State of Oregon
Department of Environmental Quality Memorandum

Date: January 12, 2024

To: FILE

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Subject: Alvadore F.D., LUST #20-91-4385; Staff Memorandum in support of a No Further Action determination

This document presents the basis for the Oregon Department of Environmental Quality's (DEQ's) recommended No Further Action (NFA) determination for the Alvadore F.D., in Alvadore. As discussed in this report, contaminant concentrations in soil and groundwater are below acceptable risk levels.

The proposed NFA determination meets the requirements of Oregon Administrative Rules Chapter 340, Division 122, Sections 0205 to 360 and ORS 465.200 through 465.455.

The proposal is based on information documented in the administrative record for this site. A copy of the administrative record index is presented at the end of this report.

1. BACKGROUND

Site location.
The site's location can be described as follows:
- Address: 90825 Alvadore Road, Alvadore, Lane County Oregon.
- Latitude 44.146º North, longitude 123.2586º West
- Tax lot(s) 2000, Township 17 South, Range 5 West, Section 2

Site setting.
This site is a 1.24-acre lot that located southeast of the intersection of Alvadore Road and 8th Street. The site is developed with a large fire station building and a small auxiliary building that serves as a community library. Between the two buildings and pavement approximately 60% of the site has impermeable surface cover.

This site is generally rural and is bounded by Alvadore Road to the west and north. The property is zoned Rural Public Facility (RPF) which permits uses associated with public and semipublic functions. The zoning allows for dwellings for persons employed on the premises, but the site is not being utilized in that manner at present. Adjacent properties to the south and east are zoned rural residential. Adjacent properties across Alvadore Road to the north and west are zoned Rural Commercial and include a gas station and convenience store and an agricultural services company.

Physical setting.
The site is located at an elevation of approximately 386 feet above sea level. Nearby surface water includes Fern Ridge Reservoir, which is approximately one mile to the southwest, and Amazon Creek, which is approximately one mile east. Additional intermittent tributaries of Amazon Creek are located east and south of the site, as well as a small, private pond to the south, at distances of at least 0.3 miles.

The Alvadore area is underlain by quaternary aged unconsolidated alluvial and lacustrine sediments common in the southern Willamette Valley. Soils at the site consist of Salkum series silt loam. Well logs from the vicinity indicate depths of fairly well-sorted, fine sediments to at least 50 feet bgs.

Depth to groundwater varies seasonally with an estimated depth to groundwater between 4 and 25 feet. Groundwater flow direction is generally to the northeast in all seasons.

Site history.
The site has been in continual operation as a fire station since the time of the release in 1991. Tax records indicates commercial improvements include the building of the storage garage in 1973 and the addition of the library building in 1980.

2. BENEFICIAL LAND AND WATER USE DETERMINATIONS

Land use.
The majority of the surrounding properties at the site are zoned rural residential and are utilized as such. Land use for rural residential properties is anticipated to remain as the dominant land use. The site itself is zoned Rural Public Facility and is anticipated to continue in its current land use. Commercial properties to the west and north are operational and even if the businesses change in the future, land use is not anticipated to.

Groundwater use.
Current and reasonably likely future beneficial uses of groundwater in the vicinity include drinking water for residential and occupational purposes. Municipal water is not available in the area. A well survey identified numerous domestic wells in the area, including 14 potentially downgradient wells. One well is located on site and is utilized for various purposes, including as drinking water on an irregular basis. All wells identified in the well survey were at similar depths exceeding 85 feet bgs. Search results from the Oregon Water Resources Department database support the results of the well survey.

Surface water use.
Nearest surface water bodies exceed 0.3 miles distance from the site. The nearest surface water bodies include two intermittent tributaries of Amazon Creek as well as a small, private pond. Larger surface water bodies nearby include Fern Creek Reservoir and Amazon Creek at distances of 1.07 miles and 1.37 miles, respectively. Surface water impacts are not anticipated due to the distance from the site and lack of direct stormwater conveyance pathways (ditches, etc.).

Stormwater on the site is not actively managed due to the rural nature of the area. Infiltration of stormwater is expected for vegetated areas of the site as well as runoff from impervious surfaces.

