Geochemistry for Energy
Dolan Integration Group
11025 Dover Street Unit 800
Westminster, CO 80021
p: 303.531.2030

Quantitative High Resolution Whole Oil Gas Chromatography
Analytical Results

Job #:	**260315541**
Lab #:	**DIG-043376**
Client:	**Energy and Carbon Management Commission**
Project/ Well Name:	**FAC 5 GAS LINE PRODUCT**
API:	
Facility ID:	
Sample Types:	**Oil**

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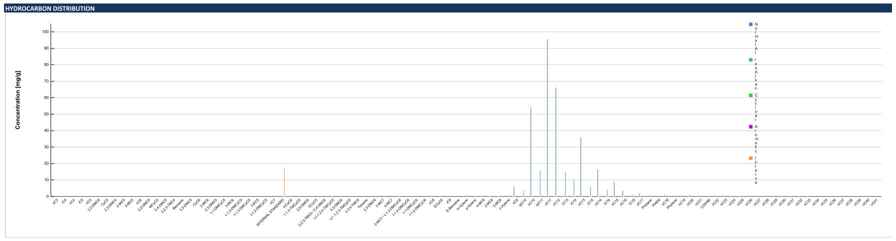
CHROMATOGRAMS

HYDROCARBON DISTRIBUTION



LABEL	nC3	iC4	nC4	iC5	nC5	2,2-DMC4	CyC5	2,3-DMC4	2-MC5	3-MC5	nC6	2,2-DMC5	MCyC5	2,4-DMC5
DESC	Normal Al	Iso-alkane	Normal Al	Iso-alkane	Normal Al	2,2-Dimetl	Cyclopent	2,3-Dimetl	2-Methylp	3-Methylp	Normal Al	2,2-Dimetl	Methylcycl	2,4-Dimetl
CONC [m														
CATEGOF	Normal Al	IsoAlkane	Normal Al	IsoAlkane	Normal Al	IsoAlkane	Cycloa kaı	IsoAlkane	IsoA kane	IsoA kane	Normal Al	IsoA kane	Cycloalkar	IsoAlkane
Normal Al														
IsoAlkane														
Cycloalka														
Aromatics														
Internal St														
Carbon#	3	4	4	5	5	6	5	6	6	6	6	7	6	7

LABEL	2,2,3-TMC	Benzene	3,3-DMC5	CyC6	2-MC6	2,3-DMC5	1,1-DMCy	3-MC6	c-1,3-DMC	t-1,3-DMC	3-EC5	t-1,2-DMC	nC7	INTERNA
DESC	2,2,3-Trim	Benzene	3,3-Dimetl	Cyclohexa	2-Methylh	2,3-Dimetl	1,1-Dimetl	3-Methylh	1-cis-3-Dir	1-trans-3-l	3-Ethylper	1-trans-2-l	Normal Al	Internal St
CONC [m														17.59
CATEGOF	IsoAlkane	Aromatics	IsoA kane	Cycloalkar	IsoA kane	IsoA kane	Cycloalkar	IsoAlkane	Cycloalkar	Cycloalkar	IsoAlkane	Cycloalkar	Normal Al	Internal St
Normal Al														
IsoAlkane														
Cycloalka														
Aromatics														
Internal St														17.59
Carbon#	7	6	7	6	7	7	7	7	7	7	6	7	7	0

LABEL	mCyC6	1,1,3-TMC	2,5-DMC6	ECyC5	2,2,3-TMC	c t-1,2,4-T	3,3-DMC6	c,t -1,2,3-T	2,3,4-TMC	Toluene	2,3-DMC6	2-MC7	4-MC7	3-MC7 / c-
DESC	Methylcyc	1,1,3,-Trim	2,5-Dimetl	Ethylcyclo	2,2,3-Trim	1,2,4-Trim	3,3-Dimetl	1,2 3-Trim	2,3,4-Trim	Toluene	2,3-Dimetl	2-Methylhe	4-Methy he	3-Methylhe
CONC [m	0.23					0.08								0.10
CATEGOF	Cycloa ka	Cycloa kaı	IsoAlkane	Cycloa kaı	IsoAlkane	Cycloa kaı	IsoAlkane	Cycloalkar	IsoA kane	Aromatics	IsoA kane	IsoA kane	IsoAlkane	Cycloa kar
Normal Al														
IsoAlkane														
Cycloalka	0.23					0.08								0.10
Aromatics														
Internal St														
Carbon#	7	8	8	7	8	8	8	8	8	7	8	8	8	8

