

**THE SUPER CRUDE PLANT PERFORMANCE WAS INDEPENDENTLY VERIFIED
BY CONOCO CANADA LTD, WHO USED CORE LABORATORIES, ONE OF THE LARGEST
SERVICE PROVIDERS OF CORE AND FLUID ANALYSIS IN THE PETROLEUM INDUSTRY.**

Results Certified by:

1. Core Labs

2. NCUT National Center for Upgrading Technology (Canada Alberta Research Alliance)
3. Conoco

GHU Process Upgrading

°API Increase	16.3 (*)
% HDS	95
% HDN	48
CCR Conversion, %	80
C7 Asphaltenes Conversion, %	90
975°F+ (524°C+) Conversion, %	81

Executive summary

Genoil Inc. has designed, built and operated a 10 bbl/D upgrader plant, used to convert heavy oil into a full body crude. The plant was installed and operated at the CONOCO battery site in Kerrobert where it was in operation to upgrade bitumen with an API range from 6.9 to 8.5.

Background

The general purpose of this upgrading plant was to convert heavy crude / bitumen into a lighter crude so that it can be transportable by pipeline without the aid of diluent, and to make it more compatible for processing in existing refineries. By increasing the yield of light products and decreasing the residual portion of a heavy crude stream, heavy crude or bitumen becomes more compatible with conventional oil as typically treated existing refineries.

Lab Results

Conoco collected samples on the feed, product and gas streams and had them analyzed by CORE Laboratories in Calgary, Alberta. The following are the main results extracted from the lab report:

	Feed (bitumen)	Product (Genoil upgraded)
API	8.5	24.8
Sulfur (wt %)	5.14	0.236
Total Nitrogen (wt %)	0.286	0.1432
Acid Number	3.05	0.11
Carbon Content	83.25	86.68
Hydrogen Content	10.59	11.88
Oxygen Content	0.78	1.07
Pentane Insoluble Asphaltene	17.3	1.6
Heptane Insoluble Asphaltene	12.6	1.2
Distillation	% yield (volume)	% yield (volume)
IBP-171 C	0	8.67
IBP-232 C	1.96	11.49
232-343 C	12.44	33.02
343-524 C	32.27	36.71
524 C plus	53.25	10.08
Loss	0.08	0.03

Of major interest is the conversion of the 524 plus fraction by over 80% at the mild conditions of 745 F and 1600 psig. In addition, the reduction in the acid number from 3.05 to 0.11, that is a 96% conversion. The sulfur and nitrogen reductions were expected due to previous testing on heavy crudes, but nevertheless again were significant.

BITUMEN ANALYSIS

LABORATORY TEST RESULTS BY CORE LABORATORIES

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Core Lab is pleased to welcome Sanchez Technologies to the Core Lab Family

Reservoir Description			Production Enhancement			Reservoir Management		
Petroleum Services	Saybolt	Core Lab Instruments Sanchez Technologies	Refinery Systems	ProTechnics	Owen Oil Tools	Stim-Lab	Integrated Reservoir Solutions	PROMORE

Core Laboratories is the Reservoir Optimization Company

ProTechnics - Completion, Reservoir and Drilling Diagnostics

Integrated Reservoir Solutions, Our Reservoir Optimization Unit

Reservoir Description	Production Enhancement	Reservoir Management
Petroleum Services Data Management Geological Sciences Reservoir Fluids Rock Properties Core Lab Instruments Routine Rock Properties Advanced Rock Properties Drilling and Stimulation Properties Reservoir Fluid Equipment Refinery Systems Octane Analysis Waukesha Parts and Service	Saybolt Analytical BioFuels Blending and Additive Calibration Crude Oil Government and Institutional LPG/LNG Marine Fuels Petrochemical Petroleum Products	Annual Report Webcasts

Core Lab News

- 04 October 2016**
Core Laboratories' Third Quarter 2016 Webcast at 7:30 A.M. CDT / 2:30 P.M. CEST on October 20, 2016
- 20 September 2016**
Core Lab Presents at Johnson Rice Energy 2016 Conference
- 20 July 2016**
Core Lab Reports Second-Quarter 2016 Results