3. INVESTIGATION AND CLEANUP WORK

In December 1991 decommissioning of two 1000-gallon underground storage tanks (USTs) was initiated. One UST was used for diesel and one UST was for gasoline. Evidence of petroleum hydrocarbon leakage was noted during decommissioning and several soil samples were taken from the original excavated area. The highest concentration observed in soil at the time of decommissioning was 14,000 mg/kg diesel-range petroleum hydrocarbon (TPH-D).

Following the initial excavation and soil sampling, several subsequent rounds of excavation and sampling were completed between December 1991 and February 1992, with an end result of a large areal extent of excavation and to a final depth of between 20-30 feet bgs. In sum, approximately 2000 tons of soil were removed from the site. During inspection of the sidewalls of the final excavation area, discolored soil with diesel odor was observed around 6-7 feet bgs. Sampling of accumulated rainwater and groundwater within the excavated area did not detect petroleum hydrocarbons or BTEX (benzene, toluene, ethylbenzene, xylenes). Gasoline-range petroleum hydrocarbons were not detected in soil samples collected during initial sampling but TPH-G was detected at a maximum concentration of 3,000 mg/kg at approximately 8.5 feet bgs during the secondary excavation.

An observation well was installed within the excavated area prior to backfilling of the excavation in August 1992. Subsequent monitoring of this well did not detect petroleum hydrocarbons or BTEX. See the attached site map for the extent of the excavation area and other relevant structures on site. Residual concentration of TPH-D was observed at 5,800 mg/kg near the southeast corner of the fire station building. Heavy range hydrocarbons were also detected at lower concentrations than TPH-D. See attachments for a table of historical soil sampling data.

In May 2011, upon request from DEQ, angled borings were advanced at a 30-degree angle to a total depth of 7.8 feet bgs underneath the fire station building (see Figure 1). Soil samples did not detect TPH-D, however groundwater sampled from one of the borings detected TPH-D at a concentration of 126 µg/L. Groundwater sampled from the domestic well on site at the same time had a concentration of TPH-D of 103 µg/L. Neither volatile organic compounds (VOCs) nor polycyclic aromatic hydrocarbons (PAHs) were detected in any of the groundwater samples. Monitoring of the domestic well on-site continued for four quarters. TPH-D was detected at a

concentration of 82.3 µg/L in October 2011 and then was below detection limits in the three subsequent quarters.

Nature and extent of contamination.
Following significant cleanup activities conducted in 1991 and 1992, constituents of interest remaining in soil include gasoline, diesel, heavy oil, and petroleum VOCs and PAHs in soil and groundwater.

Soil contamination was observed at depths from 6 to 16 feet bgs. The lateral extent of soil contamination is not known, but DEQ feels it is unlikely that soil contamination extends beyond the site.

Diesel contamination in groundwater was detected in the onsite well, which appears to draw water from 103 ft bgs and groundwater contamination could have migrated offsite historically, though at diminished concentrations.

4. RISK EVALUATION

Conceptual site model.
To evaluate human exposure to residual chemical contamination requires an assessment of the type and extent of that exposure. This is based on current and reasonably likely future site use. DEQ publishes risk-based concentrations (RBCs) for contaminants commonly encountered, for different types of exposure scenarios. These RBCs are conservative estimates of protective levels of contaminants in soil, groundwater and air. Table 1 shows potential exposure pathways and receptors for this site. Based on this, applicable RBCs are identified and used for risk screening.

