

Naphtha (Coal Tar)

		Data	Notes	Reference ID
Mixture of benzene, toluene, and xylenes.				CHRIS 91
Colour		Colourless to pale yellow		CHRIS 91
Flash Point (°C)		42		CHRIS 91
Ignition Temperature (°C)		482 to 510		CHRIS 91
Reid Vapour Pressure (kPa)		1		CHRIS 91
Odour Threshold (ppm)		4.68		CHRIS 91
Density (g/mL)				
	<u>Temperature (°C)</u>			
	20	0.8600		CHRIS 91

Naphtha (Solvent)

	Data	Notes	Reference ID
Synonyms: Light Naphtha			
Grades of purity: refined solvent, crude light solvent, crude heavy solvent			CHRIS 91
Colour	Colourless		CHRIS 91
Flash Point (°C)	> 38		CHRIS 91
Flammability Limits in Air (volume %)	0.8 to 5		CHRIS 91
Ignition Temperature (°C)	229		CHRIS 91
Density (g/mL)			
	<u>Temperature (°C)</u>		
	20	0.8500	CHRIS 91
Surface Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	20	19 to 23	CHRIS 91
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	20	39 to 51	CHRIS 91
Threshold Limit Values (ppm)			
	TWA	400	ACGIH 99

Naphtha (Stoddard Solvent)

		Data	Notes	Reference ID
Synonyms: Drycleaner Naphtha Petroleum Solvent Spotting Naphtha				
Colour		Colourless		CHRIS 91
Flash Point (°C)		43		CHRIS 91
Flammability Limits in Air (volume %)		0.8 to 5		CHRIS 91
Reid Vapour Pressure (kPa)		1		CHRIS 91
Density (g/mL)				
	<u>Temperature (°C)</u>			
	15	0.7758		ESD 96
	20	0.7800		CHRIS 91
	25	0.7681		ESD 96
	40	0.7567		ESD 96
Dynamic Viscosity (mPa·s or cP)				
	<u>Temperature (°C)</u>			
	15	1		ESD 96
	25	1		ESD 96
	40	1		ESD 96
Surface Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	15	24.3		ESD 96
	20	19 to 23		CHRIS 91
	25	23.8		ESD 96
	40	22.7		ESD 96
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	20	39 to 51		CHRIS 91
Threshold Limit Values (ppm)				
	TWA	100		ACGIH 99

Naphtha (Varnish Makers' & Painters')

	Data	Notes	Reference ID
Synonyms: Light Naphtha Petroleum Solvent VM & P Naphtha			
Petroleum hydrocarbons (90%) plus aromatic hydrocarbons such as benzene and toluene (10%).			CHRIS 91
Colour	Colourless		CHRIS 91
Flash Point (°C)	-7 to 13		CHRIS 91
Flammability Limits in Air (volume %)	0.9 to 6.7		CHRIS 91
Ignition Temperature (°C)	232		CHRIS 91
Reid Vapour Pressure (kPa)	1		CHRIS 91
Density (g/mL)			
Temperature (°C)			
20	0.7500		CHRIS 91
Surface Tension (mN/m or dynes/cm)			
Temperature (°C)			
20	19 to 23		CHRIS 91
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
Temperature (°C)			
20	39 to 51		CHRIS 91
Threshold Limit Values (ppm)			
TWA	300		ACGIH 99

		Data	Notes	Reference ID
Origin: Beaufort Sea, Canada				
The sample was identified as 'Nektoralik K-59'.				
API Gravity		24.5		EETD 89
Equation(s) for Predicting Evaporation				
%Ev = (0.62 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				ESD 96
Sulphur (weight %)		0.17		EETD 89
Density (g/mL)				
	<u>Temperature (°C)</u>			
	0	0.9166		EETD 89
	15	0.9060		EETD 89
Hydrocarbon Groups (weight %)				
	Asphaltenes	0		EETD 89
Volatile Organic Compounds (ppm)				
	Benzene	190		ESD 94
	Toluene	1,020		ESD 94
	Ethylbenzene	290		ESD 94
	Xylenes	2,280		ESD 94
	C3-benzenes	3,350		ESD 94
	Total BTEX	3,790		ESD 94
	Total VOCs	7,140		ESD 94
Surface Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	0	28.5		EETD 89
	15	29.0		EETD 89
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	0	3.4		EETD 89
	15	41.6		EETD 89
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	0	14.8		EETD 89
	15	15.1		EETD 89

Nektoralik

	Data	Notes	Reference ID
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
100	1		ESD 94
120	2		ESD 94
140	3		ESD 94
160	4		ESD 94
180	5		ESD 94
200	7		ESD 94
250	17		ESD 94
300	37		ESD 94
350	59		ESD 94
400	74		ESD 94
450	86		ESD 94
500	92		ESD 94
550	96		ESD 94
600	98		ESD 94

