

2016 Annual Inspection and Status Report for the Hallam, Nebraska, Decommissioned Reactor Site

June 2016



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Summary

The former Hallam Nuclear Power Facility was inspected on April 19, 2016. The Intermediate Heat Exchanger building and the grass cover on the foundation of the former reactor building were in good condition. No cause for a follow-up inspection was identified.

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1.0 Introduction

This report presents the findings of the annual U.S. Department of Energy (DOE) inspection of the Hallam, Nebraska, Decommissioned Reactor Site on April 19, 2016.

M. Miller and K. Broberg of the DOE Legacy Management Support contractor conducted the inspection. S. Surovchak (DOE Site Manager), H. Shuman and B. Miller (Nebraska Department of Health and Human Services) accompanied the inspection. T. Chinn (Nebraska Public Power District [NPPD]) served as an escort for the inspection team.

The inspection was conducted in accordance with the *Long-Term Surveillance Plan for the Decommissioned Hallam Nuclear Power Facility, Hallam, Nebraska* (Revision 1, DOE Office of Legacy Management, June 2008) and procedures established by DOE for site inspections. The purposes of the inspection were to confirm the integrity of the Intermediate Heat Exchanger (IHX) building and the grass cover on the foundation of the former reactor building, examine the condition of DOE monitoring wells, and meet with owner representatives.

2.0 Inspection Results

Features discussed in this report are shown in Appendix A. Photographs to support specific observations are identified in the text and on the drawing by photograph location (PL) numbers.

The Hallam Decommissioned Reactor Site consists of the following features:

- The IHX cells, entombed in a waterproofed, above-grade concrete building, referred to as the IHX building.
- A massive, below-grade, reinforced concrete structure, once the foundation of the reactor and now covered with a waterproof membrane, soil, and grass, referred to as the grass-covered mound. Fixed radioactive materials remain at three principal locations within this structure.
- Nineteen groundwater monitoring wells (OBS-1A, OBS-1B, OBS-2A, OBS-2B, OBS-2B2, OBS-2C2, OBS-3A, OBS-3B, OBS-4A, OBS-4B, OBS-4C, OBS-5A, OBS-5B, OBS-7B, OBS-6A, OBS-6B, OBS-7C, OBS-8B, and OBS-8C).

The IHX building, the below grade concrete structure, and the groundwater monitoring wells are located at the Sheldon Power Station, an active coal-fired power plant owned and operated by NPPD.

2.1 IHX Building

The IHX building is a massive, 40-foot-wide by 80-foot-long concrete sarcophagus located at the north end of the former Hallam Nuclear Power Facility. The south side of the building is two stories (about 25 to 30 feet high) with a slightly crowned roof, and the north side of the building is one story with a roof that is sloped to drain. Inspectors view the roof of the IHX building from the roof of the Sheldon Power Plant, north of the IHX building.

The roof of the IHX building was replaced in 2007. The entire roof is capped with a layer of rock material that protects the underlying roofing fabric. It was noted in 2008 that the roof rock was missing in the northwest and southwest corners of the upper roof. It is surmised that strong winds moved the roof rock from the corners, exposing the underlying roofing fabric. Paver stones were placed in all corners of the roof in 2009 to correct the problem. The roof was in good condition during the 2016 inspection. No bare spots were observed (PL-1 and PL-2).

In 2009 soil and gravel were placed around the base of the IHX building in a shallow, narrow depression in the ground surface that trapped water against the base of the building. With the depression filled, water now drains away from the base of the building. The perimeter slope around the IHX building was in good condition during the inspection.

A water stain (noted in previous inspections) remains on the outer east wall of the IHX building where the lower roof meets the wall of the two story structure (PL-3). The size and intensity of the stain appears to be stable. The cause for the staining is not known. It could be the onset of a chronic roof drainage problem. No corrective action is recommended at this time to address the stain. The area will be inspected next year to determine if the staining is progressing.

Several shallow surface cracks were observed this year on the north wall of the IHX building and on the west wall (PL-4). They appear to be cracks in the paint. No corrective action is recommended at this time to address the cracks. They will be inspected next year to determine if they are increasing.

2.2 Buried Concrete Structure (Former Reactor Foundation)

The old reactor foundation is buried beneath a waterproof membrane that is overlain by soil and grass. Today the buried structure appears as a low, flat-topped, grass-covered mound, 1.4 acres in area, immediately south of the IHX building. Inspectors check that areas of erosion are not developing on the mound and that the sprinkler system is operating adequately to maintain the grass on the mound. Grass on the mound was well established, in good condition, and is being maintained with the exception of one small area (PL-5). The grass in this area was dry and matted down. The cause for the dry grass area is not known. This area will be watched to determine if it goes away or if a cause can be determined.