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Feedstock Analysis

JACOS BITUMEN

LABORATORY TEST RESULTS						
11/13/01						
JOB NUMBER: 52137-01-5412		CUSTOMER: Conoco Canada Ltd.		ATTN: Bob Higgins-Char		
CLIENT I.D.....: Bitumen Sample			LABORATORY I.D.....: 52137-01-5412-1			
DATE SAMPLED.....: August 23, 2001			DATE RECEIVED.....: 01-08-29			
SAMPLE INFO.....: Feed Stock Tank			TIME RECEIVED.....:			
SAMPLE DESCRIPTION...: Whole Crude			REMARKS.....:			
TEST DESCRIPTION	FINAL RESULT	LIMITS/DEFINITION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Density @ 15°C	1009.9	0.1	kg/m3	ASTM D-5002	01/09/21	WC
Relative Density @ 15/15°C	1.0108			ASTM D-5002	01/09/21	WC
Specific Gravity @ 60°F	1.0106			ASTM D-5002	01/09/21	WC
API @ 15.6°C	8.5			ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	5.140	500	ppm	ASTM D-4294	01/10/03	TK
Mercaptan Sulphur	150	1	mg/kg	ASTM D-3227	01/09/21	JE
Total Nitrogen by Chemiluminescence	2680	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	3.05		mg KOH/g	ASTM D-664	01/09/21	JE
Ash Content	0.036		Wt. %	ASTM D-482	01/09/24	JE
Carbon Residue, Conradson	12.75		Wt. %	ASTM D-189	01/09/20	JE
Base Sediment	0.05	0.05	LV %	ASTM D-4007	01/09/20	JE
Water	0.05	0.05	LV %	ASTM D-4007	01/09/20	JE
Total BS & W	0.10	0.05	LV %	ASTM D-4007	01/09/20	JE
Elemental C, H, O				ASTM D-5291		
Carbon Content	83.25		Wt %			
Hydrogen Content	10.59		Wt %			
Oxygen Content	0.78		Wt %			
Salt Content	5.5		lb/Kbbbl	ASTM D-3230	01/09/20	JE
Pour Point	24	- 60	°C	ASTM D-97	01/09/21	JE
Pentane Insoluble Asphaltene	17.3	0.1	Wt %	IP-143M	01/09/20	EH
Heptane Insoluble Asphaltene	12.6	0.1	Wt %	IP-143	01/09/20	EH

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Higgins-Chan

CLIENT I.D.: Bitumen Sample
DATE SAMPLED: August 23, 2001
SAMPLE INFO: Feed Stock Tank
SAMPLE DESCRIPTION: Whole Crude

LABORATORY I.D.: 52137-01-5412-1
DATE RECEIVED: 01-08-29
TIME RECEIVED:
REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Fractional Distillation	% Yield (Mass)	% Yield (Volume)		ASTM D-2892	01/09/12	WC
IBP = 171 (Deg C @ 760 mmHg)						
IBP - 232 (Deg C @ 760 mmHg)	1.67	1.96				
232 - 343 (Deg C @ 760 mmHg)	11.18	12.44				
343 - 454 (Deg C @ 760 mmHg)	21.58	22.41				
4540 - 524 (Deg C @ 760 mmHg)	9.70	9.86				
524 Plus (Deg C @ 760 mmHg)	55.80	53.25				
Loss	0.07	0.08				
Vacuum Distillation			°C AET	ASTM D-1160	01/10/11	WC
I.B.P.	214.8					
5% Off	293.7					
10% Off	331.5					
20% Off	381.2					
30% Off	444.0					
40% Off	503.8					
46% Off	513.5					
FBP	513.5					
Wt. % Recovery	44.3					
Wt. % Residue	54.6					
Wt. % Loss	0.1					
Wt. % Cold Trap (Overheads)	1.0					

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CLIENT I.D.....: Bitumen Sample
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 SAMPLE DESCRIPTION...: Whole Crude

LABORATORY I.D.....: 52137-01-5412-1
 DATE RECEIVED.....: 01-08-29
 TIME RECEIVED.....:
 REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS / DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Metals by ICAP			mg/kg	ASTM D-5185	01/10/19	TW
Nickel	77					
Vanadium	196					
Cobalt	< 0.1					
Molybdenum	9					
Sodium	6					
Iron	7					
Potassium	1.3					
Calcium	17					
Magnesium	0.7					
Aluminum	15					
Copper	0.5					
Arsenic	< 0.1					
Shell Hot Filtration	0.04		Wt %		01/10/05	*NCUT
Shell p-Value	3.50				01/10/05	*NCUT
Viscosity, Kinematic @ 60 °C	2399		cSt	ASTM D-445	01/10/07	JE
Viscosity, Kinematic @ 100 °C	193.1		cSt	ASTM D-445	01/10/07	JE
Viscosity, Kinematic @ 140 °C	46.86		cSt	ASTM D-445	01/10/07	JE

