



Soo Line Shoreham Yard Site Cleanup Update

Geographic Hennepin • g-27-11 • April 2007

The MPCA Voluntary Investigation and Cleanup (VIC) Program is overseeing the ongoing and pending clean-up response actions by Canadian Pacific (CP) and Ashland Inc. (Ashland) to address non-petroleum contamination at the Soo Line Shoreham Yard Site (Site) in Minneapolis.

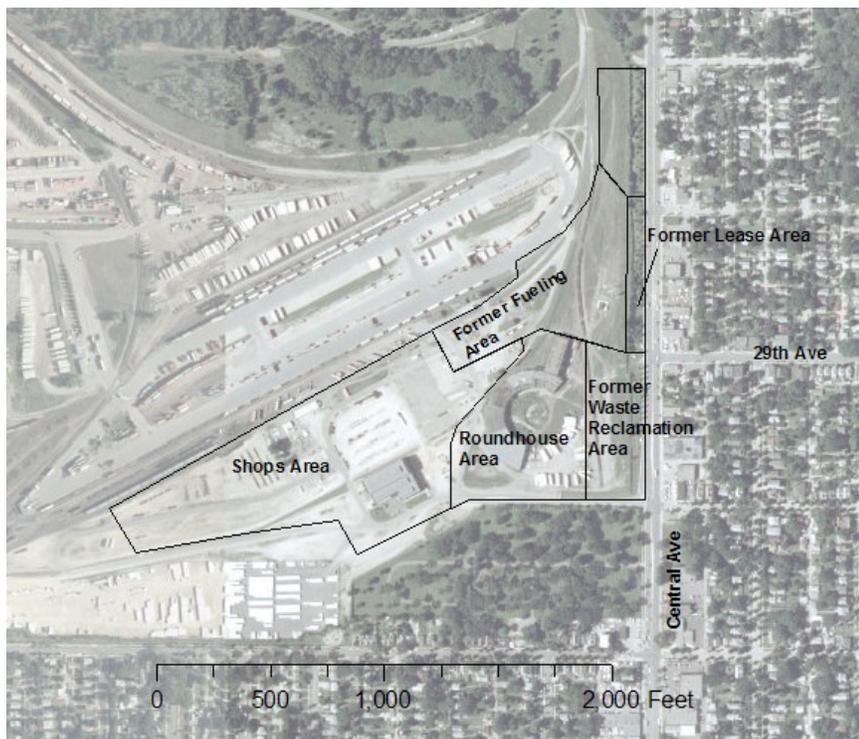
Background

The Site is approximately 24 acres of the east and southeastern part of the 230 acre Shoreham Yard Railroad Facility located at 2800 Central Ave. N.E. in Minneapolis. Soo Line Railroad Company doing business as CP owns the Shoreham Facility.

The Site was used for a variety of railroad activities since the late 1880s and it is still an active railroad facility. Past activities included fuel storage, waste storage and reclamation, and locomotive refueling, maintenance and cleaning activities. The Site includes the Former Lease Area, the Roundhouse Area, the Former Waste Reclamation Area, the Former Fueling Area, and the Former Shops Area shown on the map below.

The southern portion of the Former Lease Area was leased historically to Rocket Products and Ashland Chemical who operated bulk chemical storage and distribution facilities. Activities conducted on the northern portion of the Former Lease Area involved petroleum storage and distribution activities. Past activities at most of these areas resulted in contaminated soil and ground water. CP and Ashland are working cooperatively to jointly develop and implement clean-up remedies at the Site.

Cleanup plans developed by CP and Ashland and approved by the MPCA address soil and ground-water contamination at the Site.



g-27-11

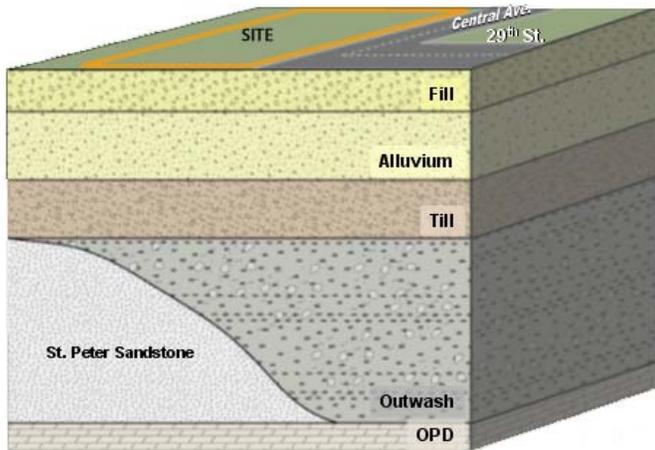
Site Geology

The geology at the Site includes four unconsolidated overburden deposits from the surface moving downward underground:

- 1) surficial fill sands;
- 2) alluvial sands (alluvium);
- 3) a glacial till comprised of gravel, sand, silt and clay (till); and
- 4) glacial outwash sand and silt (outwash).

