

Albian Heavy Synthetic

Origin

Alberta, Canada

Physical Properties

		Albian Heavy Synthetic % Weathered (w/w)	
		0%	22.6%
Evaporation Equation			
Sulphur Content (w/w)		2.28	2.91
Water Content (w/w)		1.5	1.3
Flash Point (°C)		-23	168
Pour Point (°C)		< -30	9
Density (g/mL)	0°C	0.9457	1.0271
	15°C	0.9371	1.0174
API Gravity		19.0	
Dynamic Viscosity (mPa•s)	0°C	465	156
	15°C	6.34 E+6	3.74 E+5
Emulsion Formation Tendency and Stability	Stability	Stable	Entrained
	Complex Modulus (Pa)	1880	---
	Water Content	89.4	16.2
Chemical Dispersability (using CoreExit 9500)		15.2	< 10%
Surface Tension (mN/m)	0°C	29.7	NM
	15°C	28.9	NM
Interfacial Tension (Oil/Water, mN/m)	0°C	29.0	NM
	15°C	26.5	NM
Interfacial Tension (Oil/33% Brine, mN/m)	0°C	28.2	NM
	15°C	23.2	NM

NM: Not Measurable

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Boiling Point Distribution

Yield on Crude (cum. wt. %)	Albian Heavy Synthetic Temperature (°C)	
	0% weathered	22.6% weathered
IBP	21	232
5	59	278
10	93	304
15	119	326
20	151	346
25	191	364
30	239	380
35	278	394
40	310	406
45	340	418
50	365	429
55	387	439
60	405	448
65	421	458
70	436	467
75	449	477
80	462	486
85	476	496
90	489	506
95	504	517
99.5	519	528

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Hydrocarbon Groups

Component	Albian Heavy Synthetic Concentration (%)	
	0% weathered	22.6% weathered
Saturates	41.5	31.4
Aromatics	27.0	29.3
Resins	26.2	36.3
Asphaltenes	6.0	6.8

Volatile Organic Compounds

	Albian Heavy Synthetic Concentration (mg/g oil)	
	0% weathered	22.6% weathered
Benzene	0.723	ND
Toluene	3.644	ND
Ethylbenzene	0.808	ND
<i>meta</i> - and <i>para</i> -Xylene	2.970	ND
<i>ortho</i> -Xylene	0.996	ND
ΣBTEX	9.141	ND
Isopropylbenzene	0.280	ND
Propylbenzene	0.243	ND
3- and 4-Ethyltoluene	1.068	ND
1,3,5-Trimethylbenzene	0.344	ND
2-Ethyltoluene	0.508	ND
1,2,4-Trimethylbenzene	1.14	ND
1,2,3-Trimethylbenzene	0.127	ND
ΣC₃-Benzenes	3.711	ND
Isobutylbenzene	0.026	ND
1-Methyl-2-isopropylbenzene	0.029	ND
1,2-Dimethyl-4-ethylbenzene	0.204	ND
Amylbenzene	0.092	ND
n-Hexylbenzene	0.012	ND
BTEX + ΣC₃-Benzenes	12.85	ND
All Target Alkyl-benzenes	13.22	ND

*Note that ΣC_3 -Benzenes includes eight isomers.