*NCUT - analysis conducted by National Center for Upgrading Technology

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample

LABORATORY I.D.....: 52137-01-5412-1

DATE SAMPLED.....: August 23, 2001

DATE RECEIVED.....: 01-08-29

SAMPLE INFO.....: Feed Stock Tank

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: IBP - 232 °C

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	1.96		LV %	ASTM D-2892	01/09/12	WC
Yield	1.67		WT %	ASTM D-2892	01/09/12	WC
API Gravity	33.4		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	0.8582		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	0.8585		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	1.200	0.05	Wt %	ASTM D-4294	01/10/03	TK
Mercaptan Sulphur	147	1	mg/kg	ASTM D-3227	01/09/21	JE
Total Nitrogen by Chemiluminescence	51	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	0.25		mg KOH/g	ASTM D-664	01/10/04	TK
Bromine Number	5.6		g / 100 g	ASTM D-1159	01/10/04	*HP
Aniline Point	50.3		° C	ASTM D-611	01/10/04	TK
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	84.93		Wt %			
Hydrogen Content	12.26		Wt %			
Hydrocarbon Type				ASTM D-1319	01/10/04	JE
Aromatics	10.2		LV %			
Olefins	3.8		LV %			
Saturates	86.0		LV %			
Smoke Point	19.5		mm	ASTM D-1322	01/10/10	JE

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample

LABORATORY I.D.....: 52137-01-5412-1

DATE SAMPLED.....: August 23, 2001

DATE RECEIVED.....: 01-08-29

SAMPLE INFO.....: Feed Stock Tank

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: IBP - 232 °C

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Cloud Point	< - 60	-60	° C	ASTM D-2500	01/10/06	TK
Freeze Point	solid @ -75 C no crystals	-75	° C	ASTM D-2386	01/10/10	JE
Viscosity, Kinematic @ 40 °C	1.662		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 80 °C	0.9773		cSt	ASTM D-445	01/09/21	JE

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample
 DATE SAMPLED.....: August 23, 2001
 SAMPLE INFO.....: Feed Stock Tank
 SAMPLE DESCRIPTION...: 232 °C - 343 °C

LABORATORY I.D.....: 52137-01-5412-1
 DATE RECEIVED.....: 01-08-29
 TIME RECEIVED.....:
 REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	12.44		LV %	ASTM D-2892	01/09/12	WC
Yield	11.18		WT %	ASTM D-2892	01/09/12	WC
API Gravity	24.7		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	0.9061		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	0.9064		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	1.946	500	ppm	ASTM D-4294	01/10/03	TK
Mercaptan Sulphur	69	1	mg/kg	ASTM D-3227	01/09/21	JE
Total Nitrogen by Chemiluminescence	172	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	1.59		mg KOH/g	ASTM D-664	01/10/04	JE
Bromine Number	3.0		g / 100 g	ASTM D-1159	01/10/08	*HP
Aniline Point	48.0		°C	ASTM D-611	01/10/04	TK
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	86.24		Wt %			
Hydrogen Content	13.53		Wt %			
Hydrocarbon Type				ASTM D-1319	01/10/04	JE
Aromatics	30.7		LV %			
Olefins	7.9		LV %			
Saturates	61.4		LV %			
Smoke Point	13.0		mm	ASTM D-1322	01/10/10	JE
Pour Point	< - 60	- 60	°C	ASTM D-97	01/10/04	TK
Cetane Index	35.9			ASTM D-976	01/10/17	EM

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample
 DATE SAMPLED.....: August 23, 2001
 SAMPLE INFO.....: Feed Stock Tank
 SAMPLE DESCRIPTION...: 232 °C - 343 °C

LABORATORY I.D.....: 52137-01-5412-1
 DATE RECEIVED.....: 01-08-29
 TIME RECEIVED.....:
 REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DELTA	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Cloud Point	< - 60	-60	° C	ASTM D-2500	01/10/04	TK
Freeze Point	solid @ -62 C no crystals	-75	° C	ASTM D-2386	01/10/17	JE
Viscosity, Kinematic @ 40 °C	5.638		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 80 °C	2.307		cSt	ASTM D-445	01/09/21	JE

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample

LABORATORY I.D.: 52137-01-5412-1

DATE SAMPLED: August 23, 2001

DATE RECEIVED: 01-08-29

SAMPLE INFO: Feed Stock Tank

TIME RECEIVED:

