

2011 Annual Inspection and Status Report for the Hallam, Nebraska, Decommissioned Reactor Site

Summary

The former Hallam Nuclear Power Facility (HNPF) was inspected on April 27, 2011. The IHX building, the grass cover on the foundation of the former reactor building, and DOE groundwater monitoring wells, were all in good shape.

Groundwater was sampled in June 2010. Gross alpha and beta were the only parameters that were detected at statistically significant concentrations. The gross alpha and beta activity concentrations observed were consistent with values previously observed and are attributed to naturally occurring radionuclides (e.g., uranium and uranium decay chain products) in the groundwater.

Maintenance was conducted on the groundwater monitoring wells in 2010. Concrete pads and bollards were repaired, wells casings were painted and labeled, and some hinges on protective well casings were replaced. With the exception of three minor maintenance items noted below, the monitoring wells at the site are in good condition. The maintenance items noted below are minor, and will be addressed the next time that the wells are sampled.

- Monitoring wells 6A and 6B need to be re-labeled.
- The replacement hinges on the protective casing lids of monitoring wells OBS-2A and OBS-2B allow the protective casing lids to be partially opened when locked.
- The protective casing lid of monitoring well OBS-3B is functional but needs to be replaced.

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 27, 2011.

M. Miller (Chief Inspector), K. Broberg and K. Payne, 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. H. Shuman, a Health Physicist with the Nebraska Department of Health and Human Services participated in the inspection. A. Laukaitis and E. Gregory with the Lincoln Star Journal, and M. Becker (Media Relations with NPPD) also accompanied the inspection crew in order to obtain information and photos for a newspaper article.

The inspection was conducted in accordance with the *Long-Term Surveillance Plan 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.

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 of the roof exposing the underlying roofing fabric. Paver stones were placed in all corners of the roof in 2009 to correct the problem. Inspectors found the roof to be in good shape. No bare spots were present (PL-1 and PL-2).

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 in good condition during the inspection.

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 with the exception of two areas: (1) the south end of the mound and (2) the northeast corner of the mound. NPPD replaced an 8-inch underground fire main that runs under the south edge of the mound in 2010. The area needs to be reseeded this year (PL-3). NPPD is already planning to re-seed, so no further action is required. Grass growth on the northeast corner of the mound continues to struggle, with little change from last year (PL-4). The struggling grass growth on the northeast corner of the mound does not compromise the integrity of the mound. Inspectors will continue to monitor grass conditions on the northeast corner of the mound but unless conditions get worse and the integrity of the mound is questioned no action is required.

DOE replaced the sprinkler system on the grass-covered mound in July 2005. The sprinkler system had not been activated by plant personnel in 2011 but inspectors were informed that system was in good working order when shut down at the end of the 2010 watering season.

2.3 Groundwater Monitoring Wells

There are 19 monitoring wells. During the inspection all 19 monitoring wells were properly secured with locks (PL-5). Maintenance was conducted on the monitoring wells in the summer of 2010. Concrete pads and bollards were repaired, protective casings were painted and labeled, and hinges on some of the protective casing lids were replaced (PL-6). The wells were in good condition during this year's inspection. A few minor maintenance items were identified though, that will be addressed the next time that the wells are sampled in 2012.

- The replacement hinges on monitoring wells OBS-2A and OBS-2B allow the protective casing lids to be partially opened when locked (PL-7). During the next sampling event, the protective casing lids will be fixed so they cannot be partially opened when locked.
- The protective casing lid on monitoring well OBS-3B is functional but needs to be replaced (PL-8). During the next sampling event, the protective casing lid will be replaced.
- Flush mount monitoring wells OBS-6A and OBS-6B are not properly labeled. During the next sampling event, these two wells will be properly labeled, and the concrete well pads will be painted (e.g. fluorescent orange or green) to aid in locating them on the ground.

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 7 to 10, 2010, in accordance with the Long Term Surveillance Plan for the Decommissioned Hallam Nuclear Power Plant, Revision, dated September 1998. Seventeen monitoring wells were sampled in 2010 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.

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	180	Roof of IHX building.
PL-2	225	Roof of IHX building.
PL-3	180	South end of grass covered mound. New grass seeding needed.
PL-4	270	Stressed grass on northeast corner of grass covered mound.
PL-5	NA	Monitoring Well OBS-4C.
PL-6	NA	Monitoring Wells OBS-8B and OBS-8C.
PL-7	NA	Monitoring Well OBS-2B. Hinge placement allows well cap to partially open when locked.
PL-8	NA	Monitoring Well OBS-3B.



HAL 4/2011. PL-1. Roof of IHX building.



HAL 4/2011. PL-2. Roof of IHX building.