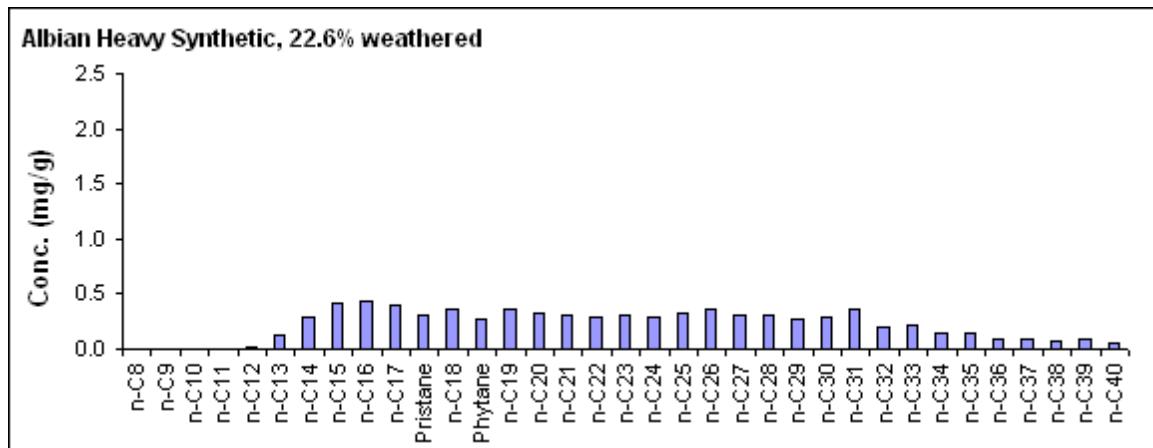
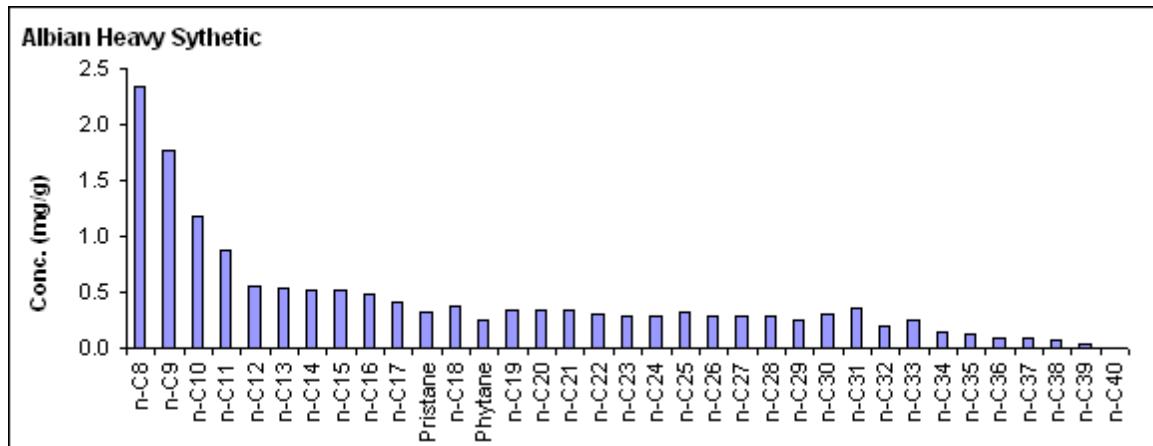
ND: Not Detected

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n-Alkane Distributions

<i>n</i> -Alkane Component	Albian Heavy Synthetic Concentration (mg/g oil)	
	0% weathered	22.6% weathered
<i>n</i> -C ₈	2.33	0.00
<i>n</i> -C ₉	1.76	0.00
<i>n</i> -C ₁₀	1.18	0.00
<i>n</i> -C ₁₁	0.87	0.00
<i>n</i> -C ₁₂	0.55	0.02
<i>n</i> -C ₁₃	0.53	0.13
<i>n</i> -C ₁₄	0.52	0.28
<i>n</i> -C ₁₅	0.52	0.41
<i>n</i> -C ₁₆	0.49	0.43
<i>n</i> -C ₁₇	0.40	0.40
Pristane	0.32	0.30
<i>n</i> -C ₁₈	0.36	0.35
Phytane	0.27	0.27
<i>n</i> -C ₁₉	0.35	0.37
<i>n</i> -C ₂₀	0.34	0.32
<i>n</i> -C ₂₁	0.33	0.30
<i>n</i> -C ₂₂	0.30	0.30
<i>n</i> -C ₂₃	0.29	0.31
<i>n</i> -C ₂₄	0.28	0.30
<i>n</i> -C ₂₅	0.33	0.34
<i>n</i> -C ₂₆	0.29	0.35
<i>n</i> -C ₂₇	0.29	0.31
<i>n</i> -C ₂₈	0.29	0.30
<i>n</i> -C ₂₉	0.25	0.28
<i>n</i> -C ₃₀	0.30	0.29
<i>n</i> -C ₃₁	0.35	0.36
<i>n</i> -C ₃₂	0.20	0.20
<i>n</i> -C ₃₃	0.26	0.22
<i>n</i> -C ₃₄	0.15	0.15
<i>n</i> -C ₃₅	0.14	0.14
<i>n</i> -C ₃₆	0.09	0.09
<i>n</i> -C ₃₇	0.08	0.09
<i>n</i> -C ₃₈	0.07	0.08
<i>n</i> -C ₃₉	0.03	0.08
<i>n</i> -C ₄₀	0.00	0.05
Σ n-Alkanes	15.1	7.83
Diagnostic ratios		
C ₁₇ /PRISTANE	1.27	1.32
C ₁₈ /PHYTANE	1.33	1.32
PRISTANE/PHYTANE	1.16	1.14
Σ Odd Alkanes	6.78	3.75
Σ Even Alkanes	7.73	3.53
CPI	0.88	1.06

