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Conventional Oil Pools of northeastern British Columbia

Ed Janicki

Tenure and Geoscience Branch

British Columbia Ministry of Natural Gas Development

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CONVENTIONAL OIL POOLS OF NORTHEASTERN BRITISH COLUMBIA

INTRODUCTION

The following pages profile over 100 conventional oil pools¹ selected from the several hundred designated by the Oil and Gas Commission (OGC) of British Columbia (BC). They are generally representative for each field² and oil producing formation within that field. Most of the pools not profiled here are small or have little data. Subsequent versions of this open-file may add some pools and drop others. A complete source of basic information on all fields and pools, for those without access to a commercial petroleum database, can be found at the Government of BC's geospatial information website (<http://geobc.gov.bc.ca>). This information is also housed at the BC Oil and Gas Commission (OGC; <http://bcogc.ca>), which is the regulator of oil and gas activity in the province.

The data, maps and wireline logs shown for each pool are intended to serve as a convenient quick-look, everyday reference for working geologists, engineers or managers. Some interpretive commentary is included to take the user beyond bare facts and draw attention to points of interest. Because this is in an open-file format, future modifications to content or style can be accommodated. We hope that this readily accessed – and low cost – compilation will increase interest on BC's conventional oil pools, and conventional oil in general.

Compilations such as this are selective because by their nature they try to be concise. The primary purpose is to save the user's time. The resulting pages reflect the influences of the author's own experience of what are the most essential characteristics. Suggestions for improvement or addition are certainly welcome.

A FEW COMMENTS ON THE PARAMETERS

Most of the data is taken directly from the OGC, or indirectly from commercial sources. Net pay map contours were drawn by the Oil and Gas Commission, except for a few slight modifications. Based upon interpretation of the data, some numbers, such as porosity, may differ somewhat from those presented by the OGC. Parameters such as trap type and drive mechanism required individual consideration of reservoir characteristics. The recovery factor is often a nominal round figure provided by the operator and based upon the initial expectation of what the pool will produce. Where reserves were calculated using material balance, or production decline, the recovery factor is less often a round figure.

Units of measurement are given in a combination of imperial and metric. Most of BC's conventional oil wells were drilled while imperial measurements were in use; so, for ease of reference to original files, they have been used here as well.

A FEW NOTES ON THE MAPS AND LOGS

Oil wells used to define the pool outlines and the net pay maps are shown in green. Other wells are shown in black. The outline of the pool (as determined by the Ministry of Energy, Mines and Natural Gas) is indicated by red stippled line, except where noted otherwise. In most cases the entire pool does not fit within the limited extent of the figure. That is because pool extent includes space reserved for gas caps or lands deemed to be productive. The reader may notice that some pool wells (in green) fall outside of the pool boundary. This is likely due to delays in updating the pool limits in the OGC's database following new drilling or re-classification of producing zones.

Wherever possible a log duo of induction and neutron-density has been chosen to illustrate characteristics of the pool's reservoir rock. When those logs are not available other forms of resistivity and porosity are shown.

ACKNOWLEDGEMENTS:

Many of the figures were ably done by co-op employee Arend Stamhuis. Dave Richardson of Ministry of Energy, Mines and Natural Gas applied his considerable knowledge of British Columbia's petroleum geology in a detailed review of the content.

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Podruski, J.A., Barclay, J.E., Hamblin, A.P., Lee, P.J., Osadetz, K.G., Procter, R.M., and Taylor, G.C. (1988): Conventional oil resources of western Canada (light and medium), Part 1, Resource endowment. Geological Survey of Canada, Paper 87-26. 149 pages.

Rose, M.L. (editor) 1990. Oil and gas pools of Canada series, Volume 1, 1990, Canadian Society of Petroleum Geologists, un-paginated binder.

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¹Pool: Underground reservoir containing an accumulation of petroleum or natural gas, or both, separated or apparently separated from another reservoir or accumulation.

²Field: The surface area underlaid or appearing to be underlaid by one or more pools, and the subsurface regions vertically beneath that surface area

Petroleum and Natural Gas Act, (RSBC 1996) Chapter 361, Part 1 - Definitions

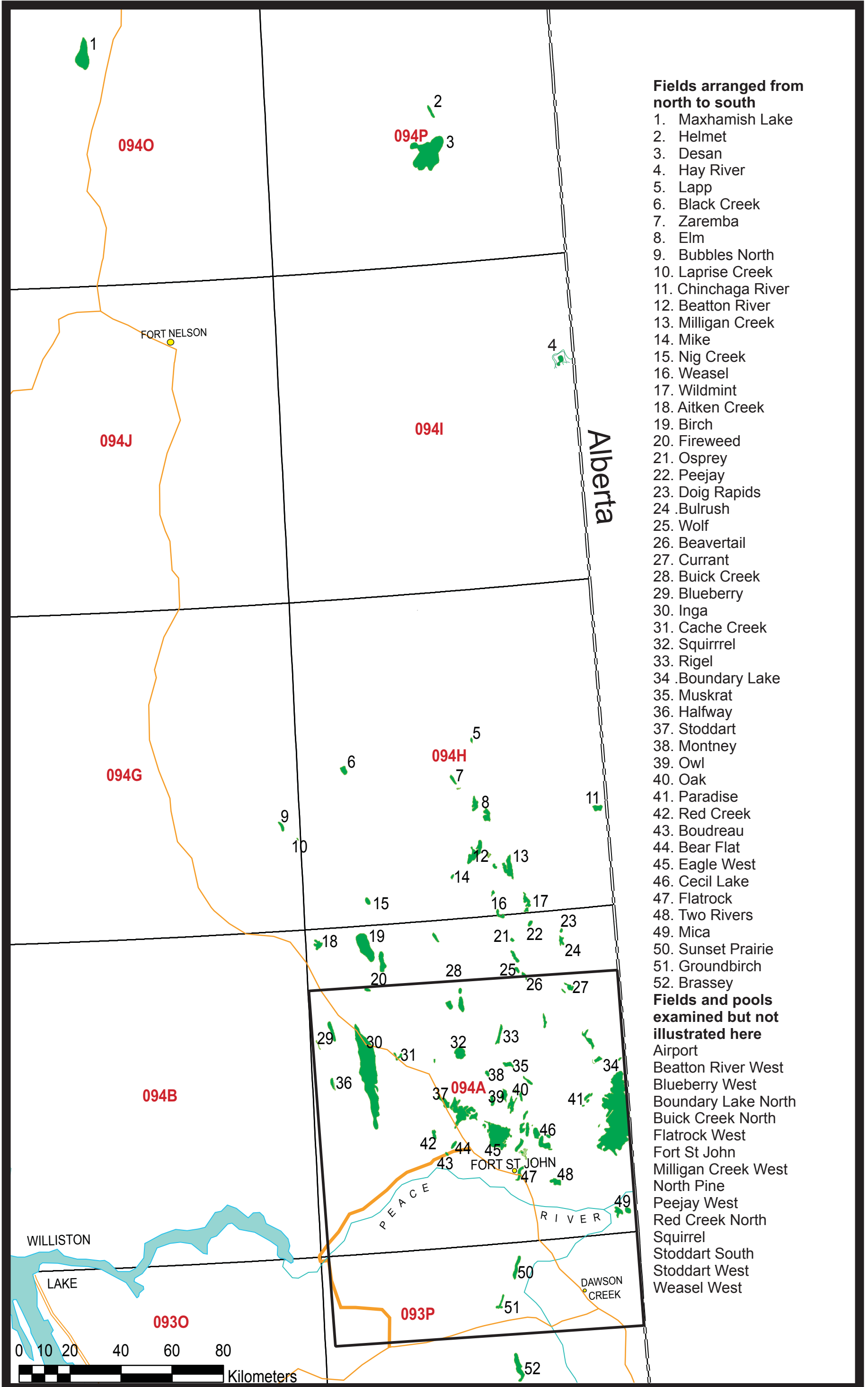
Notes on cross-sections added March 2014

As a follow-up enhancement to the initial release of this open file in 2013, cross-sections have been added for most pools to illustrate the structural position of the producing zone across the pool and how it compares to nearby offsets. The cross-sections might also be used to see variations in rock characteristics across the reservoir.

Some pool profiles –particularly those for single well pools – were not given cross sections. Some pools do not have suitable logs.

The cross-sections are adapted from work done by co-op student Matthew Griffiths.

Conventional Oil Fields Of British Columbia



Fields arranged from north to south

1. Maxhamish Lake
 2. Helmet
 3. Desan
 4. Hay River
 5. Lapp
 6. Black Creek
 7. Zarembo
 8. Elm
 9. Bubbles North
 10. Laprise Creek
 11. Chinchaga River
 12. Beatton River
 13. Milligan Creek
 14. Mike
 15. Nig Creek
 16. Weasel
 17. Wildmint
 18. Aitken Creek
 19. Birch
 20. Fireweed
 21. Osprey
 22. Peejay
 23. Doig Rapids
 24. Bulrush
 25. Wolf
 26. Beavertail
 27. Currant
 28. Buick Creek
 29. Blueberry
 30. Inga
 31. Cache Creek
 32. Squirrel
 33. Rigel
 34. Boundary Lake
 35. Muskrat
 36. Halfway
 37. Stoddart
 38. Montney
 39. Owl
 40. Oak
 41. Paradise
 42. Red Creek
 43. Boudreau
 44. Bear Flat
 45. Eagle West
 46. Cecil Lake
 47. Flatrock
 48. Two Rivers
 49. Mica
 50. Sunset Prairie
 51. Groundbirch
 52. Brassey
- Fields and pools examined but not illustrated here**
- Airport
 - Beatton River West
 - Blueberry West
 - Boundary Lake North
 - Buick Creek North
 - Flatrock West
 - Fort St John
 - Milligan Creek West
 - North Pine
 - Peejay West
 - Red Creek North
 - Squirrel
 - Stoddart South
 - Stoddart West
 - Weasel West

The green shapes on this map show the morphology of oil pools examined in this report. Fifty two fields are depicted. Fifteen additional fields are represented on the following pages, but not shown above.

Conventional Oil Pools of British Columbia

Arranged from north to south

# on map	Field	Pool
1	Maxhamish Lake	Chinkeh A
2	Helmet	Jean Marie K
3	Desan	Pekisko Shunda A
4	Hay River	Bluesky A
5	Lapp	Halfway C
6	Black Creek	Baldonnel A
7	Zarembo	Halfway C A Marker Base of Lime A
8	Elm	Gething B Halfway A
9	Bubbles North	Coplin A
10	Laprise Creek	Coplin B
11	Chinchaga River	Montney A
12	Beatton River	Halfway G
13	Milligan Creek	Halfway A
14	Mike	Bluesky A
15	Nig Creek	Baldonnel A
16	Weasel	Halfway Halfway I

Arranged Alphabetically by Field

Field	Pool	page
Airport	Halfway C	179
Aitken Creek	Gething A	54
Bear Flat	Bear Flat B	147
Beatton River	Halfway G	38
Beatton River West	Bluesky A	181
Beavertail	Halfway B	74
Birch	Baldonnel C	56
Black Creek	Baldonnel A	22
Blueberry	Debolt A	88
Blueberry West	Debolt B	183
Boudreau	Belloy A	145
Boundary Lake	Belloy I Boundary Lake A Cecil A Coplin B Halfway K	100
Boundary Lake North	Coplin J Doig A Halfway D	185
Brassey	Artex B	177
Bubbles North	Coplin A	32

17 Wildmint
 Halfway A
 Lower Halfway B
18 Aitken Creek
 Gething A
19 Birch
 Baldonnel C
20 Fireweed
 Dunlevy I
 Lower Halfway A
21 Osprey
 Halfway A
22 Peejay
 Halfway
 Halfway R
23 Doig Rapids
 Halfway C
24 Bulrush
 Halfway A
25 Wolf
 Halfway A
26 Beavertail
 Halfway B
27 Currant
 Halfway A
 Halfway C
28 Buick Creek
 Dunlevy A
 Lower Halfway B
 Lower Halfway C
 Lower Halfway D
29 Blueberry
 Debolt A
30 Inga
 Inga A
31 Cache Creek
 Doig C
32 Squirrrel
 North Pine C
33 Rigel
 Cecil B
 Halfway C

Buick Creek
 Dunlevy A 80
 Lower Halfway B
 Lower Halfway C
 Lower Halfway D
 Buick Creek North
 Lower Dunlevy A 191
 Bulrush
 Halfway A 70
 Cache Creek
 Doig C 92
 Cecil Lake
 Cecil D 151
 North Pine A
 North Pine C
 Siphon A
 Chinchaga River
 Montney A 36
 Currant
 Halfway A 76
 Halfway C
 Desan
 Pekisko
 Shunda A
 Doig Rapids
 Halfway C 68
 Eagle West
 Belloy A 149
 Elm
 Gething B
 Halfway A
 Fireweed
 Dunlevy I
 Lower Halfway A
 Flatrock
 Boundary Lake B
 Flatrock B
 Halfway E 159
 Flatrock West
 Cecil A
 Halfway D
 North Pine D 193

34 Boundary Lake	Fort St John	199
Belloy I	North Pine A	
Boundary Lake A	Groundbirch	173
Cecil A	Artex B	
Coplin B	Cecil A	
Halfway K	Halfway	117
35 Muskrat	Blueberry A	
Boundary Lake A	Hay River	18
Halfway D	Bluesky A	
Lower Halfway A	Helmet	11
36 Halfway	Jean Marie K	
Blueberry A	Inga	90
37 Stoddart	Inga A	
Belloy C	Lapp	20
North Pine F	Halfway C	
38 Montney	Laprise Creek	34
Halfway D	Coplin B	
39 Owl	Maxhamish Creek	9
Cecil A	Chinkeh A	
40 Oak	Mica	167
Baldonnel H	Doig B	
Cecil C	Mica A	
Halfway B	Mike	42
Lower Halfway A	Bluesky A	
41 Paradise	Milligan Creek	40
Boundary Lake A	Halfway A	
Gething A	Milligan Creek West	201
Montney A	Halfway I	
Siphon A	Montney	123
42 Red Creek	Halfway D	
Doig C	Muskrat	111
43 Boudreau	Boundary Lake A	
Belloy A	Halfway D	
44 Bear Flat	Lower Halfway A	
Bear Flat B	Nig Creek	44
45 Eagle West	Baldonnel A	
Belloy A	North Pine	203
46 Cecil Lake	North Pine B	
Cecil D	Oak	127
North Pine A	Baldonnel H	
North Pine C	Cecil C	
Siphon A	Halfway B	
	Lower Halfway A	

47 Flatrock
 Boundary Lake B
 Flatrock B
 Halfway E
48 Two Rivers
 Siphon A
49 Mica
 Doig B
 Mica A
50 Sunset Prairie
 Cecil A
51 Groundbirch
 Artex B
 Cecil A
52 Brassey
 Artex B

Not shown on map
 Airport
 Halfway C
 Beatton River West
 Bluesky A
 Blueberry West
 Debolt B
 Boundary Lake North
 Coplin J
 Doig A
 Halfway D
 Buick Creek North
 Lower Dunlevy A
 Flatrock West
 Cecil A
 Halfway D
 North Pine D
 Fort St John
 North Pine A
 Milligan Creek West
 Halfway I
 North Pine
 North Pine B
 Peejay West
 Halfway A

Osprey		62
	Halfway A	
Owl		125
	Cecil A	
Paradise		135
	Boundary Lake A	
	Gething A	
	Montney A	
	Siphon A	
Peejay		64
	Halfway	
	Halfway R	
Peejay West		205
	Halfway A	
Red Creek		143
	Doig C	
Red Creek North		207
	Doig B	
Rigel		96
	Cecil B	
	Halfway C	
Squirrel		94
	North Pine C	
Stoddart		119
	Belloy C	
	North Pine F	
Stoddart South		209
	Belloy A	
Stoddart West		211
	Baldonnel C	
	Bear Flat D	
	Belloy C	
	Belloy I	
	Doig B	
Sunset Prairie		171
	Cecil A	
Two Rivers		165
	Siphon A	
Weasel		46
	Halfway	
	Halfway I	

Red Creek North
Doig B

Stoddart South
Belloy A

Stoddart West
Balddonnel C
Bear Flat D
Belloy C
Belloy I
Doig B

Weasel West
Halfway B

Weasel West 221
Halfway B

Wildmint 50
Halfway A
Lower Halfway B

Wolf 72
Halfway A

Zarembo 24
Halfway C
A Marker Base of Lime A

MAXHAMISH LAKE OIL FIELD

Chinkeh A Pool

Pool Parameters

Field Code: 5852

Pool Code: 2805A

Discovery well name: AEC Maxhamish b-049-J 094-O-11

WA#: 11617

Rig Release: 1998/12/31

Other Oil and Gas Shows: Chinkeh gas

Number of Wells (November 2012) Oil: 9 Gas: 120 Active: 129 Horizontal: 24

Reservoir Data

Area of Pool: 803 acres, 325 hectares

Average Depth of Producing Zone: 1618 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 19

Average Net Pay: 2.6 metres

Average Permeability: 24 milliDarcies

Average Water Saturation (%): 31

Oil Formation Volume Factor (%): 122

Gravity (degrees API): 42

Original Pressure: 1334 psi, 9198 kPa

Reserves

Estimated original oil in place: 5,589,020 barrels, 888,583 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 558,900 barrels, 88,858 m³ (volumetric)

Cumulative Oil Production: 157,130 barrels

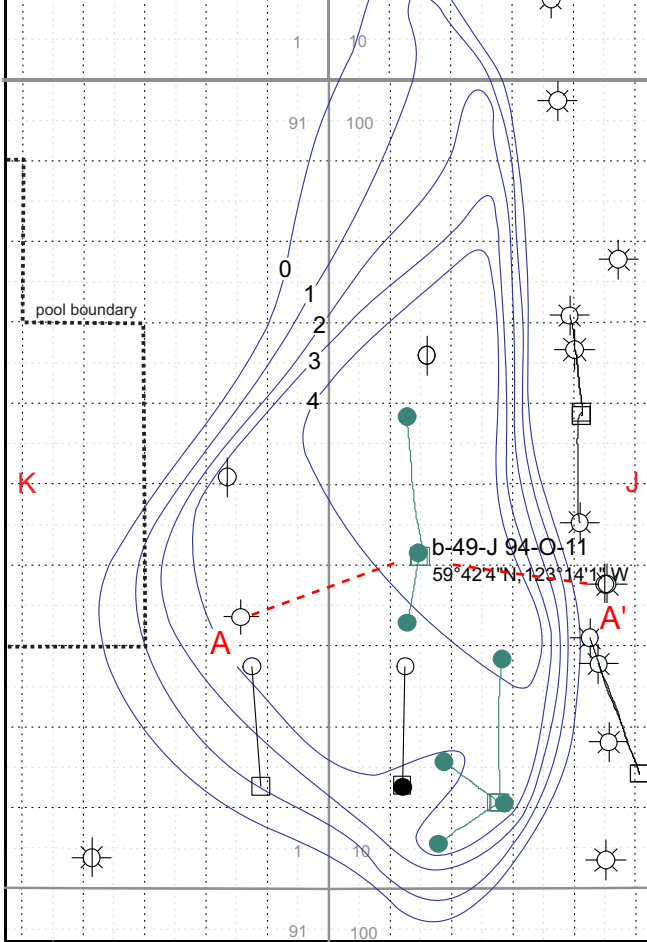
Remaining Recoverable Oil: 401,770 barrels

Remaining Original Oil in Place (%): 97

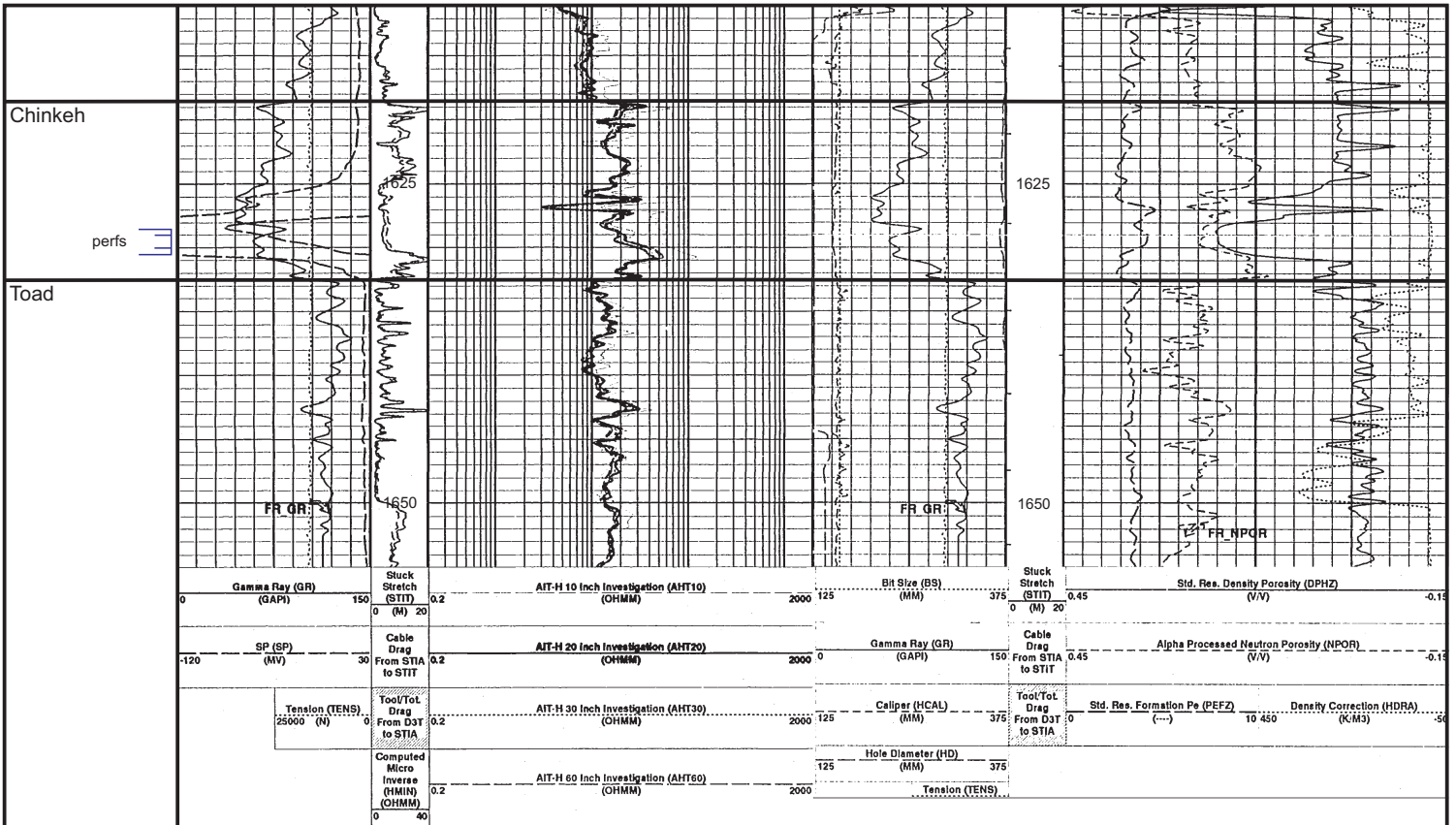
Cumulative Water Production: 248,680 barrels

Notes: The Chinkeh sandstone is correlatable over a wide distance; and therefore may have broad potential. There is no active aquifer, but a down-dip water leg exists. The pool was discovered as a gas producer in 1991 at MOBIL BP PCI MAX C- 051-B/094-O-14 (WA 07573). Discovery well b-49-J is the oil discovery for the pool.

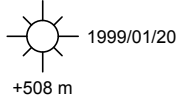
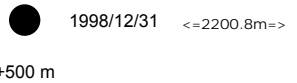
Maxhamish Lake Oil Field
Chinkeh A 94-O-11



Contour interval is one metre net Chinkeh A oil pay (Oil and Gas Commission). Discovery well is b-49-J-94-O-11.

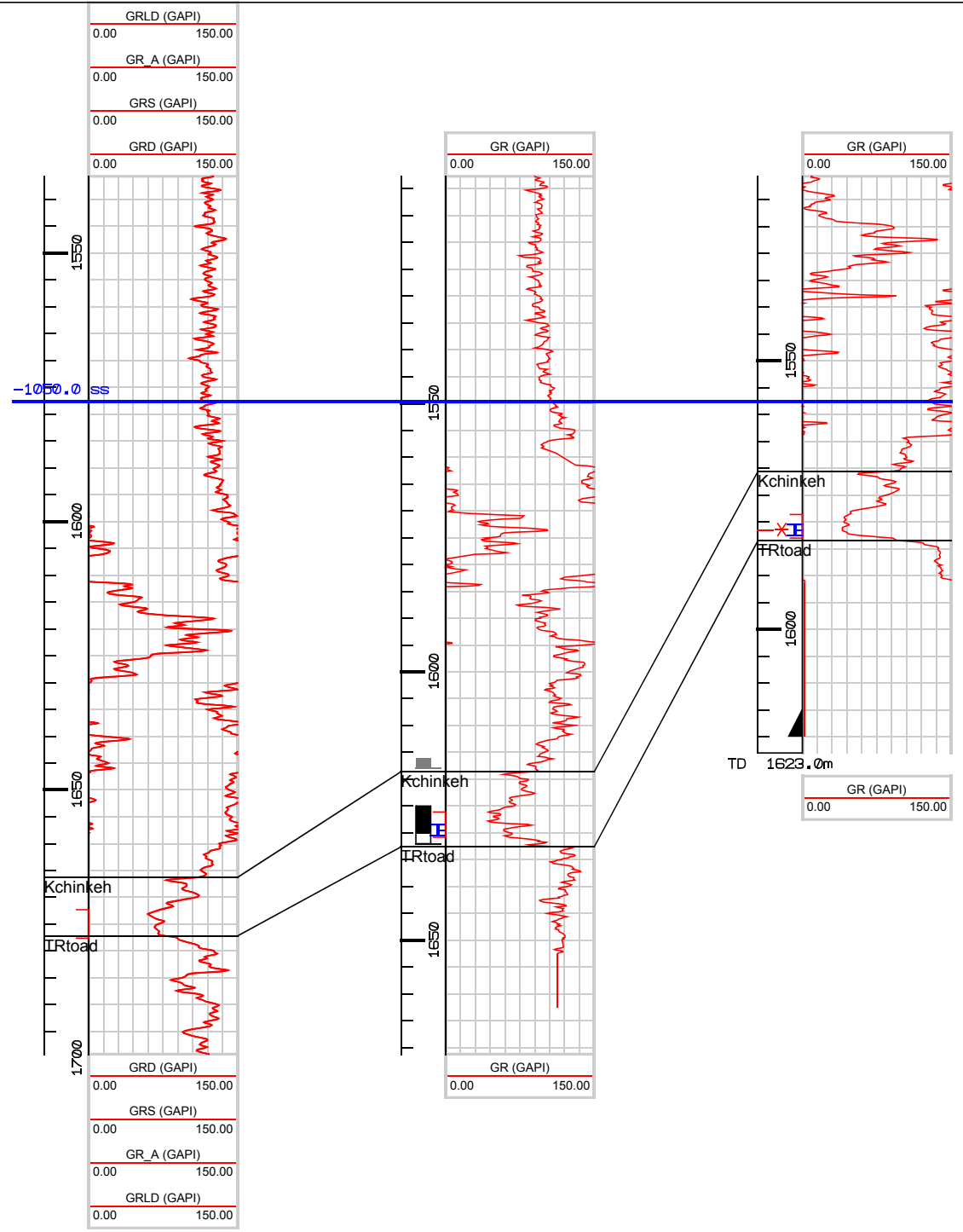


Induction and neutron-density logs for discovery well b-49-J/94-O-11. The completion interval is in the oil leg, where there is no neutron-density crossover. Some gas pay may exist in an overlying thin sand where there is a hint of gas response on the neutron curve at 1626 metres.



A'

Maxhamish Lake Chinkeh A



1:1200

HELMET OIL FIELD

Jean Marie K Pool

Pool Parameters

Field Code: 4700 **Pool Code:** 8200K
Discovery well name: ECAOG HZ d-059-K 094-P-07 **WA#:** 12619
Rig Release: 2002/09/26
Other Oil and Gas Shows: Jean Marie gas, Slave Point gas, Shunda gas
Number of Wells (October 2012) Oil: 3 **Active:** 3 **Horizontal:** 2

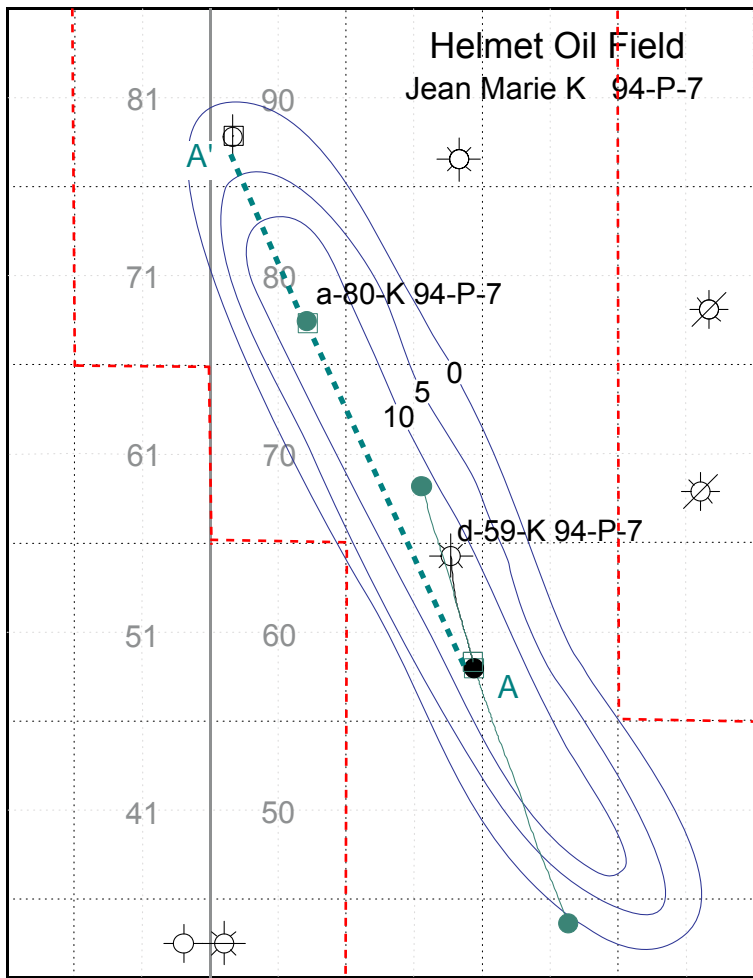
Reservoir Data

Area of Pool: 655 acres, 265 hectares
Average Depth of Producing Zone: 1300 metres
Lithology of Reservoir Rock: limestone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 10 metres
Drive Mechanism: gas depletion
Average Porosity (%): 9
Average Net Pay: 4.5 metres
Average Permeability: 20 milliDarcies
Average Water Saturation (%): 36
Oil Formation Volume Factor (%): 114
Gravity (degrees API): 42
Original Pressure: 793 psi, 5468 kPa

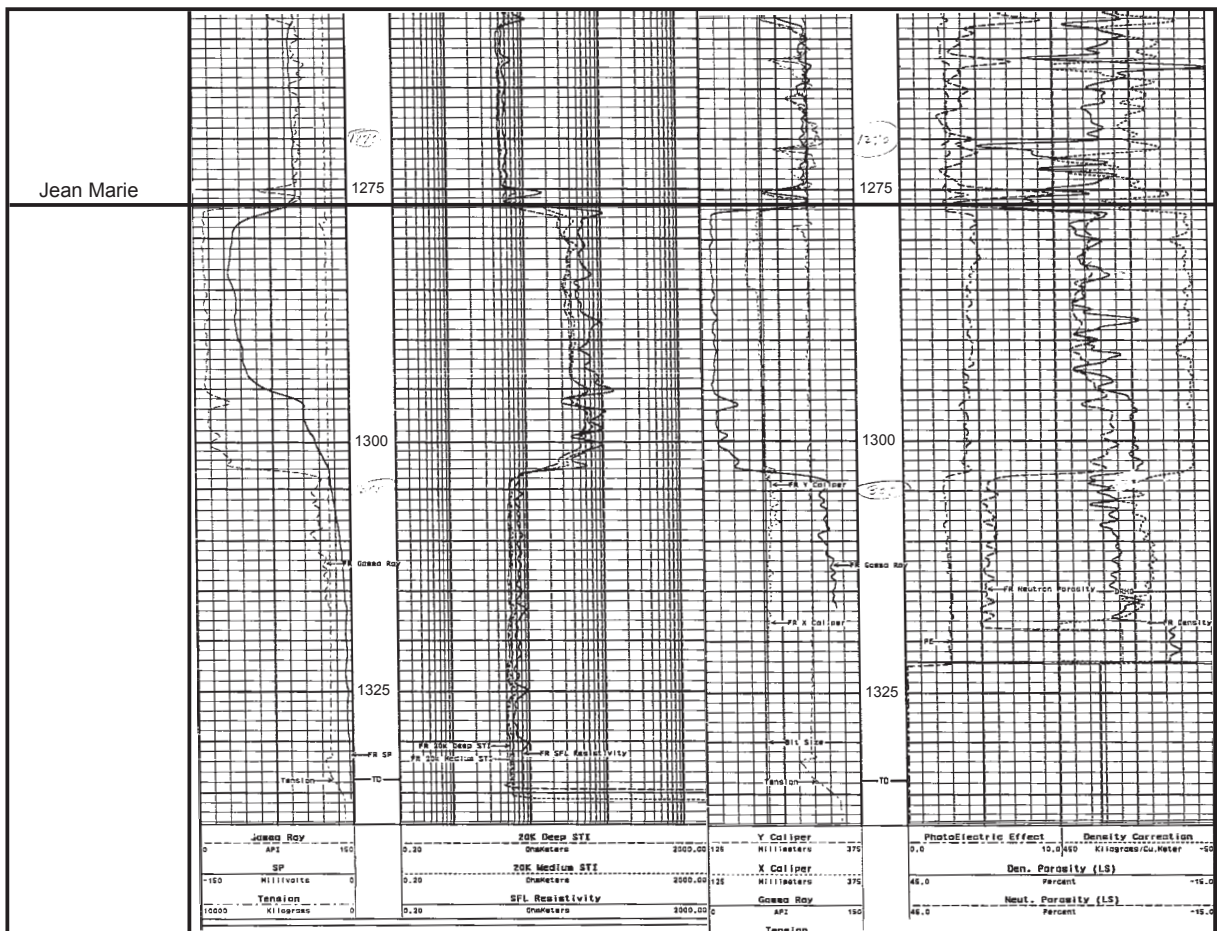
Reserves

Estimated original oil in place: 3,712,100 barrels, 590,177m³
Recovery Factor (%): 20
Estimated Recoverable Oil: 742,420 barrels, 118,035 m³ (volumetric)
Cumulative Oil Production: 464,160 barrels
Remaining Recoverable Oil: 278,260 barrels
Remaining Original Oil in Place (%): 88
Cumulative Water Production: 22,700 barrels

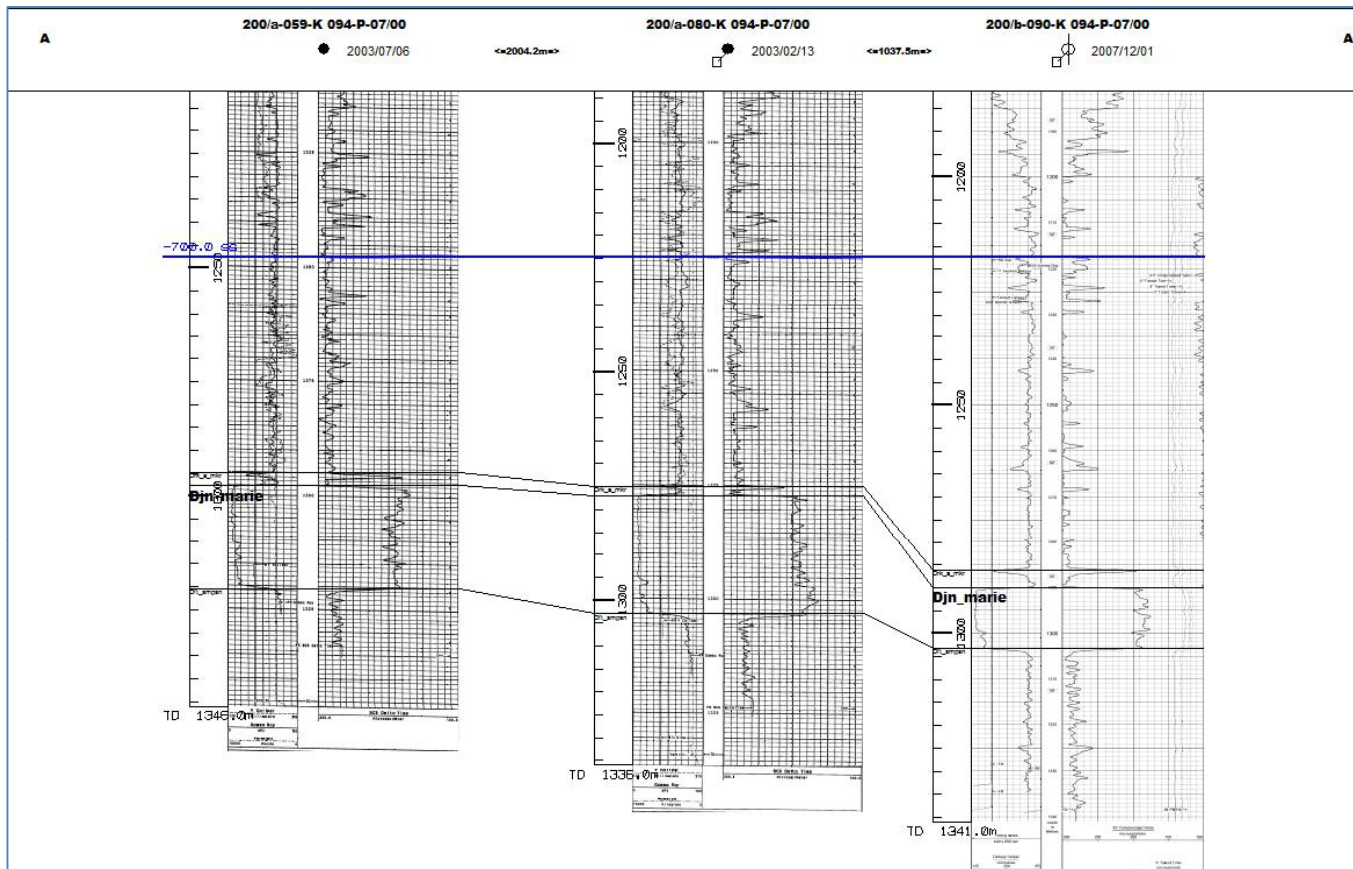
Notes: Two of the three oil wells, including discovery well d-59-K, in this pool are horizontal; but a-80-K (profiled on the attached page) is vertical. Location d-59-K is the discovery well but not an oil producer; a-69-K (event 1) is the oil producer. It produces with low water cut. Permeability is reasonably good; so is this an unconventional play?



Contour interval is 5 metres net Jean Marie K oil pay. Location d-59-K -94-P-7 is the discovery well and has two horizontal boreholes. Location a-80-K-94-P-7 is vertical.



Induction and neutron-density logs for vertical well a-80-K/94-P-7. The Jean Marie is thick and porous with fair permeability (20 md average). Completion is in the lower part (1286-95 m) of the thick porous section.