		Data	Notes	Reference ID
Origin: Gulf of Mexico, USA				
The sample was identified as 'Neptune SPAR (Viosca Knoll Block 826)'.				
API Gravity		31.2		ESD 99
Equation(s) for Predicting Evaporation				
%Ev = (3.75 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				ESD 99
Sulphur (weight %)				
<u>Evaporation (weight %)</u>				
0		0.29		ESD 99
8		0.32		ESD 99
15		0.27		ESD 99
23		0.36		ESD 99
Water Content (weight %)				
<u>Evaporation (weight %)</u>				
0		0.1		ESD 99
8		< 0.1		ESD 99
15		< 0.1		ESD 99
23		< 0.1		ESD 99
Flash Point (°C)				
<u>Evaporation (weight %)</u>				
0		2		ESD 99
8		54		ESD 99
15		89		ESD 99
23		> 100		ESD 99
Density (g/mL)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	0.8813		ESD 99
	15	0.8687		ESD 99
	25	0.8613		ESD 99
8	0	0.8948		ESD 99
	15	0.8826		ESD 99
	25	0.8749		ESD 99
15	0	0.9044		ESD 99
	15	0.8925		ESD 99
	25	0.8847		ESD 99
23	0	0.9116		ESD 99
	15	0.8986		ESD 99
	25	0.8930		ESD 99

Neptune SPAR

		Data	Notes	Reference ID
Pour Point (°C)				
<u>Evaporation (weight %)</u>				
0		-1		ESD 99
8		9		ESD 99
15		17		ESD 99
23		19		ESD 99
Dynamic Viscosity (mPa s or cP)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	51		ESD 99
	15	17		ESD 99
	25	13		ESD 99
8	0	287		ESD 99
	15	42		ESD 99
	25	24		ESD 99
15	0	687		ESD 99
	15	84		ESD 99
	25	44		ESD 99
23	0	1,610	(a)	ESD 99
		9,361	(b)	ESD 99
		84,260	(c)	ESD 99
	15	187		ESD 99
	25	76		ESD 99
<i>Shear rate = (a) 100/s; (b) 10/s; (c) 1/s</i>				
Emulsion Formation				
<u>Evaporation (weight%)</u>				
0	Visual stability	none		ESD 99
8		none		ESD 99
15		meso		ESD 99
	Viscosity (mPa·s)	14,120		ESD 99
	Complex modulus (mPa)	545,000		ESD 99
	Water content (wt %)	48		ESD 99
23	Visual stability	stable		ESD 99
	Viscosity (mPa·s)	31,240		ESD 99
	Complex modulus (mPa)	925,000		ESD 99
	Water content (wt %)	63		ESD 99
Chemical Dispersibility (volume %)				
<u>Evaporation (weight %)</u>				
0	Corexit 9500	29		ESD 99
8		21		ESD 99
15		16		ESD 99
23		14		ESD 99

		Data	Notes	Reference ID
Hydrocarbon Groups (weight %)				
<u>Evaporation (weight %)</u>				
0	Saturates	65		ESD 00
	Aromatics	28		ESD 00
	Resins	6		ESD 00
	Asphaltenes	1		ESD 00
8	Saturates	63		ESD 00
	Aromatics	29		ESD 00
	Resins	6		ESD 00
	Asphaltenes	2		ESD 00
15	Saturates	62		ESD 00
	Aromatics	29		ESD 00
	Resins	7		ESD 00
	Asphaltenes	2		ESD 00
23	Saturates	61		ESD 00
	Aromatics	29		ESD 00
	Resins	8		ESD 00
	Asphaltenes	2		ESD 00
Adhesion (g/m²)				
<u>Evaporation (weight %)</u>				
0		18	<i>SD = 4</i>	ESD 99
8		32	<i>SD = 4</i>	ESD 99
15		33	<i>SD = 5</i>	ESD 99
23		42	<i>SD = 8</i>	ESD 99

Neptune SPAR

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (weight %)</u>				
0	Benzene	3,254		ESD 99
	Toluene	6,972		ESD 99
	Ethylbenzene	1,011		ESD 99
	Xylenes	8,286		ESD 99
	C3-benzenes	7,150		ESD 99
	Total BTEX	19,523		ESD 99
	Total VOCs	26,673		ESD 99
7	Benzene	165		ESD 99
	Toluene	2,190		ESD 99
	Ethylbenzene	713		ESD 99
	Xylenes	6,490		ESD 99
	C3-benzenes	7,006		ESD 99
	Total BTEX	9,558		ESD 99
	Total VOCs	16,564		ESD 99
15	Benzene	4		ESD 99
	Toluene	7		ESD 99
	Ethylbenzene	41		ESD 99
	Xylenes	644		ESD 99
	C3-benzenes	2,985		ESD 99
	Total BTEX	695		ESD 99
	Total VOCs	3,680		ESD 99
23	Benzene	8		ESD 99
	Toluene	3		ESD 99
	Ethylbenzene	0		ESD 99
	Xylenes	1		ESD 99
	C3-benzenes	16		ESD 99
	Total BTEX	12		ESD 99
	Total VOCs	28		ESD 99