SAMPLE DESCRIPTION: 343 °C - 454 °C

REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	22.41		LV %	ASTM D-2892	01/09/12	WC
Yield	21.58		WT %	ASTM D-2892	01/09/12	WC
API Gravity	14.2		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	0.9710		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	0.9713		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	3.507	500	ppm	ASTM D-4294	01/10/03	TK
Total Nitrogen by Chemiluminescence	1510	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Nitrogen, Basic	458		ppm Wt.	UOP-269	01/10/10	JE
Acid Number	3.9		mg KOH/g	ASTM D-664	01/09/21	JE
Bromine Number	3.5		g / 100 g	ASTM D-1159	01/10/04	HP*
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	84.83		Wt %			
Hydrogen Content	11.04		Wt %			
Pour Point	-18	- 60	°C	ASTM D-97	01/09/28	JE
Cetane Index	27.6			ASTM D-976	01/10/17	EM
Cloud Point	solid @ - 21°C no crystals		°C	ASTM D-2500	01/10/04	TK
Viscosity, Kinematic @ 40 °C	143.50		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 80 °C	17.57		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 100 °C	8.995		cSt	ASTM D-445	01/09/21	JE

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample

LABORATORY I.D.: 52137-01-5412-1

DATE SAMPLED: August 23, 2001

DATE RECEIVED: 01-08-29

SAMPLE INFO: Feed Stock Tank

TIME RECEIVED:

SAMPLE DESCRIPTION: 343 °C - 454 °C

REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Paraffins	5.3	0	LV %	ASTM D-3239	01/10/09	LWS
Naphthenes	38.8	0	LV %	ASTM D-2549		
Aromatics	55.9	0	LV %	ASTM D-2786		
NAPHTHENIC DISTRIBUTION						
--1 Ring	9.3	0	LV %			
--2 Ring	14.7	0	LV %			
--3 Ring	8.2	0	LV %			
--4 Ring	5.2	0	LV %			
--5 Ring	1.4	0	LV %			
--6 Ring	< 0.1	0	LV %			
AROMATIC DISTRIBUTION						
Monoaromatics	24.3	0	LV %			
--Alkylbenzenes	8.0	0	LV %			
--Naphthenebenzenes	7.2	0	LV %			
--Dinaphthenebenzenes	9.1	0	LV %			
Diaromatics	14.8	0	LV %			
--Naphthalenes	4.5	0	LV %			
--Acenaphthenes/Dibenzofurans	4.6	0	LV %			
--Fluorenes	5.7	0	LV %			
Triaromatics	4.5	0	LV %			
--Phenanthrenes	3.3	0	LV %			
--Naphthenephenanthrenes	1.2	0	LV %			
Tetraaromatics	2.1	0	LV %			
--Pyrenes	1.7	0	LV %			
--Chrysenes	0.4	0	LV %			
Pentaaromatics	0.2	0	LV %			
--Perylenes	0.2	0	LV %			
--Dibenzanthracenes	< 0.1	0	LV %			
Thiopheno Aromatics	9.8	0	LV %			
--Benzothiophenes	5.9	0	LV %			
--Dibenzothiophenes	3.5	0	LV %			
--Naphthabenzothiophenes	0.4	0	LV %			
Unidentified Aromatics	0.2	0	LV %			

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample

LABORATORY I.D.....: 52137-01-5412-1

DATE SAMPLED.....: August 23, 2001

DATE RECEIVED.....: 01-08-29

SAMPLE INFO.....: Feed Stock Tank

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: 454 °C - 524 °C

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	9.86		LV %	ASTM D-2892	01/09/12	WC
Yield	9.70		WT %	ASTM D-2892	01/09/12	WC
API Gravity	11.3		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	0.9913		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	0.9915		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	4.045	500	ppm	ASTM D-4294	01/10/03	TK
Total Nitrogen by Chemiluminescence	2620	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Nitrogen, Basic	723		ppm Wt.	UOP-269	01/10/10	JE
Acid Number	4.9		mg KOH/g	ASTM D-664	01/10/03	TK
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	84.33		Wt %			
Hydrogen Content	11.87		Wt %			
Carbon Residue, Conradson	0.16		Wt. %	ASTM D-189	01/10/04	JE
Pour Point	15	- 60	°C	ASTM D-97	01/10/09	TK
Viscosity, Kinematic @ 40 °C	2192		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 80 °C	93.25		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 100 °C	31.71		cSt	ASTM D-445	01/09/21	JE

