

Whiting Oil and Gas
Federal 8-6 Remediation
Soil Sample Analytical Confirmation Results - Excavation

				Sample Location						
COGCC Table 910-1 Analyte Suite	Table 910-1 Standard	Units		North Wall, 3.5'	South Wall, 3.5'	East Wall, 3.5'	West Wall, 3.5'	West Wall, 3.5' Confirmation	Bottom, 7.5'	
			Lab ID →	K1513017-001	K1513017-002	K1513017-003	K1513017-004	K1512158-01	K1513017-005	
			Sample Date →	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/30/2015	11/10/2015	
			Method ↓	Results						
Organics Compounds in Soils										
TEPH (DRO)	--	mg/kg	SW8015M	7.3	12	5.0	160	NA	5.5	
TVPH (GRO)	--	mg/kg		ND (6)	3.7J	2J	7.5	NA	2.7J	
TPH (DRO+GRO)	500	mg/kg		7.3	15.7	7.0	168	NA	8.2	
BENZENE	0.17	mg/kg	SW8260B	0.000079J	0.000076J	0.000089J	0.000088J	NA	ND (0.0053)	
TOLUENE	85	mg/kg		0.00034J	ND (0.0055)	0.00019J	ND (0.0056)	NA	0.0002J	
ETHYLBENZENE	100	mg/kg		ND (0.0057)	ND (0.0055)	ND (0.0056)	ND (0.0056)	NA	ND (0.0053)	
XYLENE TOTAL	175	mg/kg		0.00219J	ND (0.0055)	0.00038J	ND (0.0056)	NA	0.00026J	
ACENAPHTHENE	1,000	mg/kg	SW846 8270D	ND (0.0029)	ND (0.0028)	ND (0.0028)	ND (0.0029)	NA	ND (0.0028)	
ANTHRACENE	1,000	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.0037	NA	ND (0.0028)	
BENZO(A)ANTHRACENE	0.22	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.0079	NA	0.0014J	
BENZO(A)PYRENE	0.022	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.025	ND (0.0076)	0.00084J	
BENZO(B)FLUORANTHENE	0.22	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.028	NA	0.0011J	
BENZO(K)FLUORANTHENE	2.2	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.0083	NA	ND (0.0028)	
CHRYSENE	22	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.031	NA	0.0036	
DIBENZO(A,H)ANTHRACENE	0.022	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.0094	NA	ND (0.0028)	
FLUORANTHENE	1,000	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.015	NA	0.0014J	
FLUORENE	1,000	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	ND (0.0029)	NA	ND (0.0028)	
INDENO(1,2,3-CD)PYRENE	0.22	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.056	NA	ND (0.0028)	
NAPHTHALENE	23	mg/kg		0.0036	0.0023J	ND (0.0028)	0.00070J	NA	0.00082J	
PYRENE	1,000	mg/kg		ND (0.0029)	ND (0.0028)	ND (0.0028)	0.023	NA	0.0020J	
Metals in Soils										
MERCURY	23	mg/kg		SW7471B	0.037	0.057	0.043	0.054	NA	0.055
ARSENIC	0.39	mg/kg	SW846 6010C	5.41	9.4	7.86	8.08	NA	7.26	
BARIUM	15,000	mg/kg		160	105	44.8	203	NA	57.6	
CADMIUM	70	mg/kg		0.38	0.278	0.249	0.269	NA	0.282	
CHROMIUM (III)	120,000	mg/kg		10.1	14	13.7	13	NA	11.6	
CHROMIUM (IV)	23	mg/kg		0.21J	0.11J	0.14J	0.14J	NA	ND (0.55)	
COPPER	3,100	mg/kg		17	15.9	16.7	13.6	NA	15.2	
LEAD	400	mg/kg		11.2	17.4	14.8	15.9	NA	16.3	
NICKEL	1,600	mg/kg		13.2	20.1	17.3	18	NA	19.6	
SELENIUM	390	mg/kg		0.6	0.6	1.26	0.49	NA	0.63	
SILVER	390	mg/kg		0.081	0.055	0.038	0.057	NA	0.046	
ZINC	23,000	mg/kg		54.6	84.7	76.8	70.2	NA	87.6	
Inorganics in Soils										
Sodium Absorption Ratio	<12	unitless	USAD H60	14.0	17.6	12.3	7.0	NA	10.9	
Electric Conductivity	<4 or 2x background	mmhos/cm		14.1	12.6	10.3	7.2	NA	5.5	
pH	6 to 9	Std. pH Units	SW9045D	7.36	7.37	7.43	7.32	NA	7.34	

All concentration results are on a dry basis unless noted otherwise

NA = not analyzed

ND = non detect (reporting limit in parentheses)

Above COGCC Table 910-1 Standard

J = estimated result below the reporting limit.