		Data	Notes	Reference ID
Surface Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	29.2		ESD 00
	15	27.8		ESD 00
	25	27.3		ESD 00
8	0	DNF		ESD 00
	15	28.9		ESD 00
	25	28.4		ESD 00
15	0	DNF		ESD 00
	15	29.6		ESD 00
	25	29.3		ESD 00
23	0	DNF		ESD 00
	15	30.1		ESD 00
	25	29.8		ESD 00
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	NM		ESD 00
	15	21.2		ESD 00
	25	20.2		ESD 00
8	0	DNF		ESD 00
	15	19.3		ESD 00
	25	16.0		ESD 00
15	0	DNF		ESD 00
	15	18.3		ESD 00
	25	18.9		ESD 00
23	0	DNF		ESD 00
	15	14.9		ESD 00
	25	11.3		ESD 00
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	0	NM		ESD 00
	15	21.5		ESD 00
	25	22.9		ESD 00
8	0	DNF		ESD 00
	15	21.4		ESD 00
	25	20.1		ESD 00
15	0	DNF		ESD 00
	15	20.9		ESD 00
	25	21.9		ESD 00
23	0	DNF		ESD 00
	15	16.8		ESD 00
	25	16.9		ESD 00

Nerlerk

	Data	Notes	Reference ID
Origin: Beaufort Sea, Canada			
The sample was identified as 'Nerlerk M-98A'.			
API Gravity	23.9		EETD 89
Equation(s) for Predicting Evaporation			
%Ev = (2.01 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)			ESD 96
Sulphur (weight %)	0.14		EETD 89
Density (g/mL)			
Temperature (°C)			
0	0.9195		EETD 89
15	0.9095		EETD 89
Hydrocarbon Groups (weight %)			
Asphaltenes	0		EETD 89
Waxes	2		ESD 91
Surface Tension (mN/m or dynes/cm)			
Temperature (°C)			
0	29.3		EETD 89
15	29.0		EETD 89
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
Temperature (°C)			
0	5.2		EETD 89
15	11.0		EETD 89
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
Temperature (°C)			
0	17.9		EETD 89
15	15.6		EETD 89

	Data	Notes	Reference ID
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
80	1		ESD 94
100	2		ESD 94
120	3		ESD 94
140	5		ESD 94
160	7		ESD 94
180	10		ESD 94
200	13		ESD 94
250	28		ESD 94
300	47		ESD 94
350	63		ESD 94
400	74		ESD 94
450	84		ESD 94
500	90		ESD 94
550	94		ESD 94
600	97		ESD 94
650	99		ESD 94

Newfoundland Offshore Burn Experiment - Sample #1

	Data	Notes	Reference ID
Origin: Alberta, Canada			
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.			ESD 93
The sample consists of fresh crude oil, collected in Hughenden, Alberta on July 22, 1993.			
API Gravity	37.2		ESD 93
Sulphur (weight %)	0.15		ESD 93
Water Content	0.1		ESD 93
Flash Point (°C)	-11		ESD 93
Density (g/mL)			
	<u>Temperature (°C)</u>		
	0	0.8524	ESD 93
	15	0.8384	ESD 93
Pour Point (°C)	-21		ESD 93
Dynamic Viscosity (mPa·s or cP)			
	<u>Temperature (°C)</u>		
	15	8	ESD 93
Hydrocarbon Groups (weight %)			
	Asphaltenes	1	ESD 93
	Waxes	11	ESD 93
Volatile Organic Compounds (ppm)			
	Benzene	90	ESD 94
	Toluene	480	ESD 94
	Ethylbenzene	300	ESD 94
	Xylenes	1,730	ESD 94
	C3-benzenes	3,330	ESD 94
	Total BTEX	2,600	ESD 94
	Total VOCs	5,930	ESD 94
Surface Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	23.4	ESD 93
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	16.6	ESD 93

Newfoundland Offshore Burn Experiment - Sample #1

	Data	Notes	Reference ID
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
<u>Temperature (°C)</u>			
15	19.0		ESD 93
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
40	1		ESD 94
60	2		ESD 94
80	4		ESD 94
100	8		ESD 94
120	10		ESD 94
140	13		ESD 94
160	17		ESD 94
180	21		ESD 94
200	24		ESD 94
250	34		ESD 94
300	44		ESD 94
350	55		ESD 94
400	64		ESD 94
450	74		ESD 94
500	81		ESD 94
550	88		ESD 94
600	93		ESD 94
650	96		ESD 94
700	99		ESD 94
Metals (ppm)			
Barium	< 0.05		ESD 94
Chromium	< 0.9		ESD 94
Copper	< 0.3		ESD 94
Iron	< 0.9		ESD 94
Lead	< 5		ESD 94
Magnesium	< 0.5		ESD 94
Molybdenum	< 2		ESD 94
Nickel	< 2		ESD 94
Titanium	< 0.5		ESD 94
Vanadium	< 0.5		ESD 94
Zinc	< 0.6		ESD 94

