

2014 Annual Inspection and Status Report for the Hallam, Nebraska, Decommissioned Reactor Site

Summary

The former Hallam Nuclear Power Facility (HNPF) was inspected on April 8, 2014. The IHX 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.

There are 19 groundwater monitoring wells at the Hallam site. Four of the 19 wells are flush mount in design and are locked using a special tool. The other 15 wells require a pad lock. All of the 15 wells requiring pad locks received a new lock during the 2013 inspection except for well 3B. The hasp on well 3B was too small for the shank of the new lock, but the old shank/lock combination remains serviceable.

Groundwater is sampled every two years, and was last sampled in June 2012. Gross alpha and gross beta were the only parameters that were detected at statistically significant concentrations. The gross alpha and beta activity concentrations observed in 2012 were consistent with values previously observed and are attributed to naturally occurring radionuclides (e.g., uranium and uranium decay chain products) in the groundwater.

1.0 Introduction

This report presents the findings of the annual U.S. Department of Energy (DOE) inspection of the decommissioned Hallam, Nebraska, Reactor Site on April 8, 2014.

M. Miller (Chief Inspector) and K. Broberg (Assistant Inspector), with S.M. Stoller Corporation, (the DOE Office of Legacy Management [LM] Contractor) conducted the inspection. T. Chinn of the Nebraska Public Power District (NPPD) acted as an escort on NPPD property.

The inspection was conducted in accordance with the *Long-Term Surveillance Plan (LTSP) for the Hallam Nuclear Power Facility, Hallam, Nebraska* (DOE Grand Junction, Colorado, Revision 1, June 2008), and procedures established by DOE for site inspections. The purposes of the inspection were to confirm the integrity of the 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 on the attached drawing. 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:

1. The IHX cells, entombed in a waterproofed above-grade concrete building, referred to as the IHX building.

2. 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.
3. Nineteen groundwater monitoring wells. (1A, 1B, 2A, 2B, 2B2, 2C2, 3A, 3B, 4A, 4B, 4C, 5A, 5B, 7B, 6A, 6B, 7C, 8B, and 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 Intermediate Heat Exchanger (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 HNPF. The south side of the building is two stories high (about 25- to 30-feet) with a slightly crowned roof, and the north side of the building is one-story high 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 (PL-1).

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 not present 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. No bare spots were observed (PL-2 and PL-3).

In 2009 soil and gravel were placed around the base of the IHX building, in a small narrow depression in the ground surface that trapped water against the base of the building. By filling the depression, water now readily drains away from the base of the building. The perimeter slope around the IHX building was found to be 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-4). The size and intensity of the stain appears to be increasing. 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 (PL-5 and PL-6). They appear to be cracks in the paint, possibly the result of the extreme cold conditions that were experienced at the site during the previous winter. 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 extent, 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 (PL-7).

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

2.3 Groundwater Monitoring Wells

There are 19 monitoring wells on site. During the inspection 17 of the 19 monitoring wells were observed to be properly secured. Due to activity by Sheldon Power Station personnel, access to monitoring wells 6A and 6B was not possible. These are flush mount wells. Plant personnel reported that they were properly locked prior to the start of their work in the area.

Four of the 19 monitoring wells are flush mount in design and are locked using a special tool. The other 15 wells require a pad lock. All of the 15 wells equipped with pad locks received a new lock in 2013 except for well 3B. The hasp on well 3B was too small for the shank of the new lock, but the old shank/lock combination remains serviceable.

2.4 Groundwater Monitoring Results

DOE monitors groundwater in response to a request from the Nebraska Department of Health. It was recommended by DOE in 2006 that groundwater monitoring be discontinued 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 two years) sampling frequency began in 2008.

Groundwater samples were last collected in June 2012, in accordance with the Long Term Surveillance Plan for the Decommissioned Hallam Nuclear Power Plant, Revision 1, dated June 1998. Seventeen monitoring wells were sampled in 2012 for gross alpha, gross beta, tritium, gamma spectrometry, and nickel-63 and water levels. Monitoring results are posted on the DOE LM website <http://www.lm.doe.gov/land/sites/ne/hallam/hallam.htm> and summarized below.

Results from the 2012 sampling event were similar to 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 observed are consistent with values previously observed and they are attributed to naturally occurring radionuclides (e.g., uranium and uranium decay chain products) in the groundwater.

3.0 Recommendations

No recommendations to report.

4.0 Photographs

Photograph Location Number	Azimuth	Photograph Description
PL-1	225	West Edge of upper IHX building roof.
PL-2	135	Northeast corner of lower IHX Building.
PL-3	135	Southeast corner of upper IHX Building.
PL-4	270	Water stain on east wall of IHX building.
PL-5	180	Surface cracks on north wall of IHX Building.
PL-6	180	Surface cracks on north wall of IHX Building.
PL-7	270	Spreading fertilizer on grass covered mound.



HAL 4/2014. PL-1. West Edge of Upper IHX building roof.



HAL 4/2014. PL-2. Northeast corner of lower IHX Building.



HAL 4/2014. PL-3. Southeast corner of upper IHX Building.



HAL 4/2014. PL-4. Water stain on east wall of IHX building.



HAL 4/2014. PL-5. Surface cracks on north wall of IHX Building.



HAL 4/2014. PL-6. Surface cracks on north wall of IHX Building.



HAL 4/2014. PL-7. Spreading fertilizer on grass covered mound.

