



Union Pacific Train Derailment

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Union Pacific Train Derailment

Aerial view of crash site



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State of Oregon
Department of
Environmental
Quality



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Derailed oil cars



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Removing rail
cars



Union Pacific Train Derailment

Removing rail cars





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Department of
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Quality

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Decontaminating wastewater plant



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Treatment plan
tank after
cleaning

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Sheen on the Columbia River



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LEGEND

- | | |
|---|---|
| <ul style="list-style-type: none"> ● Extraction Well ● Downgradient Monitoring Well ▭ Preliminary Excavation Area ▭ Cars that Did Not Leak or Burn ▭ Location of Cars and Fire | <ul style="list-style-type: none"> — Boom Area --- Rock Creek --- WWTP Pipeline ● Manhole ● Milepost ▭ WWTP |
|---|---|

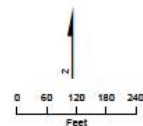


FIGURE 2
APPROXIMATE WELL LOCATIONS
CITY OF MOSIER
UNION PACIFIC RAILROAD
WASCO COUNTY, OREGON

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Maximum petroleum concentrations in Columbia River, mg/L June 5-20, 2016

Contaminant	Max upstream	Max downstream	Max at outfall
Gasoline	<0.027	<0.027	0.028
Diesel	0.053	0.038	0.082
Motor Oil	<0.029	<0.029	0.048

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Sewer line replacement



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Excavation of contaminated soil



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Monitoring well installation



Cleanup system - biosparging

Pump air into groundwater so the oxygen in the air stimulates growth of naturally occurring microbes.

Cleanup system - biosparging

System started **August 18**. Includes five sparge wells near MW-4.

System expanded **week of October 10**:

- Three additional sparge wells near MW-4
- Five sparge wells near extraction wells

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System installed Aug. 2016



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System expanded Oct. 2016



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Directional drilling to run sparge line beneath railroad tracks



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Installation of air line to sparge wells



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Contaminant concentrations in MW-4

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Contaminants in MW-4 originally above ecological screening levels, ug/L

Analyte	6/24/2016 (initial sampling)	12/6/2016	1/17/2017	2/14/2017	Eco SLVs
Benzene	1,800	23	9.7	4.9	130
Ethylbenzene	140	1.3J	0.74 J	1.4 J	7.3
Methylnaphthalene (1-)	26	4.7	1.3	4.8	2.1
Naphthalene	44	2.3	1.2J	1.5	12
Toluene	1,600	5.4	0.49 J	14	9.8
Trimethylbenzene (1,2,4-)	220	39	10	11	33
Xylene (o-)	360	25	17	39	13
Xylenes (m & p)	630	21	9.5	15	13

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BTEX concentrations south of the tracks

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Benzene in EW-1

Sample Date	Result	Notes
6/24/2016	62	
6/30/2016	160	
7/8/2016	1 J	
7/15/2016	<0.42	
7/20/2016	280	
7/27/2016	1.3 J	
8/4/2016	6.3	
8/10/2016	130	
8/16/2016	230	Initial biosparge system started Aug 17
8/24/2016	180	
9/2/2016	96	
9/9/2016	210	
10/5/2016	240	Additional biosparge wells started Oct 14
11/2/2016	<0.42	
12/7/2016	<0.42	
1/18/2017	<0.42	
2/14/2017	<0.42	

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Toluene in EW-1

Sample Date	Result	Notes
6/24/2016	24	
6/30/2016	110	
7/8/2016	1.3 J	
7/15/2016	<0.18	
7/20/2016	290	
7/27/2016	0.78 J	
8/4/2016	3.1	
8/10/2016	98	
8/16/2016	210	Initial biosparge system started Aug 17
8/24/2016	180	
9/2/2016	150	
9/9/2016	250	
10/5/2016	290	Additional biosparge wells started Oct 14
11/2/2016	<0.18	
12/7/2016	<0.18	
1/18/2017	<0.18	
2/14/2017	<0.18	

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Ethylbenzene in EW-1

Sample Date	Result	Notes
6/24/2016	1.1 J	
6/30/2016	9.9	
7/8/2016	<0.21	
7/15/2016	<0.21	
7/20/2016	26	
7/27/2016	<0.21	
8/4/2016	0.55 J	
8/10/2016	7.1	
8/16/2016	17	Initial biosparge system started Aug 17
8/24/2016	11	
9/2/2016	19	
9/9/2016	37	
10/5/2016	22	Additional biosparge wells started Oct 14
11/2/2016	<0.21	
12/7/2016	<0.21	
1/18/2017	<0.21	
2/14/2017	<0.21	

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Xylenes in EW-1

Sample Date	Result	Notes
6/24/2016	28.7	
6/30/2016	104	
7/8/2016	1.98 J	
7/15/2016	<0.79	
7/20/2016	220	
7/27/2016	<1.11	
8/4/2016	7 J	
8/10/2016	89	
8/16/2016	174	Initial biosparge system started Aug 17
8/24/2016	151	
9/2/2016	190	
9/9/2016	270	
10/5/2016	214	Additional biosparge wells started Oct 14
11/2/2016	<0.49	
12/7/2016	<0.49	
1/18/2017	<0.49	
2/14/2017	<0.49	

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MW-5

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Contaminants in MW-5, ug/L

Analyte	12/6/2016	1/17/2017	2/14/2017	Ecol SLV
Benzene	16	<0.42	5.1	130
Ethylbenzene	1.8 J	<0.21	1.8 J	7.3
Methylnaphthalene (1-)	0.29	<0.0062	1.9	2.1
Naphthalene	1.3 J	<0.26	2.2	12
Toluene	8.7	<0.18	4.7	9.8
Trimethylbenzene (1,2,3-)	27	2.1	43	not listed
Trimethylbenzene (1,2,4-)	24	1.6 J	32	33
Trimethylbenzene (1,3,5-)	11	0.88 J	17	not listed
Xylene (m & p-)	30	0.59 J	12	13
Xylene (o-)	43	1.3 J	51	13
Gasoline	600	57	1000	not listed
Motor Oil	70	<29	96	not listed

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Thank you