Newfoundland Offshore Burn Experiment - Sample #12

	Data	Notes	Reference ID
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.			ESD 93
The sample consists of residue collected from the apex of the fire boom after burn 1.			
API Gravity	17.3		ESD 93
Sulphur (weight %)	0.40		ESD 93
Water Content	15.0		ESD 93
Flash Point (°C)	> 90		ESD 93
Density (g/mL)	<u>Temperature (°C)</u>		
	15	0.9506	ESD 93
Pour Point (°C)	31		ESD 93
Dynamic Viscosity (mPa·s or cP)	<u>Temperature (°C)</u>		
	15	24,230	(a) ESD 93
		98,570	(b) ESD 93
<i>Shear rate = (a) 10/s; (b) 1/s</i>			
Hydrocarbon Groups (weight %)			
	Asphaltenes	2	ESD 93
	Waxes	13	ESD 93
Metals (ppm)			
	Barium	< 0.05	ESD 94
	Chromium	< 0.9	ESD 94
	Copper	1	ESD 94
	Iron	4	ESD 94
	Lead	< 5	ESD 94
	Magnesium	493	ESD 94
	Molybdenum	< 2	ESD 94
	Nickel	< 2	ESD 94
	Titanium	< 0.5	ESD 94
	Vanadium	4	ESD 94
	Zinc	< 0.6	ESD 94

Newfoundland Offshore Burn Experiment - Sample #15

	Data	Notes	Reference ID
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.			ESD 93
The sample consists of residue collected from the apex of the backup boom after burn 2.			
API Gravity	19.5		ESD 93
Sulphur (weight %)	0.45		ESD 93
Water Content	14.0		ESD 93
Flash Point (°C)	> 90		ESD 93
Density (g/mL)	<u>Temperature (°C)</u>		
	15	0.9365	ESD 93
Pour Point (°C)	34		ESD 93
Dynamic Viscosity (mPa·s or cP)	<u>Temperature (°C)</u>		
	15	30,080	(a) ESD 93
		130,500	(b) ESD 93
<i>Shear rate = (a) 10/s; (b) 1/s</i>			
Hydrocarbon Groups (weight %)	Asphaltenes	2	ESD 93
	Waxes	14	ESD 93
Metals (ppm)	Barium	< 0.05	ESD 94
	Chromium	< 0.9	ESD 94
	Copper	< 0.3	ESD 94
	Iron	3	ESD 94
	Lead	< 5	ESD 94
	Magnesium	354	ESD 94
	Molybdenum	< 2	ESD 94
	Nickel	< 2	ESD 94
	Titanium	< 0.5	ESD 94
	Vanadium	3	ESD 94
	Zinc	< 0.6	ESD 94

Newfoundland Offshore Burn Experiment - Sample #4

	Data	Notes	Reference ID
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.			ESD 93
The sample consists of weathered crude oil, collected in Hughenden, Alberta on July 22, 1993.			
API Gravity			
	36.2		ESD 93
Sulphur (weight %)			
	0.17		ESD 93
Water Content			
	0.2		ESD 93
Flash Point (°C)			
	-15		ESD 93
Density (g/mL)			
	<u>Temperature (°C)</u>		
	0	0.8565	ESD 93
	15	0.8431	ESD 93
Pour Point (°C)			
	-21		ESD 93
Dynamic Viscosity (mPa·s or cP)			
	<u>Temperature (°C)</u>		
	15	9	ESD 93
Hydrocarbon Groups (weight %)			
	Asphaltenes	1	ESD 93
	Waxes	7	ESD 93
Surface Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	21.3	ESD 93
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	14.8	ESD 93
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	14.8	ESD 93

Newfoundland Offshore Burn Experiment - Sample #4

		Data	Notes	Reference ID
Metals (ppm)				
	Barium	11		ESD 94
	Chromium	< 0.9		ESD 94
	Copper	< 0.3		ESD 94
	Iron	9		ESD 94
	Lead	< 5		ESD 94
	Magnesium	108		ESD 94
	Molybdenum	< 2		ESD 94
	Nickel	< 2		ESD 94
	Titanium	3		ESD 94
	Vanadium	< 0.5		ESD 94
	Zinc	3		ESD 94

Newfoundland Offshore Burn Experiment - Sample #5

		Data	Notes	Reference ID
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.				ESD 93
Samples of the weathered crude oil were collected on August 2, 1993, from the trucks, while loading the oil into CCGS Sir Wilfred Grenfell. On September 9, 1993 the oils were mixed to simulate the tank contents of the ship. Sample 5A was a mixture of oil from trucks 1 and 3. Sample 5B was a mixture of oil from trucks 2 and 3.				
API Gravity				
	5A	36.1		ESD 93
	5B	36.1		ESD 93
Sulphur (weight %)				
		0.15		ESD 93
Water Content				
		0.5		ESD 93
Flash Point (°C)				
	5B	-13		ESD 93
Density (g/mL)				
		<u>Temperature (°C)</u>		
	5A	15	0.8437	ESD 93
	5B		0.8440	ESD 93
Pour Point (°C)				
	5B	-21		ESD 93
Dynamic Viscosity (mPa·s or cP)				
		<u>Temperature (°C)</u>		
	5A	15	10	ESD 93
	5B		11	ESD 93
Hydrocarbon Groups (weight %)				
	5B	Asphaltenes	1	ESD 93
		Waxes	10	ESD 93
Surface Tension (mN/m or dynes/cm)				
		<u>Temperature (°C)</u>		
	5B	15	21.2	ESD 93
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
		<u>Temperature (°C)</u>		
	5B	15	13.3	ESD 93
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
		<u>Temperature (°C)</u>		
	5B	15	13.9	ESD 93

