Report of Analysis

Client:	**Enbridge Pipelines (North Dakota) LLC**	**Client Reference Number:**	
Job Location:	Submitted Sample	BPEP Commodity Info	
Our Reference Number:	US150-0032127		

Sample ID:	2013-CHGO-000732-001	**Date Taken:**	
Sample Designated As:	Crude-Sweet	**Date Submitted:**	20-February-2013
Vessel/Location:	Enbridge - Clearbrook, MN	**Date Tested:**	26-February-2013
Representing:	Submitted Sample Submitted	**Drawn By:**	Client

Method	Test	Result	Units
ASTM D5002	Density and Relative Density of Crude Oils		
	Density @ 15ºC	817.8	kg/m³
ASTM D445	Kinematic / Dynamic Viscosity		
	Test Temperature	10.0	°C
	Kinematic Viscosity @ Specified Temp	4.588	cSt
ASTM D445	Kinematic / Dynamic Viscosity		
	Kinematic Viscosity @ 68 ºF/ 20 ºC	3.675	mm²/s
ASTM D445	Kinematic / Dynamic Viscosity		
	Kinematic Viscosity @ 86 ºF/ 30 ºC	2.896	mm²/s
ASTM D6377	Determination of Vapor Pressure of Crude Oil: VPCRx (Expansion Method)		
	VPCR_ 0.02 (37.8 ° C)	84.3	kPa
ASTM D4007	Water and Sediment in Crude Oil		
	Total Percent Water and Sediment	0.20	Vol %
ASTM D4929	Determination of Organic Chloride Content in Crude Oil		
	Procedure Used	A	
	Organic Chloride Conc. in Naphtha Fract.	< 1.0	ug/g
ASTM D4294	Sulfur Content in Petroleum Products by ED-XRF		
	Sulfur Content	0.214	Wt %
ASTM D5623 MOD	Sulfur Compounds by GC-SSD (Sulfur Speciation)		
	Hydrogen Sulfide	21.7	ppm Wt
	C1-C3 Mercaptans	2.3	ppm Wt
	Note:	Tested on the distillation cut at 400F	
ASTM D4530	Micro Carbon Residue		
	Micro Method Carbon Residue	1.18	Wt %
ASTM D97	Pour Point of Petroleum Products		
	Pour Point	<-60	°C
	Pour Point	<-76.0	°F
ASTM D3230	Salts in Crude Oil (Electrometric Method)		
	Salt Content (as electrometric chloride)	0.3	lb/1000bbl
IP 501	Determination of Al, Si, V, Ni, Fe, Na, Ca, Zn, P in Fuel Oil -ICPES		
	Aluminium	< 5	mg/kg
	Silicon	< 10	mg/kg
	Sodium	37	mg/kg
	Vanadium	< 1	mg/kg
	Nickel	< 1	mg/kg

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Method	Test	Result	Units
IP 501	Determination of Al, Si, V, Ni, Fe, Na, Ca, Zn, P in Fuel Oil -ICPES		
	Iron	7	mg/kg
	Calcium	9	mg/kg
	Zinc	< 1	mg/kg
	Phosphorus	< 1	mg/kg
	Aluminium + Silicon	< 15	mg/kg
ASTM D664	Acid Number of Petroleum Products by Potentiometric Titration		
	Procedure Used	A	
	Acid Number	< 0.10	mg KOH/g
ASTM D7169	Boiling Point Distribution of Samples with Residues by High Temperature GC		
	Boiling Point Distribution	See Attached Report	
ASTM D6730	Individual Components in Spark Ignition Fuels by 100-Metre Capillary Gas Chromatography		
	Benzene	0.434	Vol %
	Olefins	0.343	Vol %
	Oxygenates	< 100	ppm Wt
	Aromatics	9.279	Vol %
	Olefins	0.342	Wt %
	Total Butanes	4.451	Vol %
	Note:	Tested on the distillation cut at 400F	

Signed: _____ Date: _____

Intertek
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