

5-Year Record of Decision Review

BNSF Midland Market Rail Yard
Klamath Falls, Oregon

for
Oregon Department of Environmental Quality

January 31, 2012



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Klamath Falls, Oregon

File No. 0506-013-11

January 31, 2012

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EXECUTIVE SUMMARY

The Record of Decision (ROD) for the BNSF Midland Market Rail Yard located in Klamath Falls, Oregon was issued in July 2006 (DEQ 2006). The ROD identified remedial actions to address contaminants associated with gasoline, diesel and oil-range petroleum contamination and related constituents in contaminated soil and groundwater at the site. This Five Year Record of Decision Review Report is intended to assess the effectiveness of the selected remedial actions based on current monitoring data and understanding of the site.

The ROD identified the following remedial action objectives:

- Prevent construction/utility workers from exposure to soil or groundwater containing contaminants of concern (COC);
- Remove free product to the extent feasible to mitigate migration of contaminants to groundwater;
- Prevent further migration of contaminants from on-site to off-site areas, to the extent practicable; and,
- Treat hot spots of contamination to the extent feasible, as specified in OAR 340-122-090(4).

DEQ issued an amendment to the ROD in January 2008 (DEQ 2008) to clarify the locality of the facility (LOF) and to eliminate the ROD requirement for a plan to control stormwater discharges.

Remedial actions identified in the ROD are as follows:

- Excavation and off-site disposal of contaminated soil
- Engineering and Institutional controls
- LNAPL recovery
- Monitoring
- Periodic land and water use review
- Contingency Plan

The remedial actions described in the ROD were implemented and are functioning as designed to meet RAOs. LNAPL is measured in select isolated wells during semiannual groundwater monitoring. An increase in dissolved phase diesel and related constituents was observed in site monitoring wells in September 2009. The groundwater plume appears to remain relatively stable; however, engineering controls are under evaluation to assess whether practicable solutions exist to further reduce the extent of contamination.

INTRODUCTION

This 5-year ROD review was performed, at the request of DEQ, for the BNSF Midland Market Rail Yard located in Klamath Falls, Oregon. The purpose of the five year review is to evaluate whether the implementation and performance of the selected remedial actions are protective of human health and the environment.

This is the first five year review for the site since the ROD was signed in July 2006. Hazardous substances at the site are being addressed in accordance with the hazardous substance remedial action rules (Oregon Administrative Rules [OARs] Chapter 340, Division 122, and Sections 010 through 115.

DEQ issued an amendment to the ROD in January 2008 (DEQ 2008) to clarify the locality of the facility (LOF) and to eliminate the ROD requirement for a plan to control stormwater discharges.

BACKGROUND

Site Description

The Midland Yard is located at 1800 Laverne Avenue, directly southwest of the intersection of Washburn Way and Laverne Avenue, in Klamath Falls, Oregon (see Figure 1), in the southeast quarter of Section 9, Township 39 South, and Range 9 East. The site is bounded by Laverne Avenue to the north, Washburn Way to the east, a borrow pit to the west and vacant land to the south.

The active locomotive maintenance and fueling facility is on relatively level terrain at an elevation of approximately 4,100 feet above mean sea level. The topography rises significantly to the southwest of the tracks where a bedrock hill is present. The undeveloped field area located northeast of the tracks is 3 to 5 feet lower in elevation than the track area. Lake Ewauna is located approximately 3,500 feet northwest of the rail yard.

Site History

The site was originally about 60 acres and was comprised of a portion of the rail yard, referred to as the locomotive maintenance and fueling area (LMFA), and an undeveloped field area located to the northeast containing a small seasonal wet area. In 1999, BNSF sold a portion of the undeveloped field area to a third party (specifically, Tax Lots 101 and 102). The third party pursued a No Further Action (NFA) for the property from DEQ and received it in November 2005.

The site continues to be used for maintenance and repair of rail cars and for fueling locomotives. The dissolved diesel plume in groundwater extends approximately 1,000 feet north to south and 400 feet in width. This area is considered as the LOF as documented in DEQ's ROD amendment (Figure 1) (DEQ 2008).

The plume appeared to be relatively stable until 2009, based on at least 10 years of groundwater monitoring. In September 2009, the concentrations of diesel-range hydrocarbons in groundwater samples from several wells increased due to an unknown reason and then returned to pre-September 2009 levels based on samples collected in November 2009 and March 2010. BNSF

conducted a thorough assessment of their fueling facilities and found no apparent equipment issues that would have caused a release.

In September 2010, the concentrations of diesel in groundwater from wells MW-8, MW-9 and MW-35 increased again. The PAH compound benzo(a)pyrene was detected in MW-8 at a concentration above the DEQ RBC for construction and excavation workers.