Newfoundland Offshore Burn Experiment - Sample #5

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
	<u>Boiling Point (°C)</u>			
5A	40	1		ESD 94
	60	1		ESD 94
	80	3		ESD 94
	100	7		ESD 94
	120	10		ESD 94
	140	13		ESD 94
	160	17		ESD 94
	180	21		ESD 94
	200	24		ESD 94
	250	34		ESD 94
	300	45		ESD 94
	350	56		ESD 94
	400	65		ESD 94
	450	75		ESD 94
	500	83		ESD 94
	550	89		ESD 94
	600	94		ESD 94
	650	97		ESD 94
5B	40	1		ESD 94
	60	1		ESD 94
	80	3		ESD 94
	100	7		ESD 94
	120	10		ESD 94
	140	13		ESD 94
	160	17		ESD 94
	180	20		ESD 94
	200	24		ESD 94
	250	33		ESD 94
	300	44		ESD 94
	350	55		ESD 94
	400	64		ESD 94
	450	74		ESD 94
	500	81		ESD 94
	550	88		ESD 94
	600	93		ESD 94
	650	96		ESD 94
	700	99		ESD 94

Newfoundland Offshore Burn Experiment - Sample #5

		Data	Notes	Reference ID
Metals (ppm)				
5A	Barium	< 0.05		ESD 94
	Chromium	< 0.9		ESD 94
	Copper	1		ESD 94
	Iron	16		ESD 94
	Lead	< 5		ESD 94
	Magnesium	21		ESD 94
	Molybdenum	< 2		ESD 94
	Nickel	< 2		ESD 94
	Titanium	< 0.5		ESD 94
	Vanadium	< 0.5		ESD 94
	Zinc	9		ESD 94
5B	Barium	6		ESD 94
	Chromium	< 0.9		ESD 94
	Copper	< 0.3		ESD 94
	Iron	< 0.9		ESD 94
	Lead	< 5		ESD 94
	Magnesium	58		ESD 94
	Molybdenum	< 2		ESD 94
	Nickel	< 2		ESD 94
	Titanium	< 0.5		ESD 94
	Vanadium	< 0.5		ESD 94
	Zinc	1		ESD 94

Newfoundland Offshore Burn Experiment - Sample #7

	Data	Notes	Reference ID
This sample was collected as part of the Newfoundland Offshore Burn Experiment (NOBE), which took place August 12, 1993.			ESD 93
The sample consists of weathered crude oil, collected from the apex of the fire boom before burn 1.			
API Gravity	35.0		ESD 93
Water Content	0.3		ESD 93
Flash Point (°C)	-9		ESD 93
Density (g/mL)			
	<u>Temperature (°C)</u>		
	15	0.8496	ESD 93
Pour Point (°C)	-21		ESD 93
Dynamic Viscosity (mPa·s or cP)			
	<u>Temperature (°C)</u>		
	15	13	ESD 93
Hydrocarbon Groups (weight %)			
	Asphaltenes	1	ESD 93
	Waxes	9	ESD 93
Surface Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	21.4	ESD 93
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	14.9	ESD 93
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)			
	<u>Temperature (°C)</u>		
	15	16.9	ESD 93

Newfoundland Offshore Burn Experiment - Sample #7

	Data	Notes	Reference ID
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
80	2		ESD 94
100	6		ESD 94
120	8		ESD 94
140	11		ESD 94
160	15		ESD 94
180	19		ESD 94
200	22		ESD 94
250	32		ESD 94
300	43		ESD 94
350	54		ESD 94
400	64		ESD 94
450	73		ESD 94
500	81		ESD 94
550	88		ESD 94
600	93		ESD 94
650	96		ESD 94
700	99		ESD 94
Metals (ppm)			
Barium	< 0.05		ESD 94
Chromium	< 0.9		ESD 94
Copper	< 0.3		ESD 94
Iron	< 0.9		ESD 94
Lead	< 5		ESD 94
Magnesium	57		ESD 94
Molybdenum	< 2		ESD 94
Nickel	< 2		ESD 94
Titanium	< 0.5		ESD 94
Vanadium	< 0.5		ESD 94
Zinc	7		ESD 94

		Data	Notes	Reference ID
Origin: North Sea, UK				
Data from OGJ 99 were originally published in 1983 as part of a series entitled "Guide to Export Crudes for the '80s".				
API Gravity				
		36.1		ESD 91
		35.6		OGJ 99
Equation(s) for Predicting Evaporation				
%Ev = $(2.65 + 0.045T)\ln(t)$				ESD 96
Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				
Sulphur (weight %)				
<u>Evaporation (volume %)</u>				
0		0.36		ESD 93
		0.43		OGJ 99
15		0.36		ESD 93
30		0.45		ESD 93
Flash Point (°C)				
<u>Evaporation (volume %)</u>				
0		-20		ESD 91
15		29		ESD 92
30		> 90		ESD 92
Density (g/mL)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.8547		ESD 91
	15	0.8435		ESD 91
15	0	0.8774		ESD 91
	15	0.8655		ESD 91
30	0	0.9009		ESD 91
	15	0.8889		ESD 91
Pour Point (°C)				
<u>Evaporation (volume %)</u>				
0		-9		ESD 91
		2		OGJ 99
15		6		ESD 91
30		15		ESD 91

