarly, all but one of the beta-gamma readings were indistinguishable from background level. The one beta-gamma reading that differed from background level was 0.05 mrad/h (without subtracting the background level of 0.03 mrad/h). No data summary tables exist for this area.

### Room 5B

Several small areas on the floor and walls in Room 5B required remedial action. The average, maximum, and minimum alpha and beta-gamma activity readings for each wall are reported in the data summary worksheet. Room 5B also contained a floor drain that was connected to the catch basin system. The drain was removed, and the connecting pipe was checked for contamination. All of the measurements taken were below guidelines.

### Rooms S201 and S202

Four areas on the floor in Rooms S201 and S202 required remedial action. The average, maximum, and minimum alpha and beta-gamma readings for each are reported in the data summary worksheet.

### Room S212

Three areas in Room S212 required remedial action. The average, maximum, and minimum alpha and beta-gamma readings for these areas are reported in the data summary worksheet. All measurements were direct contact readings and were below DOE guidelines.

### Room S213

Two small areas of contamination on the north wall in Room S213 required remedial action. After remedial action, the average, maximum, and minimum alpha activity readings were 45, 206, and 24 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings were 0.04, 0.05, and 0.02 mrad/h, respectively, without subtracting the background level (0.02 mrad/h). No data summary tables exist for this area.

### Hallway outside Room S213

A small area on the floor in the hallway outside Room S213 required remedial action. Results of the post-remedial action survey indicated an average alpha activity of less than 26 dpm/100 cm<sup>2</sup> and an average beta-gamma reading of 0.03 mrad/h without subtracting the background level (0.02 mrad/h). No data summary tables exist for this area.

### Room S215

One area of contamination on the floor of Room S215 required remedial action. After remedial action, the average, maximum, and minimum alpha activity readings were 11, 33, and 5 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings were 0.03, 0.06, and 0.01 mrad/h, respectively, without subtracting the background level (0.03 mrad/h). No data summary tables exist for this area.

### Room S234

One area of contamination on the floor of Room S234 required remedial action. After remedial action, the average, maximum, and minimum alpha activity readings were 34, 71, and 20 dpm/100 cm<sup>2</sup>, respectively. The average, maximum, and minimum beta-gamma level readings were 0.03, 0.03, and 0.02 mrad/h, respectively, without subtracting the background level (0.02 mrad/h). No data summary tables exist for this area.

### Outside Area

One area outside the west wall of Room 1 was found to be contaminated with radium-226 during the characterization survey. The radium-226 contamination is believed to have originated from a radium dial found buried in the center of the area where remedial action was performed. Analysis results of post-remedial action soil samples from this area indicated average, maximum, and minimum concentrations (including background) of 0.7, 0.8, and 0.6 pCi/g for radium-226, respectively. All soil samples indicated uranium-238 concentrations at background level. No data summary tables exist for this area.

## Current Site Conditions

All the measurements taken after the removal of radioactive materials indicate that no areas of radioactive contamination remain in which concentrations exceed DOE guidelines. On the basis of the data collected, the Chicago North site conforms to all applicable DOE radiological guidelines established for release of this site for unrestricted use. DOE has been responsible for long-term stewardship

of the Chicago North site since 1989. The stewardship requirements and protocols are captured in the FUSRAP Long-Term Surveillance and Maintenance Plan, which is available on the DOE Office of Legacy Management website [www.energy.gov/lm/chicago-north-illinois-site](http://www.energy.gov/lm/chicago-north-illinois-site).



## ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Chicago North, Illinois, Site are available on the LM website at [lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Chicago\\_North](http://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Chicago_North).

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

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**Office of Legacy Management**  
**2597 Legacy Way**  
**Grand Junction, CO 81503**

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# Chicago North, Illinois, Site Certification Data Summary Worksheet

Nine tables referenced in the Chicago North Certification Docket provide the evidence used to certify the site as clean.