LABEL	t-1,4-DMC	1,1-DMCy	t-1,2-DMC	nC8	ECyC6	iC9	E-Benzen	m-Xylene	p-Xylene	4-MC8	2-MC8	3-MC8	o-Xylene	nC9
DESC	1-trans-4-D	1,1-Dimet	1-trans-2-l	Normal Al	Ethylcyclo	Isoprenoic	Ethyl-benz	m-xylene	p-xylene	4-Methylo	2-Methyloc	3-Methyloc	o-xylene	Normal Al
CONC [m				0.29	0.14			0.18	0.05	0.28	0.39	0 47	0.23	6.01
CATEGOF	Cycloa kar	Cycloa ka	Cycloa kar	Normal Al	Cycloa kar	IsoAlkane	Aromatics	Aromatics	Aromatics	IsoA kane	IsoA kane	IsoA kane	Aromatics	Normal Al
Normal Al				0.29										6.01
IsoAlkane										0.28	0.39	0 47		
Cycloalka					0.14									
Aromatics								0.18	0.05				0.23	
Internal St														
Carbon#	8	8	8	8	8	9	8	8	8	9	9	9	8	9

LABEL	ipC10	nC10	ipC11	nC11	nC12	iC13	iC14	nC13	iC15	nC14	iC16	nC15	nC16	iC18
DESC	Isoprenoic	Normal Al	Isoprenoic	Normal Al	Normal Al	Isoprenoid	Isoprenoic	Normal Al	Isoprenoic	Normal Al	Isoprenoic	Normal Al	Normal Al	Isoprenoic
CONC [m	3.66	54.18	15.95	95.47	66.21	14.90	10.11	35.90	5.99	16.42	3.99	8.74	3.47	1.07
CATEGOF	IsoAlkane	Normal Al	IsoAlkane	Normal Al	Normal Al	IsoAlkane	IsoAlkane	Normal Al	IsoA kane	Normal Al	IsoA kane	Normal Al	Normal Al	IsoA kane
Normal Al		54.18		95.47	66.21			35.90		16.42		8.74	3.47	
IsoAlkane	3.66		15.95			14.90	10.11		5.99		3.99			1.07
Cycloalka														
Aromatics														
Internal St														
Carbon#	10	10	11	11	12	13	14	13	15	14	16	15	16	18

LABEL	nC17	Pristane	PHEN	nC18	Phytane	nC19	nC20	nC21	C25HBI	nC22	nC23	nC24	nC25	nC26
DESC	Normal Al	Isoprenoic	Phenanthı	Normal Al	Isoprenoic	Normal Al	Normal Al	Normal Al	Highly Bra	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al
CONC [m	1.84	0 94		1.10	0.35	0.74	0.95	0.63		0.70	0.59	0.40	0.37	0.34
CATEGOF	Normal Al	IsoAlkane	Aromatics	Normal Al	IsoAlkane	Normal Al	Normal Al	Normal Al	IsoAlkane	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al
Normal Al	1.84			1.10		0.74	0.95	0.63		0.70	0.59	0.40	0.37	0.34
IsoAlkane		0 94			0.35									
Cycloalka														
Aromatics														
Internal St														
Carbon#	17	19	14	18	20	19	20	21	25	22	23	24	25	26

LABEL	nC27	nC28	nC29	nC30	nC31	nC32	nC33	nC34	nC35	nC36	nC37	nC38	nC39	nC40	nC41
DESC	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al
CONC [m	0.35	0.22	0.18	0.14	0.17	0.11	0.10								
CATEGOF	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al	Normal Al
Normal Al	0.35	0.22	0.18	0.14	0.17	0.11	0.10								
IsoAlkane															
Cycloalka															
Aromatics															
Internal St															
Carbon#	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

THOMPSON PLOTS

Definitions & Interpretations

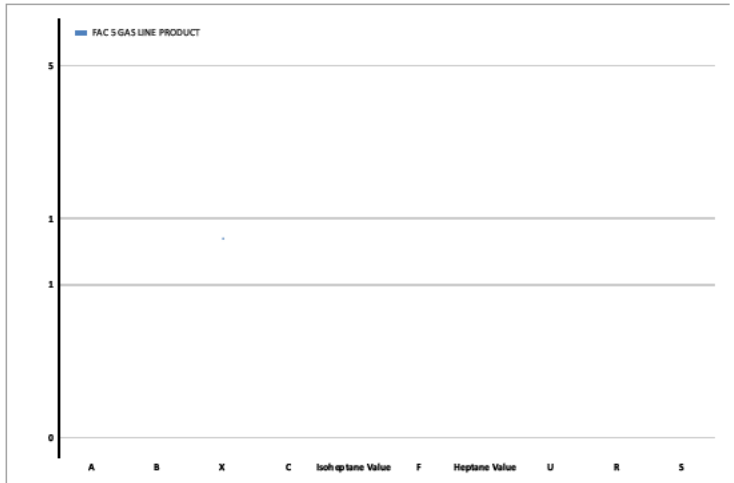
Thompson ratios describe processes affecting light hydrocarbons (C_6-C_7)