Ninian Blend

		Data	Notes	Reference ID
Dynamic Viscosity (mPa·s or cP)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	14		ESD 91
	15	8		ESD 91
15	0	1,854	(a)	ESD 91
		15,110	(b)	ESD 91
	15	16		ESD 91
30	0	7,000	(a)	ESD 91
		70,000	(b)	ESD 91
	15	62		ESD 91
<i>Shear rate = (a) 10/s; (b) 1/s</i>				
Kinematic Viscosity (mm²/s or cSt)				
	<u>Temperature (°C)</u>			
	40	6		OGJ 99
Hydrocarbon Groups (weight %)				
<u>Evaporation (volume %)</u>				
0	Saturates	61		ESD 96
	Aromatics	30		ESD 96
	Resins	8		ESD 96
	Asphaltenes	2		ESD 96
	Waxes	6		ESD 91
15	Saturates	61		ESD 96
	Aromatics	29		ESD 96
	Resins	7		ESD 96
	Asphaltenes	2		ESD 96
	Waxes	5		ESD 98
30	Saturates	55		ESD 96
	Aromatics	34		ESD 96
	Resins	10		ESD 96
	Asphaltenes	2		ESD 96
	Waxes	7		ESD 98
Adhesion (g/m²)				
<u>Evaporation (volume %)</u>				
0		17	SD = 2	ESD 96
15		22	SD = 3	ESD 96
30		32	SD = 1	ESD 96

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
<u>Evaporation (volume %)</u>				
0	Benzene	792		ESD 97
	Toluene	2,810		ESD 97
	Ethylbenzene	1,876		ESD 97
	Xylenes	5,238		ESD 97
	C3-benzenes	8,728		ESD 97
	Total BTEX	10,715		ESD 97
	Total VOCs	19,444		ESD 97
15	Benzene	450		ESD 94
	Toluene	2,760		ESD 94
	Ethylbenzene	1,360		ESD 94
	Xylenes	4,480		ESD 94
	C3-benzenes	6,740		ESD 94
	Total BTEX	9,050		ESD 94
	Total VOCs	15,790		ESD 94
30	Benzene	50		ESD 94
	Toluene	190		ESD 94
	Ethylbenzene	50		ESD 94
	Xylenes	330		ESD 94
	C3-benzenes	1,380		ESD 94
	Total BTEX	620		ESD 94
	Total VOCs	2,000		ESD 94

Surface Tension (mN/m or dynes/cm)

<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>		
0	0	26.2	ESD 91
	15	25.8	ESD 91
15	0	NM	ESD 91
	15	28.1	ESD 91
30	0	NM	ESD 91
	15	31.5	ESD 91

Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)

<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>		
0	0	21.6	ESD 91
	15	21.0	ESD 91
15	0	NM	ESD 91
	15	19.9	ESD 91
30	0	NM	ESD 91
	15	12.4	ESD 91

Ninian Blend

		Data	Notes	Reference ID
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	23.5		ESD 91
	15	22.1		ESD 91
15	0	NM		ESD 91
	15	20.4		ESD 91
30	0	NM		ESD 91
	15	22.8		ESD 91

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
0	40	4		ESD 96
	60	5		ESD 96
	80	7		ESD 96
	100	10		ESD 96
	120	10		ESD 96
	140	12		ESD 96
	160	16		ESD 96
	180	19		ESD 96
	200	23		ESD 96
	250	32		ESD 96
	300	44		ESD 96
	350	55		ESD 96
	400	65		ESD 96
	450	74		ESD 96
	500	82		ESD 96
	550	88		ESD 96
	600	93		ESD 96
	650	96		ESD 96
	700	99		ESD 96
15	60	1		ESD 96
	80	2		ESD 96
	100	4		ESD 96
	120	5		ESD 96
	140	7		ESD 96
	160	10		ESD 96
	180	14		ESD 96
	200	17		ESD 96
	250	28		ESD 96
	300	39		ESD 96
	350	51		ESD 96
	400	61		ESD 96
	450	72		ESD 96
	500	80		ESD 96
	550	87		ESD 96
30	600	92		ESD 96
	650	95		ESD 96
	700	98		ESD 96
	160	1		ESD 96
	180	2		ESD 96
	200	5		ESD 96
	250	15		ESD 96

Ninian Blend

		Data	Notes	Reference ID
Boiling Point Distribution (weight %)				
<u>Evaporation (volume %)</u>	<u>Boiling Point (°C)</u>			
30	300	28		ESD 96
	350	42		ESD 96
	400	54		ESD 96
	450	66		ESD 96
	500	76		ESD 96
	550	84		ESD 96
	600	89		ESD 96
	650	94		ESD 96
	700	97		ESD 96
Yield on Crude (volume %)				
	C1-C4	3		OGJ 99
	Light gasoline (C5-149)	20		OGJ 99
	Naphtha (149-204)	9		OGJ 99
	Kerosene (204-260)	11		OGJ 99
	Diesel (260-343)	14		OGJ 99
	Gas oil (343-435)	13		OGJ 99
	Heavy gas oil (435-538)	14		OGJ 99
	Residue (>538)	16		OGJ 99