Fueling track improvements were performed in 2010, including replacement of the fiberglass track pan, abandonment of old diesel and lube oil supply pipelines and replacement of industrial wastewater pipelines that connect from the track pans to the oil/water separator. Upon removal of the track pan, diesel impacted soil was identified and removed to a depth of 2 feet to allow for the installation of the new track pans. Residual diesel impacted soil remained following the excavation because of excavation limitations due to track and fueling structures.

BNSF recently conducted air sparging (AS), soil vapor extraction (SVE) and vacuum enhanced fluid recovery (VEFR) remedial action pilot testing of the source area beneath the fueling track and downgradient of the fueling track to assess the effectiveness of AS, SVE and VEFR for potential remediation of diesel in soil and groundwater and control of the contaminant groundwater plume. VEFR is being evaluated for implementation on a periodic basis as a free product recovery tool with pumping wells along the axis of the plume (downgradient of the fueling track) for additional plume control/containment.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) developed for site soil and groundwater for the purpose of protecting human health, ecological receptors and beneficial land and water uses are as follows:

- Prevent construction/utility workers from exposure to soil or groundwater containing contaminants of concern (COC);
- Remove free product to the extent feasible to mitigate migration of contaminants to groundwater;
- Prevent further migration of contaminants from on-site to off-site areas, to the extent practicable; and,
- Treat hot spots of contamination to the extent feasible, as specified in OAR 340-122-090(4).

In the ROD, DEQ identified the presence of LNAPL in site monitoring wells as a hot spot in groundwater based on the possible recharge to aquifers used for domestic and irrigation purposes, and/or possible discharge to surface water in the seasonal wet area. The 2008 ROD amendment addresses the concern with stormwater runoff. In the amendment, DEQ concurs that control of stormwater discharge is not a required remedial action based on: 1) 75 percent of surface water in the LMFA is captured in catch basins and engineered site drains and routed through an oil/water separator that discharges to the South Suburban Sanitary District system; 2) 25 percent of surface water runoff outside of the LMFA is collected in a trench drain and three catch basins that discharge to an infiltration pond near the property boundary; and 3) the average annual

precipitation for Klamath Falls is 14 inches limiting the volume of surface water discharged at the site.

Also, since the ROD was published, the owner of adjacent tax lots 101 and 102 completed a fill project on the site under joint permit with the Oregon Department of State Lands and the U.S. Army Corps of Engineers. The permit was taken out in April 2004 for the purpose of filling the adjacent property in anticipation of future development. The permit indicates 15,000 cubic yards of material were imported to the site, and 5,166 cubic yards were placed in the SWA. The average depth of fill placed in the SWA is 3 feet. A wetland mitigation project is proposed at an off-site location.

The fill project also involved eliminating the ditch that once carried occasional surface water flow from BNSF property to the adjacent parcel. The ditch was eliminated and an infiltration pond was created on BNSF property at the point of stormwater discharge. This is the same infiltration pond discussed previously.

REMEDIAL ACTION IMPLEMENTATION

The ROD identified the following remedial actions for the site:

- Excavation and off-site disposal of contaminated soil
- Engineering and Institutional controls
- LNAPL recovery
- Monitoring
- Periodic land and water use review
- Contingency Plan

Excavation and Off-site Disposal of Contaminated Soil

BNSF performed opportunistic excavation and off-site disposal of contaminated soil associated with two facility construction activities. In 2006, improvements to the fueling facility resulted in 3,500 tons of contaminated soil being removed from various locations within the LMFA (Kennedy Jenks 2007). Additional improvements to the fueling facility in 2010 (briefly discussed in Site History) resulted in 1,001 tons of contaminated soil being removed from primarily the fueling platform and piping corridors surrounding the platform.

Engineering and Institutional Controls

An Easement and Equitable Servitudes (E&ES) was recorded on June 18, 2010 (DEQ 2010) prohibiting the extraction of groundwater for consumption or other beneficial use as long as the hazardous substances concentrations exceed the acceptable risk level for such use. The E&ES also outlines the requirement for a Contaminated Media Management Plan to be made available to all parties conducting work that will disturb subsurface materials on site. The Plan was issued to BNSF and DEQ on May 4, 2009 (GeoEngineers 2009) and is recorded with the property deed.

LNAPL Recovery

LNAPL recovery has been performed at the site since 1990 by hand bailing as well as the operation of a passive LNAPL recovery system installed in 1997. The recovered LNAPL is emptied into the on-site oil/water separator. To date, 589 gallons of LNAPL have been recovered from the belt skimmer system, the majority of which was recovered between 1997 and 2005 (546 gallons). The passive belt skimmer system efficiency has decreased, in part due to the decrease of recoverable LNAPL in the area.