Helmet Jean Marie K

DESAN OIL FIELD

Pekisko Pool

Pool Parameters

Field Code: 3410

Pool Code: 7600

Discovery well name: Gulf AEC b-064-D 094-P-07

WA#: 05804

Rig Release: 1983/02/12

Other Oil and Gas Shows: Debolt gas, Shunda oil, Jean Marie gas

Number of Wells (November 2012) Oil: 103 Injection: 16 Horizontal: 39 Water Source: 1
Active: 84

Reservoir Data

Area of Pool: 1670 acres, 676 hectares

Average Depth of Producing Zone: 610 metres

Lithology of Reservoir Rock: limestone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 3.3 metres

Average Permeability: 53 milliDarcies

Average Water Saturation (%): 42

Oil Formation Volume Factor (%): 106

Gravity (degrees API): 24

Original Pressure: 716 psi, 4937 kPa

Reserves

Estimated original oil in place: 41,087,980 barrels, 6,532,467 m³

Recovery Factor (%): 14

Estimated Recoverable Oil: 5,587,970 barrels, 888,416 m³

Cumulative Oil Production: 5,041,630 barrels

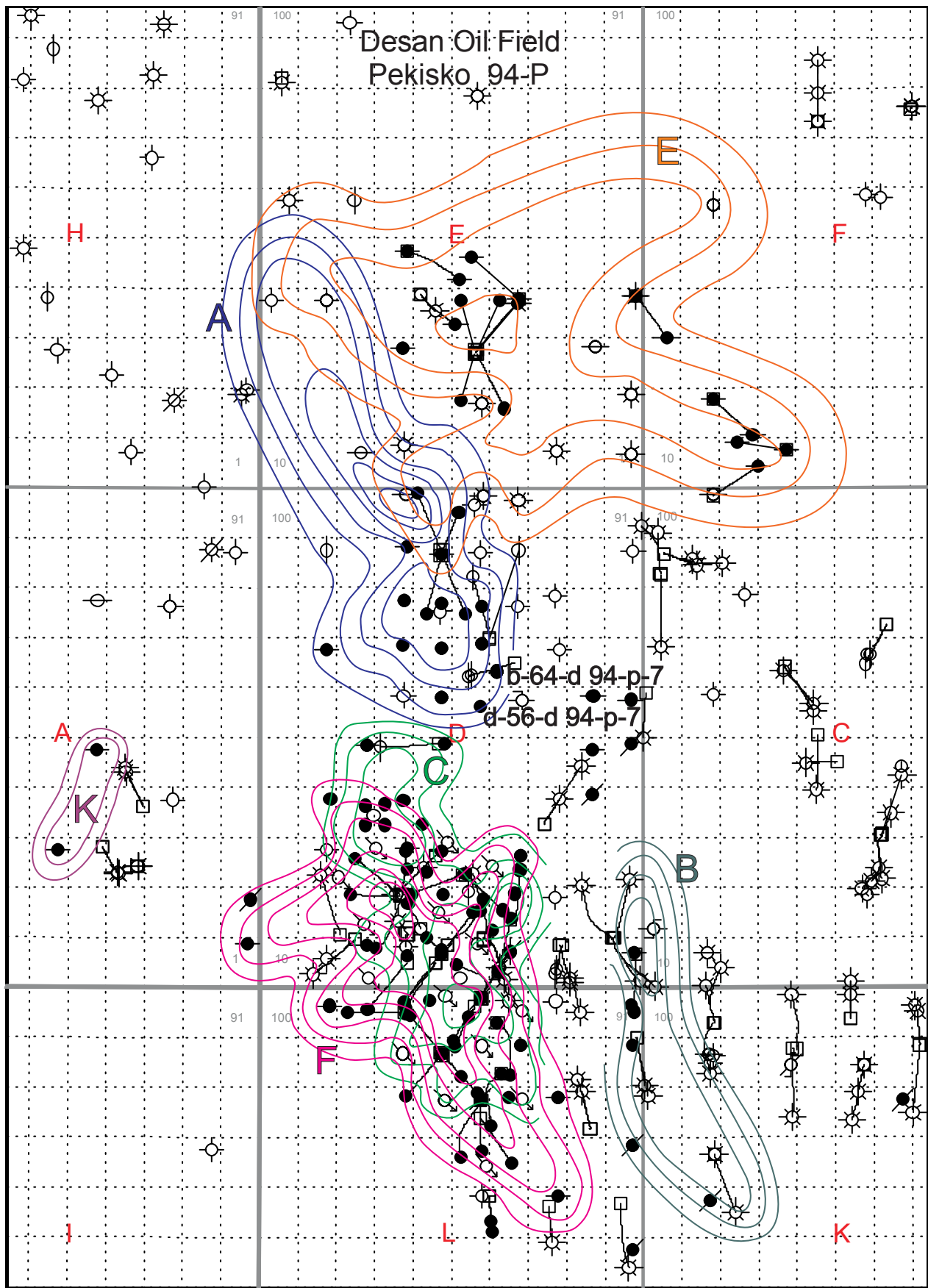
Remaining Recoverable Oil: 546,340 barrels

Remaining Original Oil in Place (%): 88

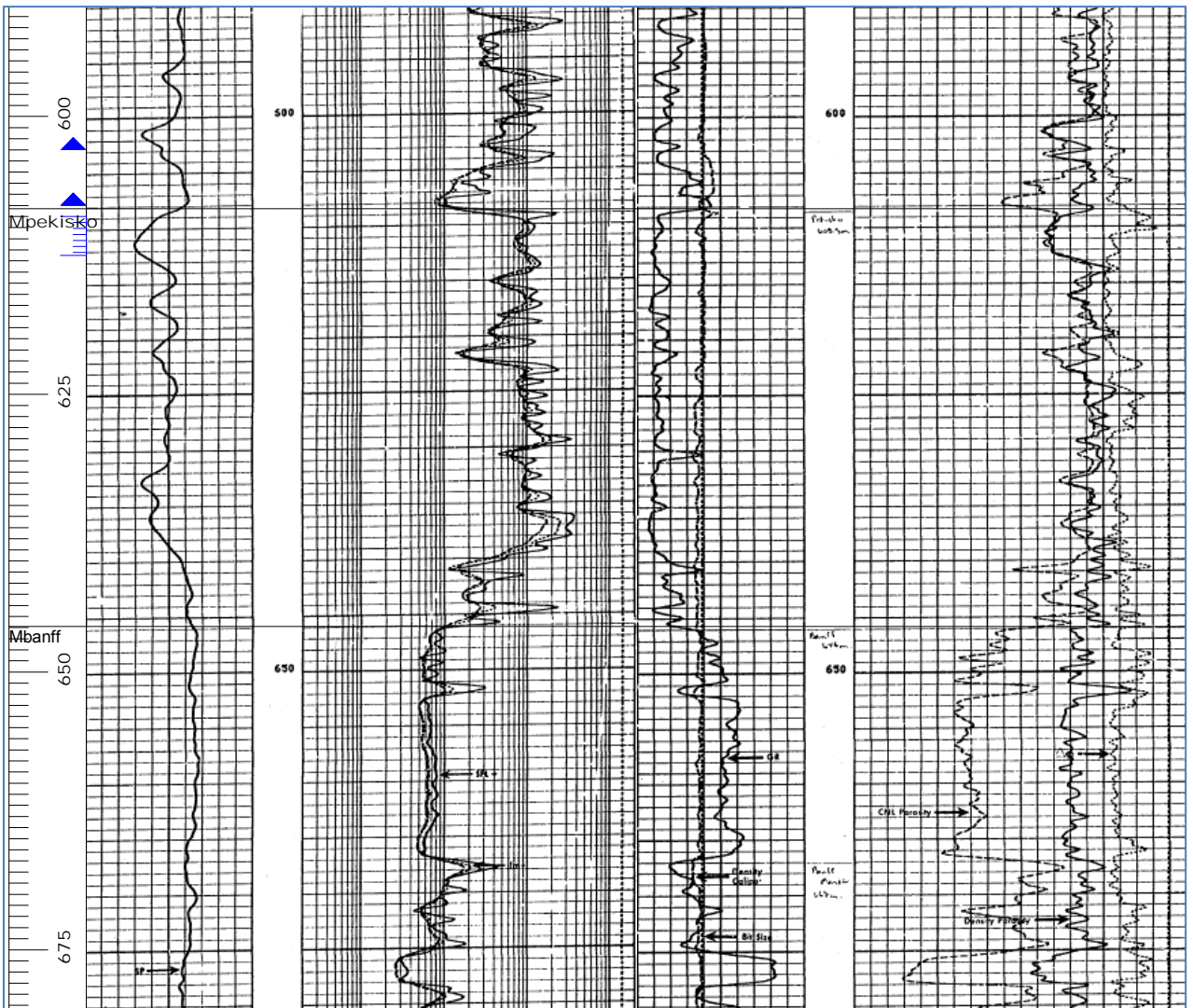
Cumulative Water Production: 1,774,570 barrels

Cumulative Water Injection: 8,038,300 barrels

Notes: The Desan field has pools for Pekisko A – K; the parameters shown on this page are collective for all pools. Trapping mechanisms are variable and complex for each pool; they range from facies pinch-outs to structural entrapment on horsts or in grabens. Location d-1-E is a water source well.



Contour intervals (Oil and Gas Commission) are shown in different colours for Pekisko Pools A, B, C, E, F and K. Interval for each is two metres Pekisko oil pay. The discovery well is b-64-D-94-P-7. Logs for d-56-D-94-P-7 are shown below. Shapes vary for each pool reflecting the complex and variable nature of each pool.



Induction and neutron-density logs for d-56-D-94-P-7. Completion is in the most porous part of the Pekisko at the top in a bio-clastic limestone.

DESAN OIL FIELD

Shunda A Pool

Pool Parameters

Field Code: 3410

Pool Code: 7500A

WA#: 05804

Discovery well original name: Gulf AEC b-064-D 094-P-07

Rig Release: 1983/02/12

Other Oil and Gas Shows: Pekisko oil

Number of Wells (November 2012) Oil: 9 **Active:** 3

Reservoir Data

Area of Pool: 2570 acres, 1040 hectares

Average Depth of Producing Zone: 540 metres

Lithology of Reservoir Rock: limestone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas depletion

Average Porosity (%): 14

Average Net Pay: 1.8 metres

Average Permeability: 16 milliDarcies

Average Water Saturation (%): 37

Oil Formation Volume Factor (%): 106.9

Gravity (degrees API): 25.7

Original Pressure: 658 psi, 4536 kPa

Reserves

Estimated original oil in place: 9,665,430 barrels, 1,536,681 m³

Recovery Factor (%): 1.5

Estimated Recoverable Oil: 144,980 barrels, 23,050 m³ (volumetric)

Cumulative Oil Production: 87,440 barrels

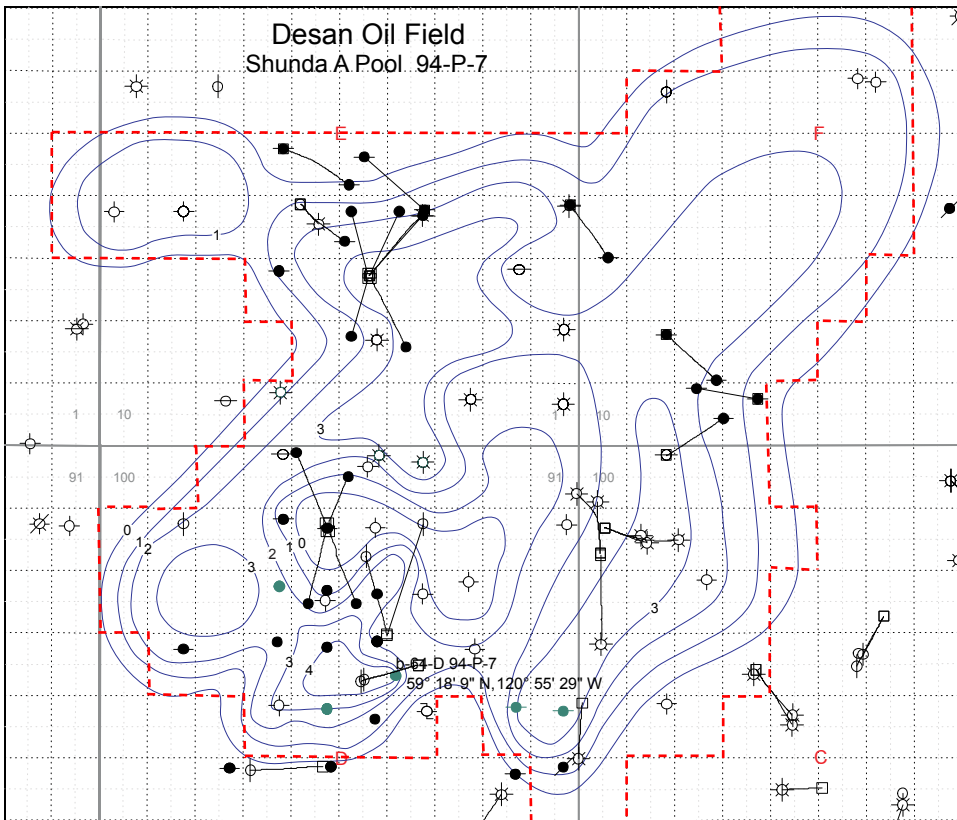
Remaining Recoverable Oil: 57,550 barrels

Remaining Original Oil in Place (%): 99

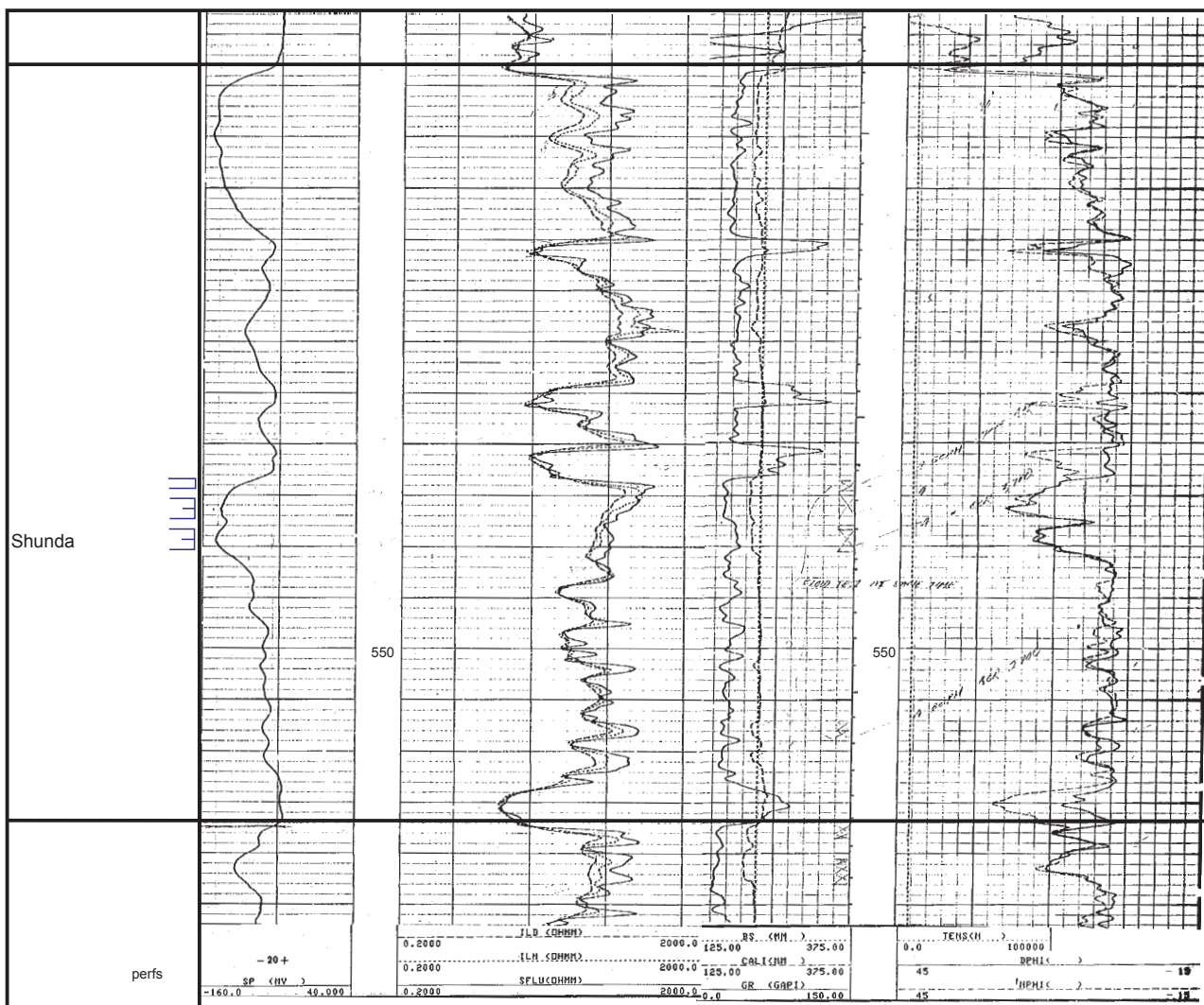
Cumulative Water Production: 38,860 barrels

Notes: A large portion of the pool, as mapped by the Oil and Gas Commission, is without producing wells. A very low recovery factor would seem to leave room for gains in production. A graben intersects the mid-portion of the pool and likely exerts some structural control over trapping.

Desan Oil Field
Shunda A Pool 94-P-7



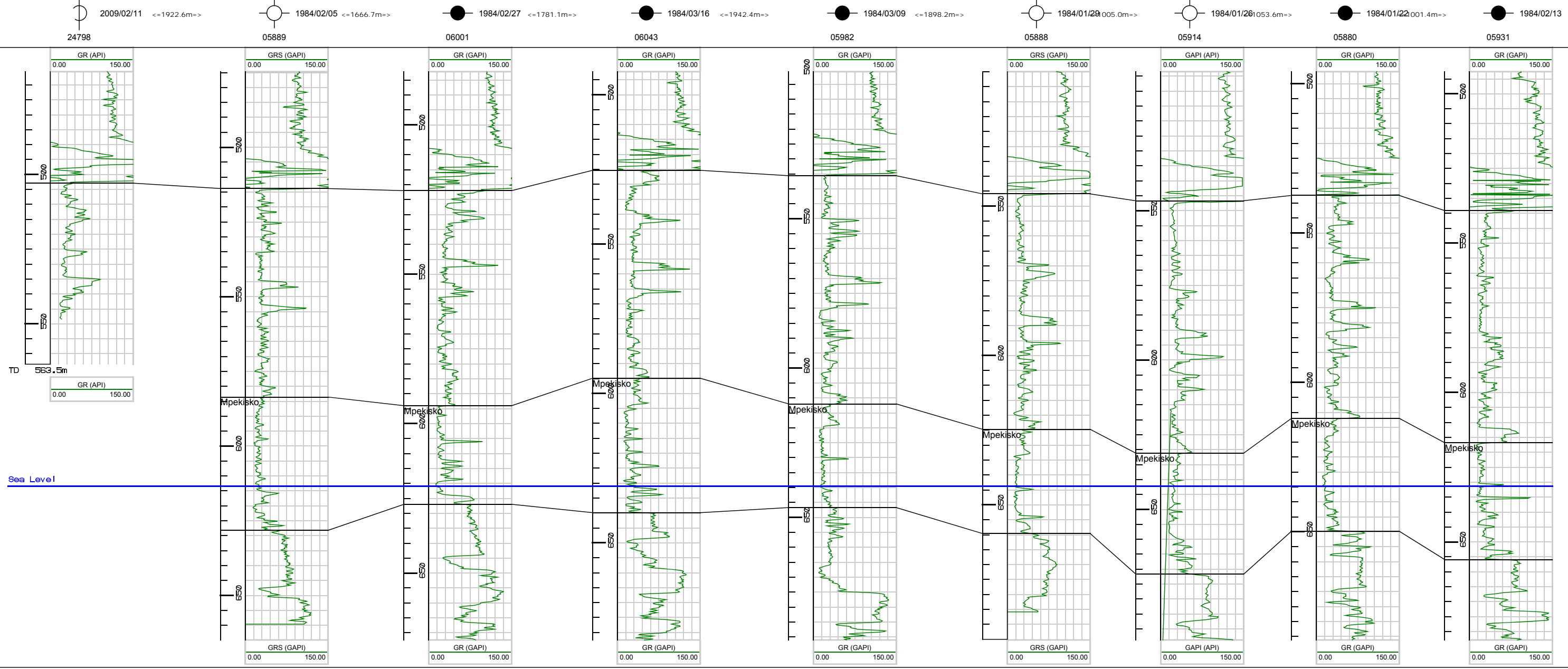
Contour interval as supplied by the Oil and Gas Commission is one metre
Shunda A net oil pay.
Discovery well b-64-D is in the south-central part of the pool. Much of the pool has mapped pay but no producers.



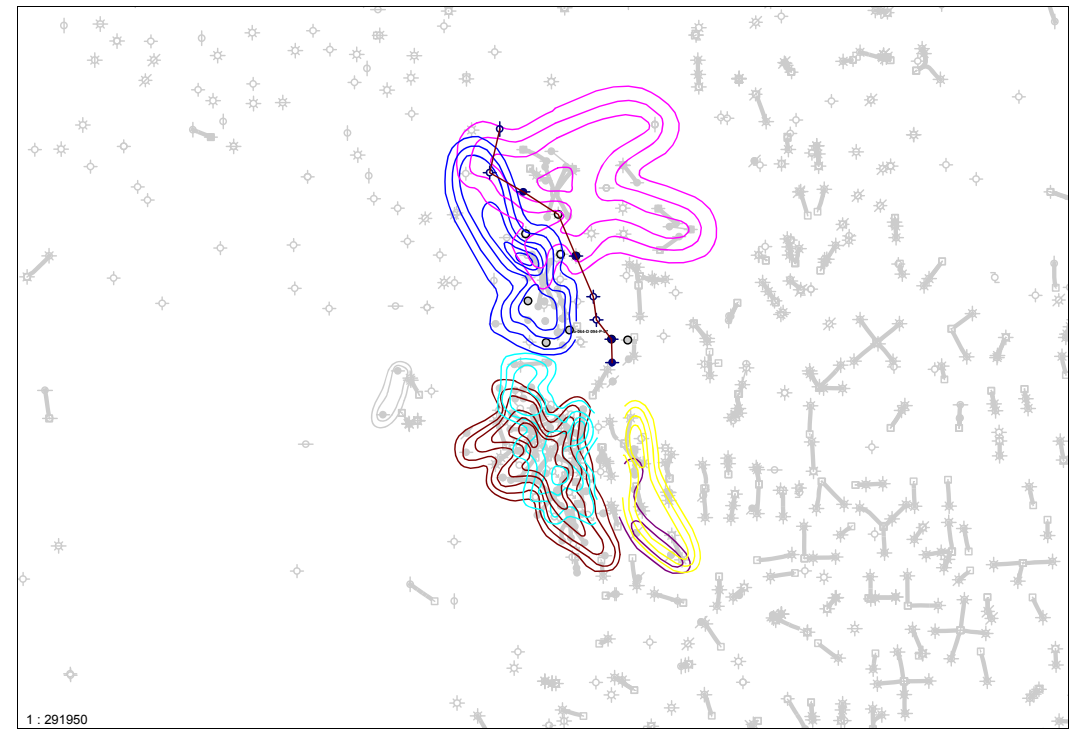
Induction and neutron-density logs for discovery well b-64-D/94-P-7. The completed zone has very good porosity in relation to the rest of the Shunda Formation.

A

A'



Desan Shunda A



HAY RIVER OIL FIELD

Bluesky A and B Pool

Pool Parameters

Field Code: 4650

Pool Code: 2600A

Discovery well original name: Texaco N Hay d-077-H 094-I-09

WA#: 06443

Rig Release: 1986/01/12

Other Oil and Gas Shows: Bluesky gas

Number of Wells (October 2012) Oil: 225 Active: 377 Injection: 161 Horizontal: 374

Water Source: 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 320 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: water flood

Average Porosity (%): 27

Average Net Pay: 2.5 metres

Average Permeability: 341 millidarcies

Average Water Saturation (%): 37

Oil Formation Volume Factor (%): 105

Gravity (degrees API): 25

Original Pressure: 521 psi, 3592 kPa

Reserves

Estimated original oil in place: 195,285,500 barrels, 31,047,914 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 39,057,100 barrels, 6,209,583 m³ (production decline)

Cumulative Oil Production: 26,578,280 barrels

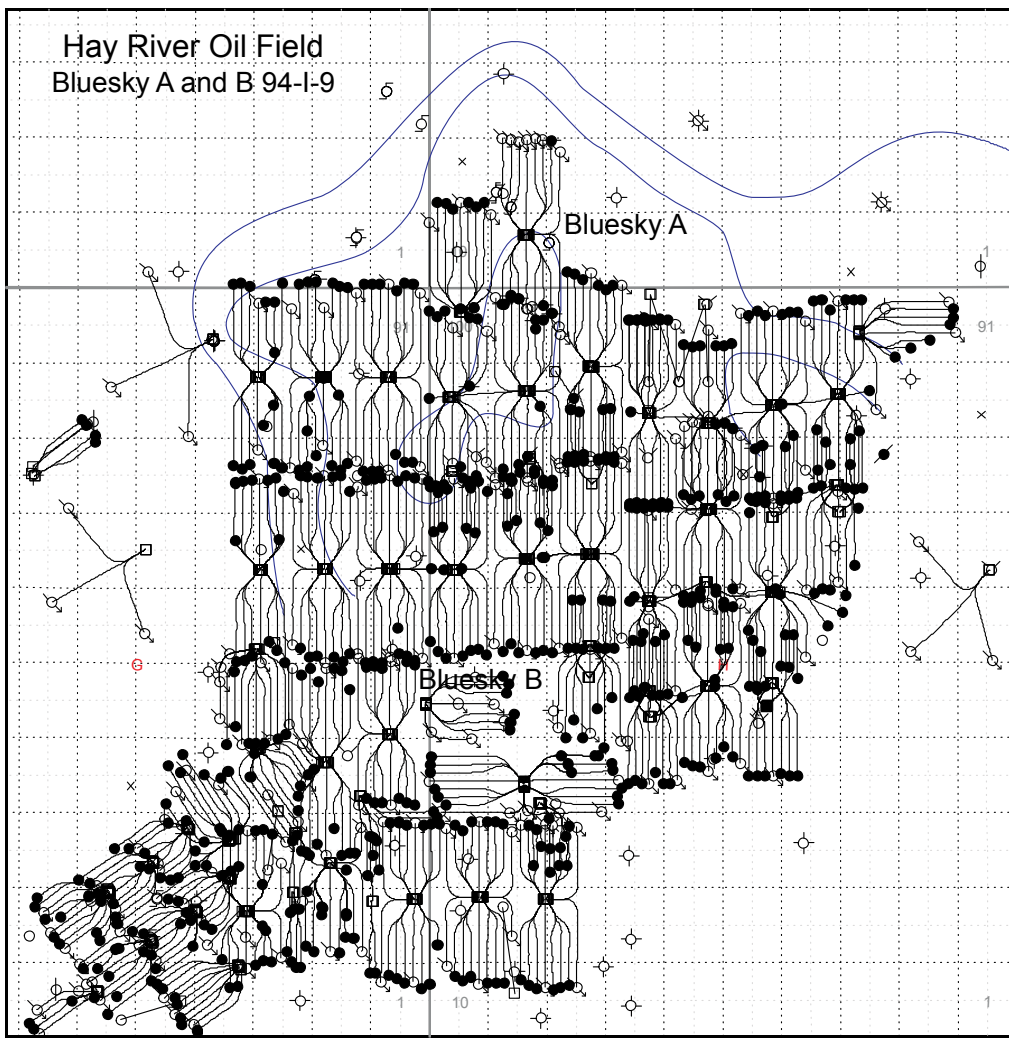
Remaining Recoverable Oil: 12,478,820 barrels

Remaining Original Oil in Place (%): 86

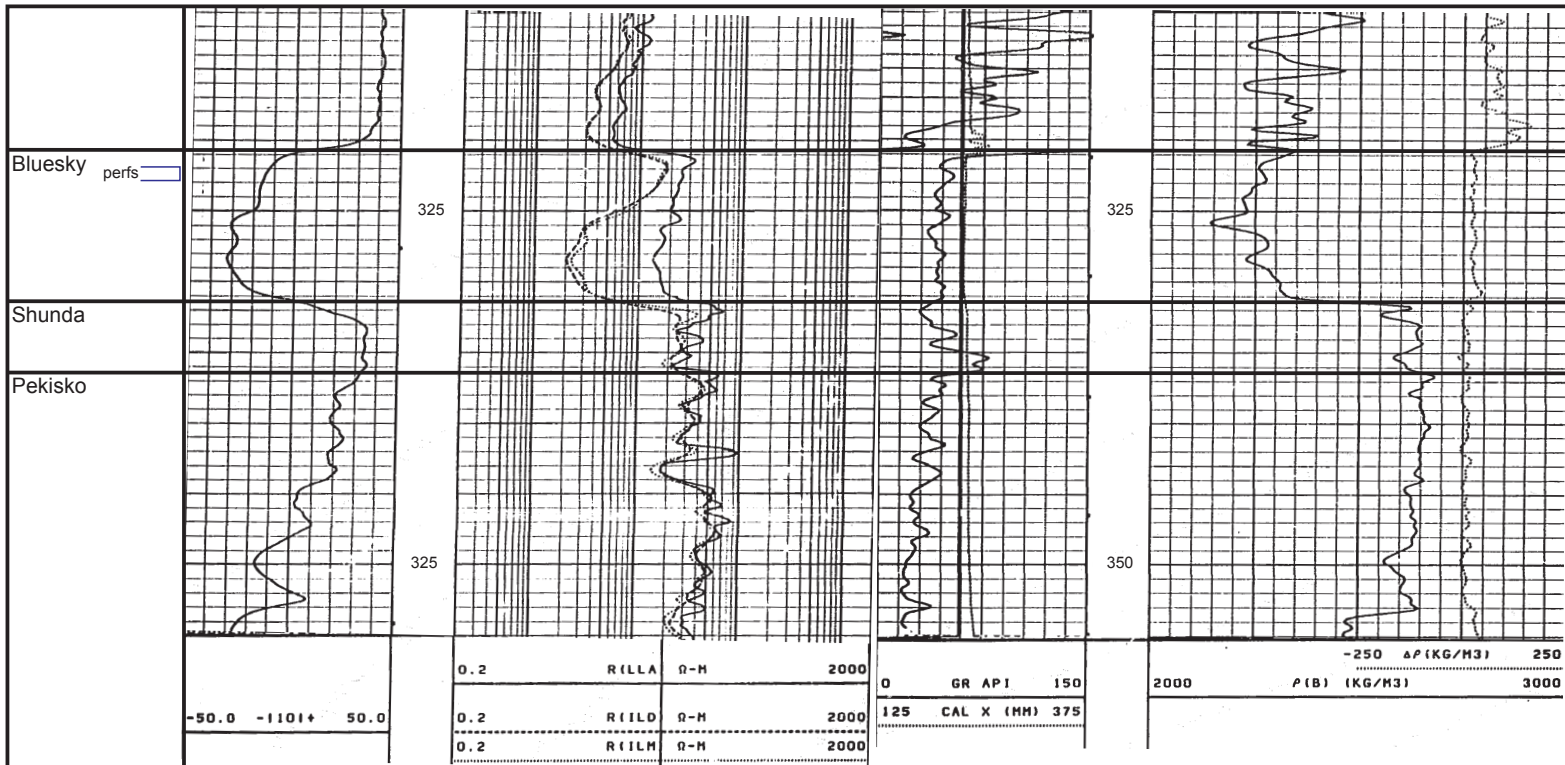
Cumulative Water Production: 444,927,340 barrels

Cumulative Water Injection: 425,957,540 barrels

Notes: The oil produced here is relatively viscous. Discovery well d-77-H was converted to water injection in 2000. The pool is highly reliant on water injection for recovery. The Oil and Gas Commission has mapped and assigned two Bluesky oil pools (A and B) for the Hay River Field, but provided information only for Bluesky A. Interest has been recently revived in this field with the drilling of many horizontal wells, for which the Bluesky appears to be well suited due to its thickness and lithological contrast to surrounding beds. Most wells, including water injection, are horizontal. Location a-21-J is a water source well.



Contour interval is two metres net Bluesky A and b net oil pay. As mapped by the Oil and Gas Commission contours have been left open. Bluesky A is at the north end and Bluesky B is at the south. Discovery well is d-77-H-94-I-9. It is one of the few vertical wells in the field.



Laterolog and neutron-density logs for discovery well d77-H-94-I-9. The Bluesky is completed near the top (321-325 metres). An apparent water leg begins below 325 metres. This well had a high water cut from the start, and was later converted to water injection. Note the suppression of the SP curve over the upper Bluesky in the oil leg.

LAPP OIL FIELD

Halfway C Pool

Pool Parameters

Field Code: 5560 **Pool Code:** 4800C
Discovery well original name: CRESTAR et al LAPP c-048-C 094-H-10 **WA#:** 10055
Rig Release: 1997/01/27
Other Oil and Gas Shows: Bluesky gas, Halfway gas
Number of Wells (October 2012) Oil: 8 **Active:** 7 **Injection:** 2

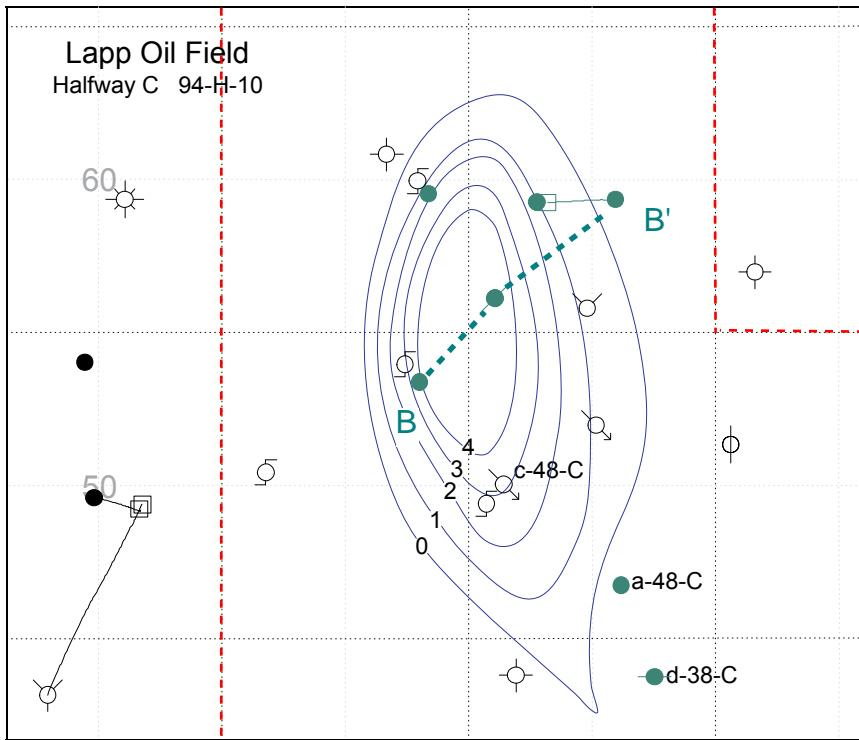
Reservoir Data

Area of Pool: 853 acres, 345 hectares
Average Depth of Producing Zone: 1018 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 4.5 metres
Drive Mechanism: water flood
Average Porosity (%): 22
Average Net Pay: 2 metres
Average Permeability: 1.08 Darcies
Average Water Saturation (%): 25
Oil Formation Volume Factor (%): 115
Gravity (degrees API): 41.3
Original Pressure: 999 psi, 6888 kPa

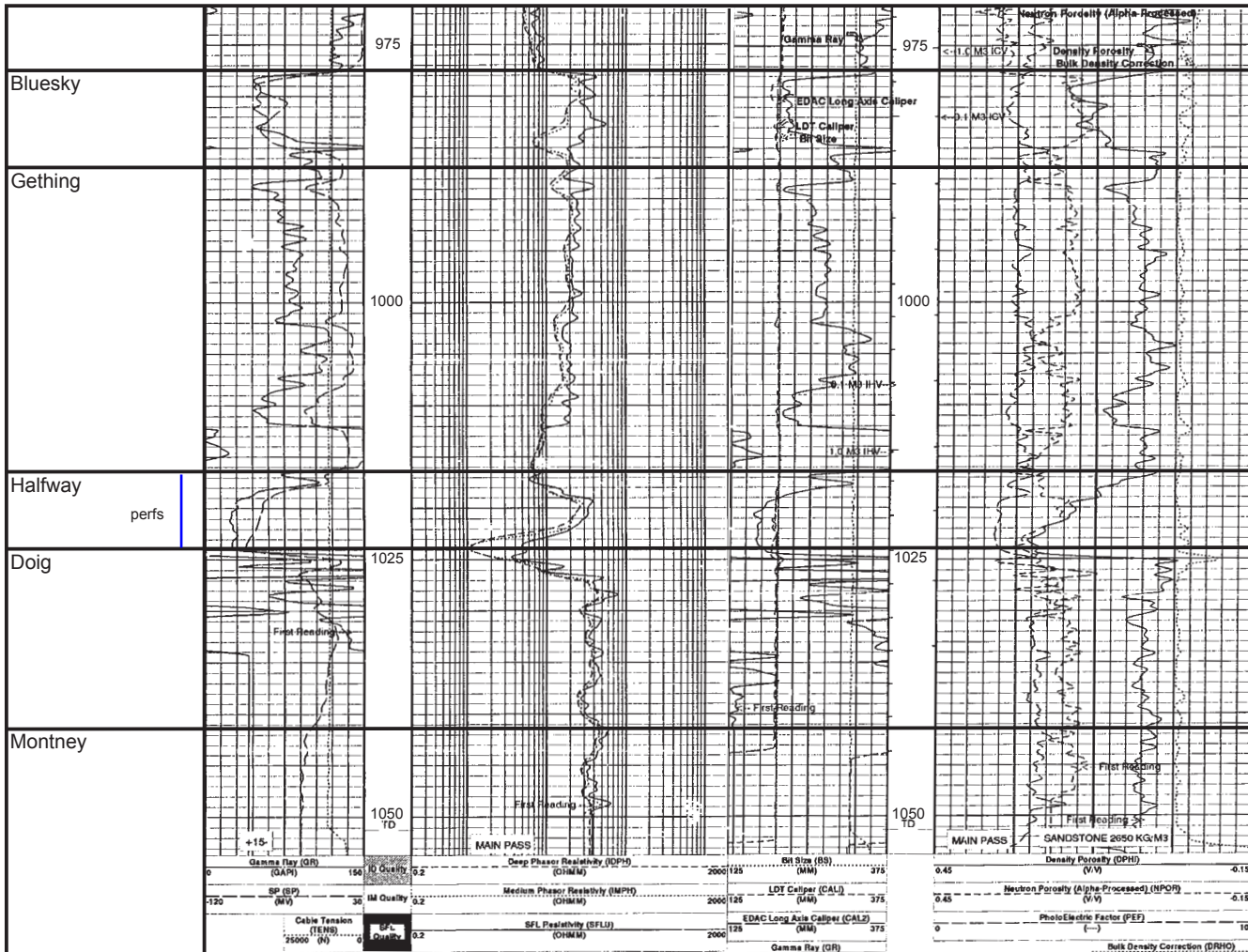
Reserves

Estimated original oil in place: 6,385,500 barrels, 1,015,213 m³
Recovery Factor (%): 45
Estimated Recoverable Oil: 2,873,480 barrels, 456,847 m³ (volumetric)
Cumulative Oil Production: 2,750,480 barrels
Remaining Recoverable Oil: 122,990 barrels
Remaining Original Oil in Place (%): 57
Cumulative Water Production: 6,913,330 barrels
Cumulative Water injection: 14,151,590 barrels

Notes: Permeability is very good. A high water cut is likely due to water flood. Discovery well c-48-C is now a water injection well.