Ninian Blend

		Data	Notes	Reference ID
Metals (ppm)				
<u>Evaporation (volume %)</u>				
0	Aluminum	< 5		Cao 92
	Barium	< 0.3		Cao 92
	Cadmium	< 0.5		Cao 92
	Calcium	45		Cao 92
	Chromium	< 2		Cao 92
	Cobalt	< 1		Cao 92
	Copper	< 0.6		Cao 92
	Iron	4		Cao 92
	Lead	< 3		Cao 92
	Magnesium	< 1		Cao 92
	Manganese	< 0.3		Cao 92
	Mercury	< 15		Cao 92
	Molybdenum	< 0.6		Cao 92
	Nickel	< 1		Cao 92
	Selenium	< 15		Cao 92
	Strontium	< 0.2		Cao 92
	Tin	< 15		Cao 92
	Titanium	< 0.6		Cao 92
	Vanadium	4		Cao 92
	Zinc	< 0.6		Cao 92
15	Barium	< 0.3		Cao 92
	Chromium	< 2		Cao 92
	Copper	< 0.6		Cao 92
	Iron	5		Cao 92
	Lead	< 3		Cao 92
	Magnesium	< 1		Cao 92
	Molybdenum	< 0.6		Cao 92
	Nickel	< 1		Cao 92
	Titanium	0.5		Cao 92
	Vanadium	5		Cao 92
30	Zinc	< 0.6		Cao 92
	Barium	< 0.3		Cao 92
	Chromium	< 2		Cao 92
	Copper	< 0.6		Cao 92
	Iron	7		Cao 92
	Lead	< 3		Cao 92
	Magnesium	< 1		Cao 92
	Molybdenum	< 0.6		Cao 92
	Nickel	1		Cao 92
	Titanium	< 0.6		Cao 92
	Vanadium	6		Cao 92

Ninian Blend

		Data	Notes	Reference ID
Metals (ppm)				
<u>Evaporation (volume %)</u>				
30	Zinc	< 0.6		Cao 92
Aqueous Solubility (mg/L)				
	Room temperature	50	(a)	ESD 91
(a) fresh water				

		Data	Notes	Reference ID
Origin: Northwest Territories, Canada				
API Gravity		38.4		EETD 84
Equation(s) for Predicting Evaporation				
%Ev = (3.11 + 0.045T)ln(t) Where %Ev = weight percent evaporated; T = surface temperature (°C); t = time (minutes)				ESD 96
Sulphur (weight %)		0.37		EETD 86
Flash Point (°C)		3		EETD 84
Fire Point (°C)		< 14		Twardus 80
Reid Vapour Pressure (kPa)		36		EETD 84
Density (g/mL)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	0.8450		Mackay 82a
		0.8581		EETD 85
	5	0.8410		Mackay 82a
	10	0.8390		Mackay 82a
	15	0.8320		EETD 84
		0.8340		Mackay 82a
	20	0.8320		Mackay 82a
	25	0.8290		Mackay 82a
10	20	0.8440		Mackay 82a
20	0	0.8810		Mackay 82a
	20	0.8590		Mackay 82a
Pour Point (°C)				
<u>Evaporation (volume %)</u>				
0		< -50		Mackay 82a
		-85		Twardus 80
10		< -50		Mackay 82a
20		< -50		Mackay 82a

Norman Wells

		Data	Notes	Reference ID
Dynamic Viscosity (mPa·s or cP)				
	<u>Temperature (°C)</u>			
	0	9		Mackay 82a
		14		Twardus 80
	5	7		Mackay 82a
	10	6		Mackay 82a
		9		Twardus 80
	15	5		Mackay 82a
	20	4		Mackay 82a
		6		Twardus 80
	25	4		Mackay 82a
Chemical Dispersibility (volume %)				
	Corexit 9500	35		ESD 94
	Dasic LTS	20		EETD 89
	Enersperse 700	65		EETD 89
Hydrocarbon Groups (weight %)				
	<u>Evaporation (volume %)</u>			
0	Saturates	85		Mackay 82a
		86		EETD 86
	Aromatics	11		Mackay 82a
		11		EETD 86
	Resins	2		Mackay 82a
		2		EETD 86
	Asphaltenes	1		Mackay 82a
		0		ESD 91
	Waxes	2		Mackay 82a
10	Saturates	82		Mackay 82a
	Aromatics	12		Mackay 82a
	Resins	3		Mackay 82a
	Asphaltenes	3		Mackay 82a
	Waxes	2		Mackay 82a
20	Saturates	80		Mackay 82a
	Aromatics	13		Mackay 82a
	Resins	4		Mackay 82a
	Asphaltenes	3		Mackay 82a
	Waxes	2		Mackay 82a

