F O R E W O R D

Numerous samples of crude oil collected in various regions of Canada have been analysed, over a period of several decades, at the Fuels Research Centre, Mines Branch, Department of Energy, Mines and Resources, in Ottawa, as part of the resource evaluation program. For general documentation, as well as for specialized studies, it has been considered desirable to publish nearly 400 of these analyses of typical oil samples, together with some reservoir data.

The present publication is part of a series which will cover separately the Maritime Provinces (New Brunswick, Newfoundland and Nova Scotia), Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia and Northwest Territories. All these analyses were performed according to the United States Bureau of Mines Routine Method of Distillation. In the more recent analyses, refractive index and dispersion were determined at 20°C, using an Abbé-type refractometer equipped with compensating prisms. The refractive index thus determined is for the Sodium D line of light, and the dispersion $(N_F - N_C)\ 10^4$ is calculated from the position of the compensating prisms.

Most of the reservoir data are estimates obtained in the mid 1960's and grateful acknowledgement is hereby given for the excellent cooperation received from the various provincial authorities (Departments of Mines and others concerned with oil resources development and conservation) and from the numerous oil companies which contributed to this project. In order to improve further editions of this publication, it would be greatly appreciated if any errors, additional data, or supplementary bibliographical references were reported to the authors.

John Convey,
Director,
Mines Branch.

Ottawa, June 16, 1969.

AVANT-PROPOS

Au cours d'une période de plusieurs décennies, de nombreux échantillons de pétrole brut recueillis dans diverses régions du Canada ont été analysés au Centre de recherches sur les combustibles, Direction des mines, ministère de l'Énergie, des Mines et des Ressources, à Ottawa, dans le cadre du programme de l'évaluation des ressources. Pour la documentation générale, aussi bien que pour des études spécialisées, il a semblé désirable de publier presque 400 de ces analyses d'échantillons de pétrole typiques, ainsi que quelques caractéristiques des gisements.

La présente publication fait partie d'une série de rapports qui traitera séparément les Provinces Maritimes (Nouveau-Brunswick, Terre-Neuve et Nouvelle-Écosse), le Québec, l'Ontario, le Manitoba, la Saskatchewan, l'Alberta, et la Colombie-Britannique et les Territoires du Nord-Ouest. Toutes ces analyses ont été faites d'après la méthode "Routine" de distillation du Bureau des Mines des États-Unis d'Amérique. Dans les analyses plus récentes, l'indice de réfraction et la dispersion ont été determinés à 20°C à l'aide d'un réfractomètre de type Abbé équipé de prismes compensateurs. L'indice de réfraction ainsi obtenu correspond à la raie de lumière D du sodium, et la dispersion $(N_F - N_C)10^4$ est calculée d'après les positions des prismes compensateurs.

La plupart des caractéristiques de gisement sont des estimations obtenues vers 1965, et l'on doit rendre hommage à l'excellente collaboration reçue des diverses autorités provinciales (Ministères des mines, et autres intéressés au développement et à la conservation des ressources pétrolières) ainsi que des nombreuses sociétés de pétrole qui contribuèrent à ce projet.

Pour l'amélioration de rééditions de cette publication, il serait très apprécié que toute erreur, caractéristique ou référence bibliographique supplémentaire soit indiquée aux auteurs.

John Convey,
Directeur,
Direction des mines.

Ottawa, le 16 juin 1969.

Mines Branch Information Circular IC 228

ANALYSES AND CHARACTERISTICS OF OIL SAMPLES FROM ONTARIO

by

R. P. Charbonnier[1], R. G. Draper[1],
W. H. Harper[2] and A. Yates[1]

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ABSTRACT

The 54 oil analyses gathered in this publication have been performed in the Fuels Research Laboratories of the Mines Branch in Ottawa, according to the U.S.B.M. Routine Method of Distillation. Some reservoir characteristics are also included.

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[1]Senior Scientific Officer, and [2]Technical Officer, Fuels Research Centre, Mines Branch, Department of Energy, Mines and Resources, Ottawa, Canada.

Direction des mines

Circulaire d'information IC 228

ANALYSES ET CARACTÉRISTIQUES D'ÉCHANTILLONS DE PÉTROLE DE L'ONTARIO

par

R. P. Charbonnier[1], R. G. Draper[1],
W. H. Harper[2] et A. Yates[1]

RÉSUMÉ

Les 54 analyses de pétrole rassemblées dans cette publication ont été faites aux laboratoires de recherches sur les combustibles de la Direction des mines, à Ottawa, suivant la méthode U.S.B.M. de distillation. On a aussi inclus quelques caractéristiques des gisements.

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[1]Officier scientifique principal, [2]agent technique, Centre de recherches sur les combustibles, Direction des mines, ministère de l'Énergie, des Mines et des Ressources, Ottawa, Canada.

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ONTARIO

OIL SAMPLES

CRUDE PETROLEUM ANALYSIS

Laboratory Number 132-58

FIELD: Acton

POOL:

ZONE: Gull River

Well Name: Anthony No. 21
Location: Lot 15, Con. IV, Esquesing Tp., Halton Cty.
(co-ord 604S 1000W)
Interval tested, depth, feet: 1927-1933
Producing Zone: Gull River
Geological Age: Ordovician

Province: Ontario

Sample From: Ontario Fuel Board

Date Sampled: May 12, 1958
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.845
Sulphur, percent by weight: 0.20
Saybolt Universal Viscosity:
at 100°F., sec. 49

A.P.I. gravity at 60°F.: 36.0
Pour point, °F.: 55
Colour: Greenish Brown
Carbon residue, percent by weight: 0.7
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 742 mm. Hg.
First drop, 120°C. (248°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122									
2.	167									
3.	212									
4.	257									
5.	302	1.5	0.762	54.2	25					
6.	347	5.7	0.772	51.8	23	59.4				
7.	392	10.8	0.783	49.2	22	63.5				
8.	437	17.7	0.797	46.0	23	68.4				
9.	482	25.1	0.810	43.2	23	72.9				
10.	527	35.1	0.820	41.1	23	77.0				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	39.4	0.832	38.6	25	81.5	39	20		
12.	437	52.9	0.837	37.6	24	85.9	43	40		
13.	482	64.4	0.846	35.8	25	91.0	52	60		
14.	527	73.4	0.858	33.4	27	95.8	70	70		
15.	572	81.4	0.867	31.7	28	99.9	108	85		
Residuum		101.8	0.919	22.5						

Carbon residue of residuum: 3.2% Carbon residue of crude: 0.7%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline				
Total gasoline and naphtha	10.8	0.776	50.9	
Kerosine distillate	24.3	0.810	43.2	
Gas oil	20.7	0.837	37.6	Below 50
Nonviscous lubricating distillate	19.9	0.845-0.865	36.0-32.1	50-100
Medium lubricating distillate	5.8	0.865-0.871	32.1-31.0	100-200
Viscous lubricating distillate				Above 200
Residuum	20.4	0.919	22.5	
Distillation loss	-			

OIL FIELD DATA

Field and Pool: Belle River

Location: Essex County; Rochester Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name:

Completed: 1913

Perforated: Open Hole (110'-120')

Initial Potential: Unknown

GEOLOGY

Producing Zone(s): Dundee (Devonian)

Trap Type: Stratigraphic

Lithology: Dolomite

Maximum Reservoir Thickness: 7

Regional Setting: This field is situated on the south shore of Lake St. Clair. (It was abandoned in 1918.)

DEVELOPMENT DATA

Total Wells: Completed Oil: 25

Producing Oil: Nil

Logging Practice: Nil

RESERVOIR DATA

Type of Drive: Unknown

Estimated Recoverable Oil: 2240 S.T.bbls

Oil Zone Thickness: Average: 7

Area: 100 Acres

Oil Characteristics: Gravity: Low

Bibliographical Reference: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

OIL FIELD DATA

Field and Pool: Bothwell-Thamesville

Location: Kent County. Zone: Camden, Oxford Twps.

DISCOVERY DETAILS

Method: Oil Seep

Well: Name:

Completed: 1862

Perforated: Open Hole (300-400')

Initial Potential: Unknown (3-30 BOPD in 1935-1940)

GEOLOGY

Producing Zone(s): Devonian

Trap Type: Anticlinal

Lithology: Dolomite, Sandy

Maximum Reservoir Thickness: 8 feet

Regional Setting: Bothwell-Thamesville consists of a number of pools along an E-W trending anticline, found in the S-E corner of Lambton County and the N-E corner of Kent County.

DEVELOPMENT DATA

Total Wells: Completed Oil: 370 (approx.)

Producing Oil: 53

Well Spacing: 3 Acres (originally)

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Recoverable Oil: 3,100,000 S.T.bbls

Oil Zone Thickness: Average: 8 feet

Area: 800 Acres

Oil Characteristics: Gravity: 35.1 - 37.1 °API

PRODUCTION

Operating: (1966): 10,625 b/yr

Cumulative Production: 3,023,995 b

Market Outlet: Imperial Oil Refinery (Trucked)

C R U D E P E T R O L E U M A N A L Y S I S

Laboratory Number 5530

FIELD: Bothwell

POOL:

ZONE: Dundee-Columbus

Well Name: Composite Sample: Bothwell Field
Location: Zone Twp., Kent County
Interval tested, depth, feet: 325-604
Producing Zone: Dundee-Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: October 1927
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.844
Sulphur, percent by weight: 0.96
Saybolt Universal Viscosity:
at 70°F., sec. 72
at 100°F., sec. 53

A.P.I. gravity at 60°F.: 36.2
Pour point, °F.: Below 0
Colour: Greenish Black
Carbon residue, percent by weight: 1.2
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 757 mm. Hg.
First drop, 42°C. (108°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	0.5	0.8)	0.677	77.5	-			
3.	100	212	1.6	2.4	0.710	67.8	17			
4.	125	257	5.1	7.5	0.727	63.1	16			
5.	150	302	5.6	13.1	0.747	57.9	18			
6.	175	347	5.6	18.7	0.767	53.0	20			
7.	200	392	5.2	23.9	0.784	49.0	22			
8.	225	437	5.7	29.6	0.798	45.8	23			
9.	250	482	6.4	36.0	0.811	43.0	24			
10.	275	527	7.7	43.7	0.823	40.4	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.1	47.8	0.837	37.6	28		40	25
12.	225	437	7.0	54.8	0.843	36.4	27		46	40
13.	250	482	5.6	60.4	0.853	34.4	28		57	60
14.	275	527	5.8	66.2	0.858	33.4	27		78	75
15.	300	572	5.7	71.9	0.874	30.4	32		123	85
Residuum			27.0	98.9						

Carbon residue of residuum: 4.5% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	2.4	0.699	70.9	
Total gasoline and naphtha	21.9	0.751	56.9	
Kerosine distillate	19.8	0.812	42.8	
Gas oil	10.0	0.840	36.9	
Nonviscous lubricating distillate	12.5	0.847-0.866	35.6-31.9	50-100
Medium lubricating distillate	5.7	0.866-0.882	31.9-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	27.0	-	-	
Distillation loss	1.1			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5531

FIELD: Bothwell

POOL:

ZONE: Dundee-Columbus

Well Name: Composite Sample: Bothwell Field
Location: Zone Twp., Kent County
Interval tested, depth, feet: 325-604
Producing Zone: Dundee-Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: Imperial Oil Ltd.

Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.838
Sulphur, percent by weight: 0.91
Saybolt Universal Viscosity:
at 70°F., sec. 64
at 100°F., sec. 47

A.P.I. gravity at 60°F.: 37.3
Pour point, °F.: Below 0
Colour: Greenish Black
Carbon residue, percent by weight: 1.2
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 747 mm. Hg.
First drop, 30°C. (86°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.5	0.5)						
2.	75	167	1.1	1.6)	0.660	82.9	-			
3.	100	212	2.8	4.4	0.703	69.8	13			
4.	125	257	6.1	10.5	0.727	63.1	16			
5.	150	302	5.9	16.4	0.748	57.7	18			
6.	175	347	6.1	22.5	0.767	53.0	20			
7.	200	392	4.8	27.3	0.784	49.0	22			
8.	225	437	5.8	33.1	0.798	45.8	23			
9.	250	482	6.1	39.2	0.810	43.2	23			
10.	275	527	6.8	46.0	0.821	40.8	24			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.5	51.5	0.836	37.8	27		39	20
12.	225	437	6.0	57.5	0.843	36.3	27		46	40
13.	250	482	6.6	64.1	0.855	34.0	29		59	60
14.	275	527	6.1	70.2	0.867	31.7	31		87	80
15.	300	572	6.1	76.3	0.880	29.3	35		134	90
Residuum			22.9	99.2						

Carbon residue of residuum: 5.3% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.4	0.689	73.9	
Total gasoline and naphtha	27.3	0.744	58.7	
Kerosine distillate	18.7	0.810	43.2	
Gas oil	10.5	0.839	37.1	
Nonviscous lubricating distillate	12.3	0.847-0.870	35.6-31.1	50-100
Medium lubricating distillate	7.5	0.870-0.887	31.1-28.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	22.9	-	-	
Distillation loss	0.8			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 15007

FIELD: Brant

POOL:

ZONE: Whirlpool

Well Name: Hartley No. 1
Location: Lot. 16, Con. III, Onondaga Twp., Brant County
Interval tested, depth, feet: 572-582
Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: Mines Branch

Date Sampled: October 4, 1935
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.869
Sulphur, percent by weight: 0.43
Saybolt Universal Viscosity:
at 70°F., sec. 241
at 100°F., sec. 121

A.P.I. gravity at 60°F.: 31.3
Pour point, °F.: 25
Colour: Dark Green
Carbon residue, percent by weight: 1.5 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 760 mm. Hg.
First drop, 74°C. (166°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.2	0.2)	-	-	-			
4.	125	257	0.3	0.5)	0.747	57.9	-			
5.	150	302	1.0	1.5)	-	-				
6.	175	347	2.0	3.5	0.768	52.7	21			
7.	200	392	2.4	5.9	0.782	49.5	21			
8.	225	437	3.1	9.0	0.793	46.9	21			
9.	250	482	5.1	14.1	0.802	44.9	20			
10.	275	527	7.5	21.6	0.814	42.3	21			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.3	27.9	0.832	38.6	25		41	25
12.	225	437	8.6	36.5	0.843	36.4	27		47	45
13.	250	482	8.9	45.4	0.856	33.8	29		62	60
14.	275	527	8.1	53.5	0.867	31.7	31		92	70
15.	300	572	9.4	62.9	0.880	29.3	35		160	75
Residuum			34.8	97.7	0.915	23.1				

Carbon residue of residuum: 4.3% Carbon residue of crude: 1.5%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.2	-	-	
Total gasoline and naphtha	5.9	0.768	52.7	
Kerosine distillate	15.7	0.806	44.1	
Gas oil	12.3	0.836	37.8	
Nonviscous lubricating distillate	16.5	0.846-0.869	35.8-31.3	50-100
Medium lubricating distillate	12.5	0.869-0.887	31.3-28.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	34.8	0.915	23.1	
Distillation loss	2.3	-	-	

Remarks: The sample as received contained a trace of water (A.S.T.M.)

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5525

FIELD: Brant

POOL:

ZONE: Whirlpool

Well Name: Onondaga No. 1 (Fearman Farm)
Location: Lot.18, Con.III, Onondaga Twp., Brant County
Interval tested, depth, feet: -
Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: J.F. Carmody

Date Sampled: April 1928
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.859
Sulphur, percent by weight: 0.46
Saybolt Universal Viscosity:
at 70°F., sec. 147
at 100°F., sec. 88

A.P.I. gravity at 60°F.: 33.2
Pour point, °F.: 20
Colour: Dark Green
Carbon residue, percent by weight: 1.2
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 756 mm. Hg.
First drop, 59°C. (138°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167	0.1	0.1)						
3.	100	212	0.4	0.5)						
4.	125	257	1.3	1.8)	0.729	62.6	-			
5.	150	302	2.9	4.7	0.750	57.2	19			
6.	175	347	3.6	8.3	0.764	53.7	19			
7.	200	392	3.7	12.0	0.776	50.8	18			
8.	225	437	4.2	16.2	0.789	47.8	19			
9.	250	482	5.4	21.6	0.801	45.1	19			
10.	275	527	8.0	29.6	0.815	42.1	21			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.9	34.5	0.832	38.6	25		41	25
12.	225	437	7.2	41.7	0.842	36.5	26		46	35
13.	250	482	7.9	49.6	0.855	34.0	29		59	55
14.	275	527	7.3	56.9	0.867	31.7	31		85	70
15.	300	572	9.3	66.2	0.880	29.3	35		152	80
Residuum			32.3	98.5						

Carbon residue of residuum: 3.8% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.5	-	-	
Total gasoline and naphtha	12.0	0.758	55.2	
Kerosine distillate	17.6	0.805	44.3	
Gas oil	10.7	0.837	37.6	
Nonviscous lubricating distillate	14.8	0.846-0.870	35.8-31.1	50-100
Medium lubricating distillate	11.1	0.870-0.887	31.1-28.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	32.3	-	-	
Distillation loss	1.5			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 456

FIELD: Brant

POOL:

ZONE: Whirlpool

Well Name: Composite 3 wells: Hartley No. 2, 3 and 4
Location: Lot.16, Con.III, Onondaga Twp., Brant County
Interval tested, depth, feet: 564-574
Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 13, 1938
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.867
Sulphur, percent by weight: 0.50
Saybolt Universal Viscosity:
at 70°F., sec. 236

A.P.I. gravity at 60°F.: 31.7
Pour point, °F.: 30
Colour: Dark Green
Carbon residue, percent by weight: 1.4
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 770 mm. Hg.
First drop, 81°C. (178°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.4	0.4						
4.	125	257	0.1	0.5						
5.	150	302	0.7	1.2						
6.	175	347	1.7	2.9	0.764	53.7				
7.	200	392	2.3	5.2	0.779	50.1				
8.	225	437	3.0	8.2	0.789	47.8	19			
9.	250	482	4.8	13.0	0.800	45.4	19			
10.	275	527	6.9	19.9	0.811	43.0	19			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.6	26.5	0.827	39.6	23		39	20
12.	225	437	8.6	35.1	0.839	37.2	25		45	40
13.	250	482	9.7	44.8	0.854	34.2	28		58	60
14.	275	527	7.3	52.1	0.865	32.1	31		83	70
15.	300	572	9.6	61.7	0.877	29.9	33		137	80
Residuum			36.9	98.6	0.916	23.0				

Carbon residue of residuum: 2.8% Carbon residue of crude: 1.4%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.4	-	-	
Total gasoline and naphtha	5.2	0.767	53.0	
Kerosine distillate	14.7	0.803	44.7	
Gas oil	14.4	0.833	38.4	
Nonviscous lubricating distillate	16.8	0.845-0.869	36.0-31.3	50-100
Medium lubricating distillate	10.6	0.869-0.884	31.3-28.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	36.9	0.916	23.0	
Distillation loss	1.4			

Remarks: The sample as received contained 0.2% by vol. water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: Brigden

Location: Lambton County, Moore Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Canadian Delhi, No. 29 - Brigden No. 1 (Lot 10, Con. IV)

Completed: December 23, 1963

Perforated: Open Hole (2108-2120')

Treatment: Frac. 610 bbls. oil; 9000 lbs. 10-20 sand

Initial Potential: 30 bbl/d

GEOLOGY

Producing Zone(s): Salina A-1 (Silurian)

Other Shows: Gas (Devonian)

Trap Type: Anticlinal

Lithology: Dolomite

Maximum Reservoir Thickness: 34

Regional Setting: This pool is situated immediately east of the Kimball-Colinville pool. The pool consists of two separate oil wells. The oil and gas horizons are confined to separate horizons within the main pool.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 2; Gas: 2; Dry and Abandoned: 3

Producing Oil: 2

Well Spacing: 25 Acres; Pattern: Centre

Logging Practice: Radioactivity and Density

Completion Practice: 10 3/4" casing to 89', 8 5/8" to 456', 7" to 1229', 4½" to 2159', 2 3/8" to 2116' acidized and fractured with crude

RESERVOIR DATA

Type of Drive: Solution Gas and Expansion

Estimated Oil in Place: 500,000 S.T.bbls (830 bbls/acre-foot)

Estimated Recoverable Oil: 50,000 S.T.bbls(83 bbls/acre-foot)

Oil Zone Thickness: Maximum: 34 (est); Average: 23 (est)

Gas Zone Thickness: Maximum: 12

Porosity: 7 (est)%; Permeability: 2.0 md

Area: 550 total Acres (Approx. 50 Oil)

Oil Characteristics: Gravity: 39.4 ^{o}API; Sulphur: 0.70%

Pour Point: -40°F.

PRODUCTION

Operating: (1966): 5,701 b/yr

Cumulative Production: 23,608 b

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Koepke, W.E., and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Chatham-Dresden-Camden Gore

Location: Kent County, Chatham-Camden Twps.

DISCOVERY DETAILS

Method: Subsurface and Structure Test Hole

Well: Name: (Lot 8, Con. XII) Chatham Gas Field

Completed: 1936

Perforated: Open Hole (1425-1625')

Initial Potential: 250 M.C.F./d

GEOLOGY

Producing Zone(s): Salina-Guelph (Silurian)

Trap Type: Anticlinal

Lithology: Dolomite

Maximum Reservoir Thickness: 30'

Regional Setting: These fields are located on a long E-W anticline bounded by a fault zone to the south of the anticline. The fields are located in the north end of Kent County.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 6; Gas: 62;

Producing Oil: 3

Well Spacing: 25 Acres

Logging Practice: Nil

Completion Practice: 10" casing to 60', 8" to 450', 7" to 1500'. Shot with approx. 140 quarts nitroglycerine at various intervals.

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Oil in Place: 900,000 S.T.bbls

Estimated Recoverable Oil: 80,000 S.T.bbls

Oil Zone Thickness: Maximum: 8'; Average: 5'

Gas Zone Thickness: Maximum: 30'

Porosity: 10%

Area: 4,300 Gas and 320 Oil Acres

Oil Characteristics: Gravity: 38.5 ^{o}API

PRODUCTION

Operating: (1966): 5,080 b/yr

Cumulative Production: 60,959 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical References: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

Koepke, W.E., and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Clearville

Location: Kent County, Oxford Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Tobacco Road Oil No. 1 (Lot 55, Con. S.T.R.)

Completed: February 12, 1962

Perforated: Open Hole (3954-3963')

Initial Potential: 250 BOPD

GEOLOGY

Producing Zone(s): Trempealeau (Cambrian)

Other Shows: Gas (Silurian)

Trap Type: Structural (fault)

Lithology: Dolomite, Sandy

Maximum Reservoir Thickness: 11'

Regional Setting: This field is situated near the town of Clearville, 1½ miles from Lake Erie. The structure of the field is a subdued erosional remnant associated with Post Mid. Devonian faulting.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 17; Dry and Abandoned: 8

Producing Oil: 16

Well Spacing: 50 Acres; Pattern: Even Tracts - Odd Lots; Odd Tracts - Even Lots

Logging Practice: Radioactivity, Density

Completion Practice: 13 3/8" casing to 190', 10 3/4" at 370', 8 5/8" to 1200', 7" to 1890', 4½" to 3930' - Open Hole or Perforated, 4 jets/ft., acidized

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Oil in Place: 5,000,000 S.T.bbls

Estimated Recoverable Oil: 1,500,000 S.T.bbls

Oil Zone Thickness: Maximum: 10'; Average: 7'

Porosity: 12%

Area: 1000 Acres

Oil Characteristics: Gravity: 38.8 ^{o}API; Sulphur: 0.31%

Pour Point: 35°F

PRODUCTION

Operating: (1966): 87,713 bbls/yr

Cumulative Production: 750,713 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical References: Burgess, R.J., " Cambrian Hydrocarbon Traps on the Northwest Rim of the Appalachian Basin", O.P.I., Vol. I (1962).

Pounder, J.A., "Cambrian of Ontario", O.P.I., Vol. III (1964).

Annual Report, "The Clearville Field", Ont. Dept. of Energy Resources (1963).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 267-63

FIELD: Clearville

POOL:

ZONE: Trenton

Well Name: Clearville No. 6
Location: Lot 57 S.T.R., Oxford Tp., Kent County
Interval tested, depth, feet: 3472-3508
Producing Zone: Trenton
Geological Age: Ordovician

Province: Ontario
Sample From: Ontario Dept. of Energy Resources
Date Sampled: June 10, 1963
Sampled at: Well Head

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.853
Sulphur, percent by weight: 0.04
Saybolt Universal Viscosity:
at 77°F., sec. 106
at 100°F., sec. 71

A.P.I. gravity at 60°F.: 34.4
Pour point, °F.: 10
Colour: Brownish Black
Carbon residue, percent by weight: 2.6 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 761 mm. Hg.
First drop, 54°C. (129°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122									
2.	167	1.6	0.676	77.8	-	-			1.3878	
3.	212	3.4	0.700	70.6	12	-			1.3945	
4.	257	5.4	0.721	64.8	13	64.0			1.4032	
5.	302	8.5	0.736	60.8	12	66.5			1.4103	
6.	347	12.3	0.750	57.2	12	68.4			1.4174	
7.	392	16.3	0.764	53.7	13	72.5			1.4248	
8.	437	21.3	0.778	50.4	14	75.6			1.4320	
9.	482	26.4	0.791	47.4	14	78.2			1.4396	
10.	527	33.6	0.804	44.5	16	81.2			1.4464	
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	37.4	0.818	41.5	19	84.0	38	20	1.4537	
12.	437	44.7	0.828	39.4	19	86.8	42	30	1.4597	
13.	482	49.7	0.842	36.6	23	89.2	50	45	1.4683	
14.	527	54.0	0.858	33.4	27	90.5	65	65	1.4767	
15.	572	58.6	0.870	31.1	30	92.4	97	80	1.4848	
Residuum		99.9	0.936	19.7						

Carbon residue of residuum: 5.8% Carbon residue of crude: 2.6%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	3.4	0.689	73.9	
Total gasoline and naphtha	16.3	0.734	61.3	
Kerosine distillate	17.3	0.793	46.9	
Gas oil	13.6	0.827	39.6	Below 50
Nonviscous lubricating distillate	9.5	0.842-0.871	36.6-31.0	50-100
Medium lubricating distillate	1.9	0.871-0.876	31.0-30.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	41.3	0.936	19.7	
Distillation loss	0.1			

OIL FIELD DATA

Field and Pool: Colchester

Location: Essex County, Colchester South Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial - Harvest - Submarine - P.E. Wright - Colchester No. 1. (Lot.76; Con. - Front)

Completed: June 6, 1959

Perforated: Open Hole (2148-2165)

Treatment: Acidized (2) Zones - 1,000 gal. HCl - 700 gal. HCl, fractured with 8400 lbs. sand and 177 bbls il

Initial Potential: 25 BOPD

GEOLOGY

Producing Zone(s): Trenton, Black River (Ordovician)

Other Shows: Gas - Salina (A-2)

Trap Type: Stratigraphic

Lithology: Dolomite Zone

Maximum Reservoir Thickness: 50'

Regional Setting: This field is situated 1 mile west of Colchester and adjacent to Lake Erie.