When the tables refer to the "Post-Remedial Action Report," that is the "Post-Remedial Action Report for the National Guard Armory, Chicago, Illinois" (dated December 1988).

Results of Radiological Survey of the Catch Basins in the Catch Basin System						
Table 4-1 in Post-Remedial Action Report						
	Alpha Activity (dpm/100 cm <sup>2</sup> )			Beta-Gamma Activity (mrad/h)*		
	Average	Maximum	Minimum	Average	Maximum	Minimum
<b>CATCH BASIN 1</b>						
North Wall	68	98	<36	<0.20+	N/A	N/A
East Wall	43	62	<36	<0.20+	N/A	N/A
South Wall	39	49	<36	<0.20+	N/A	N/A
West Wall	40	49	<36	<0.20+	N/A	N/A
Floor	51	123	<36	<0.03	0.05	<0.03
<b>CATCH BASIN 2</b>						
North Wall	88	191	<36	0.04	0.05	0.03
East Wall	63	110	<36	0.06	0.07	0.04
South Wall	120	294	41	0.06	0.12	0.05
West Wall	115	260	<36	0.06	0.09	0.03
Floor	69	99	<36	0.06	0.14	<0.03
<b>CATCH BASIN 4</b>						
North Wall	34	45	<30	0.03	0.04	<0.03
East Wall	100	294	<30	0.06	0.13	<0.03
South Wall	38	45	<30	0.04	0.04	0.03
West Wall	81	121	45	0.06	0.12	<0.03
Floor	48	99	<30	0.04	0.06	0.03
<b>CATCH BASIN 5</b>						
North Wall	76	164	<34	0.04	0.05	0.02
East Wall	44	69	<34	0.04	0.04	0.02
South Wall	74	101	<34	0.04	0.05	0.02
West Wall	110	164	69	0.06	0.08	0.02
Floor	47	111	<34	0.10	0.13	0.04
<b>CATCH BASIN 6</b>						
North Wall	41	52	<37	<0.20+	N/A	N/A
East Wall	37	41	<37	<0.20+	N/A	N/A
South Wall	41	52	<37	<0.20+	N/A	N/A
West Wall	55	109	<37	<0.20+	N/A	N/A
Floor	44	64	<37	<0.06+	0.07	0.04
*Background, 0.02 mrad/h, has not been subtracted.						
+Area was checked only to ensure that guidelines were met.						

Beta-Gamma Values for the Main Line in the Catch Basin System				
Table 4-3 in Post-Remedial Action Report				
Line	Background (mrad/h)	Average <sup>a</sup> (mrad/h)	Maximum <sup>a</sup> (mrad/h)	Minimum <sup>a</sup> (mrad/h)
Catch Basin 1 to Catch Basin 2	0.07	0.16	0.26	0.04
Catch Basin 2 to Catch Basin 3	0.06	0.16	0.38	0.10
Catch Basin 3 to Catch Basin 4	0.10	0.28	0.93	0.13
Catch Basin 4 to Catch Basin 5	0.07	0.16	0.59	0.08
Catch Basin 5 to Catch Basin 6	0.06	0.10	0.12	0.07
<sup>a</sup> Background has not been subtracted.				



## Chicago North, Illinois, Site Certification Data Summary Worksheet

Beta-Gamma Values for the Laterals Connected to the Basin System			
Table 4-5 in Post-Remedial Action Report			
Location	Average (mrad/h)	Maximum (mrad/h)	Minimum (mrad/h)
<b>Catch Basin 1</b>	N/A	N/A	N/A
<b>Catch Basin 2</b>			
Northwest lateral	0.06	0.13	0.03
Southwest lateral	0.05	0.14	0.03
Southeast lateral	0.07	0.10	0.03
Northeast lateral	0.06	0.07	0.03
<b>Catch Basin 3</b>			
Northeast lateral	0.04	0.09	0.03
Southeast lateral	0.04	0.10	0.02
<b>Catch Basin 4</b>			
Northeast lateral	0.04	0.07	0.03
Southwest lateral	0.04	0.07	0.03
Southeast lateral	0.04	0.09	0.03
<b>Catch Basin 5</b>			
Northwest lateral	0.04	0.04	0.03
Northeast lateral	0.04	0.04	0.02
Southeast lateral	0.04	0.05	0.03
<b>Catch Basin 6</b>	N/A	N/A	N/A

Average background, 0.03 mrad/h, has not been subtracted.