Contour interval is one metre net Halfway C oil pay (Oil and Gas Commission). Discovery well c-48-C/94-H-10 was a Halfway C producer but was converted to water injection. Locations a-48-C and d-38-C are in the pool even though they are mapped outside the contours.

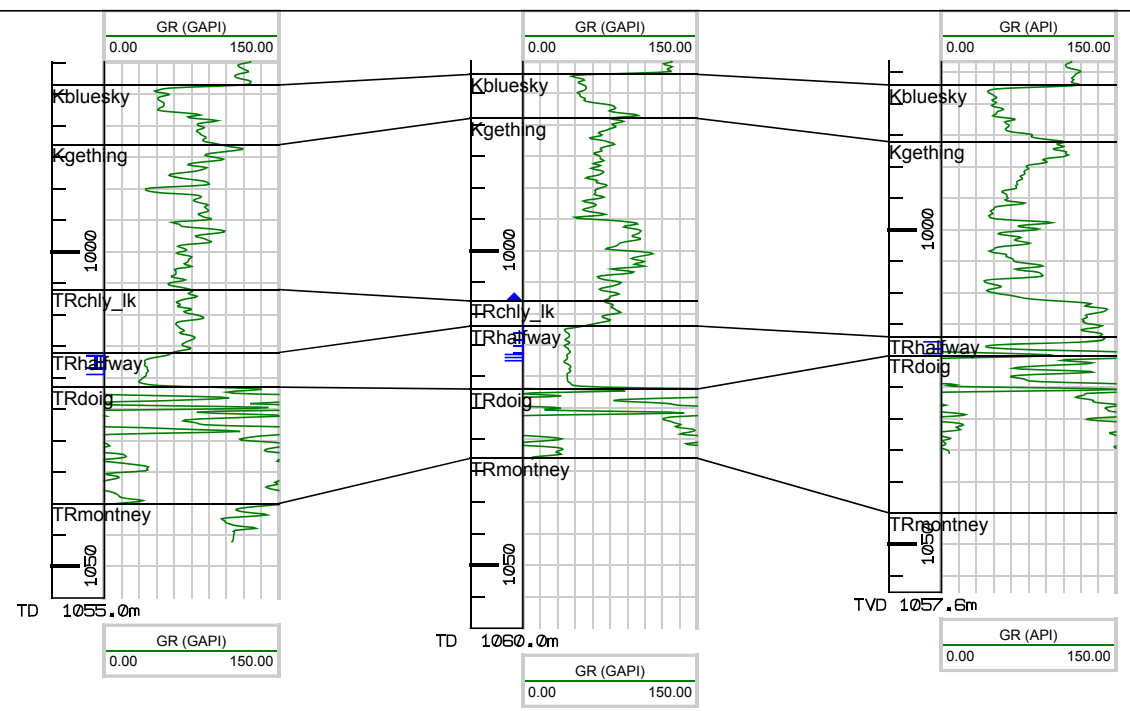


Induction and neutron-density logs for discovery well c-48-C/94-H-10. Initially the Halfway was completed at 1018-1020 metres in the oil leg; it was later converted to water injection as the upper perfs were squeezed and the perferd in the water leg at 1022 – 1024.5 metres.

● 1997/03/20 <=342.2m=>

● 1997/03/17 <=473.1m=>

□ 2003/03/02



Lapp Halfway C

BLACK CREEK OIL FIELD

Baldonnel A Pool

Pool Parameters

Field Code: 1350 **Pool Code:** 4100A
Discovery well original name: CHAUVCO BLACK d-077-J 094-H-05 **WA#:** 09746
Rig Release: 1996/02/07
Other Oil and Gas Shows: Baldonnel gas
Number of Wells (December 2012) Oil: 4 Gas: 19 Active: 22

Reservoir Data

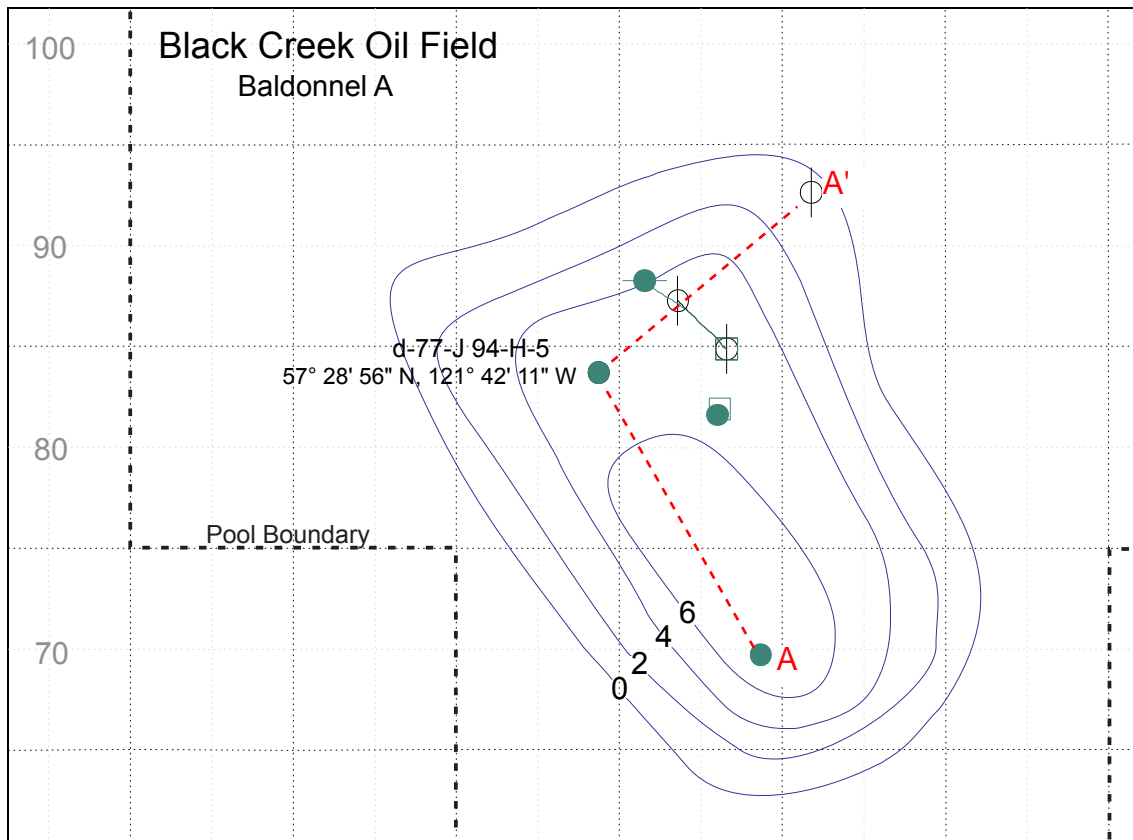
Area of Pool: 959 acres, 388 hectares
Average Depth of Producing Zone: 1312 metres
Lithology of Reservoir Rock: Dolomite
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 8 metres
Drive Mechanism: gas cap expansion
Average Porosity (%): 16
Average Net Pay: 4 metres
Average Permeability: 36 md
Average Water Saturation (%): 37
Oil Formation Volume Factor (%): 113.2
Gravity (degrees API): 37
Original Pressure: 877 psi, 6047 kpa

Reserves

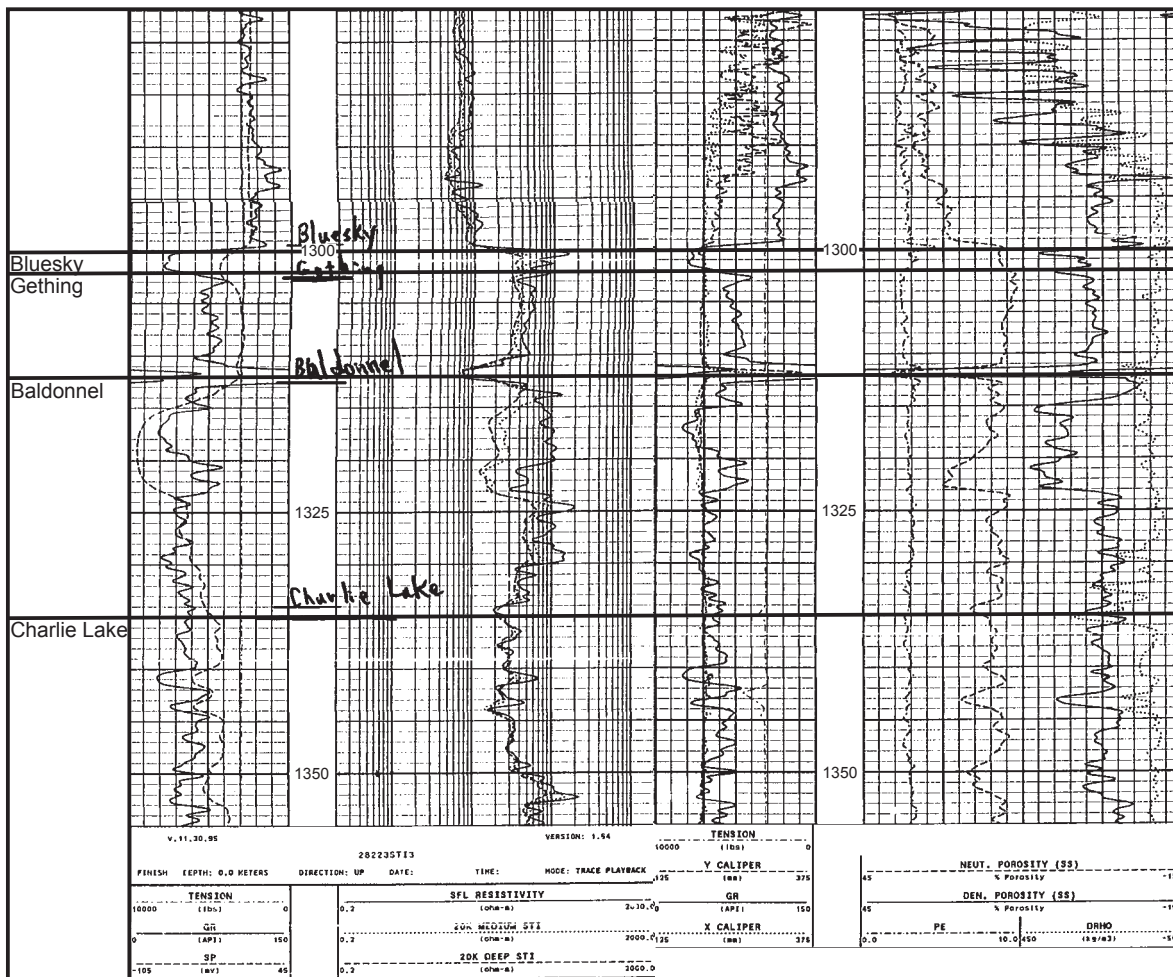
Estimated oil in place: 6,424,460 barrels, 1,021,408 m3
Recovery Factor (%): 15
Estimated Recoverable Oil: 963,670 barrels, 153,211 m3 (volumetric)
Cumulative Oil Production: 215,320 barrels
Original Oil in Place Remaining (%): 97
Cumulative Water Production: 60,000 barrels

Notes:

This was a seismic prospect drilled on a Baldonnel erosional remnant. Gas is now being conserved; therefore gas production is restricted to a brief period early in the discovery well's history.



Location d-77-J was the discovery well in 1996. Only d-76-J is horizontal. Contour interval is two metres net Baldonnell A oil pay (Oil and Gas Commission).



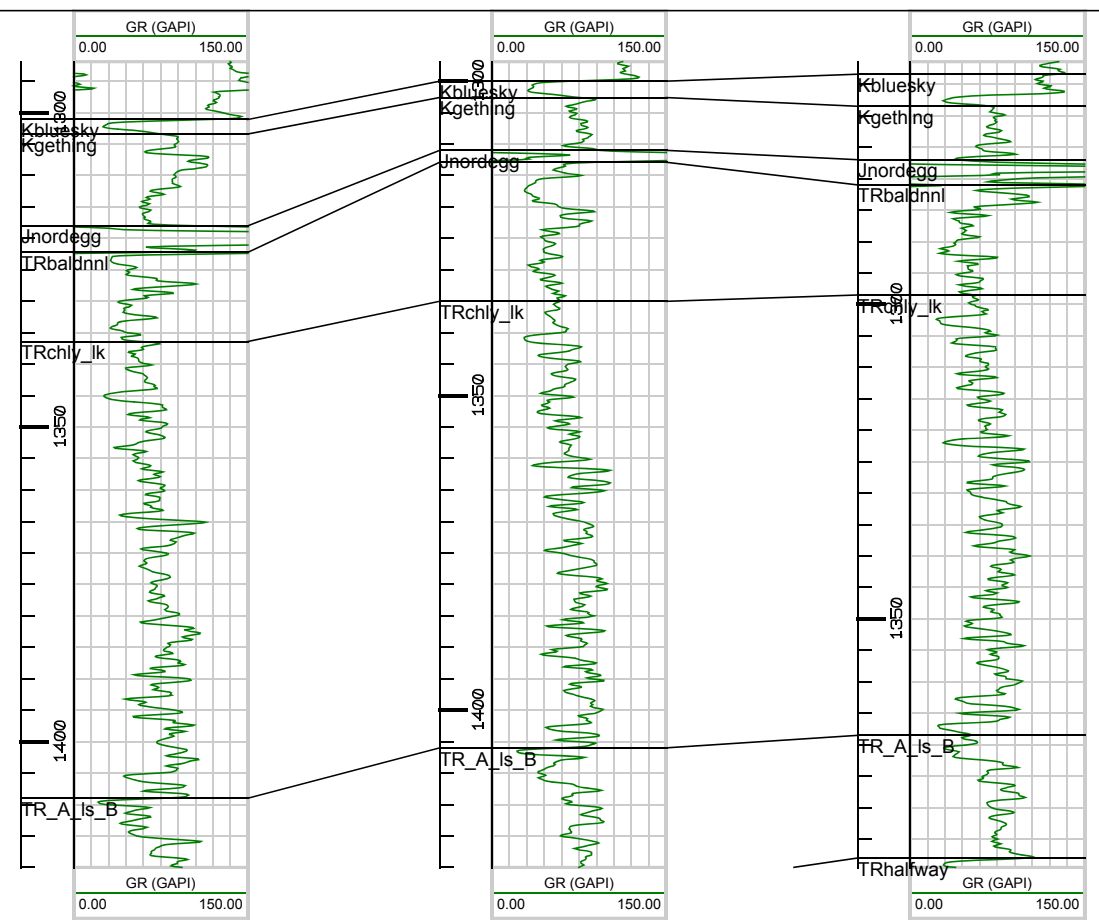
Induction and neutron density curves for d-77-J. No obvious oil/water contact but strong neutron-density approach indicates the gas cap.

● 1997/01/07 <=1496.4m=>

○ 1996/02/07 <=1280.3m=>

○ 1996/12/19

1:1200



Black Creek Baldonnel A

ZAREMBA OIL FIELD

Halfway C

Pool Parameters

Field Code: 8900

Pool Code: 4800C

Discovery well original name: NORCEN et al ZAREMBA a-030-L 094-H-07 **WA#:** 10065

Rig Release: 1997/01/18

Other Oil and Gas Shows: A marker base of lime gas

Number of Wells (November 2012) Oil: 3 **Gas:** 1 **Active:** 2

Reservoir Data

Area of Pool: 173 acres, 70 hectares

Average Depth of Producing Zone: 1228 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 18

Average Net Pay: 2.8 metres

Average Permeability: 152 millidarcies

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 43

Original Pressure: 1212 psi, 8356 kpa

Reserves

Estimated original oil in place: 4,392,480 barrels, 698,349 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 658,870 barrels, 104,752 m³ (volumetric)

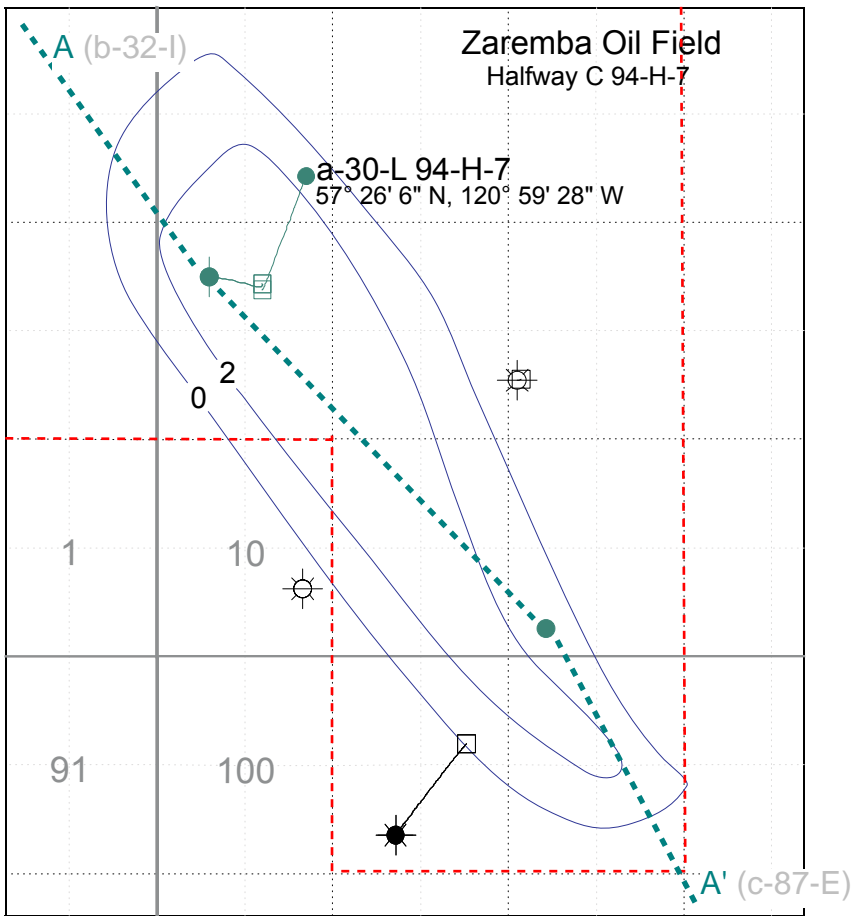
Cumulative Oil Production: 407,250 barrels

Remaining Recoverable Oil: 251,630 barrels

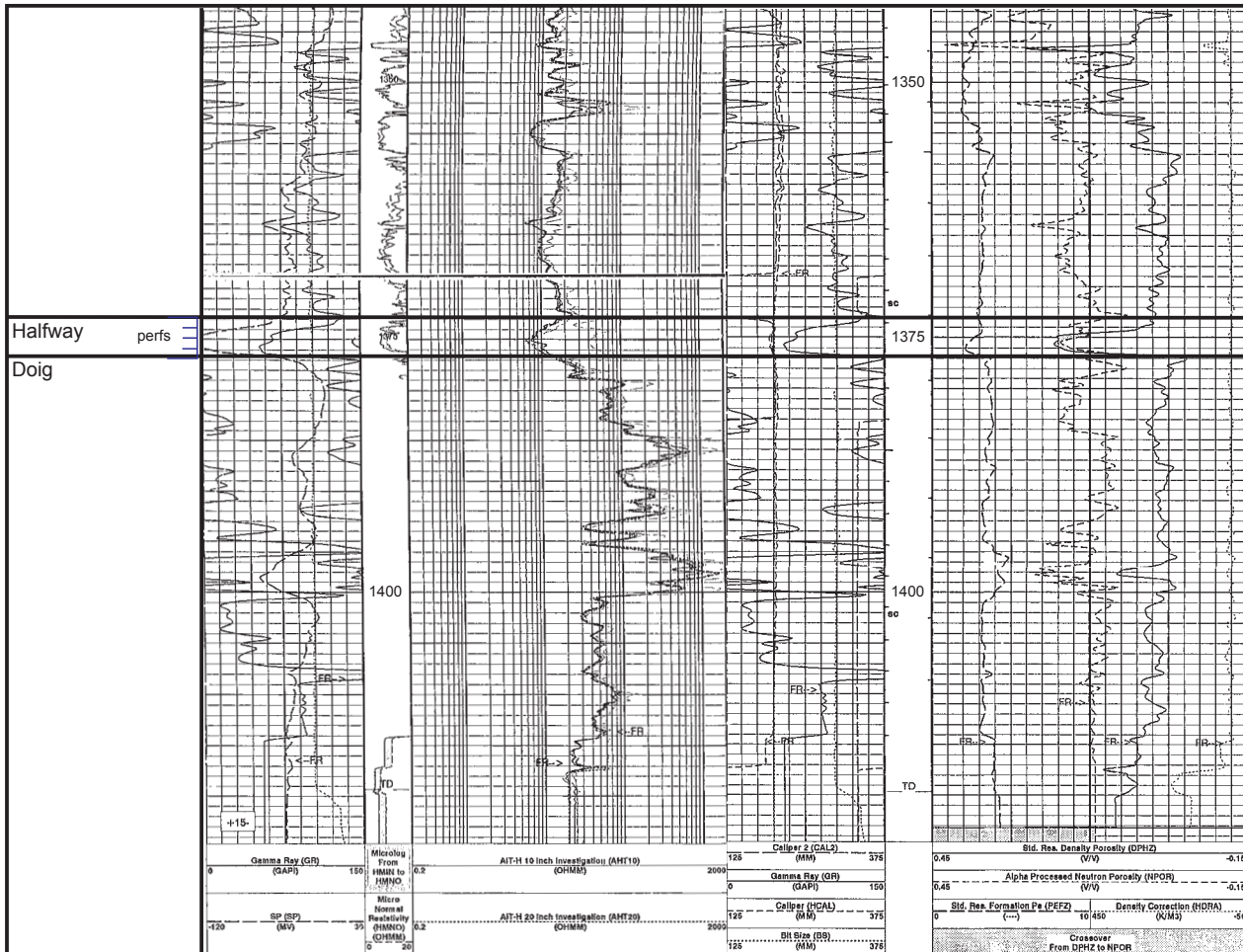
Remaining Original Oil in Place (%): 91

Cumulative Water Production: 139,000 barrels

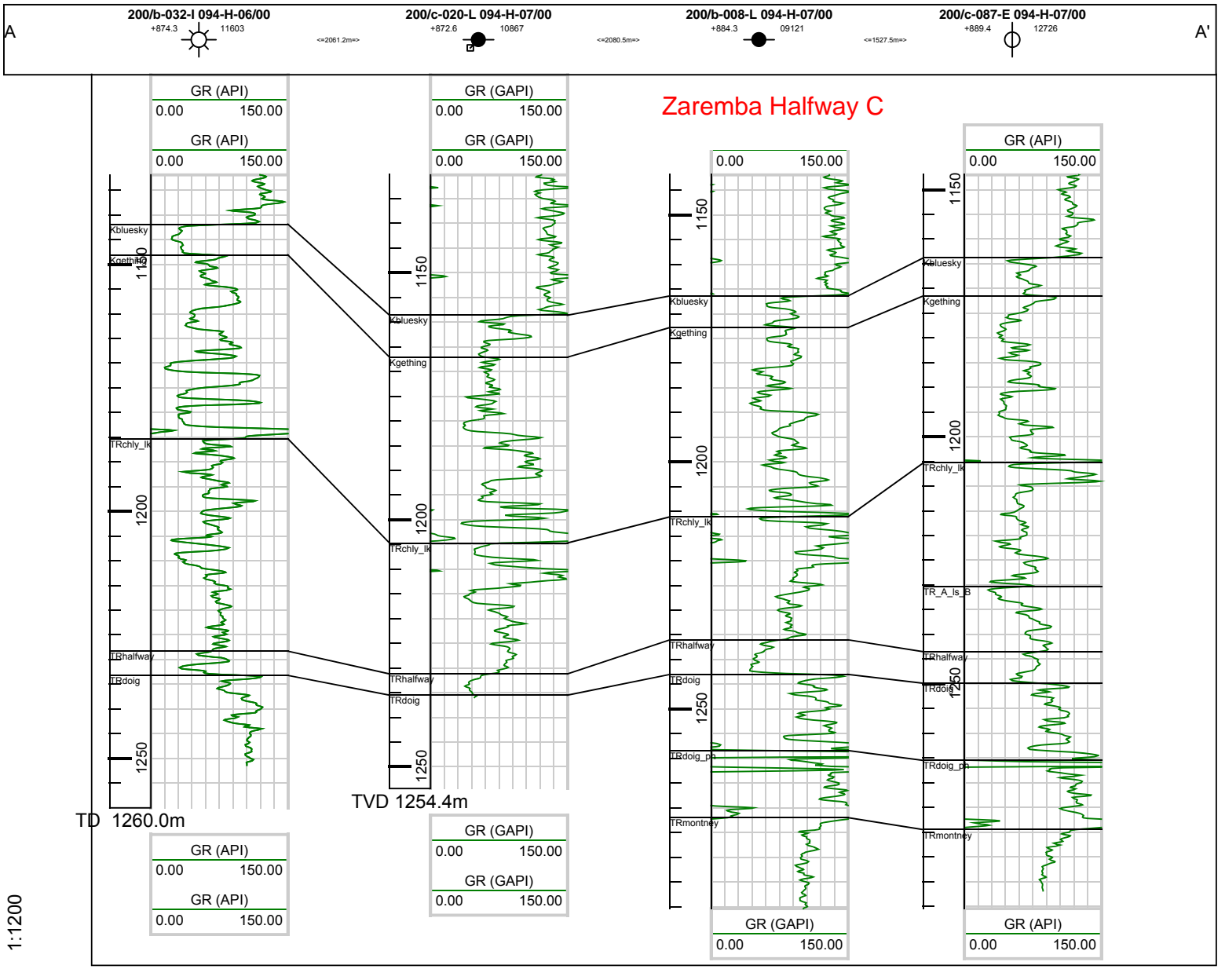
Notes: Discovery well a-30-L is directional.



Contour interval is two metres net Halfway C oil pay (Oil and Gas Commission). Discovery well is a-30-L-94-H-7.



Induction and neutron-density logs for discovery well a-30-L-94-H-7. This well is directional; the logs display measured depth. The Halfway is thin, but porous throughout.



ZAREMBA OIL FIELD
A Marker Base of Lime A Pool

Pool Parameters

Field Code: 8900 **Pool Code:** 4610A
Discovery well original name: Para et al Lapp c-077-E 094-H-07 **WA#:** 09665
Rig Release: 1996/03/14
Other Oil and Gas Shows: A Marker/Base of Lime A gas,
Number of Wells (November 2012) Oil: 1 **Gas:** 2 **Active:** 2

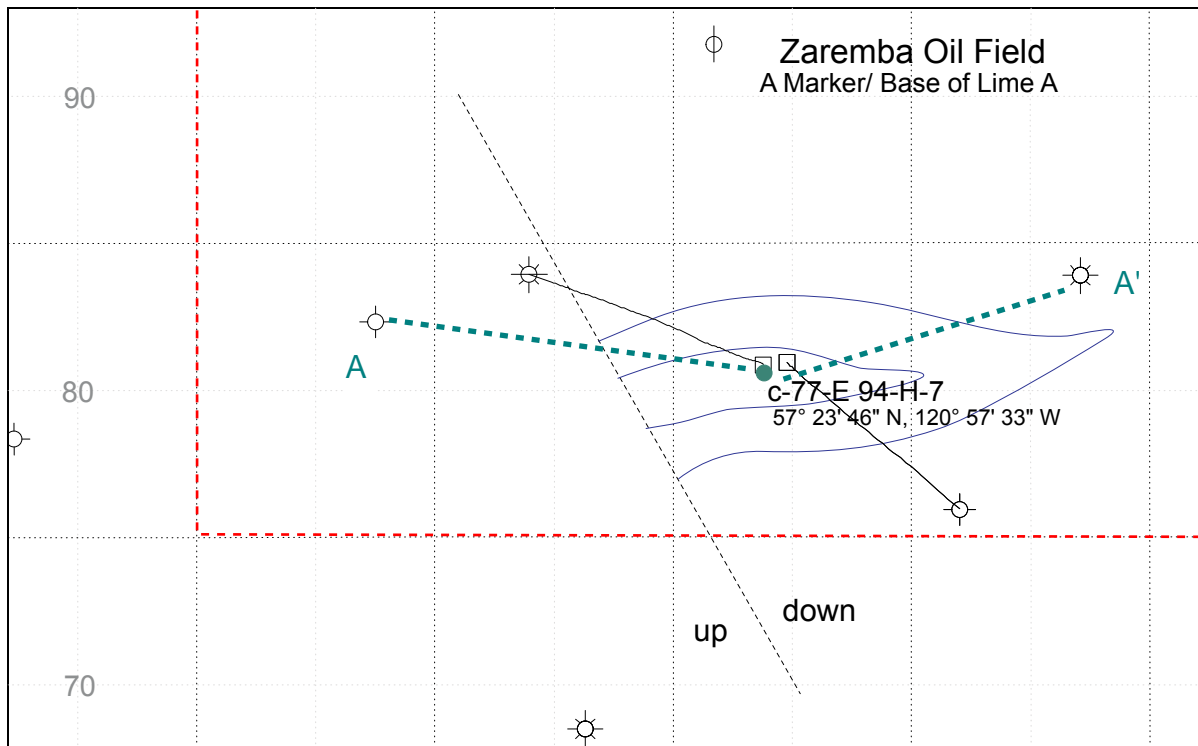
Reservoir Data

Area of Pool: 173 acres, 70 hectares
Average Depth of Producing Zone: 1240 metres
Lithology of Reservoir Rock: limestone
Trap Type: structural
Estimated Maximum Reservoir Thickness: 1.2 metres
Drive Mechanism: gas depletion
Average Porosity (%): 24
Average Net Pay: 1.1 metres
Average Permeability: no core, a DST indicates good permeability
Average Water Saturation (%): 20
Oil Formation Volume Factor (%): 117
Gravity (degrees API): 37
Original Pressure: 1140 psi, 7860 kpa

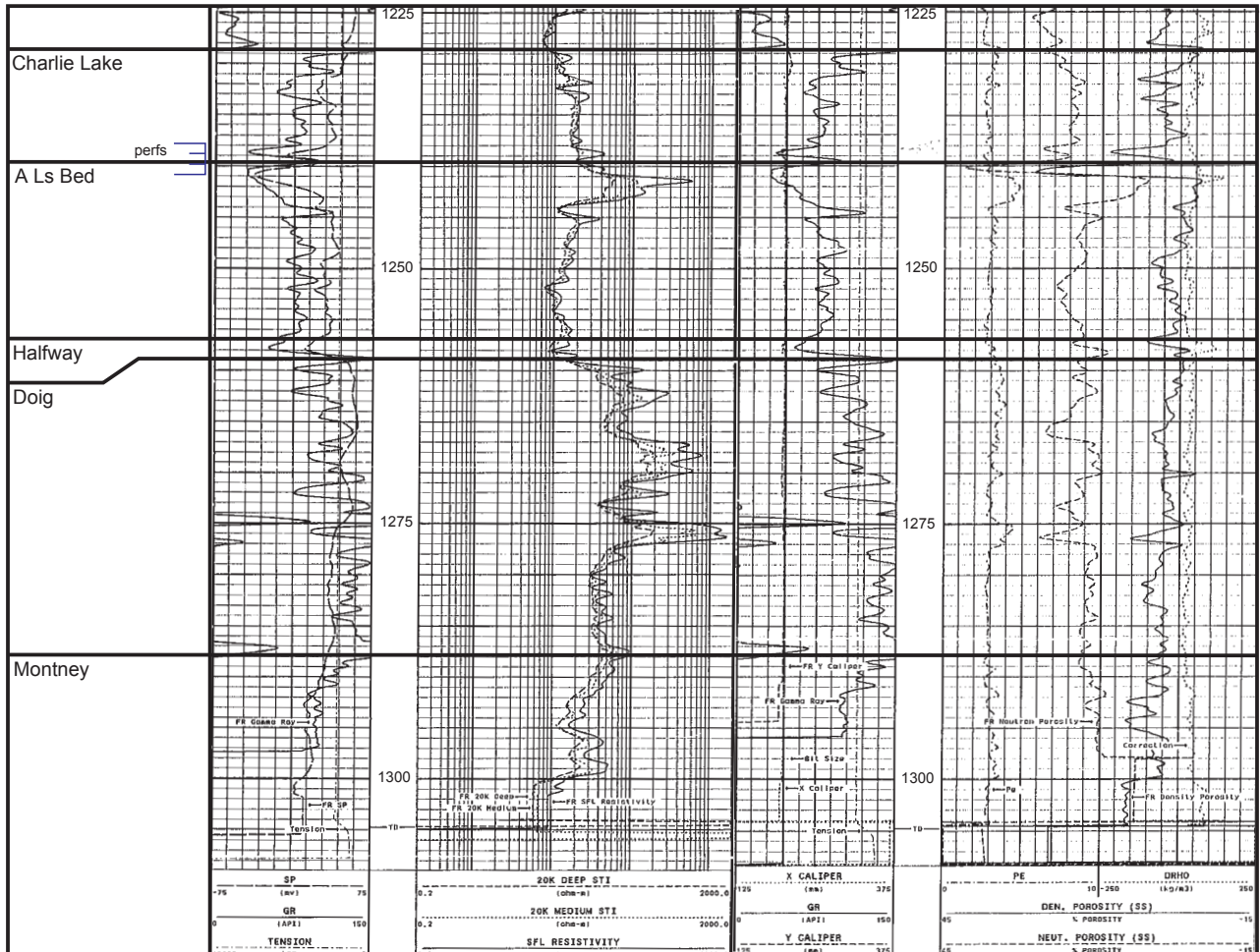
Reserves

Estimated original oil in place: 798,740 barrels, 126,990 m3
Recovery Factor (%): 20
Estimated Recoverable Oil: 159,750 barrels, 25,398 m3 (volumetric)
Cumulative Oil Production: 102,330 barrels
Remaining Recoverable Oil: 57,420 barrels
Remaining Original Oil in Place (%): 87
Cumulative Water Production: 5,300 barrels

Notes: A gas cap extends over a large area on the up-thrown side of a fault that apparently separates oil from gas. The well was initially in the Lapp field but determined to be in Zarembo field in September 1996.



Contour interval is one metre A Marker/Base of Lime A net oil pay (adapted from Oil and Gas Commission). An A Marker/Base of Lime C gas pool is on the up-thrown side of the normal fault. C-77-E/94-H-7 is the discovery well and only A Marker/Base of Lime A oil well of the pool.



Induction and neutron-density logs for discovery well c-77-E-94-H-7. The A Marker is a thin but widespread limestone bed useful as a stratigraphic marker. It also has good porosity in places as seen on the density curve.

A

A'

1967/01/07
02033

<=1237.7m=>

1996/03/14
09665

<=1042.7m=>

2006/03/21
20678

Calibration Curve Survey

DEPTH (m)	GRAPHS	INTERVAL TRANSIT TIME (microseconds per foot)
200	100	100
100	50	50
150	25	25
100	12.5	12.5

TD 1274.4m

TD 1309.0m

TD 1255.0m

Zaremba A Marker Base of Lime A

Perfs are close to the top of A Is B marker at c-77-E.
Throw of the fault between d-79-E and c-77-E is apparently slight.

ELM OIL FIELD

Gething B Pool

Pool Parameters

Field Code: 3460

Pool Code: 2700B

Discovery well original name: WISER et al ELM d-029-F 094-H-07

WA#: 09671

Rig Release: 1996/12/07

Other Oil and Gas Shows: Gething gas

Number of Wells (October 2012) Oil: 20 **Active:** 6 **Injection:** 1 **Horizontal:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1175 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 12 metres

Drive Mechanism: water flood

Average Porosity (%): 14

Average Net Pay: 7 metres

Average Permeability: 19 milliDarcies

Average Water Saturation (%): 37

Oil Formation Volume Factor (%): 131

Gravity (degrees API): 44.5

Original Pressure: 1141 psi, 7867 kPa

Reserves

Estimated original oil in place: 11,154,490 barrels, 1,773,422 m³

Recovery Factor (%): 7.5

Estimated Recoverable Oil: 836,590 barrels, 133,010 m³ (production decline)

Cumulative Oil Production: 800,570 barrels

Remaining Recoverable Oil: 36,020 barrels

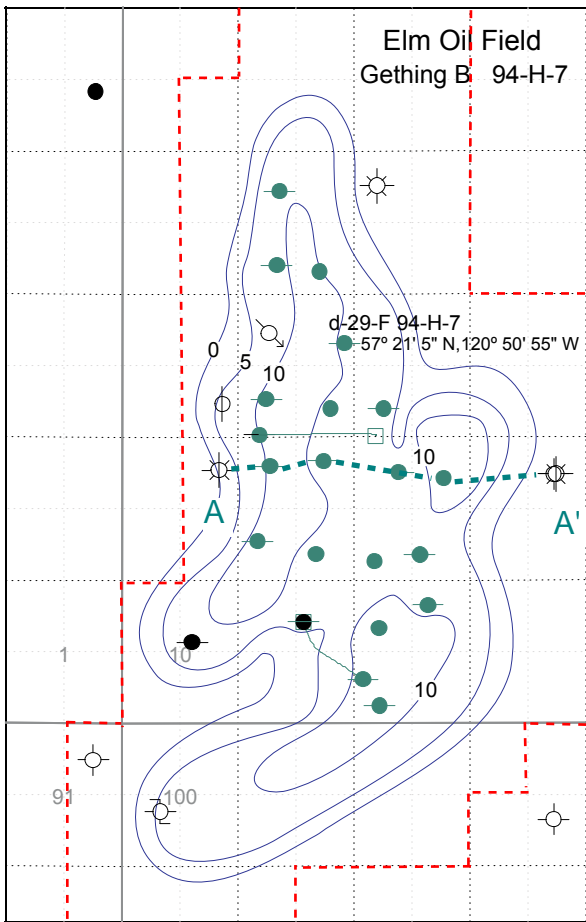
Remaining Original Oil in Place (%): 93

Cumulative Water Production: 542,850 barrels

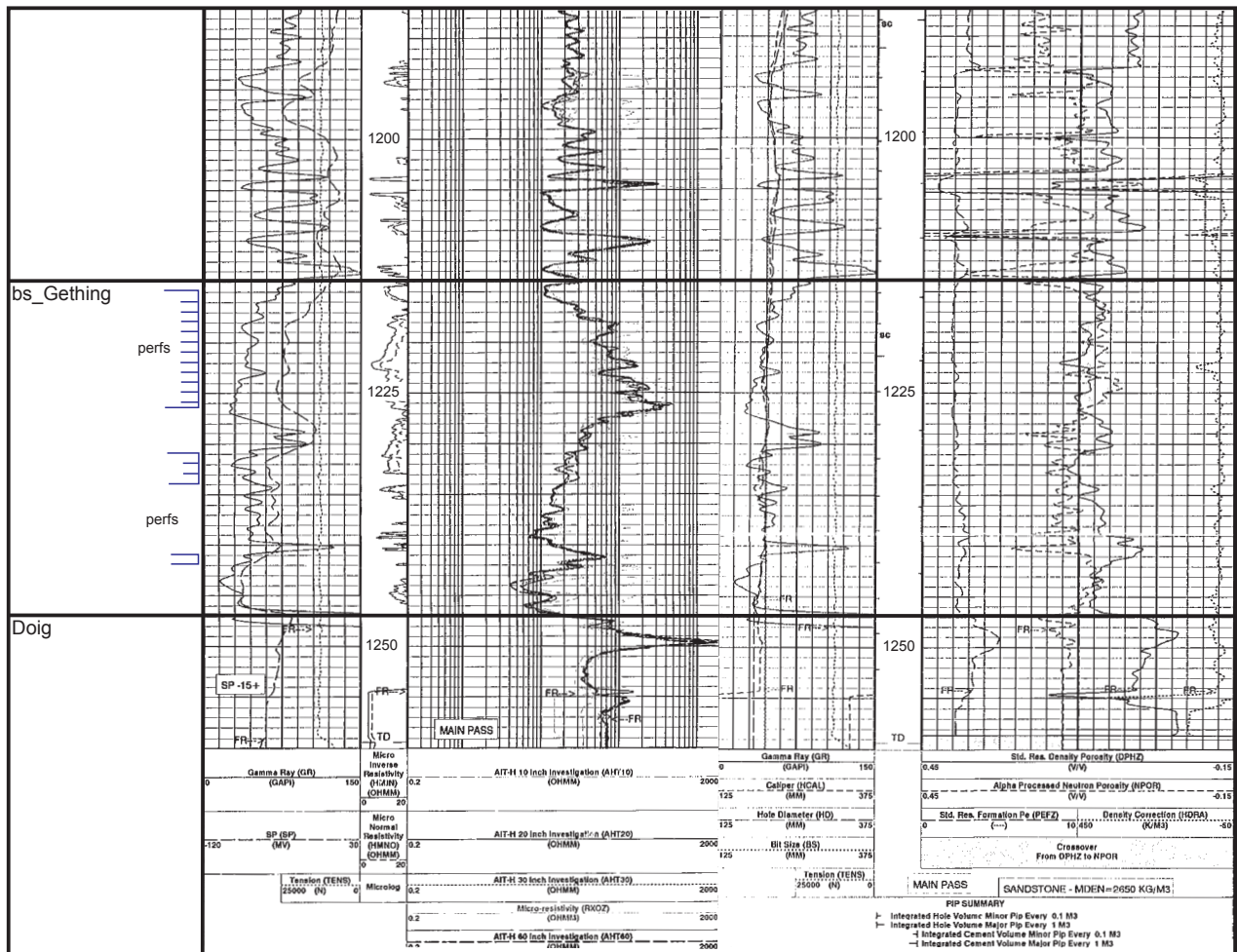
Cumulative Water Injection: 1,011,330 barrels

Notes: This pool presents horizontal drilling possibilities because the Gething sandstone appears to be adequately thick and well-defined. The lower part of the Gething might be wet, but water cut has been relatively low.