Localized areas of free product remain, specifically near wells MW-7 and MW-38. LNAPL is hand-bailed from MW-7 on a quarterly basis during system operation and maintenance checks and from MW-7 and MW-38 on a semiannual basis as part of the groundwater monitoring and sampling program. LNAPL monitoring of all site monitoring wells is conducted semiannually.

The LNAPL thicknesses in MW-7 are variable and do not appear to be affected by seasonal groundwater fluctuations. Over the past 5 years thicknesses have varied between a trace and up to nearly 0.9-foot of product. The LNAPL in MW-38 is difficult to measure as product is present in the form of oily globules, at times mixed with LNAPL. Product recovery in wells MW-7 and MW-38 is slow and although other means of product recovery are currently being evaluated, hand-bailing of these wells during site visits, or as product thicknesses dictate, is practical under current conditions.

Monitoring

A Work Plan for Groundwater Monitoring and Sampling at the Midland Yard was submitted to DEQ in 2007 (GeoEngineers, 2007) as a condition of the ROD. The work plan outlined a semiannual groundwater monitoring and sampling program that was implemented immediately. Semiannual sampling is still being conducted at the site.

The groundwater contaminant plume was relatively stable until 2009. As discussed previously, in September 2009 the concentrations of diesel-range hydrocarbons in groundwater samples from several wells increased. The 2009 increase in diesel concentrations also resulted in a voluntary expansion of the groundwater monitoring and sampling network to include wells within the plume versus monitoring and sampling of perimeter wells only. Diesel concentrations then returned to pre-September 2009 levels based on samples collected in November 2009 and March 2010. BNSF conducted a thorough assessment of their fueling facilities and found no apparent equipment issues that would have caused a release.

In September 2010, the concentrations of diesel in groundwater from wells MW-8, MW-9 and MW-35 increased again.

Periodic Land and Water Use Review

There have been no changes in land use, zoning or water use at the site or in the near site vicinity since 2006. Although the adjacent northeastern property has been acquired by others, and rumors of retail developments on this parcel exist, Klamath County zoning maps indicate the property remains zoned for heavy industrial uses.

Contingency Plan

The ROD outlines the need for a periodic monitoring, review and contingency plan to evaluate the performance of the remedy, and any changes that may affect the ability of the remedy to meet the Remedial Action Objectives. A formal contingency plan was not submitted to DEQ. The property use, groundwater plume stability, LNAPL monitoring and potential for future environmental releases of hazardous substances are reviewed semiannually during groundwater monitoring and sampling, as well as through BNSF's Spill Prevention Control and Countermeasure Plan (SPCC) regular inspections at the facility.

In response to the 2009 and 2010 increase in diesel concentrations in groundwater, BNSF completed an extensive sampling of site wells to assess if a source of the impacts was identifiable. Sample results indicated that the current monitoring well network was providing a good assessment of overall site conditions.

With regard to LNAPL monitoring, based on the decreasing efficiency of the belt skimmer system, additional free product recovery options are being evaluated to determine if a more effective method is feasible.

PLUME STABILITY ASSESSMENT

Dissolved plume concentration data trends were previously discussed in this report. There has been no change to the LOF as a result of the recent increase in diesel and PAH concentrations in groundwater.

Continued LNAPL recovery using the belt skimmer system is unlikely to affect the overall plume stability. Regular hand bailing combined with occasional VEFR (currently under evaluation) in wells with product including MW-7 and MW-38 and in wells downgradient and in the near vicinity of the fueling track, will limit LNAPL mobility.

The distribution of LNAPL at the site is variable and limited in extent. The presence of LNAPL in site monitoring wells constitutes a hot spot in groundwater as per DEQ based on the potential for discharge to surface water. However, the potential for groundwater discharge to surface water on the northeastern adjacent property has been reduced by the adjacent property owner's filling activities. Ultimately, if development plans are established for this adjacent parcel, the property grade is likely to be raised even higher, eliminating the groundwater discharge to surface water pathway.

TECHNICAL ASSESSMENT

The remedial actions described in the ROD are functioning as designed to meet RAOs. Additional engineering controls are being evaluated to assess whether practicable solutions exist to further reduce the extent of contamination. The results of the evaluation will be forwarded to DEQ.

