

<p>RESULTS: Karla Reesor 403 807 2995 Penn West Petroleum Ltd - Three Creeks Project</p> <p>INVOICE: Kenda Friesen</p>	<p>CLIENT SAMPLE ID CANISTER ID</p> <p>986b-2016-10-05 1833</p> <p>DESCRIPTION:</p> <p>DATE SAMPLED: 05-Oct-16 18:45 DATE RECEIVED: 11-Oct-16</p> <p>REPORT CREATED: 26-Oct-16 REPORT NUMBER: 16100077</p> <p>VERSION: Version 01</p>
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	1-Butene	K, T, U	< 0.18	ppmv	0.18	NA-025	12-Oct-16
16100077-001	Acetylene	K, T, U	< 0.4	ppmv	0.4	NA-025	12-Oct-16
16100077-001	n-Butane	K, T, U	< 0.4	ppmv	0.4	NA-025	12-Oct-16
16100077-001	cis-2-Butene	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	Ethane	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	Ethylacetylene	K, T, U	< 0.11	ppmv	0.11	NA-025	12-Oct-16
16100077-001	Ethylene	K, T, U	< 0.4	ppmv	0.4	NA-025	12-Oct-16
16100077-001	Isobutane	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	Isobutylene	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	Methane		2.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	n-Propane	K, T, U	< 0.13	ppmv	0.13	NA-025	12-Oct-16
16100077-001	Propylene	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	Propyne	K, T, U	< 0.2	ppmv	0.2	NA-025	12-Oct-16
16100077-001	trans-2-Butene	K, T, U	< 0.16	ppmv	0.16	NA-025	12-Oct-16
16100077-001	2,5-Dimethylthiophene	K, T, U	< 1.6	ppbv	1.6	NA-024	12-Oct-16
16100077-001	2-Ethylthiophene	K, T, U	< 1.8	ppbv	1.8	NA-024	12-Oct-16
16100077-001	2-Methylthiophene	K, T, U	< 1.4	ppbv	1.4	NA-024	12-Oct-16
16100077-001	3-Methylthiophene	K, T, U	< 0.9	ppbv	0.9	NA-024	12-Oct-16

CLIENT SAMPLE ID 986b-2016-10-05	CANISTER ID 1833	Matrix Ambient Air	DATE SAMPLED 05-Oct-16 18:45
DESCRIPTION:			
REPORT NUMBER: 16100077	REPORT CREATED: 26-Oct-16	VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	Butyl mercaptan	K, T, U	< 1.4	ppbv	1.4	NA-024	12-Oct-16
16100077-001	Carbon disulphide	K, T, U	< 1.1	ppbv	1.1	NA-024	12-Oct-16
16100077-001	Carbonyl sulphide		8.1	ppbv	1.8	NA-024	12-Oct-16
16100077-001	Dimethyl disulphide	K, T, U	< 1.4	ppbv	1.4	NA-024	12-Oct-16
16100077-001	Dimethyl sulphide	K, T, U	< 1.3	ppbv	1.3	NA-024	12-Oct-16
16100077-001	Ethyl mercaptan	K, T, U	< 1.1	ppbv	1.1	NA-024	12-Oct-16
16100077-001	Ethyl sulphide	K, T, U	< 1.6	ppbv	1.6	NA-024	12-Oct-16
16100077-001	Hydrogen sulphide	K, T, U	< 1.3	ppbv	1.3	NA-024	12-Oct-16
16100077-001	Isobutyl mercaptan	K, T, U	< 1.4	ppbv	1.4	NA-024	12-Oct-16
16100077-001	Isopropyl mercaptan	K, T, U	< 1.6	ppbv	1.6	NA-024	12-Oct-16
16100077-001	Methyl mercaptan	K, T, U	< 1.6	ppbv	1.6	NA-024	12-Oct-16
16100077-001	Pentyl mercaptan	K, T, U	< 3.6	ppbv	3.6	NA-024	12-Oct-16
16100077-001	Propyl mercaptan	K, T, U	< 1.8	ppbv	1.8	NA-024	12-Oct-16
16100077-001	tert-Butyl mercaptan	K, T, U	< 1.6	ppbv	1.6	NA-024	12-Oct-16
16100077-001	Thiophene	K, T, U	< 1.3	ppbv	1.3	NA-024	12-Oct-16
16100077-001	1,1,1-Trichloroethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,1,2,2-Tetrachloroethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,1,2-Trichloroethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,1-Dichloroethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,1-Dichloroethylene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	1,2,3-Trimethylbenzene	K, T, U	< 0.09	ppbv	0.09	AC-058	15-Oct-16
16100077-001	1,2,4-Trichlorobenzene	K, T, U	< 1.4	ppbv	1.4	AC-058	15-Oct-16
16100077-001	1,2,4-Trimethylbenzene	I	0.06	ppbv	0.05	AC-058	15-Oct-16
16100077-001	1,2-Dibromoethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,2-Dichlorobenzene	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Oct-16