Deepest Formation Penetrated: Black River

DEVELOPMENT DATA

Total Wells: Completed Oil: 13; Dry and Abandoned: 4;

Producing Oil: 5

Well Spacing: +25 Acres; Pattern: Even

Logging Practice: Radioactivity Log

Completion Practice: 13 3/8" casing to 100'; 10 3/4" to 400'; 8 5/8" to 1250'; 7" to 2000' and occasionally 4½" to T.D.

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Oil in Place: 3,100,000 S.T.bbls (374 bbls/acre-foot)

Estimated Recoverable Oil: 590,000 S.T.bbls (71 bbls/acre-foot)

Oil Zone Thickness: Maximum: 50; Average: 10

Porosity: 6%

Area: 450 Acres

Oil Characteristics: Gravity: 40.8 -42° API; Sulphur: 0.18%

Pour Point: 15°F.

PRODUCTION

Operating: (1966): 21,560 b/yr

Cumulative Production: 529,467 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Sanford, B.V., "Subsurface Stratigraphy of Ordovician Rocks in Southwestern Ontario", Geol. Surv. Can. Paper 60-26 (1961).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 114-60

FIELD: Colchester

POOL:

ZONE: Sherman Fall

Well Name: Imperial Colchester No. 1
Location: Lot 76, Concession I, Colchester South Twp., Essex County
Interval tested, depth, feet: 2148-2165
Producing Zone: Sherman Fall, Trenton
Geological Age: Ordovician

Province: Ontario
Sample From: Ontario Fuel Board

Date Sampled: February 16, 1960
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.816
Sulphur, percent by weight: 0.18
Saybolt Universal Viscosity: at 100°F., sec. 39

A.P.I. gravity at 60°F.: 41.9
Pour point, °F.: 15
Colour: Greenish Black
Carbon residue, percent by weight: 1.0 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 761 mm. Hg.
First drop, 27°C. (81°F.)

Fraction No.	Cut at °F.	Sum per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122	1.7	0.640	89.6	-	-				
2.	167	4.2	0.672	79.1	8.4	-				
3.	212	9.0	0.703	69.8	13	58.6				
4.	257	14.9	0.729	62.6	17	58.0				
5.	302	21.0	0.747	57.9	18	59.2				
6.	347	27.4	0.765	53.5	19	60.5				
7.	392	32.4	0.780	49.9	20	63.9				
8.	437	37.3	0.793	46.9	21	67.7				
9.	482	43.0	0.805	44.3	21	71.0				
10.	527	49.6	0.817	41.7	22	75.0				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	52.6	0.828	39.4	23	77.8	38	15		
12.	437	58.6	0.838	37.4	24	81.8	43	35		
13.	482	63.9	0.850	35.0	27	84.5	54	55		
14.	527	67.8	0.863	32.5	30	89.5	71	70		
15.	572	72.9	0.871	31.0	30	93.2	108	90		
Residuum		96.8	0.922	22.0						

Carbon residue of residuum: 3.6% Carbon residue of crude: 1.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	9.0	0.682	76.0	
Total gasoline and naphtha	32.4	0.734	61.3	
Kerosine distillate	17.2	0.806	44.1	
Gas oil	9.8	0.835	38.0	Below 50
Nonviscous lubricating distillate	10.1	0.846-0.870	35.8-31.1	50-100
Medium lubricating distillate	3.4	0.870-0.876	31.1-30.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.9	0.922	22.0	
Distillation loss	3.2			

OIL FIELD DATA

Field and Pool: Corunna

Location: Lambton County, Moore Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Imperial Oil No. 259 - Corunna 4 - A & M Wellington No. 1, Lot 20, Con. X; Completed: September 8, 1950. Treatment: Nil. Perforated: Open Hole (2149-2208'; 2254-2289'; 2308-2330'). Initial Potential: 7.5 MMCF/d; Oil Discovered December 22, 1950; Imperial Oil No. 271, Lot 20, Con. X (I.P.=10-15 b/d)

GEOLOGY

Producing Zone(s): Guelph and Salina A-1 (Silurian); Trap Type: Pinnacle Reef

Lithology: Dolomite. Maximum Reservoir Thickness: 180'

Regional Setting: This field is situated adjacent to the Seckerton Field, seven miles S.E. of Sarnia and within the pinnacle reef belt.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 13; Gas: 4; Dry and Abandoned: 4

Producing Oil: 10; Injection or Disposal: Gas Storage Wells

Logging Practice: Radioactivity, Density and Caliper

Completion Practice: 10 3/4" casing to 150'; 8 5/8" to 500'; 7" to 1250'; 4½" to 2500' - Open Hole, Acidized.

RESERVOIR DATA

Type of Drive: Solution Gas and Gas Expansion

Estimated Oil in Place: 6,000,000 S.T.bbls (570 bbls/acre-foot)

Estimated Recoverable Oil: 1,400,000 S.T.bbls (133 bbls/acre-foot)

Oil Zone Thickness: Maximum: 140; Average: 30

Gas Zone Thickness: Maximum: 180

Porosity: 8%

Area: 350 Acres

Oil Gravity: 35 °API

Pressure Maintenance or Secondary Recovery: Gas Storage

PRODUCTION

Operating: (1966): 60,704 bbl/yr

Cumulative Production: 990,077 bbls

Market Outlet: Imperial Oil Refinery (Trucked and Pipeline)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Dante

Location: Lambton County, Euphemia Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial 148 - Stocking No. 1 (Lot 16, Con. V)

Completed: May 17, 1948

Perforated: Open Hole (334'-345')

Treatment: Nil

Initial Potential: 44 BOPD

GEOLOGY

Producing Zone(s): Dundee (Devonian)

Other Shows: Gas (334') (Devonian)

Trap Type: Anticlinal

Lithology: Dolomite

Maximum Reservoir Thickness: About 10'

Regional Setting: This field is situated about 4 miles north of the Bothwell-Thamesville pools. The field was abandoned in 1949.

Deepest Formation Penetrated: Guelph (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 10; Dry and Abandoned: 23

Well Spacing: 64 Acres

Logging Practice: Nil

Completion Practice: 10 3/4" casing to 130'; 8 5/8" to 140'; 7" to 240' and 2" to 330' (Open Hole)

RESERVOIR DATA

Estimated Recoverable Oil: 17,460 S.T.bbls

Oil Zone Thickness: Average: 10' (approx.)

Porosity: 9 (est.) %

Area: 300 Acres

PRODUCTION

Operating: Nil

Cumulative Production: 17,118 bbls

OIL FIELD DATA

Field and Pool: Dawn

Location: Lambton County, Dawn Twp.

DISCOVERY DETAILS

Method: Structure Test Hole and Subsurface Geology

Well: Name: Union Gas Dawn No. 3, Lot 24, Con. V

Completed: November 13, 1921

Perforated: Open Hole (1615'-1750')

Treatment: None

Initial Potential: 177 MCF/d Gas

GEOLOGY

Producing Zone(s): Salina-Guelph A-2 and A-1 (Silurian)

Trap Type: Structural - Stratigraphic

Lithology: Dolomite, Brownish-Grey, Fine Grained

Maximum Reservoir Thickness: 25'

Regional Setting: This field is situated on an 11 mile long E-W anticline feature; 7 miles S-W of Oil Springs.

Deepest Formation Penetrated: Ordovician

DEVELOPMENT DATA

Total Wells: Completed Oil: 19; Gas: 23

Producing Oil: 19

Well Spacing: 25 Acres

Logging Practice: Radioactivity Log

Completion Practice: 10 3/4" casing to 70'; 8 5/8" to 500'; 7" to 1100'; 5½" to 1800'; 2" to 1900'. Hole Usually Shot, Acidized and/or fracted (various programmes).

RESERVOIR DATA

Type of Drive: Solution Gas and Gas Cap

Estimated Oil in Place: 2,400,000 S.T.bbls

Estimated Recoverable Oil: 250,000 S.T.bbls

Oil Zone Thickness: Maximum: 12; Average: 8

Gas Zone Thickness: Maximum: 30

Porosity: 12%

Area: 2,250 Acres (Approx. 400 Oil)

Oil Characteristics: Gravity: 39.8 °API; Sulphur: 0.62%

Pour Point: Below 0°F.

Pressure Maintenance or Secondary Recovery: Gas Storage Area

PRODUCTION

Operating: (1966): 24,655 b/yr

Cumulative Production: 156,966 bbls

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Dawn 156

Location: Lambton County, Dawn Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Union Dawn No. 156, Lot 33, Con. II

Completed: January 28, 1952 (Oil Disc. 1956)

Perforated: Open Hole (Pay Intervals: 1621-27; 1633-39; 1719-34)

Treatment: Nil

Initial Potential: 6014 MCF/d

GEOLOGY

Producing Zone(s): Salina-Guelph (Silurian)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 348'

Regional Setting: This pool is a small pinnacle reef, now used for gas storage, and is located 3 miles north of the main Dawn-Sombra pools.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 2; Gas: 16; Dry and Abandoned: 6

Producing Oil: 1; Gas: 9

Injection or Disposal: Gas Storage Wells

Well Spacing: 25 Acres

Logging Practice: Radioactivity

Completion Practice: 13 3/8" casing to 100'; 10 3/4" to 570'; 8 5/8" to 1300'; 5½" to 2,000' perforated and acidized.

RESERVOIR DATA

Type of Drive: Gas Expansion

Estimated Oil in Place: 1,150,000 S.T.bbls

Estimated Recoverable Oil: 315,000 S.T.bbls

Oil Zone Thickness: Maximum: 17; Average: 14

Gas Zone Thickness: Maximum: 348

Porosity: 12%

Area: 825 Total Acres (Approx. 100 Oil)

Oil Characteristics: Gravity: 49.1 ^{o}API

Pressure Maintenance or Secondary Recovery: Gas Storage

PRODUCTION

Operating: (1966): 18,284 b/yr

Cumulative Production: 206,262 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16158

FIELD: Dawn

POOL:

ZONE: Guelph

Well Name: Union No. 68
Location: Lot 25, Con. II, Dawn Twp., Lambton County
Interval tested, depth, feet: 1925-1955
Producing Zone: Guelph
Geological Age: Middle Silurian

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 1, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.826
Sulphur, percent by weight: 0.62
Saybolt Universal Viscosity:
at 70°F., sec. 44

A.P.I. gravity at 60°F.: 39.8
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 1.5
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 760 mm. Hg.
First drop, 24°C. (75°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	3.6	3.6	0.636	91.0	-			
2.	75	167	3.1	6.7	0.671	79.4	8			
3.	100	212	4.1	10.8	0.710	67.8	17			
4.	125	257	5.7	16.5	0.742	59.2	23			
5.	150	302	7.0	23.5	0.768	52.7	27			
6.	175	347	6.3	29.8	0.789	47.8	31			
7.	200	392	5.1	34.9	0.803	44.7	31			
8.	225	437	5.1	40.0	0.811	43.0	29			
9.	250	482	4.8	44.8	0.820	41.1	28			
10.	275	527	6.6	51.4	0.831	38.8	29			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	3.7	55.1	0.843	36.4	30		40	30
12.	225	437	6.0	61.1	0.848	35.4	29		46	50
13.	250	482	5.1	66.2	0.856	33.8	29		56	70
14.	275	527	5.5	71.7	0.867	31.7	31		78	85
15.	300	572	5.8	77.5	0.878	29.7	34		131	95
Residuum			20.5	98.0	-	-				

Carbon residue of residuum: 7.3% Carbon residue of crude: 1.5%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	10.8	0.674	78.4	
Total gasoline and naphtha	34.9	0.744	58.7	
Kerosine distillate	9.9	0.815	42.1	
Gas oil	15.3	0.840	37.0	
Nonviscous lubricating distillate	11.2	0.851-0.871	34.8-31.0	50-100
Medium lubricating distillate	6.2	0.871-0.883	31.0-28.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	20.5			
Distillation loss	2.0			

Remarks: The sample as received contained 0.1% by vol. water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: Dover

Location: Kent County, Dover Twp.

DISCOVERY DETAILS

Method: Non Technical

Well: Name: (Lot 3, Con. III)

Completed: 1917

Perforated: Open Hole (3165')

Initial Potential: 4-100 BOPD and 6,000 MCFD (Gas)

GEOLOGY

Producing Zone(s): Trenton - Black River (Ordovician)

Other Shows: Gas 3165' (Trenton)

Trap Type: Faulted Syncline

Lithology: Limestone and Dolomite

Maximum Reservoir Thickness: 60 (Approx.)

Regional Setting: This field is situated near the southwest corner of Lake St. Clair and on the western flank of the Chatham sag. The field forms an E-W syncline about 4 miles long and ½ mile wide.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil and Gas: 35

Producing Oil: 1

Well Spacing: 6 (Approx.) Acres

Logging Practice: Nil

Completion Practice: 12½" casing to 100'; 10" to 260'; 8¼" to 1000'; 6 5/8" to 2700'; 3" to 2900'. Completed open hole, shot with nitroglycerine.

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Recoverable Oil: 250,000 S.T.bbls

Oil Zone Thickness: Maximum: 60

Porosity: 5-6 (est.) %

Area: 100 Acres (Oil)

Oil Characteristics: Gravity: 39 °API; Sulphur: 0.15%

Pour Point: Below 0°F.

PRODUCTION

Operating: (1966): 295 bbls/yr

Cumulative Production: 247,025 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical References: Caley, J.F., "Paleozoic Geology Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

Sanford B.V., "Subsurface Stratigraphy of Ordovician Rocks in Southwestern Ontario," Paper 60-26 (1961).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5539

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Petrol Oil and Gas
Location: Lot. 1, Con. II, Dover West Twp., Kent County
Interval tested, depth, feet: 3280
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Petrol Oil and Gas Company
Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.826
Sulphur, percent by weight: 0.16
Saybolt Universal Viscosity:
at 70°F., sec. 50
at 100°F., sec. 42

A.P.I. gravity at 60°F.: 39.8
Pour point, °F.: 30
Colour: Dark Green
Carbon residue, percent by weight: 1.0 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 764 mm. Hg.
First drop, 30°C. (86°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.9	0.9						
2.	75	167	1.5	2.4	0.656	84.2	-			
3.	100	212	2.9	5.3	0.702	70.1	13			
4.	125	257	5.2	10.5	0.727	63.1	16			
5.	150	302	6.5	17.0	0.748	57.7	18			
6.	175	347	6.2	23.2	0.764	53.7	19			
7.	200	392	6.1	29.3	0.778	50.4	19			
8.	225	437	5.5	34.8	0.790	47.6	19			
9.	250	482	6.2	41.0	0.803	44.7	20			
10.	275	527	7.6	48.6	0.816	41.9	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.4	55.0	0.834	38.2	26		41	30
12.	225	437	6.5	61.5	0.843	36.4	27		47	45
13.	250	482	5.7	67.2	0.855	34.0	29		60	60
14.	275	527	5.0	72.2	0.866	31.9	31		85	80
15.	300	572	5.5	77.7	0.875	30.2	32		141	95
Residuum			20.7	98.4						

Carbon residue of residuum: 4.8% Carbon residue of crude: 1.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.3	0.681	76.3	
Total gasoline and naphtha	29.3	0.742	59.2	
Kerosine distillate	19.3	0.804	44.5	
Gas oil	11.0	0.837	37.6	
Nonviscous lubricating distillate	11.5	0.845-0.868	36.0-31.5	50-100
Medium lubricating distillate	6.6	0.868-0.880	31.5-29.3	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	20.7			
Distillation loss	1.6			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5541

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Composite Sample: Dover Field
Location: Prairie Siding, Dover East Twp., Kent County
Interval tested, depth, feet: 3000-3300
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Imperial Oil Ltd.
Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.836
Sulphur, percent by weight: 0.13
Saybolt Universal Viscosity:
at 70°F., sec. 54
at 100°F., sec. 45

A.P.I. gravity at 60°F.: 37.8
Pour point, °F.: 10
Colour: Dark Green
Carbon residue, percent by weight: 1.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 752 mm. Hg.
First drop, 40°C. (104°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.2	0.2)						
2.	75	167	0.5	0.7)						
3.	100	212	1.3	2.0)	0.691	73.3	-			
4.	125	257	4.5	6.5	0.730	62.3	17			
5.	150	302	6.6	13.1	0.749	57.4	18			
6.	175	347	6.3	19.4	0.765	53.5	19			
7.	200	392	6.1	25.5	0.778	50.4	19			
8.	225	437	6.7	32.2	0.792	47.2	20			
9.	250	482	6.5	38.7	0.805	44.3	21			
10.	275	527	7.5	46.2	0.817	41.7	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.7	51.9	0.832	38.6	25		40	25
12.	225	437	6.4	58.3	0.841	36.7	26		45	40
13.	250	482	6.5	64.8	0.852	34.6	28		56	60
14.	275	527	5.7	70.5	0.866	31.9	31		80	75
15.	300	572	6.7	77.2	0.878	29.7	34		142	85
Residuum			22.1	99.3						

Carbon residue of residuum: 4.8% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	2.0	0,691	73.3	
Total gasoline and naphtha	25.5	0.752	56.7	
Kerosine distillate	20.7	0.805	44.3	
Gas oil	11.8	0.837	37.6	
Nonviscous lubricating distillate	11.7	0.846-0.870	35.8-31.1	50-100
Medium lubricating distillate	7.5	0.870-0.884	31.1-28.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	22.1	-	-	
Distillation loss	0.7			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16159

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Prairie No. 3
Location: Lot 2, River Front Con., Dover East Twp., Kent County
Interval tested, depth, feet: 3280-3292
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 2, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.830
Sulphur, percent by weight: 0.15
Saybolt Universal Viscosity:
at 70°F., sec. 49
at °F., sec.

A.P.I. Gravity at 60°F.: 39.0
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 0.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 766 mm. Hg.
First drop, 42°C. (108°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	0.9	1.2)						
3.	100	212	2.8	4.0)	0.703	69.8	13			
4.	125	257	6.2	10.2	0.733	61.5	18			
5.	150	302	7.1	17.3	0.752	56.7	20			
6.	175	347	6.4	23.7	0.768	52.7	21			
7.	200	392	5.9	29.6	0.781	49.7	21			
8.	225	437	6.3	35.9	0.793	46.9	21			
9.	250	482	6.1	42.0	0.807	43.8	22			
10.	275	527	7.2	49.2	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.3	53.5	0.832	38.6	25		40	20
12.	225	437	6.5	60.0	0.840	37.0	25		45	35
13.	250	482	6.3	66.3	0.852	34.6	28		57	55
14.	275	517	5.0	71.3	0.865	32.1	31		82	75
15.	300	572	3.7	75.0	0.874	30.4	32		125	90
Residuum			23.6	98.6	-	-				

Carbon residue of residuum: 3.9% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.0	0.703	69.8	
Total gasoline and naphtha	29.6	0.751	56.9	
Kerosine distillate	19.6	0.807	43.8	
Gas oil	10.0	0.836	37.8	
Nonviscous lubricating distillate	11.3	0.845-0.869	36.0-31.3	50-100
Medium lubricating distillate	4.5	0.869-0.878	31.3-29.7	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.6			
Distillation loss	1.4			

Remarks: The sample as received contained no water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16160

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Bruette No. 1
Location: Lot 4, Con. V, Raleigh Twp., Kent County
Interval tested, depth, feet: 3220
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 2, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.823
Sulphur, percent by weight: 0.15
Salbolt Universal Viscosity:
at 70°F., sec. 47
at °F., sec.

A.P.I. gravity at 60°F.: 40.4
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 0.8
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 757 mm. Hg.
First drop, 25°C. (77°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	1.1	1.1)						
2.	75	167	1.0	2.1)	0.657	83.9	-			
3.	100	212	3.1	5.2	0.709	68.1	16			
4.	125	257	6.0	11.2	0.734	61.3	19			
5.	150	302	6.9	18.1	0.753	56.4	20			
6.	175	347	6.4	24.5	0.767	53.0	20			
7.	200	392	5.8	30.3	0.781	49.7	21			
8.	225	437	5.6	35.9	0.794	46.7	21			
9.	250	482	6.5	42.4	0.806	44.1	22			
10.	275	527	7.3	49.7	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.1	54.8	0.832	38.6	25		39	20
12.	225	437	6.2	61.0	0.840	37.0	25		45	40
13.	250	482	5.7	66.7	0.853	34.4	28		56	55
14.	275	527	4.7	71.4	0.865	32.1	31		72	70
15.	300	572	5.5	76.9	0.873	30.6	31		123	90
Residuum			20.9	97.8	-	-				

Carbon residue of residuum: 3.7% Carbon residue of crude: 0.8%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.2	0.688	74.2	
Total gasoline and naphtha	30.3	0.746	58.2	
Kerosine distillate	19.4	0.807	43.8	
Gas oil	10.8	0.836	37.8	
Nonviscous lubricating distillate	11.4	0.846-0.869	35.8-31.3	50-100
Medium lubricating distillate	5.0	0.869-0.877	31.3-29.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	20.9			
Distillation loss	2.2			

Remarks: The sample as received contained no water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16161

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Duphrette No. 1
Location: Lot 3, Con. IV, Dover East Twp., Kent County
Interval tested, depth, feet:
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 2, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.825
Sulphur, percent by weight: 0.15
Saybolt Universal Viscosity:
at 70°F., sec. 48
at °F., sec.

A.P.I. gravity at 60°F.: 40.0
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 1.2
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 761 mm. Hg.
First drop, 26°C. (79°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.9	0.9)						
2.	75	167	1.5	2.4)	0.664	81.6	-			
3.	100	212	3.4	5.8	0.710	67.8	17			
4.	125	257	6.4	12.2	0.732	61.8	18			
5.	150	302	7.2	19.4	0.752	56.7	20			
6.	175	347	6.0	25.4	0.768	52.7	21			
7.	200	392	5.7	31.1	0.782	49.5	21			
8.	225	437	5.6	36.7	0.794	46.7	21			
9.	250	482	6.1	42.8	0.807	43.8	22			
10.	275	527	7.0	49.8	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.2	55.0	0.833	38.4	26		40	25
12.	225	437	6.5	61.5	0.841	36.8	26		45	40
13.	250	482	5.7	67.2	0.853	34.4	28		56	60
14.	275	527	4.5	71.7	0.865	32.1	31		76	75
15.	300	572	4.8	76.5	0.876	30.0	33		117	90
Residuum			21.5	98.0	-	-				

Carbon residue of residuum: 5.8% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.8	0.691	73.3	
Total gasoline and naphtha	31.1	0.745	58.4	
Kerosine distillate	18.7	0.808	43.6	
Gas oil	11.0	0.837	37.6	
Nonviscous lubricating distillate	11.3	0.846-0.871	35.8-31.0	50-100
Medium lubricating distillate	4.4	0.871-0.882	31.0-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	21.5			
Distillation loss	2.0			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 1521

FIELD: Dover

POOL:

ZONE: Trenton

Well Name: Bruette No. 5
Location: Lot 4; River Front Con.; Raleigh Twp.; Kent County
Interval tested, depth, feet:
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Bureau of Mines Dept. of Mines & Resources
Date Sampled: September 21, 1939
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.827
Sulphur, percent by weight: 0.34
Saybolt Universal Viscosity:
at 70°F., sec. 48
at °F., sec.

A.P.I. gravity at 60°F.: 39.6
Pour point, °F.: Below -35
Colour: Dark Green
Carbon residue, percent by weight: 0.8 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 759 mm. Hg.
First drop, 33°C. (91°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.7	0.7)						
2.	75	167	1.3	2.0)	0.669	80.0	-			
3.	100	212	3.0	5.0	0.712	67.2	18	56.7		
4.	125	257	6.0	11.0	0.737	60.5	20	55.6		
5.	150	302	6.6	17.6	0.757	55.4	22	55.6		
6.	175	347	7.2	24.8	0.773	51.6	23	57.8		
7.	200	392	5.3	30.1	0.787	48.3	23	61.7		
8.	225	437	6.6	36.7	0.798	45.8	23	66.7		
9.	250	482	5.5	42.2	0.811	43.0	24	72.2		
10.	275	527	8.1	50.3	0.823	40.4	25	75.6		
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.2	56.5	0.837	37.6	28	78.9	39	25
12.	225	437	5.2	61.7	0.846	35.8	28	83.9	46	45
13.	250	482	5.5	67.2	0.859	33.2	31	86.7	56	60
14.	275	527	6.0	73.2	0.869	31.3	32	90.6	82	80
15.	300	572	5.7	78.9	0.881	29.1	35	94.4	142	95
Residuum			19.9	98.8	0.925	21.5				

Carbon residue of residuum: 3.9% Carbon residue of crude: 0.8%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.0	0.695	72.1	
Total gasoline and naphtha	30.1	0.752	56.7	
Kerosine distillate	20.2	0.812	42.8	
Gas oil	11.0	0.841	36.8	
Nonviscous lubricating distillate	10.7	0.852-0.872	34.6-30.8	50-100
Medium lubricating distillate	6.9	0.872-0.887	30.8-28.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	19.9	0.925	21.5	
Distillation loss	1.2			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 50-64

FIELD: Dunwich

POOL:

ZONE:

Well Name: Bluewater Dunwich 16-1
Location: Lot 16, Con. I, Dunwich Twp., Elgin County
Interval tested, depth, feet: 3601' - 3606'
Producing Zone:
Geological Age: Cambrian

Province: Ontario
Sample From: Ontario Dept. of Energy Resources
Date Sampled: January 8, 1964
Sampled at: Tank Bottom

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.827
Sulphur, percent by weight: 0.19
Saybolt Universal Viscosity:
at 100°F., sec. 41
at °F., sec.