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LABORATORY TEST RESULTS

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JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample

LABORATORY I.D.: 52137-01-5412-1

DATE SAMPLED: August 23, 2001

DATE RECEIVED: 01-08-29

SAMPLE INFO: Feed Stock Tank

TIME RECEIVED:

SAMPLE DESCRIPTION: 454 °C - 524 °C

REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Paraffins	3.6	0	LV %	ASTM D-3239	01/10/09	LWS
Naphthenes	24.8	0	LV %	ASTM D-2549		
Aromatics	71.6	0	LV %	ASTM D-2786		
NAPHTHENIC DISTRIBUTION						
---1 Ring	6.2	0	LV %			
---2 Ring	9.9	0	LV %			
---3 Ring	6.0	0	LV %			
---4 Ring	2.1	0	LV %			
---5 Ring	0.6	0	LV %			
---6 Ring	< 0.1	0	LV %			
AROMATIC DISTRIBUTION						
Monoaromatics	34.8	0	LV %			
---Alkylbenzenes	12.4	0	LV %			
---Naphthenebenzenes	9.8	0	LV %			
---Dinaphthenebenzenes	12.6	0	LV %			
Diaromatics	19.0	0	LV %			
---Naphthalenes	6.4	0	LV %			
---Acenaphthenes/Dibenzofurans	5.1	0	LV %			
---Fluorenes	7.5	0	LV %			
Triaromatics	3.3	0	LV %			
---Phenanthrenes	2.6	0	LV %			
---Naphthenephenanthrenes	0.7	0	LV %			
Tetraaromatics	2.3	0	LV %			
---Pyrenes	1.9	0	LV %			
---Chyrsenes	0.4	0	LV %			
Pentaaromatics	0.2	0	LV %			
---Perylenes	0.2	0	LV %			
---Dibenzanthracenes	< 0.1	0	LV %			
Thiopheno Aromatics	11.1	0	LV %			
---Benzothiophenes	8.7	0	LV %			
---Dibenzothiophenes	2.2	0	LV %			
---Naphthabenzothiophenes	0.2	0	LV %			
Unidentified Aromatics	0.9	0	LV %			

CORE LABORATORIES
2810 - 12th STREET N.E.
CALGARY, ALBERTA T2E 7P7

LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Bitumen Sample

LABORATORY I.D.....: 52137-01-5412-1

DATE SAMPLED.....: August 23, 2001

DATE RECEIVED.....: 01-08-29

SAMPLE INFO.....: Feed Stock Tank

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: 343 °C Plus

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DRIFTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	85.5		LV %	ASTM D-2892	01/09/12	WC
Yield	87.1		WT %	ASTM D-2892	01/09/12	WC
API Gravity	6.2		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	1.0279		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	1.0281		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	5.718	500	ppm	ASTM D-4294	01/10/03	TK
Total Nitrogen by Chemiluminescence	2960	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	2.70		mg KOH/g	ASTM D-664	01/10/10	JE
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	83.29		Wt %			
Hydrogen Content	10.20		Wt %			
Carbon Residue, Conradson	16.05		Wt. %	ASTM D-189	01/09/24	JE
Pour Point	42	- 60	°C	ASTM D-97	01/10/07	TK
Viscosity, Kinematic @ 60 °C	30 230		cSt	ASTM D-445	01/09/21	JE
Viscosity, Kinematic @ 100 °C	1 436		cSt	ASTM D-445	01/09/24	JE
Viscosity, Kinematic @ 140 °C			cSt	ASTM D-445		
Pentane Insoluble Asphaltene	20.5	0.1	Wt %	IP-143M	01/09/20	EH
Heptane Insoluble Asphaltene	14.1	0.1	Wt %	IP-143	01/09/20	EH
Ash Content	0.062		Wt. %	ASTM D-482	01/09/24	JE

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CALGARY, ALBERTA T2E 7P7

LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample
DATE SAMPLED: August 23, 2001
SAMPLE INFO: Feed Stock Tank
SAMPLE DESCRIPTION: 343 °C Plus

LABORATORY I.D.: 52137-01-5412-1
DATE RECEIVED: 01-08-29
TIME RECEIVED:
REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Metals by ICAP			mg/kg	ASTM D-5185	01/10/19	TW
Nickel	89					
Vanadium	227					
Cobalt	< 0.1					
Molybdenum	10					
Sodium	10					
Iron	41					
Potassium	0.3					
Calcium	8					
Magnesium	1					
Aluminum	19					
Copper	0.8					
Arsenic	< 0.1					