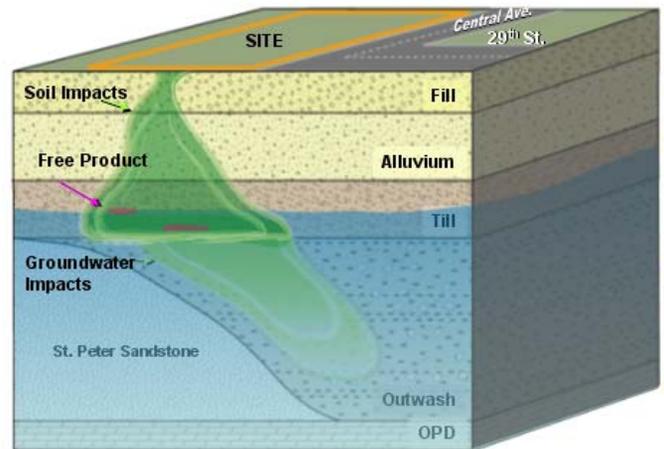
Two bedrock units include the St. Peter Sandstone and the largely dolomitic Prairie du Chien Group (the OPD).

The shallow water table is about 35 to 40 feet below the surface. The depth to bedrock across the Site varies from about 50 feet to almost 200 feet from west to the east. The on-site ground-water flow direction in the overburden is east to southeast; ground-water flow direction in the OPD bedrock south of the Site is to the south.



Site Contamination

Soils at the southern portion of the Former Lease Area, the Roundhouse Area, the Former Waste Reclamation Area, and the Former Shops Area are contaminated with solvent-related volatile organic compounds (VOCs). Petroleum contamination is located mainly at the Former Fueling Area and the northern portion of the Former Lease Area. The MPCA Petroleum Remediation Program is addressing the petroleum contamination. Significant solvent-related VOC releases in the Former Lease Area and Roundhouse Area resulted in ground-water contamination beneath and down gradient from these areas in the overburden and the bedrock aquifers.



Compounds identified in soil and ground water include tetrachloroethylene, trichloroethylene, trichloroethane, dichloroethylene, dichloroethane, toluene and xylene. Non-dissolved free product is also present beneath the Former Lease Area. The OPD ground-water contamination extends from the site to several blocks south of the Site.

An extensive ground-water monitoring network helps determine the extent of ground-water contamination on- and off-site and allows for monitoring of ground-water quality during clean-up activities. More than 140 wells are monitoring shallow to deep overburden aquifers and the deeper St. Peter Sandstone and OPD bedrock aquifers.

Cleanup Plans and Implementation Status

Interim Response Action Plan (IRAP), May 2005

CP and Ashland submitted the *Interim Response Action Plan (IRAP) for the Former Ashland/Rocket Lease Area* in May 2005. A public meeting was held on August 31, 2005. After incorporation of public comments the MPCA approved the IRAP and follow-up remedial design plans in August and November 2005.

Former Lease Area Unsaturated Soils, Soil Vapor Extraction Remedy: A soil vapor extraction (SVE) system, installed in November 2005 is one of the most effective technologies available to remediate unsaturated soil. A vacuum process extracts VOCs from soils above the water table. This system uses 5 alluvium SVE wells and 8 till SVE wells. The extracted vapors are treated before being vented to the atmosphere. The SVE system has been operating since April 2006 following review and approval of start-up testing results by the MPCA. More than 4,000 pounds of VOCs have been extracted

from the soils. The initial emission treatment was through the use of a catalytic oxidizer. Since July 2006, granulated activated carbon (GAC) canisters have treated the vapors before venting.

Former Lease Area Free Product, Belt-Skimmer Product Recovery System: A pocket of trapped free product in the subsurface is approximately 50 feet below the surface, beneath a lacustrine clay unit, between the till and outwash units. A belt-skimmer pump system installed in early 2006 at monitoring well MW-402D has collected approximately 25 gallons of product. Free product monitoring continues at several other wells in the Former Lease Area, although MW-402D is currently the only location where product is of sufficient thickness to be recovered.

Site-Wide Response Action Plan (RAP), August 2005

The *Response Action Plan for the East Side Shoreham Facility* (Site-Wide RAP) was submitted in August 2005 and covered contamination issues not addressed by the IRAP. A public meeting was held on January 31, 2006 and the MPCA approved the Site-Wide RAP in 2006 after incorporation of public comments.

Shallow VOC Contaminated Soils at Roundhouse/Former Waste Reclamation/Former Shops Areas, Soil Vapor Extraction and Soil Excavation: Soil in the alluvium and till unit at the Roundhouse Area and the Former Waste Reclamation Area is contaminated by VOCs. A smaller volume of shallow solvent impacted soils was removed from outside the former Diesel Shop located west of the Roundhouse structure.

SVE systems for the Roundhouse, Former Shops Area and Former Waste Reclamation Area were installed and tested in late 2006. The system includes 13 alluvium SVE wells and 13 till SVE wells. During the initial 14-day start-up test the systems removed more than 1300 pounds of VOCs from the unsaturated soils. The extracted VOC vapors were treated with GAC canisters to remove up to 99% of the VOCs before they were vented. Full start-up of this SVE system is scheduled for spring 2007.