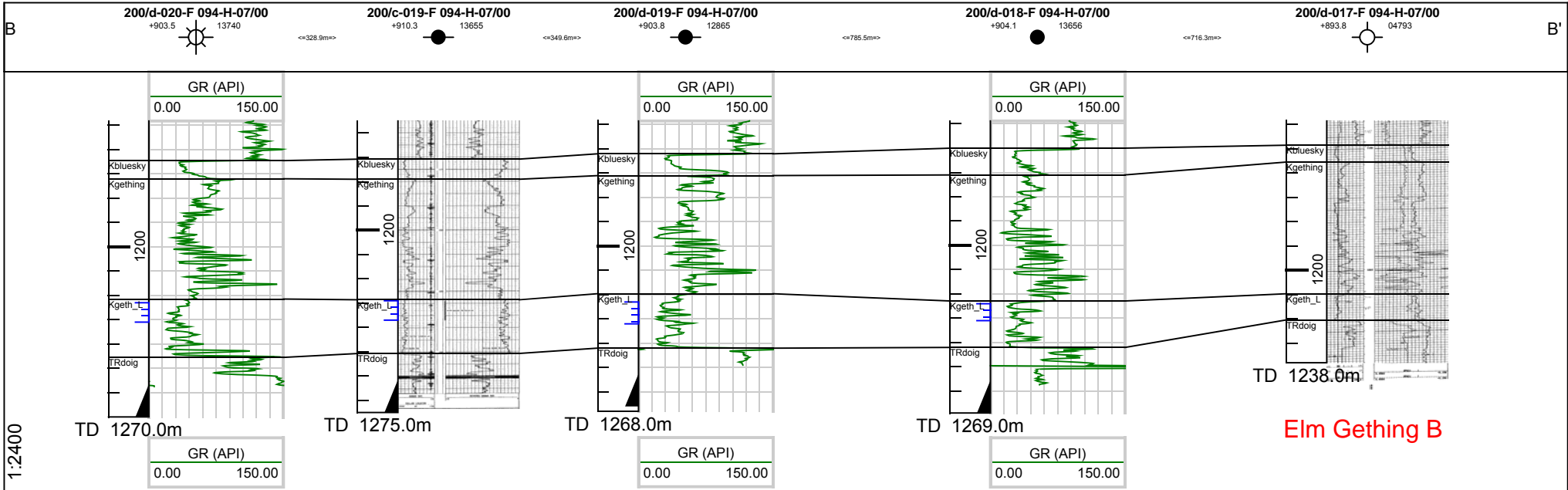
Elm Oil Field
Gething B 94-H-7



Contour interval is 5 metres net Gething B net pay (Oil and Gas Commission). Discovery well is d-29-F-94-H-7. One well is horizontal. The southern arm of the field is un-drilled.



Induction and neutron-density for discovery well d-29-F-94-H-7. Several zones within the Gething have been completed. It is picked as Basal Gething here but designated as Gething by the Oil and Gas Commission. The lowest part might be wet.



ELM OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 3460

Pool Code: 4800A

Discovery well: BRALORNE et al ELM b-062-C 094-H-07

WA#: 02856

Rig Release: 1971/01/28

Other Oil and Gas Shows: Doig gas, Halfway gas

Number of Wells (January 2013) Oil: 4 **Active:** 4 **Water Disposal:** 1

Reservoir Data

Area of Pool: 1362 acres, 551 hectares

Average Depth of Producing Zone: 3760 feet, 1145 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 24

Average Net Pay: 1.2 metres

Average Permeability: 398 milliDarcies

Average Water Saturation (%): 27

Oil Formation Volume Factor (%): 121

Gravity (degrees API): 40.6

Original Pressure: 1155 psi, 7963 kPa

Reserves

Estimated original oil in place: 6,015,960 barrels, 956,461 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 601,600 barrels, 95,647 m³ (volumetric)

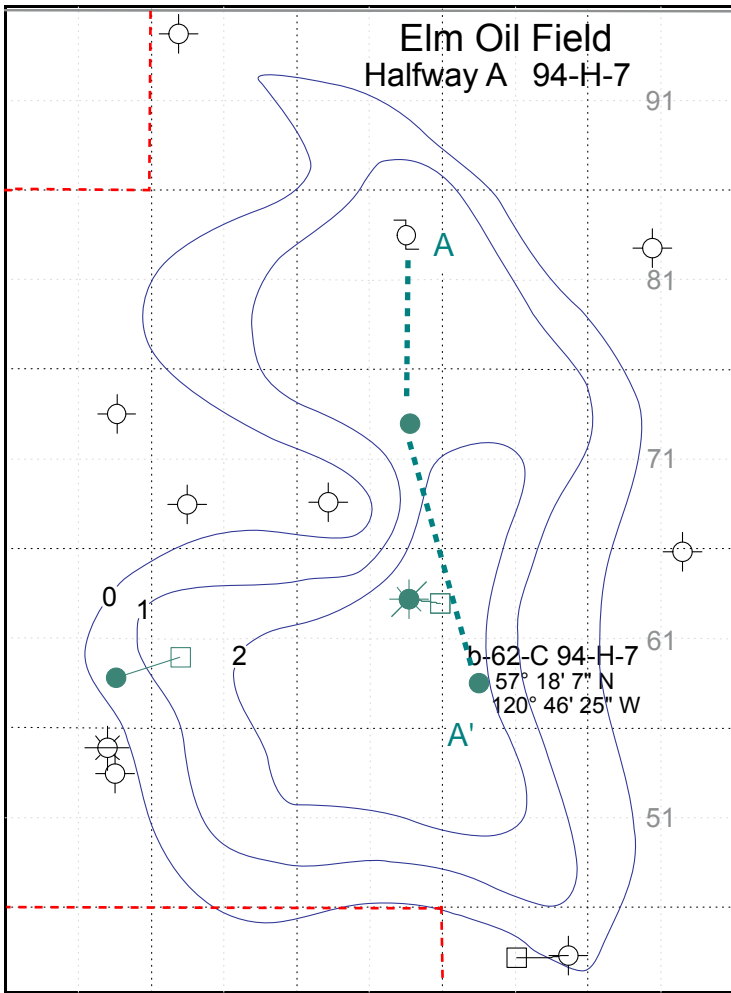
Cumulative Oil Production: 414,190 barrels

Remaining Recoverable Oil: 187,410 barrels

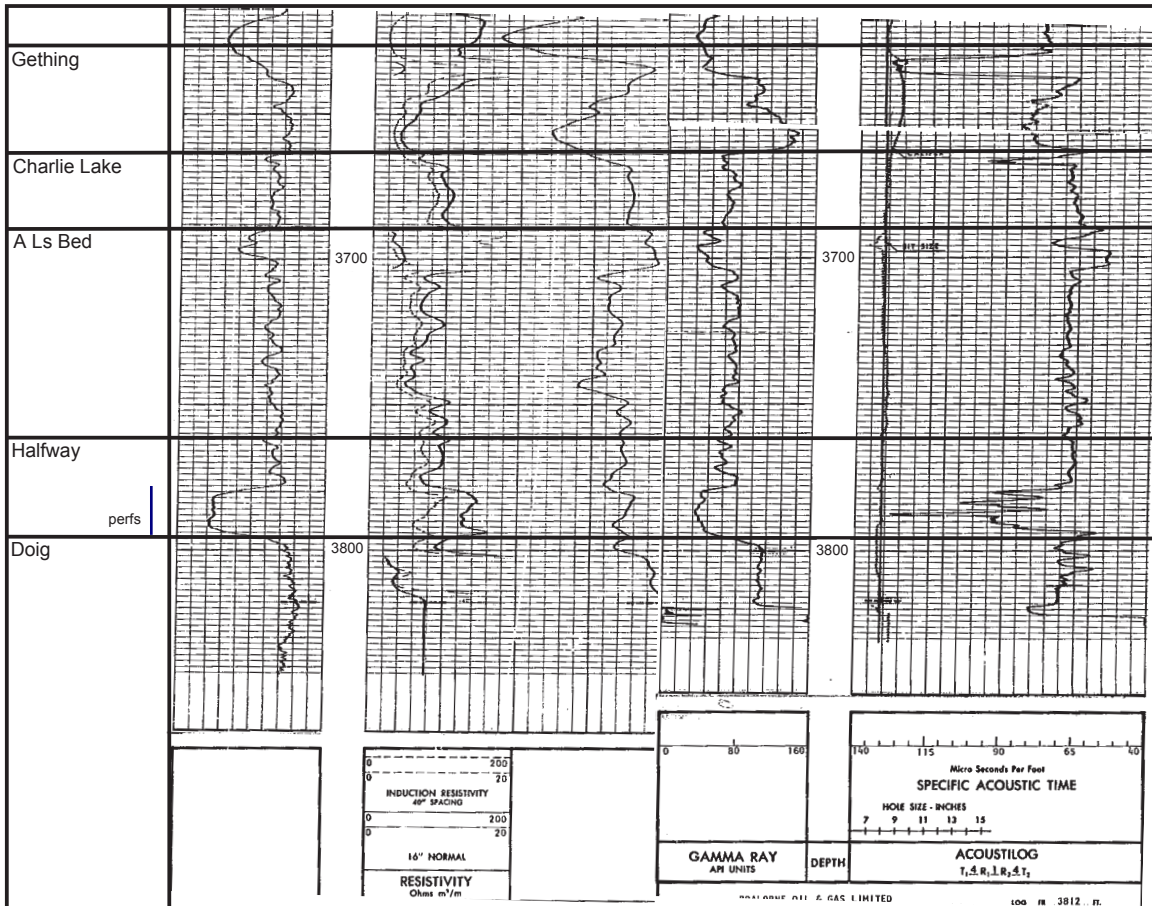
Remaining Original Oil in Place (%): 93

Cumulative Water Production: 1,152,550 barrels

Notes: The pool has a high water cut due to apparently unavoidable completion within a water leg. Perhaps more structurally favourable positions could be found in the pool for new wells, or existing perms could be squeezed and the well re-perfed higher up. The Halfway sandstone is relatively thin here, but porous and well-defined.



Contour interval is one metre Halfway A oil pay (Oil and Gas Commission). Location b-62-C is the discovery well. Location d-83-C is a disposal well for the pool.



Elog and sonic log for discovery well b-62-C/94-H-7. Perforations are over the zone of very good porosity, as indicated by the low velocity zone on the sonic log. This coincides with an apparent water leg.



1970/03/30

<=976.7m=>



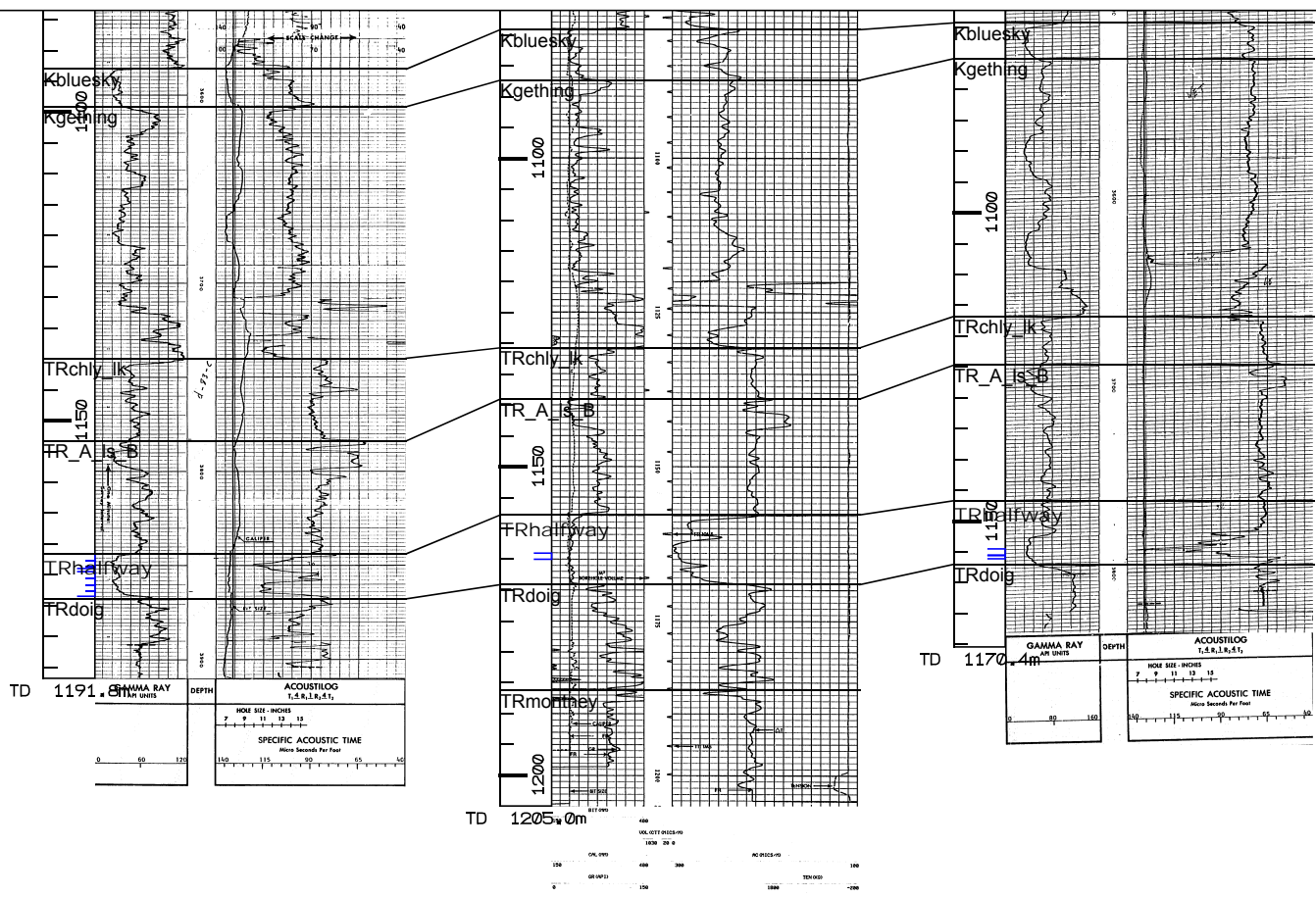
1994/03/05

<=1393.2m=>



1971/01/28

A'



Elm Halfway A

1:1200

BUBBLES NORTH OIL FIELD

Coplin A Pool

Pool Parameters

Field Code: 2240 **Pool Code:** 4540A
Discovery well original name: COGC BUBBLES c-C79A/94-G-8 **WA#:** 13390
Rig Release: 2001/03/11
Other Oil and Gas Shows: Halfway gas
Number of Producing Wells (November 2012) Oil: 2 **Active:** 2 **Injection:** 2

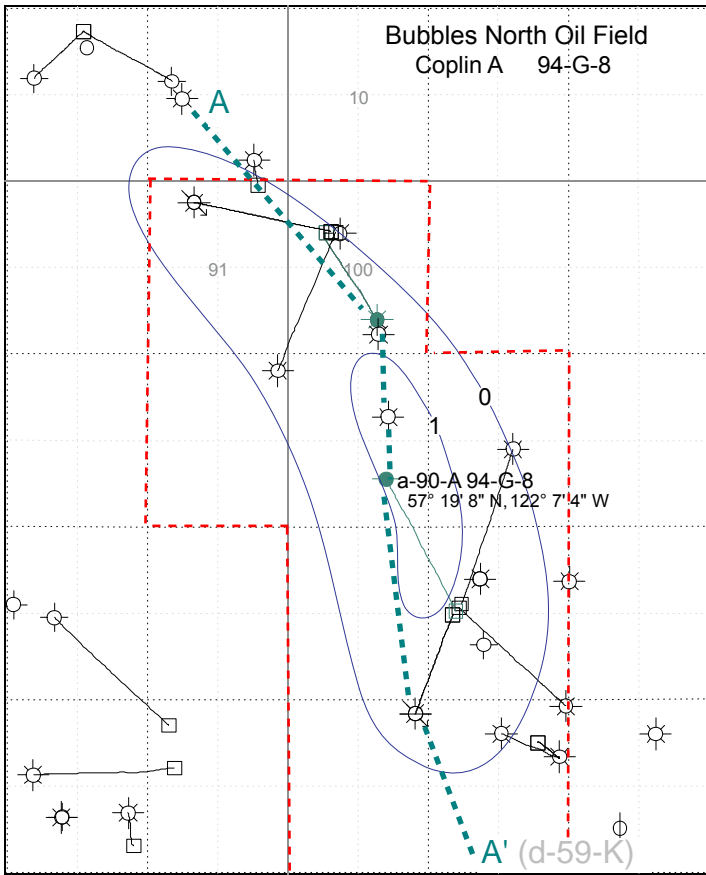
Reservoir Data

Area of Pool: 840 acres, 340 hectares
Average Depth of Producing Zone: 1418 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic-structural
Estimated Maximum Reservoir Thickness: 1.5 metres
Drive Mechanism: water flood
Average Porosity (%): 11.6
Average Net Pay: 0.6 metres
Average Permeability: not cored, no DSTs
Average Water Saturation (%): 13
Oil Formation Volume Factor (%): 143
Gravity (degrees API): 46.5
Original Pressure: 2147 psi, 14,803 kPa

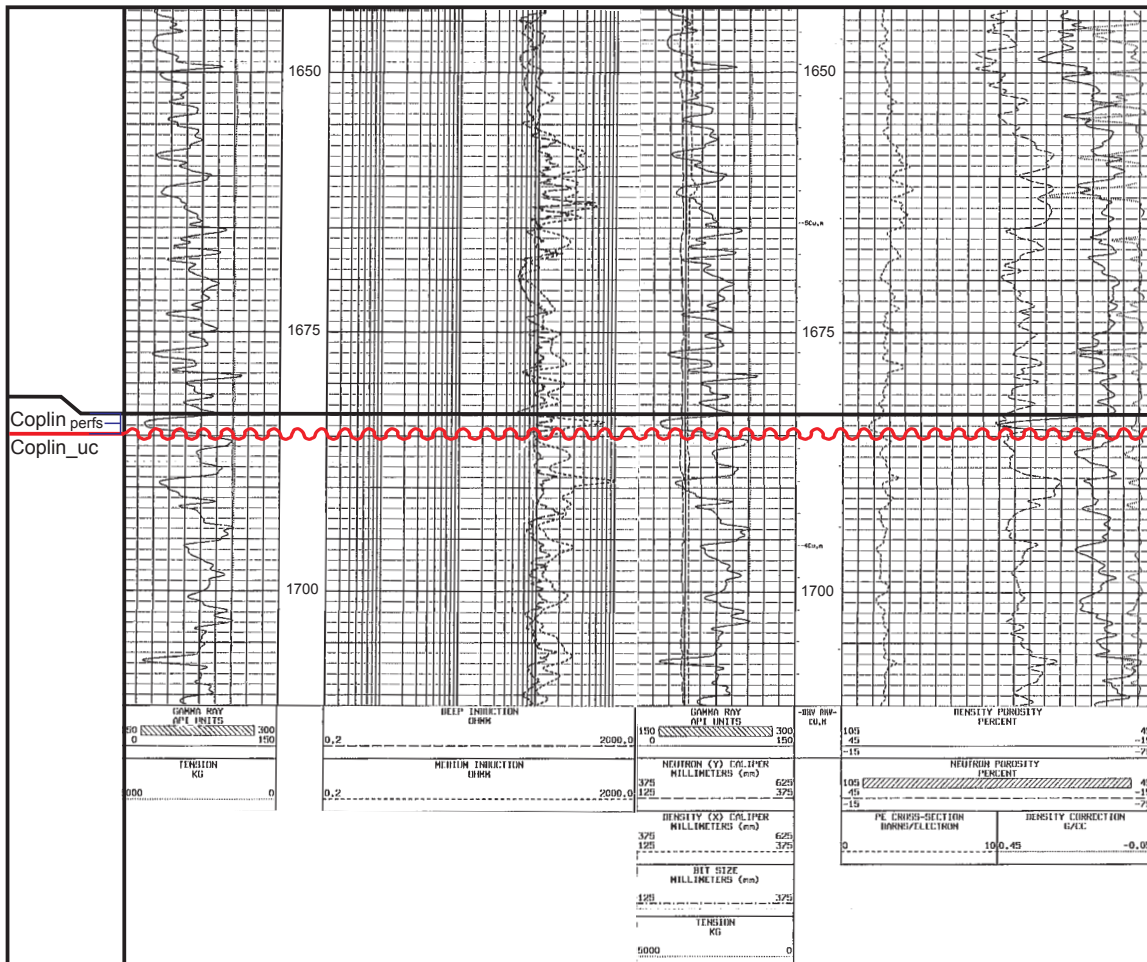
Reserves

Estimated original oil in place: 904,940 barrels, 143,874 m3
Recovery Factor (%): 40
Estimated Recoverable Oil: 361,980 barrels, 57,550 m3 (volumetric)
Cumulative Oil Production: 240,800 barrels
Remaining Recoverable Oil: 121,180 barrels
Remaining Original Oil in Place (%): 73
Cumulative Water Production: 4,980 barrels
Cumulative Water Injection: 1,287,260 barrels

Notes: Both producing oil wells in this pool are directional. The bottom hole location of the discovery well is a-90-A/94-G-8. Water flood might be needed to produce any oil. The Bubbles area is on the edge of the disturbed belt and the Triassic section is lightly folded. Erosion of strata in deep channels also controls the extent of these Triassic reservoirs.



Contour interval is one metre Coplin A net oil pay (supplied by the Oil and Gas Commission). Both discovery well a-90-A -94-G-8 and a-100-A are directional



Induction and neutron-density logs for discovery well a-90-A (c-C79-A). The Coplin is a thin sandstone resting unconformably, and discontinuously, above the lower Charlie Lake Formation.

LAPRISE CREEK OIL FIELD
Coplin B Pool

Pool Parameters

Field Code: 5600 **Pool Code:** 4540B
Discovery well original name: SOUTHPOINT et al LAPRISE b-A56H/94-G-8 **WA#:** 16377
Rig Release: 2003/09/04
Other Oil and Gas Shows: Baldonnel gas, Bluesky gas
Number of Wells (October 2012) Oil: 8 **Active:** 3

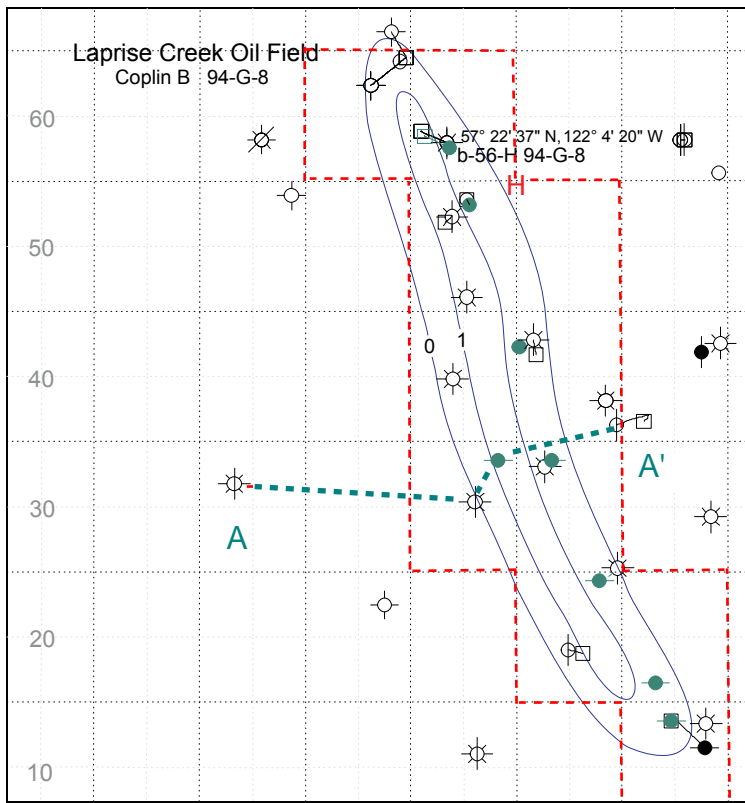
Reservoir Data

Area of Pool:
Average Depth of Producing Zone: 1378 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 1.5 metres
Drive Mechanism: gas depletion
Average Porosity (%): 11
Average Net Pay: 0.6 metres
Average Permeability: 87 milliDarcies
Average Water Saturation (%): 12
Oil Formation Volume Factor (%): 143
Gravity (degrees API): 78
Original Pressure: 1855 psi, 12790 kPa

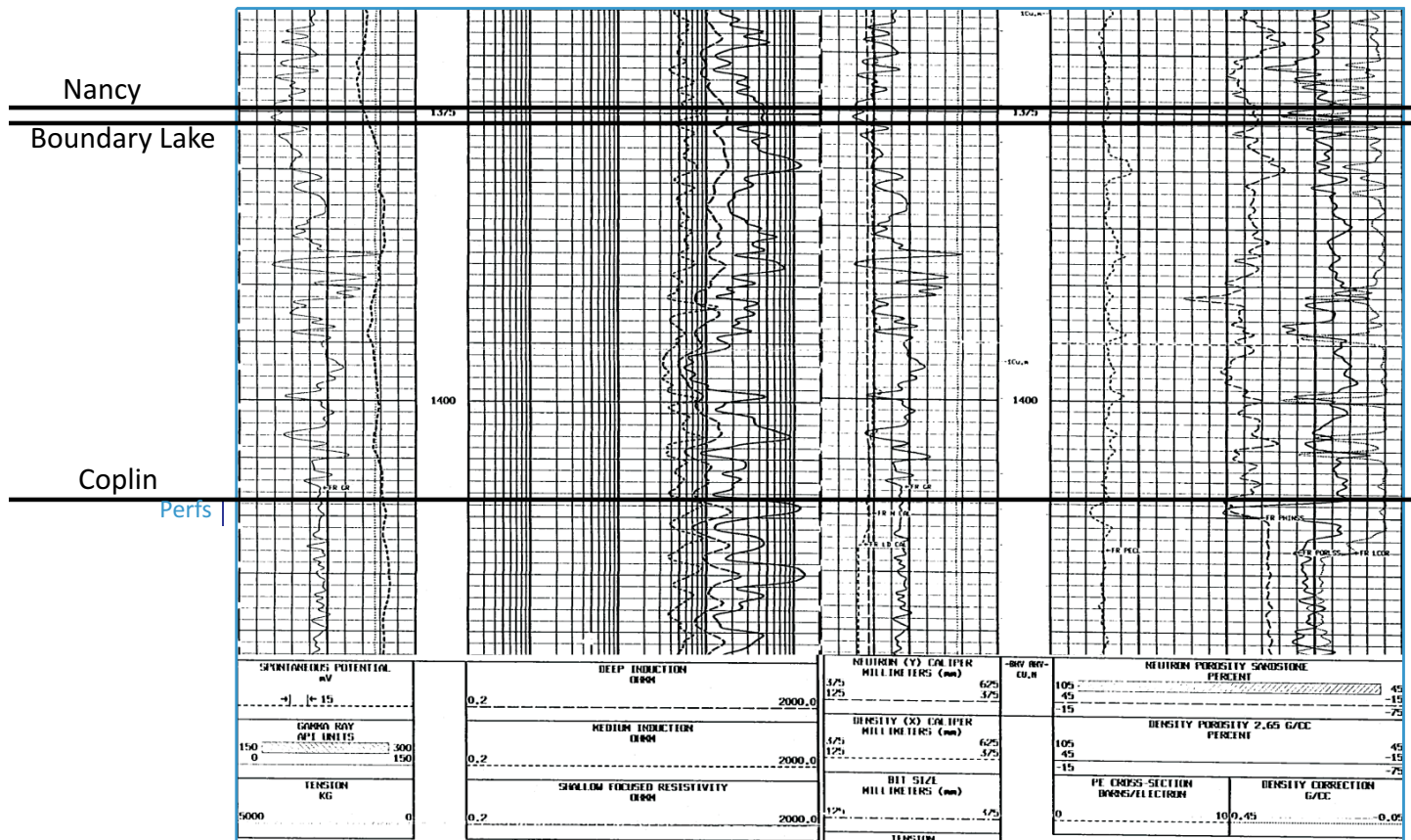
Reserves

Estimated original oil in place: 1,806,050 barrels, 287,139 m3
Recovery Factor (%): 30
Estimated Recoverable Oil: 541,820 barrels, 86,143 m3 (material balance)
Cumulative Oil Production: 450,500 barrels
Remaining Recoverable Oil: 91,320 barrels
Remaining Original Oil in Place (%): 75
Cumulative Water Production: 2,860 barrels

Notes: Water cut is very low. API is high. Discovery well ID is now given as 202/b-056-H 094-G-08/00.



Contour interval is one metre net Coplin B oil pay (Oil and Gas Commission). Discovery well 202/b-56-H-94-G-8 is in the northern part of the field.



Induction and neutron-density logs for discovery well b-56-H/94-G-8. The Coplin is a thin but porous streak. Water saturation is low. These logs are measured depth. TVD is 1407.5 metres; measured depth is 1440 metres.

A



2002/02/04 <=1721.5m=>



2003/11/01 <=338.6m=>

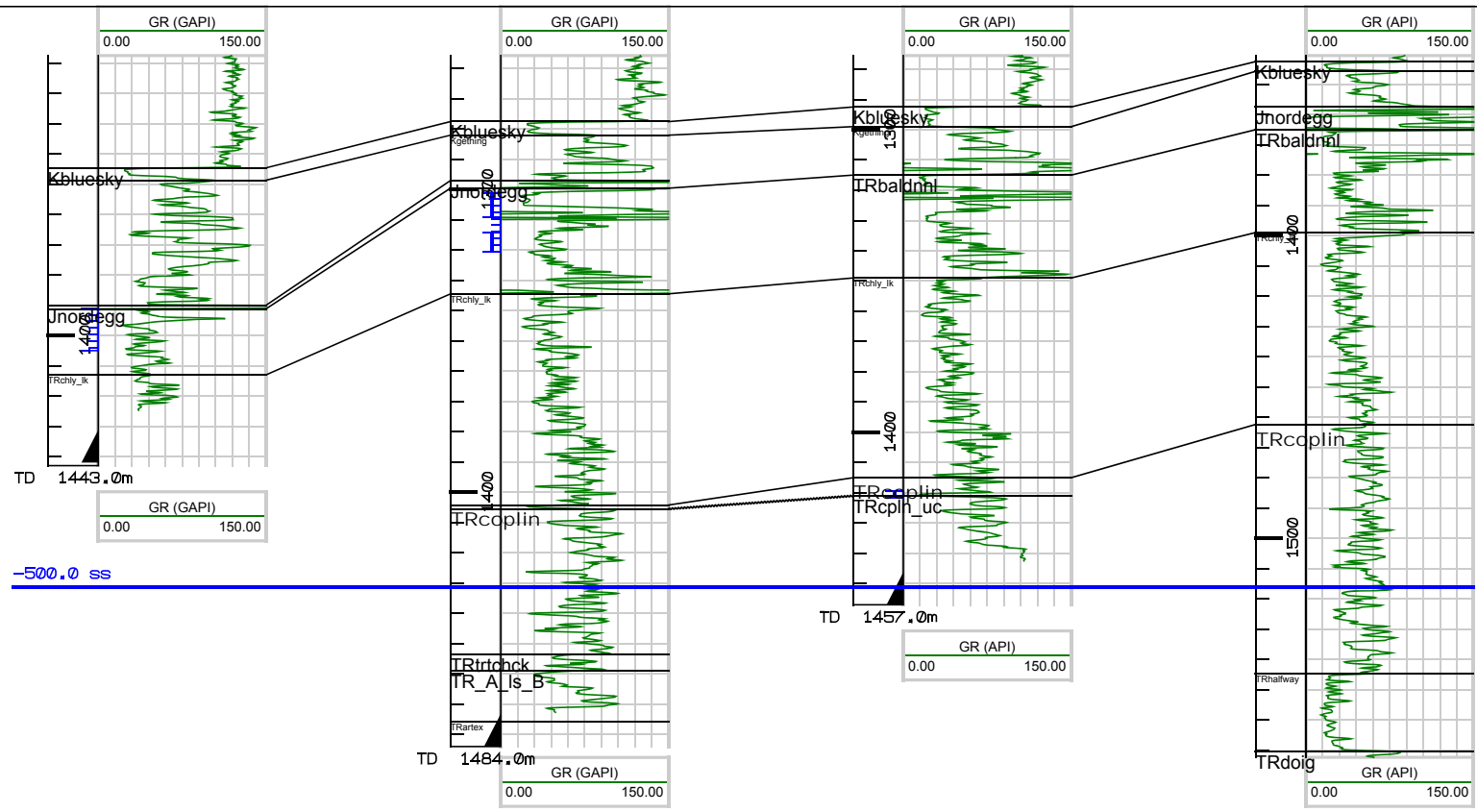


2005/03/11 <=879.5m=>



2006/09/12

A'



Laprise Creek Coplin B

CHINCHAGA RIVER OIL FIELD

Lower Charlie Lake / Montney A Pool

Pool Parameters

Field Code: 2985

Pool Code: 4995A

Discovery well original name: CANHUNTER CHINCHAGA a-078-A 094-H-08 **WA#:** 08454

Rig Release: 1994/01/22

Other Oil and Gas Shows: Gething gas, Charlie Lake gas

Number of Wells (November 2012) Oil: 8 Gas: 123 Active: 108

Reservoir Data

Area of Pool: 1458 acres, 590 hectares

Average Depth of Producing Zone: 970 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 15

Average Net Pay: 3.5 metres

Average Permeability: 9 milliDarcies

Average Water Saturation (%): 50

Oil Formation Volume Factor (%): 110.5

Gravity (degrees API): 33

Original Pressure: 958 psi, 6605 kPa

Reserves

Estimated original oil in place: 8,901,830 barrels, 1,415,278 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 445,090 barrels, 70,764 m³ (volumetric)

Cumulative Oil Production: 191,400 barrels

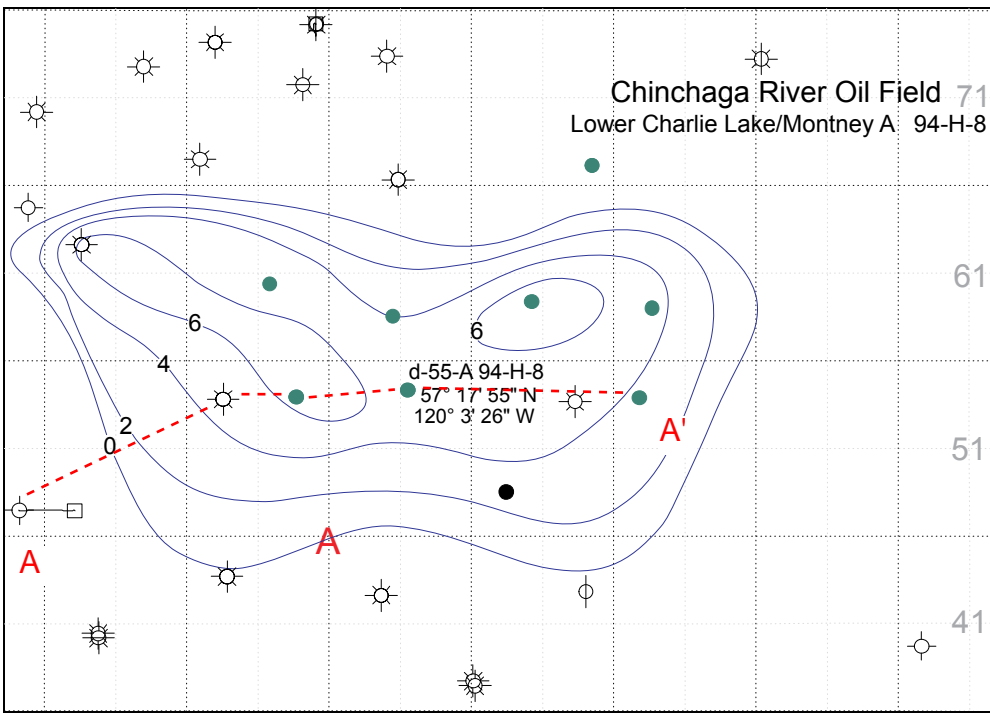
Remaining Recoverable Oil: 253,700 barrels

Remaining Original Oil in Place (%): 98

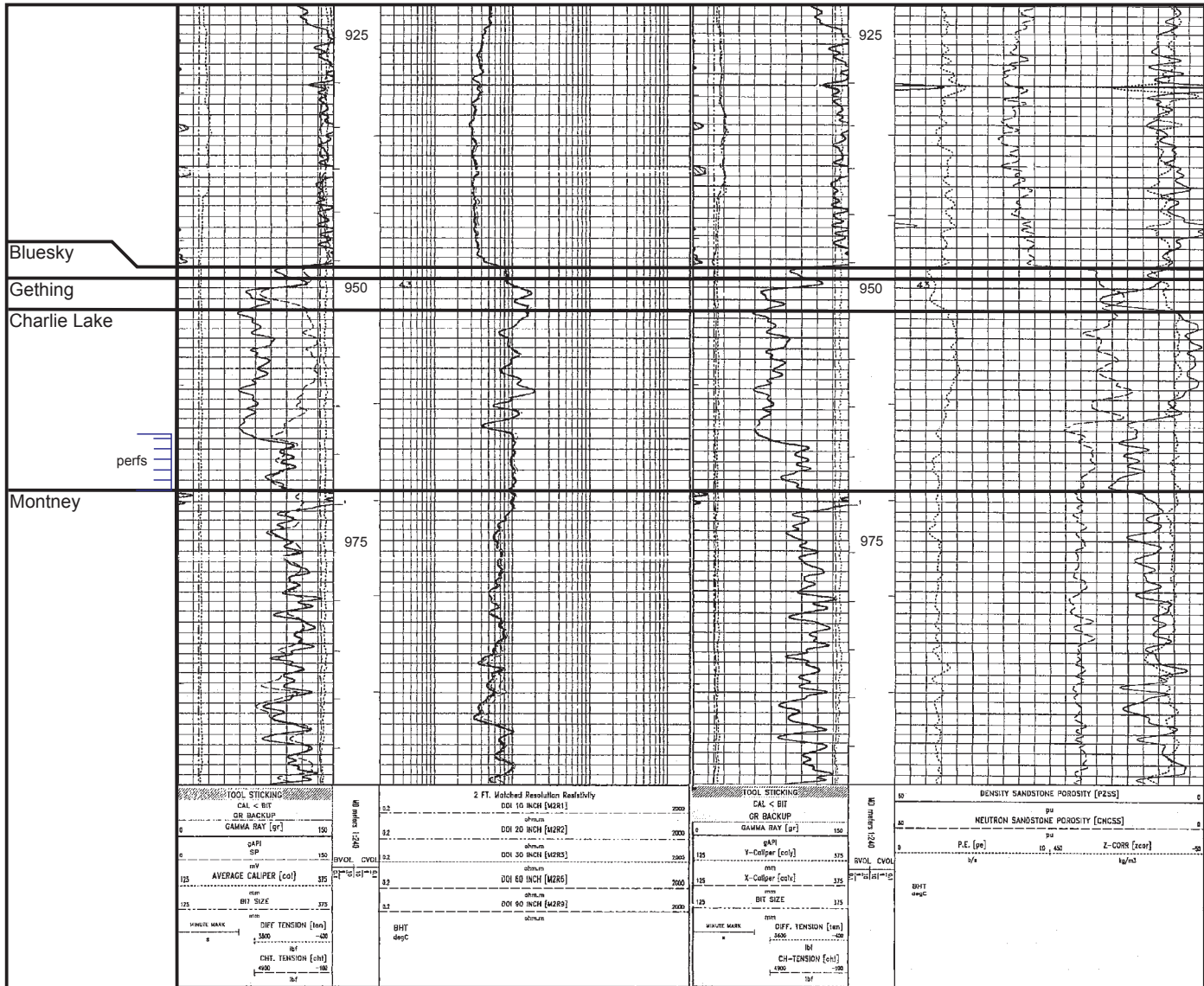
Cumulative Water Production: 1,805,220 barrels

Notes: Permeability is low in the Montney; it was fracked upon completion. The recovery factor is remarkably low. The water cut is high as indicated by barrels of produced water. Discovery well a-78-A is in the gas cap of the pool.