Name	Ratio	Property	Process
A	benzene / *n*-hexane	Aromaticity	Fractionation, water washing, TSR
B	toluene / *n*-heptane	Aromaticity	Fractionation, water washing, TSR
X	(*m*-xylene + *p*-xylene) / *n*-octane	Aromaticity	Fractionation, water washing, TSR
C	(*n*-hexane + *n*-heptane) / (cyclohexane + methylcyclohexane)	Paraffiniciy	Maturity, biodegradation
I	(2- + 3-methylhexane) / (1*c*3- + 1*t*3- + 1*t* 2-DMCP)	Paraffiniciy	Maturity, source, biodegradation
F	*n*-heptane / methylcyclohexane	Paraffiniciy	Maturity, biodegradation
H	(100**n*-heptane)/(Σcyclohexane + ΣC_7 HCs)	Paraffiniciy	Maturity, source, biodegradation
S	*n*-hexane / 2,2-dimethylbutane	Paraffin branching	Maturity, source, biodegradation
R	*n*-heptane / 2-methylhexane	Paraffin branching	Maturity, source, biodegradation
U	cyclohexane / methylcyclohexane	Naphthene branching	Maturity, source

DMCP, dimethylcyclopentane; H, heptane value; I, isoheptane value; Σcyclohexane, [cyclohexane + 1,1-DMCP + 1*c*3-DMCP + 1*t*3-DMCP + 1*t* 2-DMCP + methylcyclohexane]; ΣC_7 HCs, [Σcyclohexane + 2-methylhexane + 3-methylhexane + *n*-heptane + 2,3-dimethylpentane + 3-ethylpentane]; 1*c*3, 1-*cis*-3; 1*t*3, 1-*trans*-3.

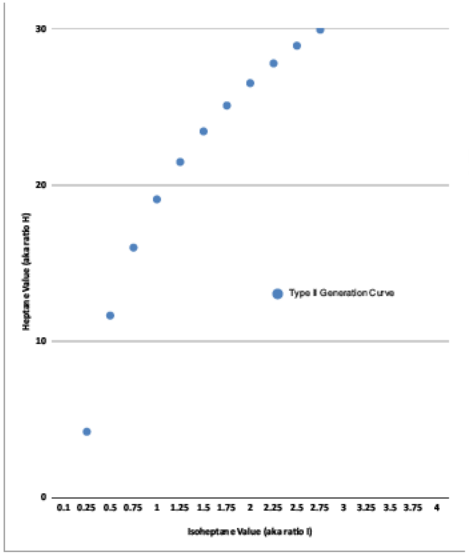
THOMPSON PLOTS

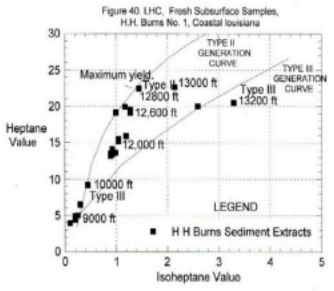
Thompson Ratios



THOMPSON PLOTS

Heptane Plot - Light Hydrocarbon Maturity





Thompson K F M. Classification and thermal history of petroleum based on light hydrocarbons. Geochimica et Cosmochimica Acta, 1983, 47(2): 303–316.

THOMPSON PLOTS

Oil Alteration Vectors

Modified from Thompson, KFM 1987 (Fig. 12)

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Evaporative Fractionation

- Physical processes can also fractionate petroleum during migration.
- As petroleum migrates upward, temperature and pressure decrease. If the bubble point is reached, a single phase fractionates into liquid and gas phases that can migrate separately.
- Partitioning of petroleum between these phases depends on the vapor equilibrium constants for each component (Thompson, 1987). This can result in reservoirs filled with petroleum from a common source, but with different gross compositions.
- The effects of evaporative or phase fractionation were described based mostly on laboratory experiments (e.g. Thompson, 1987; Larter and Mills, 1991; van Graas et al.. 2000).
- The process leads to oils deficient in light ends and enriched in aromatics, as exemplified by many U.S. Gulf Coast oils (Thompson, 1987, 1988).