		Data	Notes	Reference ID
Volatile Organic Compounds (ppm)				
	Benzene	490		ESD 94
	Toluene	1,850		ESD 94
	Ethylbenzene	490		ESD 94
	Xylenes	2,290		ESD 94
	C3-benzenes	5,170		ESD 94
	Total BTEX	5,120		ESD 94
	Total VOCs	10,290		ESD 94
Surface Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	0	24.9		EETD 84
	15	23.6		EETD 84
	Room temperature	22.7		Twardus 80
Oil/Salt Water Interfacial Tension (mN/m or dynes/cm)				
<u>Evaporation (volume %)</u>	<u>Temperature (°C)</u>			
0	0	16.5		EETD 84
	15	16.4		EETD 84
	Room temperature	30.5		Mackay 82a
10		27.0		Mackay 82a
20		25.5		Mackay 82a
Oil/Fresh Water Interfacial Tension (mN/m or dynes/cm)				
	<u>Temperature (°C)</u>			
	0	20.5		EETD 85
	15	20.1		EETD 85
	Room temperature	26.8		Twardus 80

Norman Wells

	Data	Notes	Reference ID
Boiling Point Distribution (weight %)			
<u>Boiling Point (°C)</u>			
40	1		ESD 94
60	1		ESD 94
80	4		ESD 94
100	8		ESD 94
120	11		ESD 94
140	15		ESD 94
160	19		ESD 94
180	23		ESD 94
200	27		ESD 94
250	38		ESD 94
300	48		ESD 94
350	59		ESD 94
400	68		ESD 94
450	76		ESD 94
500	83		ESD 94
550	89		ESD 94
600	93		ESD 94
650	97		ESD 94
700	99		ESD 94
Metals (ppm)			
Barium	< 0.3		Cao 92
Chromium	< 2		Cao 92
Copper	< 0.6		Cao 92
Iron	< 3		Cao 92
Lead	< 3		Cao 92
Magnesium	< 1		Cao 92
Molybdenum	< 0.6		Cao 92
Nickel	3		Cao 92
Titanium	< 0.6		Cao 92
Vanadium	9		Cao 92
Zinc	< 0.6		Cao 92

		Data	Notes	Reference ID
Aqueous Solubility (mg/L)				
<u>Evaporation (weight %)</u>	<u>Temperature (°C)</u>			
0	5	30	(a)	Maijanen 84
		26	(b)	Maijanen 84
	20	33	(a)	Maijanen 84
		28	(b)	Maijanen 84
		9	(b)	MacLean 89
		12	(c)	MacLean 89
	22	34	(a)	Maijanen 84
	Room temperature	32	(d)	Bobra 83
6		27	(d)	Bobra 83
12		15	(d)	Bobra 83
20		7	(d)	Bobra 83
37		0.7	(d)	Bobra 83
43		0.1	(d)	Bobra 83
(a) distilled water; (b) salt water; (c) fresh water; (d) double-distilled water				
Acute Toxicity of Water Soluble Fraction (mg/L)				
	<u>Test Organism</u>			
48h EC50	Daphnia magna	2	(a)	MacLean 89
		3	(b)	EETD 89
	Artemia spp.	6	(a)	MacLean 89
		9	(b)	EETD 89
48h LC50	Daphnia magna	9		Bobra 83
		7	(a)	MacLean 89
		19	(b)	EETD 89
		11	(c)	Bobra 83
		6	(d)	Bobra 83
		4	(e)	Bobra 83
		0.5	(f)	Bobra 83
		0.1	(g)	Bobra 83
	Artemia spp.	6	(a)	MacLean 89
		10	(b)	EETD 89
	Rainbow trout larvae	10	(h)	Lockhart 87
		12	(i)	Lockhart 87

(a) results based on fluorescence spectroscopy

(b) results based on GC purge-and-trap analysis

oil evaporated: (c) 6 wt%; (d) 12 wt%; (e) 20 wt%; (f) 37 wt%; (g) 43 wt%

(h) closed container; (i) open container

Northwest Shelf Condensate

	Data	Notes	Reference ID
Origin: Australia			
Data from OGJ 99 were originally published sometime between 1984 and 1992.			
API Gravity	53.1		OGJ 99
Sulphur (weight %)	0.01		OGJ 99
Reid Vapour Pressure (kPa)	42		OGJ 99
Density (g/mL)			
	<u>Temperature (°C)</u>		
	15	0.7660	OGJ 99
Pour Point (°C)	-36		OGJ 99
Kinematic Viscosity (mm²/s or cSt)			
	<u>Temperature (°C)</u>		
	20	1	OGJ 99
	40	1	OGJ 99
Hydrocarbon Groups			
	Aromatics	11	(a) OGJ 99
	Waxes	0	(b) OGJ 99
(a) volume %; (b) weight %			
Yield on Crude (volume %)			
	<u>Boiling Range (°C)</u>		
	Gasoline (C5-70)	17	OGJ 99
	Naphtha (70-190)	50	OGJ 99
	Kerosene (150-230)	18	OGJ 99
	Gas oil (190-230)	8	OGJ 99
	Heavy gas oil (230-260)	19	OGJ 99
	Residue (360+)	3	OGJ 99
Metals (ppm)			
	Copper	1	OGJ 99
	Iron	1	OGJ 99
	Nickel	0.2	OGJ 99
	Sodium	0.5	OGJ 99
	Vanadium	< 0.1	OGJ 99
Other Elements (weight %)			
	Nitrogen	0.01	OGJ 99