A small area of ground erosion was observed along the fenced perimeter of the grass-covered mound, located west of the IHX building, where a retaining wall is located to separate the grass-covered mound on the east from the parking lot to the west (PL-6 and PL-7). Inspectors requested that Sheldon Power Plant personnel fill in these two areas with soil to hinder further erosion.

DOE replaced the sprinkler system on the grass-covered mound in July 2005. The sprinkler system had not been operated yet this year. Plant personnel stated that last year the sprinkler system was operating well.

A land survey was recently conducted of the grass-covered mound area at the Hallam facility. Based on results of this survey, DOE plans to install survey markers to better define the area of the grass-covered mound that pertains to DOE long-term care and maintenance.

2.3 Groundwater Monitoring Wells

There are 19 monitoring wells onsite. During the inspection, all 19 monitoring wells were observed to be properly secured.

Four of the 19 monitoring wells are a flush-mount design and are locked using a special tool. The other 15 wells require a padlock. All 15 padlocked wells received a new lock in 2013 except for well OBS-3B. The hasp on well OBS-3B was too small for the shank of the new lock, but the old shank/lock combination remains serviceable. The wells are scheduled to be sampled in June 2016. The sampling crew will be asked to replace the lock on well OBS-3B with a new lock.

The OBS-8 well pad was loose, and some of the protective bollards were also loose. When the wells are sampled in June, the sampling crew will be asked to assess the pad situation and stabilize both the pad and the bollards if possible. The crew will also be instructed to remove the wood surrounding the well pad, as it no longer serves a purpose (PL-8).

The concrete Jersey barrier located on the east side of the OBS-2 well pad serves to protect the well pad from local traffic. The barrier has been nudged west, closer to the well pad, over the past year (PL-9). A request was made to have Sheldon Power Station personnel nudge the barrier back a few feet to the east.

Monitoring wells OBS-1A and OBS-1B are flush-mount wells. The well IDs that had been on the well caps have worn away and need to be replaced. The sampling crew in June will be instructed to replace the well ID labels (PL-10 and PL-11).

2.4 Groundwater Monitoring Results

DOE monitors groundwater as a best management practice in response to a request from the Nebraska Department of Health. In 2006 DOE recommended discontinuing groundwater monitoring because analytical results since 1970 demonstrate that there has been no impact to shallow perched groundwater and no current or anticipated unacceptable risk to human health and the environment. The State of Nebraska did not concur with this recommendation but did agree to a reduction in sampling and analysis from once a year to once every 2 years. The new (once every 2 years) sampling frequency began in 2008.

Groundwater samples were last collected in June 2014, in accordance with the June 2008 Long-Term Surveillance Plan. Water levels were measured in 17 monitoring wells in 2014, and those wells were sampled for gross alpha, gross beta, tritium, gamma spectrometry, and nickel-63. Monitoring results are posted on the DOE Office of Legacy Management website at <http://www.lm.doe.gov/land/sites/ne/hallam/hallam.htm> and are summarized below.

Results from the 2014 sampling event were similar to those of previous sampling events. Gross alpha and gross beta are the only parameters that were detected at statistically significant concentrations. The gross alpha and gross beta activity concentrations are consistent with values detected previously and are attributed to naturally occurring radionuclides such as uranium and its decay-chain products in the groundwater.

The monitoring wells are scheduled to be sampled next in June of 2016. If the results are consistent with historical results, DOE plans to discontinue monitoring the wells. This intent was expressed verbally to Nebraska Department of Health personnel during the inspection.

3.0 Minor Maintenance Actions

Inspectors requested that NPPD personnel fill in some small areas of erosion along the fence line, just west of the IHX building to hinder further erosion, and move a concrete Jersey barrier a few feet to the east of well pad OBS-2.

The June 2016 water sampling crew will be instructed to address the following items while onsite:

- Install a new lock at monitoring well OBS-3B.
- Secure the loose well pad and bollards at the OBS-8 monitoring wells.
- Label the well caps of flush-mount wells OBS-1A and OBS-1B.

DOE plans to install survey markers to better define the area of the grass-covered mound that pertains to DOE long-term care and maintenance.

4.0 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	135	Northeast corner of roof of IHX building.
PL-2	225	Northwest corner of roof of IHX building.
PL-3	270	Water staining on east wall of IHX building.
PL-4	90	Surface cracks on west wall of IHX building.
PL-5	360	Brown grass area on grass-covered mound.
PL-6	225	Erosion at base of fence.
PL-7	NA	Erosion at base of fence.
PL-8	NA	Slight erosion around base of OBS-8 well pad.
PL-9	360	Jersey barrier on east side of OBS-2 well pad.
PL-10	NA	OBS-1A (flush-mount well).
PL-11	NA	OBS-1B (flush-mount well).