In September 2006 approximately 400 cubic yards of contaminated soil from the Former Shops Area, southwest of the Roundhouse, was excavated and properly disposed of off-site.

Till Ground Water in Former Lease Area, Enhanced Bioremediation: Trapped pockets of free product and soil contamination are below the water table 35 to 55 feet below the Former Lease Area.

A phased Enhanced Bioremediation remedy will augment and accelerate the natural biodegradation of VOCs. The ground-water geochemistry was characterized and the native populations of microorganisms capable of biodegrading VOCs were identified. Laboratory augmentation studies are underway to determine the most favorable means to accelerate the natural biodegradation of contaminants. Ashland is developing a full-scale bioremediation remedy. The MPCA must review and approve the design plans prior to implementation. The full-scale remedy will likely include the installation of wells/probes at the Former Lease Area to both monitor and introduce nutrients to accelerate bioremediation.

Outwash under Former Lease Area, Ground-water Containment Pumping: The MPCA approved the design of a pump and treat system at the Former Lease Area in December 2006. Installation began during the week of March 19, 2007.

The containment system is designed to ensure capture and treatment of the most elevated concentrations of contaminants in the ground-water plume. Pumping will help prevent further degradation of downgradient ground water and remove contaminants directly from the outwash. Pumping will occur until the soil remedies are completed and stability and attenuation of the outwash and bedrock ground-water contamination are documented.

Contaminated ground water extracted from this and the other extraction systems at the Site must be discharged in accordance with a Metropolitan Council Environmental Services permit.

Roundhouse/Former Waste Reclamation Area, Ground-Water Containment Pumping: Chlorinated solvents contaminate two zones of overburden ground water in the Roundhouse and Former Waste Reclamation Areas. There is shallow outwash ground-water contamination beneath portions of the Roundhouse and deep outwash contamination to the southeast of the Roundhouse.

As with the outwash contamination beneath the Former Lease Area, interim ground-water containment pumping will be used. CP has designed the pumping system for this area. MPCA must review and approve this design.

Monitored Natural Attenuation, OPD Bedrock

Ground Water: The OPD aquifer is contaminated with VOCs beneath the Former Lease Area and the Roundhouse Area and extends south of the Site several blocks. The contamination level is lower than what has been found in the glacial till and outwash geologic units, and exists in a thin (20-40-feet thick) zone over 200-feet below ground surface off site. However, contaminant concentrations above Minnesota Department of Health (MDH) Health Risk Limits (HRLs) are both on site and off site to the south. The primary VOCs that exceed their HRLs off site are tetrachloroethylene, trichloroethylene and vinyl chloride. The contamination in the OPD extends as far south as 19th Avenue and Fillmore Avenue at monitoring well MW05-08-OPSH.

Monitored, natural attenuation (MNA) will be supplemented by the ground-water source control pumping (hydrologic containment) and aggressive soil and free product treatment remedies. This should enhance the effectiveness of the natural attenuation of contamination in the OPD aquifer.

The MPCA supports the MNA conceptual approach; however an approved plan must be completed prior to implementation. Downgradient compliance and sentinel wells, as well as a long-term monitoring plan, must be established. An additional downgradient OPD well is to be installed approximately half mile south of MW05-08-OPSH that will be used as part of the monitoring network for the pending MNA remedy.

Residents near the Site get drinking water from the city of Minneapolis municipal drinking water system. Although portions of the aquifer near the Site are contaminated, they do not pose a risk to the drinking water supply for area residents.

Petroleum Contamination Cleanup: With oversight from the MPCA Petroleum Remediation Program, CP is cleaning up petroleum contaminated soil and free product in the Former Fueling Areas. Clean-up actions in 2006 have included the excavation and proper off site disposal of approximately 6,600 cubic yards of contaminated soil. In addition, a belt-skimmer pump system has collected approximately 85 gallons of product that has been recycled.

For More Information

MPCA

520 Lafayette Drive, St. Paul, Minnesota 55155

Patrice Jensen, VIC Project Manager, 651-296-7744 or patrice.jensen@pca.state.mn.us.

Richard Jolley, VIC Project Hydrogeologist, 651-297-5573 or rick.jolley@pca.state.mn.us.

John Kaehler, Petroleum Remediation Hydrogeologist, 651-297-8575 or john.kaehler@pca.state.mn.us

Stacey Van Patten, Petroleum Remediation Project Manager, 651-297-8577 or stacey.vanpatten@pca.state.mn.us.

City of Minneapolis

Minneapolis Public Library Northeast location
2200 Central Avenue N.E.

Minneapolis Community Planning and Economic Development (CPED) Department Web site at www.ci.minneapolis.mn.us/cped/shoreham_yards.asp

CP

LeeAnn Thomas, Manager Environmental Accrual – U.S., 612-904-6130

Jeff Johnson, Manager Municipal Affairs – U.S.
612 851-5616.

Ashland

Jim Vondracek, Remediation Engineer, 614-790-6146.

James E. Vitak, Public Relations Manager,
614-790-3715.