CORE LABORATORIES
 2810 - 12th STREET N.E.
 CALGARY, ALBERTA T2E 7P7

LABORATORY TEST RESULTS
11/13/01

JOB NUMBER: 52137-01-5412 **CUSTOMER:** Conoco Canada Ltd. **ATTN:** Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample **LABORATORY I.D.:** 52137-01-5412-1
DATE SAMPLED: August 23, 2001 **DATE RECEIVED:** 01-08-29
SAMPLE INFO: Feed Stock Tank **TIME RECEIVED:**
SAMPLE DESCRIPTION: 524 °C Plus **REMARKS:**

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	53.25		LV %	ASTM D-2892	01/09/12	WC
Yield	55.80		WT %	ASTM D-2892	01/09/12	WC
API Gravity	2.4		@ 60 °F	ASTM D-5002	01/09/21	WC
Specific Gravity	1.0570		@ 60/60 °F	ASTM D-5002	01/09/21	WC
Relative Density	1.0572		@ 15/15 °C	ASTM D-5002	01/09/21	WC
Sulphur, Total by X-ray Fluorescence	6.431	500	ppm	ASTM D-4294	01/10/03	TK
Total Nitrogen by Chemiluminescence	3770	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	2.16		mg KOH/g	ASTM D-664	01/10/10	JE
Elemental C, H, O				ASTM D-5291	01/10/17	PM
Carbon Content	82.02		Wt %			
Hydrogen Content	9.36		Wt %			
Oxygen Content	1.34		Wt %			
Carbon Residue, Conradson	24.74		Wt. %	ASTM D-189	01/09/21	JE
Pour Point	90	- 60	°C	ASTM D-97	01/10/09	TK
Viscosity, Kinematic @ 100 °C	99 860		cSt	ASTM D-445	01/09/24	JE
Viscosity, Kinematic @ 140 °C	4 071		cSt	ASTM D-445	01/10/07	TK
Viscosity @ 200 °C			Poise	ASTM D-2171		
Viscosity @ 250 °C			Poise	ASTM D-2171		
Pentane Insoluble Asphaltene	32.3	0.1	Wt %	IP-143M	01/09/20	EH
Heptane Insoluble Asphaltene	24.0	0.1	Wt %	IP-143	01/09/20	EH
Ash Content	0.104		Wt. %	ASTM D-482	01/09/24	JE
Penetration @ 0 °C						
Penetration @ 25 °C						

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.: Bitumen Sample

LABORATORY I.D.: 52137-01-5412-1

DATE SAMPLED: August 23, 2001

DATE RECEIVED: 01-08-29

SAMPLE INFO: Feed Stock Tank

TIME RECEIVED:

SAMPLE DESCRIPTION: 524 °C Plus

REMARKS:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Metals by ICAP			mg/kg	ASTM D-5185	01/10/19	TW
Nickel	123					
Vanadium	311					
Cobalt	< 0.1					
Molybdenum	14					
Sodium	17					
Iron	49					
Potassium	< 0.1					
Calcium	11					
Magnesium	2					
Aluminum	25					
Copper	1					
Arsenic	< 0.1					

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GENOIL TEST RESULTS - PRODUCT ANALYSIS

LABORATORY TEST RESULTS BY CORE LABORATORIES

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Core Lab is pleased to welcome Sanchez Technologies to the Core Lab Family

Reservoir Description			Production Enhancement			Reservoir Management		
Petroleum Services	Saybolt	Core Lab Instruments Sanchez Technologies	Refinery Systems	ProTechnics	Owen Oil Tools	Stim-Lab	Integrated Reservoir Solutions	PROMORE

Core Laboratories is the Reservoir Optimization Company

ProTechnics - Completion, Reservoir and Drilling Diagnostics

Integrated Reservoir Solutions, Our Reservoir Optimization Unit

Reservoir Description	Production Enhancement	Reservoir Management
Petroleum Services Data Management Geological Sciences Reservoir Fluids Rock Properties Core Lab Instruments Routine Rock Properties Advanced Rock Properties Drilling and Stimulation Properties Reservoir Fluid Equipment Refinery Systems Octane Analysis Waukesha Parts and Service	Saybolt Analytical BioFuels Blending and Additive Calibration Crude Oil Government and Institutional LPG/LNG Marine Fuels Petrochemical Petroleum Products	Annual Report Webcasts