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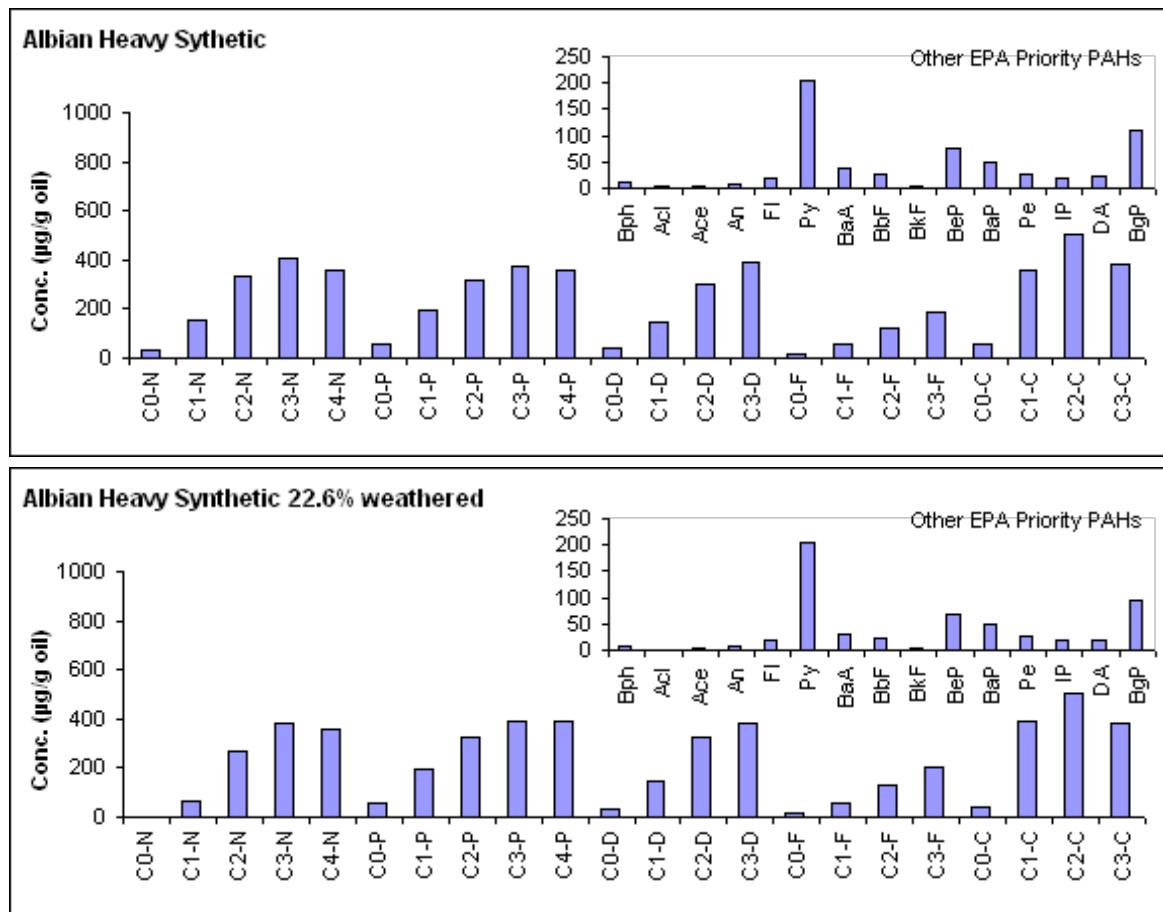
n-Alkane Distributions for Albian Heavy Synthetic