CONCEPTUAL SITE MODEL TABLE
Table 1. Identification of applicable RBCs, based on pertinent pathways and receptors

	Pathway	Receptor	Is pathway complete?	Is RBC Exceeded?	Comments
Soil	Ingestion, Dermal Contact, and Inhalation	Residential and/or Urban Residential	No	N/A	Site is not used for residential purposes at present or expected to in the future.
		Occupational	No	N/A	Site surface in the area of contamination is paved and contamination is greater than three feet bgs.
		Construction Worker	Yes	Yes*	*Sample was slightly above RBC in 1992. This contamination has likely attenuated naturally and should not present an unacceptable risk.
		Excavation Worker	Yes	No	
	Leaching to Groundwater	Residential and/or Urban residential	Yes	No	Groundwater uses off-site include residential.
		Occupational	Yes	No	
Groundwater	Ingestion & Inhalation from Tap Water	Residential and/or Urban residential	Yes	No	
		Occupational	Yes	No	
	Vapor Intrusion into Buildings	Residential	Yes	No	
		Commercial	Yes	No	
	Groundwater in Excavation	Occupational	Yes	No	
Ecological		Terrestrial & Surface Water	No	N/A	Contamination not at surface and not expected to interact with surface water or aquatic sediments.

Contaminant concentrations.

Table 2. Final Concentrations of Contaminants of Interest

Contaminant of Interest	Date of Last Sampling	Residual concentration	Comment
Soil			
Gasoline	1/7/1992	ND[1]	Detection limit = 20 mg/kg
Diesel	1/9/1992	5800 mg/kg	RBC = 4600 kg/kg
Heavy Oil	1/13/1992	ND[1]	No reported detection limit for this analyte.
VOCs	N/A	N/A	Only analyzed in groundwater.
PAHs	N/A	N/A	Only analyzed in groundwater.
Groundwater			
Gasoline	N/A	N/A	TPH-G not analyzed in groundwater due to contaminated soil being removed.
Diesel	7/26/2012	ND[1]	Detection limit = 76 µg/L
Heavy Oil	7/26/2012	ND[1]	Detection limit = 190 µg/L
VOCs	5/16/2011	ND[1]	Detection limit = 0.3-2.0 µg/L
PAHs	5/16/2011	ND[1]	Detection limit = 0.0189 µg/L

Notes:
[1] ND-Not detected.

The residual concentrations from the Table 2 describe the concentration of each of the contaminants of interest at the last sampling event. Some contaminated soil has been left in place. The concentration of diesel in the soil that remains on site is slightly above the Construction Worker RBC. While groundwater was contaminated by the release, the contaminated source soils were removed long ago. The most recent groundwater sampling did not detect contaminants of interest. Diesel was detected at low levels in the on-site domestic well in 2011, but not since then. While the extent of contamination in groundwater has not been fully delineated, DEQ feels that it is unlikely that contamination from the site would adversely impact nearby domestic wells. This is due to the nature of the contamination (diesel), not being highly mobile in groundwater, the amount of time since the detection in the on-site well, the distance of the release site to nearby wells, and the propensity of diesel to degrade relatively quickly in groundwater over time — especially because the source soils were removed many years ago.

Human health risk.
Based on the conceptual site model shown above, there are several complete pathways for exposure to various receptors. Only one complete exposure pathway has an RBC slightly exceeded: Soil direct contact by Construction Workers for diesel. The sample triggering the exceedance was collected 32 years ago, and DEQ feels that the remaining contamination should not currently present an unacceptable risk to construction workers, should they work in that area. Similarly, other contaminants of interest that are typically associated with a diesel release, such

as VOCs and PAHs, are expected to have degraded sufficiently that no unacceptable risks are considered to remain.

Vapor intrusion should not be a concern beneath the existing building because soil samples collected from beneath the building contained very low levels of diesel-range hydrocarbons, and no groundwater contamination was detected beneath the building.

No RBCs are exceeded for the groundwater exposure pathways in the latest sampling events from 2012.

Ecological risk.
No ecological risks have been identified or are anticipated. The contamination is not at the surface and the site does not contain ecological habitat. And while dilute contamination in groundwater may migrate off-site, due to the distance to surface water, discharge to surface water or interaction with aquatic sediments is not anticipated.

5. RECOMMENDATION

Due to the extensive soil removal activities and based on sample results for soil and groundwater, acceptable risk levels are not exceeded, and a No Further Action determination is recommended for this site. A Contaminated Media Management Plan is recommended to developed prior to any construction activities on site that may impact contaminated soil, but due to the relatively low concentration of the remaining contaminated soil, development of the CMMP is not required prior to NFA determination. The No Further Action determination should be recorded in DEQ's underground storage tank database (Facility No. 8375 and LUST No. 20-91-4385).