HAL 4/2016. PL-1. Northeast corner of roof of IHX building.



HAL 4/2016. PL-2. Northwest corner of roof of IHX building.



HAL 4/2016. PL-3. Water staining on east wall of IHX building.



HAL 4/2016. PL-4. Surface cracks on west wall of IHX building.



HAL 4/2016. PL-5. Brown grass area on grass-covered mound.



HAL 4/2016. PL-6. Erosion at base of fence.



HAL 4/2016. PL-7. Erosion at base of fence.



HAL 4/2016. PL-8. Slight erosion around base of OBS-8 well pad.



HAL 4/2016. PL-9. Jersey barrier on east side of OBS-2 well pad.



HAL 4/2016. PL-10. OBS-1A (flush-mount well).

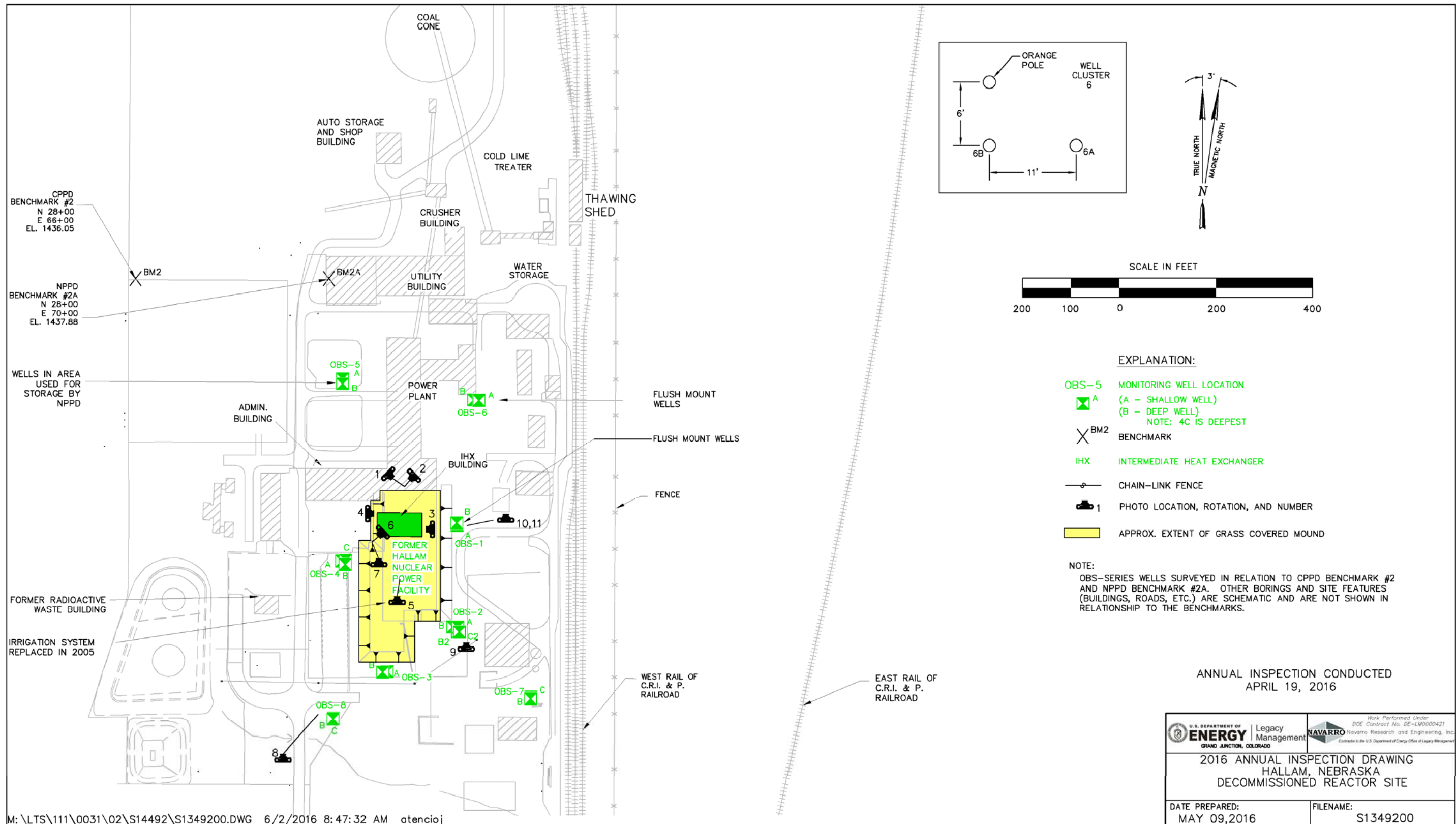


HAL 4/2016. PL-11. OBS-1B (flush-mount well).

Appendix A

Site Drawing

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