Peters & Fowler, Organic Geochemistry 33 (2002) pp 5-36

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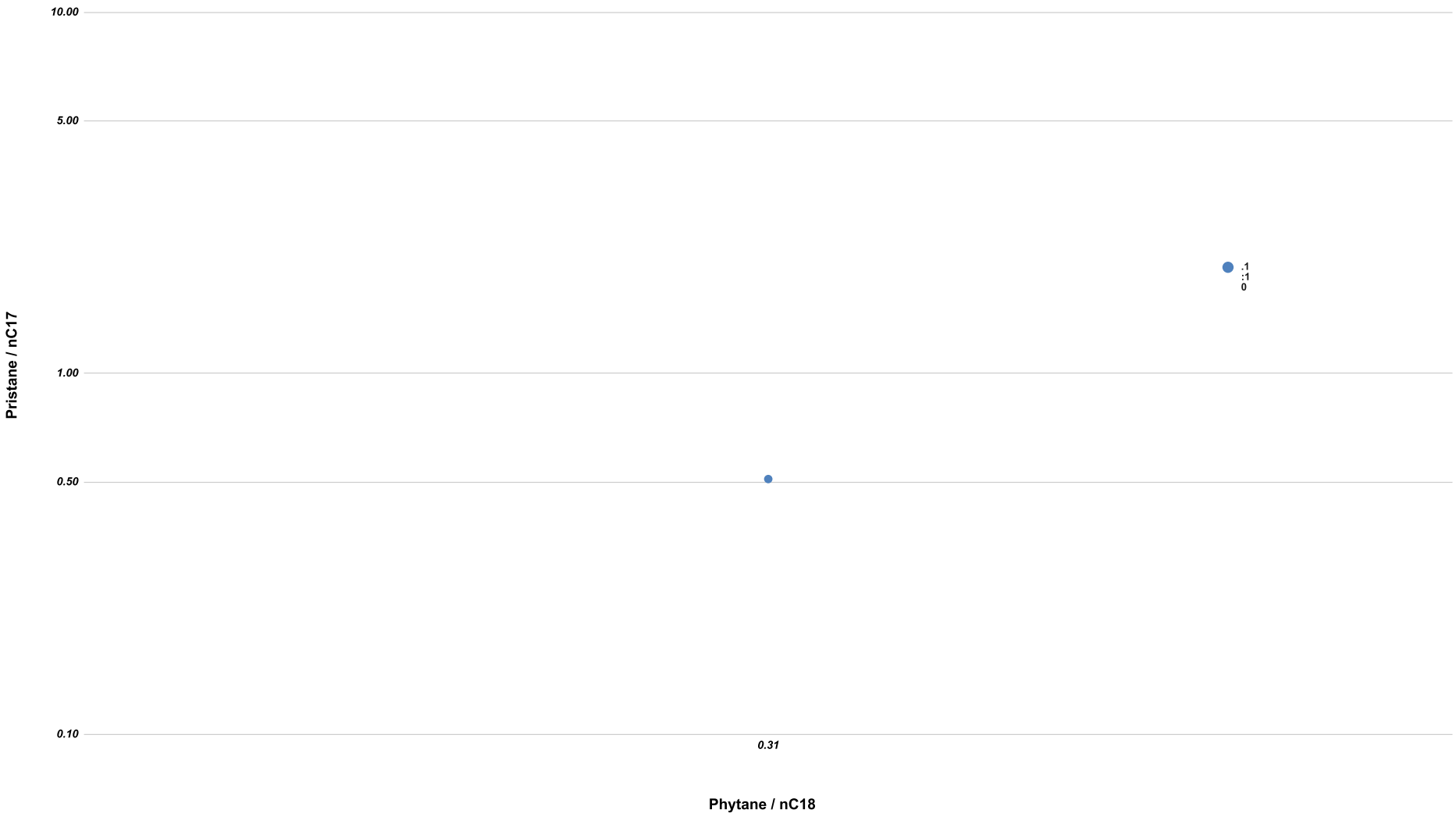
CONNAN PLOT - SOURCE ROCK DEPOSITION/MATURATION CHARACTERIZATION



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HALPERN TRANSFORMATION & CORRELATION RATIOS

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Table 7.3. *Halpern (1995) C_7 ratios for use in star diagrams to differentiate oils*

Name	Ratio	ΔBP (°C)	ΔSolubility (ppm)	Process
TR1	Toluene/X	22.8	496	Water washing
TR2	nC_7/X	10.6	−21.8	
TR3	3-Methylhexane/X	4.0	−21.4	
TR4	2-Methylhexane/X	2.2	−21.5	
TR5	P2/X	(3.2)	(−21.4)	
TR6	1-*cis*-2-Dimethylcyclopentane/X	11.7	−11.0	
TR7	1-*trans*-3-Dimethylcyclopentane/X	3.0	−4.0	
TR8	P2/P3	(6)	(−2.4)	
C1	2,2-Dimethylpentane/P3	(−5.8)	(−0.6)	
C2	2,3-Dimethylpentane/P3	(4.8)	(0.3)	
C3	2,4-Dimethylpentane/P3	(−4.5)	(−0.6)	
C4	3,3-Dimethylpentane/P3	(1.1)	(0.9)	
C5	3-Ethylpentane/P3	(8.5)	(−2.0)	

Biodegradation ↑ Evaporation

Correlation ↑ ↓

X = 1,1-dimethylcyclopentane, boiling point 87.8°C, solubility 24 ppm. P2 = 2-methylhexane + 3-methylhexane, boiling point 91°C, solubility 2.6 ppm. P3 = 2,2-dimethylpentane + 2,3-dimethylpentane + 2,4-dimethylpentane + 3,3-dimethylpentane + 3-ethylpentane, boiling point 85°C, solubility 5 ppm.
ΔBP = boiling point numerator − boiling point denominator (°C).
ΔSolubility = solubility of numerator − solubility of denominator (ppm in distilled water).
Parentheses indicate average values for mixtures.