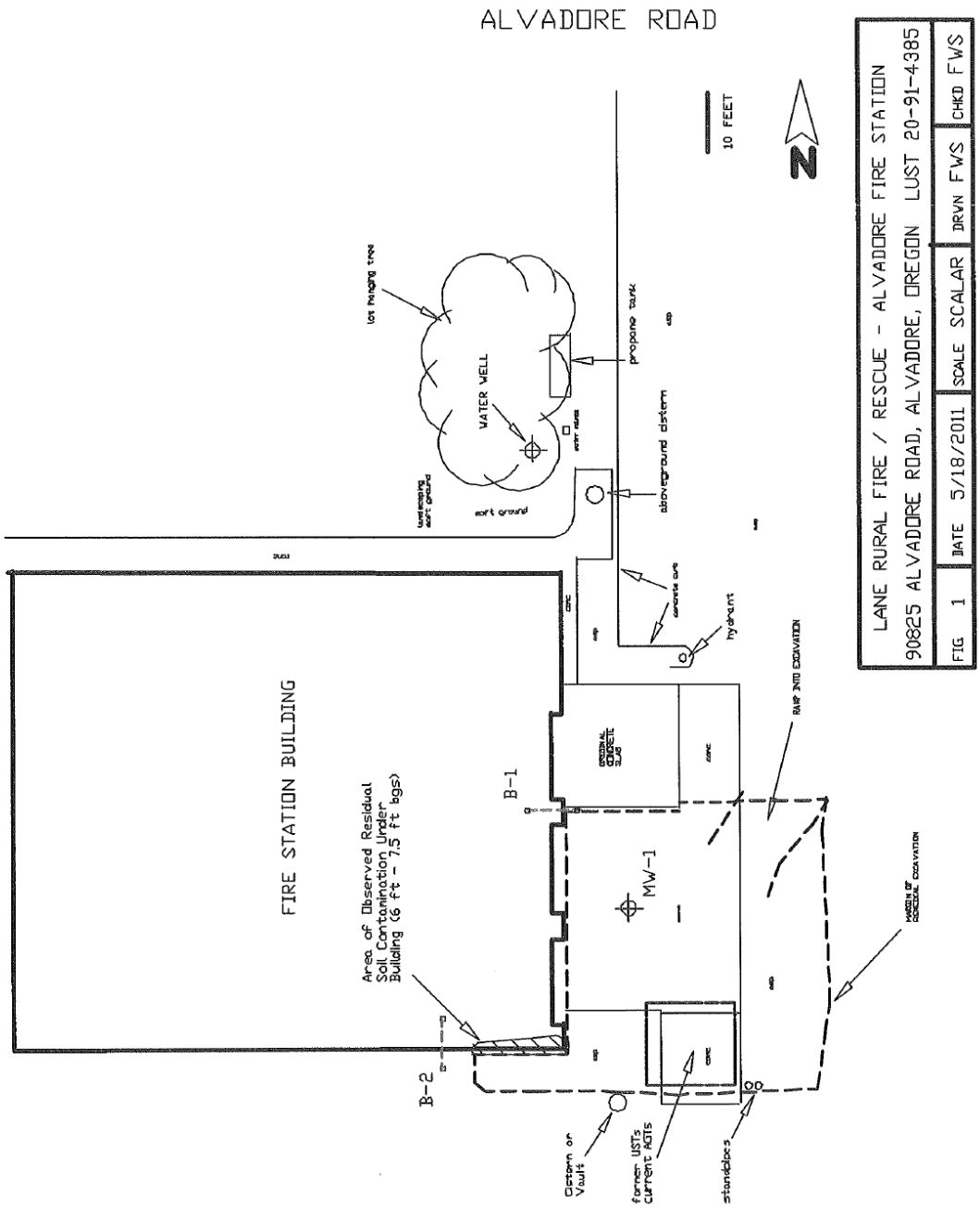
6. ADMINISTRATIVE RECORD

20-91-4385 CONTAMINATION REPORT JUN 17 2011.pdf
20-91-4385 FILE REVIEW JUN 30 2011.pdf
20914384-AlvadoreFD-LabReport 1992.01.07.pdf
20914384-AlvadoreFD- LabReport 1992.01.06.pdf
20914384-AlvadoreFD- LabReport 1992.01.10.pdf
20914384-AlvadoreFD- LabReport 1992.01.14.pdf
20914384-AlvadoreFD- LabReport 1992.01.15.pdf
20090928_20-91-4385_AlvadoreFileReviewMemo.pdf
1991_20-91-4385_InitialSoilData.pdf

7. ATTACHMENTS

1. Vicinity map
2. Site map
3. Initial soil data summary table

Vicinity Map


ALVADORE ROAD
10 FEET
N
LANE RURAL FIRE / RESCUE - ALVADORE FIRE STATION
90825 ALVADORE ROAD, ALVADORE, OREGON LUST 20-91-4385
FIG 1 | DATE 5/18/2011 | SCALE SCALAR | DRVN FWS | CHKD FWS
FIRE STATION BUILDING
WATER WELL
propane tank
aboveground cistern
hydrant
B-1
B-2
MW-1
Area of Observed Residual Soil Contamination Under Building (6 ft - 7.5 ft bgs)
RAMP INTO EXCAVATION
MIDDLE OF RESCUE EXCAVATION
Cistern or Vault
former USTs current ASTs
standpipe

Site Map

Table 1. Summary of soil analytical data in DEQ's LUST file.

Sample ID	Location	Media	Diesel	Gasoline	HW Oil	Date
A-1*	Bottom of pit @ 6 feet	Soil	7,300	ND	ND	December 22, 1991
B-1*	Bottom of pit @ 6 feet	Soil	14,000	ND	ND	December 22, 1991
C-1*	Bottom of pit @ 6 feet	Soil	83	ND	ND	December 22, 1991
D-1*	Bottom of pit @ 6 feet	Soil	ND	ND	ND	December 22, 1991