Summary of the Radiological Condition of the Ceiling in Room 1						
Table 4-6 in Post-Remedial Action Report						
Bay	Alpha Activity (dpm/100 cm <sup>2</sup> )			Beta-Gamma Activity (mrad/h)*		
	Average	Maximum	Minimum	Average	Maximum	Minimum
1	32	189	23	0.02	0.04	0.01
2	68	204	33	0.02	0.03	0.02
3A	196	352	23	0.03	0.03	0.01
3B	30	139	25	0.02	0.03	0.01
4A	156	723	30	0.03	0.04	0.02
4B	45	720	30	0.02	0.03	0.01
5	94	522	30	0.02	0.05	0.01
6	220	879	29	0.03	0.19	0.01
7	354	1551	33	0.04	0.14	0.02
8	376	2228	76	0.03	0.07	0.02
9	68	209	26	0.02	0.03	0.01
Sand Pit	76	122	22	0.04	0.09	0.02

\*Average background, 0.02 mrad/h, has not been subtracted.

Radionuclide Concentrations in Soil Samples taken under Catch Basin 3			
Table 4-2 in Post-Remedial Action Report			
Sample Location	Concentration (pCi/g)*		
	Uranium-238	Radium-226	Thorium-232
Northwest Corner of Catch Basin 3	<5	0.8	1.2
Northeast Corner of Catch Basin 3	<10	1.1	1.1
Southwest Corner of Catch Basin 3	<6	1.9	2.0
Southeast Corner of Catch Basin 3	<4	0.7	<1

\*Samples were counted wet; background level has not been subtracted.

Post-Remedial Action Measurements for Room 5B						
Table 4-7 in Post-Remedial Action Report						
Location	Alpha Activity (dpm/100 cm2)			Beta-Gamma Activity (mrad/h)*		
	Average	Maximum	Minimum	Average	Maximum	Minimum
South Wall	40	96	<26	0.03	0.06	0.01
West Wall	52	128	<26	0.03	0.04	0.02
North Wall	52	257	<26	0.04	0.06	0.03
East Wall	32	54	<26	0.04	0.05	0.03
Floor	26	32	<26	0.03	0.06	0.02

\*Average background, 0.02 mrad/h, has not been subtracted.

Post-Remedial Action Measurements for Room S212						
Table 4-9 in Post-Remedial Action Report						
Location	Alpha Activity (dpm/100 cm2)			Beta-Gamma Activity (mrad/h)*		
	Average	Maximum	Minimum	Average	Maximum	Minimum
Area I	23	23	<23	0.03	0.04	0.03
Area II	28	39	<23	0.04	0.05	0.03
Area III	95	161	<29	0.05	0.09	0.03
West Wall	88	262	<29	0.02	0.03	0.02
South Wall	73	139	<29	0.02	0.03	0.02
Recessed Floor	95	217	<29	0.05	0.09	0.03

\*Average background, 0.02 mrad/h, has not been subtracted.

# Chicago North, Illinois, Site Map



U.S. DEPARTMENT OF ENERGY  
OFFICE OF LEGACY MANAGEMENT

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

## Chicago North, IL, Site

- Catch Basins
- + Remediated Areas
- Original Site Boundary

DATE PREPARED: August 6, 2019

FILE NAME: CHN\_DELIVERABLE

Imagery: HRO 2012  
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