

Solar Evaporation Ponds IHSS Briefing Summary

Prepared by Rik Getty

Briefing Summary Revision Number

Rev 0 (5/05)

Name

Solar Ponds

IHSS Group Number

000 Area

IHSS/PAC Number

IHSS 101, PAC 000-101

Approximate Location

Northing: 750,725

Easting: 2,084,760

Approximate acreage: 5 acres

Location Relationship other Site areas: east of Building 779 area

Historical Information

[For a detailed history on the Solar Evaporation Ponds (SEPs) see Reference 1]

The initial SEPs were built during the 1950s when liquid (aqueous) waste processing in Building 774 was not able to keep up with increasing waste treatment demands (see Figure 1, page 4, 1995 photo of SEPs). When the Site was designed, there was not enough attention paid to waste processing. Hence, when production output increased, the amount of liquid wastes increased which strained the treatment capacity of Building 774. These wastes were transferred from throughout the Site via the Original Process Waste Lines (IHSS 121 Briefing Summary) to Building 774 for processing.

At the time of the initial SEP design and construction, a nonpermeable lining was not specified and the SEP were lined with clay and other semi-permeable materials such as asphalt planking. As a result, liquid wastes leaked into the ground under the SEP. The liquid wastes were composed of complex mixtures of nitrates, trace amounts of radionuclides, metals, and VOC/SVOCs. Plumes of contaminated groundwater primarily containing soluble nitrates and some uranium were discovered migrating downgradient from the SEP towards North Walnut Creek (Reference 2).

The leaking SEP prompted the Site to reduce the inventory of liquid wastes stored at the SEP. One of the methods chosen was to spray-irrigate the liquid wastes over a large area of land east of the SEP known as the East Spray Fields. Millions of gallons of liquid wastes were treated in this manner before this practice was stopped. The East Spray Fields are identified as IHSSs 216.1, 216.2 and 216.3. More historical detail can be found in the IHSS Briefing Summary for the East Spray Fields.

Remaining liquid wastes and sludge material from the SEP were treated with a mixture of Portland cement forming a product known as “Pondcrete”. Due to quality control and storage problems, Pondcrete became a waste product which caused a lot of difficulties for the Site. The Pondcrete storage area (750 Pad) is a separate IHSS from the SEP. Further information on Pondcrete can be found in the Pondcrete IHSS 214 Briefing Summary.

A further item of interest is that one of the SEP (Pond 2 auxiliary) was located where Building 779 was to be built. This SEP was taken out of service and Building 779 was constructed in its location. Actinide-contaminated soil from Pond 2 auxiliary was to have been buried in the east trenches, but Site documents could not be found which referenced where the soil was placed. Any residual contamination remaining in the former Pond 2 auxiliary location will contribute to Building 779 UBC.

Pre-remediation Characterization Data

Pre-remediation characterization data of the SEP identified primary Contaminants of Concern (COCs) as nitrates, radionuclides, metals, and some VOC/SVOCs. Examples of COCs found during pre-remediation characterization above Site background levels are:

- Water-soluble nitrate salts from various processes;
- Radionuclides such as Am-241, U 234/235/238, Pu 239/240;
- Metals such as lead, chromium, arsenic, beryllium, cadmium, nickel, strontium, and many others;
- VOCs such as chlorinated solvents, other industrial solvents; and
- SVOCs such as phenols, biphenyls, and phthalates

Remedial Actions Taken

Remedial actions for the SEP were performed in several project phases separated by a few years. After contaminated groundwater plumes (nitrates and U) were discovered downgradient of the SEP, a series of interceptor trenches were installed to direct the groundwater to a passive groundwater treatment system. This remedial action occurred in the late 1990s.

More recently (2002-2003) the SEP themselves were remediated. This action consisted of removing all the associated pond lining, pump transfer equipment, utility corridors/structures, and contaminated soils. The area was back-filled with clean fill, final grading occurred, and revegetation was started.

Although the groundwater plume treatment system, mentioned earlier, has been in operation for several years, some of the contaminated groundwater bypassed the system and moved downgradient to North Walnut Creek. As of May 2005, the Site has proposed further remedial actions downgradient of the treatment system. The Site is waiting on final direction and approval from the EPA and CDPHE regarding the additional remediation (Reference 3). When that remedial action is completed, this IHSS Briefing Summary (Revision 0) will be updated.

Post-remediation Remaining Contamination

As a result of the remediation activities, there are no areas of the SEP where COCs exceed the wildlife worker action levels. However, contamination above Site background levels still

remains under clean fill at the SEP and the contaminated groundwater plume is still active and moving towards North Walnut Creek.

Potential Exposure Pathways to Remaining Contamination

The major exposure pathway to remaining contamination is the threat to surface water posed by the SEP groundwater plume. The SEP plume remains problematic for the Site. This is one of the largest contaminated groundwater plumes at the Site and will require treatment well into the future.

Long-term Stewardship Controls

Long-term stewardship controls are critical for the SEP. One critical component of this IHSS is the performance of the passive groundwater treatment system and any other remedial systems employed downgradient of the passive groundwater treatment system (see Figure 2, page 5). Of equal importance is the groundwater and surface water monitoring network that will be established for the post-closure Site. These networks are currently being developed by the Integrated Monitoring Plan (IMP) Working Group. Members of the IMP include the Site, EPA, CDPHE, and local stakeholders. A robust monitoring network surrounding the SEP and SEP plume is needed to effectively monitor the status of the remediation. This document will be updated when final monitoring locations are selected. However, if those initial monitoring locations don't prove adequate in the future, the post-closure IMP calls for additional monitoring if required.

The passive treatment system will need to undergo periodic maintenance during its lifetime. If maintenance is postponed then the effectiveness of the treatment system will be compromised. If this were to occur, then contaminated groundwater could affect surface water quality in North Walnut Creek. In particular, nitrate contamination of North Walnut Creek could possibly result in concentrations above the surface water quality standard. Monitoring & Maintenance activities for remediated sites are critical to the success of the total Site remedy and will be spelled out in the Site's Long Term Stewardship Plan and other post-closure documents.

Notes

None at this time.

Document references

1. 1992 Historical Release Report (2 volumes, document path, CERCLA AR #SW-A-000378 and SW-A-000379)
2. 1982 The Past 30 Years at Rocky Flats Plant, Ed Putzier (heavily referenced document in the 1992 HRR, not available on-line, copy located at Front Range Reading Room)
3. 2005 Draft Industrial Area Groundwater IM/IRA (currently not available as regulator approved document)

Figure 1. Aerial view looking southwest of central Industrial Area (CIRCA 1995) with Solar Evaporation Ponds in foreground



Figure 2. SEP passive groundwater treatment system located at the left edge of photo to treat nitrate and uranium contaminated groundwater before it migrates to North Walnut Creek.