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PAH Distributions

Alkylated PAHs	Albian Heavy Synthetic Concentration (µg/g oil)	
	0% weathered	22.6% weathered
Naphthalene		
C0-N	30.5	2.43
C1-N	155	66.4
C2-N	333	267
C3-N	406	384
C4-N	354	345
ΣN	1278	1065
Phenanthrene		
C0-P	55.1	55.4
C1-P	195	195
C2-P	321	329
C3-P	374	388
C4-P	357	387
ΣP	1302	1354
Dibenzothiophene		
C0-D	36.9	35.9
C1-D	147	147
C2-D	302	328
C3-D	390.4	381
ΣD	877	891
Fluorene		
C0-F	14.1	13.5
C1-F	53.9	55.3
C2-F	124	127
C3-F	188	204
ΣF	380	399
Chrysene		
C0-C	53.2	43.9
C1-C	359	388
C2-C	502	505
C3-C	379	380
ΣC	1294	1317
Σ alkylated PAHs	5131	5027
2-m-N:1-m-N	1.62	1.34
(3+-2-)/(4-9-+1-m-phen)	1.57	1.63
4:-2/-3:-1-m-DBT	1.00:0.66:0.45	1.00:0.66:0.46
(C2D/C2P):(C3D/C3P)	0.94:1.04	1.00:0.98
C0N:C1N:C2N:C3N:C4N	0.09:0.44:0.94:1.15:1.00	0.01:0.19:0.78:1.11:1.00
$\Sigma N:\Sigma P:\Sigma DBT:\Sigma F:\Sigma C$	0.98:1.00:0.67:0.29:0.99	0.79:1.00:0.66:0.29:0.97
EPA Priority PAHs		
Biphenyl	13.0	8.21
Acenaphthylene	1.94	1.65
Acenaphthene	4.75	4.41
Anthracene	6.22	6.57
Fluoranthene	19.2	18.0
Pyrene	206	204
Benz(a)anthracene	37.8	31.9
Benzo(b)fluoranthene	25.0	23.6
Benzo(k)fluoranthene	5.66	4.92
Benzo(e)pyrene	75.3	69.6
Benzo(a)pyrene	49.6	47.9
Perylene	28.1	26.5
Indeno(1,2,3cd)pyrene	20.5	20.2
Dibenzo(a,h)anthracene	22.2	19.9
Benzo(ghi)perylene	109	93.3
Σ EPA Priority PAHs	624	581
Σ PAHs	5755	5607

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PAH Distribution for Albian Heavy Synthetic

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Biomarker Distributions

Biomarker	Albian Heavy Synthetic Concentration ($\mu\text{g/g oil}$)	
	0% weathered	22.6% weathered
C21	16.0	16.2
C22	6.82	7.02
C23	46.9	46.0
C24	24.2	24.1
Ts	13.5	13.1
Tm	55.8	55.4
C29	97.1	95.8
C30	114	114
C31(S)	46.9	46.4
C31(R)	35.7	34.6
C32(S)	31.4	31.0
C32(R)	23.6	23.3
C33(S)	24.2	23.5
C33(R)	16.1	15.7
C34(S)	17.8	16.8
C34(R)	10.8	11.2
C35(S)	19.0	19.2
C35(R)	12.9	13.0
C27 $\alpha\beta\beta$ steranes	76.5	78.3
C28 $\alpha\beta\beta$ steranes	55.7	56.3
C29 $\alpha\beta\beta$ steranes	84.9	86.8
Σ Biomarkers	829	828
Diagnostic ratios		
C23/C24	1.94	1.91
C23/C30	0.41	0.40
C24/C30	0.21	0.21
C29/C30	0.85	0.84
C31(S)/C31(R)	1.31	1.34
C32(S)/C32(R)	1.33	1.33
Ts/Tm	0.24	0.24
C27 $\alpha\beta\beta$ /C29 $\alpha\beta\beta$	0.90	0.90
C30/ Σ (C31...C35)	0.48	0.49