Organization	Reporting Organization	Reporting Organization Name	Order Number	Entity Requesting Analysis	Purpose	Project
	10206	Dolan Integration Group		Energy and Carbon Management Commission		

Sample	COGCC Facility No.	Sample Date and Time	API #	LAB Sample ID	Sample Type	Matrix	Comments	Project Number	Chain of Custody I	Date Received by Lab
		3/26/26 9:40		DIG-043376		LIQUID			FAC 5 GAS LINE P	3/26/2026

Batch	LabID	Lab Batch Identifier	Leach Date	Extract Date and Time	Extract Method	Start Date and Tim	Conc Method	Init Vol	Final Vol	Init Vol Units	Final Vol Units	Analysis Date and Tim	Report Basi	Comments	File Name	Column #
	10206															

Resu t	CAS Number	Analysis Name	Analysis Method	Analytical Method Modifier	Unit	Result Value	Qualifier	Test Type	Result Text	Data Flag	Dilution	Fraction Type	MDC	Requested MDC	Detection Limit	Instrument Detection Limit	Method De	Comments	AnalyticalBatchID
	75-28-5	ISOBUTANE	G02G		PPM	10	ND								10				260315541
	106-97-8	BUTANE	G02G		PPM	10	ND								10				260315541
	IC5	ISOPENTANE	G02G		PPM	10	ND								10				260315541
	109-66-0	PENTANE	G02G		PPM	10	ND								10				260315541
	75-83-2	2,2-DIMETHYLBUTANE	G02G		PPM	10	ND								10				260315541
	287-92-3	CYCLOPENTANE	G02G		PPM	10	ND								10				260315541
	79-29-8	2,3-DIMETHYLBUTANE	G02G		PPM	10	ND								10				260315541
	107-83-5	2-METHYLPENTANE	G02G		PPM	10	ND								10				260315541
	96-14-0	3-METHYLPENTANE	G02G		PPM	10	ND								10				260315541
	92112-69-1	HEXANEs	G02G		PPM	10	ND								10				260315541
	590-35-2	2,2-dimethylpentane	G02G		PPM	10	ND								10				260315541
	96-37-7	METHYLCYCLOPENTANE	G02G		PPM	10	ND								10				260315541
	108-08-7	2,4-dimethylpentane	G02G		PPM	10	ND								10				260315541
	464-06-2	2,2,3-trimethylbutane	G02G		PPM	10	ND								10				260315541
	71-43-2	BENZENE	G02G		PPM	10	ND								10				260315541
	562-44-2	3,3-dimethylpentane	G02G		PPM	10	ND								10				260315541
	110-82-7	CYCLOHEXANE	G02G		PPM	10	ND								10				260315541
	591-76-4	2-Methylhexane	G02G		PPM	10	ND								10				260315541
	565-59-3	2,3-dimethylpentane	G02G		PPM	10	ND								10				260315541
	1638-26-2	1,1-dimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	589-34-4	3-methylhexane	G02G		PPM	10	ND								10				260315541
	2453-00-1	cis-1,3-dimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	1759-58-6	trans-1,3-dimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	617-78-7	3-ethylpentane	G02G		PPM	10	ND								10				260315541
	28729-52-4	trans-1,2-dimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	142-82-5	HEPTANES, MIXED ISOMERS	G02G		PPM	10	ND								10				260315541
	108-87-2	METHYL CYCLOHEXANE	G02G		PPM	228									10				260315541
	4516-69-2	1,1,3-Trimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	1640-89-7	ethylcyclopentane	G02G		PPM	10	ND								10				260315541
	4850-28-6	1,2,4-trimethylcyclopentane	G02G		PPM	83									10				260315541
	2815-57-8	1,2,3-trimethylcyclopentane	G02G		PPM	10	ND								10				260315541
	108-88-3	TOLUENE	G02G		PPM	10	ND								10				260315541
	111-65-9	n-octane	G02G		PPM	292									10				260315541
	1072-05-5	isoprenoid C9	G02G		PPM	10	ND								10				260315541
	100-41-4	ETHYLBENZENE	G02G		PPM	10	ND								10				260315541
	108-38-3	m-XYLENE	G02G		PPM	185									10				260315541
	106-42-3	p-XYLENE	G02G		PPM	54									10				260315541
	95-47-6	o-XYLENE	G02G		PPM	229									10				260315541
	61193-19-9	Normal Alkane C9	G02G		PPM	6005									10				260315541
	2051-30-1	isoprenoid C10	G02G		PPM	3660									10				260315541
	74296-31-4	Propyl-benzene	G02G		PPM	10	ND								10				260315541
	124-18-5	Decane	G02G		PPM	54179									10				260315541
	17302-28-2	isoprenoid C11	G02G		PPM	15953									10				260315541
	1120-21-4	n-C11	G02G		PPM	95466									10				260315541
	112-40-3	n-C12	G02G		PPM	66209									10				260315541
	17301-23-4	isoprenoid C13	G02G		PPM	14904									10				260315541
	6864-53-5	isoprenoid C14	G02G		PPM	10114									10				260315541
	629-50-5	n-C13	G02G		PPM	35901									10				260315541
	3891-98-3	isoprenoid C15	G02G		PPM	5995									10				260315541
	629-59-4	n-C14	G02G		PPM	16418									10				260315541
	3891-99-4	isoprenoid C16	G02G		PPM	3994									10				260315541