Chinchaga River Oil Field 71
Lower Charlie Lake/Montney A 94-H-8



Discovery well a-78-A-94-H-8 is a gas well in the gas cap part of the pool. Location d-55-A-94-H-8 is in the middle of the oil pool. Contour interval (adapted from Oil and Gas Commission) is 2 metres Lower Charlie Lake / Montney A net oil pay.



Induction and neutron-density curves for d-55-A. Oil is produced from the porous but shaly bed just above the Montney.

200/a-058-A 094-H-08/00

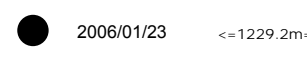
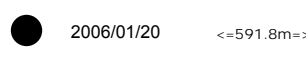
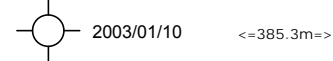
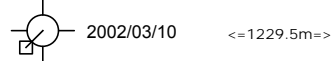
200/c-056-A 094-H-08/00

200/d-056-A 094-H-08/00

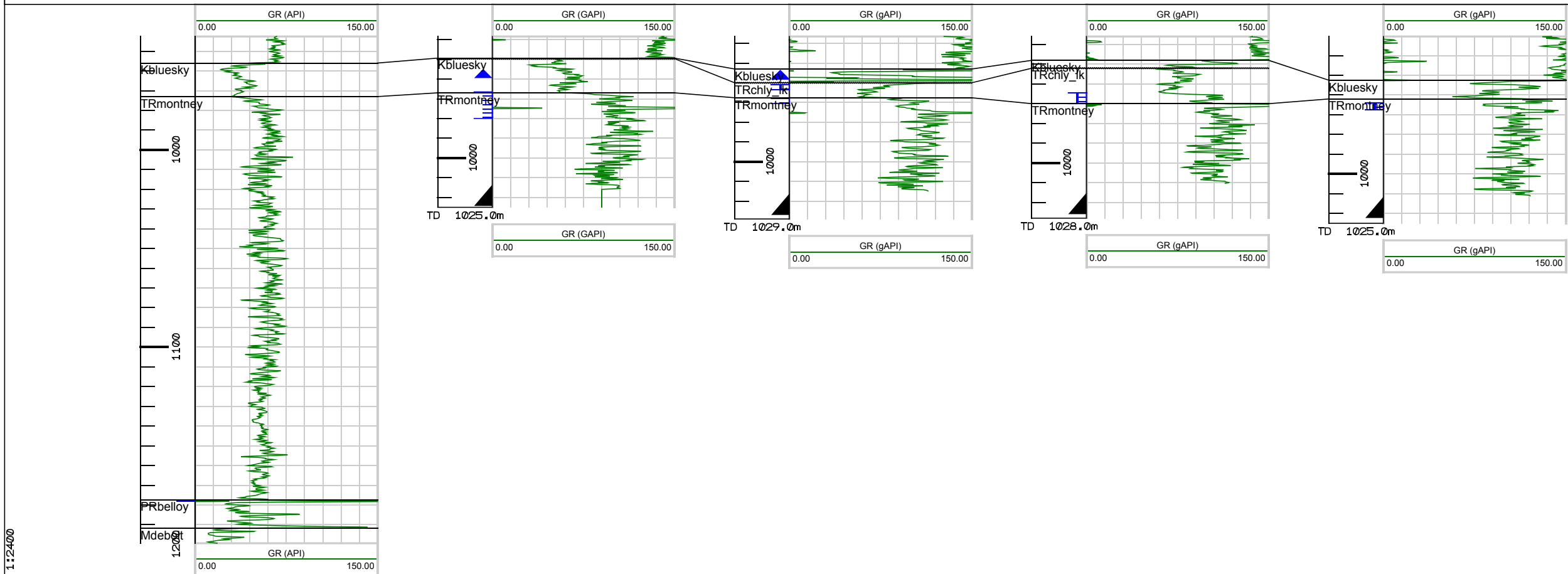
200/d-055-A 094-H-08/00

200/c-053-A 094-H-08/00

A



A'



Chinchaga River Structural

BEATTON RIVER OIL FIELD

Halfway G Pool

Pool Parameters

Field Code: 0400

Pool Code: 4800G

Discovery well original name: Unocal Suncor Beatton a-023-K/94-H-2

WA#: 06630

Rig Release: 1987/02/10

Other Oil and Gas Shows:

Number of Wells (November 2012) Oil: 7 Injection: 1 Active: 4

Reservoir Data

Average Depth of Producing Zone: 1120 metres

Lithology of Reservoir Rock: Sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 5 metres

Area of Pool (acres/hectares): not calculated; contours are not closed to north

Drive Mechanism: water flood

Average Porosity (%): 19

Average Net Pay: 3.7 metres

Average Permeability: 20 millidarcies

Average Water Saturation (%): 36

Oil Formation Volume Factor (%): 115

Gravity (degrees API): 38

Original Pressure (psi/kpa): 1136 psi, 7833 kpa

Reserves

Estimated Original Oil in Place: 9,867,220 barrels, 1,568,760 m3

Recovery Factor (%): 30

Estimated Recoverable Oil: 2,960,170 barrels, 470,629 m3 (production decline)

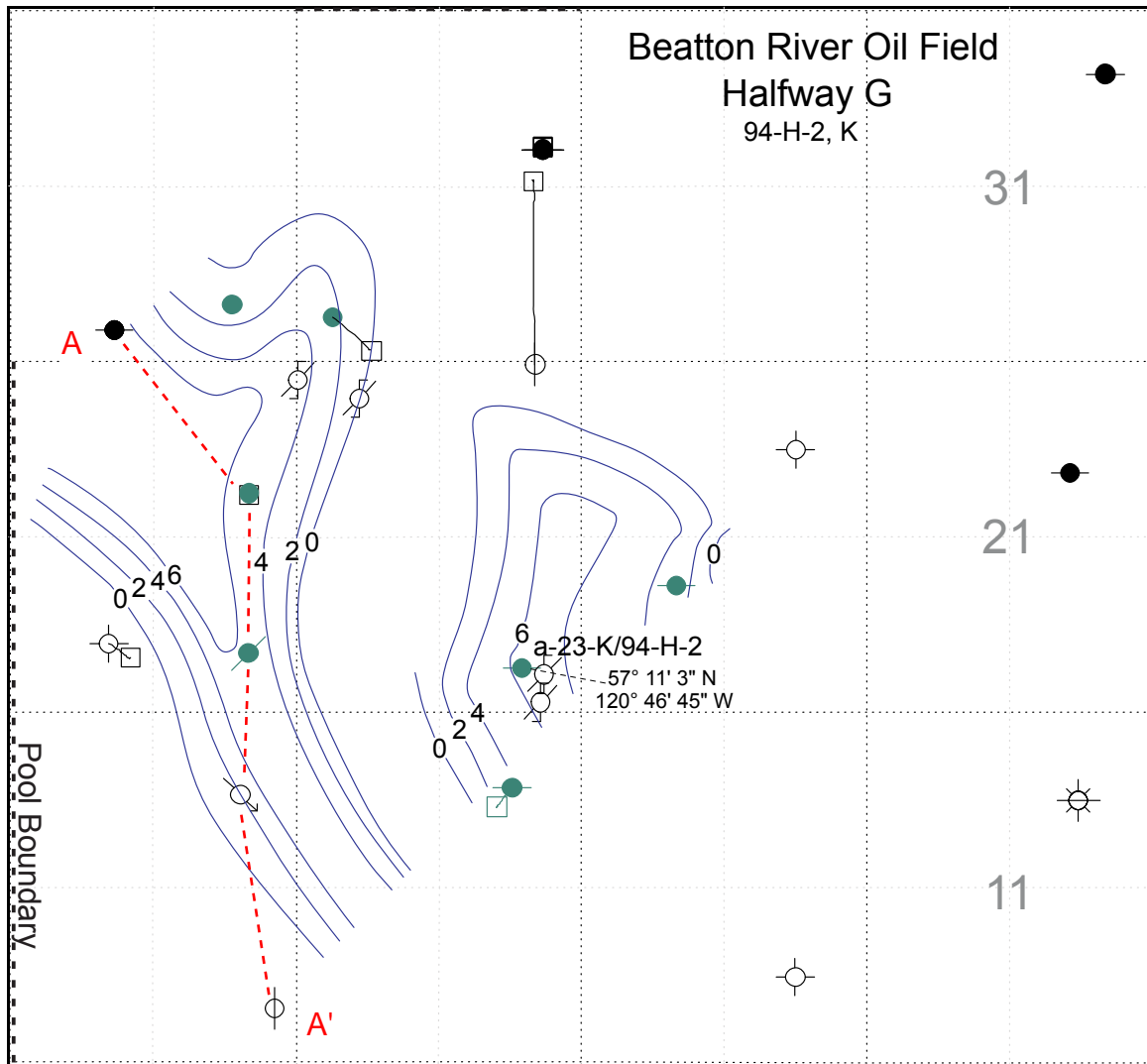
Cumulative Production (May 2012): 2,671,200 barrels

Remaining Recoverable Oil: 288,970 barrels

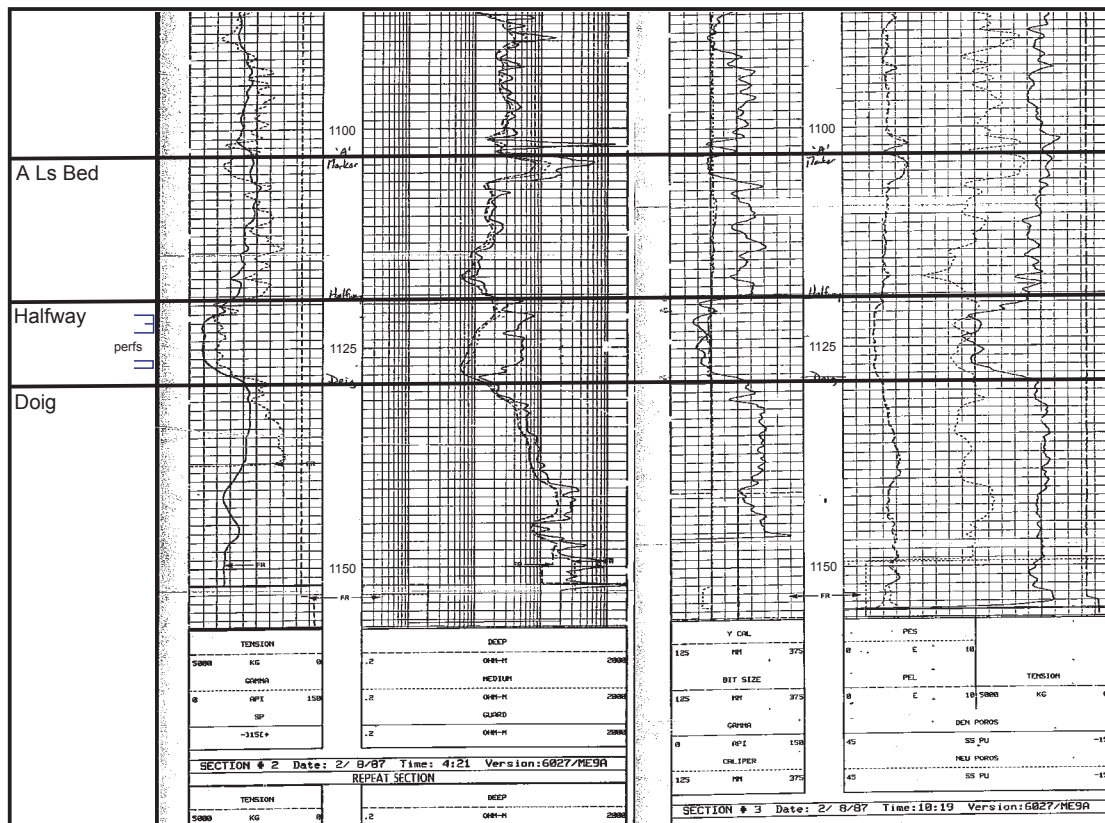
Remaining Original Oil in Place (%): 73

Cumulative water Production: 6,388,480 barrels

Notes: All wells drilled in the Beatton River Halfway oil pools are vertical. Horizontal drilling might result in good oil recovery because the Halfway formation has adequate thickness and extent, and is capped with a porous coquina. High water cut might be due to initial perms extending into a water leg at around 1125 metres. Several water source wells drilled within the pool provide information on the shallow subsurface. An injection well at d-14-K was converted from oil production. Ministry mapping in 1997 does not show a fault truncating the southern end of the pool. Fracking to boost recovery was done on the Halfway.



The Beatton River oilfield is comprised of seven oil wells and one injector. The Oil and Gas Commission has contoured two apparent different accumulations for the Halfway G. They suggest communication between the two parts by an underlying aquifer and a leaky normal fault. The Halfway is deposited in linear depressions on an eroded Doig surface. The depressions may be influenced by normal faults (GSC 87-26). The contours are truncated by assumed normal faults.



Induction and Neutron-Density logs for discovery well a-23-K/94-H-2. A water contact might be present at around 1125 metres. A thin gas cap is indicated by neutron-density crossover at 1121 metres. Completion is in two separate intervals of relatively higher porosity. Some place the A marker below the thin limestone bed.

A

1998/01/29 <=559.4m=>

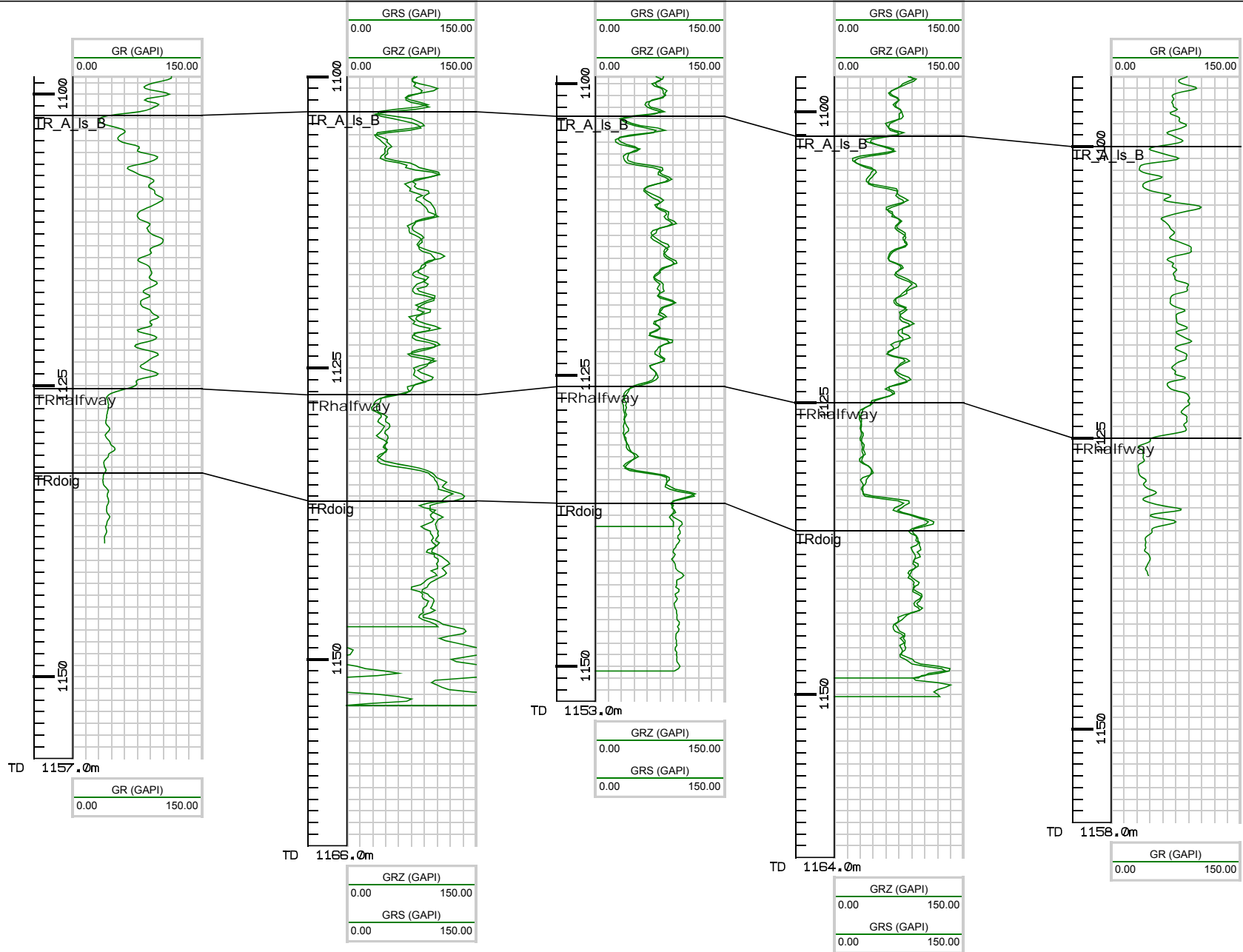
1987/03/31=424.2m=>

1990/02/24=374.0m=>

1990/12/23 <=573.6m=>

2005/11/03

A'



Beaton River Halfway G

MILLIGAN CREEK OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 6000 **Pool Code:** 4800A
Discovery well original name: Northcor et al Milligan b-015-J/94-H-2 **WA#:** 06833
Rig Release: 1988/02/20
Other Oil and Gas Shows: Halfway gas, Bluesky gas
Number of Wells (October 2012) Oil: 29 **Gas:** 1 **Injection:** 16 **Active:** 5

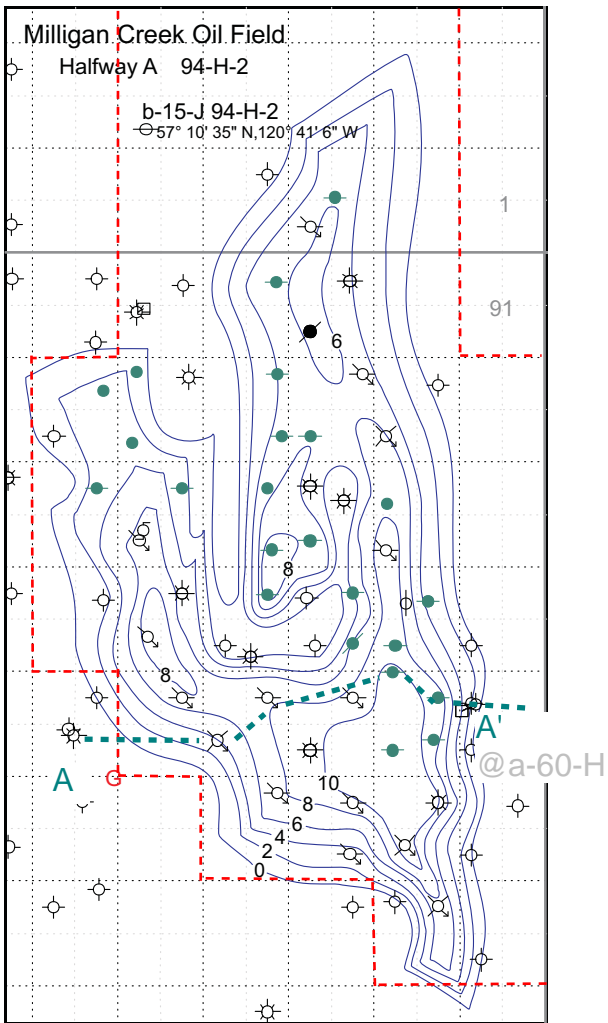
Reservoir Data

Area of Pool:
Average Depth of Producing Zone:
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 11 metres
Drive Mechanism: water flood
Average Porosity (%): 24
Average Net Pay: 5.4 metres
Average Permeability: 507 milliDarcies
Average Water Saturation (%): 19
Oil Formation Volume Factor (%): 116
Gravity (degrees API): 39
Original Pressure: 1166 psi, 8039 kPa

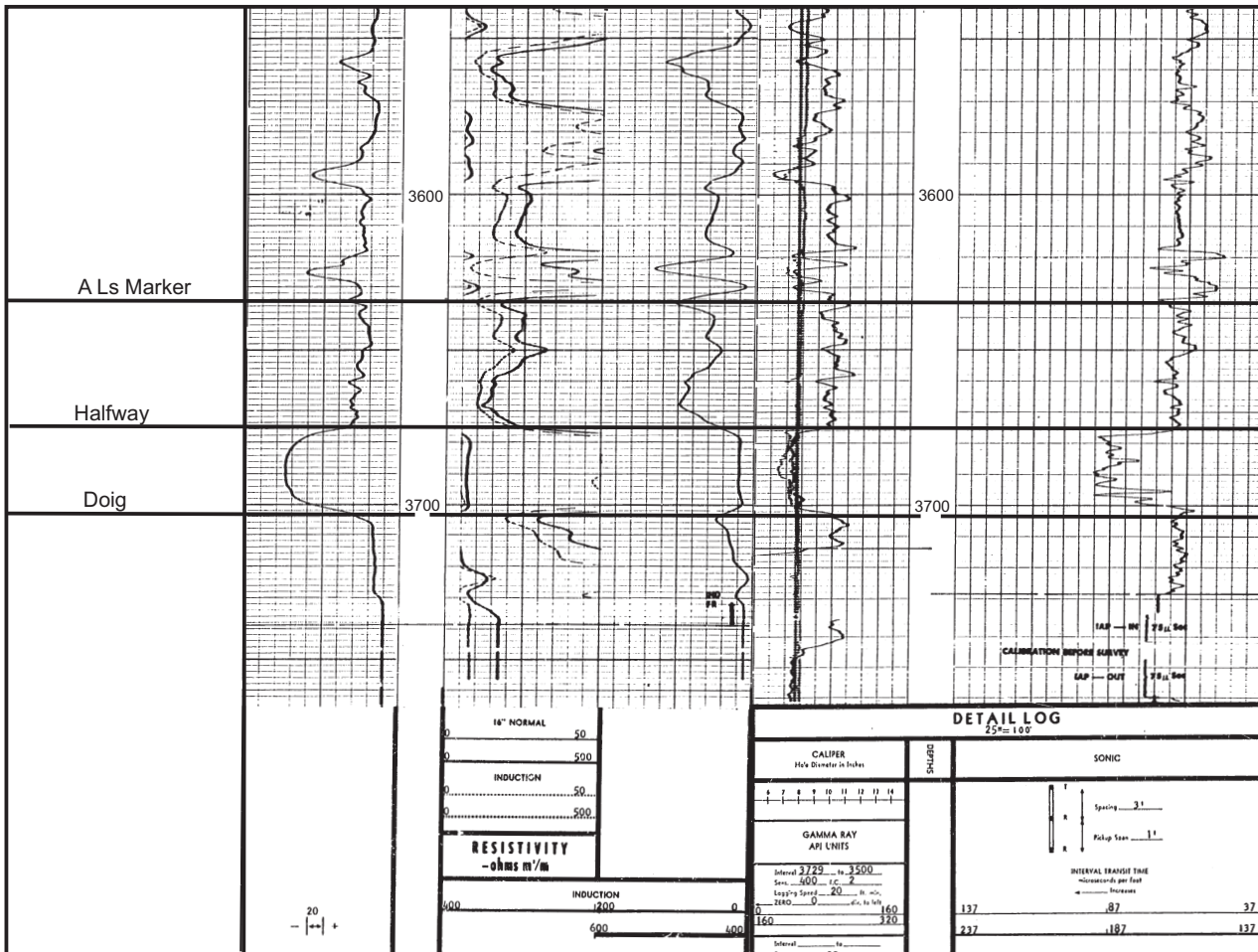
Reserves

Estimated original oil in place: 88,116,490 barrels, 14,009,400 m³
Recovery Factor (%): 53
Estimated Recoverable Oil: 46,820,260 barrels, 7,443,630 m³ (production decline)
Cumulative Oil Production: 46,477,110 barrels
Remaining Recoverable Oil: 343,150 barrels
Remaining Original Oil in Place (%): 47.3
Cumulative Water Production: 86,001,000 barrels
Cumulative Water Injection: 140,540,500 barrels

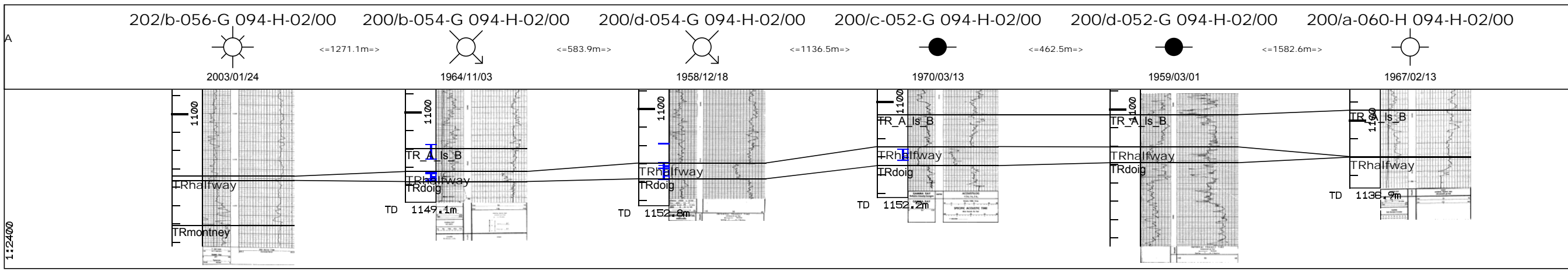
Notes: Discovery well b-15-J is within the gas cap portion of the field, which extends in an elongate form to the north. Milligan Creek oil play is considered to be sandstones of the discontinuous phase of the Halfway infilling erosional depressions (Podruski et al, 1988). A tremendous amount of water has been injected.



Contour interval is two metres of Halfway A oil pay. Discovery well b-15-J/94-H-2 is within the gas leg of the field.



Elog and sonic logs for c-72-G/94-H-2, which is within the oil leg of the field. Very good porosity is displayed within a thick and continuous sand body (possible barrier bar).



Milligan Creek Halfway A

MIKE OIL FIELD

Bluesky A Pool

Pool Parameters

Field Code: 5880

Pool Code: 2600A

Discovery well original name: Brascan et al Mike d-053-H/94-H-3

WA#: 03463

Rig Release: 1974/02/10

Other Oil and Gas Shows: Bluesky gas, Notikewin gas

Number of Wells (October 2012) Oil: 1 **Gas:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1033 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 20

Average Net Pay: 2.4 metres

Average Permeability: 253 milliDarcies (calculated from DST)

Average Water Saturation (%): 17

Oil Formation Volume Factor (%): 114

Gravity (degrees API): 42

Original Pressure: 1109 psi, 7646 kPa

Reserves

Estimated original oil in place: 6,129,260 barrels, 974,474 m³

Recovery Factor (%): 7.5

Estimated Recoverable Oil: 459,690 barrels, 73,085 m³ (material balance)

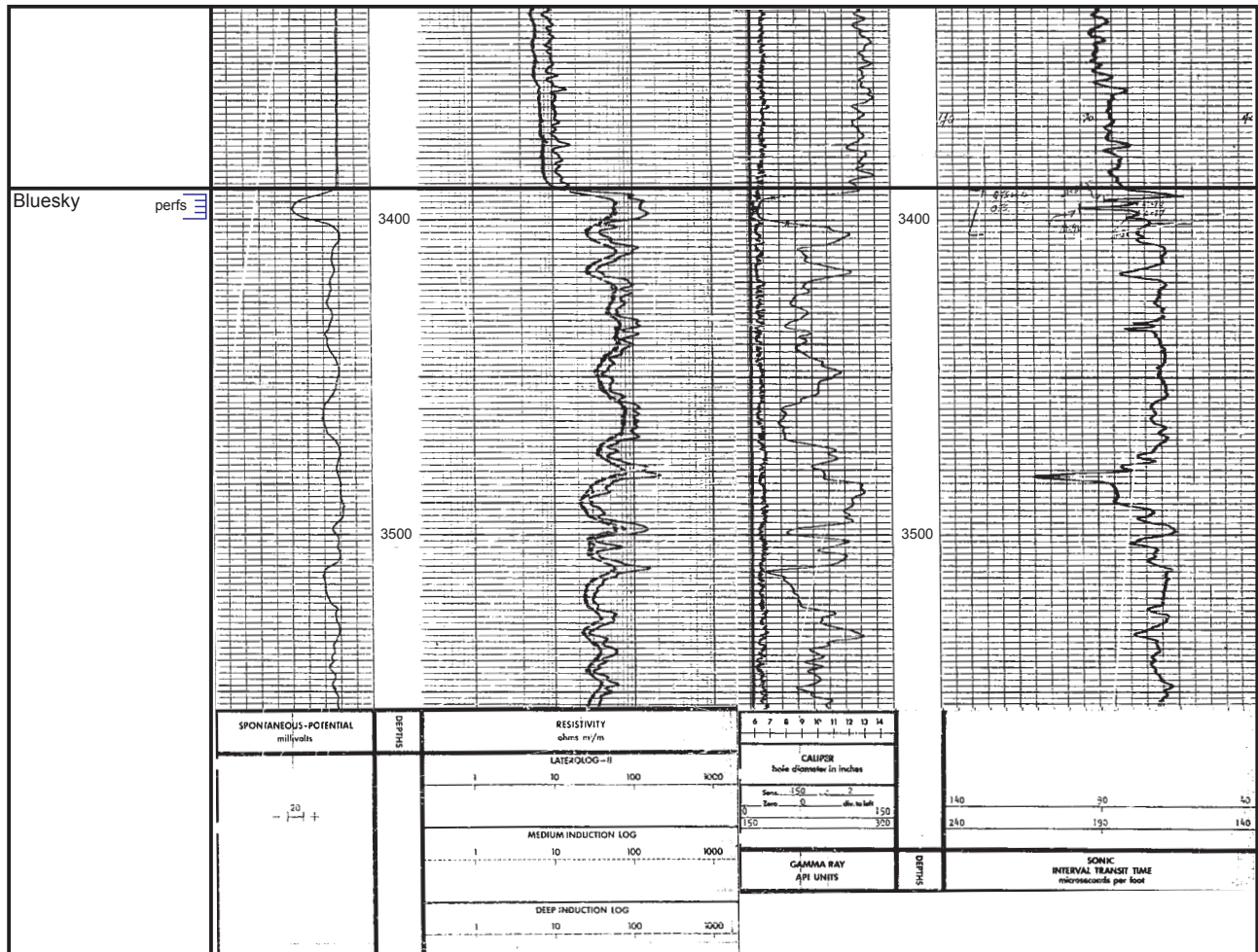
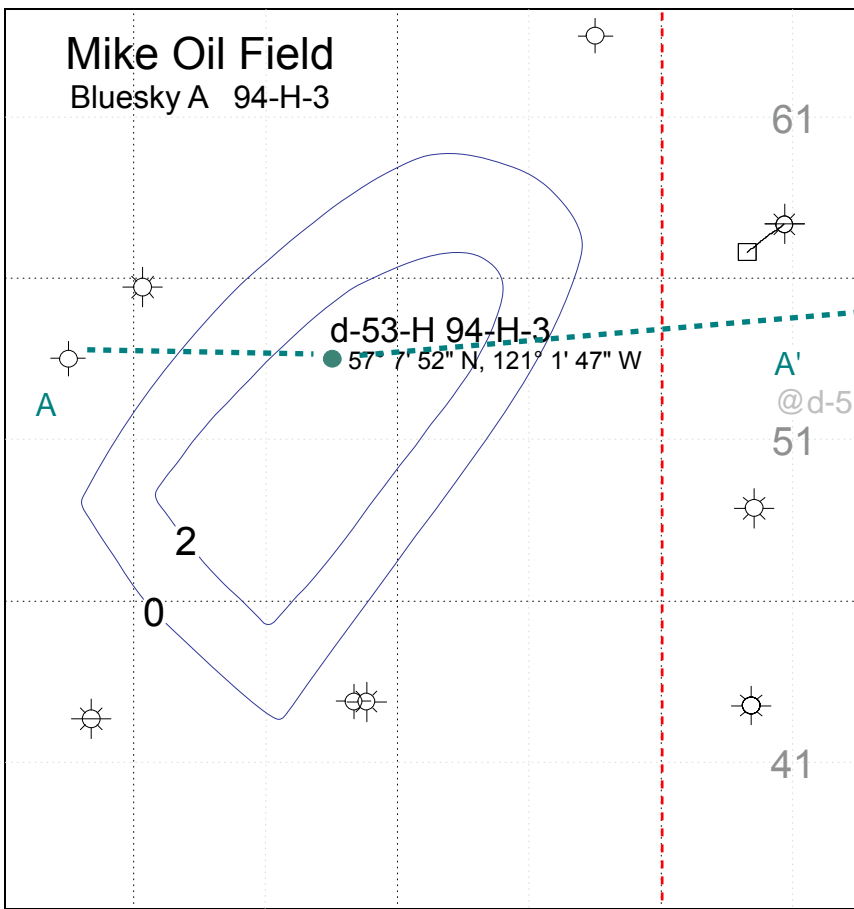
Cumulative Oil Production: 342,390 barrels

Remaining Recoverable Oil: 117,310 barrels

Remaining Original Oil in Place (%): 94

Cumulative Water Production: 126,950 barrels

Notes: No core available but the DST for the Bluesky indicates good permeability. Water cut is low. A fault may form a boundary on the east side of the pool.



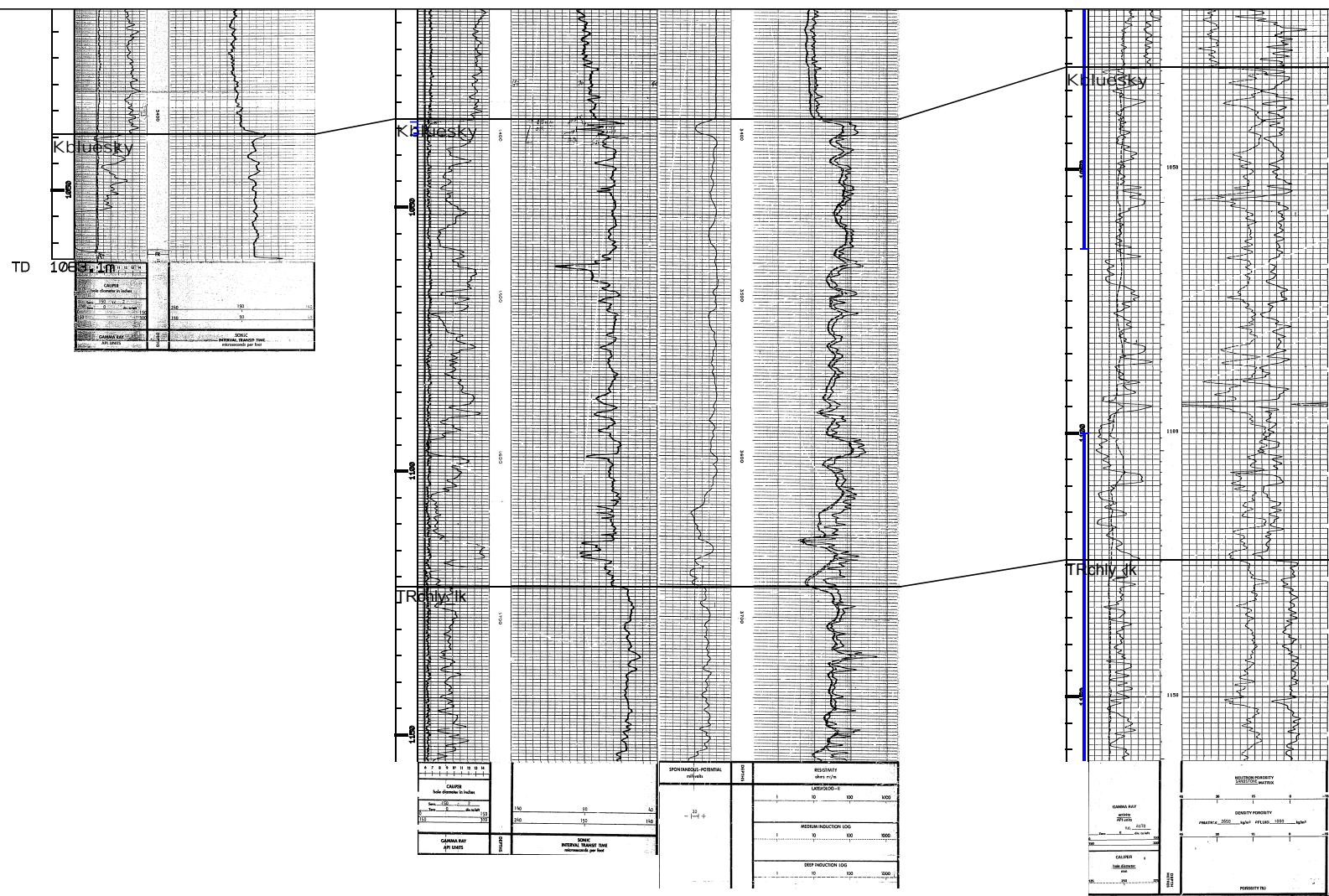
Laterolog and sonic logs for discovery well d-53-H/94-H-3. The completion interval is in a thin quartz arenite, with fair to good porosity, at the top of the formation.