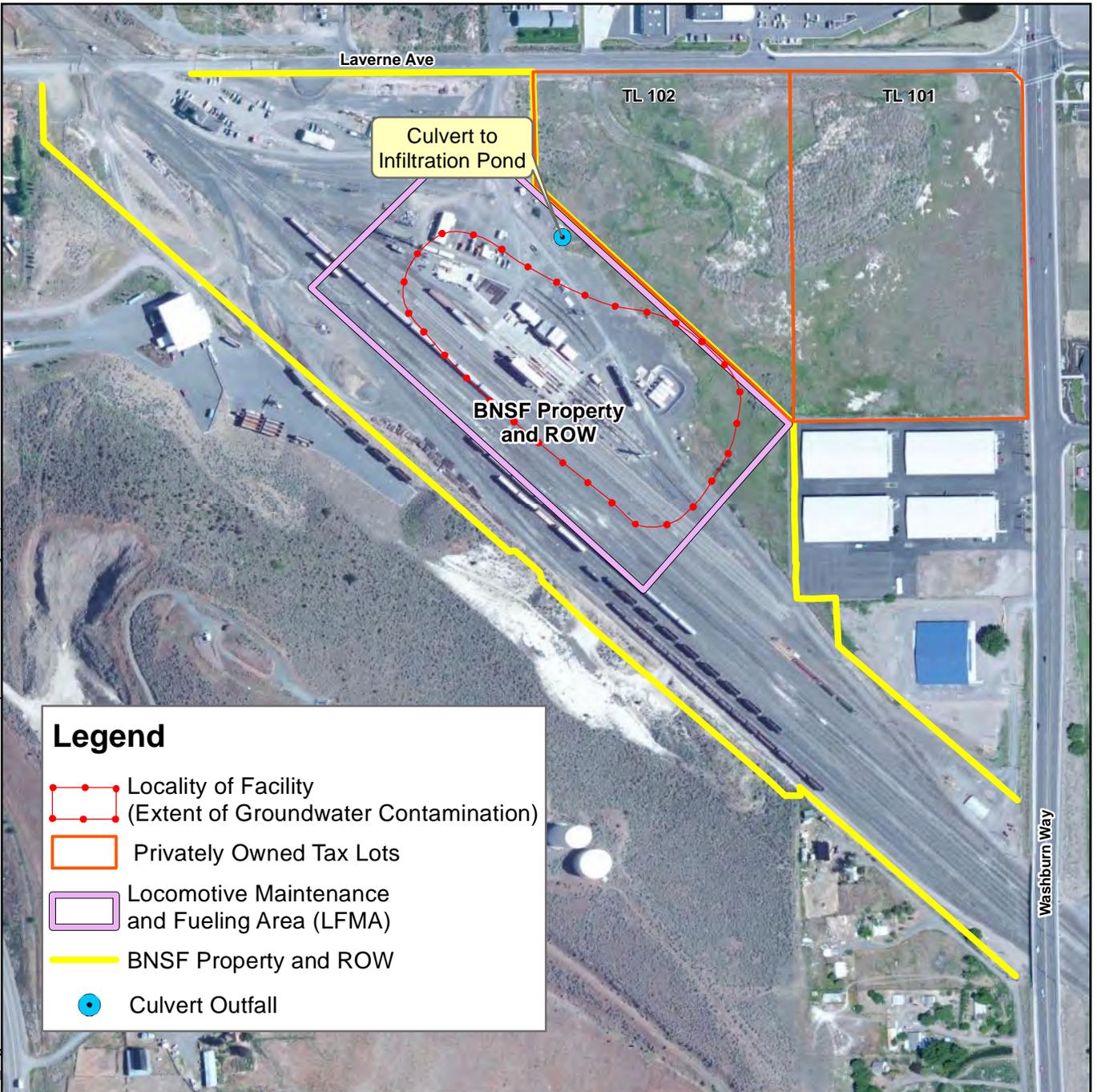
The site remains an active rail yard with on-going maintenance and fueling activities. The dissolved phase plume will continue to be monitored to verify the protectiveness of remedial actions.

REFERENCES

- DEQ. 2006. Record of Decision for Burlington Northern Santa Fe Railway Company, Midland Market Rail Yard, Klamath Falls, Oregon. July 21, 2006.
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- DEQ. 2010. Easement and Equitable Servitudes, June 14, 2010.
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- Kennedy Jenks. 2007. Soil Disposal Report, Fueling Facility Improvements, BNSF Railway Company – Klamath Falls, Oregon, August 1, 2007.

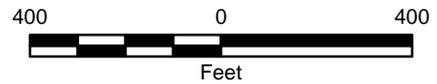
Map Revised: January 20, 2012

Office: PORT Path: P:\0506013\11\GIS\MXD\050601311_Figure1.mxd



Legend

- Locality of Facility
(Extent of Groundwater Contamination)
- Privately Owned Tax Lots
- Locomotive Maintenance and Fueling Area (LFMA)
- BNSF Property and ROW
- Culvert Outfall



Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: Tax Lots digitized from ORMAP, 2009.
 Bing Maps Aerial from ESRI Data Online.
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

Site Plan	
BNSF Midland Market Rail Yard	
	Figure 1

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