A.P.I. gravity at 60°F.: 39.6
Pour point, °F.: 15
Colour: Brownish Black
Carbon residue, percent by weight: 0.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 751 mm. Hg.
First drop, 28°C. (82°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion (N_F-N_C) 10^4
1.	122	0.8	0.648	86.9	-	-			-	-
2.	167	2.7	0.674	78.4	9.4	-			1.3881	76.7
3.	212	6.0	0.716	66.1	19	56.1			1.3996	79.1
4.	257	10.9	0.739	60.0	21	54.0			1.4104	82.7
5.	302	16.8	0.756	55.7	22	54.5			1.4192	85.3
6.	347	22.9	0.772	51.8	23	56.9			1.4289	89.0
7.	392	28.7	0.784	49.0	22	59.9			1.4355	91.2
8.	437	34.2	0.796	46.3	22	64.4			1.4420	93.5
9.	482	40.2	0.808	43.6	22	70.0			1.4485	95.8
10.	527	47.2	0.820	41.1	23	74.5			1.4554	98.1
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	51.7	0.833	38.4	26	76.5	38	20	1.4628	103.4
12.	437	57.5	0.842	36.6	26	80.0	45	35	1.4680	105.5
13.	482	62.8	0.852	34.6	28	84.5	53	55	1.4728	107.4
14.	527	67.5	0.864	32.3	30	88.0	70	65	1.4799	112.7
15.	572	73.4	0.873	30.6	31	92.5	109	85	1.4878	114.1
Residuum		98.3	0.918	22.6						

Carbon residue of residuum: 3.2% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.0	0.694	72.4	
Total gasoline and naphtha	28.7	0.749	57.4	
Kerosine distillate	18.5	0.809	43.4	
Gas oil	10.8	0.838	37.4	Below 50
Nonviscous lubricating distillate	11.2	0.848-0.871	35.4-31.0	50-100
Medium lubricating distillate	4.2	0.871-0.878	31.0-29.7	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	24.9	0.918	22.6	
Distillation loss	1.7			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5526

FIELD: Dunwich Township

POOL:

ZONE: Dundee

Well Name: Peace River No. 3
Location: Lot 24, Con. V, Dunwich Twp., Elgin County
Interval tested, depth, feet: 330
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Ontario Dept. of Mines
Date Sampled: December 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.897
Sulphur, percent by weight: 1.54
Saybolt Universal Viscosity:
at 70°F., sec. 745
at 100°F., sec. 313

A.P.I. gravity at 60°F.: 26.3
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 2.3 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 754 mm. Hg.
First drop, 76°C. (169°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion (N_F-N_C) 10^4
1.	122									
2.	167									
3.	212	0.1)								
4.	257	0.2)								
5.	302	0.3)								
6.	347	0.6)	0.790	47.6	-					
7.	392	1.8	0.805	44.3	32					
8.	437	5.2	0.815	42.1	31					
9.	482	11.1	0.827	39.6	31					
10.	527	20.8	0.839	37.2	32					
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	22.8	0.856	33.8	37		41	Below 5		
12.	437	30.6	0.865	32.1	37		48	5		
13.	482	38.0	0.874	30.4	38		64	25		
14.	527	45.5	0.884	28.6	40		97	45		
15.	572	56.1	0.889	27.7	39		193	60		
Residuum		99.1								

Carbon residue of residuum: 5.3% Carbon residue of crude: 2.3%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.1	-	-	
Total gasoline and naphtha	1.8	0.800	45.4	
Kerosine distillate	3.4	0.815	42.1	
Gas oil	22.4	0.842	36.6	Below 50
Nonviscous lubricating distillate	14.4	0.866-0.884	31.9-28.6	50-100
Medium lubricating distillate	9.5	0.884-0.889	28.6-27.7	100-200
Viscous lubricating distillate	4.6	0.889-0.892	27.7-27.1	Above 200
Residuum	43.0			
Distillation loss	0.9			

OIL FIELD DATA

Field and Pool: Dutton-Wallacetown

Location: Elgin County, Dunwich Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name: (Lot 15, Con. 10)

Completed: 1898

Perforated: Open Hole 400'

Initial Potential: 15-20 b/d

GEOLOGY

Producing Zone(s): Dundee Detroit River (Devonian)

Trap Type: Anticlinal

Lithology: Dolomite

Maximum Reservoir Thickness: 16 (approx.)

Regional Setting: These fields are situated in the N.E. and south central areas of Dunwich Twp.

Deepest Formation Penetrated: Devonian

DEVELOPMENT DATA

Total Wells: Completed Oil: Over 150; Dry and Abandoned: Unknown

Producing Oil: 16

Well Spacing: 6¼ Acres; Logging Practice: Nil; Completion Practice: Unknown

RESERVOIR DATA

Type of Drive: Solution Gas, Minor Water Drive

Estimated Oil in Place: 3,000,000 S.T.bbls

Estimated Recoverable Oil: 240,000 S.T.bbls

Oil Zone Thickness: Average: 16; Porosity: 8% (est.); Area: 400 Acres

PRODUCTION

Operating: (1966): 1188 bbls/yr.

Cumulative Production: 231,193 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Caley, J.F., "Paleozoic Geology of the London Area, Ontario", Geol. Surv. Can. Memoir 237 (1943).

OIL FIELD DATA

Field and Pool: Fletcher

Location: Kent County, Tilbury East and Raleigh Twps.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name: John Kerr Farm (Lot 10, North Middle Road, Tilbury East Twp.)

Completed: 1905

Perforated: Open Hole (1385', 1410', 1430')

Treatment: Nitroglycerine or dynamite

Initial Potential: 40 BOPD and 500 MCFD (Gas)

GEOLOGY

Producing Zone(s): Salina A-1 (Silurian)

Trap Type: Patch Reef

Lithology: Dolomite

Maximum Reservoir Thickness:

Regional Setting: This field is situated immediately north of the Tilbury gas field

Deepest Formation Penetrated: Ordovician

DEVELOPMENT DATA

Total Wells: Completed Oil: 276

Producing Oil: Nil

Well Spacing: 6 Acres

Logging Practice: Nil

Completion Practice: 10" casing to 110'; 8¼" to 260'; 6¼" to 870', 2" to 1400'. Open Hole. Shot with nitroglycerine or dynamite.

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Recoverable Oil: 1,200,000 S.T.bbls

Porosity: 8%

Area: 5600 Acres

Oil Characteristics: Gravity: 38-41 °API

PRODUCTION

Cumulative Production: 1,200,000 bbls

Bibliographical References: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240. (1945).

Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Glencoe

Location: Middlesex County, Mosa Twp.

DISCOVERY DETAILS

Method: Structure Test Hole

Well: Name:

Completed: Original Discovery in 1904. Reopened in 1917.

Perforated: Open Hole (275'-400')

Treatment: Shot with Nitroglycerine

Initial Potential: 2-8 b/d to 250 b/d

GEOLOGY

Producing Zone(s): Detroit River (Devonian)

Trap Type: Dome or Anticline

Lithology: Dolomite

Maximum Reservoir Thickness: 12'

Regional Setting: This field covers a large area of Mosa Township and is situated immediately west of the town of Glencoe.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 400 (Approx.)

Producing Oil: 121

Injection or Disposal: Water: 65

Well Spacing: 2-5 Acres on Flood Project

Completion Practice: 1. (Generally) 5 5/8" casing to 130'; 4 5/8" to 300'; open hole shot with nitroglycerine.

2. (Recent, 1960) 8 5/8" to 90'; 6¾" to 275'; 2" to 300'; shot with nitroglycerine.

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 13,900,000 S.T.bbls

Estimated Recoverable Oil: 1,375,000 S.T.bbls

Oil Zone Thickness: Average: 9.5

Porosity: 15%; Permeability: 150 md

Area: 2000 Acres (sec. project: 175 Acres)

Oil Characteristics: Gravity: 36.3 ^{o}API

Pressure Maintenance or Secondary Recovery: Secondary Recovery

PRODUCTION

Operating: (1966): 37,171 b/yr

Cumulative Production: 949,309 bbl

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Caley, J.F., "Paleozoic Geology of the London Area, Ontario", Geol. Surv. Can. Memoir 237 (1943).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Glencoe

2) Pool:

3) Province: Ontario

4) Location: Middlesex County; Mosa Twp.

5) Operator: Bradley Prod. Corp.

6) Project: -

7) Reservoir: Columbus Dundee - Devonian

8) Discovery Date: 1904

9) Date Injection Began: April 11, 1956

10) Main Structural Feature: Domal, anticline

11) Gas Cap: Originally: No; At Present: No

12) Time required for initial Results: 3 months from water injection to oil pickup

13) Initial Results on Production: Est. FVF at 1.1

14) Main Drive in Primary Production: Solution Gas

15) Productive Area (Acres) of reservoir: 1137 primary, 431 secondary (entire field);
of project: 175;
affected by injection: 175

16) Average Depth to Top of Pay (feet): 350

17) Average Effective Thickness (feet): 9.5 for sec. rec. in project area

18) Average Porosity %: 15

19) Average Horizontal Permeability and Range in Brackets: (millidarcys): 150 (0-500)

20) Connate water (% of Pore Space): 15% (50°F. in 1958)

21) Viscosity at initial reservoir conditions (centipoises): Approx. 19

22) API Gravity: 32°

23) Solution Gas/Oil Ratio at Saturation Pressure (cu. ft/bbl): Early operators reported very little gas in solution, or produced with the oil, initially. Practically none when sec. rec. operations began.

24) Bubble Point Pressure (psi):

25) Original Pressure (psi):

26) Reservoir Pressure at Start of Injection (psi): Negligible

27) Latest Reservoir Pressure: Approx. that of Water Injection Pressure

28) Injection Fluid: Fresh and Salt Water Mixed

29) Injection Fluid Source: Wells and Produced Water

30) System: Open

31) Fluid Treatment before Injection: Filtration; Bactericide; Tektreat and Calgon

32) Injection Pattern: 5-Spot

33) Structural Position Injection Wells: Oil Zone, in patterned squares

34) Distance Injection Wells to Producers (feet): Varied, 180'-330'; to centre well of five spots.

35) Number of injection wells at start: 6 in pilot flood operation

36) Number of injection wells at present: 65 on July 1, 1965

37) Average daily injection rate per injection well at start: 10-12 bbls

38) Average daily injection rate per injection well at present (bbls): 10-12 (July 1, 1965) - Maintained by occasional hydrochloric acid treatments

39) Average injection pressure at start (psi): 98 at plant

40) Average injection pressure at present (psi): 340 at plant on July 1, 1965

41) Number of producing wells in project area at start: 147 active

42) Number of producing wells in project area at present: 120 on July 1, 1965

43) Average production rate in project area at start (bbls/day): 37.4 (average for 1954)

44) Average oil production rate in project area at present: 90 B/D on July 1, 1965

45) Original oil in place in project area (bbls): 1,600,000 (est.). This is for the 9.5 of effective sec. rec. pay. Much more oil initially in place in other pays in project area.

46) Original oil saturation (% of pore space): (Est.) 82%

47) Primary recovery from field when injection started (bbls): (Est.) 650,000

48) Oil saturation at start of project (% of pore space): (Est.) 60-75%

49) Oil production from project area from start of injection to now (bbls): 226,086 to July 1, 1965.

50) Total volume of injected fluids at present (bbls): 1,642,000 to July 1, 1965

51) Estimated primary ultimate recovery from project area (bbls):

52) Estimated increase in ultimate recovery from project area (bbls): 725,000

53) Well spacing: Varied: 2.0 to 4.5 acres per five spot.

54) Oil volume factor (initial reservoir barrels per Stock-Tank barrel): (Est.) 1.1

OIL FIELD DATA

Field and Pool: Gobles

Location: Oxford County, Blenheim Twp.; and Brant County, Burford Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name: R. McMaster & Sons - Gobles No. 1 - D.M. King No. 1 (Lot 19, Con. I)

Completed: May 23, 1960

Perforated: Open Hole 2880-2890'

Treatment: Fractured with 300 bbls. crude and 10,000# sand

Initial Potential: 50 BOPD 550,MCF/d

GEOLOGY

Producing Zone(s): Eau Claire (Cambrian)

Other Shows: Gas (Ordovician)

Trap Type: Stratigraphic

Lithology: Sandstone, Coarse Grained, Dolomitic

Maximum Reservoir Thickness: 28'

Regional Setting: This field is situated 35 miles northeast of London, Ontario. It is formed as a result of a porosity pinchout along the northern truncated edge of the Cambrian sediment of the Appalachian Basin.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 52; Gas: 12; Dry and Abandoned: 14

Producing Oil: 50; Suspended Oil: 2

Well Spacing: 50 Acres; Pattern: Odd Tract

Logging Practice: Radioactivity and Density

Completion Practice: 10 3/4" casing to 100'; 8 5/8" to 175'; 7" to 815'; 4½" to 2900'; open hole completion, sand fractured with 1200# 20/40 sand, 3000# 10/20 sand, 1000# hulls with 189 bbls crude (some wells cased through pay and perforated).

RESERVOIR DATA

Type of Drive: Gas cap and solution gas.

Estimated Oil in Place: 17,000,000 S.T.bbls (680 bbls/acre-foot)

Estimated Recoverable Oil: 1,700,000 S.T.bbls (68 bbls/acre-foot)

Oil Zone Thickness: Maximum: 28; Average: 10

Gas Zone Thickness: Maximum: 28

Porosity: 12.6%; Permeability: 11 (est.) md

Area: 2500 Acres

Oil Characteristics: Gravity: 39.6 ^{o}API; Sulphur: 0.2%

Pour Point: +25°F.

PRODUCTION

Operating: (1966): 102,258 b/yr

Cumulative Production: 757,135 b

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical References: Eaglesham, J.," Gobles Field, History, Development and Outlook for Secondary Recovery", Ontario Petroleum Institute, Vol. IV (1965).

MacKay, A.E. and O'Shea, H.J., "Ontario Production and Reservoir Characteristics and Statistics", Ontario Petroleum Institute, Vol. III (1964).

Burgess, R.J., "Cambrian Hydrocarbon Traps in the N.W. rim of the Appalachian Basin", Ontario Petroleum Institute, Vol. I (1962).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 629-60

FIELD: Gobles

POOL:

ZONE:

Well Name: McMaster No. 3
Location: Lot 20, Con. I, Blenheim Twp., Oxford County
Interval tested, depth, feet: 2895 to 2920
Producing Zone: Eau Claire
Geological Age: Upper Cambrian

Province: Ontario
Sample From: Ontario Dept. of Energy Resources
Date Sampled: November 22, 1960
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.827
Sulphur, percent by weight: 0.20
Saybolt Universal Viscosity:
at 100°F., sec. 42
at °F., sec.

A.P.I. gravity at 60°F.: 39.6
Pour point, °F.: +25
Colour: Brownish Black
Carbon residue, percent by weight: 1.05
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 748 mm. Hg.
First drop, 32°C. (90°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion (N_F-N_C) 10^4
1.	122									
2.	167	3.0	0.660	82.9	-	-				
3.	212	6.4	0.703	69.8	13	57.4				
4.	257	11.3	0.731	62.1	18	54.6				
5.	302	16.2	0.751	56.9	19	54.9				
6.	347	21.2	0.767	53.0	20	56.4				
7.	392	25.6	0.780	49.9	20	59.9				
8.	437	30.4	0.793	46.9	21	65.0				
9.	482	35.7	0.806	44.1	22	69.2				
10.	527	43.1	0.817	41.7	22	74.1				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	48.1	0.834	38.2	26	77.2	38	15		
12.	437	53.9	0.841	36.8	26	81.4	43	35		
13.	482	59.9	0.850	35.0	27	86.0	51	55		
14.	527	65.6	0.860	33.0	28	90.2	68	70		
15.	572	72.5	0.869	31.3	29	94.6	106	85		
Residuum		98.7	0.918	22.6						

Carbon residue of residuum: 3.6% Carbon residue of crude: 1.05%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.4	0.683	75.7	
Total gasoline and naphtha	25.6	0.738	60.2	
Kerosine distillate	17.5	0.807	43.8	
Gas oil	13.0	0.839	37.2	Below 50
Nonviscous lubricating distillate	11.9	0.849-0.868	35.2-31.5	50-100
Medium lubricating distillate	4.5	0.868-0.874	31.5-30.4	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	26.2	0.918	22.6	
Distillation loss	1.3			

OIL FIELD DATA

Field and Pool: Grand Bend

Location: Middlesex County, McGillivray Twp.; and Huron County, Stephen Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Union Grand Bend No. 1 (Lot 41, Con. N.B.)

Completed: May 24, 1955

Perforated: (1800-1811 and 1866-1896) pay intervals

Treatment: 3000 gals acid

Initial Potential: 400 BOPD

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Gas (Salina)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 70'

Regional Setting: This field is situated 13 miles S.W. of the town of Exeter, 4 miles E. of Lake St. Clair and within the Silurian pinnacle reef belt.

Deepest Formation Penetrated: Cataract (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 5; Gas: Nil

Producing Oil: 2

Injection or Disposal: Water: 1

Well Spacing: 25 Acres

Logging Practice: Radioactivity, Density

Completion Practice: (Discovery) 10 3/4" casing to 110'; 8 5/8" to 390'; 7" to 900'; 4½" to 1900'; perforated, acidized and fractured

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 1,800,000 S.T.bbls

Estimated Recoverable Oil: 400,000 S.T.bbls

Oil Zone Thickness: Maximum: 90; Average: 50

Gas Zone Thickness: Maximum: 100

Porosity: 7%; Permeability: Poor

Area: 118 Acres

Oil Characteristics: Gravity: 30 ^{o}API

Initial Solution GOR: 233 cu. ft/b.

Pressure Maintenance or Secondary Recovery: Secondary Recovery

PRODUCTION

Operating: (1966): 17,138 b/yr

Cumulative Production: 355,492 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Grand Bend

2) Pool: Grand Bend - Guelph Oil Pool

3) Province: Ontario

4) Location: Middlesex County, McGillivray Twp.

5) Operator: Imperial Oil Limited

6) Project: Grand Bend

7) Reservoir: Guelph - Lockport, Silurian

8) Discovery Date: May 1955

9) Date Injection Began: March 1962

10) Main Structural Feature: Reef; Average Flank Dip: 10 to 30°

11) Gas Cap: Originally: Yes; At Present: Yes

12) Time Required for Initial Results: Six Months

13) Initial Results on Production: Slight Production Increase, WOR Increase

14) Main Drive in Primary Production: Solution Gas

15) Productive Area of Reservoir: 118 Acres; Of Project: 118 Acres; Affected by Injection: Suspended

16) Average Depth to Top of Pay: 1500 Feet

17) Average Effective Thickness: 40 Feet (Est)

18) Average Porosity: 7% Est

19) Average Horizontal Permeability and Range in Brackets (Millidarcys): Poor

20) Connate Water (% of Pore Space): 20% Est

21) Viscosity at Initial Reservoir Conditions: (Centipoises): 20 Est

22) API Gravity: 30°

23) Solution Gas/Oil Ratio at Saturation Pressure (Cu.Ft./Bbl): 233 Est

24) Bubble Point Pressure: 760 psig

25) Original Pressure: 760 psig

26) Reservoir Pressure at Start of Injection (psi): 260 Est

27) Latest Reservoir Pressure: -

28) Injection Fluid: Water

29) Injection Fluid Source: Detroit River Subsurface Formation

30) System: Closed

31) Fluid Treatment Before Injection: Scale and corrosion inhibitor, flocculator, filter

32) Injection Pattern: Single Well

33) Structural Position Injection Wells: Oil Zone

34) Distance Injection Wells to Producers (Feet): 600

35) Number of Injection Wells at Start: One

36) Number of Injection Wells at Present: Suspended

37) Average Daily Injection Rate per Injection Well at Start (bbl): 1500

38) Average Daily Injection Rate per Injection Well at Present: Suspended

39) Average Injection Pressure at Start (psi): 700 WH

40) Average Injection Pressure at Present (psi): Suspended

41) Number of Producing Wells in Project Area at Start: 4

42) Number of Producing Wells in Project Area at Present: 2 (August 1965)

43) Average Production Rate in Project Area at Start (bbl/day): 130

44) Average Production Rate in Project Area at Present: 52 BOPD (August 1965)

45) Original Oil in Place in Project Area (bbl): 1.8 million stb (Est.)

46) Original Oil Saturation (% of Pore Space): -

47) Primary Recovery from Project Area when Injection Started (bbl): 259,947

48) Oil Saturation at Start of Project: 1% of Pore Space

49) Oil Production from Project Area from Start of Injection to now (bbl): 63,557 on August 31, 1965

50) Total Volume of Injected Fluids at Present (bbl): 654,878
Suspended - April 25, 1963

51) Estimated Primary Ultimate Recovery from Project Area (bbl): -

52) Estimated Increase in Ultimate Recovery from Project Area: -

53) Well Spacing: 20 Acres

54) Oil Volume Factor (Initial Reservoir Bbl. per Stock-Tank Bbl): 1.125 (est.)

55) Remarks: Injection suspended April 1963 due to premature water breakthrough at producing wells.

CRUDE PETROLEUM ANALYSIS

Laboratory Number 2902-41

FIELD: Haldimand

POOL:

ZONE: Whirlpool

Well Name: Moulton Township
Location: Moulton Twp., Haldimand County

Interval tested, depth, feet: 650
Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: Natural Gas Commissioner, Ontario Dept. of Mines
Date Sampled: November 28, 1941
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.848
Sulphur, percent by weight: 0.26
Saybolt Universal Viscosity:
at 100°F., sec. 67
at °F., sec.

A.P.I. gravity at 60°F.: 35.4
Pour point, °F.: 30
Colour: Dark Green
Carbon residue, percent by weight: 0.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 765 mm. Hg.
First drop, 60°C. (140°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.9	0.9)						
4.	125	257	0.8	1.7)	0.729	62.6	-			
5.	150	302	1.7	3.4	0.743	58.9	16			
6.	175	347	3.2	6.6	0.756	55.7	15			
7.	200	392	5.3	11.9	0.772	51.8	16			
8.	225	437	6.6	18.5	0.787	48.3	18			
9.	250	482	7.1	25.6	0.799	45.6	18			
10.	275	527	8.1	33.7	0.814	42.3	21			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.7	38.4	0.828	39.4	23		39	15
12.	225	437	6.5	44.9	0.835	38.0	23		45	35
13.	250	482	6.9	51.8	0.844	36.2	24		55	50
14.	275	527	6.7	58.5	0.854	34.2	25		76	70
15.	300	572	7.9	66.4	0.865	32.1	28		121	80
Residuum			33.3	99.7	0.903	25.2				

Carbon residue of residuum: 2.6% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.9	-	-	
Total gasoline and naphtha	11.9	0.757	55.4	
Kerosine distillate	21.8	0.801	45.2	
Gas oil	11.6	0.832	38.6	
Nonviscous lubricating distillate	13.8	0.840-0.860	37.0-33.0	50-100
Medium lubricating distillate	7.3	0.860-0.871	33.0-31.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	33.3	0.903	25.2	
Distillation loss	0.3			

Remarks: The sample as received contained 0.4% by vol. water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: Innerkip

Location: Oxford County, Blandford Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Wakeham Bay Mines No. 1 - Chesney No. 1

Completed: July 19, 1962. (North Gas Pool Completed April 6, 1961)

Perforated: Open Hole (2870'-2884')

Treatment: Unknown

Initial Potential: 50 BOPD

GEOLOGY

Producing Zone(s): Cambrian

Other Shows: Gas-Clinton (Silurian)

Trap Type: Stratigraphic

Lithology: Dolomite

Maximum Reservoir Thickness: 14'

Regional Setting: This field is situated 4 miles N.W. of the Gobles Field and was discovered as a result of exploration along the truncated Cambrian sediments, following the Gobles discovery.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 1; Gas: 1; Dry and Abandoned: 4

Producing Oil: 1

Well Spacing: 50 Acres

Logging Practice: Radioactivity and Density

Completion Practice: 10 3/4" casing to 170'; 7" to 944'

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 208,000 S.T.bbls

Estimated Recoverable Oil: 18,000 S.T.bbls

Oil Zone Thickness: Maximum: 14; Average: 7

Gas Zone Thickness: Maximum: 18 (Approx.)

Porosity: 10-12%; Permeability: 26.7-74 md

Area: 100 Acres

PRODUCTION

Operating: (1966): 501 bbls/yr

Cumulative Production: 2,934 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

OIL FIELD DATA

Field and Pool: Kimball-Colinville

Location: Lambton County, Moore Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial No. 102 - Kimball No. 2, J.M. Gray No. 1; Lot 17, Con. IV

Completed: August 13, 1947

Perforated: Open Hole (2153-2155') and (2176-2180')

Treatment: None

Initial Potential: 435 MCF/d; Kimball oil discovered 1948 - I.P. =10 BOPD
Colinville oil discovered 1952 - I.P. = 20 BOPD

GEOLOGY

Producing Zone(s): Salina A-1 and Guelph (Silurian)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 10'

Regional Setting: These pools are situated 9 miles S-E of Sarnia, and are used, presently, for gas storage

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 6; Gas: 24

Producing Oil: 4

Injection or Disposal: Gas Storage Wells

Logging Practice: Radioactivity and Density

Completion Practice: 10 3/4" casing to 150'; 7" to 1200'; 5½" to 2200'; Open Hole or perforated and acidized with 2" casing set at 2200'.

RESERVOIR DATA

Type of Drive: Solution Gas and Gas Expansion

Estimated Oil in Place: 700,000 S.T.bbls

Estimated Recoverable Oil: 114,000 S.T.bbls

Oil Zone Thickness: Maximum: 57 (Approx.); Average: 10

Gas Zone Thickness: Maximum: 35 (Approx.)

Porosity: 7%

Area: 1660 Total Acres, including 150 Oil (est.)

Oil Characteristics: Gravity: 37-39 ^{o}API

Pressure Maintenance or Secondary Recovery: Gas Storage

PRODUCTION

Operating: (1966): 4,424 bbl/yr

Cumulative Production: 101,243 bbl

Market Outlet (pipeline): Imperial Oil Refinery (Trucked and Pipeline)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields in Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Kingsville - Leamington - Mersea

Location: Essex County, Gosfield South and Mersea Twps.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name: Lot 238; Talbot Road Survey

Completed: 1902

Perforated: 1074' (Open Hole)

Treatment: Shot with Nitroglycerine

Initial Potential: 1200b/d (1905)

GEOLOGY

Producing Zone(s): Salina - Guelph (Silurian)

Other Shows: Gas - Salina

Trap Type: Bioherm - Patch Reef

Lithology: Dolomite, light grey, crystalline

Maximum Reservoir Thickness: 30' (est)

Regional Setting: This field is situated northeast of the town of Leamington. The field is 8 miles long and ½ to 1 mile wide. Abandoned in 1921.

Deepest Formation Penetrated: Cambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 80

Producing Oil: Nil

Logging Practice: Nil

Completion Practice:

RESERVOIR DATA

Type of Drive: Water Drive

Estimated Recoverable Oil: 235,342 S.T.bbls

Oil Zone Thickness: Average: 30 (est.)

Porosity: 8%

Area: 5700 Acres (Total)

Bibliographical References: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ontario", Geol. Surv. Can., Memoir 240 (1945).

Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields in Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 226-62

FIELD: Kingsville

POOL:

ZONE:

Well Name: Putman Canadian Devonian Kingsville No. 1
Location: Lot 6, Con. Front, Western Division, Gosfield South Twp., Essex County
Interval tested, depth, feet: 2406-2440
Producing Zone: Trenton
Geological Age: Ordovician

Province: Ontario
Sample From: Ontario Dept. of Energy Resources
Date Sampled: March 20, 1962
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.810
Sulphur, percent by weight: 0.14
Saybolt Universal Viscosity:
at 100°F., sec. 38 (3.46 cs)
at °F., sec.

A.P.I. gravity at 60°F.: 43.2
Pour point, °F.: 15
Colour: Brownish Green
Carbon residue, percent by weight: 0.79 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 760 mm. Hg.
First drop, 33°C. (91°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122	1.3	0.645	87.9	-	-				
2.	167	3.9	0.664	81.6	4.6	-				
3.	212	8.4	0.697	71.5	10	59.4				
4.	257	14.5	0.726	63.4	15	57.8				
5.	302	20.9	0.746	58.2	17	57.8				
6.	347	26.7	0.762	54.2	18	59.4				
7.	392	32.2	0.777	50.6	19	62.6				
8.	437	37.2	0.789	47.8	19	66.6				
9.	482	42.4	0.802	44.9	20	70.7				
10.	527	48.5	0.814	42.3	21	75.2				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	52.5	0.829	39.2	24	78.0	38	15		
12.	437	58.1	0.837	37.6	24	82.2	43	30		
13.	482	63.4	0.850	35.0	27	86.1	51	50		
14.	527	68.0	0.860	33.0	28	89.5	67	70		
15.	572	74.0	0.871	31.0	30	93.6	106	85		
Residuum		95.8	0.922	22.0						

Carbon residue of residuum: 3.2% Carbon residue of crude: 0.79%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	8.4	0.679	76.9	
Total gasoline and naphtha	32.2	0.733	61.5	
Kerosine distillate	16.3	0.803	44.7	
Gas oil	11.4	0.835	38.0	Below 50
Nonviscous lubricating distillate	10.3	0.848-0.869	35-4-31.3	50-100
Medium lubricating distillate	3.8	0.869-0.877	31.3-29.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	21.8	0.922	22.0	
Distillation loss	4.2	-	-	

OIL FIELD DATA

Field and Pool: Malden

Location: Essex County, Malden Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial - Felmont - C.W.P. No. 1 (Lot 63, Con. VI)

Completed: September 28, 1961; Perforated: Notched (2221')

Treatment: 250 gal. acid; 15140 gal. treated crude; 9700# sand; 700# tuff prop. Initial Potential: 50 BOPD

GEOLOGY

Producing Zone(s): Trenton (Ordovician). Trap Type: Faulted Syncline

Lithology: Dolomite, Med. Brn, slightly argillaceous

Maximum Reservoir Thickness: 37' (approx.)

Regional Setting: This field is situated 18 miles south of Windsor on the eastern rim of the Michigan Basin

Deepest Formation Penetrated: Trenton

DEVELOPMENT DATA

Total Wells: Completed Oil: 6; Dry and Abandoned: 2;

Producing Oil: 6

Well Spacing: 50 Acres; Pattern: Odd

Logging Practice: Radioactivity

Completion Practice: 13 3/4" casing to 80'; 10 3/4" to 550'; 8 5/8" to 1350'; 7" to 2200'; 4½" to 2300'; 2 3/8" prod. string, notched, acidized, fractured.

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 650,000 S.T.bbls (360 bbls/acre-foot)

Estimated Recoverable Oil: 150,000 S.T.bbls (83 bbls/acre-foot)

Oil Zone Thickness: Maximum: 37 (approx.); Average: 6.

Porosity: 6%. Permeability: 10 md. Area: 300 Acres.

Oil Characteristics: Gravity: 43 °API; Sulphur: 0.15%

Pour Point: -45° F.

PRODUCTION

Operating: (1966): 10,153 b/yr.

Cumulative Production: 84,593 bbls

Market Outlet: Imperial Oil Refinery (Trucked)

CRUDE PETROLEUM ANALYSIS

Laboratory Number 227-62

FIELD: Malden

POOL:

ZONE:

Well Name: Imperial Felmont Consolidated West Petroleum Malden No. 1
Location: Lot 63, Con. 6, Malden Twp., Essex County
Interval tested, depth, feet: 2221 notched
Producing Zone: Trenton
Geological Age: Ordovician

Province: Ontario
Sample From: Ontario Dept. of Energy Resources
Date Sampled: March 20, 1962
Sampled at: "Before Separator"

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.811
Sulphur, percent by weight: 0.15
Saybolt Universal Viscosity:
at 100°F., sec. 38 (3.65 cs.)
at °F., sec.

A.P.I. gravity at 60°F.: 43.0
Pour point, °F.: -45
Colour: Brownish Black
Carbon residue, percent by weight: 0.87 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 757 mm. Hg.
First drop, 35°C. (95°F.)

Fraction No.	Cut at °F.	Sum per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122	0.9	0.651	85.9	-	-				
2.	167	4.3	0.676	77.8	10	-				
3.	212	9.6	0.698	71.2	11	60.4				
4.	257	15.8	0.723	64.2	14	58.2				
5.	302	22.7	0.743	59.0	16	59.5				
6.	347	28.2	0.761	54.5	17	61.1				
7.	392	33.3	0.774	51.3	17	63.8				
8.	437	38.3	0.788	48.1	18	67.7				
9.	482	43.4	0.801	45.2	19	71.7				
10.	527	50.2	0.812	42.8	20	75.7				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	54.4	0.827	39.6	23	78.8	38	15		
12.	437	59.6	0.837	37.6	24	83.0	43	35		
13.	482	64.7	0.847	35.6	25	86.1	51	50		
14.	527	69.1	0.859	33.2	28	89.2	68	70		
15.	572	74.9	0.870	31.1	30	93.2	102	85		
Residuum		97.9	0.923	21.8						

Carbon residue of residuum: 3.34% Carbon residue of crude: 0.87%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	9.6	0.686	74.8	
Total gasoline and naphtha	33.3	0.731	62.1	
Kerosine distillate	16.9	0.802	44.9	
Gas oil	11.8	0.835	38.0	Below 50
Nonviscous lubricating distillate	9.7	0.847-0.870	35.6-31.1	50-100
Medium lubricating distillate	3.2	0.870-0.877	31.1-29.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.0	0.923	21.8	
Distillation loss	2.1	-	-	

CRUDE PETROLEUM ANALYSIS

Laboratory Number 445-57

FIELD:

POOL: Manitouwaning

ZONE:

Well Name: Burgess No. 2
Location: Lot 44, Con. II, Assiginack Twp., Manitoulin District
Interval tested, depth, feet: -
Producing Zone: -
Geological Age: -

Province: Ontario
Sample From: Geological Surveys, DMTS

Date Sampled: December 1957
Sampled at: -

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.863
Sulphur, percent by weight: 0.28
Saybolt Universal Viscosity:
at 70°F., sec. 83
at 100°F., sec. 57

A.P.I. gravity at 60°F.: 32.5
Pour point, °F.: 15
Colour: Brownish Black
Carbon residue, percent by weight: 2.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 752 mm. Hg.
First drop, 98°C. (208°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion, $(N_F-N_C)\ 10^4$
1.	122									
2.	167									
3.	212									
4.	257	2.1	0.750	57.2	-	55.2				
5.	302	6.2	0.764	53.7	26	56.3				
6.	347	10.4	0.781	49.7	27	57.8				
7.	392	15.9	0.792	47.2	26	60.2				
8.	437	20.4	0.806	44.1	27	63.0				
9.	482	27.7	0.816	41.9	26	67.1				
10.	527	37.0	0.826	39.8	26	72.5				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	42.7	0.838	37.4	28	74.0	38	20		
12.	437	51.4	0.847	35.6	28	78.1	44	40		
13.	482	58.1	0.861	32.8	32	82.4	56	60		
14.	527	64.5	0.875	30.2	35	85.0	79	75		
15.	572	72.9	0.890	27.5	39	88.0	143	90		
Residuum		100.0	0.948	17.8						

Carbon residue of residuum: 7.0% Carbon residue of crude: 2.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	-	-	-	
Total gasoline and naphtha	15.9	0.776	50.8	
Kerosine distillate	11.8	0.812	42.8	
Gas oil	23.3	0.836	37.8	Below 50
Nonviscous lubricating distillate	12.7	0.854-0.880	34.2-29.3	50-100
Medium lubricating distillate	9.2	0.880-0.898	29.3-26.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	27.1	0.948	17.8	
Distillation loss	0.0			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16155

FIELD: Moore

POOL:

ZONE: Dundee

Well Name: Davis
Location: Lot 3, Con. X, Moore Twp., Lambton Co.
Interval tested, depth, feet: -
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: August 31, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.868
Sulphur, percent by weight: 1.36
Saybolt Universal Viscosity:
at 70°F., sec. 158

A.P.I. gravity at 60°F.: 31.5
Pour point, °F.: 10
Colour: Brownish Green
Carbon residue, percent by weight: 2.3
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 747 mm. Hg.
First drop, 55°C. (131°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167	0.3	0.3)	-	-	-			
3.	100	212	0.6	0.9)	-	-	-			
4.	125	257	1.4	2.3)	0.735	61.0	-			
5.	150	302	5.3	7.6	0.758	55.2	23			
6.	175	347	4.1	11.7	0.777	50.6	25			
7.	200	392	5.0	16.7	0.791	47.4	25			
8.	225	437	5.5	22.2	0.803	44.7	25			
9.	250	482	6.0	28.2	0.814	42.3	25			
10.	275	527	7.1	35.3	0.826	39.8	26			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.1	39.4	0.838	37.4	28		40	20
12.	225	437	5.6	45.0	0.845	36.0	28		47	40
13.	250	482	7.6	52.6	0.858	33.4	30		61	60
14.	275	527	5.8	58.4	0.868	31.5	32		93	75
15.	300	572	6.5	64.9	0.878	29.7	34		136	85
Residuum			32.1	97.0	-	-				

Carbon residue of residuum: 7.1% Carbon residue of crude: 2.3%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.9	-	-	
Total gasoline and naphtha	16.7	0.769	52.5	
Kerosine distillate	11.5	0.809	43.4	
Gas oil	15.1	0.834	38.2	
Nonviscous lubricating distillate	13.2	0.847-0.870	35.6-31.1	50-100
Medium lubricating distillate	8.4	0.870-0.883	31.1-28.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	32.1	-	-	
Distillation loss	3.0			

Remarks: The sample as received contained 0.1% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5528

FIELD: Mosa

POOL:

ZONE: Dundee-Columbus

Well Name: Walker No. 17
Location: Lot 6, Con. VI, Mosa Twp., Mosa County
Interval tested, depth, feet: 350
Producing Zone: Dundee-Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: October 1927
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.854
Sulphur, percent by weight: 0.74
Saybolt Universal Viscosity:
at 70°F., sec. 95
at 100°F., sec. 63

A.P.I. gravity at 60°F.: 34.2
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.7
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 766 mm. Hg.
First drop, 31°C. (88°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.5	0.5)						
2.	75	167	0.8	1.3)	0.653	85.2	-			
3.	100	212	1.8	3.1	0.704	69.5	14			
4.	125	257	3.2	6.3	0.729	62.6	17			
5.	150	302	3.8	10.1	0.750	57.2	19			
6.	175	347	4.3	14.4	0.769	52.5	21			
7.	200	392	4.0	18.4	0.787	48.3	23			
8.	225	437	4.6	23.0	0.801	45.2	24			
9.	250	482	5.9	28.9	0.813	42.6	25			
10.	275	527	7.5	36.4	0.823	40.4	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.7	41.1	0.832	38.6	25		40	15
12.	225	437	8.0	49.1	0.836	37.8	23		46	35
13.	250	482	6.1	55.2	0.854	34.2	28		57	55
14.	275	527	6.3	61.5	0.864	32.3	30		78	70
15.	300	572	7.9	69.5	0.877	29.9	33		129	80
Residuum			30.6	100.0						

Carbon residue of residuum: 5.6% Carbon residue of crude: 1.7%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	3.1	0.684	75.4	
Total gasoline and naphtha	18.4	0.748	57.7	
Kerosine distillate	18.0	0.814	42.3	
Gas oil	11.2	0.834	38.2	
Nonviscous lubricating distillate	13.8	0.842-0.870	36.6-31.1	50-100
Medium lubricating distillate	8.0	0.870-0.884	31.1-28.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	30.6	-	-	
Distillation loss	0.0			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5529

FIELD: Mosa

POOL:

ZONE: Dundee-Columbus

Well Name: Composite sample, Mosa Field
Location: Gillies Siding, Mosa Twp, Middlesex County
Interval tested, depth, feet: -
Producing Zone: Dundee-Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: Imperial Oil Ltd.

Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.857
Sulphur, percent by weight: 0.89
Saybolt Universal Viscosity:
at 70°F., sec. 103
at 100°F., sec. 66

A.P.I. gravity at 60°F.: 33.6
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.7
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 749 mm. Hg.
First drop, 42°C. (108°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.1	0.1)						
2.	75	167	0.9	1.0)	0.670	79.7	-			
3.	100	212	1.0	2.0	0.706	68.9	15			
4.	125	257	3.3	5.3	0.733	61.5	18			
5.	150	302	4.1	9.4	0.753	56.4	20			
6.	175	347	4.0	13.4	0.773	51.5	23			
7.	200	392	4.2	17.6	0.790	47.6	25			
8.	225	437	4.6	22.2	0.804	44.5	26			
9.	250	482	5.6	27.8	0.814	42.3	25			
10.	275	527	7.0	34.8	0.824	40.2	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.1	40.9	0.837	37.6	28		40	20
12.	225	437	7.1	48.0	0.844	36.1	27		46	45
13.	250	482	6.8	54.8	0.854	34.2	28		58	65
14.	275	527	6.5	61.3	0.865	32.1	31		82	75
15.	300	572	7.5	68.8	0.876	30.0	33		136	90
Residuum			30.6	99.4						

Carbon residue of residuum: 5.4% Carbon residue of crude: 1.7%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	2.0	0.690	73.6	
Total gasoline and naphtha	17.6	0.756	55.7	
Kerosine distillate	17.2	0.816	41.9	
Gas oil	11.9	0.840	36.9	
Nonviscous lubricating distillate	13.6	0.847-0.868	35.6-31.5	50-100
Medium lubricating distillate	8.5	0.868-0.882	31.5-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	30.6	-	-	
Distillation loss	0.6			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 1743-51

FIELD: Norfolk

POOL:

ZONE: Whirlpool

Well Name: W.D. Cookson Farm
Location: Lot 3, Broken Front Concession, Woodhouse Twp., Norfolk County
Interval tested, depth, feet: 1160-1172
Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: W.D. Cookson

Date Sampled: November 23, 1951
Sampled at: Well

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.834
Sulphur, percent by weight: 0.05
Saybolt Universal Viscosity:
at 70°F., sec. 58
at 100°F., sec. 45

A.P.I. gravity at 60°F.: 38.2
Pour point, °F.: 10
Colour: Dark Green
Carbon residue, percent by weight: 0.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 762 mm. Hg.
First drop, 23°C. (73°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.8	0.8)						
2.	75	167	1.7	2.5)	0.663	81.9	-	-		
3.	100	212	3.5	6.0	0.706	68.9	15	58.5		
4.	125	257	5.7	11.7	0.731	62.1	18	56.2		
5.	150	302	5.7	17.4	0.750	57.2	19	55.7		
6.	175	347	5.5	22.9	0.769	52.5	21	56.2		
7.	200	392	4.7	27.6	0.783	49.2	22	58.5		
8.	225	437	4.7	32.3	0.796	46.3	22	63.2		
9.	250	582	5.1	37.4	0.809	43.4	23	67.8		
10.	275	527	6.3	43.7	0.819	41.3	23	72.8		
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.0	48.7	0.834	38.2	26	75.6	39	20
12.	225	437	5.8	54.5	0.842	36.6	26	80.6	46	40
13.	250	482	5.2	59.7	0.853	34.4	28	85.5	57	55
14.	275	527	5.3	65.0	0.865	32.1	31	88.7	81	70
15.	300	572	6.2	71.2	0.875	30.2	32	93.6	135	85
Residuum			27.7	98.9	0.913	23.5				

Carbon residue of residuum: 3.3% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.0	0.688	74.2	
Total gasoline and naphtha	27.6	0.742	59.2	
Kerosine distillate	16.1	0.809	43.4	
Gas oil	10.0	0.838	37.4	
Nonviscous lubricating distillate	10.7	0.846-0.868	35.8-31.5	50-100
Medium lubricating distillate	6.8	0.868-0.882	31.5-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	27.7	0.913	23.5	
Distillation loss	1.1			

Remarks: The sample as received contained no water (A.S.T.M.) and 3 lb. salt (as NaCl) per 1000 bbl.

OIL FIELD DATA

Field and Pool: Oil Springs

Location: Lambton County, Enniskillen Twp.

DISCOVERY DETAILS

Method: Oil Seeps

Well: Name:

Completed: At Oil Springs (1858)

Perforated: 370'-400' Pay Depths

Initial Potential: 50 BOPD (2000-5000 bbls/day - Wells in 1861)

GEOLOGY

Producing Zone(s): Dundee - Detroit River (Devonian)

Trap Type: Anticline

Lithology: Dolomite

Maximum Reservoir Thickness: 35'

Regional Setting: This field is situated 25 miles S.E. of Sarnia, and immediately south of the town of Oil Springs. The structure of the field is an elongated N.W. trending dome with 60' of closure.

DEVELOPMENT DATA

Total Wells: Completed Oil: Unknown

Producing Oil: 465

Injection or Disposal: Water: 103

Well Spacing: 6¼ Acres; Pattern: Centre

Logging Practice: Nil

Completion Practice: 8 5/8" casing to 95'; 7" to 260'; 1½" to 300'; Open hole shot with nitroglycerine.

RESERVOIR DATA

Type of Drive: Solution gas and water drive

Estimated Recoverable Oil: 9,260,000 S.T.bbls

Oil Zone Thickness: Maximum: 35'; Average: 8-10'

Porosity: 10 (est.)%

Area: 900 Acres

Oil Characteristics: Gravity: 37.5 - 38.2 ^{o}API

Pressure Maintenance or Secondary Recovery: 3 waterflood projects

PRODUCTION

Operating: (1966): 63,056 b/yr

Cumulative Production: 8,837,182 b (including 1966)

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Oil Springs

2) Pool: Oil Springs

3) Province: Ontario

4) Location: Lambton Cty, Enniskillen Twp.

5) Operator: Flood Oils

6) Project: Flood Unit

7) Reservoir: Formation: Dundee, Detroit River

8) Discovery Date: 1858

9) Date Injection Began: April 1961

10) Main Structural Feature: Anticline

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: A few days

13) Initial Results on Production, BHP, GOR, etc.:

14) Main Drive in Primary Production: Solution Gas and Water Drive

15) Productive Area (Acres) of Reservoir: 900; Of Project: 80; Affected by Injection: 80

16) Average Depth to Top of Pay (feet): 365-395'

17) Average Effective Thickness (feet): 30'

18) Average Porosity %: 14 - 15

19) Average Horizontal Permeability and Range in Brackets: 33 millidarcys

20) Connate Water (% of Pore Space):

21) Viscosity at initial reservoir conditions (centipoises):

22) API gravity: 37°-38°

23) Solution gas/oil ratio at saturation pressure (cu. ft/bbl):

24) Bubble Point Pressure (psi):

25) Original Pressure (psi):

26) Reservoir pressure at start of injection (psi):

27) Latest Reservoir Pressure:

28) Injection Fluid: Fresh Water and Formation Water

29) Injection fluid source: 265' formation water and gravel beds

30) System: Open

31) Fluid Treatment before Injection: Filtration, Bactericide

32) Injection Pattern: Irregular

33) Structural Position Injection Wells: Oil Zone

34) Distance Injection Wells to Producers (feet): 100-200'

35) Number of Injection Wells at Start: 3

36) Number of Injection Wells at Present: 29 (1966)

37) Average Daily Injection Rate per Injection Well at Start: 140 b/d

38) Average Daily Injection Rate per Injection Well at Present: (1962) 295 b/d

39) Average Injection Pressure at Start (psi): 80-100

40) Average Injection Pressure at Present (psi): 365 (1962)

41) Number of Producing Wells in Project Area at Start: 36

42) Number of Producing Wells in Project Area at Present: 62 (1966)

43) Average Production Rate in Project Area at Start (bbls/day): 30 (approx.)

44) Average Production Rate in Project Area at Present: 38 b/d (1966)

45) Original Oil in Place in Project Area (bbls): 1,500,000

46) Original Oil Saturation (% of Pore Space):

47) Primary Recovery from Project Area when Injection Started (bbls):

48) Oil Saturation at Start of Project (% of Pore Space): 49%

49) Oil Production from Project Area from Start of Injection to Now (bbls): 75,500 (approx.) (Dec. 1966)

50) Total Volume of Injected Fluids at Present (bbls): 139,000 (1963)

51) Estimated Primary Ultimate Recovery from Project Area (bbls): 450,000

52) Estimated Increase in Ultimate Recovery from Project Area (bbls): 300,000

53) Well Spacing: 1 Acre

54) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.0

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Oil Springs

2) Pool: Oil Springs

3) Province: Ontario

4) Location: Lambton Cty, Enniskillen Twp.

5) Operator: Fairbanks

6) Project: James Unit (Lot 17; Con. II)

7) Reservoir: Formation: Dundee, Detroit River

8) Discovery Date: 1858

9) Date Injection Began: October 1962

10) Main Structural Feature: Anticline

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: Approx. 6 months

13) Initial Results on Production, BHP, GOR, etc.:

14) Main Drive in Primary Production: Solution Gas; Water Drive

15) Productive Area (Acres) of Reservoir: 900; Of Project: 20 (approx.);
Affected by Injection: 20 (approx.)

16) Average Depth to Top of Pay (feet): 310

17) Average Effective Thickness (feet): +10

18) Average Porosity: 10-14%

19) Average Horizontal Permeability and Range in Brackets: 33 est. millidarcys (0.1-433)

20) API Gravity: 37.5-38.2°

21) Injection Fluid: Fresh Water

22) Injection Fluid Source: Fresh Water Gravel Beds

23) System: Open

24) Fluid Treatment before Injection: Filtration

25) Injection Pattern: Irregular

26) Structural Position Injection Wells: Oil Zone

27) Distance Injection Wells to Producers (feet): 100'-200'

28) Number of Injection Wells at Start: 5

29) Number of Injection Wells at Present: 5 (1964)

30) Average Daily Injection Rate per Injection Well at Start (bbls): 38

31) Average Daily Injection Rate per Injection Well at Present (bbls): 5 (1964)

32) Average Injection Pressure at Start (psi): 350

33) Average Injection Pressure at Present (psi): 350 (1964)

34) Number of Producing Wells in Project Area at Start: Approx. 22

35) Number of Producing Wells in Project Area at Present: 22 (1964)

36) Average Production Rate in Project Area at Start (bbls/day): (Production reported for 155 wells on 150 Acres Property).

37) Total Volume of Injected Fluids at Present (bbls): 23,500 (1964)

38) Well Spacing: Approx. 2 Acres

39) Oil Volume Factor (Initial Reservoir Barrels per Stock-Tank Barrel): 1.0 (est.)

40) Remarks: Project suspended in 1964 because of filtration problems with injected water.

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Oil Springs

2) Pool: Oil Springs

3) Province: Ontario

4) Location: Lambton Cty, Enniskillen Twp.

5) Operator: Victor E. de Mers

6) Project: de Mers Unit

7) Reservoir: Formation: Dundee, Detroit River

8) Discovery Date: 1858

9) Date Injection Began: December 1954

10) Main Structural Feature: Anticline

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: (approx.) 1 month

13) Initial Results on Production, BHP, GOR, etc.:

14) Main Drive in Primary Production: Solution Gas and Water Drive

15) Productive Area (Acres) of Reservoir: 900; Of Project: 40; Affected by Injection: +40

16) Average Depth to Top of Pay (feet): 315

17) Average Effective Thickness (feet): 30 est.

18) Average Porosity: 14%

19) Average Horizontal Permeability and Range in Brackets: 3 est. millidarcys (0.1-42)

20) API Gravity: 37°-38°

21) Injection Fluid: Fresh Water and Formation Water

22) Injection Fluid Source: Gravel Beds and Formation Water @ 265'

23) System: Open

24) Fluid Treatment before Injection: Filtration and aeration

25) Injection Pattern: 5 Spot

26) Structural Position Injection Wells: Oil Zone

27) Distance Injection Wells to Producers (feet): 50-100'

28) Number of Injection Wells at Start: 4

29) Number of Injection Wells at Present: 74 (1965)

30) Average Daily Injection Rate per Injection Well at Start (bbls): 72

31) Average Daily Injection Rate per Injection Well at Present: 1 bbl (1965)

32) Average Injection Pressure at Start (psi): 450

33) Average Injection Pressure at Present (psi): 400 (1965)

34) Number of Producing Wells in Project Area at Start: Trial Five Spot

35) Number of Producing Wells in Project Area at Present: 108 (1966)

36) Average Production Rate in Project Area at Start: 1 b/d (trial 5 spot)

37) Average Production Rate in Project Area at Present; 67 b/d (1966)

38) Original Oil in Place in Project Area (bbls): 1,000,000 (est.)