<=759.4m=>



<=1566.4m=>



Mike Bluesky A

NIG CREEK OIL FIELD

Baldonnel D Pool

Pool Parameters

Field Code: 6400

Pool Code: 4100D

Discovery well original name: Texaco NFA Nig d-087-A 94-H-4

WA#: 02152

Rig Release: 1967/07/25

Other Oil and Gas Shows: Baldonnel gas

Number of Wells (October 2012) Oil: 3 **Active:** 2 **Horizontal:** 2

Reservoir Data

Area of Pool: 675 acres, 273 hectares

Average Depth of Producing Zone: 1290 metres

Lithology of Reservoir Rock: dolomite

Trap Type: structural

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 5.9 metres

Average Permeability: 41 milliDarcies

Average Water Saturation (%): 26

Oil Formation Volume Factor (%): 126

Gravity (degrees API): 39

Original Pressure: 1551 psi, 10,694 kPa

Reserves

Estimated original oil in place: 6,649,170 barrels, 1,057,130 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 664,920 barrels, 105,710 m³ (volumetric)

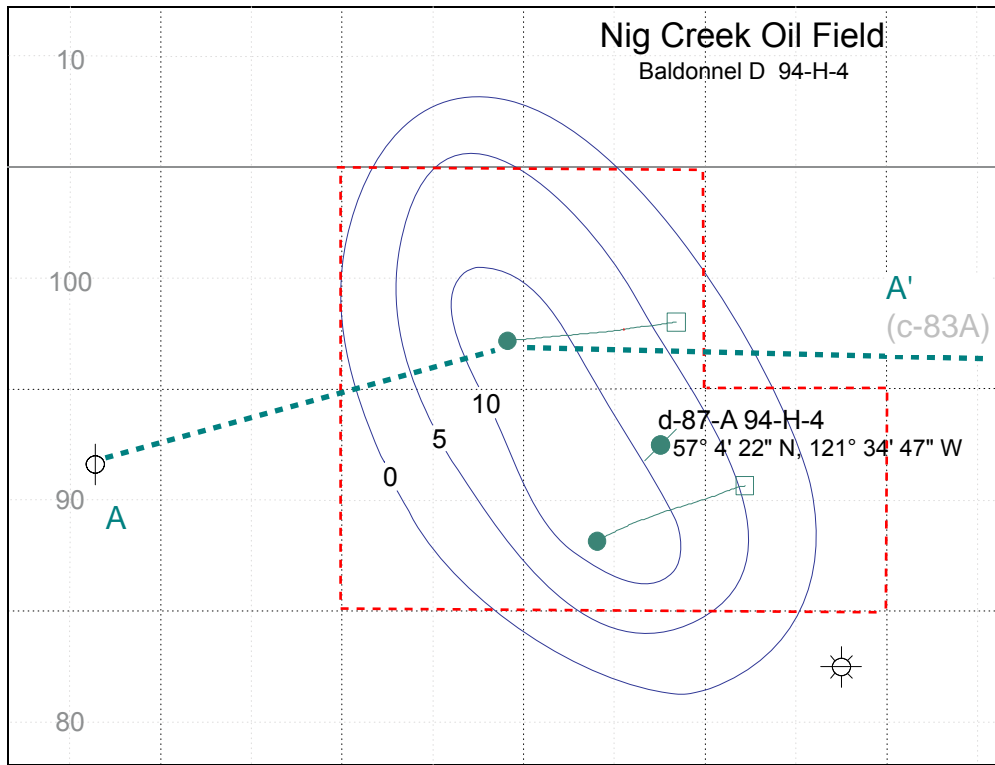
Cumulative Oil Production: 204,480 barrels

Remaining Recoverable Oil: 460,440 barrels

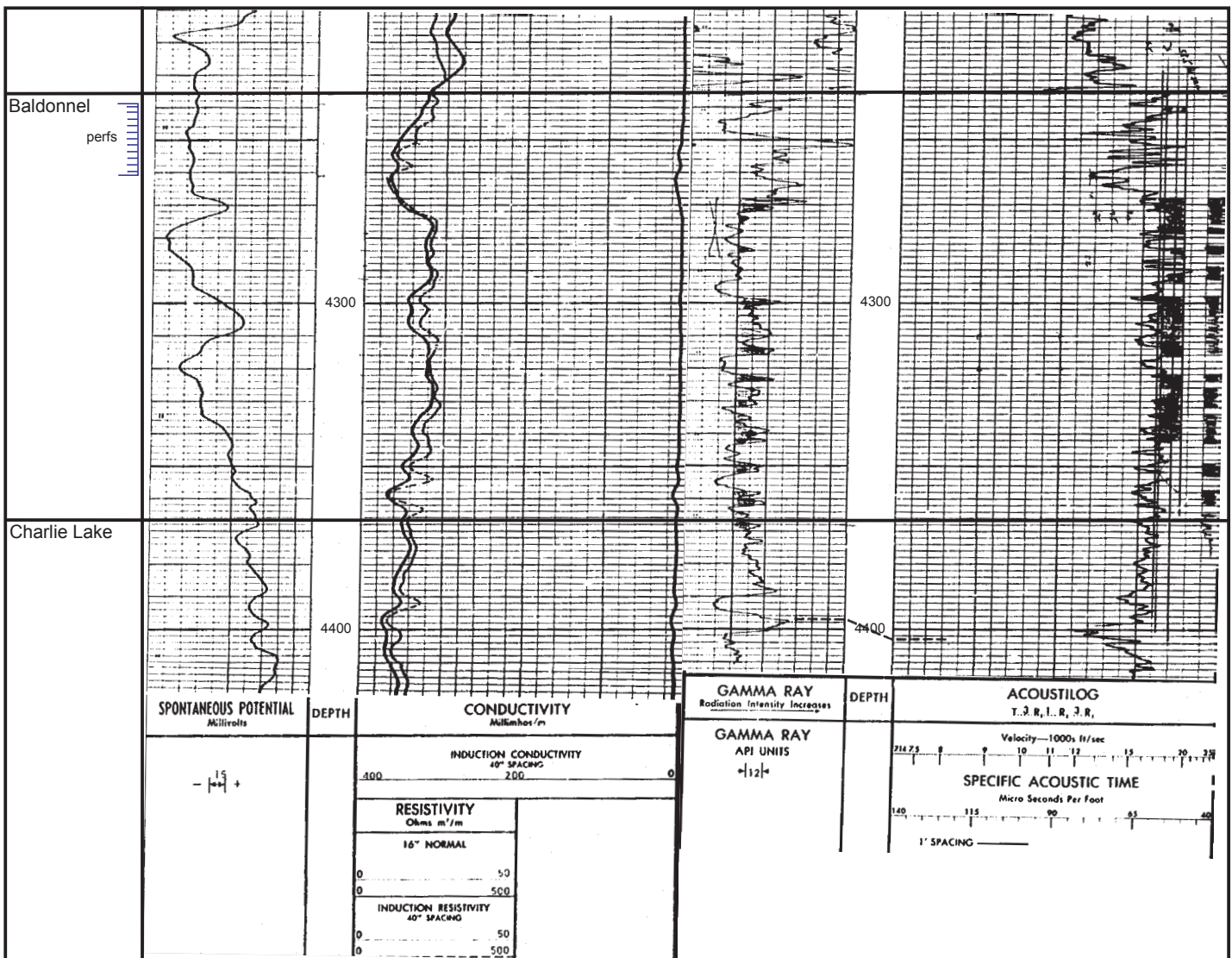
Remaining Original Oil in Place (%): 97

Cumulative Water Production: 443,160 barrels

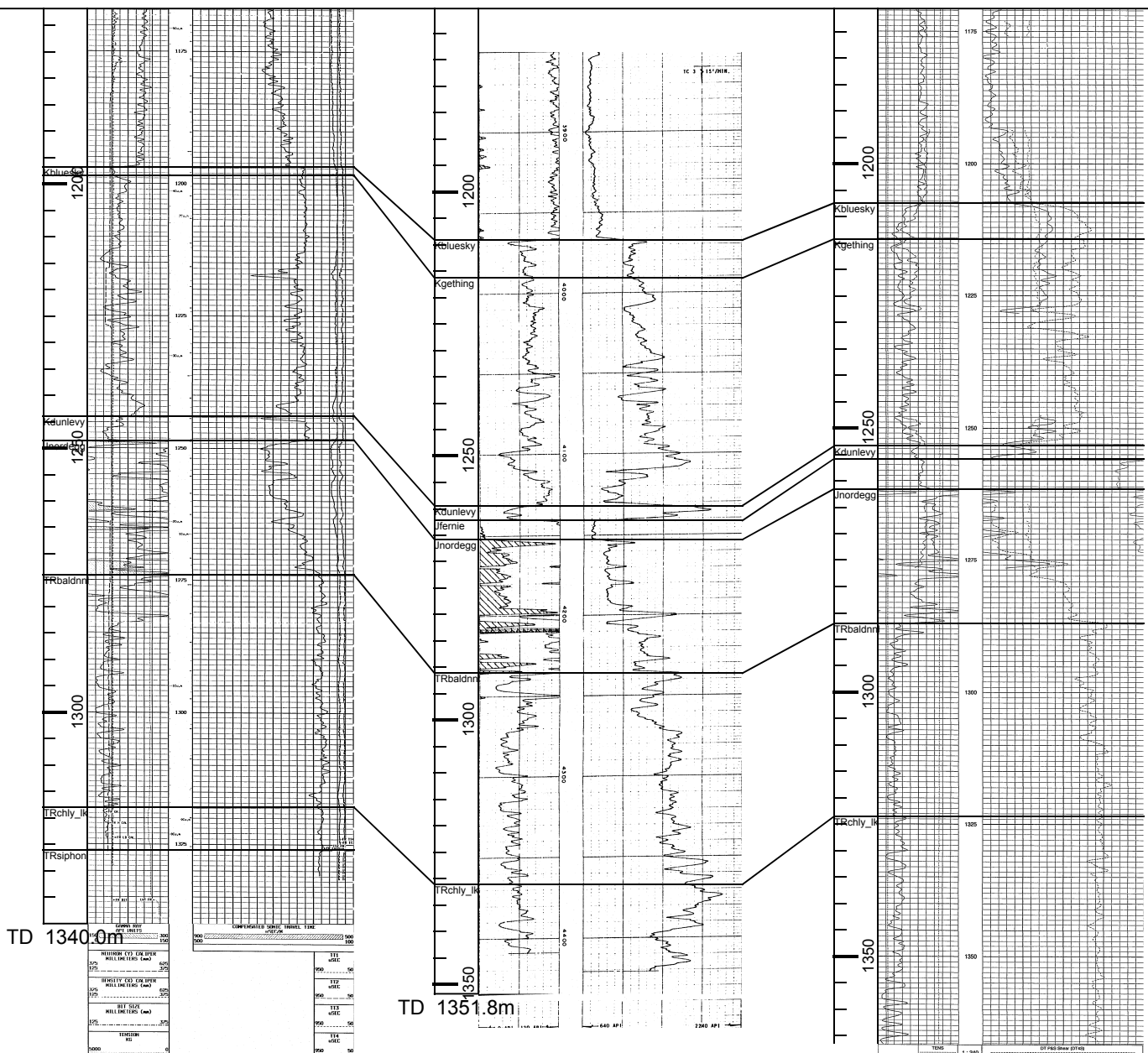
Notes: Two of the three wells are horizontal. The discovery well is now abandoned. Trapping is anticlinal.



Contour interval is five metres net Baldonnel A oil pay (Oil and Gas Commission). The discovery well is d-87-A/94-H-4. The Baldonnel has been folded into an anticline.



Elog and sonic log for discovery well d-87-A/94-H-4. The entire upper ten metres of the Baldonnel have been completed. This well is now abandoned.



TD 1340.0m

TD 1351.8m

Nig Creek Baldonnel D

1:1200

DEPTH (m)	LOG	DEPTH (m)	LOG
1350	311	1350	311
1345	305	1345	305
1340	300	1340	300
1335	295	1335	295
1330	290	1330	290
1325	285	1325	285
1320	280	1320	280
1315	275	1315	275
1310	270	1310	270
1305	265	1305	265
1300	260	1300	260
1295	255	1295	255
1290	250	1290	250
1285	245	1285	245
1280	240	1280	240
1275	235	1275	235
1270	230	1270	230
1265	225	1265	225
1260	220	1260	220
1255	215	1255	215
1250	210	1250	210
1245	205	1245	205
1240	200	1240	200
1235	195	1235	195
1230	190	1230	190
1225	185	1225	185
1220	180	1220	180
1215	175	1215	175
1210	170	1210	170
1205	165	1205	165
1200	160	1200	160
1195	155	1195	155
1190	150	1190	150
1185	145	1185	145
1180	140	1180	140
1175	135	1175	135
1170	130	1170	130
1165	125	1165	125
1160	120	1160	120
1155	115	1155	115
1150	110	1150	110
1145	105	1145	105
1140	100	1140	100
1135	95	1135	95
1130	90	1130	90
1125	85	1125	85
1120	80	1120	80
1115	75	1115	75
1110	70	1110	70
1105	65	1105	65
1100	60	1100	60
1095	55	1095	55
1090	50	1090	50
1085	45	1085	45
1080	40	1080	40
1075	35	1075	35
1070	30	1070	30
1065	25	1065	25
1060	20	1060	20
1055	15	1055	15
1050	10	1050	10
1045	5	1045	5
1040	0	1040	0

DEPTH (m)	LOG	DEPTH (m)	LOG
1350	311	1350	311
1345	305	1345	305
1340	300	1340	300
1335	295	1335	295
1330	290	1330	290
1325	285	1325	285
1320	280	1320	280
1315	275	1315	275
1310	270	1310	270
1305	265	1305	265
1300	260	1300	260
1295	255	1295	255
1290	250	1290	250
1285	245	1285	245
1280	240	1280	240
1275	235	1275	235
1270	230	1270	230
1265	225	1265	225
1260	220	1260	220
1255	215	1255	215
1250	210	1250	210
1245	205	1245	205
1240	200	1240	200
1235	195	1235	195
1230	190	1230	190
1225	185	1225	185
1220	180	1220	180
1215	175	1215	175
1210	170	1210	170
1205	165	1205	165
1200	160	1200	160
1195	155	1195	155
1190	150	1190	150
1185	145	1185	145
1180	140	1180	140
1175	135	1175	135
1170	130	1170	130
1165	125	1165	125
1160	120	1160	120
1155	115	1155	115
1150	110	1150	110
1145	105	1145	105
1140	100	1140	100
1135	95	1135	95
1130	90	1130	90
1125	85	1125	85
1120	80	1120	80
1115	75	1115	75
1110	70	1110	70
1105	65	1105	65
1100	60	1100	60
1095	55	1095	55
1090	50	1090	50
1085	45	1085	45
1080	40	1080	40
1075	35	1075	35
1070	30	1070	30
1065	25	1065	25
1060	20	1060	20
1055	15	1055	15
1050	10	1050	10
1045	5	1045	5
1040	0	1040	0

WEASEL OIL FIELD

Halfway Pool

Pool Parameters

Field Code: 8300

Pool Code: 4800

Discovery well original name: TENN Ashland Weasel d-035-B 94-H-2 **WA#:** 01601

Rig Release: 1965/03/02

Other Oil and Gas Shows: Halfway gas, Bluesky gas, Baldonnel gas, Gething gas

Number of Wells (November 2012) Oil: 20 Gas: 2 Injection: 14 Active: 10

Water Disposal: 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 3778 feet, 1152 metres

Lithology of Reservoir Rock: sandstone

Trap Type: sandstone

Estimated Maximum Reservoir Thickness: 9 metres

Drive Mechanism: water flood

Average Porosity (%): 20

Average Net Pay: 3.4 metres

Average Permeability: 158 milliDarcies

Average Water Saturation (%): 23

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 40

Original Pressure: 1307 psi, 9011 kPa

Reserves

Estimated original oil in place: 34,383,160 barrels, 5,466,486 m³

Recovery Factor (%): 63 (water flood)

Estimated Recoverable Oil: 21,641,650 barrels, 3,440,748 m³ (production decline)

Cumulative Oil Production: 20,952,300 barrels

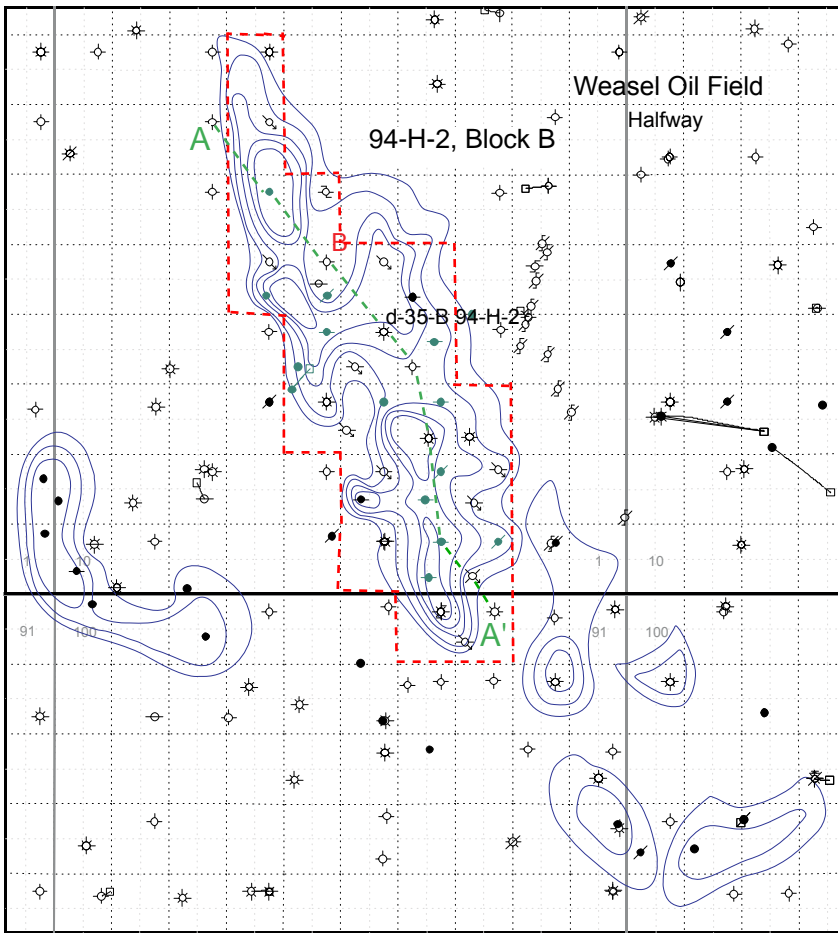
Remaining Recoverable Oil: 689,350 barrels

Remaining Original Oil in Place (%): 39

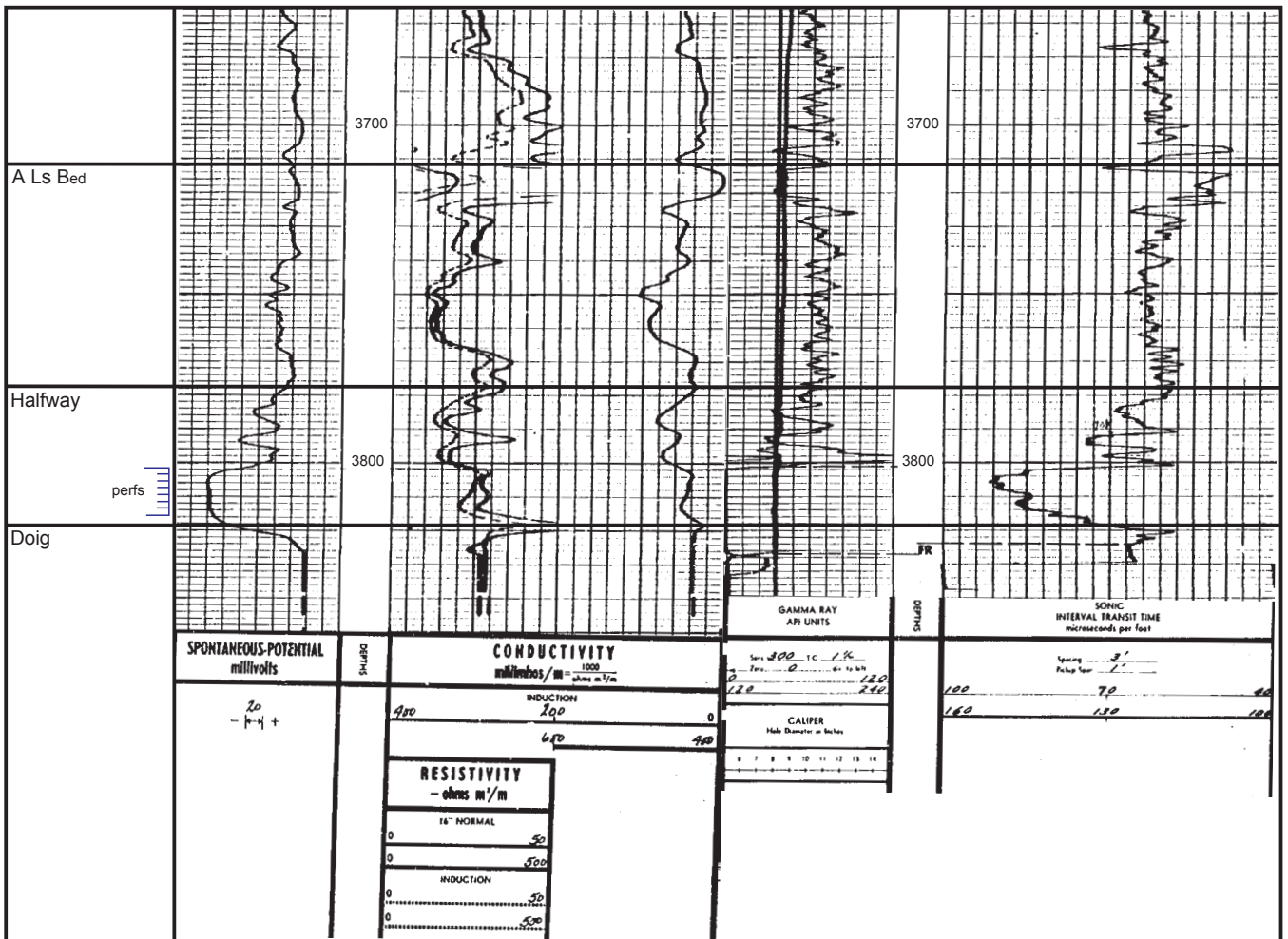
Cumulative Water Production: 6,044,620 barrels

Cumulative Water Injection: 45,442,830 barrels

Notes: This pool appears to be mapped as Halfway C by the OGC but has not been given a letter designation because it is in a unitized area. Weasel Halfway pools typically trend southeast. Water flood has been very efficient.



Contour interval is two metres net Halfway oil pay. Discovery well is d-35-B-94-H-2.



Elog and sonic log for discovery well d-35-B-94-H-2. Almost the entire Halfway has good porosity, which increases upward; and the entire porous interval was completed.

A

200/d-068-B 094-H-02/00
+763.7 01834

200/d-057-B 094-H-02/00
+757.8 01811

200/d-046-B 094-H-02/00
+753.7 01679

200/d-035-B 094-H-02/00
+742.0 01601

200/b-034-B 094-H-02/00
+738.0 02545

200/a-024-B 094-H-02/00
+739.7 02346

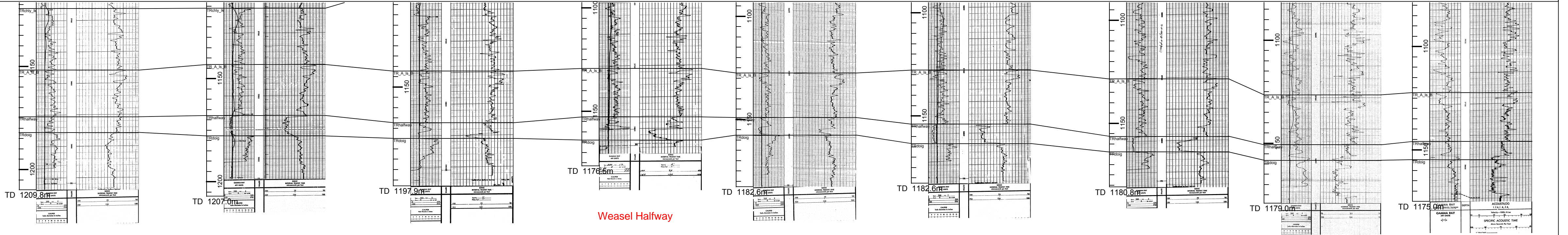
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+736.1 01748

200/b-003-B 094-H-02/00
+726.4 02394

200/d-093-J 094-A-15/00
+723.3 01790

A'

1:1200



Weasel Halfway

WEASEL OIL FIELD

Halfway I Pool

Pool Parameters

Field Code: 8300

Pool Code: 4800I

Discovery well original name: Dome et al Osprey d-011-C 094-H-02 **WA#:** 05878

Rig Release: 1984/01/10

Other Oil and Gas Shows: Halfway gas, Bluesky gas

Number of Wells (November 2012) Oil: 7 Active: 4

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1190 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 21

Average Net Pay: 2.3 metres

Average Permeability: 241 milliDarcies

Average Water Saturation (%): 42

Oil Formation Volume Factor (%): 119

Gravity (degrees API): 31

Original Pressure: 1301 psi, 8970 kPa

Reserves

Estimated original oil in place: 6,176,220 barrels, 981,941 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 1,235,240 barrels, 196,387 m³ (production decline)

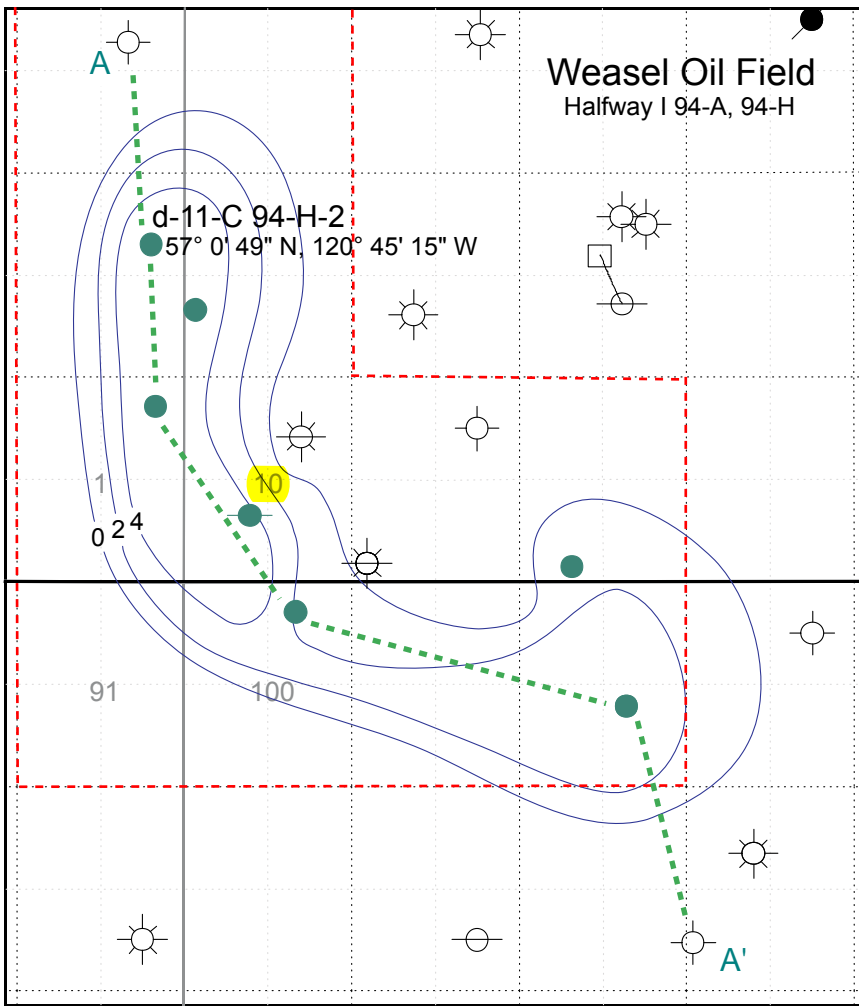
Cumulative Oil Production: 1,112,490 barrels

Remaining Recoverable Oil: 122,750 barrels

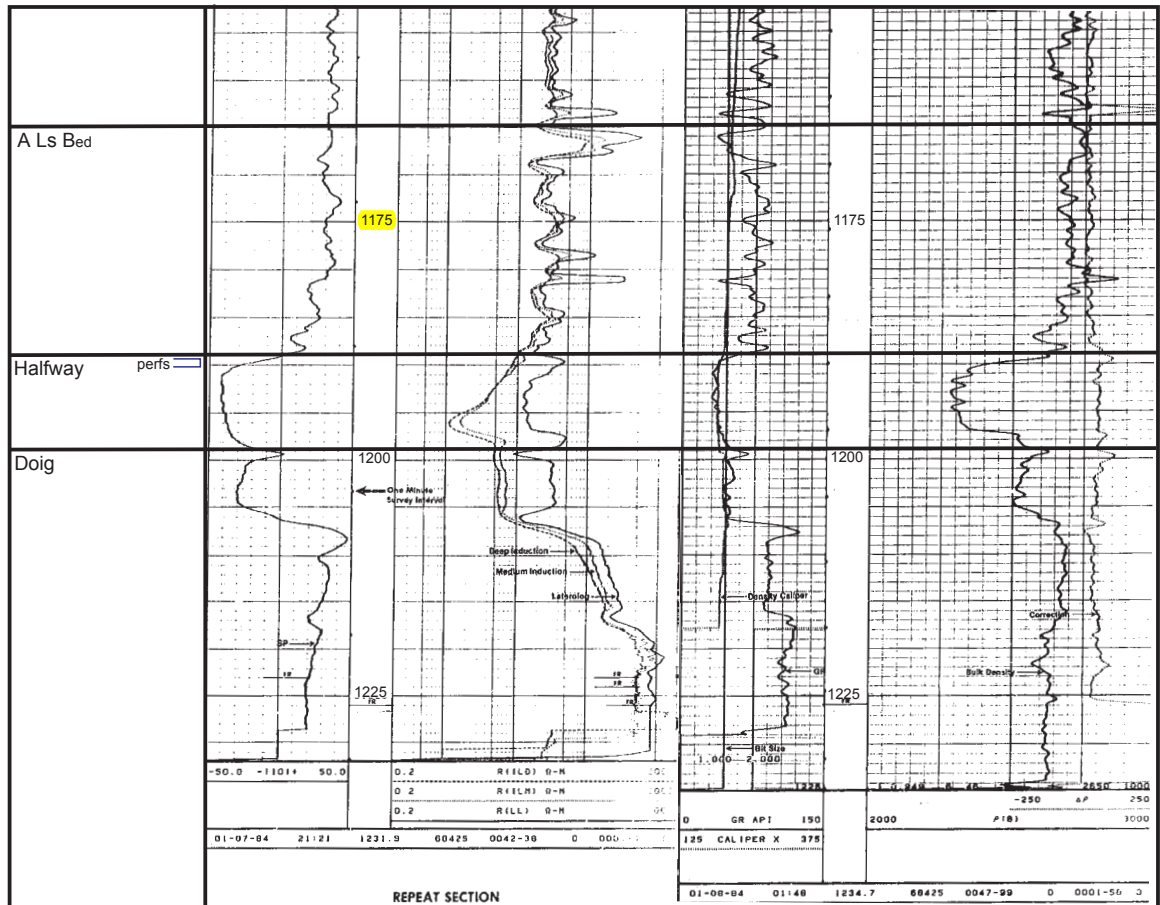
Remaining Original Oil in Place (%): 82

Cumulative Water Production: 342,390 barrels

Notes: Halfway was deposited into erosional depressions on the Doig (Podruski et al, 1988). The field name changed from Osprey to Weasel sometime on or before 1992.



Contour interval is two metres net Halfway I oil pay (Oil and Gas Commission). Discovery well is d-11-C-94-H-2.



Laterolog and neutron-density logs for discovery well d-11-C-94-H-2. Completion is near the top of the Halfway (1189.5 – 1190.5 metres) where it has the greatest resistivity.

A

200/d-021-C 094-H-02/00
+749.5 05991

200/d-011-C 094-H-02/00
+752.0 05878

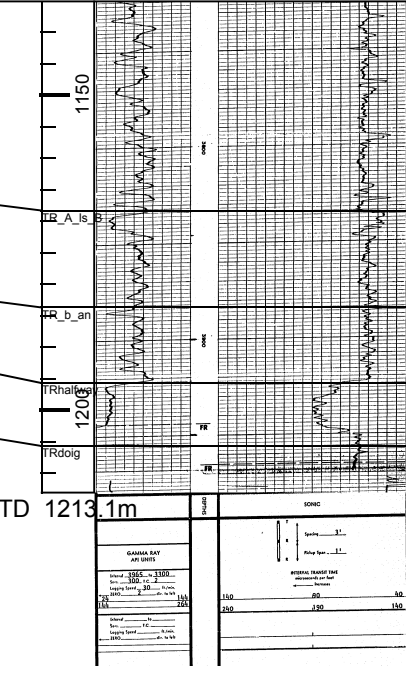
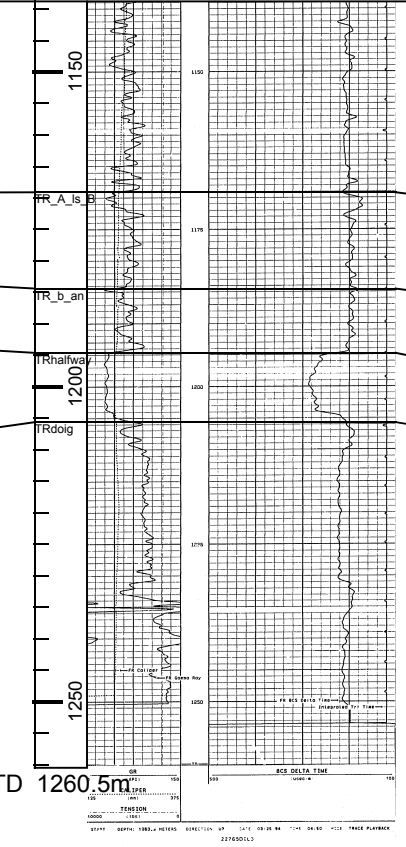
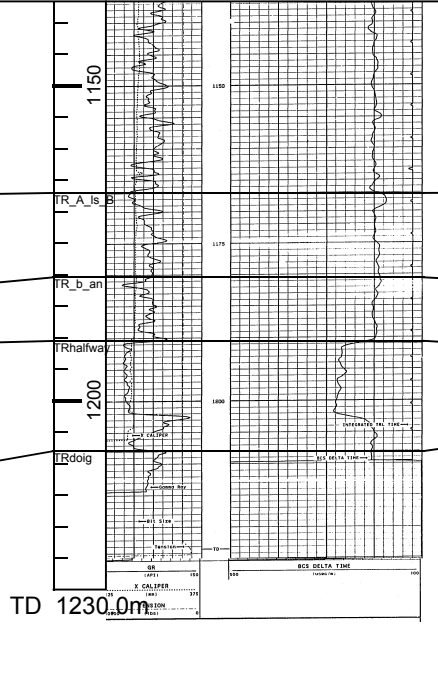
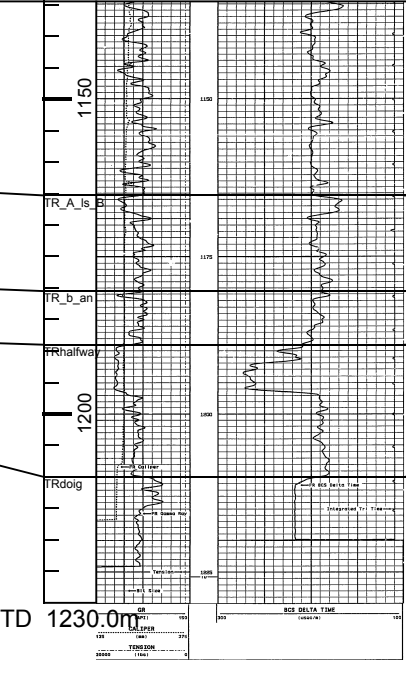
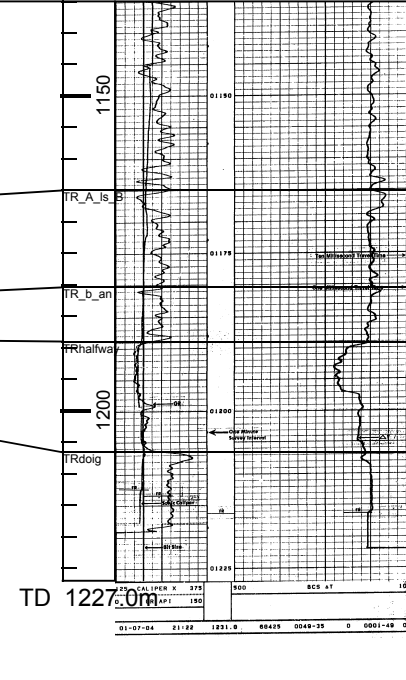
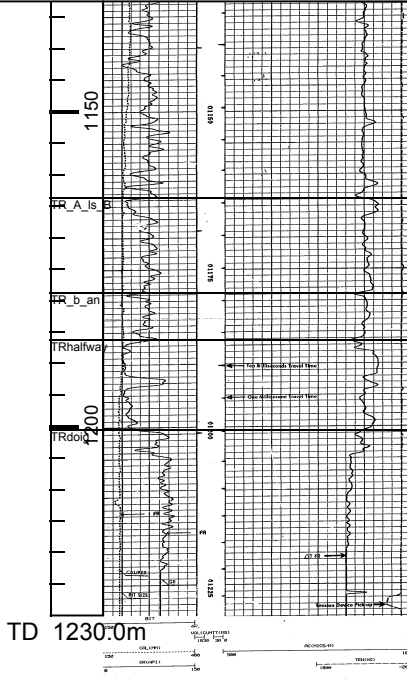
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+751.5 08539

200/d-100-J 094-A-15/00
+753.6 09241

200/a-098-J 094-A-15/00
+755.8 08583

200/b-087-J 094-A-15/00
+752.1 01253

A'



