

2013 Annual Inspection and Status Report for the Hallam, Nebraska, Decommissioned Reactor Site

Summary

The former Hallam Nuclear Power Facility (HNPF) was inspected on May 1, 2013. 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. It was reported in June 2012, as the wells were being sampled, that the pad locks were hard to work and needed to be replaced. All of the 15 wells requiring pad locks received a new lock during the inspection except for well 3B. The hasp on well 3B was too small for the shank of the new lock. An old DOE lock remains on well 3B. It will be replaced in 2014 during the next scheduled sampling round.

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 May 1, 2013.

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. C. Clayton, representing DOE LM, also participated in the inspection.

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 feet wide by 80 feet 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 corner of the upper roof. It is surmised that strong winds moved the roof rock from the corners of the roof 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 observed 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 does not appear to be progressing. The cause for the staining is not known. It could be the result of a one-time heavy rain event that overwhelmed the roof drainage system, or perhaps 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.

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 and in good condition.

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 all 19 monitoring wells were observed to be properly secured. Some minor maintenance was conducted on the monitoring wells in the summer of 2012. Specifically,

- The protective casing lid on monitoring well OBS-3B was replaced,
- Flush mount monitoring wells OBS-6A and OBS-6B were labeled, and
- The replacement hinges on monitoring wells OBS-4B, OBS-2A, and OBS-2B were adjusted so that the lids could not be partially opened.

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. It was reported in June 2012, as the wells were being sampled, that the pad locks were hard to work and needed to be replaced. All of the 15 wells equipped with pad locks received a new lock during the inspection except for well 3B. The hasp on well 3B was too small for the shank of the new lock. An old DOE lock remains on well 3B. It will be replaced in 2014 during the next scheduled sampling round.

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 collected from June 4 to June 7, 2012, in accordance with the Long Term Surveillance Plan for the Decommissioned Hallam Nuclear Power Plant, dated September 1998. Seventeen monitoring wells were sampled in 2012 for gross alpha, gross beta, tritium, gamma spectrometry, and nickel-63; water levels also were obtained. 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	90	Roof of Power Plant building.
PL-2	225	Roof of IHX building.
PL-3	135	Roof, east half of IHX building.
PL-4	270	Stain on east side of IHX building.



HAL 4/2013. PL-1. Roof of Power Plant building.