39) Oil Saturation at Start of Project (% of Pore Space): 55

40) Oil Production from Project Area from Start of Injection to Now (bbls): 211,796 (1966)

41) Estimated Primary Ultimate Recovery from Project Area (bbls): 300,000

42) Estimated Increase in Ultimate Recovery from Project Area (bbls): 175,000

43) Well Spacing: Approx. 2 Acres

44) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.0

CRUDE PETROLEUM ANALYSIS

Laboratory Number 3021

FIELD: Oil Springs

POOL:

ZONE:

Well Name: Oil Seepage
Location: Lambton County
Interval tested, depth, feet: -
Producing Zone: -
Geological Age: -

Province: Ontario
Sample From: A.W. Dewar

Date Sampled: 1924
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.842
Sulphur, percent by weight: 0.77
Saybolt Universal Viscosity:
at 70°F., sec. 73
at 100°F., sec. 56

A.P.I. gravity at 60°F.: 36.5
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.8
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 757 mm. Hg.
First drop, 38°C. (100°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.5	0.5)						
2.	75	167	1.8	2.3)	0.664	81.6	-			
3.	100	212	4.6	6.9	0.708	68.4	16			
4.	125	257	5.4	12.3	0.730	62.3	17			
5.	150	302	5.3	17.6	0.753	56.4	20			
6.	175	347	5.9	23.5	0.773	51.6	23			
7.	200	392	5.4	28.9	0.788	48.1	24			
8.	225	437	4.5	33.4	0.800	45.4	24			
9.	250	482	6.2	39.6	0.813	42.6	25			
10.	275	527	5.3	44.9	0.822	40.6	24			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	3.5	48.4	0.838	37.4	28		40	25
12.	225	437	5.5	53.9	0.845	36.0	28		45	40
13.	250	482	5.5	59.4	0.856	33.8	29		56	60
14.	275	527	5.0	64.4	0.865	32.1	31		78	75
15.	300	572	5.6	70.0	0.874	30.4	32		129	80
Residuum			28.7	98.7	-					

Carbon residue of residuum: 6.4% Carbon residue of crude: 1.8%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.9	0.693	72.7	
Total gasoline and naphtha	28.9	0.745	58.4	
Kerosine distillate	16.0	0.812	42.8	
Gas oil	8.7	0.842	36.6	
Nonviscous lubricating distillate	10.6	0.850-0.869	35.0-31.3	50-100
Medium lubricating distillate	5.8	0.869-0.879	31.3-29.5	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	28.7			
Distillation loss	1.3			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5537

FIELD: Oil Springs

POOL:

ZONE: Dundee

Well Name: Fairbank No. 157
Location: Lot 18, Con. II, Enniskillen Twp., Lambton County
Interval tested, depth, feet: 390
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: October 1927
Sample at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.845
Sulphur, percent by weight: 0.71
Saybolt Universal Viscosity:
at 70°F., sec. 71
at 100°F., sec. 53

A.P.I. gravity at 60°F.: 36.0
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.8 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 753 mm. Hg.
First drop, 33°C. (91°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	1.0	1.3	0.665	81.3	-			
3.	100	212	3.3	4.6	0.711	67.5	17			
4.	125	257	5.5	10.1	0.734	61.3	19			
5.	150	302	5.3	15.4	0.755	55.9	21			
6.	175	347	5.9	21.3	0.773	51.6	23			
7.	200	392	5.6	26.9	0.788	48.1	24			
8.	225	437	5.4	32.3	0.801	45.2	24			
9.	250	482	5.5	37.8	0.813	42.6	25			
10.	275	527	7.2	45.0	0.825	40.0	26			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.1	49.1	0.841	36.8	29		41	35
12.	225	437	5.7	54.8	0.847	35.6	28		47	45
13.	250	482	5.6	60.4	0.858	33.4	30		59	65
14.	275	527	5.3	65.7	0.865	32.1	31		86	80
15.	300	572	7.3	73.0	0.877	29.9	33		138	90
Residuum			25.5	98.5						

Carbon residue of residuum: 7.2% Carbon residue of crude: 1.8%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.6	0.698	71.2	
Total gasoline and naphtha	26.9	0.752	56.7	
Kerosine distillate	18.1	0.814	42.3	
Gas oil	8.5	0.843	36.3	
Nonviscous lubricating distillate	11.3	0.850-0.868	35.0-31.5	50-100
Medium lubricating distillate	8.2	0.868-0.884	31.5-28.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	25.5	-	-	
Distillation loss	1.5			

C R U D E P E T R O L E U M A N A L Y S I S

Laboratory Number 5619

FIELD: Oil Springs

POOL:

ZONE: Dundee

Well Name: "Old Well" (Hillis and Son)
Location: Lot 16, Con. II, Enniskillen Twp., Lambton County
Interval tested, depth, feet: 280
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Ontario Dept. of Mines

Date Sampled: December 1928
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.845
Sulphur, percent by weight: 0.79
Saybolt Universal Viscosity:
at 70°F., sec. 73
at 100°F., sec. 55

A.P.I. gravity at 60°F.: 36.0
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.7 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 761 mm. Hg.
First drop, 35°C. (95°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.4	0.4)						
2.	75	167	1.2	1.6)	0.664	81.6	-			
3.	100	212	3.9	5.5	0.711	67.5	17			
4.	125	257	4.9	10.4	0.734	61.3	19			
5.	150	302	5.4	15.8	0.754	56.2	21			
6.	175	347	6.2	22.0	0.773	51.6	23			
7.	200	392	5.3	27.3	0.790	47.6	25			
8.	225	437	4.9	32.2	0.801	45.2	24			
9.	250	482	5.3	37.5	0.812	42.8	24			
10.	275	527	9.3	46.8	0.822	40.6	24			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	2.7	49.5	0.840	37.0	29		41	30
12.	225	437	5.2	54.7	0.847	35.6	28		46	40
13.	250	482	6.1	60.8	0.857	33.6	30		57	60
14.	275	527	4.5	65.3	0.867	31.7	31		80	80
15.	300	572	6.6	71.9	0.876	30.0	33		126	85
Residuum			26.8	98.7						

Carbon residue of residuum: 6.3% Carbon residue of crude: 1.7%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.5	0.698	71.2	
Total gasoline and naphtha	27.3	0.750	57.2	
Kerosine distillate	19.5	0.813	42.6	
Gas oil	7.5	0.844	36.1	
Nonviscous lubricating distillate	11.2	0.851-0.871	34.8-31.0	50-100
Medium lubricating distillate	6.4	0.871-0.881	31.0-29.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	26.8			
Distillation loss	1.3			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 244-63

FIELD: Onondaga Twp.

POOL:

ZONE:

Well Name: Robert McMaster & Sons Combrian I
Location: Lot 7, Concession III, Onondaga Twp. Brant County
Interval tested, depth, feet: 2605-2631
Producing Zone: Cambrian
Geological Age: Cambrian

Province: Ontario
Sample From: Ontario Dept. of Energy Resources

Date Sampled: May 10, 1963
Sampled at: Well bottom by boiler

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.843
Sulphur, percent by weight: 0.17
Saybolt Universal Viscosity:
at 77°F., sec. 65
at 100°F., sec. 51

A.P.I. gravity at 60°F.: 36.4
Pour point, °F.: 40
Colour: Brownish Black
Carbon residue, percent by weight: 1.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 756 mm. Hg. First drop, 49°C. (120°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion (N_F-N_C) 10^4
1.	122									
2.	167	1.0	0.689	73.9	-	-				
3.	212	3.2	0.711	67.5	17	-				
4.	257	7.1	0.731	62.1	18	58.6				
5.	302	12.2	0.749	57.4	18	59.4				
6.	347	16.7	0.765	53.5	19	60.2				
7.	392	20.5	0.779	50.1	20	63.9				
8.	437	24.6	0.791	47.4	20	68.4				
9.	482	30.0	0.804	44.5	21	72.6				
10.	527	37.2	0.818	41.5	23	77.0				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	42.2	0.832	38.6	25	81.0	39	15		
12.	437	49.1	0.841	36.8	26	84.7	44	35		
13.	482	56.1	0.853	34.4	28	89.2	53	55		
14.	527	62.1	0.863	32.5	30	93.1	73	75		
15.	572	69.4	0.872	30.8	31	97.1	116	95		
Residuum		99.7	0.920	22.3						

Carbon residue of residuum: 3.3% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	3.2	0.704	69.5	
Total gasoline and naphtha	20.5	0.748	57.7	
Kerosine distillate	16.7	0.807	43.8	
Gas oil	13.0	0.838	37.4	Below 50
Nonviscous lubricating distillate	13.0	0.849-0.869	35.2-31.3	50-100
Medium lubricating distillate	6.2	0.869-0.877	31.3-29.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	30.3	0.920	22.3	
Distillation loss	0.3			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 1522

FIELD: Onondaga (Brant)

POOL:

ZONE: Whirlpool

Well Name: Composite 2 wells: Thompson Nos. 1 & 2
Location: Lot 16, Con. I, Onondaga Twp., Brant County
Interval tested, depth, feet: -

Producing Zone: Whirlpool
Geological Age: Lower Silurian

Province: Ontario
Sample From: Bureau of Mines Dept. of Mines and Resources
Date Sampled: September 28, 1939
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.866
Sulphur, percent by weight: 0.70
Saybolt Universal Viscosity:
at 70°F., sec. 194
at 100°F., sec. 103

A.P.I. gravity at 60°F.: 31.9
Pour point, °F.: 30
Colour: Light Green
Carbon residue, percent by weight: 1.2 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 746 mm. Hg.
First drop, 68°C. (154°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.5	0.5	0.719	65.3	21			
4.	125	257	0.9	1.4	0.743	58.9	23			
5.	150	302	2.7	4.1	0.765	53.5	26			
6.	175	347	3.2	7.3	0.776	50.9	24			
7.	200	392	3.0	10.3	0.789	47.8	24			
8.	225	437	3.4	13.7	0.801	45.2	24			
9.	250	482	5.7	19.4	0.812	42.8	24			
10.	275	527	7.3	26.7	0.823	40.4	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.6	32.2	0.836	37.8	27		39	20
12.	225	437	8.4	40.7	0.847	35.6	28		46	40
13.	250	482	7.3	48.0	0.862	32.7	32		59	60
14.	275	527	7.4	55.4	0.873	30.6	34		91	70
15.	300	572	8.7	64.1	0.885	28.4	37		151	75
Residuum			35.0	99.1	0.925	21.5				

Carbon residue of residuum: 3.3% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.5	0.719	65.3	
Total gasoline and naphtha	10.3	0.771	52.0	
Kerosine distillate	16.4	0.815	42.1	
Gas oil	12.0	0.841	36.8	
Nonviscous lubricating distillate	14.2	0.851-0.875	34.8-30.2	50-100
Medium lubricating distillate	11.2	0.875-0.892	30.2-27.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	35.0	0.925	21.5	
Distillation loss	0.9			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: Pelee Island

Location: Essex County, Pelee Island

DISCOVERY DETAILS

Method: Non-Technical

Well: Name:

Completed: 1895

Perforated: Open Hole at Approx. 870'

Treatment: Shot with Nitroglycerine

GEOLOGY

Producing Zone(s): Salina - Guelph (Silurian)

Trap Type: Erosional Remnant

Lithology: Dolomite, Brownish-Grey, Fine Grained

Maximum Reservoir Thickness: Unknown

Regional Setting: Pelee Island is situated in Lake Erie, 12 miles south of Essex County. (Most wells abandoned before 1935.)

Deepest Formation Penetrated: Guelph

DEVELOPMENT DATA

Total Wells: Completed Oil: 31

Producing Oil: Nil

Well Spacing: Irregular

Logging Practice: Nil

Completion Practice: Nil

RESERVOIR DATA

Type of Drive: Water Drive

Estimated Oil in Place: Unknown

Estimated Recoverable Oil: 6,700 S.T.bbls

Oil Zone Thickness: Maximum: Unknown

Porosity: Unknown

Area: 320 Acres

Bibliographical References: Caley, J.F., "Paleozoic Geology Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario". Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Pelee Island #2

Location: Essex County, Pelee Island

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: J.F. Stover No. 3 - Pelee Island No. 1 - A. Reiger No. 1

Completed: September 2, 1964

Perforated: Open Hole (895'-911')

Initial Potential: 40 gal./hr.

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Gas-Guelph

Trap Type: Anticline

Lithology: Dolomite

Maximum Reservoir Thickness: 16' (approx.)

Regional Setting: Pelee Island is situated in Lake Erie, 12 miles south of Essex County

Deepest Formation Penetrated: Guelph

DEVELOPMENT DATA

Total Wells: Completed Oil: 1

Producing Oil: 1

Logging Practice: Nil

RESERVOIR DATA

Type of Drive: Water Drive

Estimated Oil in Place: 400,000(est.) S.T.bbls

Oil Zone Thickness: Maximum: 16; Average: 16

Porosity: 8% (est.)

Area: 50 Acres

Oil Characteristics: Gravity: 37.3 ^{o}API

Bibliographical References: Caley, J.F., "Paleozoic Geology Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945)

Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Petrolia

Location: Lambton County, Enniskillen Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Completed: 1862; Perforated: Open Hole (470-500') average depth

Initial Potential: Approx. 1,000 b/d under solution gas drive (gas since exhausted)

GEOLOGY

Producing Zone(s): Dundee - Detroit River (Devonian)

Trap Type: Anticline. Lithology: Dolomite.

Maximum Reservoir Thickness: 13 (approx.)

Regional Setting: This field is located about 4 miles S.E. of Sarnia, and spreads into the townships of Moore, Sarnia, and Plympton. The central portion of the field consists of a domal feature with about 40' of closure.

Deepest Formation Penetrated: Queenston (Ordovician)

DEVELOPMENT DATA

Total Wells: Completed Oil: Over 2500 Drilled before 1890

Producing Oil: 113; Injection or Disposal: Water: 9

Well Spacing: 6¼ Acres. Pattern: Centre. Logging Practice: Nil.

Completion Practice: Open Hole 6¼" casing to 100'; 4" to 400' (variable). Shot with nitroglycerine.

RESERVOIR DATA

Type of Drive: Mostly Water Drive

Estimated Recoverable Oil: 18,000,000 S.T.bbls

Oil Zone Thickness: Maximum: 13 (approx.); Average: 9

Porosity: 10% (est.). Area: 20,000 Acres (Operating: 10,000).

Oil Characteristics: Gravity: 31-34 °API; Sulphur: 1.03%; Pour Point: 0°F.

Pressure Maintenance or Secondary Recovery: 2 Waterflood Projects

PRODUCTION

Operating: (1966): 23,169 bbls/yr

Cumulative Production: 16,884,896 b

Market Outlet: Imperial Oil Refinery (Trucked)

Bibliographical Reference: Caley, J.F., "Paleozoic Geology Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Petrolia

2) Pool: Petrolia (1 of 2)

3) Province: Ontario

4) Location: Lambton County, Enniskillen Twp.

5) Operator: R.J. Brennan

6) Project: Telsey Unit

7) Reservoir Formation: Dundee, Detroit River

8) Discovery Date: 1862

9) Date Injection Began: October 1955

10) Main Structural Feature: Anticline

11) Gas Cap: Originally: No; At Present: No

12) Main Drive in Primary Production: Water Drive

13) Productive Area (Acres) of Reservoir: 20,000; Of Project: 25;
Affected by Injection: 25

14) Average Depth to Top of Pay (feet): 470

15) Average Effective Thickness (feet): 30 (approx.)

16) Average Porosity %: 11

17) Average Horizontal Permeability and Range in Brackets: 150 est. (millidarcys);
(15-700)

18) API Gravity: 31°-34°

19) Injection Fluid: Air - from 1954-1955; Gas - January 1955-May 1955;
Water - May 1955

20) Injection Fluid Source: Gravel Beds

21) System: Open

22) Fluid Treatment before Injection: Filtration

23) Injection Pattern: 5 Spot

24) Structural Position Injection Wells: Oil Zone

25) Distance Injection Wells to Producers (feet): 300

26) Number of Injection Wells at Start: 4

27) Number of Injection Wells at Present: 4 (1965)

28) Average Daily Injection Rate per Injection Well at Start: 3 b/d from June 1955 (Air and 1,082 MCF gas total injected to May 1955.)

29) Average Daily Injection Rate per Injection Well at Present (bbls): 48 (1965)

30) Average Injection Pressure at Start:
1. Air - 200 psi 1954-January 1955
2. Gas - 200 psi Jan. 1955-May 1955
3. Water - 100-350 psi May 1955

31) Average Injection Pressure at Present (psi): 400 (1966)

32) Number of Producing Wells in Project Area at Start: 1

33) Number of Producing Wells in Project Area at Present: 8 (1965)

34) Average Production Rate in Project Area at Start (bbls/day): 1

35) Average Production Rate in Project Area at Present: 12 b/d (1965)

36) Original Oil in Place in Project Area (bbls): 470,000 (est.)

37) Oil Production From Entire Lease (250 Acres approx.) from Start of Injection to now: approx. 43,000 bbls (1966)

38) Total volume of injected fluids at present: Gas - 1,082,800 cu.ft. and Water - approx. 290,000 bbls (1965)

39) Estimated Primary Ultimate Recovery from Project Area (bbls): 94,000

40) Estimated Increase in Ultimate Recovery from Project Area (bbls): 70,000

41) Well Spacing: 2 Acres

42) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.0 (est.)

43) Remarks: Difficulties with gas and recycled water. Fresh water injection successful.

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Petrolia

2) Pool: Petrolia (1 & 2)

3) Province: Ontario

4) Location: Lambton County, Enniskillen Twp.

5) Operator: Victor E. de Mers

6) Project: Tecumseh Unit

7) Reservoir Formation: Dundee, Detroit River

8) Discovery Date: 1862

9) Date Injection Began: December 1961

10) Main Structural Feature: Anticline

11) Gas Cap: Originally: No; At Present: No

12) Main Drive in Primary Production: Water Drive

13) Productive Area (Acres) of Reservoir: 20,000; Of Project: 67;
Affected by Injection: 20 (approx.)

14) Average Depth to Top of Pay (feet): 320-330

15) Average Effective Thickness (feet): 30 (approx.)

16) Average Porosity %: 11 (est.)

17) API Gravity: 31°-34°

18) Injection Fluid: Fresh Water and Recycled Water

19) Injection Fluid Source: Gravel Beds

20) System: Open

21) Fluid Treatment before Injection: Filtration, Bactericide

22) Injection Pattern: 5 Spot

23) Structural Position Injection Wells: Oil Zone

24) Distance Injection Wells to Producers (feet): 160 approx.

25) Number of Injection Wells at Start: 5

26) Number of Injection Wells at Present: 5 (1965)

27) Average Daily Injection Rate per Injection Well at Start (bbls): 20 approx.

28) Average Daily Injection Rate per Injection Well at Present (bbls): 65 (1965)

29) Average Injection Pressure at Start (psi): (200-400)

30) Average Injection Pressure at Present (psi): 340 (1965)

31) Number of Producing Wells in Project Area at Start: 10

32) Number of Producing Wells in Project Area at Present: 9 (1965)

33) Average Production Rate in Project Area at Start (bbls/day): 40

34) Average Production Rate in Project Area at Present: 12 b/d

35) Original Oil in Place in Project Area (bbls): 1,700,000 est.

36) Oil Production from Project Area from Start of Injection to now (1966): 22,252 bbls (12 wells)

37) Total Volume of Injected Fluids at Present (bbls): 60,000 est. (1965)

38) Estimated Primary Ultimate Recovery from Project Area (bbls): 340,000

39) Estimated Increase in Ultimate Recovery from Project Area (bbls): 200,000

40) Well Spacing: 1 Acre

41) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.0

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5538

FIELD: Petrolia

POOL:

ZONE: Dundee

Well Name: Kelly No. 2
Location: Lot 11, Con. XI, Enniskillen Twp., Lambton County
Interval tested, depth, feet: 465
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: October 1927
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.855
Sulphur, percent by weight: 0.82
Saybolt Universal Viscosity:
at 70°F., sec. 104
at 100°F., sec. 65

A.P.I. gravity at 60°F.: 34.0
Pour point, °F.: 5
Colour: Brownish Green
Carbon residue, percent by weight: 2.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 744 mm. Hg.
First drop, 37°C. (99°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.7	0.7)						
2.	75	167	0.9	1.6)	0.697	71.5	-			
3.	100	212	2.9	4.5	0.712	67.2	18			
4.	125	257	4.6	9.1	0.738	60.2	21			
5.	150	302	4.3	13.4	0.759	54.9	23			
6.	175	347	4.9	18.3	0.779	50.1	26			
7.	200	392	4.5	22.8	0.793	46.9	26			
8.	225	437	4.5	27.3	0.806	44.1	27			
9.	250	482	5.8	33.1	0.816	41.9	26			
10.	275	527	7.2	40.3	0.826	39.8	26			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	2.4	42.7	0.839	37.1	28		40	20
12.	225	437	5.8	48.5	0.846	35.8	28		45	40
13.	250	482	5.8	54.3	0.857	33.6	30		57	60
14.	275	527	5.1	59.4	0.868	31.5	32		79	70
15.	300	572	6.5	65.9	0.879	29.5	34		128	80
Residuum			34.0	99.9						

Carbon residue of residuum: 6.3% Carbon residue of crude: 2.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.5	0.707	68.6	
Total gasoline and naphtha	22.8	0.755	55.9	
Kerosine distillate	10.3	0.812	42.8	
Gas oil	14.7	0.835	38.0	
Nonviscous lubricating distillate	11.5	0.850-0.873	35.0-30.6	50-100
Medium lubricating distillate	6.6	0.873-0.886	30.6-28.2	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	34.0			
Distillation loss	0.1			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16156

FIELD: Petrolia

POOL:

ZONE: Dundee

Well Name: Bennett
Location: Lot 15, Con. XII, Enniskillen Twp., Lambton County
Interval tested, depth, feet: -
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Sate Sampled: September 1, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.867
Sulphur, percent by weight: 1.03
Saybolt Universal Viscosity:
at 70°F., sec. 149
at °F., sec.

A.P.I. gravity at 60°F.: 31.7
Pour point, °F.: 0
Colour: Brownish Green
Carbon residue, percent by weight: 2.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 759 mm. Hg.
First drop, 55°C. (131°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167	0.3	0.3)						
3.	100	212	0.9	1.2)						
4.	125	257	1.5	2.7)	0.736	60.8	-			
5.	150	302	4.6	7.3	0.759	54.9	23			
6.	175	347	5.2	12.5	0.777	50.6	25			
7.	200	392	4.5	17.0	0.793	46.9	26			
8.	225	437	4.9	21.9	0.804	44.5	26			
9.	250	482	5.6	27.5	0.815	42.1	26			
10.	275	527	7.5	35.0	0.826	39.8	26			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	2.9	37.9	0.840	37.0	29		40	20
12.	225	437	5.9	43.8	0.845	36.0	28		45	35
13.	250	482	6.1	49.9	0.855	34.0	29		54	55
14.	275	527	5.8	55.7	0.866	31.9	31		76	65
15.	300	572	6.7	62.4	0.876	30.0	33		116	75
Residuum			35.7	98.1						

Carbon residue of residuum: 6.0% Carbon residue of crude: 2.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	1.2	-	-	
Total gasoline and naphtha	17.0	0.770	52.3	
Kerosine distillate	10.5	0.810	43.2	
Gas oil	16.6	0.835	38.0	
Nonviscous lubricating distillate	12.5	0.850-0.872	35.0-30.8	50-100
Medium lubricating distillate	5.8	0.872-0.881	30.8-29.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	35.7			
Distillation loss	1.9			

Remarks: The sample as received contained 0.5% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16157

FIELD: Petrolia

POOL:

ZONE: Dundee

Well Name: Perkins
Location: Lot 11, Con. XII, Enniskillen Twp.. Lambton County
Interval tested, depth, feet: -
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 1, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.855
Sulphur, percent by weight: 0.75
Saybolt Universal Viscosity:
at 70°F., sec. 101
at °F., sec.

A.P.I. gravity at 60°F.: 34.0
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 2.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 773 mm. Hg.
First drop, 33°C. (91°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	1.1	1.4)						
3.	100	212	2.5	3.9)	0.700	70.6	-			
4.	125	257	4.9	8.8	0.737	60.5	20			
5.	150	302	4.8	13.6	0.759	54.9	23			
6.	175	347	4.7	18.3	0.778	50.4	25			
7.	200	392	4.4	22.7	0.794	46.7	27			
8.	225	437	5.1	27.8	0.806	44.1	27			
9.	250	482	5.5	33.3	0.817	41.7	27			
10.	275	527	8.3	41.6	0.828	39.4	27			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	2.0	43.6	0.840	37.0	29		40	25
12.	225	437	5.3	48.9	0.848	35.4	29		46	40
13.	250	482	6.0	54.9	0.857	33.6	30		57	55
14.	275	527	5.4	60.3	0.867	31.7	31		80	70
15.	300	572	6.7	67.0	0.877	29.9	33		129	80
Residuum			32.4	99.4	-	-				

Carbon residue of residuum: 6.4% Carbon residue of crude: 2.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	3.9	0.700	70.6	
Total gasoline and naphtha	22.7	0.755	55.9	
Kerosine distillate	10.6	0.812	42.8	
Gas oil	14.8	0.835	38.0	
Nonviscous lubricating distillate	11.9	0.851-0.871	34.8-31.0	50-100
Medium lubricating distillate	7.0	0.871-0.882	31.0-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	32.4			
Distillation loss	0.6			

Remarks: The sample as received contained no water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: Rodney

Location: Elgin County, Aldborough Twp.

DISCOVERY DETAILS

Method: Non-Technical (result of drilling deeper play)

Well: Name: Richfield Oil and Gas No. 1 - J.D. Graham No. 1 (Lot 6, Con. IV)

Completed: May 18, 1949

Perforated: Open Hole (365'-379')

Treatment: Shot with 35 lbs of dynamite at 256'-261'

Initial Potential: 50 BOPD

GEOLOGY

Producing Zone(s): Columbus (Devonian)

Other Shows: Gas 281'

Trap Type: Dome

Lithology: Dolomite

Maximum Reservoir Thickness: 28'

Regional Setting: This field is situated immediately south of the Thames River and 8 miles north of Lake Erie.

Deepest Formation Penetrated: Bois Blanc (Devonian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 257; Dry and Abandoned: 10

Producing Oil: 172

Injection or Disposal: Water: 100

Well Spacing: 6¼ Acres

Logging Practice: Few Radioactivity Logs

Completion Practice: 13 3/8" casing 5', 7" at 230', 5½" at 340'. Open hole, usually shot with nitroglycerine.

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 30,195,600 S.T.bbls

Estimated Recoverable Oil: 11,000,000 S.T.bbls

Oil Zone Thickness: Maximum: 28; Average: 13

Porosity: 19%

Area: 1610 Acres

Oil Characteristics: Gravity: 38 °API

Initial Solution GOR: 93 cu.ft/bbl (in 1957)

Pressure Maintenance or Secondary Recovery: Secondary Recovery (3)

PRODUCTION

Operating: (1966): 470 713 b/y

Cumulative Production: 4,345,392 bbls

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical References: Malcom, W., "Canada City Service Rodney Waterford Unit", Ontario Petroleum Institute, Vol. I (1962).

Mackay, A.E. and O'Shea, H.J., "Ontario Production and Reservoir Characteristics and Statistics", Ontario Petroleum Institute, Vol. III (1964).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Rodney

2) Pool: Rodney (1 of 3)

3) Province: Ontario

4) Location: Elgin County, Aldborough Twp.

5) Operator: Canadian Cities Service Petroleum Corp.