Report certified by: Rebecca Holgate, Account Coordinator

On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: Wednesday, October 26, 2016

Inquiries: (780) 632 8455

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CLIENT SAMPLE ID 986b-2016-10-05	CANISTER ID 1833	Matrix Ambient Air	DATE SAMPLED 05-Oct-16 18:45
DESCRIPTION:			
REPORT NUMBER: 16100077	REPORT CREATED: 26-Oct-16	VERSION: Version 01	

Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	1,2-Dichloroethane	I	0.03	ppbv	0.02	AC-058	15-Oct-16
16100077-001	1,2-Dichloropropane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	1,3,5-Trimethylbenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,3-Butadiene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1,3-Dichlorobenzene	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Oct-16
16100077-001	1,4-Dichlorobenzene	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	1,4-Dioxane	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	1-Butene		0.55	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1-Hexene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	1-Pentene	I	0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2,2,4-Trimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2,2-Dimethylbutane	I	0.15	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2,3,4-Trimethylpentane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2,3-Dimethylbutane	I	0.38	ppbv	0.04	AC-058	15-Oct-16
16100077-001	2,3-Dimethylpentane	I	0.06	ppbv	0.04	AC-058	15-Oct-16
16100077-001	2,4-Dimethylpentane	I	0.03	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2-Methylheptane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2-Methylhexane	I	0.13	ppbv	0.02	AC-058	15-Oct-16
16100077-001	2-Methylpentane		1.93	ppbv	0.02	AC-058	15-Oct-16
16100077-001	3-Methylheptane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	3-Methylhexane	I	0.09	ppbv	0.04	AC-058	15-Oct-16
16100077-001	3-Methylpentane		0.76	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Acetone		4.9	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Acrolein	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Oct-16
16100077-001	Benzene		0.93	ppbv	0.02	AC-058	15-Oct-16

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CLIENT SAMPLE ID 986b-2016-10-05	CANISTER ID 1833	Matrix Ambient Air	DATE SAMPLED 05-Oct-16 18:45
DESCRIPTION:			
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	Benzyl chloride	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Bromodichloromethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Bromoform	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Bromomethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Carbon disulfide	I	0.05	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Carbon tetrachloride	I	0.12	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Chlorobenzene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Chloroethane	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Chloroform	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Chloromethane	I	0.41	ppbv	0.04	AC-058	15-Oct-16
16100077-001	cis-1,2-Dichloroethene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	cis-1,3-Dichloropropene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	cis-2-Butene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	cis-2-Pentene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Cyclohexane	I	0.53	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Cyclopentane		31.2	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Dibromochloromethane	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Ethanol		0.9	ppbv	0.5	AC-058	15-Oct-16
16100077-001	Ethyl acetate	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Ethylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Freon-11	I	0.33	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Freon-113	I	0.05	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Freon-114	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Freon-12		0.65	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Hexachloro-1,3-butadiene	K, T, U	< 0.90	ppbv	0.90	AC-058	15-Oct-16