Core Lab News

- 04 October 2016**
Core Laboratories' Third Quarter 2016 Webcast at 7:30 A.M. CDT / 2:30 P.M. CEST on October 20, 2016
- 20 September 2016**
Core Lab Presents at Johnson Rice Energy 2016 Conference
- 20 July 2016**
Core Lab Reports Second-Quarter 2016 Results

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NCUT
 National Centre for Upgrading Technology
 "a Canada/Alberta research alliance"

**NCUT ANALYTICAL LABORATORY
 ANALYSIS REPORT**

Submitter Eric MacDonald
 Core Laboratories Canada Ltd
 2810- 12th Street NE
 Calgary, Alberta
 T2E 7P7

Lab ID	Customer ID	P-Value	FR (Flocculation Ratios)	1/X (Inverse of dilution Ratio)	SHFT (wt%)
10006785	Whole Crude 52137-01-5412-1	3.50	0.2056	0.150	0.04
	This Athabasca Bitumen feed sample.		0.1244	0.250	
			0.0431	0.350	
10006786	Whole Crude 52137-01-5412-12	1.20	0.4400	0.200	0.42
	This is the liquid product from the catalytic run.		0.4218	0.400	
			0.4036	0.600	
10006854	52137-01-5412-12 524C PLUS	1.41	0.5780	0.251	0.012
	This is the 524 C+ fraction of the liquid product above.		0.5060	0.439	
			0.4350	0.754	

X= dilution ratio=(ml of Heptane+ml Toluene)/ml sample
 1/X= inverse of dilution ratio= ml sample/(ml Heptane+ml Toluene)

Test Results

PRODUCT SAMPLE

Catalyst Run - Composite Sample.

LABORATORY TEST RESULTS						
11/13/01						
JOB NUMBER: 52137-01-5412		CUSTOMER: Conoco Canada Ltd		ATTN: Bob Huggins-Clan		
CLIENT I.D.....: Crude Sample			LABORATORY I.D.....: 52137-01-5412-12			
DATE SAMPLED.....:			DATE RECEIVED.....: 01-09-19			
SAMPLE INFO.....: 20010828			TIME RECEIVED.....:			
SAMPLE DESCRIPTION...: Whole Crude			REMARKS.....:			
TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Density @ 15°C	904.7	0.1	kg/m ³	ASTM D-5002	01/10/04	WC
Relative Density @ 15/15°C	905.5			ASTM D-5002	01/10/04	WC
Specific Gravity @ 60°F	905.2			ASTM D-5002	01/10/04	WC
API @ 15.6°C	24.8			ASTM D-5002	01/10/04	WC
Sulphur, Total by X-ray Fluorescence	2360	500	ppm	ASTM D-4294	01/10/04	TK
Total Nitrogen by Chemiluminescence	1432	1	ppm Wt.	ASTM D-4629	01/10/12	WC
Acid Number	0.11		mg KOH/g	ASTM D-664	01/10/16	JE
Ash Content	0.001		Wt. %	ASTM D-482	01/10/16	JE
Carbon Residue, Conradson	2.59		Wt. %	ASTM D-189	01/10/16	JE
Elemental C, H, O				ASTM D-5291	01/10/17	PM
Carbon Content	86.68		Wt %			
Hydrogen Content	11.88		Wt %			
Oxygen Content	1.07		Wt %			
Salt Content	3.2		lb/Kbbl	ASTM D-3230	01/10/15	JE
Pentane Insoluble Asphaltene	1.6	0.1	Wt %	IP-143M	01/10/02	EH
Heptane Insoluble Asphaltene	1.2	0.1	Wt %	IP-143	01/10/02	EH

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Crude Sample

LABORATORY I.D.....: 52137-01-5412-12

DATE SAMPLED.....:

DATE RECEIVED.....: 01-09-19

SAMPLE INFO.....: 20010828

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: Whole Crude

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Fractional Distillation	% Yield (Mass)	% Yield (Volume)		ASTM D-2892	01/09/29	WC
IBP = 48 (Deg C @ 760 mmHg)						
IBP - 177 (Deg C @ 760 mmHg)	7.44	8.67				
177 - 232 (Deg C @ 760 mmHg)	10.59	11.49				
232 - 343 (Deg C @ 760 mmHg)	32.23	33.02				
343 - 524 (Deg C @ 760 mmHg)	38.00	36.71				
524 Plus (Deg C @ 760 mmHg)	11.68	10.08				
Loss	0.06	0.03				
Atmospheric / Vacuum Distillation			°C AET	ASTM D-1160	01/10/17	WC
I.B.P.	60.2	(atmospheric)				
5% Off	150.6	(atmospheric)				
10% Off	175.8	(atmospheric)				
20% Off	203.5	(atmospheric)				
30% Off	290.0	(vacuum)				
40% Off	315.1	(vacuum)				
50% Off	333.8	(vacuum)				
60% Off	363.5	(vacuum)				
70% Off	395.5	(vacuum)				
80% Off	443.8	(vacuum)				
90% Off	518.1	(vacuum)				
94% Off	567.8	(vacuum)				
FBP	567.8					
Wt. % Recovery	89.8					
Wt. % Residue	9.3					
Wt. %t Loss	0.9					