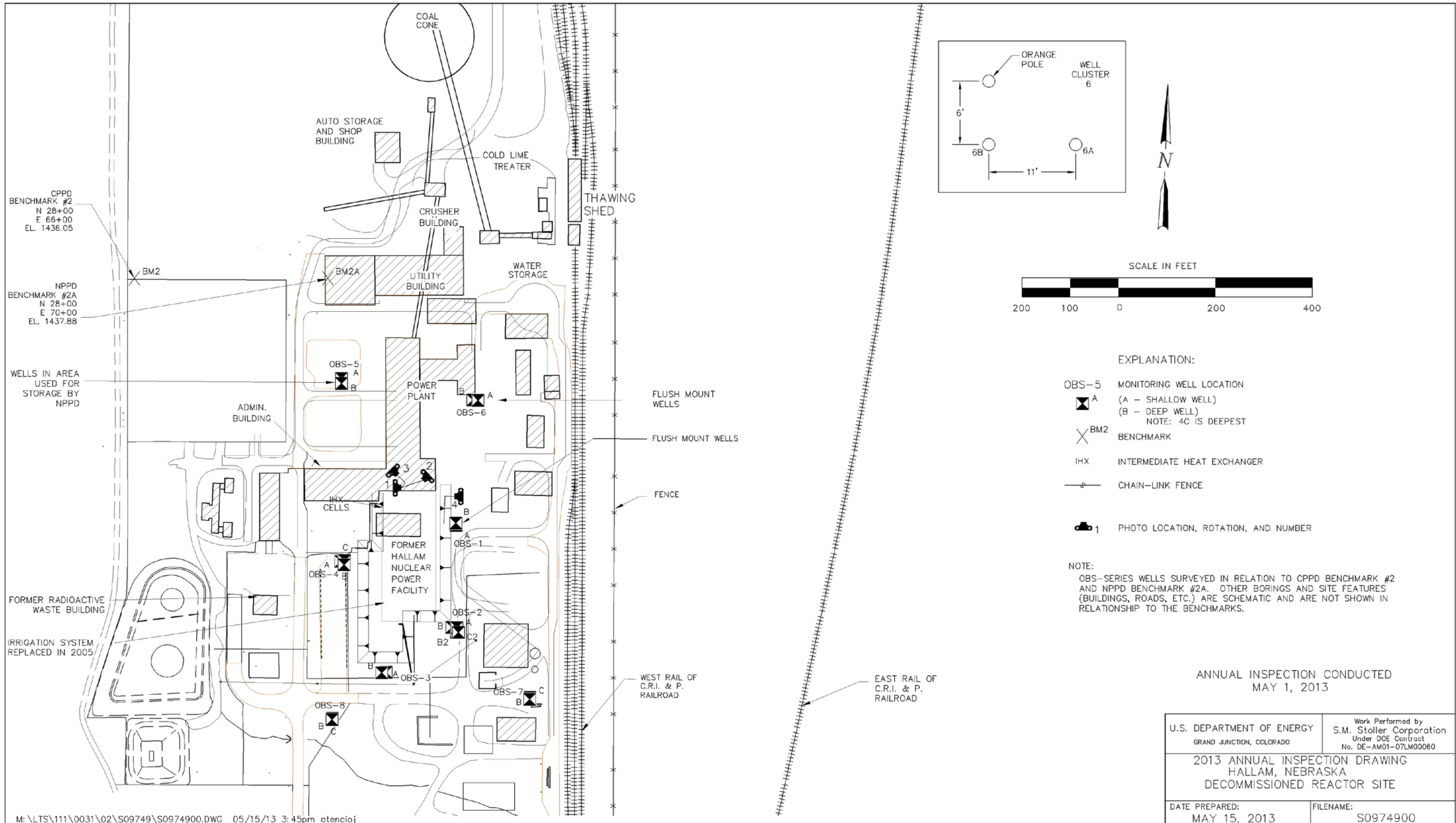
HAL 4/2013. PL-2. Roof of IHX building.



HAL 4/2013. PL-3. Roof, east half of IHX building.



HAL 4/2013. PL-4. Stain on east side of IHX building.



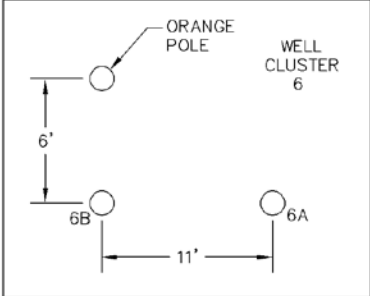
CPPD
BENCHMARK #2
N 28+00
E 66+00
EL. 1436.05

NPPD
BENCHMARK #2A
N 28+00
E 70+00
EL. 1437.88

WELLS IN AREA
USED FOR
STORAGE BY
NPPD

FORMER RADIOACTIVE
WASTE BUILDING

IRRIGATION SYSTEM
REPLACED IN 2005



EXPLANATION:

- OBS-5 MONITORING WELL LOCATION
 A (A - SHALLOW WELL)
 B (B - DEEP WELL)
 NOTE: 4C IS DEEPEST
- BM2 BENCHMARK
- IHX INTERMEDIATE HEAT EXCHANGER
- CHAIN-LINK FENCE
- 1 PHOTO LOCATION, ROTATION, AND NUMBER

NOTE:
OBS-SERIES WELLS SURVEYED IN RELATION TO CPPD BENCHMARK #2 AND NPPD BENCHMARK #2A. OTHER BORINGS AND SITE FEATURES (BUILDINGS, ROADS, ETC.) ARE SCHEMATIC AND ARE NOT SHOWN IN RELATIONSHIP TO THE BENCHMARKS.

ANNUAL INSPECTION CONDUCTED
MAY 1, 2013

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION, COLORADO	Work Performed by S.M. Stoller Corporation Under DOE Contract No. DE-AM01-07LM00060
2013 ANNUAL INSPECTION DRAWING HALLAM, NEBRASKA DECOMMISSIONED REACTOR SITE	
DATE PREPARED: MAY 15, 2013	FILENAME: S0974900