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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	Isobutane		1.07	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Isopentane		13.8	ppbv	0.05	AC-058	15-Oct-16
16100077-001	Isoprene	I	0.07	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Isopropyl alcohol	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Isopropylbenzene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	m,p-Xylene	I	0.07	ppbv	0.05	AC-058	15-Oct-16
16100077-001	m-Diethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	m-Ethyltoluene	K, T, U	< 0.14	ppbv	0.14	AC-058	15-Oct-16
16100077-001	Methyl butyl ketone	K, T, U	< 0.90	ppbv	0.90	AC-058	15-Oct-16
16100077-001	Methyl ethyl ketone	K, T, U	< 0.5	ppbv	0.5	AC-058	15-Oct-16
16100077-001	Methyl isobutyl ketone		3.0	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Methyl methacrylate	K, T, U	< 0.13	ppbv	0.13	AC-058	15-Oct-16
16100077-001	Methyl tert butyl ether	K, T, U	< 0.05	ppbv	0.05	AC-058	15-Oct-16
16100077-001	Methylcyclohexane	I	0.18	ppbv	0.02	AC-058	15-Oct-16
16100077-001	Methylcyclopentane		0.63	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Methylene chloride		0.6	ppbv	0.5	AC-058	15-Oct-16
16100077-001	n-Butane		7.73	ppbv	0.05	AC-058	15-Oct-16
16100077-001	n-Decane	K, T, U	< 0.11	ppbv	0.11	AC-058	15-Oct-16
16100077-001	n-Dodecane	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	n-Heptane	I	0.13	ppbv	0.02	AC-058	15-Oct-16
16100077-001	n-Hexane		1.59	ppbv	0.02	AC-058	15-Oct-16
16100077-001	n-Octane	I	0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	n-Pentane		11.9	ppbv	0.2	AC-058	15-Oct-16
16100077-001	n-Propylbenzene	K, T, U	< 0.09	ppbv	0.09	AC-058	15-Oct-16
16100077-001	n-Undecane	K, T, U	< 0.9	ppbv	0.9	AC-058	15-Oct-16

CLIENT SAMPLE ID 986b-2016-10-05	CANISTER ID 1833	Matrix Ambient Air	DATE SAMPLED 05-Oct-16 18:45
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Lab ID	Parameter	Qualifier	Result	Units	RDL	Method	Analysis Date
16100077-001	Naphthalene	K, T, U	< 0.9	ppbv	0.9	AC-058	15-Oct-16
16100077-001	n-Nonane	I	0.03	ppbv	0.02	AC-058	15-Oct-16
16100077-001	o-Ethyltoluene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	o-Xylene	I	0.03	ppbv	0.02	AC-058	15-Oct-16
16100077-001	p-Diethylbenzene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	p-Ethyltoluene	K, T, U	< 0.13	ppbv	0.13	AC-058	15-Oct-16
16100077-001	Styrene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	Tetrachloroethylene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	Tetrahydrofuran	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Toluene	I	0.16	ppbv	0.02	AC-058	15-Oct-16
16100077-001	trans-1,2-Dichloroethylene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	trans-1,3-Dichloropropylene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	trans-2-Butene	K, T, U	< 0.02	ppbv	0.02	AC-058	15-Oct-16
16100077-001	trans-2-Pentene	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16
16100077-001	Trichloroethylene	K, T, U	< 0.07	ppbv	0.07	AC-058	15-Oct-16
16100077-001	Vinyl acetate	K, T, U	< 0.7	ppbv	0.7	AC-058	15-Oct-16
16100077-001	Vinyl chloride	K, T, U	< 0.04	ppbv	0.04	AC-058	15-Oct-16

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On behalf of: PJ Pretorius, Manager, Analysis and Testing Services

Date: Wednesday, October 26, 2016

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Revision History

Order ID	Ver	Date	Reason
16100077	01	26-Oct-16	Report created

Methods

Method	Description
AC-058	VOC - GC/MS Volatile Organic Compounds
NA-024	RSC - GC/SCD Reduced Sulphur Compound Screening Analysis
NA-025	C1C4 or - GC/FID Hydrocarbon Analysis

Qualifiers

Data Qualifier Translation

B	Blank contamination; Analyte detected above the method reporting limit in an associated blank
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1	Reported value is estimated; Surrogate recoveries limits were exceeded
J2	Reported value is estimated; No known QC criteria for this component
J3	Reported value is estimated; The value failed to meet QC criteria for either precision or accuracy
J4	Reported value is estimated; The sample matrix interfered with the analysis
K	Off-scale low. Actual value is known to be less than the value given
L	Off-scale high. Actual value is known to be greater than value given
N	Non-target analyte; Tentatively identified compound (using mass spectroscopy)
Q	Sample held beyond the accepted holding time
R	Rejected data; Not suitable for the projects intended use
T	Value reported is less than the laboratory method detection limit
U	Compound was analyzed for but not detected
V	Analyte was detected in both the sample and the associated method blank



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ENVIRONMENTAL ANALYTICAL SERVICES

TEST REPORT

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Order Comments



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TEST REPORT

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Sample Comments



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Result Comments

Note: Results relate only to items tested