A-2'*	2 feet	Soil	7,000	ND	ND	December 22, 1991
B-3'*	3 feet	Soil	ND	ND	ND	December 22, 1991
E-1	Southeast of building	Soil	4,800	26	DET	January 7, 1992
F-1*	Bottom of gas pit @ 6.5 feet	Soil	2,100	2,800	DET	January 7, 1992
G-1	Parking lot @ 16 inches	Soil	ND	ND	ND	January 7, 1992
H-1	Gas pit @ 8 feet	Soil	3,000	4,100	ND	January 7, 1992
I-1	Diesel Pit west end @ 8'	Soil	180	ND	ND	January 7, 1992
J-1	South End Corner of Bldg @ 16 feet	Soil	ND	ND	ND	January 8, 1992
K-1	Edge of Concrete Slab @ 12 feet	Soil	3,800	ND	ND	January 8, 1992
L-1	Bottom middle of pit @ 15 feet		ND	ND	ND	January 9, 1992
M-1	South Side Wall Middle of pit @ 12 feet	Soil	ND	ND	ND	January 9, 1992
N-1	West side wall at 13 feet	Soil	5,800	ND	ND	January 9, 1992
O-1	Bottom diesel pit @ 15 feet	Soil	ND	ND	ND	January 9, 1992
Q1	W end pit @ 13 feet	Soil	970	ND	ND	January 13, 1992
S1	Bottom of Pit @ 15 feet	Soil	ND	ND	ND	January 13, 1992
E2	South East Corner of Building @ 2'	Soil	ND	ND	ND	January 13, 1992
P1	East End of Pit @ 13 feet	Soil	ND	ND	ND	January 13, 1992
R1	South west end of pit @ 15 feet	Soil	ND	ND	ND	January 13, 1992
T1	North side edge of slab @ 13'	Soil	2,600	ND	ND	January 13, 1992

ND – Not detected
NA – Not analyzed
* - sample location likely to have been over-excavated

Initial Soil Data Summary Table
Note: many samples beyond those indicated (*) were also over-excavated over the course of the project.