6) Project: Rodney CSC Unit

7) Reservoir: Columbus Formation, Middle Devonian, Upper Onondaga Age

8) Discovery Date: May 1949

9) Date Injection Began: March 1962

10) Main Structural Feature: Elongated Dome

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: About 12 Months

13) Initial Results on Production, BHP, GOR, etc: Unknown - Wells Gradually at Production Rate 1-5 BOPD

14) Main Drive in Primary Production: Solution Gas

15) Productive Area (Acres) of Reservoir: 1610 (entire field); Of Project: 479; Affected by Injection: 479

16) Average Depth to Top of Pay (feet): 380

17) Average Effective Thickness (feet): 17

18) Average Porosity %: 19.2

19) Average Horizontal Permeability and Range in Brackets: 424 millidarcys (5-11,000)

20) Connate Water (% of Pore Space): 6.3

21) Viscosity at Initial Reservoir Conditions (centipoises): 6.6

22) API gravity: 38°

23) Solution Gas/Oil Ratio at Saturation Pressure (cu.ft/bbl): Unknown, 93 cu.ft/b in 1957

24) Bubble Point Pressure: Unknown

25) Original Pressure: 170 psi (est.)

26) Reservoir Pressure at Start of Injection: (est.) 10 psig

27) Latest Reservoir Pressure: None

28) Injection Fluid: Fresh Water

29) Injection Fluid Source: Gravel Beds (177'-240')

30) System: Closed

31) Fluid Treatment before Injection: Filtration

32) Injection Pattern: 5 Spot

33) Structural Position Injection Wells: Oil Zone

34) Distance Injection Wells to Producers (feet): 500 approx.

35) Number of Injection Wells at Start: 9

36) Number of Injection Wells at Present: 51 on 7/1/65

37) Average Daily Injection Rate per Injection Well at Start (bbls): 69

38) Average Daily Injection Rate per Injection Well at Present (bbls): 80 (1965)

39) Average Injection Pressure at Start: 250 psi

40) Average Injection Pressure at Present (psi): 235 on 7/22/65

41) Number of Producing Wells in Project Area at Start: 11 (pilot area)

42) Number of Producing Wells in Entire area at Present: 63 on 7/1/65

43) Average Production Rate in Project Area at Start (bbls/day): 34 (pilot area)

44) Average Production Rate in Project Area at Present: 557 on 7/22/65

45) Original Oil in Place in Project Area (bbls): 19,000,000

46) Original Oil Saturation (% of pore space): 93.7%

47) Primary Recovery from Entire Area when Injection Started (bbls): 1,335,000

48) Oil Saturation at Start of Project (% of pore space): Unknown

49) Oil Production from Project Area from Start of Injection to now (bbls): 239,050 on 7/1/65

50) Total Volume of Injected Fluids at Present (bbls): 2,244,231 on 7/1/65

51) Estimated Primary Ultimate Recovery from Project Area (bbls): 1½ million

52) Estimated Increase in Ultimate Recovery from Project Area (bbls): 3 million

53) Well Spacing: 6½ Acres

54) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.05

55) Remarks: Information given only for the Canad. Cities Service portion of Rodney Field.

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Rodney

2) Pool: Rodney (1 of 3) - East Boundary Injection Wells Common With City Service Petroleum Co.

3) Province: Ontario

4) Location: Elgin County, Aldborough Twp.

5) Operator: Ray Rock Mines Ltd.

6) Project: Rodney (Ray Rock) Unit

7) Reservoir: Columbus Formation, Mid. Devonian

8) Discovery Date: May 1949

9) Date Injection Began: June 1962

10) Main Structural Feature: Domal

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: February 1963

13) Main Drive in Primary Production: Solution Gas

14) Productive Area (Acres) of Reservoir: 1610 (entire field); Of Project: 350; Affected by Injection: 350

15) Average Depth to Top of Pay (feet): 380

16) Average Effective Thickness (feet): 18

17) Average Porosity %: 19.2 (est.)

18) Average Horizontal Permeability: 424 md (est.)

19) Connate Water (% of pore space): 6.3% (est.)

20) Viscosity at Initial Reservoir Conditions (centipoises): 6.6

21) API gravity: 38°

22) Original Pressure (psi): 160

23) Reservoir Pressure at Start of Injection (psi): 10-15

24) Injection Fluid: Fresh Water

25) Injection Fluid Source: Gravel Beds

26) System: Closed

27) Fluid Treatment before Injection: Filtration

28) Injection Pattern: Peripheral

29) Structural Position Injection Wells: Oil Zone

30) Distance Injection Wells to Producers (feet): 500 approx.

31) Number of Injection Wells at Start: 11

32) Number of Injection Wells at Present: 19 (January 1966)

33) Average Daily Injection Rate per Injection Well at Start (bbls): 45 (est.)

34) Average Daily Injection Rate per Injection Well at Present: 82 b/d (January 1966)

35) Average Injection Pressure at Start (psi): 350-400

36) Average Injection Pressure at Present (psi): 350 (1966)

37) Number of Producing Wells in Project Area at Start: 48

38) Number of Producing Wells in Project Area at Present: 62 (January 1966)

39) Average Production Rate in Project Area at Start (bbls/day): Under 260

40) Average Production Rate in Project Area at Present: 334 b/d (January 1966)

41) Original Oil in Place in Project Area (bbls): 7,000,000

42) Primary Recovery from Project Area when Injection Started (bbls): 563,000 (approx.)

43) Oil Production from Project Area from Start of Injection to Now (bbls): approx. 540,000 (December 1966)

44) Total Volume of Injected Fluids at Present (bbls): 2,001,000 (December 1966)

45) Estimated Primary Ultimate Recovery from Project Area (bbls): 600,000

46) Estimated Increase in Ultimate Recovery from Project Area (bbls): 2,800,000

47) Well Spacing: 6¼ Acres

48) Oil Volume Factor (initial reservoir barrels per Stock-Tank barrel): 1.05

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Rodney

2) Pool: Rodney (1 of 3)

3) Province: Ontario

4) Location: Elgin County, Aldborough Twp.

5) Operator: Bow Valley Oil Company Ltd.

6) Project: R & R Unit

7) Reservoir: Columbus Formation, Middle Devonian

8) Discovery Date: May 1949

9) Date Injection Began: December 1962

10) Main Structural Feature: Domal

11) Gas Cap: Originally: No; At Present: No

12) Time Required for Initial Results: About 3 Months

13) Main Drive in Primary Production: Solution Gas

14) Productive Area (Acres) of Reservoir: 1610 (entire field); Of Project: 393; Affected by Injection: 393

15) Average Depth to Top of Pay (feet): 380

16) Average Effective Thickness (feet): 14

17) Average Porosity %: 17.4

18) Average Horizontal Permeability: 425 MD (est.)

19) Connate Water (% of pore space): 22.5

20) API Gravity: 38°

21) Original Pressure (psi): 170 (est.)

22) Injection Fluid: Fresh Water

23) Injection Fluid Source: Gravel Beds at 195'

24) System: Closed

25) Fluid Treatment before Injection: Filtration

26) Injection Pattern: Peripheral

27) Structural Position Injection Wells: Oil Zone

28) Distance Injection Wells to Producers (feet): 400-500

29) Number of Injection Wells at Start: 30

30) Number of Injection Wells at Present: 30 (December 1965)

31) Average Daily Injection Rate per Injection Well at Start: approx. 47 bbls.

32) Average Daily Injection Rate per Injection Well at Present: approx. 40 bbls per well.

33) Average Injection Pressure at Start (psi): About 160

34) Average Injection Pressure at Present (psi): 170 (December 1965)

35) Number of Producing Wells in Project Area at Start: 79

36) Number of Producing Wells in Project Area at Present: 49 (December 1965)

37) Average Production Rate in Project Area at Start (bbls/day): 160

38) Average Production Rate in Project Area at Present: 54,630 bbls/yr (December 1965)

39) Original Oil in Place in Project Area (bbls): 5,000,000

40) Original Oil Saturation (% of pore space): 77.5

41) Primary Recovery from Project Area when Injection Started (bbls): 859,731

42) Oil Production from Project Area from Start of Injection to now (bbls): 159,000 (December 1965)

43) Total Volume of Injected Fluids at Present: 1,293,261 bbls (January 1, 1956)

44) Estimated Primary Ultimate Recovery from Project Area (bbls): 1,300,000

45) Estimated Increase in Ultimate Recovery from Project Area (bbls): 790,000

46) Well Spacing: 6¼ Acres

47) Oil Volume Factor (initial Reservoir barrels per Stock-Tank barrel): 1.05

CRUDE PETROLEUM ANALYSIS

Laboratory Number 2493-54

FIELD: Rodney

POOL:

ZONE: Columbus

Well Name: No. 8
Location: Lot 5, Con. V (Western Division), Aldborough Twp., Elgin County
Interval tested, depth, feet: 372-390
Producing Zone: Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: DMTS

Date Sampled: September 17, 1954
Sampled at: Before Separator

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.835
Sulphur, percent by weight: 0.87
Saybolt Universal Viscosity:
at 100°F., sec. 44
at °F., sec.

A.P.I. gravity at 60°F.: 38.0
Pour point, °F.: -65
Colour: Brownish Black
Carbon residue, percent by weight: 1.3 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 748 mm. Hg.
First drop, 32°C. (90°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index 20°C.
1.	50	122	1.4	1.4)							
2.	75	167	2.1	3.5)	0.685	75.1	-	-			-
3.	100	212	4.1	7.6	0.710	67.8	17	58.9			1.3985
4.	125	257	6.0	13.6	0.735	61.0	19	58.0			1.4076
5.	150	302	5.0	18.6	0.755	55.9	21	58.2			1.4179
6.	175	347	5.3	23.9	0.773	51.6	23	59.0			1.4283
7.	200	392	5.2	29.1	0.790	47.6	25	60.5			1.4372
8.	225	437	5.0	34.1	0.803	44.7	25	62.9			1.4446
9.	250	482	4.8	38.9	0.815	42.1	26	67.0			1.4514
10.	275	527	6.9	45.8	0.826	39.8	26	71.5			1.4583
Stage 2 - Distillation continued at 40 mm. Hg. pressure											
11.	200	392	3.1	48.9	0.839	37.2	28	75.4	41	15	1.4613
12.	225	437	5.7	54.6	0.845	36.0	28	78.4	44	35	1.4673
13.	250	482	5.2	59.8	0.855	34.0	29	83.4	52	50	1.4735
14.	275	527	4.8	64.6	0.865	32.1	31	87.0	69	65	1.4788
15.	300	572	6.8	71.4	0.876	30.0	33	91.0	109	80	1.4870
Residuum			27.4	98.8	0.925	21.5					

Carbon residue of residuum: 4.3% Carbon residue of crude: 1.3%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	7.6	0.698	71.2	
Total gasoline and naphtha	29.1	0.746	58.2	
Kerosine distillate	9.8	0.809	43.4	
Gas oil	16.9	0.837	37.6	
Nonviscous lubricating distillate	10.9	0.853-0.874	34.4-30.4	50-100
Medium lubricating distillate	4.7	0.874-0.883	30.4-28.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	27.4	0.925	21.5	
Distillation loss	1.2			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge) and no salt (as NaCl) per 1000 bbl.

CRUDE PETROLEUM ANALYSIS

Laboratory Number 2494-54

FIELD: Rodney

POOL:

ZONE: Columbus

Well Name: MacMillan No. 2
Location: Lot 5, Con. V (Western Division), Aldborough Twp., Elgin County
Interval tested, depth, feet: 370-390
Producing Zone: Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: DMTS

Date Sampled: September 17, 1954
Sampled at: Before Separator

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.835
Sulphur, percent by weight: 0.83
Saybolt Universal Viscosity:
at 100°F., sec. 45
at °F., sec.

A.P.I. gravity at 60°F.: 38.0
Pour point, °F.: -65
Colour: Brownish Black
Carbon residue, percent by weight: 1.4 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 752 mm. Hg.
First drop, 28°C. (82°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index 20°C.
1.	50	122	1.1	1.1)							
2.	75	167	2.0	3.1)	0.688	74.2	-	-			-
3.	100	212	3.8	6.9	0.712	67.2	18	59.2			1.4019
4.	125	257	5.9	12.8	0.736	60.8	20	58.1			1.4100
5.	150	302	5.7	18.5	0.756	55.7	22	58.4			1.4189
6.	175	347	5.0	23.5	0.773	51.6	23	59.1			1.4287
7.	200	392	4.5	28.0	0.789	47.8	24	60.3			1.4368
8.	225	437	4.9	32.9	0.803	44.7	25	62.5			1.4444
9.	250	482	5.8	38.7	0.815	42.1	26	67.5			1.4510
10.	275	527	7.3	46.0	0.828	39.4	27	71.9			1.4584
Stage 2 - Distillation continued at 40 mm. Hg. pressure											
11.	200	392	2.2	48.2	0.839	37.2	28	74.7	40	20	1.4652
12.	225	437	5.7	53.9	0.846	35.8	28	78.2	43	35	1.4683
13.	250	482	6.0	59.9	0.855	34.0	29	83.4	53	55	1.4737
14.	275	527	4.8	64.7	0.866	31.9	31	87.2	70	60	1.4795
15.	300	572	6.2	70.9	0.874	30.4	32	91.2	120	80	1.4883
Residuum			28.2	99.1	0.924	21.6					

Carbon residue of residuum: 4.6% Carbon residue of crude: 1.4%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.9	0.701	70.4	
Total gasoline and naphtha	28.0	0.747	57.9	
Kerosine distillate	10.7	0.810	43.2	
Gas oil	16.5	0.837	37.6	
Nonviscous lubricating distillate	10.4	0.852-0.871	34.6-31.0	50-100
Medium lubricating distillate	5.3	0.871-0.880	31.0-29.3	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	28.2	0.924	21.6	
Distillation loss	0.9			

Remarks: The sample as received contained 0.08% by vol. water and sediment (by centrifuge) and 85 lb. salt (as NaCl) per 1000 bbl.

CRUDE PETROLEUM ANALYSIS

Laboratory Number 2495-54

FIELD: Rodney

POOL:

ZONE: Columbus

Well Name: Downey No. 1 & 4
Location: Lot 4, Con. VI (Western Division)
Aldborough Twp., Elgin County
Interval tested, depth, feet: 416-429
Producing Zone: Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: DMTS

Date Sampled: September 17, 1954
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.838
Sulphur, percent by weight: 0.84
Saybolt Universal Viscosity:
at 100°F., sec. 45
at °F., sec.

A.P.I. gravity at 60°F.: 37.4
Pour point, °F.: -40
Colour: Brownish Black
Carbon residue, percent by weight: 1.2
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 760 mm. Hg.
First drop, 38°C. (100°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index 20°C.
1.	50	122	0.6	0.6)							
2.	75	167	2.2	2.8)	0.671	79.4	-	-			-
3.	100	212	3.9	6.7	0.708	68.4	16	59.6			1.3998
4.	125	257	5.8	12.5	0.735	61.0	19	58.3			1.4088
5.	150	302	6.0	18.5	0.754	56.2	21	58.8			1.4174
6.	175	347	4.7	23.2	0.774	51.3	23	59.3			1.4283
7.	200	392	4.8	28.0	0.790	47.6	25	60.8			1.4369
8.	225	437	4.9	32.9	0.804	44.5	26	62.6			1.4448
9.	250	482	5.9	38.8	0.815	42.1	26	67.2			1.4519
10.	275	527	6.9	45.7	0.826	39.8	26	71.9			1.4584
Stage 2 - Distillation continued at 40 mm. Hg. pressure											
11.	200	392	2.9	48.6	0.840	37.0	29	74.8	38	20	1.4642
12.	225	437	6.2	54.8	0.846	35.8	28	79.1	44	35	1.4689
13.	250	482	5.2	60.0	0.856	33.8	29	84.1	54	50	1.4744
14.	275	527	5.0	65.0	0.865	32.1	31	88.1	70	65	1.4794
15.	300	572	6.2	71.2	0.875	30.2	32	90.9	110	80	1.4870
Residuum			28.7	99.9	0.921	22.1					

Carbon residue of residuum: 3.9% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.7	0.693	72.7	
Total gasoline and naphtha	28.0	0.745	58.4	
Kerosine distillate	10.8	0.810	43.2	
Gas oil	16.3	0.836	37.8	
Nonviscous lubricating distillate	11.6	0.852-0.872	34.6-30.8	50-100
Medium lubricating distillate	4.5	0.872-0.881	30.8-29.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	28.7	0.921	22.1	
Distillation loss	0.1			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge) and no salt (as NaCl) per 1000 bbl.

OIL FIELD DATA

Field and Pool: Romney

Location: Kent County, Romney Twp. & East Tilbury Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name:

Completed: 1906

Perforated: Open Hole (200')

Initial Potential: 1,000 BOPD

GEOLOGY

Producing Zone(s): Dundee (Devonian)

Trap Type: Anticlinal

Lithology: Dolomite Zone

Regional Setting: This field is situated 7 miles N.E. of Wheatley and 5 miles north of Lake Erie. (Abandoned in 1910.)

Deepest Formation Penetrated: Ordovician

DEVELOPMENT DATA

Total Wells: Completed Oil: 23 (1906)

Producing Oil: None

Well Spacing: 2 Acres

Logging Practice: Nil

Completion Practice: Unknown

RESERVOIR DATA

Type of Drive: Unknown

Estimated Recoverable Oil: 62,031 S.T.bbls

Porosity: 5% (est.)

Area: 800 Acres (approx.)

Oil Characteristics: Gravity: 28-30 ^{o}API

PRODUCTION

Cumulative Production: 62,031 bbls.

Bibliographical Reference: Caley, J.F., "Paleozoic Geology, Windsor-Sarnia Area, Ont", Geol. Surv. Can. Memoir 240 (1945).

OIL FIELD DATA

Field and Pool: Shetland

Location: Lambton County, Euphemia Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name:

Completed: 1898

Perforated: (337'-392')

GEOLOGY

Producing Zone(s): Dundee - Detroit River (Devonian)

Trap Type: Anticline

Lithology: Dolomite

Regional Setting: This field is situated 4 miles N.E. of Florence and 5 miles east of the Dawn Pools.

Deepest Formation Penetrated: Silurian

DEVELOPMENT DATA

Total Wells: Producing Oil: 50

Injection or Disposal: Water: 42

Logging Practice: Nil

Completion Practice: (1963) 8 5/8" casing to 30'; 7" to 50'; 5½" to 270'; Open Hole, fractured with 1400 lbs 10-20 sand and crude.

RESERVOIR DATA

Type of Drive: Solution Gas and Water Drive

Estimated Recoverable Oil: 50,000 S.T.bbls

Oil Zone Thickness: Average: 8 (est.)

Area: 700 Acres

Oil Characteristics: Gravity: 36.3 °API

Pressure Maintenance or Secondary Recovery: One Waterflood Project.

PRODUCTION

Operating: (1966): 1,154 bbls/yr

Cumulative Production: 39,388 b

Market Outlet: Imperial Oil Refinery (trucked)

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Shetland

2) Pool: Shetland

3) Province: Ontario

4) Location: Lambton County, Euphemia Twp.

5) Operator: N.Y.K. Oil Canada Ltd.

6) Project: Shetland Unit

7) Reservoir: Dundee

8) Discovery Date: 1898

9) Date Injection Began: 1956

10) Main Structural Feature: Anticline

11) Time Required for Initial Results: 1957

12) Main Drive in Primary Production: Solution Gas

13) Productive Area (Acres) of Reservoir: 700; Of Project: 550; Affected by Injection: 550

14) Average Depth to Top of Pay (feet): 337-392

15) Average Effective Thickness (feet): 8 (est.)

16) API Gravity: 36.3

17) Injection Fluid: Fresh Water

18) Injection Fluid Source: Shallow Water, Well or River

19) Fluid Treatment before Injection: Filtration

20) Injection Pattern: 5 Spot

21) Structural Position Injection Wells: Oil Zone

22) Number of Injection Wells at Start: 6

23) Number of Injection Wells at Present: 42 (1965)

24) Average Daily Injection Rate per Injection Well at Start (bbls): 9

25) Average Daily Injection Rate per Injection Well at Present (bbls): 14 (1960)

26) Average Injection Pressure at Start (psi): 290

27) Average Injection Pressure at Present (psi): 380 (1960)

28) Number of Producing Wells in Project Area at Start: 2

29) Number of Producing Wells in Project Area at Present: 51 (1965)

30) Average Production Rate in Project Area at Start: ½ bbl/day/well

31) Average Production Rate in Project Area at Present: 1200 bbl/yr (1966)

32) Total Volume of Injected Fluids at Present: 1,630,000 bbl (est.)

33) Estimated Increase in Ultimate Recovery from Project Area (bbls): 50,000

34) Well Spacing: 6¼ Acres

35) Remarks: Project terminated in 1966.

OIL FIELD DATA

Field and Pool: Staples

Location: Essex County, Tilbury West Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial Oil No. 116; Staples No. 1; S. Lynn No. 1 (Lot 4, Con. XI)

Completed: January 10, 1948

Perforated: Open Hole (1165'-1168')

Initial Potential: 144 BOPD and 500 MCFD (gas)

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Oil 175'-190', 1160', and Gas 1070'

Trap Type: Bioherm Patch Reef

Lithology: Dolomite, Grey-Brown, Med. Crystalline

Maximum Reservoir Thickness: 20'

Regional Setting: This field is situated 9 miles north of Leamington on trend with the Kingsville-Leamington and Mersea fields.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 5; Gas: 7; Dry and Abandoned: 5

Producing Oil: None

Well Spacing: 25 Acres

Logging Practice: Nil

Completion Practice: 10 3/4" casing to 90'; 7" to 670'; 5½" to 1150'; 2" to 1160'

RESERVOIR DATA

Type of Drive: Gas Cap

Estimated Oil in Place: 850,000 S.T.bbls

Estimated Recoverable Oil: 4,605 S.T.bbls

Estimated Recoverable Gas: 115 MMCF

Oil Zone Thickness: Maximum: 8'; Average: 6'

Gas Zone Thickness: Maximum: 12'

Porosity: 8% (est.)

Area: 410 Acres

PRODUCTION

Field shut in 1963.

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Seckerton-Seckerton North

Location: Lambton County, Moore Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Imperial Oil No. 344 - Moore 21-9 - R. Murray No. 1 (Lot 21, Con. IX)

Perforated: Open Hole (2400-2465'). Completed: July 28, 1952.

Treatment: Acidized with 2,000 Gals. Acid

Initial Potential: 23 M.M.C.F.D. Gas; 60 BOPD

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 250'

Regional Setting: This pool is situated 7 miles S.E. of Sarnia, adjacent to the Corunna Field.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 15; Gas: 8

Producing Oil: 14

Injection or Disposal: Gas Storage Wells

Logging Practice: Radioactivity, Density and Caliper

Completion Practice: 13 3/8" casing to 150'; 10 3/4" to 550'; 8 5/8" to 1300'; 4½" to 2,600'. Perforated, acidized and/or fractured with sand and hulls in fresh water.

RESERVOIR DATA

Type of Drive: Gas Cap and Solution Gas

Estimated Oil in Place: 10,000,000 S.T.bbls (500 bbls/acre-foot)

Estimated Recoverable Oil: 1,500,000 S.T.bbls (75 bbls/acre-foot)

Oil Zone Thickness: Maximum: 100'; Average: 50'

Gas Zone Thickness: Maximum: 250'

Porosity: 8%

Area: 500 (400 oil) Acres (approx.)

Oil Characteristics: Gravity: 38.7 °API

Pressure Maintenance or Secondary Recovery: Gas Storage

PRODUCTION

Operating: (1966): 74,205 b/yr

Cumulative Production: 742,641 bbls

Market Outlet: Imperial Oil Refinery (trucked and pipeline)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Stevenson

Location: Kent County, Romney Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Imperial Oil No. 627; Union-Dominion-Romney "A" Gore; T & E; Austin No. 1

Completed: November 1, 1957

Perforated: Open Hole (2712'-2727')

Treatment: Acidized with 2000 Gals 15% Acid

Initial Potential: 5 BOPD

GEOLOGY

Producing Zone(s): Trenton (Ordovician)

Other Shows: 2704' - (527 MCFD Gas); 2712' - (188 MCFD Gas)

Trap Type: Anticlinal

Lithology: Dolomite Zone

Maximum Reservoir Thickness: 6' (approx.)

Regional Setting: This field is situated inland from Lake Erie within the N.W. portion of the Tilbury Gas Field. (Abandoned in 1962)

Deepest Formation Penetrated: Ordovician

DEVELOPMENT DATA

Total Wells: Completed Oil: 1

Producing Oil: None

Logging Practice: Radioactivity

Completion Practice: 13 3/8" casing to 142'; 10 3/4" to 785'; 8 5/8" to 1695'; 7" to 2710'; Acidized

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 95,000 S.T.bbls

Estimated Recoverable Oil: 10,000 S.T.bbls

Oil Zone Thickness: Maximum: 6'; Average: 6'

Porosity: 5-6% (est.)

Oil Characteristics: Gravity: 38.4 °API

PRODUCTION

Cumulative Production: 2,878 bbls

OIL FIELD DATA

Field and Pool: Sutorville

Location: Lambton County, Brook Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Earl-Tostick Gas Syndicate No. 2 (Lot 10; Con. XIII)

Completed: December 27, 1963

Perforated: Open Hole, (1990'-2008') and (2025'-2038')

Treatment: Fractured 2005-2038' with 13,520 gals crude; 7,000 lbs 20-40 sand; 3,000 lbs 10-20 sand

Initial Potential: 150 BOPD

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Gas (1989-1990) Guelph

Trap Type: Incipient Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 32'

Deepest Formation Penetrated: Guelph (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 3; Gas: None; Dry and Abandoned: 4

Producing Oil: 3

Well Spacing: 25 Acres; Pattern: Centre

Logging Practice: Nil

Completion Practice: 10" casing to 60'; 7" to 1100'; 4½" to 2000'; Open Hole, fractured with crude oil and sand

RESERVOIR DATA

Type of Drive: Solution Gas and Some Water Drive

Estimated Oil in Place: 630,000 S.T.bbls (630 bbls/acre-foot)

Estimated Recoverable Oil: 65,000 S.T.bbls (65 bbls/acre-foot)

Oil Zone Thickness: Maximum: 32'; Average: 25' (approx.)

Porosity: 10%

Area: 40 Acres

Oil Characteristics: Gravity: 23.4 °API

PRODUCTION

Operating: (1966): 8016 bbls/yr

Cumulative Production: 33,361 b (approx.)

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Talford

Location: Lambton County, Moore Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Imperial Oil No. 704 - Moore 20-12 - T.G. Scott No. 1 (Lot 20, Con. XII)

Completed: June 15, 1959

Perforated: Open Hole (2560-2570')

Treatment: Acidized with 1000 gals - fractured with 216 bbls of oil and 5000 lbs of sand

Initial Potential: 50 BOPD

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Gas 2422-2428 @ 410 MCF/d

Trap Type: Incipient Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 38

Regional Setting: This pool is located 1 mile north of the Corunna Field, 7 miles S.E. of Sarnia and within the pinnacle reef belt.