Whiting Oil and Gas
Federal 8-6 and Federal 6-6
Soil Sample Analytical Background Results

				Hill 8-6 Sample Location			Hill 6-6 Sample Location		
COGCC Table 910-1 Analyte Suite	Table 910-1 Standard	Units		BKGD 01	BKGD 02	BKGD 03	BKGD 01	BKGD 02	BKGD 03
			Lab ID →	K1513015-001	K1513015-002	K1513015-003	K1513005-002	K1513005-003 and K1514367-001	K1513005-004
			Sample Date →	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/10/2015
			Method ↓	Results			Results		
Arsenic	0.39	mg/kg	SW846 6010C	8.85	7.37	7.17	5.59	5.73	5.91
Sodium Absorption Ratio	<12	unitless	USAD H60	NA	NA	0.23	12.4	33.2	36.6
Electric Conductivity	<4 or 2x background	mmhos/cm		NA	NA	0.312	9.56	14.9	15.4
pH	6 to 9	Std. pH Units	SW9045D	NA	NA	8.26	7.7	8.01	7.93

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Whiting Oil and Gas
Federal 8-6 Remediation
Soil Sample Analytical Results - Stockpiles

				Sample Location									
COGCC Table 910-1 Analyte Suite	Table 910-1 Standard	Units		Baseline	SP 01	SP 02	SP 03	SP 04	Stockpile 01 - East	Stockpile 02 - West	LTU	LTU-050416	
			Lab ID →	K1513018-001	K1513018-002	K1513018-003	K1513018-004	K1513018-005	1512160-01	1512160-02	15121346-01	1605389-01	
			Sample Date →	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/10/2015	11/30/2015	11/30/2015	12/16/2015	5/4/2016	
			Method ↓	Results									
Organics Compounds in Soils													
TEPH (DRO)	--	mg/kg	SW8015M	2,300	2,200	2,900	2,000	1,700	490	970	1,100	430	
TVPH (GRO)	--	mg/kg		24	56	100	120	57	120	190	140	ND (3.1)	
TPH (DRO+GRO)	500	mg/kg		2,324	2,256	3,000	2,120	1,757	610	1,160	1,240	430	
BENZENE	0.17	mg/kg	SW8260B	0.00027J	0.0020J	0.0018J	0.00062J	0.00053J	NA	NA	NA	ND (0.037)	
TOLUENE	85	mg/kg		0.00018J	0.0098J	0.029	0.013J	0.0025J	NA	NA	NA	ND (0.037)	
ETHYLBENZENE	100	mg/kg		0.00052J	0.037	0.096	0.066	0.014	NA	NA	NA	ND (0.037)	
XYLENE TOTAL	175	mg/kg		0.00034J	0.111	0.359	0.200	0.0263	NA	NA	NA	ND (0.037)	
ACENAPHTHENE	1,000	mg/kg	SW846 8270D	NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
ANTHRACENE	1,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
BENZO(A)ANTHRACENE	0.22	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
BENZO(A)PYRENE	0.022	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
BENZO(B)FLUORANTHENE	0.22	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
BENZO(K)FLUORANTHENE	2.2	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
CHRYSENE	22	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
DIBENZO(A,H)ANTHRACENE	0.022	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
FLUORANTHENE	1,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
FLUORENE	1,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
INDENO(1,2,3-CD)PYRENE	0.22	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
NAPHTHALENE	23	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
PYRENE	1,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.014)	
Metals in Soils													
MERCURY	23	mg/kg		SW7471B	NA	NA	NA	NA	NA	NA	NA	NA	0.040
ARSENIC	0.39	mg/kg	SW846 6010C	NA	NA	NA	NA	NA	NA	NA	NA	9.5	
BARIUM	15,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	180	
CADMIUM	70	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.32)	
CHROMIUM (III)	120,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	0.56	
CHROMIUM (IV)	23	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	1.1	
COPPER	3,100	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	16	
LEAD	400	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	21	
NICKEL	1,600	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	17	
SELENIUM	390	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	1.3	
SILVER	390	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	ND (0.40)	
ZINC	23,000	mg/kg		NA	NA	NA	NA	NA	NA	NA	NA	86	
Inorganics in Soils													
Sodium Absorption Ratio	<12	unitless	USAD H60	NA	NA	NA	NA	NA	NA	NA	NA	11	
Electric Conductivity	<4or 2x background	mmhos/cm		NA	NA	NA	NA	NA	NA	NA	NA	14	
pH	6 to 9	Std. pH Units	SW9045D	NA	NA	NA	NA	NA	NA	NA	NA	7.8	

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Above COGCC Table 910-1 Standard

J = estimated result below the reporting limit.