Weasel Halfway I

1:1200

DATE: 09/10/04 TIME: 10:00 AM BY: J. B. [unreadable] 22745011

VERSION: 1.01

WILDMINT OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 8400

Pool Code: 4800A

Discovery well original name: Union-HB Wildmint d-046-A 94-H-2

WA#: 00530

Rig Release: 1960/01/07

Producing Zone: Halfway A

Other Oil and Gas Shows: Halfway gas, Bluesky gas

Number of Wells (November 2012) Oil: 13 Gas: 6 Injection: 10 Active: 6

Reservoir Data

Area of Pool: 79 acres, 32 hectares

Average Depth of Producing Zone: 3700 feet, 1128 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6.5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 13

Average Net Pay: 1.2 metres

Average Permeability: 285 milliDarcies

Average Water Saturation (%): 19

Oil Formation Volume Factor (%): 115

Gravity (degrees API): 40

Original Pressure: 1224 psi, 8439 kPa

Reserves

Estimated original oil in place: 18,335,270 barrels, 291,506 m³

Recovery Factor (%): 53

Estimated Recoverable Oil: 9,790,440 barrels, 1,556,560 m³ (volumetric)

Cumulative Oil Production: 9,692,280 barrels

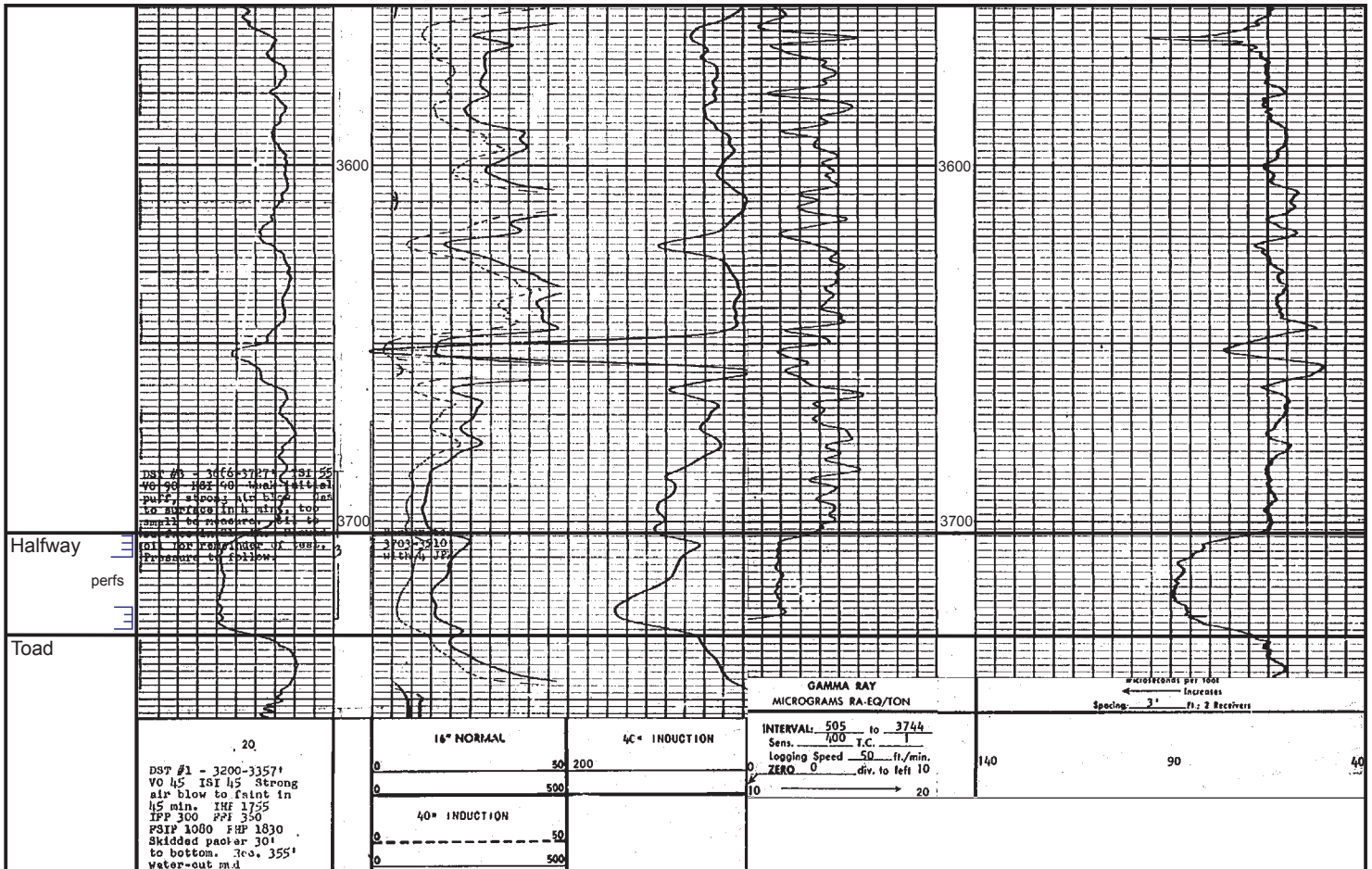
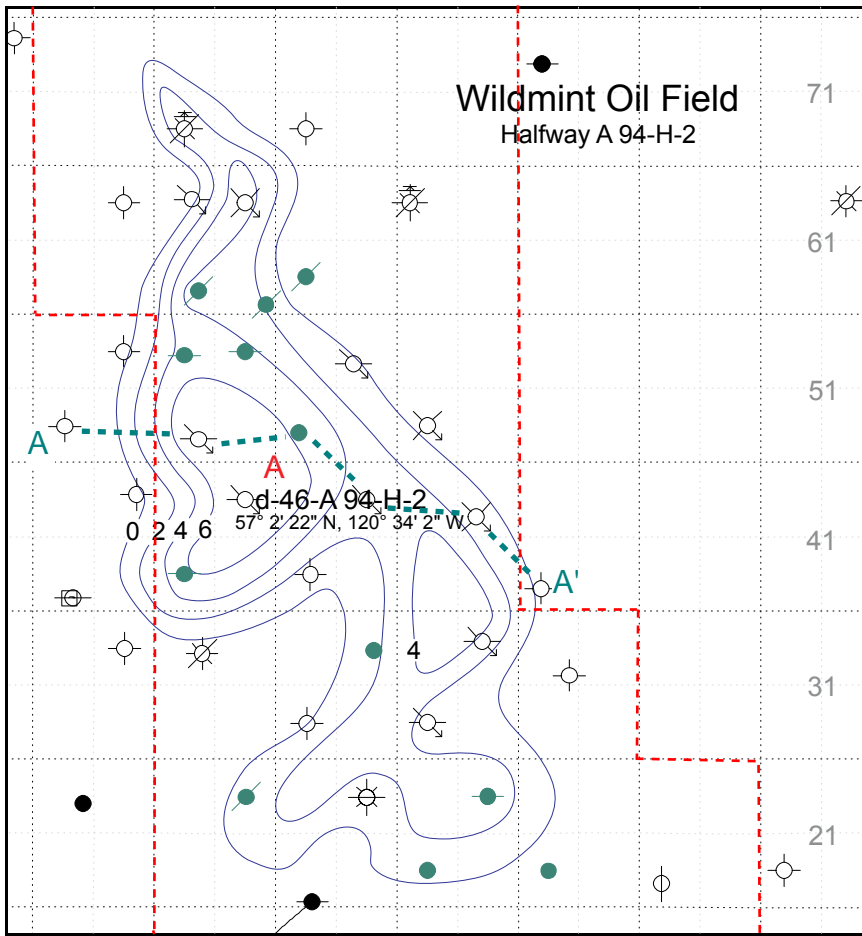
Remaining Recoverable Oil: 98,150 barrels

Remaining Original Oil in Place (%): 47

Cumulative Water Production: 19,378,070 barrels

Cumulative Water Injection: 51,391,630 barrels

Notes: Halfway was deposited as discontinuous sandstone (Podruski et al, 1988). Discovery well d-46-A is now a suspended water injection well. Primary recovery was only 5%; water injection has boosted that to 53%. High permeability allows good communication within the reservoir.



Elog and sonic log for discovery well d-46-A-94-H-2. The Halfway was first completed (1960) near the top (3703' – 3710') in the oil leg and then a few years later (1963) lower down (3724' – 3730') in the water leg. Elog and sonic log for

B

200/b-057-A 094-H-02/00
+741.0 07372

<<#835.7mm>>

200/b-056-A 094-H-02/00
+745.2 00945

<<#627.1mm>>

200/b-055-A 094-H-02/00
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<<#595.4mm>>

200/d-045-A 094-H-02/00
+731.5 00810

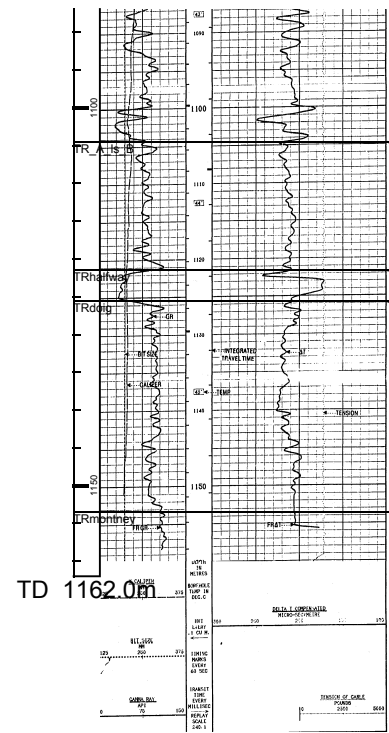
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+704.1 01808

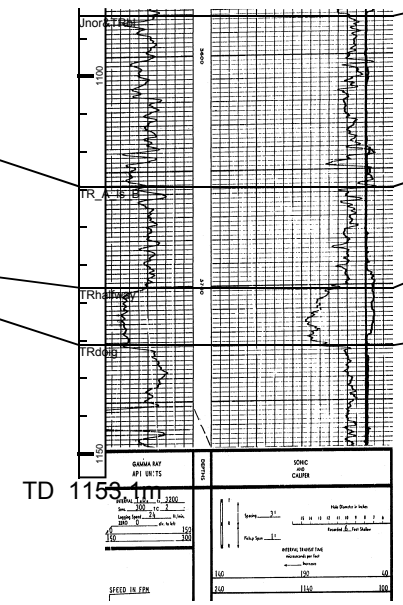
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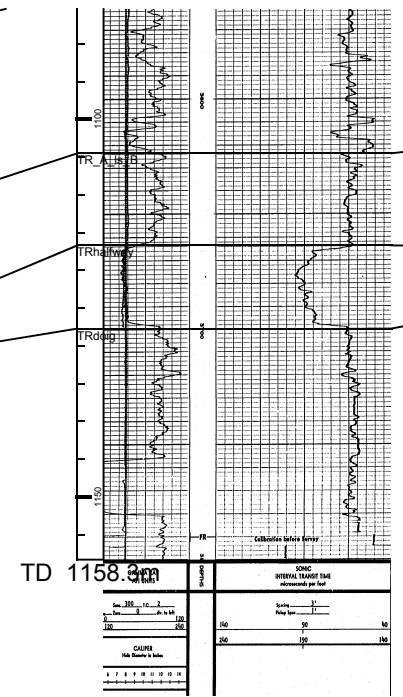
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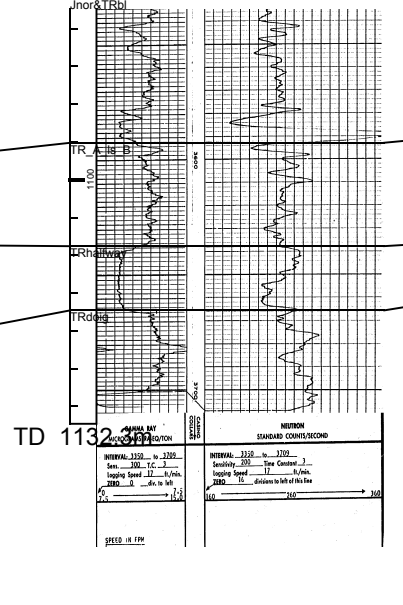
TD 1162.0m



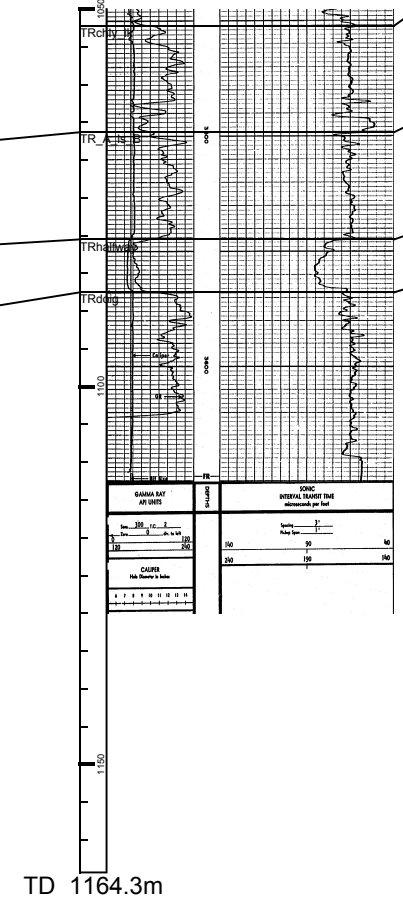
TD 1155.1m



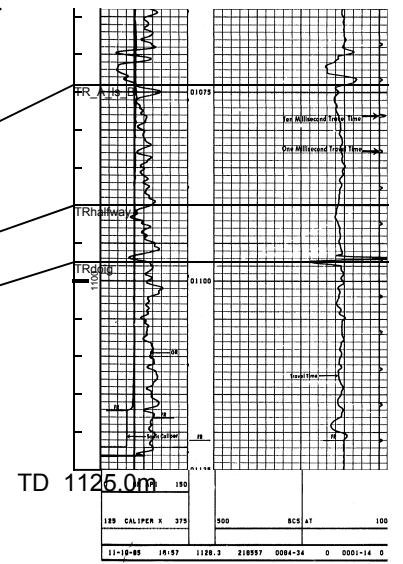
TD 1158.9m



TD 1132.0m



TD 1164.3m



TD 1126.0m

Wildmint Halfway A

1:1000

WILDMINT OIL FIELD

Lower Halfway B Pool

Pool Parameters

Field Code: 8400

Pool Code: 4805B

Discovery well original name: Union HB Wildmint d-015-A 94-H-2

WA#: 00984

Rig Release: 1962/02/14

Other Oil and Gas Shows: Lower Halfway gas, Bluesky gas, Gething gas

Number of Wells (November 2012) Oil: 6 **Active:** 1 **Horizontal:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 3700 feet, 1128 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 1.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 14

Average Net Pay: 1.1 metres

Average Permeability: 13 milliDarcies

Average Water Saturation (%): 34

Oil Formation Volume Factor (%): 115

Gravity (degrees API): 40

Original Pressure: 1232 psi, 8494 kPa

Reserves

Estimated original oil in place: 1,501,250 barrels, 238,680 m³

Recovery Factor (%): 18

Estimated Recoverable Oil: 269,940 barrels, 42,917 m³ (production decline)

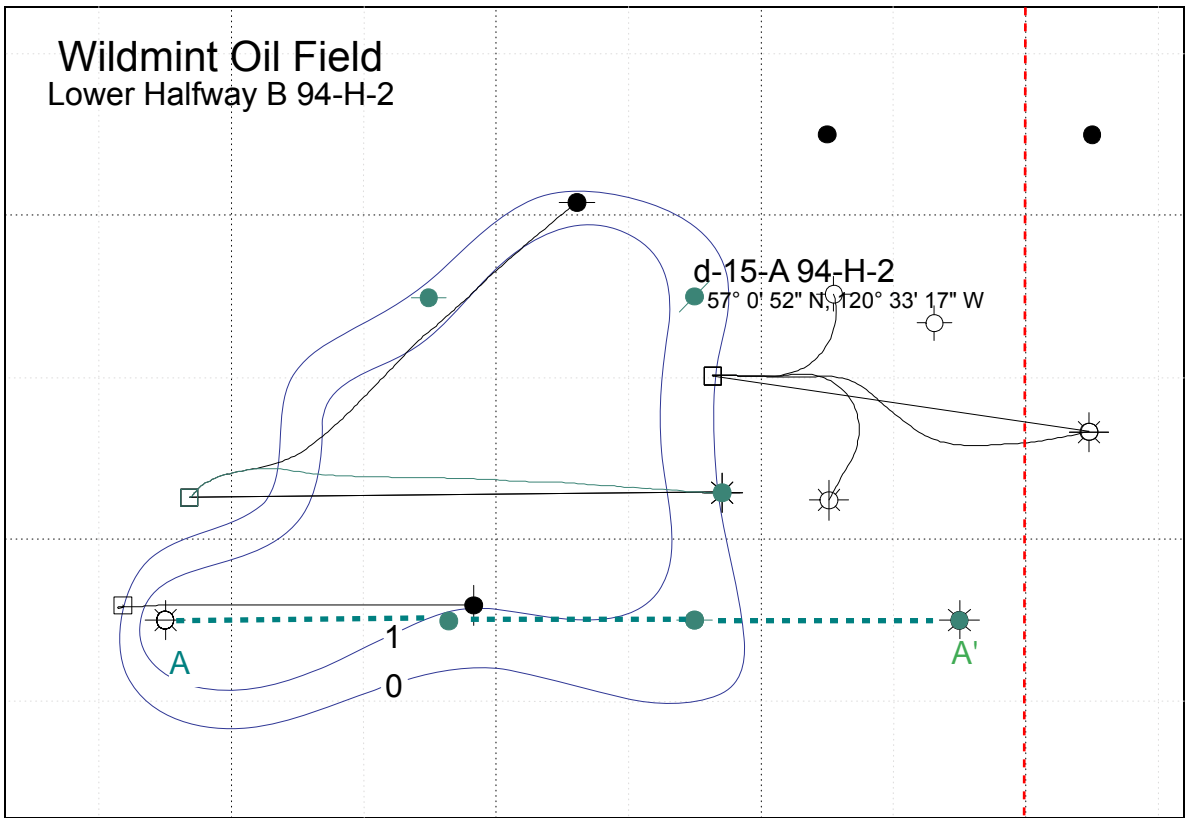
Cumulative Oil Production: 252,630 barrels

Remaining Recoverable Oil: 17,310 barrels

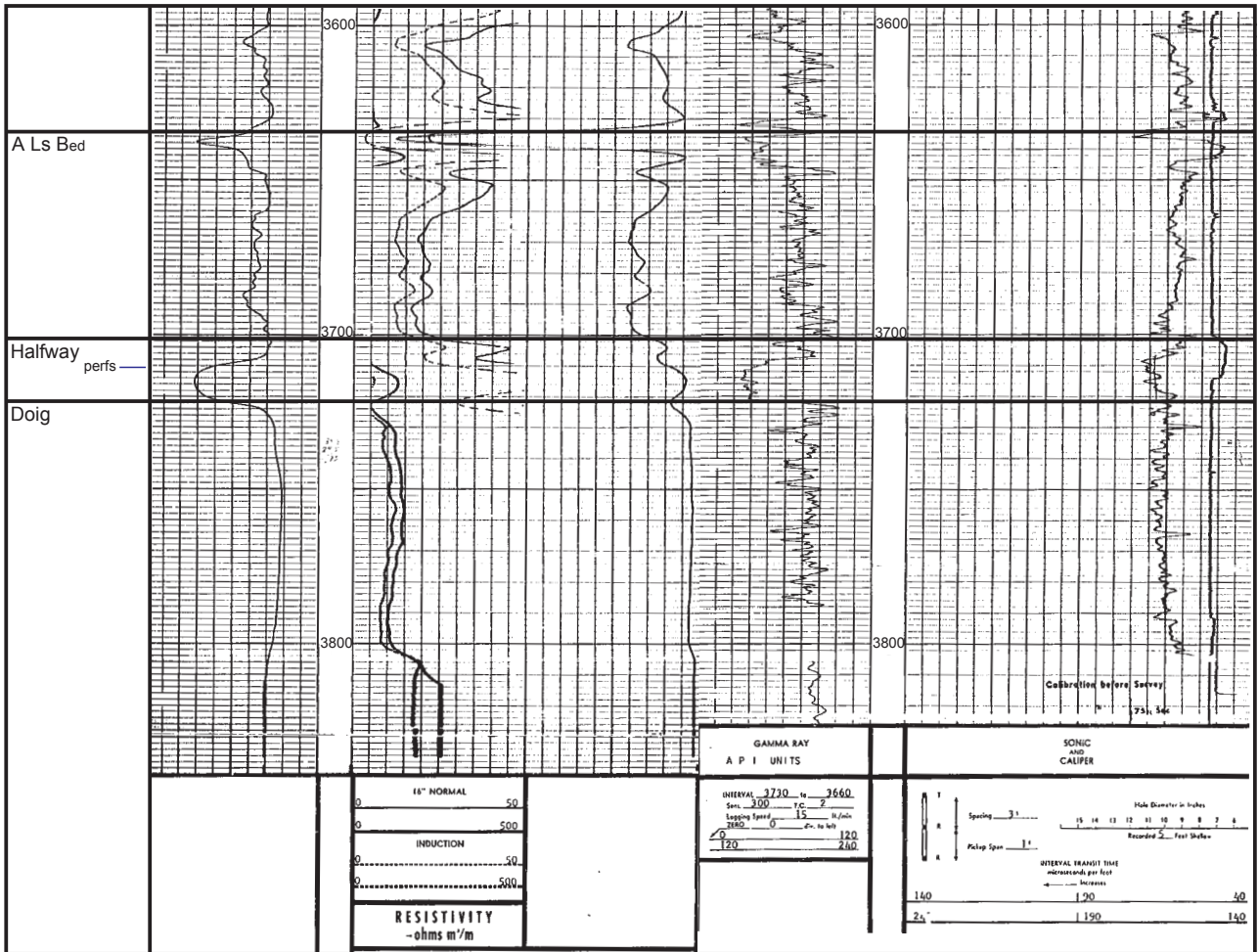
Remaining Original Oil in Place (%): 83

Cumulative Water Production: 16,880 barrels

Notes: The Lower Halfway gas cap almost directly overlies the oil pool. Horizontal drilling at a-15-A has increased estimated recovery factor from 16.5% to 18%. The Lower Halfway seems to be well-suited for horizontal drilling because it is thick and distinct from overlying and underlying shales.



Contour interval is one metre net Lower Halfway B oil pay (Oil and Gas Commission). Discovery well is d-15-A-94-H-2. Pool wells are indicated in green.



Elog and sonic logs for discovery well d-15-A-94-H-2. Completion is at a single point at 3711' near the top of the porosity in the Halfway. None of the Halfway appears to be wet. It is designated as Lower Halfway by the Oil and Gas Commission, but picked geologically as Halfway.

200/d-007-A 094-H-02/00
+720.4 01750

200/d-006-A 094-H-02/00
+732.3 01184

200/d-005-A 094-H-02/00
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200/d-004-A 094-H-02/02
+712.7 01092

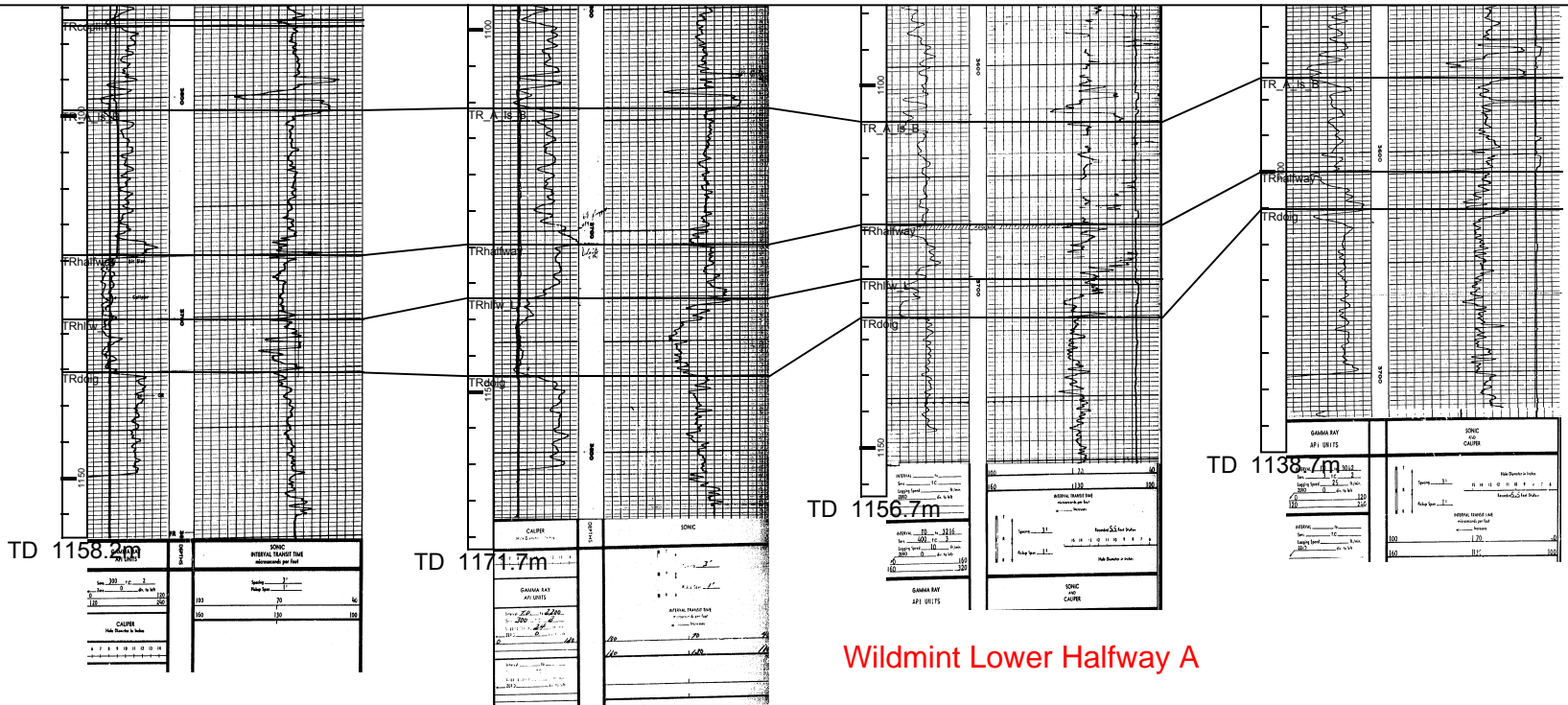
A

A'

<=811.0m>

<=708.0m>

<=759.0m>



TD 1156.7m

TD 1138.7m

Wildmint Lower Halfway A

1:1000

AITKEN CREEK OIL FIELD

Gething A Pool

Pool Parameters

Field Code: 0200

Pool Code: 2700A

Discovery well original name: UNION AITKEN CREEK b-042-L 94-A-13

WA#: 00485

Rig Release: 1959/11/02

Other Oil and Gas Shows: Gething gas

Number of Wells (January 2013) Oil: 4 Gas: 11 Injection: 3 Active: 11 Horizontal: 4

Reservoir Data

Average Depth of Producing Zone: 4348 feet, 1325 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 12 metres

Area of Pool: approximately 1630 acres or 660 hectares within contour limits

Drive Mechanism: gas depletion

Average Porosity (%): 12

Average Net Pay: 5 metres

Average Permeability: 74 millidarcies

Average Water Saturation (%): 27

Oil Formation Volume Factor (%): 131

Gravity (degrees API): 42

Original Pressure: 1561 psi, 10763 kpa

Reserves

Estimated original oil in place: 14,055,160 barrels, 2,234,592 m3

Recovery Factor (%): 65 (gas injection)

Estimated Recoverable Oil: 9,135,850 barrels, 1,452,484 m3 (production decline)

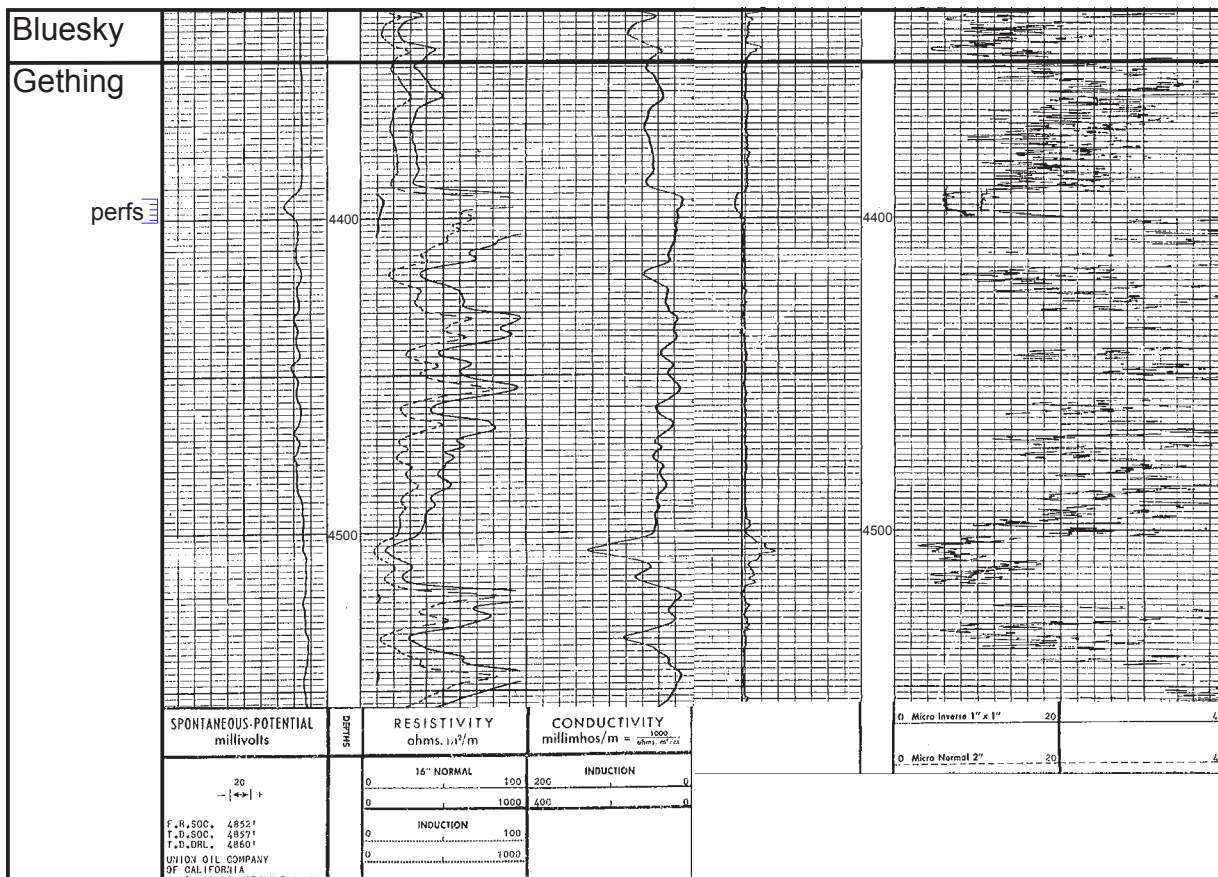
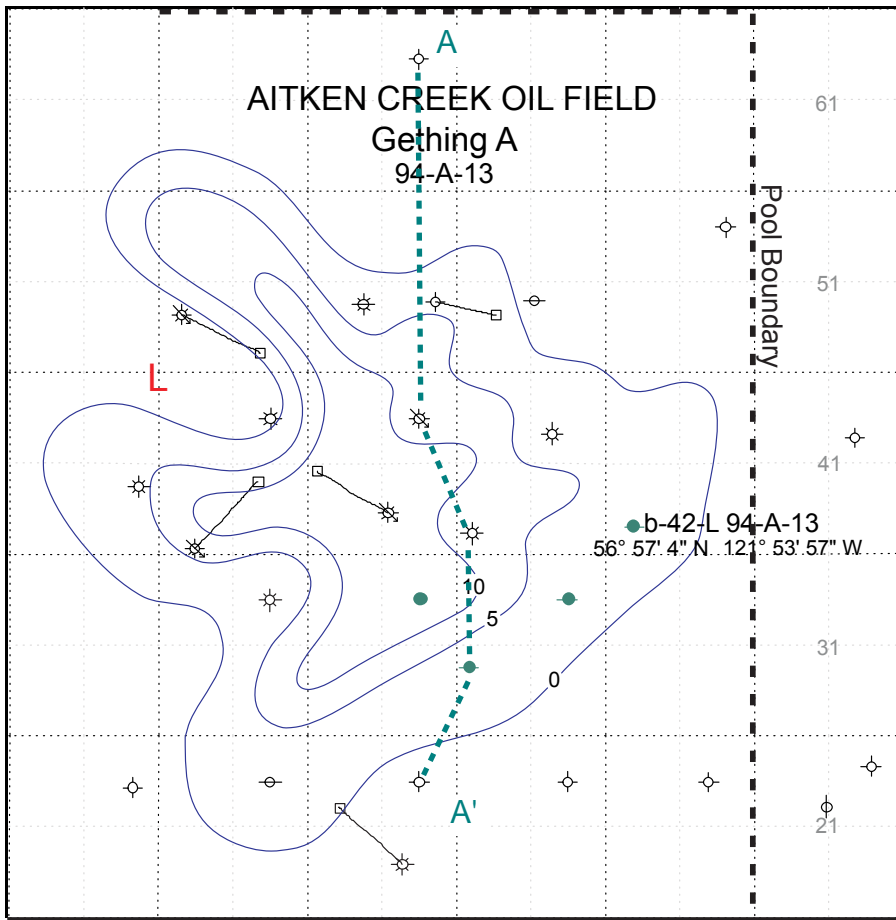
Cumulative Oil Production: 8,552,370 barrels

Remaining Recoverable Oil: 583,480 barrels

Remaining Original Oil in Place (%): 39

Cumulative Water Production: 92,710 barrels

Notes: Recovery is very high probably due to gas injection. This pool is part of the Aitken Creek Gas Storage project and a number of the wells are gas injectors.



Elog and microlog for discovery well b-42-L-94-A-13. The microlog indicates good permeability across the perfered interval (4392' - 4400').