Deepest Formation Penetrated: Guelph (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 1

Producing Oil: 1

Well Spacing: 25 Acres; Pattern: Centre

Logging Practice: Nil

Completion Practice: 13 3/8" casing to 135'; 10 3/4" to 1236'; 4½" to 2619'; perforated, acidized and fractured.

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 500,000 (approx.) S.T.bbls

Estimated Recoverable Oil: 37,000 S.T.bbls

Oil Zone Thickness: Maximum: 38'; Average: 38'

Porosity: 6-8% (est.)

Area: 80 Acres (oil: 25 acres)

Oil Characteristics: Gravity: 34.3 °API

PRODUCTION

Operating: (1966): 1,060 b/yr

Cumulative Production: 12,805 bbls

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5532

FIELD: Thamesville

POOL:

ZONE: Mount Simon

Well Name: Colchester "Deep Well"
Location: Lot. 5, Con. III, Zone Twp., Kent County
Interval tested, depth, feet: 3935-3954
Producing Zone: Mount Simon
Geological Age: Upper Cambrian

Province: Ontario
Sample From: Ontario Department of Mines
Date Sampled: May 1928
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.827
Sulphur, percent by weight: 0.22
Saybolt Universal Viscosity:
at 70°F., sec. 56
at 100°F., sec. 43

A.P.I. gravity at 60°F.: 39.6
Pour point, °F.: 20
Colour: Brownish Green
Carbon residue, percent by weight: 1.0 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 747 mm. Hg.
First drop, 25°C. (77°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	1.1	1.1)						
2.	75	167	1.7	2.8)	0.662	82.3	-			
3.	100	212	3.2	6.0	0.706	68.9	15			
4.	125	257	5.3	11.3	0.731	62.1	18			
5.	150	302	5.4	16.7	0.750	57.2	19			
6.	175	347	5.6	22.3	0.766	53.2	20			
7.	200	392	4.9	27.2	0.778	50.4	19			
8.	225	437	5.7	32.9	0.789	47.8	19			
9.	250	482	6.1	39.0	0.803	44.7	20			
10.	275	527	7.0	46.0	0.816	41.9	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.3	50.3	0.830	39.0	24		39	25
12.	225	437	7.2	57.5	0.837	37.6	24		45	40
13.	250	482	6.7	64.2	0.851	34.8	27		56	60
14.	275	527	6.3	70.5	0.863	32.5	30		82	75
15.	300	572	5.0	75.5	0.869	31.3	29		134	90
Residuum			23.0	98.5						

Carbon residue of residuum: 4.3% Carbon residue of crude: 1.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.0	0.687	74.5	
Total gasoline and naphtha	27.2	0.740	59.7	
Kerosine distillate	18.8	0.804	44.5	
Gas oil	11.0	0.834	38.2	
Nonviscous lubricating distillate	12.3	0.843-0.865	36.3-32.1	50-100
Medium lubricating distillate	6.2	0.865-0.879	32.1-29.5	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.0	-	-	
Distillation loss	1.5			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5533

FIELD: Thamesville

POOL:

ZONE: Dundee

Well Name: Ajax No. 1 (Earl Smith Farm)
Location: Lot. 5, Con. XIII, Gore of Camden Twp., Kent County
Interval tested, depth, feet: 220-580
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Ajax Oil and Gas Co.

Date Sampled: January 1928
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.838
Sulphur, percent by weight: 0.93
Saybolt Universal Viscosity:
at 70°F., sec. 64
at 100°F., sec. 49

A.P.I. gravity at 60°F.: 37.4
Pour point, °F.: Below 0
Colour: Greenish Black
Carbon residue, percent by weight: 1.1 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 762 mm. Hg.
First drop, 37°C. (99°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	0.7	1.0)	0.661	82.6	-			
3.	100	212	1.6	2.6	0.706	68.9	15			
4.	125	257	5.2	7.8	0.728	62.9	16			
5.	150	302	5.9	13.7	0.746	58.2	17			
6.	175	347	6.3	20.0	0.762	54.2	18			
7.	200	392	6.0	26.0	0.779	50.1	20			
8.	225	437	6.7	32.7	0.793	46.9	21			
9.	250	482	6.2	38.9	0.806	44.1	22			
10.	275	527	8.0	46.9	0.818	41.5	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	3.6	50.5	0.833	38.4	26		40	25
12.	225	437	7.3	57.8	0.840	37.0	25		46	40
13.	250	482	5.9	63.7	0.854	34.2	28		58	60
14.	275	527	6.4	70.1	0.864	32.3	30		83	75
15.	300	572	4.7	74.8	0.875	30.2	32		139	85
Residuum			23.3	98.1						

Carbon residue of residuum: 4.7% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	2.6	0.688	74.2	
Total gasoline and naphtha	26.0	0.748	57.7	
Kerosine distillate	20.9	0.806	44.1	
Gas oil	9.5	0.837	37.6	
Nonviscous lubricating distillate	12.2	0.845-0.868	36.0-31.5	50-100
Medium lubricating distillate	6.2	0.868-0.880	31.5-29.3	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.3	-	-	
Distillation loss	1.9			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5534

FIELD: Thamesville

POOL:

ZONE: Dundee

Well Name: Barclay
Location: Lot. 4, Con. III, Zone Twp., Kent County
Interval tested, depth, feet: 278
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Colchester Oil Co.

Date Sampled: January 1928
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.823
Sulphur, percent by weight: 0.86
Saybolt Universal Viscosity:
at 70°F., sec. 50
at 100°F., sec. 42

A.P.I. gravity at 60°F.: 40.4
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 0.9
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 758 mm. Hg.
First drop, 28°C. (82°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.7	0.7)						
2.	75	167	1.7	2.4)	0.658	83.6	-			
3.	100	212	4.2	6.6	0.700	70.6	12			
4.	125	257	7.5	14.1	0.725	63.7	15			
5.	150	302	6.4	20.5	0.745	58.4	17			
6.	175	347	6.7	27.2	0.763	54.0	18			
7.	200	392	6.3	33.5	0.781	49.7	21			
8.	225	437	6.5	40.0	0.794	46.7	21			
9.	250	482	6.3	46.3	0.807	43.8	22			
10.	275	527	7.0	53.3	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.5	58.8	0.836	37.8	27		41	30
12.	225	437	5.6	64.4	0.844	36.2	27		48	45
13.	250	482	5.2	69.6	0.854	34.2	28		61	60
14.	275	527	4.0	73.6	0.863	32.5	30		83	75
15.	300	572	5.3	78.9	0.873	30.6	31		127	85
Residuum			19.9	98.8						

Carbon residue of residuum: 4.7% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	6.6	0.685	75.1	
Total gasoline and naphtha	33.5	0.739	60.0	
Kerosine distillate	19.8	0.807	43.8	
Gas oil	9.0	0.839	37.1	
Nonviscous lubricating distillate	11.2	0.845-0.867	36.0-31.7	50-100
Medium lubricating distillate	5.4	0.867-0.879	31.7-29.5	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	19.9	-	-	
Distillation loss	1.2			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5535

FIELD: Thamesville

POOL:

ZONE: Dundee

Well Name: Composite Sample: Thamesville Field
Location: Zone Twp., Kent County
Interval tested, depth, feet: -
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Imperial Oil Ltd.

Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.831
Sulphur, percent by weight: 0.86
Saybolt Universal Viscosity:
at 70°F., sec. 52
at 100°F., sec. 44

A.P.I. gravity at 60°F.: 38.8
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 1.0
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 750 mm. Hg.
First drop, 36°C. (97°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	0.7	1.0)	0.662	82.2	-			
3.	100	212	3.0	4.0	0.700	70.6	12			
4.	125	257	6.9	10.9	0.724	63.9	14			
5.	150	302	6.5	17.4	0.743	58.9	16			
6.	175	347	6.5	23.9	0.763	53.9	18			
7.	200	392	6.3	30.2	0.779	50.1	20			
8.	225	437	6.3	36.5	0.793	46.9	21			
9.	250	482	6.6	43.1	0.807	43.8	22			
10.	275	527	7.1	50.2	0.821	40.8	24			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	6.5	56.7	0.835	38.0	27		40	20
12.	225	437	4.8	61.5	0.844	36.1	27		48	45
13.	250	482	5.5	67.0	0.853	34.4	28		60	60
14.	275	527	5.4	72.4	0.862	32.6	29		84	80
15.	300	572	5.5	77.9	0.875	30.2	32		124	95
Residuum			21.9	99.8						

Carbon residue of residuum: 4.6% Carbon residue of crude: 1.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.0	0.690	73.6	
Total gasoline and naphtha	30.2	0.744	58.7	
Kerosine distillate	20.0	0.808	43.6	
Gas oil	9.8	0.838	37.3	
Nonviscous lubricating distillate	11.9	0.845-0.867	36.0-31.7	50-100
Medium lubricating distillate	6.0	0.867-0.881	31.7-29.1	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	21.9	-	-	
Distillation loss	0.2			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5536

FIELD: Thamesville

POOL:

ZONE: Dundee

Well Name: Composite Sample: Thamesville Field
Location: Zone Twp., Kent County
Interval tested, depth, feet: -
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Vacuum Gas and Oil Co.

Date Sampled: October 1927
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.833
Sulphur, percent by weight: 1.02
Saybolt Universal Viscosity:
at 70°F., sec. 57
at 100°F., sec. 45

A.P.I. gravity at 60°F.: 38.4
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 1.1
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 755 mm. Hg.
First drop, 48°C. (118°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167	0.9	0.9	0.666	81.0	-			
3.	100	212	3.3	4.2	0.705	69.2	14			
4.	125	257	5.8	10.0	0.726	63.4	15			
5.	150	302	6.5	16.5	0.746	58.2	17			
6.	175	347	6.4	22.9	0.763	53.9	18			
7.	200	392	6.8	29.7	0.780	49.9	20			
8.	225	437	5.9	35.6	0.796	46.3	22			
9.	250	482	6.3	41.9	0.807	43.8	22			
10.	275	527	7.7	49.6	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	3.7	53.3	0.832	38.6	25		40	20
12.	225	437	6.1	59.4	0.840	36.9	25		46	40
13.	250	482	6.5	65.9	0.852	34.6	28		58	60
14.	275	527	5.6	71.5	0.862	32.6	29		83	75
15.	300	572	5.3	76.8	0.876	30.0	33		123	90
Residuum			22.9	99.7						

Carbon residue of residuum: 4.9% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.2	0.698	71.2	
Total gasoline and naphtha	29.7	0.746	58.2	
Kerosine distillate	19.9	0.809	43.4	
Gas oil	9.0	0.836	37.8	
Nonviscous lubricating distillate	12.5	0.844-0.868	36.1-31.5	50-100
Medium lubricating distillate	5.7	0.868-0.882	31.5-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	22.9	-	-	
Distillation loss	0.3			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 16162

FIELD: Tilbury East

POOL:

ZONE: Guelph

Well Name: Walker & Drake No. 1
Location: Lot 6, Con. IX, Tilbury East Twp., Kent County
Interval tested, depth, feet: 1434
Producing Zone: Guelph
Geological Age: Middle Silurian

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 3, 1936
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.819
Sulphur, percent by weight: 0.50
Saybolt Universal Viscosity:
at 70°F., sec. 44
at °F., sec.

A.P.I. gravity at 60°F.: 41.3
Pour point, °F.: Below 0
Colour: Dark Green
Carbon residue, percent by weight: 0.7
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 758 mm. Hg.
First drop, 35°C. (95°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3)						
2.	75	167	1.1	1.4)						
3.	100	212	3.1	4.5)	0.699	70.9	-			
4.	125	257	7.0	11.5	0.731	62.1	18			
5.	150	302	8.6	20.1	0.749	57.4	18			
6.	175	347	8.1	28.2	0.767	53.0	20			
7.	200	392	7.2	35.4	0.781	49.7	21			
8.	225	437	6.7	42.1	0.795	46.5	22			
9.	250	482	7.1	49.2	0.808	43.6	22			
10.	275	527	7.5	56.7	0.820	41.1	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.3	62.0	0.835	38.0	27		40	25
12.	225	437	5.8	67.8	0.844	36.2	27		47	40
13.	250	482	5.0	72.8	0.855	34.0	29		59	60
14.	275	527	4.6	77.4	0.865	32.1	31		85	80
15.	300	572	5.1	82.5	0.875	30.2	32		140	90
Residuum			16.3	98.8	-	-				

Carbon residue of residuum: 4.3% Carbon residue of crude: 0.7%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.5	0.699	70.9	
Total gasoline and naphtha	35.4	0.750	57.2	
Kerosine distillate	21.3	0.808	43.6	
Gas oil	9.5	0.838	37.4	
Nonviscous lubricating distillate	10.3	0.847-0.868	35.6-31.5	50-100
Medium lubricating distillate	6.0	0.868-0.884	31.5-28.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	16.3			
Distillation loss	1.2			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 17962

FIELD: Tilbury East

POOL:

ZONE: Guelph

Well Name: Reid Farm No. 1
Location: Lot 11, N. Back Line, Tilbury East Twp., Kent County
Interval tested, depth, feet: 1435
Producing Zone: Guelph
Geological Age: Middle Silurian

Province: Ontario
Sample From: Mines Branch

Date Sampled: September 2, 1937
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.822
Sulphur, percent by weight: 0.45
Saybolt Universal Viscosity:
at 70°F., sec. 45
at °F., sec.

A.P.I. gravity at 60°F.: 40.6
Pour point, °F.: -10
Colour: Dark Green
Carbon residue, percent by weight: 0.8 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 747 mm. Hg.
First drop, 57°C. (135°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167	0.5	0.5)						
3.	100	212	1.9	2.4)	0.709	68.1	-			
4.	125	257	6.9	9.3	0.733	61.5	18			
5.	150	302	8.5	17.8	0.750	57.2	19			
6.	175	347	8.6	26.4	0.767	53.0	20			
7.	200	392	7.7	34.1	0.783	49.2	22			
8.	225	437	6.9	41.0	0.796	46.3	22			
9.	250	482	7.0	48.0	0.810	43.2	23			
10.	275	527	8.5	56.5	0.824	40.2	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.7	61.2	0.836	37.8	27		40	20
12.	225	437	6.2	67.4	0.844	36.2	27		47	40
13.	250	482	5.2	72.6	0.855	34.0	29		60	60
14.	275	527	5.1	77.7	0.866	31.9	31		90	75
15.	300	572	6.3	84.0	0.876	30.0	33		157	95
Residuum			15.3	99.3	-	-				

Carbon residue of residuum: 5.3% Carbon residue of crude: 0.8%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	2.4	0.709	68.1	
Total gasoline and naphtha	34.1	0.755	55.9	
Kerosine distillate	22.4	0.811	43.0	
Gas oil	9.0	0.839	37.2	
Nonviscous lubricating distillate	10.6	0.846-0.868	35.8-31.5	50-100
Medium lubricating distillate	7.9	0.868-0.882	31.5-28.9	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	15.3			
Distillation loss	0.7			

Remarks: The sample as received contained 0.01% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5540

FIELD: Tilbury East

POOL:

ZONE: Guelph

Well Name: Composite Sample: Tilbury East Field
Location: Glenwood, Tilbury East Twp., Kent County
Interval tested, depth, feet: -
Producing Zone: Guelph
Geological Age: Middle Silurian

Province: Ontario
Sample From: Imperial Oil Ltd.

Date Sampled: October 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.844
Sulphur, percent by weight: 0.49
Saybolt Universal Viscosity:
at 70°F., sec. 74
at 100°F., sec. 54

A.P.I. gravity at 60°F.: 36.1
Pour point, °F.: 30
Colour: Brownish Green
Carbon residue, percent by weight: 1.1
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 752 mm. Hg.
First drop, 65°C. (149°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.4	0.4)						
4.	125	257	0.3	0.7)	0.735	61.0	-			
5.	150	302	1.4	2.1	0.749	57.4	18			
6.	175	347	4.4	6.5	0.765	53.5	19			
7.	200	392	5.9	12.4	0.776	50.8	18			
8.	225	437	8.2	20.6	0.789	47.8	19			
9.	250	482	8.9	29.5	0.803	44.7	20			
10.	275	527	9.9	39.4	0.816	41.9	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.6	45.0	0.829	39.2	24		40	20
12.	225	437	9.5	54.5	0.836	37.8	23		45	55
13.	250	482	8.5	63.0	0.847	35.6	25		58	60
14.	275	527	5.7	68.7	0.858	33.4	27		84	80
15.	300	572	6.7	75.4	0.868	31.5	29		131	95
Residuum			24.6	100.0						

Carbon residue of residuum: 4.3% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.4	-	-	
Total gasoline and naphtha	12.4	0.767	53.0	
Kerosine distillate	27.0	0.804	44.5	
Gas oil	14.0	0.833	38.4	
Nonviscous lubricating distillate	14.5	0.840-0.861	36.9-32.8	50-100
Medium lubricating distillate	7.5	0.861-0.873	32.8-30.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	24.6	-	-	
Distillation loss	0.0			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 5527

FIELD: Wallacetown

POOL:

ZONE: Columbus

Well Name: Lidster No. 1
Location: Lot 14, Con. XI, Dunwich Twp, Elgin County
Interval tested, depth, feet: 305
Producing Zone: Columbus
Geological Age: Middle Devonian

Province: Ontario
Sample From: G.H. Lidster
Date Sampled: December 1927
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.837
Sulphur, percent by weight: 0.90
Saybolt Universal Viscosity:
at 70°F., sec. 64
at 100°F., sec. 50

A.P.I. gravity at 60°F.: 37.6
Pour point, °F.: Below 0
Colour: Brownish Green
Carbon residue, percent by weight: 1.2 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 764 mm. Hg.
First drop, 35°C. (95°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.5	0.5)						
2.	75	167	1.6	2.1)	0.666	81.0	-			
3.	100	212	3.5	5.6	0.710	67.8	17			
4.	125	257	6.3	11.9	0.732	61.8	18			
5.	150	302	5.4	17.3	0.751	56.9	19			
6.	175	347	5.6	22.9	0.769	52.5	21			
7.	200	392	5.1	28.0	0.787	48.3	23			
8.	225	437	4.7	32.7	0.802	44.9	25			
9.	250	482	5.5	38.2	0.812	42.8	24			
10.	275	527	6.8	45.0	0.824	40.2	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	2.9	47.9	0.837	37.6	28		40	25
12.	225	437	6.5	54.4	0.844	36.2	27		45	40
13.	250	482	6.0	60.4	0.854	34.2	28		56	60
14.	275	527	5.5	65.9	0.864	32.3	30		78	75
15.	300	572	6.1	72.0	0.874	30.4	32		121	85
Residuum			26.9	98.9						

Carbon residue of residuum: 4.6% Carbon residue of crude: 1.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.6	0.693	72.7	
Total gasoline and naphtha	28.0	0.745	58.4	
Kerosine distillate	17.0	0.814	42.3	
Gas oil	9.0	0.841	36.7	
Nonviscous lubricating distillate	12.1	0.848-0.869	35.4-31.3	50-100
Medium lubricating distillate	5.9	0.869-0.879	31.3-29.5	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	26.9	-	-	
Distillation loss	1.1			

OIL FIELD DATA

Field and Pool: Wanstead

Location: Lambton County, Enniskillen & Brooke Twps.

DISCOVERY DETAILS

Method; Gravity and Subsurface Geology

Well: Name: Roth & Roth No. 1 - R. Capes No. 1-3 (Lot 1, Con. XIV, Brooke)

Completed: May 15, 1958

Perforated: Open Hole (2015-2025)

Treatment: Sand Fracture

Initial Potential: 50 BOPD (Abandoned after Fracture)

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 37

Regional Setting: This field is situated 16 miles due east of Sarnia, within the pinnacle reef belt.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 4

Producing Oil: 3

Well Spacing: 25 Acres; Pattern: Centre

Logging Practice: Nil

Completion Practice: 10" casing to 50'; 8 5/8" to 400'; 7" to 1100'; 5" to 1900'; Open Hole, Sand Fracture

RESERVOIR DATA

Type of Drive: Water Drive

Estimated Oil in Place: 1,600,000 S.T.bbls (460 bbls/acre-foot)

Estimated Recoverable Oil: 450,000 S.T.bbls (128 bbls/acre-foot)

Oil Zone Thickness: Maximum: 37'; Average: 25'

Porosity: 8% (est.)

Area: 140 (approx.) Acres

Oil Characteristics: Gravity; 36.5 °API

PRODUCTION

Operating: (1966): 28,936 b/yr Cumulative Production: 357,244 b

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

OIL FIELD DATA

Field and Pool: Warwick

Location: Lambton County, Warwick Twp.

DISCOVERY DETAILS

Method: Gravity

Well: Name: Imperial 384 - Hollingsworth No. 1 (Lot 12, Con. III)

Completed: June 25, 1953

Perforated: (Tools Remained in Hole - Abandoned)

Treatment: Nil

Initial Potential: 30 BOPD at 1831'

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Oil (Dundee); Gas (Guelph)

Trap Type: Pinnacle Reef

Lithology: Dolomite

Maximum Reservoir Thickness: 70'

Regional Setting: This pool is situated 25 miles east of Sarnia and within the Silurian Pinnacle Reef Belt.

Deepest Formation Penetrated: Clinton (Silurian)

DEVELOPMENT DATA

Total Wells: Completed Oil: 4; Gas: 2

Producing Oil: 3

Well Spacing: 25 Acres

Logging Practice: Radioactivity, Guard

Completion Practice: 13 3/8" to 50'; 10 3/4" to 400'; 8 5/8" to 1100'; 5½" to 2000', Open Hole - Acidized

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 1,228,000 S.T.bbls

Estimated Recoverable Oil: 550,000 S.T.bbls

Oil Zone Thickness: Maximum: 66 est.; Average: 35 est.

Gas Zone Thickness: Maximum: 70

Porosity: 5.3%; Permeability: 15 md (2500 md range)

Area: 50 Acres

Oil Characteristics: Gravity: 29 °API

Initial Solution GOR: 208 cu.ft/bbl

Pressure Maintenance or Secondary Recovery: Secondary Recovery

PRODUCTION

Operating: (1966): 25,229 b/yr

Cumulative Production: 495,643 b

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Warwick

2) Pool: Warwick Guelph Oil Pool

3) Province: Ontario

4) Location: Lambton County, Warwick Twp.

5) Operator: Imperial Oil Limited

6) Project: Warwick Unit

7) Reservoir: Guelph - Lockport, Silurian

8) Discovery Date: August 1953

9) Date Injection Began: October 1962

10) Main Structural Feature: Reef and Average Flank Dip 21°

11) Gas Cap: Originally: Yes; At Present: Yes

12) Time Required for Initial Results: 5 Months

13) Initial Results on Production: Early Water Breakthrough

14) Main Drive in Primary Production: Solution Gas

15) Productive Area of Reservoir: 50 Acres; Of Project: 50 Acres;
Affected by Injection: Suspended

16) Average Depth to Top of Pay: 1660 feet

17) Average Effective Thickness: 70 feet (est.)

18) Average Porosity: 5.3% (est.)

19) Average Horizontal Permeability and Range: 15 md (est.); (2500 md range)

20) Connate Water: 20% (est.) of Pore Space

21) Viscosity at Initial Reservoir Conditions: 6 Centipoises

22) API Gravity: 29

23) Solution Gas/Oil Ratio at Saturation Pressure: 208 cu.ft./bbl

24) Bubble Point Pressure: 1065 psig

25) Original Pressure: 1065 psig

26) Reservoir Pressure at Start of Injection: 300 psig (est.)

27) Latest Reservoir Pressure: Not Available

28) Injection Fluid: Water

29) Injection Fluid Source: Subsurface Detroit River Formation

30) System: Closed

31) Fluid Treatment before Injection: Flocculator, scale and corrosion inhibitor, filter.

32) Injection Pattern: Single Well

33) Structural Position Injection Wells: Edge well below WOC

34) Distance Injection Wells to Producers: 1000 feet

35) Number of Injection Wells at Start: 1

36) Number of Injection Wells at Present: Suspended

37) Average Daily Injection Rate per Injection Well at Start: 550 bbl

38) Average Daily Injection Rate per Injection Well at Present: Suspended

39) Average Injection Pressure at Start: 1250 psig WH

40) Average Injection Pressure at Present: Suspended

41) Number of Producing Wells in Project Area at Start: 3

42) Number of Producing Wells in Project Area at Present: 3

43) Average Production Rate in Project Area at Start: 180 BPD

44) Average Production Rate in Project Area at Present: 94 BPD (August 1965)

45) Original Oil in Place in Project Area: -- 1,228,000 (est.) bbl

46) Original Oil Saturation (% of Pore Space): 80% (est.)

47) Primary Recovery from Project Area when Injection Started: 320,000 bbl

48) Oil Saturation at Start of Project: Not Available

49) Oil Production from Project Area from Start of Injection to Now: 145,000 (At the end of August 1965)

50) Total Volume of Injected Fluids at Present: 56,000 - terminated 1963

51) Estimated Increase in Ultimate Recovery from Project Area: None

52) Well Spacing: 20 Acres

53) Oil Volume Factor (Initial reservoir barrels per Stock Tank barrel): 1.068

54) Remarks: Injection was terminated in 1963, after only 56,000 bbl. of water had been injected, due to premature water breakthrough.

CRUDE PETROLEUM ANALYSIS

Laboratory Number 647

FIELD: Watford

POOL:

ZONE: Dundee

Well Name: Discovery No. 1
Location: Lot 23, Con. V, Warwick Twp., Lambton County
Interval tested, depth, feet: 480
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Ontario Department of Mines
Date Sampled: December 7, 1938
Sampled at: Well

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.830
Sulphur, percent by weight: 0.75
Saybolt Universal Viscosity:
at 70°F., sec. 55
at °F., sec.