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CALGARY, ALBERTA T2E 7P7

LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Crude Sample

LABORATORY I.D.....: 52137-01-5412-12

DATE SAMPLED.....:

DATE RECEIVED.....: 01-09-19

SAMPLE INFO.....: 20010828

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: Whole Crude

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Metals by ICAP			mg/kg	ASTM D-5185	01/10/19	TW
Nickel	8					
Vanadium	18					
Cobalt	< 0.1					
Molybdenum	< 0.05					
Sodium	5					
Iron	1					
Potassium	1					
Calcium	1					
Magnesium	0.1					
Aluminum	3.0					
Copper	0.5					
Arsenic	< 0.1					
Shell Hot Filtration	0.42		Wt %		01/09/19	*NCUT
Shell p-Value	1.20				01/09/19	*NCUT
Viscosity, Kinematic @ 40 °C	10.04		cSt	ASTM D-445	01/10/03	TK
Viscosity, Kinematic @ 80 °C	3.71		cSt	ASTM D-445	01/10/03	TK

*NCUT - analysis conducted by National Center for Upgrading Technology

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CALGARY, ALBERTA T2E 7P7

LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Crude Sample

LABORATORY I.D.....: 52137-01-5412-12

DATE SAMPLED.....:

DATE RECEIVED.....: 01-09-19

SAMPLE INFO.....: 20010828

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: 177 °C - 232 °C

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Yield	11.49		LV %	ASTM D-2892	01/09/29	WC
Yield	10.59		WT %	ASTM D-2892	01/09/29	WC
API Gravity	38.2		@ 60 °F	ASTM D-5002	01/10/04	WC
Specific Gravity	0.8340		@ 60/60 °F	ASTM D-5002	01/10/04	WC
Relative Density	0.8344		@ 15/15 °C	ASTM D-5002	01/10/04	WC
Sulphur, Total by UV Fluorescence	19	1	mg/kg	ASTM D-5453	01/10/04	TK
Total Nitrogen by Chemiluminescence	66	1	ppm Wt.	ASTM D-4629	01/10/05	WC
Bromine Number	0.5		g / 100 g	ASTM D-1159	01/10/08	*HP
Elemental C, H.				ASTM D-5291	01/10/17	PM
Carbon Content	88.04		Wt %			
Hydrogen Content	12.91		Wt %			
Hydrocarbon Type				ASTM D-1319	01/10/17	JE
Aromatics	26.8		LV %			
Olefins	0.8		LV %			
Saturates	72.4		LV %			
Aniline Point	46.0		° C	ASTM D-611	01/10/04	TK
Smoke Point	18.0		mm	ASTM D-1322	01/10/15	JE
Freeze Point	-69	-76	° C	ASTM D-2386	01/10/16	JE

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LABORATORY TEST RESULTS

11/13/01

JOB NUMBER: 52137-01-5412

CUSTOMER: Conoco Canada Ltd.

ATTN: Bob Huggins-Chan

CLIENT I.D.....: Crude Sample

LABORATORY I.D.....: 52137-01-5412-12

DATE SAMPLED.....:

DATE RECEIVED.....: 01-09-19

SAMPLE INFO.....: 20010828

TIME RECEIVED.....:

SAMPLE DESCRIPTION...: 524 °C Plus

REMARKS.....:

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Metals by ICAP			mg/kg	ASTM D-5185	01/10/19	TW
Nickel	67					
Vanadium	147					
Cobalt	< 0.1					
Molybdenum	< 0.05					
Sodium	12					
Iron	4					
Potassium	2.3					
Calcium	12					
Magnesium	2					
Aluminum	10					
Copper	1					
Arsenic	< 0.1					
Shell Hot Filtration	0.012		Wt %		01/10/31	*NCUT
Shell p-Value	1.41				01/10/31	*NCUT

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