	629-62-9	n-C15	G02G		PPM	8739									10				260315541
	544-76-3	n-C16	G02G		PPM	3472									10				260315541
	3892-00-0	isoprenoid C18	G02G		PPM	1073									10				260315541
	629-78-7	n-C17	G02G		PPM	1842									10				260315541
	1921-70-6	pristane	G02G		PPM	937									10				260315541
	85-01-8	PHENANTHRENE	G02G		PPM	10	ND								10				260315541
	593-45-3	n-C18	G02G		PPM	1104									10				260315541
	638-36-8	phytane	G02G		PPM	346									10				260315541
	629-92-5	n-C19	G02G		PPM	741									10				260315541
	112-95-8	n-C20	G02G		PPM	953									10				260315541
	629-94-7	n-C21	G02G		PPM	632									10				260315541
	73303-36-3	highly branched C25 isoprenoid	G02G		PPM	10	ND								10				260315541
	629-97-0	n-C22	G02G		PPM	699									10				260315541
	638-67-5	n-C23	G02G		PPM	594									10				260315541
	646-31-1	n-C24	G02G		PPM	400									10				260315541
	629-99-2	n-C25	G02G		PPM	366									10				260315541
	630-01-3	n-C26	G02G		PPM	341									10				260315541
	593-49-7	n-C27	G02G		PPM	352									10				260315541
	630-02-4	n-C28	G02G		PPM	224									10				260315541
	630-03-5	n-C29	G02G		PPM	182									10				260315541
	638-68-6	n-C30	G02G		PPM	145									10				260315541
	630-04-6	n-C31	G02G		PPM	174									10				260315541
	544-85-4	n-c32	G02G		PPM	112									10				260315541
	630-05-7	n-C33	G02G		PPM	97									10				260315541
	14167-59-0	n-C34	G02G		PPM	10	ND								10				260315541
	630-07-9	n-C35	G02G		PPM	10	ND								10				260315541
	630-06-8	n-C36	G02G		PPM	10	ND								10				260315541
	7194-84-5	n-C37	G02G		PPM	10	ND								10				260315541
	7194-85-6	n-C38	G02G		PPM	10	ND								10				260315541
	7194-86-7	n-C39	G02G		PPM	10	ND								10				260315541
	4181-95-7	n-C40	G02G		PPM	10	ND								10				260315541
	7194-87-8	n-C41	G02G		PPM	10	ND								10				260315541
	75-28-5	ISOBUTANE	G02G		AREA COUNT	1	ND								1				260315541
	106-97-8	BUTANE	G02G		AREA COUNT	1	ND								1				260315541
	IC5	ISOPENTANE	G02G		AREA COUNT	1	ND								1				260315541
	109-66-0	PENTANE	G02G		AREA COUNT	1	ND								1				260315541
	75-83-2	2,2-DIMETHYLBUTANE	G02G		AREA COUNT	1	ND								1				260315541
	287-92-3	CYCLOPENTANE	G02G		AREA COUNT	1	ND								1				260315541
	79-29-8	2,3-DIMETHYLBUTANE	G02G		AREA COUNT	1	ND								1				260315541
	107-83-5	2-METHYLPENTANE	G02G		AREA COUNT	1	ND								1				260315541
	96-14-0	3-METHYLPENTANE	G02G		AREA COUNT	1	ND								1				260315541
	92112-69-1	HEXANEs	G02G		AREA COUNT	1	ND								1				260315541
	590-35-2	2,2-dimethylpentane	G02G		AREA COUNT	1	ND								1				260315541
	96-37-7	METHYLCYCLOPENTANE	G02G		AREA COUNT	1	ND								1				260315541
	108-08-7	2,4-dimethylpentane	G02G		AREA COUNT	1	ND								1				260315541
	464-06-2	2,2,3-trimethylbutane	G02G		AREA COUNT	1	ND								1				260315541
	71-43-2	BENZENE	G02G		AREA COUNT	1	ND								1				260315541
	562-44-2	3,3-dimethylpentane	G02G		AREA COUNT	1	ND								1				260315541
	110-82-7	CYCLOHEXANE	G02G		AREA COUNT	1	ND								1				260315541
	591-76-4	2-Methylhexane	G02G		AREA COUNT	1	ND								1				260315541
	565-59-3	2,3-dimethylpentane	G02G		AREA COUNT	1	ND								1				260315541
	1638-26-2	1,1-dimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	589-34-4	3-methylhexane	G02G		AREA COUNT	1	ND								1				260315541
	2453-00-1	cis-1,3-dimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	1759-58-6	trans-1,3-dimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	617-78-7	3-ethylpentane	G02G		AREA COUNT	1	ND								1				260315541
	28729-52-4	trans-1,2-dimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	142-82-5	HEPTANES, MIXED ISOMERS	G02G		AREA COUNT	1	ND								1				260315541
	108-87-2	METHYL CYCLOHEXANE	G02G		AREA COUNT	2.787									1				260315541
	4516-69-2	1,1,3-Trimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	1640-89-7	ethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	4850-28-6	1,2,4-trimethylcyclopentane	G02G		AREA COUNT	1.01									1				260315541
	2815-57-8	1,2,3-trimethylcyclopentane	G02G		AREA COUNT	1	ND								1				260315541
	108-88-3	TOLUENE	G02G		AREA COUNT	1	ND								1				260315541
	111-65-9	n-octane	G02G		AREA COUNT	3.632									1				260315541
	1072-05-5	isoprenoid C9	G02G		AREA COUNT	1	ND								1				260315541
