

Ponds B1, B2, & B3 IHSS Briefing Summary

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Briefing Summary Revision Number

Rev 0 (6/05)

IHSS Group Number

NE-1 (all A-, B-, and C-series ponds)

IHSS/PAC Number

IHSS NE-142.5, Pond B1

IHSS NE-142.6, Pond B2

IHSS NE-142.7, Pond B3

Approximate Location

Northing: 750,500 (B1), 750,600 (B2), 750,700 (B3)

Easting: 2,087,100 (B1), 2,087,400 (B2), 2,087,800 (B3)

Location Relationship to other Site areas: Ponds B1, B2, and B3 are located east of the former sanitary wastewater treatment plant (Building 995) in the South Walnut Creek drainage.

Historical Information

(For a detailed history on IHSS Group NE-1 see Reference 1)

Note:

There are 5 ponds, B1 through B5, in the South Walnut Creek drainage. Although Ponds B4 and B5 are part of IHSS Group NE-1, they have not been remediated like B1, B2, and B3. Currently B4 and B5 are being evaluated by the RFCA parties to determine if remedial action (sediment removal) is warranted (Reference 2). However, for an appropriate historical description of ponds B1, B2, and B3, mention of B4 and B5 is necessary.

The first pond, B4, was used as a flow-through detention pond when the Site first opened in 1952. Effluent from the sanitary wastewater treatment plant and stormwater runoff was discharged into B4. B2 and B3 were constructed in July 1953 as flow-through detention ponds. B1 was constructed as a flow-through detention pond in November 1962. Finally B5 was constructed in 1979 to provide adequate capacity for stormwater control.

The general types of materials that were routinely released to the B-series drainage during the Site's history included the following (Reference 3):

- treated sanitary effluent;
- treated and untreated process waste;
- treated and untreated decontamination laundry wastewater;
- cooling tower blowdown;
- footing drain flows; and,
- stormwater runoff.

In addition to these releases, examples of spills that were released to the B-series drainage include (Reference 1):

- 1972 high radioactivity levels in B1, B2, B3, and B4 due to release of contaminated liquid from Building 1979,
- 1973 release of tritium to the Walnut Creek drainage,
- 1978 leak of caustic sodium hydroxide solution which was diverted to B1 for temporary holding,
- 1979 steam condensate leak from Building 707 which reached B4 and South Walnut Creek below B4, which prompted the construction of B5 later in 1979,
- 1980 leak of antifreeze into the drainage, and,
- 1989 chromic acid leak which resulted in 5 pounds of hexavalent chromium (RCRA hazardous waste) reaching B3.

Over the years the Site changed the way in which surface water moved through the B-series ponds in response to prior leaks, spills, and other issues. Some examples are:

- In 1973 a pipeline was built to allow transfer of water to A2 from B2.
- Beginning in 1978, B1 and B2 were isolated from the South Walnut Creek drainage. These were no longer flow-through structures and could be used for spill control purposes.
- From 1979 until the present, stormwater flow was diverted around B1, B2, and B3 to B4 which flows into B5.
- In 1990, a pipeline was built to allow transfer of water from B5 to A4 for treatment (removal of pesticide residues) and subsequent discharge.

The B-series ponds provided some measure of spill control and detention of contaminated water over the years. Sediment studies of the B-series by Colorado State University in the 1970s identified radioactive contamination in the pond sediments. Subsequent Site investigations into actinide contamination of the pond sediments indicated the majority of the contamination was contained in the sediments of B1, B2, and B3.

Pre-remediation Characterization Data

The contaminants of concern (COC) for B1, B2, and B3 based on pre-remediation characterization data were:

- radioactive species such as Pu239/240, Am-241, and, uranium isotopes,
- metals such as Ag, Cd, Cr, Hg, Ni, Pb, Sr, and Zn,
- VOCs such as acetone, 2-butanone, methylene chloride, and toluene,
- SVOCs such as anthracenes, PCBs, and phthalates.

The only COCs which exceeded wildlife refuge worker (WRW) action levels (ALs) in the sediments and surrounding soils of B1, B2, and B3 were Pu (AL 50 pCi/g) and Am (AL 76 pCi/g). Maximum concentrations detected in the surface soils and sediments were 1636 pCi/g Pu and 287 pCi/g Am.

Remedial Actions Taken

Based on pre-remediation characterization data, it was decided to completely remove all the sediment in ponds B1, B2, and B3 as well as any surface soil hotspots surrounding the three ponds (Reference 2). Prior to remediation it was estimated that the sediments in the three ponds were 2 to 8 feet thick. However, as excavation activities began it became obvious that this

estimate was inaccurate as the sediments ranged in thickness from 2 to 19 feet. The underestimation of the sediments resulted in significantly more sediment being removed from the ponds and shipped offsite as low level waste (LLW, <100 nCi/g Pu). Approximately 40,500 cubic yards of sediment and soil were removed from the area. Contaminated sediments and soil were blended with small amounts of Portland cement to dewater the waste for disposal criteria. Some of the sediments and soils were stockpiled and used as a “cushion” layer for LLW building debris waste (Building 776/777) that was placed in gondola railroad cars for shipment to the disposal site (Envirocare LLW disposal facility in Utah).

Ponds B1, B2, and B3 were backfilled and graded with clean Site soil (figure 1 photo on p.4). Wetlands in the area were restored after completion of the backfilling and grading. The former ponds were reconfigured to create a low-energy environment that includes oxbows, backwater eddies, meandering channels, and wetlands. Establishment of this low-energy environment will serve to minimize erosion and the potential mobilization of residual contaminants (Reference 3).

Post-remediation Remaining Contamination

Large amounts of sediment and soil contaminated with the COCs previously mentioned were removed from the three ponds. COCs still exist in the area but they are below WRW ALS.

Potential Exposure Pathways to Remaining Contamination

Since the 3 ponds had large amounts of sediment and soil removed from them, they would appear unlikely to pose a threat to surface water quality in South Walnut Creek. However, one potential threat would be from any newly-contaminated sediment moving into the ponds as a result of upstream remediation activities. Hopefully the low energy flow design of the new pond structures will be robust enough to deal with any potential contamination threat.

Long-term Stewardship Controls

In order to ensure that the three ponds are not receiving influent of newly contaminated sediment it is important for the Site to monitor surface water quality upstream of the 3 ponds. Downstream surface water monitoring at B5 will capture any evidence of surface water contamination migrating through the B-series ponds. The A-, B-, and C-series ponds will be part of the DOE-retained lands at the Site. Some type of physical/institutional controls will be necessary to keep the ponds off-limits except to authorized personnel.

Note

Reference 3 has an extensive set of project photographs detailing progress made during the remediation activities.

Document references

1. 1992 Historical Release Report (document path, CERCLA AR# SW-A-000378)
2. ERRSOP for Routine Soil Remediation, FY04 Notification #04-11, IHSS Group NE-1 (Ponds B1, B2, and B3), (document path, EDDIE database/document archive/Environmental Restoration/2004)
3. Close-out Report for IHSS Group NE-1, (document path, EDDIE database/document archive/Environmental Restoration/2005)

Figure 1. August 2005 photo of remediated pond B-2 (center) with B-1 on right edge and B-3 to the left of B-2