A.P.I. gravity at 60°F.: 39.0
Pour point, °F.: Below -35
Colour: Dark Green
Carbon residue, percent by weight: 1.0
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 758 mm. Hg.
First drop, 28°C. (82°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.3	0.3	0.662	82.3	-			
2.	75	167	3.5	3.8	0.682	76.0	13			
3.	100	212	3.7	7.5	0.716	66.1	19			
4.	125	257	3.5	11.0	0.733	61.5	18			
5.	150	302	6.9	17.9	0.748	57.7	18			
6.	175	347	6.1	24.0	0.766	53.2	20			
7.	200	392	5.4	29.4	0.782	49.5	21			
8.	225	437	6.0	35.4	0.796	46.3	22			
9.	250	482	5.5	40.9	0.809	43.4	23			
10.	275	527	7.2	48.1	0.819	41.3	23			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.4	52.5	0.830	39.0	24		39	15
12.	225	437	5.7	58.2	0.838	37.4	24		45	45
13.	250	482	5.2	63.4	0.850	35.0	27		56	55
14.	275	527	5.4	68.8	0.859	33.2	28		75	70
15.	300	572	6.3	75.1	0.870	31.1	30		122	80
Residuum			23.6	98.7	0.916	23.0				

Carbon residue of residuum: 4.4% Carbon residue of crude: 1.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	7.5	0.698	71.2	
Total gasoline and naphtha	29.4	0.743	58.9	
Kerosine distillate	18.7	0.809	43.4	
Gas oil	9.8	0.834	38.2	
Nonviscous lubricating distillate	11.3	0.844-0.865	36.2-32.1	50-100
Medium lubricating distillate	5.9	0.865-0.876	32.1-30.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.6	0.916	23.0	
Distillation loss	1.3			

Remarks: The sample as received contained 0.6% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 648

FIELD: Watford

POOL:

ZONE: Dundee

Well Name: S. Burchell Farm No. 1
Location: Lot 27, Con. V, Warwick Twp., Lambton County
Interval tested, depth, feet: 375
Producing Zone: Dundee
Geological Age: Middle Devonian

Province: Ontario
Sample From: Ontario Department of Mines
Date Sampled: December 7, 1938
Sampled at: Well

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.813
Sulphur, percent by weight: 0.70
Saybolt Universal Viscosity:
at 70°F., sec. 44
at °F., sec.

A.P.I. gravity at 60°F.: 42.6
Pour point, °F.: Below -35
Colour: Dark Green
Carbon residue, percent by weight: 0.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 763 mm. Hg.
First drop, 28°C. (82°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	2.3	2.3	0.637	90.6	-			
2.	75	167	2.8	5.1	0.665	81.3	5			
3.	100	212	4.8	9.9	0.698	71.2	11			
4.	125	257	7.1	17.0	0.726	63.4	15			
5.	150	302	6.3	23.3	0.746	58.2	17			
6.	175	347	5.6	28.9	0.764	53.7	19			
7.	200	392	5.7	34.6	0.779	50.1	20			
8.	225	437	5.3	39.9	0.792	47.2	20			
9.	250	482	5.7	45.6	0.805	44.3	21			
10.	275	527	6.3	51.9	0.816	41.9	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	4.9	56.8	0.828	39.4	23		38	15
12.	225	437	4.6	61.4	0.836	37.8	23		44	40
13.	250	482	5.3	66.7	0.848	35.4	26		54	55
14.	275	527	4.5	71.2	0.859	33.2	28		75	70
15.	300	572	4.7	75.9	0.870	31.1	30		118	80
Residuum			22.4	98.3	0.916	23.0				

Carbon residue of residuum: 4.1% Carbon residue of crude: 0.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	9.9	0.674	78.4	
Total gasoline and naphtha	34.6	0.730	62.3	
Kerosine distillate	17.3	0.805	44.3	
Gas oil	10.1	0.832	38.6	
Nonviscous lubricating distillate	9.7	0.843-0.866	36.4-31.9	50-100
Medium lubricating distillate	4.2	0.866-0.876	31.9-30.0	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	22.4	0.916	23.0	
Distillation loss	1.7			

Remarks: The sample as received contained a trace of water and sediment (by centrifuge).

OIL FIELD DATA

Field and Pool: West Becher

Location: Lambton County, Sombra Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Bechard No. 1

Completed: February 5, 1946

Perforated: Open Hole (1827'-1990')

Treatment: Acidized (1824'-1851')

Initial Potential: 5 BOPD to 30 BOPD

GEOLOGY

Producing Zone(s): Salina-Guelph (Silurian)

Trap Type: Anticlinal (flank dip 48'/mile to the West)

Lithology: Dolomite. Maximum Reservoir Thickness: 30'

Regional Setting: This field is located 3 miles east of Port Lambton on the St. Clair River

Deepest Formation Penetrated: Silurian

DEVELOPMENT DATA

Total Wells: Completed Oil: 37; Gas: 14; Dry and Abandoned: 25
Producing Oil: 32; Injection or Disposal: Water: 10

Well Spacing: 20 Acres

Logging Practice: Radioactivity and Density

Completion Practice: 10 3/4" casing to 100'; 8 5/8" to 500'; 7" to 1160'; 4 1/2" to 1900' - acidized, or perforated and acidized

RESERVOIR DATA

Type of Drive: Solution Gas

Estimated Oil in Place: 7,600,000 S.T.bbls

Estimated Recoverable Oil: 2,000,000 S.T.bbls

Oil Zone Thickness: Maximum: 30'; Average: 11'

Porosity: 12.5%; Permeability: Up to 50 md.; Area: 2,400 Acres

Oil Characteristics: Gravity: 37.7 °API; Initial Solution GOR: 335

Pressure Maintenance or Secondary Recovery: Secondary Recovery Unit

PRODUCTION

Operating: (1966): 78,531 b/yr

Cumulative Production: 1,272,763 bbls

Market Outlet: Imperial Oil Refinery (trucked)

Bibliographical Reference: Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Paper 65-30 (1966).

SECONDARY RECOVERY

RESERVOIR DATA

1) Field: Becher

2) Pool: Becher A-1

3) Province: Ontario

4) Location: Lambton County, Sombra Twp.

5) Operator: Imperial Oil Limited

6) Project: West Becher Unit

7) Reservoir: A-1 Unit, Salina, Silurian

8) Discovery Date: February 5, 1946 (Bechard No. 1)

9) Date Injection Began: Pilot Area: January 1957
Main Area: February 27, 1964

10) Main Structural Feature: Anticline and average flank dip 48 ft/mile westerly

11) Gas Cap: Originally: Yes (non-communicating); At Present: No

12) Time Required for Initial Results: 13 Months

13) Initial Results on Production: Rates increased from 5 BOPD to 30 BOPD, GOR dropped

14) Main Drive in Primary Production: Solution Gas

15) Productive Area (Acres) of Project: 1077; Affected by Injection: 1077

16) Average Depth to Top of Pay (feet): 1900

17) Average Effective Thickness (feet): 10.3

18) Average Porosity: 12.5% (estimated)

19) Average Horizontal Permeability and Range in Brackets: low (up to 50 md)

20) Connate Water (% of Pore Space): 15% (estimated)

21) Viscosity at Initial Reservoir Conditions (Centipoises) : 2 (estimated)

22) API Gravity: 38°

23) Solution Gas/Oil Ratio at Saturation Pressure (cu.ft./bbl): Approx. 335

24) Bubble Point Pressure: 920 psig

25) Original Pressure: 920 psig

26) Reservoir Pressure at Start of Injection (psi): 300 (estimated)

27) Latest Reservoir Pressure: 300 psi (estimated) (1965)

28) Injection Fluid: Surface, Subsurface and Produced Water

29) Injection Fluid Source: Sydenham River, Detroit River Formation, A-1 Produced Water

30) System: One Open, One Closed

31) Fluid Treatment Before Injection: Chlorine, biocide, corrosion inhibitor, coagulant, filtered

32) Injection Pattern: Irregular

33) Structural Position Injection Wells: Oil Zone

34) Distance Injection Wells to Producers (feet): Approx. 1000 ft.

35) Number of Injection Wells at Start: Pilot - 2, Total - 10

36) Number of Injection Wells at Present: 10 (September 1, 1965)

37) Average Daily Injection Rate per Injection Well at Start: 250 BPD

38) Average Daily Injection Rate per Injection Well at Present: 200 BPD

39) Average Injection Pressure at Start (psi): 800

40) Average Injection Pressure at Present (psi): 1225 (September 1, 1965)

41) Number of Producing Wells in Project Area at Start: 32

42) Number of Producing Wells in Project Area at Present: 24 (September 1, 1965)

43) Average Production Rate in Project Area at Start: 40 BPD

44) Average Production Rate in Project Area at Present: 130 (September 1, 1965)

45) Original Oil in Place in Project Area (bbl): 7.6×10^6 stb

46) Original Oil Saturation (% of Pore Space): 85

47) Primary Recovery from Project Area when Injection Started: 738,000 bbl

48) Oil Production from Project Area from Start of Injection to Now (bbl): 363,000 (July 1, 1965)

49) Total Volume of Injected Fluids at Present (bbl): 1,225,988 (June 30, 1965)

50) Estimated Primary Ultimate Recovery from Project Area (bbl): 840,000

51) Estimated Increase in Ultimate Recovery from Project Area (bbl): 1,822,000

52) Well Spacing: 20 Acres

53) Oil Volume Factor (Initial Reservoir bbl per Stock Tank barrel): 1.163

CRUDE PETROLEUM ANALYSIS

Laboratory Number 7933

FIELD: West Becher

POOL:

ZONE: Salina

Well Name: Becher No. 4
Location: Lot 10, Con. VI, Sombra Twp., Lambton County
Interval tested, depth, feet: 1885
Producing Zone: Salina
Geological Age: Upper Silurian

Province: Ontario
Sample From: Division of Fuels, Ottawa
Date Sampled: September 12, 1949
Sampled at: Wellhead

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.850
Sulphur, percent by weight: 0.92
Saybolt Universal Viscosity:
at 70°F., sec. 58
at 100°F., sec. 45

A.P.I. gravity at 60°F.: 35.0
Pour point, °F.: 30
Colour: Dark Green
Carbon residue, percent by weight: 1.9 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 763 mm. Hg.
First drop, 36°C. (97°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	0.5	0.5)						
2.	75	167	0.8	1.3)	0.666	81.0	-			
3.	100	212	2.0	3.3	0.709	68.1	16			
4.	125	257	4.0	7.3	0.739	60.0	21			
5.	150	302	6.7	14.0	0.768	52.7	27			
6.	175	347	6.3	20.3	0.788	48.1	30			
7.	200	392	6.1	26.4	0.802	44.9	31			
8.	225	437	5.2	31.6	0.813	42.6	30			
9.	250	482	5.9	37.5	0.821	40.9	29			
10.	275	527	5.9	43.4	0.832	38.6	29			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	3.7	47.1	0.846	35.8	32		39	20
12.	225	437	5.8	52.9	0.850	35.0	30		43	40
13.	250	482	6.7	59.6	0.857	33.6	30		53	65
14.	275	527	6.5	66.1	0.864	32.3	30		73	85
15.	300	572	6.8	72.9	0.878	29.7	34		115	100
Residuum			26.6	99.5	0.941	18.9				

Carbon residue of residuum: 7.0% Carbon residue of crude: 1.9%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	3.3	0.692	73.0	
Total gasoline and naphtha	26.4	0.767	53.0	
Kerosine distillate	11.1	0.817	41.7	
Gas Oil	16.9	0.843	36.4	
Nonviscous lubricating distillate	12.7	0.855-0.873	34.0-30.6	50-100
Medium lubricating distillate	5.8	0.873-0.885	30.6-28.4	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	26.6	0.941	18.9	
Distillation loss	0.5			

Remarks: The sample as received contained no water (A.S.T.M.)

OIL FIELD DATA

Field and Pool: Wheatley

Location: Kent County, Romney Twp.

DISCOVERY DETAILS

Method: Non-Technical

Well: Name: Lot 11; Con II

Completed: 1902

Perforated: Open Hole (1290'-1300')

Initial Potential: 10 BOPD

GEOLOGY

Producing Zone(s): Guelph (Silurian)

Other Shows: Unknown

Trap Type: Erosional Remnant

Lithology: Dolomite

Maximum Reservoir Thickness: Unknown

Regional Setting: This field is situated on the N.W. flank of the Tilbury Field. (Abandoned in 1919)

DEVELOPMENT DATA

Total Wells: Completed Oil: 4

Producing Oil: Nil

Logging Practice: Nil

Completion Practice: Unknown

RESERVOIR DATA

Type of Drive: Water Drive (?)

Estimated Recoverable Oil: 9100 S.T.bbls

Area: 60 Acres

PRODUCTION

Cumulative Production: 9100 bbls

Bibliographical References: Caley, J.F., "Paleozoic Geology Windsor-Sarnia Area, Ontario", Geol. Surv. Can. Memoir 240 (1945).

Koepke, W.E. and Sanford, B.V., "Silurian Oil and Gas Fields, Southwestern Ontario", Geol. Surv. Can. Memoir 240 (1945)

OIL FIELD DATA

Field and Pool: Willey (north and south)

Location: Elgin County, Dunwich Twp; and Middlesex County, Ekfrid Twp.

DISCOVERY DETAILS

Method: Subsurface Geology

Well: Name: Bluewater - et al Dunwich (Lot 16, Con. I)

Completed: January 9, 1964

Perforated: Open Hole (3601-3607)

Treatment: Fractured at 3580'-3607' with 3150 gals. crude, 400 lbs. 20/40 sand, 500 lbs. 8-12 hulls and 250 gals. 15% N.E. Acid

Initial Potential: 30 BOPD; 42 MCF/d Gas

Well: S.E. Pool - (March 23, 1965; Imp. Bluewater-Dunwich 22-II @ 240 BOPD)

GEOLOGY

Producing Zone(s): Cambrian

Other Shows: Gas Salina (Silurian)

Trap Type: Structural

Lithology: Dolomitic Sandstone

Maximum Reservoir Thickness: 10'

Regional Setting: This field is composed of 2 separate pools, separated by a fault system. It is situated south of the Thames River, 11 miles north of Lake Erie.

Deepest Formation Penetrated: Precambrian

DEVELOPMENT DATA

Total Wells: Completed Oil: 13; Dry and Abandoned: 5

Producing Oil: 10; Suspended Oil: 3

Well Spacing: 100 Acres; Pattern: Odd

Logging Practice: Radioactivity and Density

Completion Practice: 13 3/8" casing to 240'; 10 3/4" to 400'; 8 5/8" to 1100'; 4½" to 3650'; 2 3/8" to 3600'; perforated, acidized, and sand fractured

RESERVOIR DATA

Type of Drive: Solution Gas and Minor Water Drive

Estimated Oil in Place: 4,200,000 S.T.bbls

Estimated Recoverable Oil: 930,000 S.T.bbls

Oil Zone Thickness: Average: 8-10'

Porosity: 8%; Permeability: 12.3 md

Area: 900 Acres

Oil Characteristics: (N.W. Pool) Gravity: 39.6 °API; Sulphur: 0.19%
Pour Point: 15°F; Initial Solution GOR: 360 cu.ft./b (est.)

PRODUCTION

Operating: (1966): 139,999 bbl/yr

Cumulative Production: 217,955 bbls

Market Outlet: Imperial Oil Refinery (trucked)

CRUDE PETROLEUM ANALYSIS

Laboratory Number 7405

FIELD: Other Areas: Not Defined

POOL:

ZONE:

Well Name: Oil Seepage
Location: Southeast of Collingwood, Simcoe County
Interval tested, depth, feet: -
Producing Zone: -
Geological Age: -

Province: Ontario
Sample From: R. Cherry, Collingwood

Date Sampled: August, 1930
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.838
Sulphur, percent by weight: 0.15
Saybolt Universal Viscosity:
at °F., sec. -
at °F., sec.

A.P.I. gravity at 60°F.: 37.3
Pour point, °F.: -
Colour: Brownish Green
Carbon residue, percent by weight: 1.1
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 748 mm. Hg.
First drop, 65°C. (149°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	-							
2.	75	167	0.4	0.4	0.670	79.7	-			
3.	100	212	0.5	0.9	0.721	64.8	22			
4.	125	257	0.9	1.8	0.737	60.5	20			
5.	150	302	3.6	5.4	0.757	55.4	22			
6.	175	347	5.9	11.3	0.770	52.3	22			
7.	200	392	5.4	16.7	0.782	49.5	21			
8.	225	437	7.0	23.7	0.794	46.7	21			
9.	250	482	7.9	31.6	0.807	43.8	22			
10.	275	527	9.5	41.1	0.817	41.7	22			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	8.7	49.8	0.831	38.8	25		40	30
12.	225	437	9.6	59.4	0.838	37.4	24		47	50
13.	250	482	7.9	67.3	0.849	35.2	26		57	65
14.	275	527	7.6	74.9	0.858	33.4	27		80	80
15.	300	572	6.9	81.8	0.870	31.1	30		129	90
Residuum			17.8	99.6						

Carbon residue of residuum: 6.1% Carbon residue of crude: 1.1%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.9	0.700	70.6	
Total gasoline and naphtha	16.7	0.765	53.5	
Kerosine distillate	24.4	0.807	43.8	
Gas oil	16.0	0.834	38.2	
Nonviscous lubricating distillate	17.0	0.841-0.863	36.8-32.5	50-100
Medium lubricating distillate	7.7	0.863-0.875	32.5-30.2	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	17.8			
Distillation loss	0.4			

CRUDE PETROLEUM ANALYSIS

Laboratory Number 676

FIELD: Other Areas: Not Defined

POOL:

ZONE: Trenton

Well Name: J. Marshall Farm No. 3
Location: Lot 44, Con. I, Assiginack Twp., Manitoulin County
Interval tested, depth, feet: 453-471
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Ontario Department of Mines

Date Sampled: December 21, 1938
Sampled at:

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.847
Sulphur, percent by weight: 0.24
Saybolt Universal Viscosity:
at 70°F., sec. 59
at °F., sec.

A.P.I. gravity at 60°F.: 35.6
Pour point, °F.: Below -35
Colour: Dark Green
Carbon residue, percent by weight: 1.6 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 761 mm. Hg.
First drop, 30°C. (86°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122	1.1	1.1)						
2.	75	167	1.3	2.4)	0.672	79.1	-			
3.	100	212	2.1	4.5	0.723	64.2	23			
4.	125	257	3.4	7.9	0.743	58.9	23			
5.	150	302	4.7	12.6	0.759	54.9	23			
6.	175	347	4.5	17.1	0.774	51.3	23			
7.	200	392	4.2	21.3	0.791	47.4	25			
8.	225	437	5.5	26.8	0.802	44.9	25			
9.	250	482	6.4	33.2	0.814	42.3	25			
10.	275	527	7.7	40.9	0.823	40.4	25			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	8.0	48.9	0.836	37.8	27		39	15
12.	225	437	7.3	56.2	0.846	35.8	28		45	40
13.	250	482	6.6	62.8	0.860	33.0	31		57	55
14.	275	527	6.1	68.9	0.874	30.4	35		82	70
15.	300	572	6.6	75.5	0.888	27.9	38		151	75
Residuum			23.5	99.0	0.946	18.1				

Carbon residue of residuum: 6.8% Carbon residue of crude: 1.6%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	4.5	0.696	71.8	
Total gasoline and naphtha	21.3	0.753	56.4	
Kerosine distillate	19.6	0.814	42.3	
Gas oil	14.5	0.840	37.0	
Nonviscous lubricating distillate	12.1	0.852-0.877	34.6-29.9	50-100
Medium lubricating distillate	8.0	0.877-0.895	29.9-26.6	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	23.5	0.946	18.1	
Distillation loss	1.0			

Remarks: The sample as received contained 0.2% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 2309

FIELD: Other Areas: Not Defined

POOL:

ZONE: Trenton

Well Name: Richard Currie Farm
Location: Lot 33, Con. XII, Nottawasaga Twp, Simcoe County
Interval tested, depth, feet: -
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: Natural Gas Commissioner, Ontario Dept. of Mines
Date Sampled: November 6, 1940
Sampled at: Well

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.826
Sulphur, percent by weight: 0.15
Saybolt Universal Viscosity:
at 70°F., sec. 41
at °F., sec.

A.P.I. gravity at 60°F.: 39.8
Pour point, °F.: 50
Colour: Dark Green
Carbon residue, percent by weight: 0.3 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 770 mm. Hg.
First drop, 70°C. (158°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	0.9	0.9	0.701	70.4	12			
4.	125	257	1.6	2.5	0.729	62.6	17			
5.	150	302	4.5	7.0	0.748	57.7	18			
6.	175	347	5.4	12.4	0.763	54.0	18			
7.	200	392	6.4	18.8	0.776	50.9	18			
8.	225	437	7.6	26.4	0.790	47.6	19			
9.	250	482	7.3	33.7	0.801	45.2	19			
10.	275	527	10.3	44.0	0.814	42.3	21			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	9.6	53.6	0.828	39.4	23		39	25
12.	225	437	10.3	63.9	0.836	37.8	23		45	45
13.	250	482	7.3	71.2	0.845	36.0	24		54	60
14.	275	527	8.1	79.3	0.853	34.4	25		73	80
15.	300	572	6.9	86.2	0.863	32.5	27		116	90
Residuum			13.6	99.8	0.899	25.9				

Carbon residue of residuum: 2.5% Carbon residue of crude: 0.3%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	0.9	0.701	70.4	
Total gasoline and naphtha	18.8	0.758	55.2	
Kerosine distillate	25.2	0.803	44.7	
Gas oil	20.0	0,832	38.6	
Nonviscous lubricating distillate	16.0	0.841-0.859	36.8-33.2	50-100
Medium lubricating distillate	6.2	0.859-0.867	33.2-31.7	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	13.6	0.899	25.9	
Distillation loss	0.2			

Remarks: The sample as received contained 0.05% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 3148

FIELD: Other Areas: Not Defined

POOL:

ZONE: Trenton

Well Name: George McIvor No. 1
Location: Lot 12, Con. VI, Sheguiandah Twp., Manitoulin County
Interval tested, depth, feet: 517-531
Producing Zone: Trenton
Geological Age: Middle Ordovician

Province: Ontario
Sample From: E.R. Morris, Little Current

Date Sampled: February 26, 1942
Sampled at: Well

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.869
Sulphur, percent by weight: 0.30
Saybolt Universal Viscosity:
at 70°F., sec. 105
at 100°F., sec. 66

A.P.I. gravity at 60°F.: 31.3
Pour point, °F.: 15
Colour: Brownish Green
Carbon residue, percent by weight: 2.2 (Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 730 mm. Hg.
First drop, 66°C. (151°F.)

Fraction No.	Cut at °C.	Cut at °F.	Per Cent	Sum Per Cent	Specific Gravity 60°F.	Degrees A.P.I. 60°F.	Correlation Index	Aniline Point, °C.	Viscosity S.U. 100°F.	Cloud Test, °F.
1.	50	122								
2.	75	167								
3.	100	212	1.1	1.1	0.720	65.0	-			
4.	125	257	1.6	2.7	0.746	58.2	25			
5.	150	302	2.7	5.4	0.765	53.5	26			
6.	175	347	3.3	8.7	0.780	49.9	26			
7.	200	392	4.6	13.3	0.795	46.5	27			
8.	225	437	5.3	18.6	0.807	43.8	27			
9.	250	482	7.7	26.3	0.818	41.5	27			
10.	275	527	8.2	34.5	0.828	39.4	27			
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	200	392	5.0	39.5	0.840	37.0	29		40	20
12.	225	437	9.1	48.6	0.846	35.8	28		45	40
13.	250	482	8.1	56.7	0.862	32.7	32		54	55
14.	275	527	6.6	63.3	0.875	30.2	35		86	70
15.	300	572	7.7	71.0	0.887	28.0	38		152	85
Residuum			28.7	99.7	0.949	17.6				

Carbon residue of residuum: 7.5% Carbon residue of crude: 2.2%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	1.1	0.720	65.0	
Total gasoline and naphtha	13.3	0.773	51.6	
Kerosine distillate	13.0	0.814	42.3	
Gas oil	22.6	0.838	37.4	
Nonviscous lubricating distillate	12.7	0.855-0.878	34.0-29.7	50-100
Medium lubricating distillate	9.4	0.878-0.894	29.7-26.8	100-200
Viscous lubricating distillate	-	-	-	Above 200
Residuum	28.7	0.949	17.6	
Distillation loss	0.3			

Remarks: The sample as received contained 0.1% by vol. water and sediment (by centrifuge).

CRUDE PETROLEUM ANALYSIS

Laboratory Number 304-58

FIELD: Unnamed

POOL:

ZONE: Guelph

Well Name: Capes #2
Location: Lot 1, Con. 14, Brooke Twp., Lambton County
Interval tested, depth, feet: 1990-1995
Producing Zone: Guelph Reef
Geological Age: Silurian

Province: Ontario
Sample From: Ontario Fuel Board

Date Sampled: September 4, 1958
Sampled at: Tank

GENERAL CHARACTERISTICS

Specific gravity at 60°F.: 0.888
Sulphur, percent by weight: 1.15
Saybolt Universal Viscosity:
at 100°F., sec. 84
at 70°F., sec. 142

A.P.I. gravity at 60°F.: 27.8
Pour point, °F.: Below -50
Colour: Brownish Black
Carbon residue, percent by weight: 5.0
(Conradson)

DISTILLATION

(U.S. Bureau of Mines Routine Method)

Stage 1 - Distillation at atmospheric pressure, 754 mm. Hg.
First drop, 32°C. (90°F.)

Fraction No.	Cut at °F.	Sum Per Cent	Specific Gravity 60/60°F.	Degrees A.P.I. °60 F.	Correlation Index	Aniline Point, °C.	Visc. S.U. 100°F.	Cloud Test, °F.	Refractive Index @ 20°C.	Dispersion $(N_F-N_C)\ 10^4$
1.	122	0.8	0.656	84.2	-	-				
2.	167	2.7	0.679	76.9	12					
3.	212	5.4	0.716	66.1	19	53.8				
4.	257	8.8	0.742	59.2	23	51.0				
5.	302	13.0	0.766	53.2	27	46.2				
6.	347	16.8	0.789	47.8	31	44.2				
7.	392	20.6	0.808	43.6	33	44.0				
8.	437	24.3	0.824	40.2	35	48.0				
9.	482	28.6	0.835	38.0	35	51.5				
10.	527	34.6	0.846	35.8	36	56.5				
Stage 2 - Distillation continued at 40 mm. Hg. pressure										
11.	392	37.2	0.858	33.4	37	60.2	39	25		
12.	437	42.2	0.864	32.3	37	65.8	45	45		
13.	482	47.4	0.874	30.4	38	69.7	57	60		
14.	527	53.2	0.886	28.2	40	74.0	85	80		
15.	572	59.4	0.901	25.6	45	77.4	169	95		
Residuum		98.4	0.989	11.6						

Carbon residue of residuum: 11.5% Carbon residue of crude: 5.0%

APPROXIMATE SUMMARY

	Percent by Vol.	Specific Gravity	Degrees A.P.I.	Viscosity S.U. 100°F.
Light gasoline	5.4	0.694	72.4	
Total gasoline and naphtha	20.6	0.755	55.9	
Kerosine distillate	3.7	0.824	40.2	
Gas oil	17.6	0.850	35.0	Below 50
Nonviscous lubricating distillate	9.4	0.868-0.889	31.5-27.7	50-100
Medium lubricating distillate	7.2	0.889-0.906	27.7-24.7	100-200
Viscous lubricating distillate	0.9	0.906-0.909	24.7-24.2	Above 200
Residuum	39.0	0.989	11.6	
Distillation loss	1.6			

Base of Crude Oil: Intermediate (wax bearing).