	100-41-4	ETHYLBENZENE	G02G		AREA COUNT	1	ND								1				260315541
	108-38-3	m-XYLENE	G02G		AREA COUNT	2.345									1				260315541
	106-42-3	p-XYLENE	G02G		AREA COUNT	0.655									1				260315541
	95-47-6	o-XYLENE	G02G		AREA COUNT	2.845									1				260315541
	61193-19-9	Normal Alkane C9	G02G		AREA COUNT	74.454									1				260315541
	2051-30-1	isoprenoid C10	G02G		AREA COUNT	45.286									1				260315541
	74296-31-4	Propyl-benzene	G02G		AREA COUNT	1	ND								1				260315541
	124-18-5	Decane	G02G		AREA COUNT	670.361									1				260315541
	17302-28-2	isoprenoid C11	G02G		AREA COUNT	197.186									1				260315541
	1120-21-4	n-C11	G02G		AREA COUNT	1180.024									1				260315541
	112-40-3	n-C12	G02G		AREA COUNT	817.562									1				260315541
	17301-23-4	isoprenoid C13	G02G		AREA COUNT	183.846									1				260315541
	6864-53-5	isoprenoid C14	G02G		AREA COUNT	124.637									1				260315541
	629-50-5	n-C13	G02G		AREA COUNT	442.86									1				260315541
	3891-98-3	isoprenoid C15	G02G		AREA COUNT	73.8									1				260315541
	629-59-4	n-C14	G02G		AREA COUNT	202.318									1				260315541
	3891-99-4	isoprenoid C16	G02G		AREA COUNT	49.167									1				260315541
	629-62-9	n-C15	G02G		AREA COUNT	107.588									1				260315541
	544-76-3	n-C16	G02G		AREA COUNT	42.748									1				260315541
	3892-00-0	isoprenoid C18	G02G		AREA COUNT	13.193									1				260315541
	629-78-7	n-C17	G02G		AREA COUNT	22.648									1				260315541
	1921-70-6	pristane	G02G		AREA COUNT	11.529									1				260315541
	85-01-8	PHENANTHRENE	G02G		AREA COUNT	1	ND								1				260315541
	593-45-3	n-C18	G02G		AREA COUNT	13.581									1				260315541
	638-36-8	phytane	G02G		AREA COUNT	4.255									1				260315541
	629-92-5	n-C19	G02G		AREA COUNT	9.116									1				260315541
	112-95-8	n-C20	G02G		AREA COUNT	11.711									1				260315541
	629-94-7	n-C21	G02G		AREA COUNT	7.769									1				260315541
	73303-36-3	highly branched C25 isoprenoid	G02G		AREA COUNT	1	ND								1				260315541
	629-97-0	n-C22	G02G		AREA COUNT	8.578									1				260315541
	638-67-5	n-C23	G02G		AREA COUNT	7.286									1				260315541
	646-31-1	n-C24	G02G		AREA COUNT	4.913									1				260315541
	629-99-2	n-C25	G02G		AREA COUNT	4.496									1				260315541
	630-01-3	n-C26	G02G		AREA COUNT	4.18									1				260315541
	593-49-7	n-C27	G02G		AREA COUNT	4.312									1				260315541
	630-02-4	n-C28	G02G		AREA COUNT	2.748									1				260315541
	630-03-5	n-C29	G02G		AREA COUNT	2.236									1				260315541
	638-68-6	n-C30	G02G		AREA COUNT	1.774									1				260315541
	630-04-6	n-C31	G02G		AREA COUNT	2.13									1				260315541
	544-85-4	n-c32	G02G		AREA COUNT	1.367									1				260315541
	630-05-7	n-C33	G02G		AREA COUNT	1.188									1				260315541
	14167-59-0	n-C34	G02G		AREA COUNT	1	ND								1				260315541
	630-07-9	n-C35	G02G		AREA COUNT	1	ND								1				260315541
	630-06-8	n-C36	G02G		AREA COUNT	1	ND								1				260315541
	7194-84-5	n-C37	G02G		AREA COUNT	1	ND								1				260315541
	7194-85-6	n-C38	G02G		AREA COUNT	1	ND								1				260315541
	7194-86-7	n-C39	G02G		AREA COUNT	1	ND								1				260315541
	4181-95-7	n-C40	G02G		AREA COUNT	1	ND								1				260315541
	7194-87-8	n-C41	G02G		AREA COUNT	1	ND								1				260315541
	IP19/IP20	pristane/phytane ratio	CALC		Ratio	2.71													260315541
	IP19/nC17	pristane/nC17 ratio	CALC		Ratio	0.509													260315541
	phytane/nC18	phytane/nC18 ratio	CALC		Ratio	0.313													260315541
	nC18/(nC18+nC19)	nC18/(nC18+nC19) ratio	CALC		Ratio	0.598													260315541
	nC17/(nC18+nC29)	nC17/(nC18+nC29) ratio	CALC		Ratio	0.91													260315541
	CPI Hunt	carbon preference index (Hunt)	CALC		Ratio	1.162													260315541
	CPI Marzi	carbon preference index (Marzi)	CALC		Ratio	1.133													260315541
	n paraffins	n paraffin %	CALC		%	56.951													260315541
	isoprenoids	isoprenoids %	CALC		%	10.963													260315541
	cycloparaffins	cyc oparaffins %	CALC		%	0.086													260315541
	isoparaffins	isoparaffins % (branched)	CALC		%	0.219													260315541
	BTX aromatics	BTX aromatics %	CALC		%	0.091													260315541
	resolved unknowns	resolved unknowns %	CALC		%	30.646													260315541