HAL 4/2011. PL-3. South end of grass covered mound. New grass seeding needed.



HAL 4/2011. PL-4. Stressed grass on northeast corner of grass covered mound.



HAL 4/2011. PL-5. Monitoring Well OBS-4C.



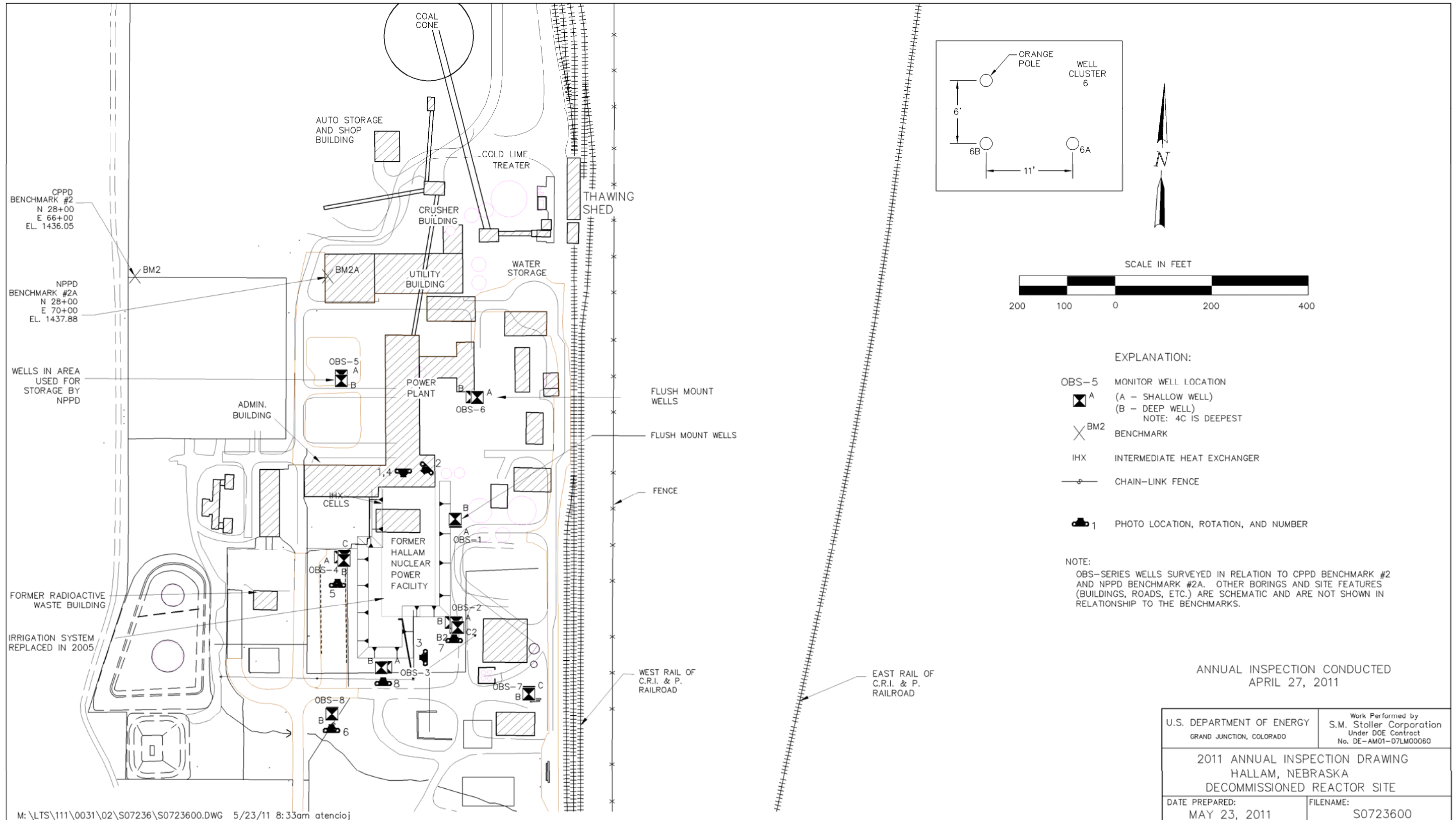
HAL 4/2011. PL-6. Monitoring Wells OBS-8B and OBS-8C.



HAL 4/2011. PL-7. Monitoring Well OBS-2B. Hinge placement allows well cap to partially open when locked.



HAL 4/2011. PL-8. Monitoring Well OBS-3B.



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2011 ANNUAL INSPECTION DRAWING HALLAM, NEBRASKA DECOMMISSIONED REACTOR SITE	
DATE PREPARED: MAY 23, 2011	FILENAME: S0723600