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Send Data to:	Send Invoice to (if different):	Additional Information:
Name: Laurel Anderson, Nikki Graber	Name: Laurel Anderson	AFE #: —
Company: Energy and Carbon Management Commission	Company: Energy and Carbon Management Commission	Project: Spill ID 492917
Address: 1120 Lincoln Street, Suite 801	Address: 1120 Lincoln Street, Suite 801	PO #: GAE PHAA*056
City, State: Denver, CO 80203	City, State: Denver, CO 80203	Location: KPK FAC. 5 GAS LINE SPILL
Phone: 970-404-9911	Phone: 970-404-9911	Sampled By: Laurel Anderson
Email: laurel.anderson@state.co.us, Nikki.graber@state.co.us	Email: laurel.anderson@state.co.us	API #: —

Turnaround Time**: (•) Standard (≤ 10 Business days) ( ) Rush (≤ 5 Business days) ( ) Expedited Rush (≤ 3 Business days)

Container Number	Sample Identification	Date Sampled	Time	Sample Type*	Gas Composition	d13C of Methane (C1)	d13C of Ethane (C2)	d13C of Propane+ (C3+)	d13C of Carbon Dioxide (CO2)	dD of Methane (C1)	Whole Oil Gas Chromatography	d18O and dD Isotopes of Water	RSK 175 Dissolved Gas Quantification
2	FAC 5 GAS LINE PRODUCT	3.26.26	09:40	OIL							X		
2	FAC 5 GAS LINE PRODUCT	3.26.26	09:42	OIL + WATER*									

Chain of Custody Record

Comments: *RUN VOAS (OIL) 2-40Z JARS PROVIDED AS EXTRA IF NEEDED

Relinquished by Signature	Company	Date	Time	Received by Signature	Company	Date	Time
[signature]	ECMC	3.26.26	10:56	[signature]	DIG	3/26/26	10:56

*Gas composition vs RSK-175 - Gas composition is a basic analysis of the concentration (ppm) of gases within the headspace of the sample (headspace is created at the lab). RSK-175 is a specific analysis technique combined with calculations to give the total dissolved gas of each species in the water sample (mg/L). Why one or the other? Gas composition gives us a quick, general look at relative concentrations and ratios (e.g., gas wetness). RSK-175 gives us an exact total of gas present in the sample (headspace and dissolved in the water). Questions? Give us a call at 303-531-2030.

** Rush and Expedited Rush turnaround time analysis will incur additional costs at 2x and 3x the standard turnaround time pricing.

* WHOLE OIL GAS CHROMATOGRAPHY W/ PHYTANE & PRISTANE