A

200/d-064-L 094-A-13/00

+957.8 01291



<=1834.4m=>

200/d-044-L 094-A-13/00

+975.7 01186



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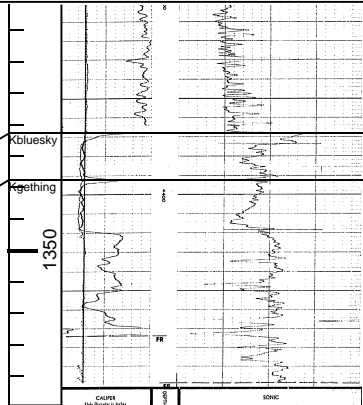
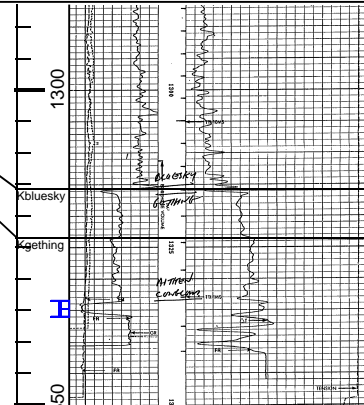
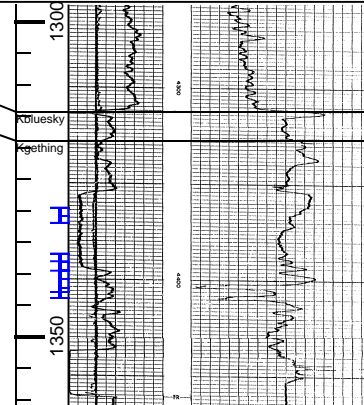
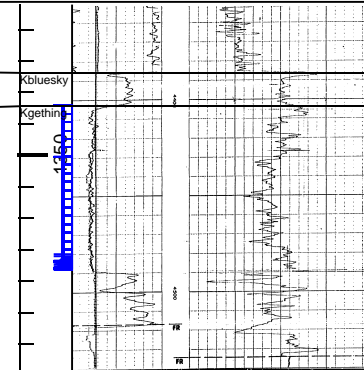
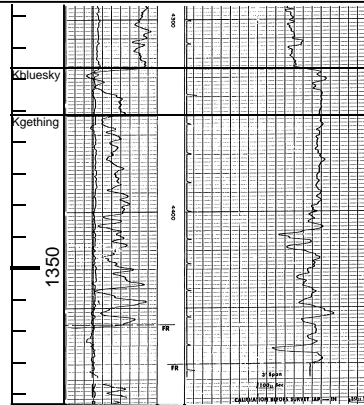
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200/d-024-L 094-A-13/00

+960.6 01229



A'



TD 1371.6m

CALIPER	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
SONIC	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
GAMMA RAY API UNITS	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	

TD 1384.7m

CALIPER	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
SONIC	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
GAMMA RAY API UNITS	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	

TD 1365.5m

CALIPER	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
SONIC	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
GAMMA RAY API UNITS	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	

TD 1355.0m

CALIPER	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
SONIC	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
GAMMA RAY API UNITS	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	

TD 1374.6m

CALIPER	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
SONIC	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	
GAMMA RAY API UNITS	
Interval	3"
Spacing	1/8"
Scale	1/16"
Notes	

Aitken Creek
Gething A

1:1200

BIRCH OIL FIELD

Baldonnel C Pool

Pool Parameters

Field Code: 1260

Pool Code: 4100C

Discovery well original name: Zephyr et al Birch b-050-I 94-A-13

WA#: 04616

Rig Release: 1978/12/05

Other Oil and Gas Shows: Montney gas, Dunlevy gas, Baldonnel gas

Number of Wells (January 2013) Oil: 51 Active: 35 Injection: 2 Horizontal: 38 Disposal: 1

Reservoir Data

Area of Pool: 24,424 acres, 9,884 hectares

Average Depth of Producing Zone: 1258 metres

Lithology of Reservoir Rock: dolomite

Trap Type: structural - stratigraphic

Estimated Maximum Reservoir Thickness: 33 metres

Drive Mechanism: water drive plus gas expansion

Average Porosity (%): 8

Average Net Pay: 5 metres

Average Permeability: low permeability suggested by DST charts

Average Water Saturation: 33.4

Oil Formation Volume Factor: 128.7

Gravity (degrees API): 39.2

Original Pressure (psi/kpa): 1,786 psi, 12,314 kpa

Reserves

Estimated oil in place: 10,930,490 barrels, 1,737,809 m³

Recovery Factor (%): 41.7

Estimated Recoverable Oil: 4,561,550 barrels, 725,229 m³ (production decline)

Cumulative Oil Production: 4,019,630 barrels

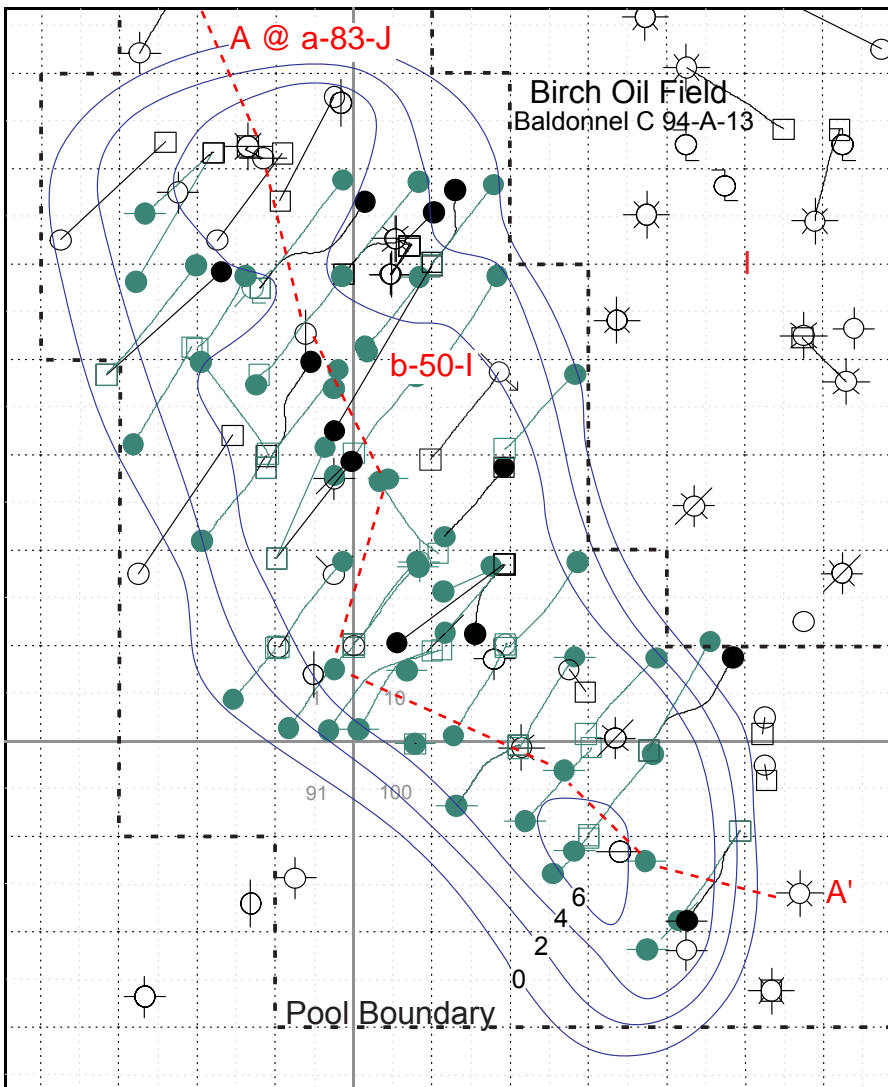
Remaining Recoverable Oil: 541,920 barrels

Original Oil in Place Remaining (%): 63

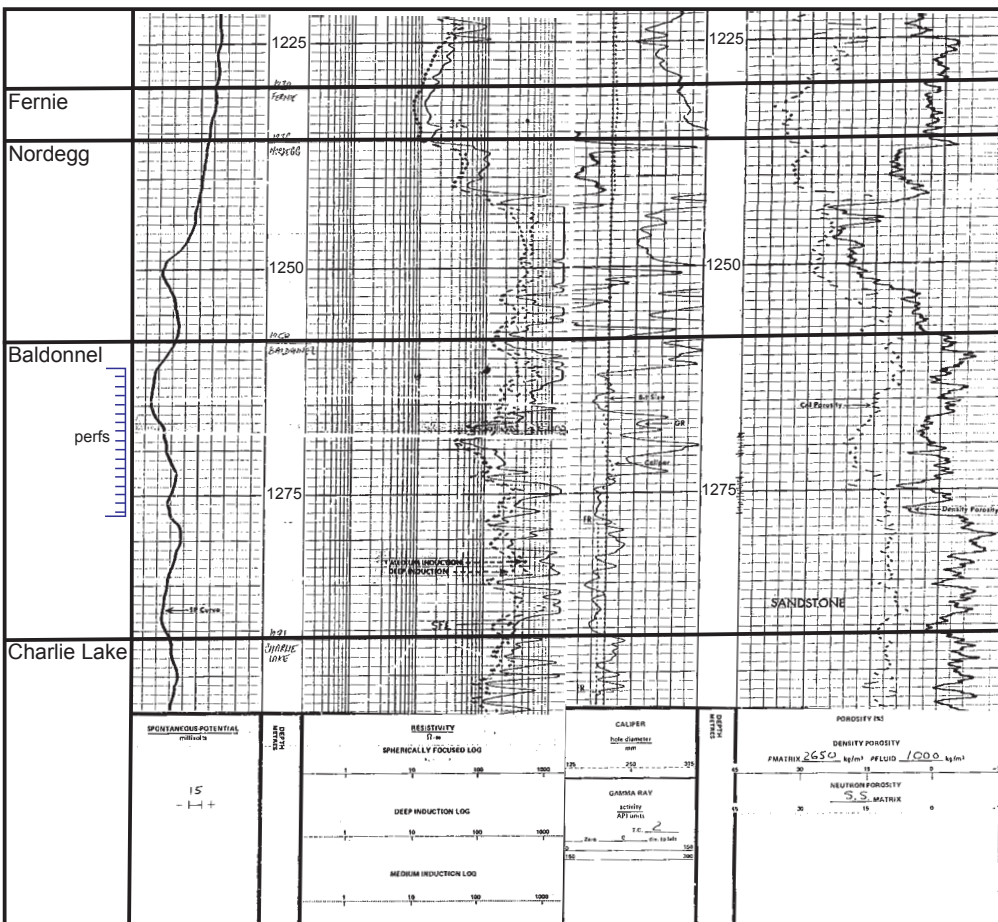
Cumulative Water Production: 7,758,380 barrels

Cumulative Water Injection: 503,300 barrels

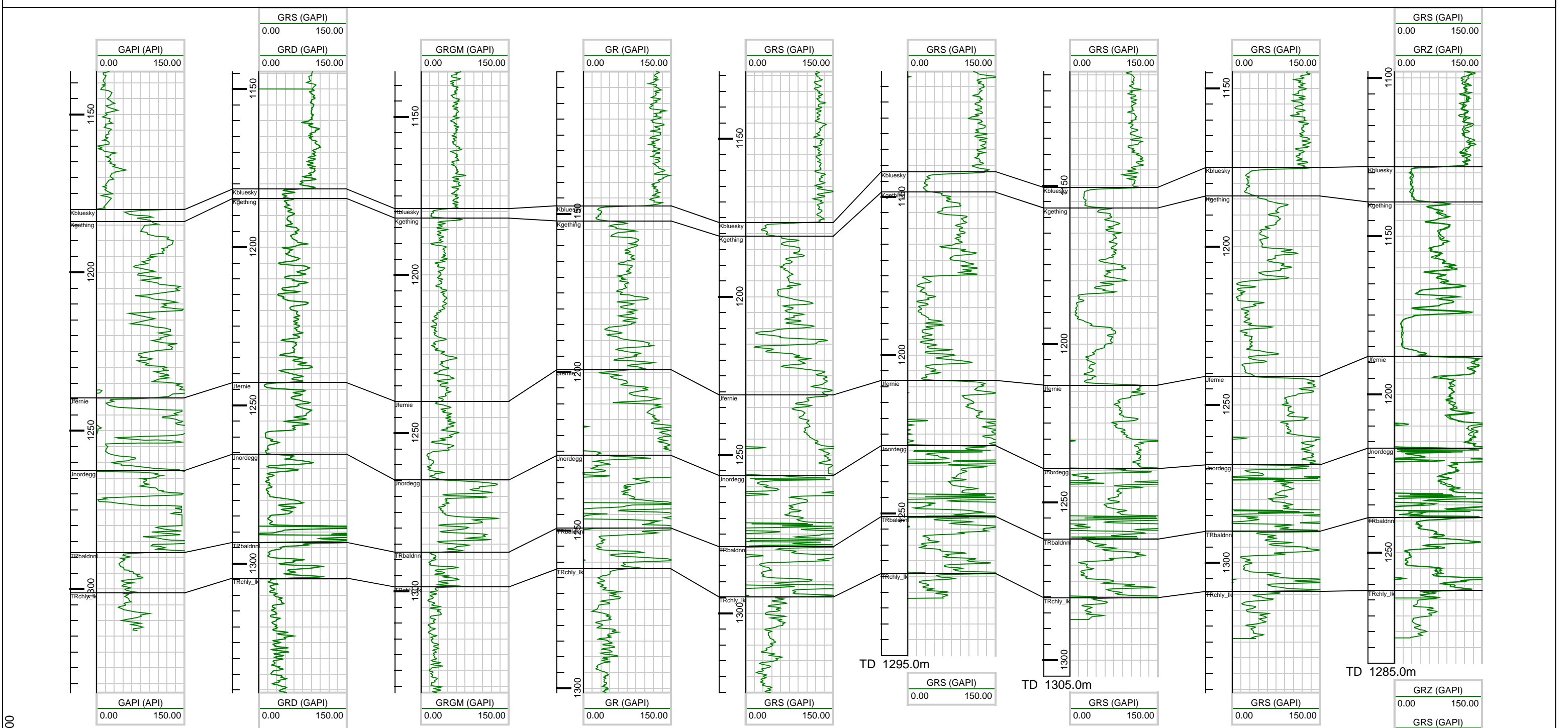
Notes: The Baldonnel at Birch is well suited for horizontal drilling, although some suggest the orientation of most of the horizontal legs is not optimal in relation to fractures at the crest of an anticline. It is thick and sharply defined by at both the upper and lower contacts. High water cut is reflective of a strong water drive supplemented by injection. The water disposal well is abandoned.



Contour interval is Discovery well b-50-I-94-A-13 is one of only a few vertical producers. Trapping is by a combination of stratigraphic pinch-out and anticlinal folding.



Resistivity and neutron-density logs for d-50-I/94-A-13. The Baldonnel is thick and continuous over the Birch field.



1:1200

Birch Baldonnel C

FIREWEED OIL FIELD

Dunlevy L

Pool Parameters

Field Code: 3540

Pool Code: 2900L

Discovery well original name: Dome et al Fireweed a-069-A 94-A-13

WA#: 04503

Rig Release: 1978/08/23

Other Oil and Gas Shows: Baldonnel gas

Number of Wells (December 2012) Oil: 3 Active: 2 Horizontal: 1

Reservoir Data

Area of Pool: 363 acres, 147 hectares

Average Depth of Producing Zone: 1260 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11.6

Average Net Pay: 3.7 metres

Average Permeability: 50 milliDarcies

Average Water Saturation (%): 20

Oil Formation Volume Factor (%): 118

Gravity (degrees API): 35

Original Pressure: 1347 psi, 9287 kPa

Reserves

Estimated original oil in place: 2,688,380 barrels, 427,418 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 268,840 barrels, 42,742 m³ (volumetric)

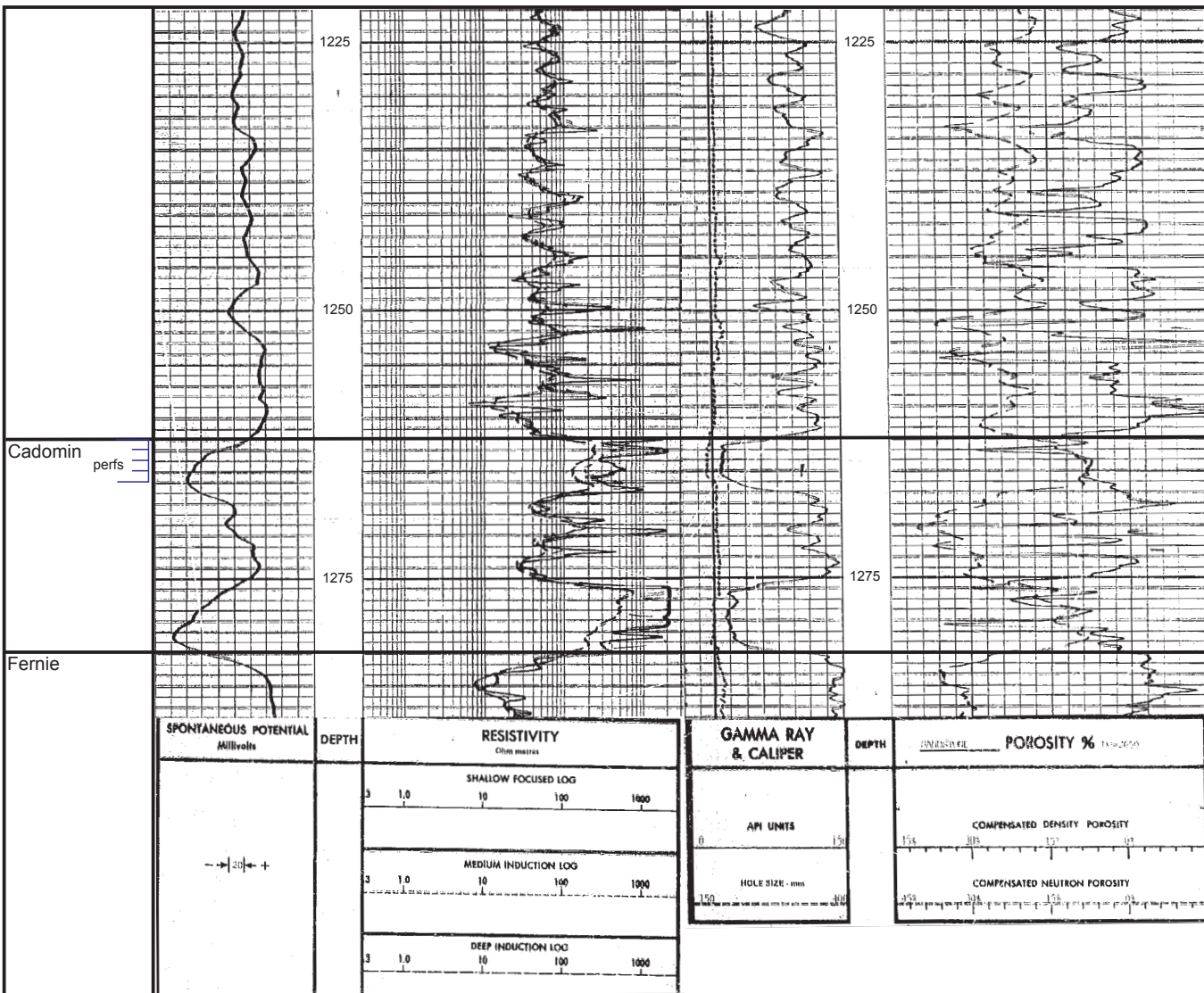
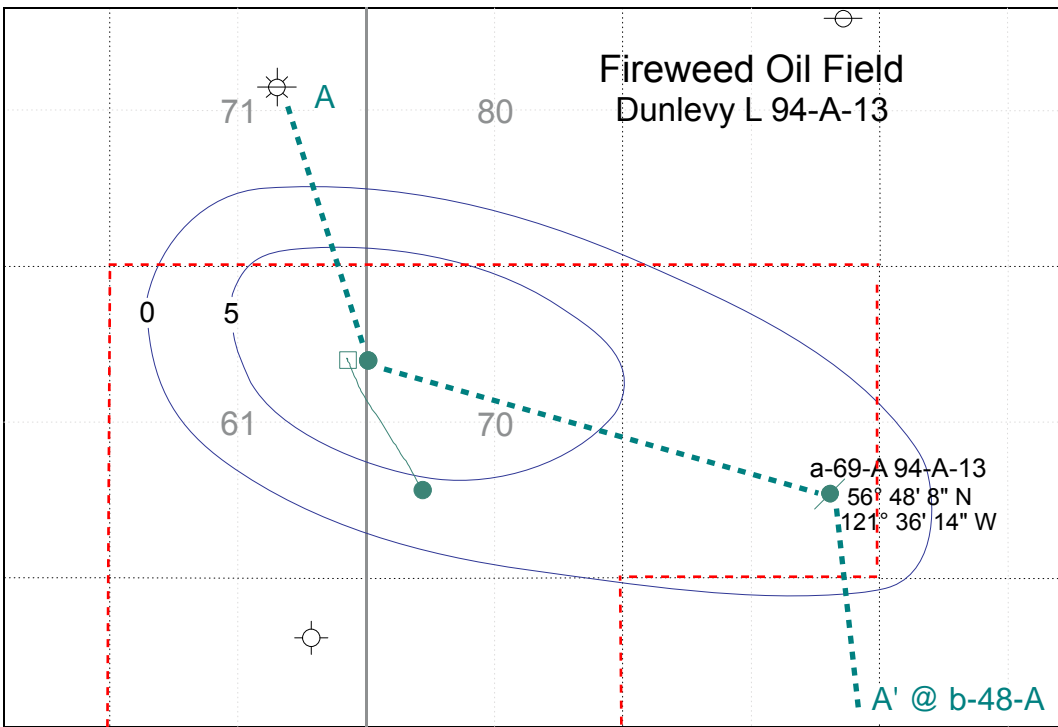
Cumulative Oil Production: 58,310 barrels

Remaining Recoverable Oil: 210,520 barrels

Remaining Original Oil in Place (%): 98

Cumulative Water Production: 9,440 barrels

Notes: The productive zone of Dunlevy might be confused with the stratigraphically equivalent lowermost Cadomin. The Oil and Gas Commission considers the pool to be Dunlevy, but the productive formation here might be picked as Cadomin by some companies. The discovery well is now abandoned.



Induction and neutron-density logs for discovery wells a-69-A/94-A-13. Completion intervals were at 1262-1266 and 1275-1278 metres in the Cadomin, which is stratigraphically equivalent to the Dunlevy. A gas cap over the completion interval is indicated by neutron-density crossover.



<=854.8m=>



<=1429.8m=>



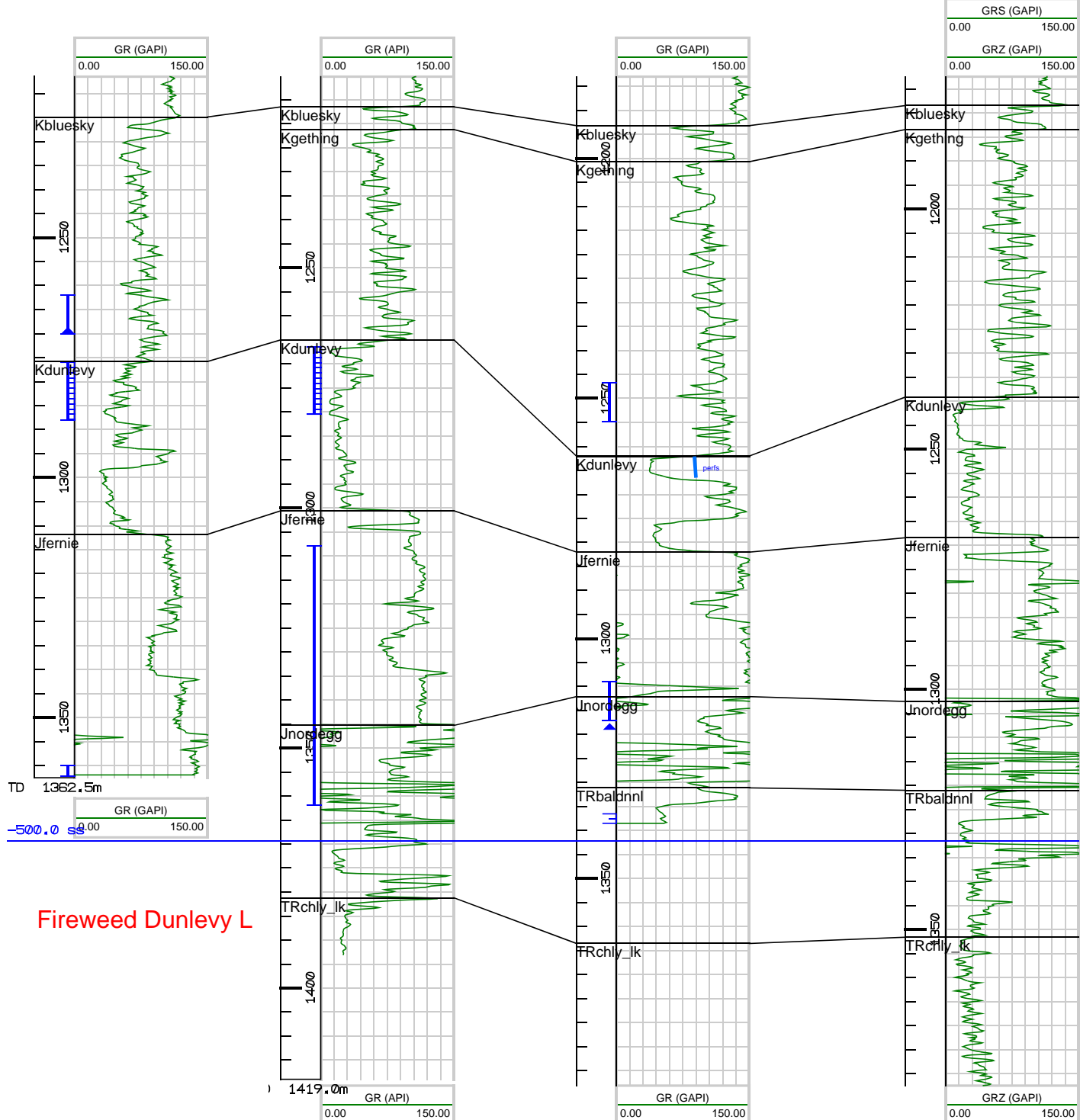
+842 m

<=1823.4m=>



+832 m

A'



Fireweed Dunlevy L

FIREWEED OIL FIELD

Lower Halfway A Pool

Pool Parameters

Field Code: 3540

Pool Code: 4805A

Discovery well original name: ESSO FIREWEED d-042-H/094-A-13

WA#: 07716

Rig Release: 1991/07/07

Other Oil and Gas Shows: Dunlevy gas, Bluesky gas

Number of Wells (October 2012) Oil: 19 **Active:** 17

Horizontal: 4

Reservoir Data

Area of Pool: 2456 acres, 994 hectares

Average Depth of Producing Zone: 1540 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 33 metres

Drive Mechanism: gas depletion

Average Porosity (%): 7

Average Net Pay: 15 metres

Average Permeability: 1.3 milliDarcies

Average Water Saturation (%): 28

Oil Formation Volume Factor (%): 138.7

Gravity (degrees API): 45.6

Original Pressure: 1978 psi, 13,638 kPa

Reserves

Estimated original oil in place: 32,971,040 barrels, 5,241,977 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 3,297,100 barrels, 524,197 m³ (volumetric)

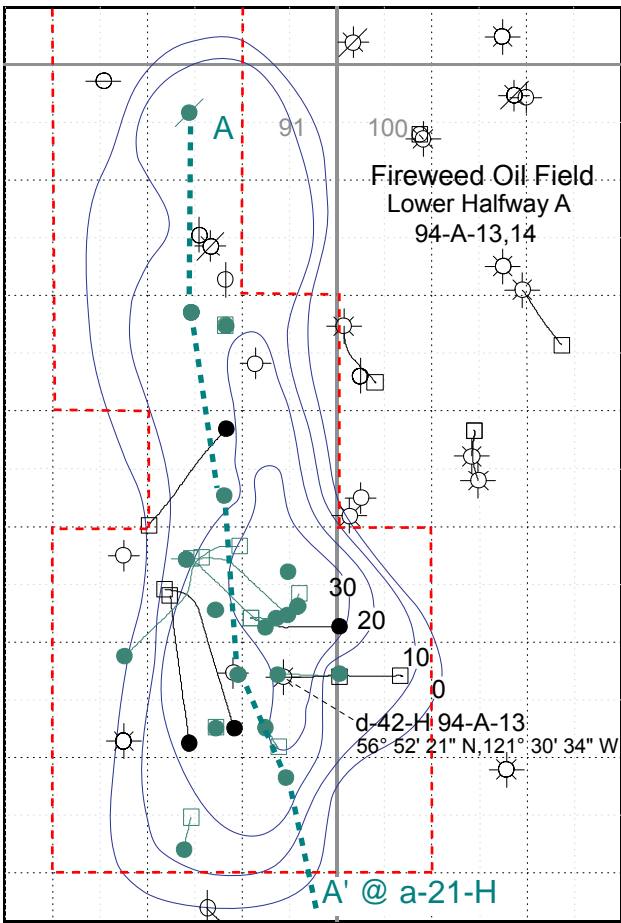
Cumulative Oil Production: 959,170 barrels

Remaining Recoverable Oil: 2,337,930 barrels

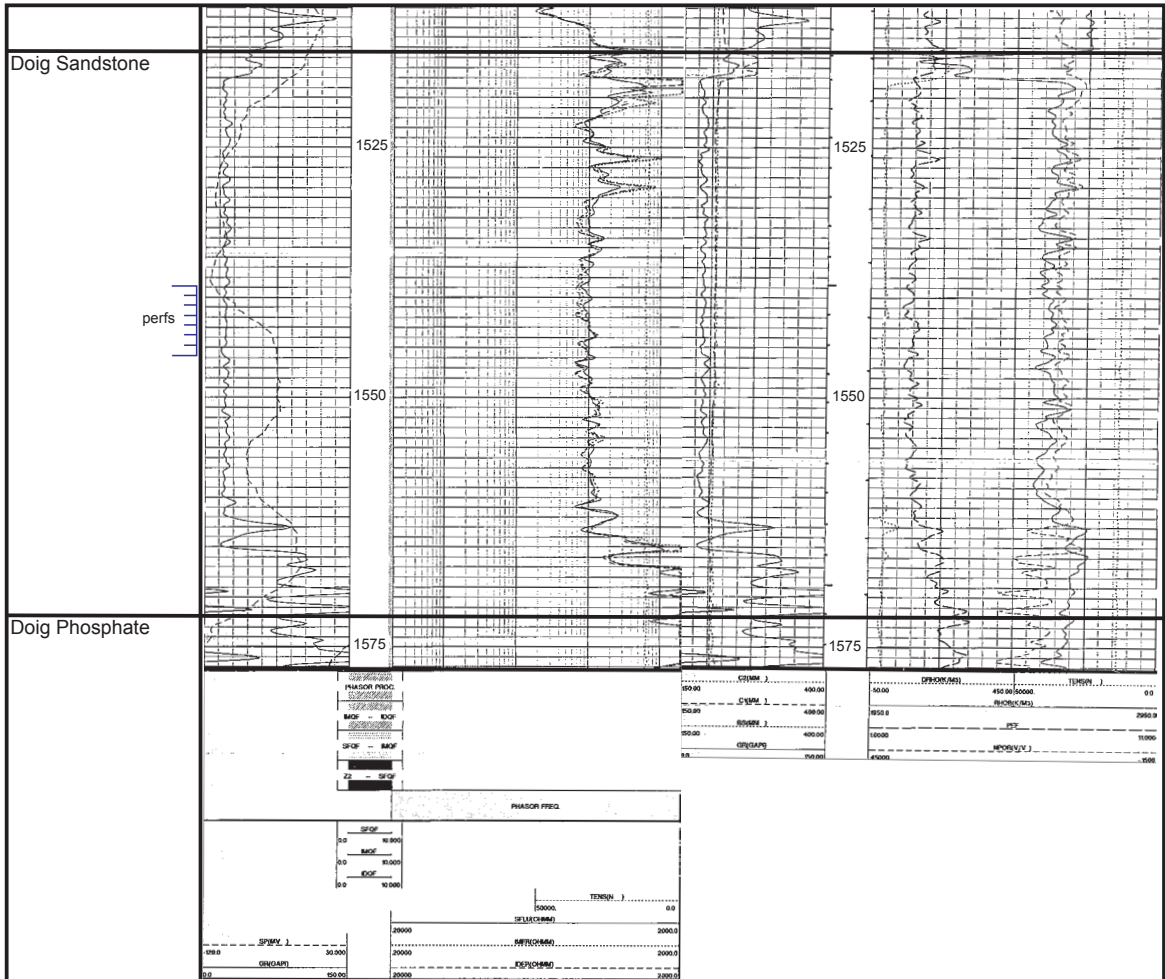
Remaining Original Oil in Place (%): 97

Cumulative Water Production: 224,720 barrels

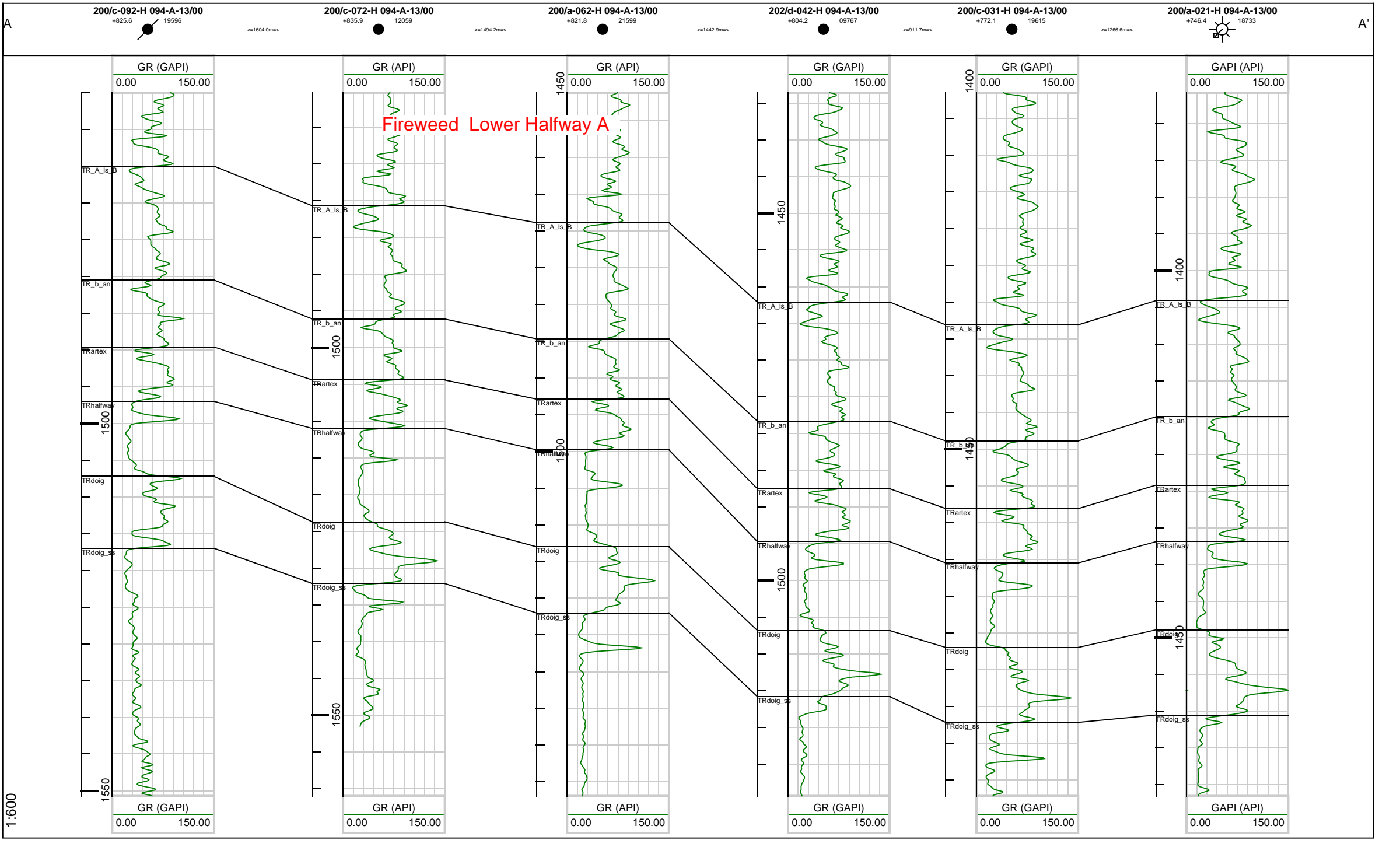
Notes: The formational pool designation is Lower Halfway A, but the formation might at times be picked as Doig. The central, thickest part of the field is criss-crossed with horizontal wells, but the northern part appears to be relatively un-drained. The sand body is thick but relatively tight, and possibly an ideal horizontal drilling candidate. Location 200/ d-42-H never produced oil; twin well (202/d-42-H, rig release in 1996) is the discovery producer.



Contour interval is 10 metres Lower Halfway A (Doig) net oil pay (Oil and Gas Commission). Discovery well is d-42-H-94-A-13.



Induction and neutron-density logs for twin discovery well 202/d-42-H/94-A-13. Pay occurs the full extent of a thick sand body between 1520 – 1560 metres. Completion took place between 1539 – 1546 metres.



Fireweed Lower Halfway A

1:600

OSPREY OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 6500

Pool Code: 4800A

Discovery well original name: Pacific SR CanDel Osprey d-4-J 94-A-15

WA#: 01610

Rig Release: 1965/02/26

Other Oil and Gas Shows: Halfway gas, Bluesky gas

Number of Wells (October 2012) Oil: 1 **Gas:** 2 **Active:** 1

Reservoir Data

Area of Pool: 330 acres, 134 hectares within the zero contour

Average Depth of Producing Zone: 3765 feet, 1147 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 11

Average Net Pay: 1.2 metres

Average Permeability: 152 milliDarcies

Average Water Saturation (%): 20

Oil Formation Volume Factor (%): 115.7

Gravity (degrees API): 40

Original Pressure: 1392 psi, 9598 kPa

Reserves

Estimated original oil in place: 1,264,870 barrels, 201,098 m³

Recovery Factor (%): 40

Estimated Recoverable Oil: 505,950 barrels, 80,440 m³

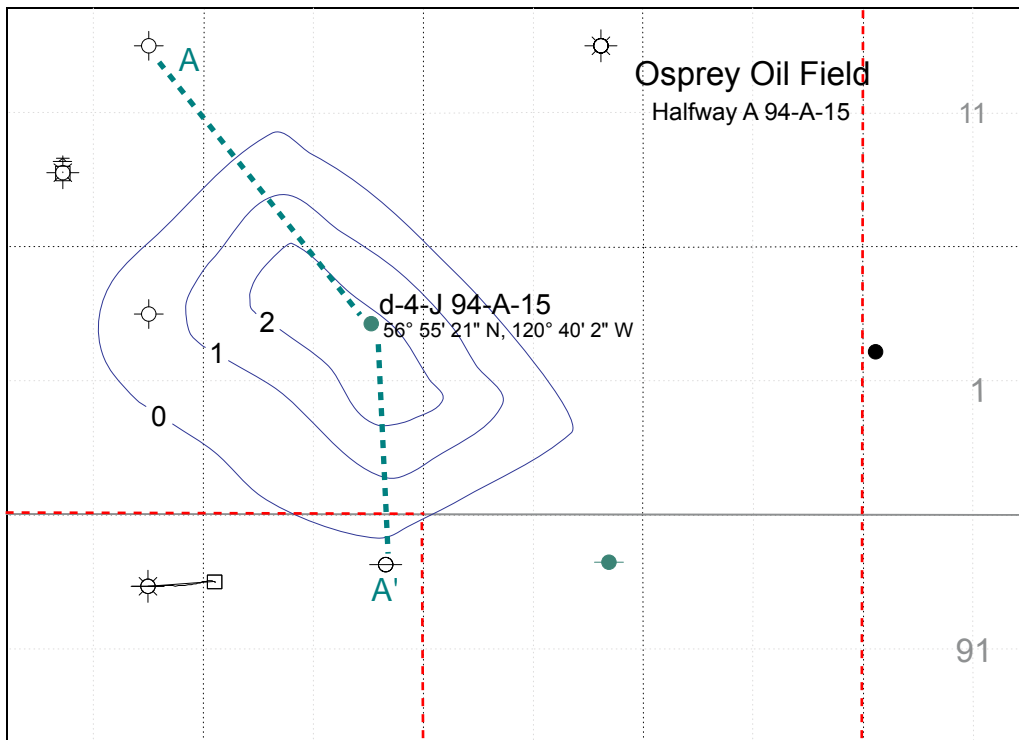
Cumulative Oil Production: 502,490 barrels

Remaining Recoverable Oil: 3,460 barrels

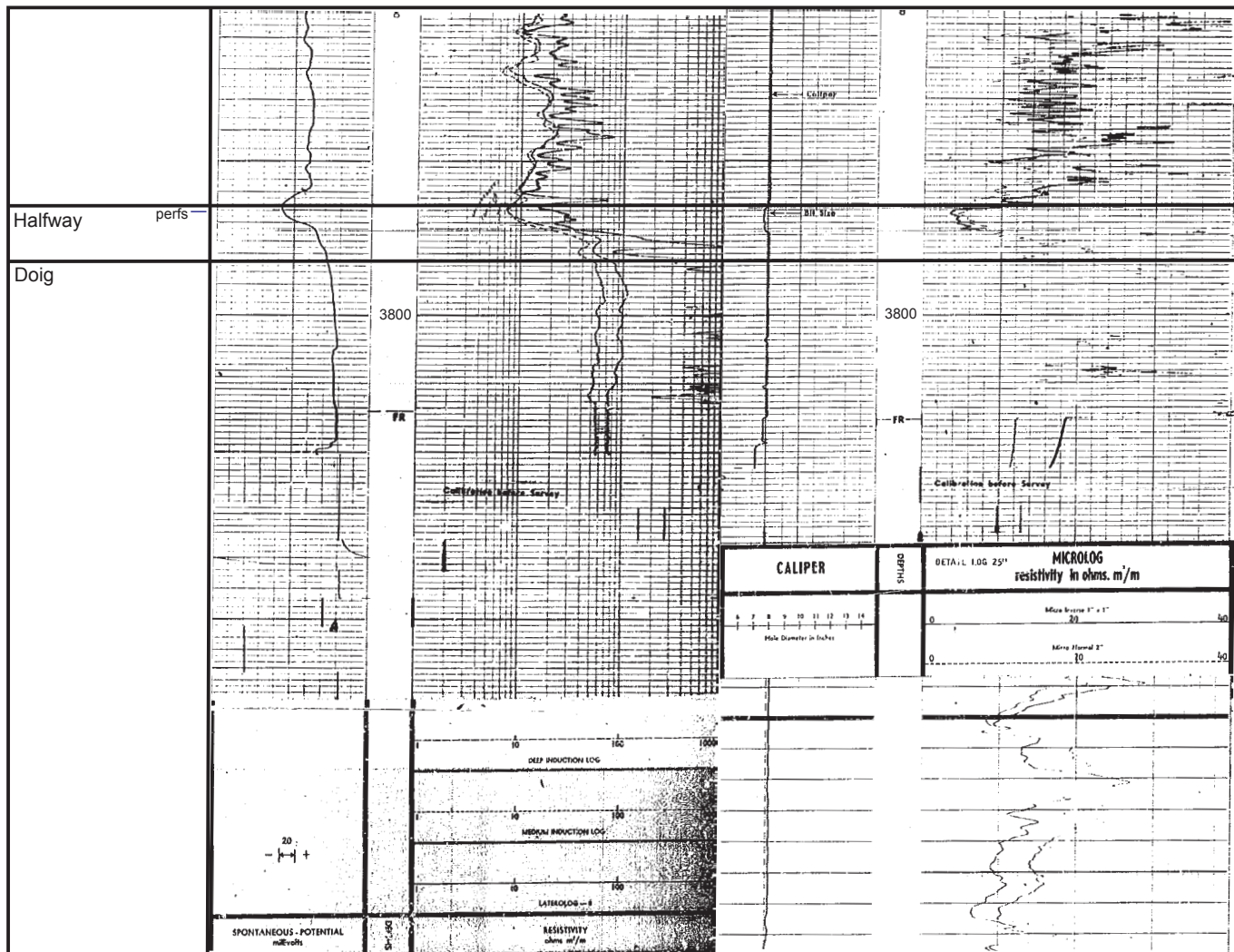
Remaining Original Oil in Place (%): 60

Cumulative Water Production: 5,380 barrels

Notes: A gas cap, consisting of two gas-wells, extends the pool to the north. The Halfway gas-wells to the south are not in the pool.



Contour interval is one metre net Halfway A oil pay (mapping adapted from Oil and Gas Commission). Discovery well is d-4-J/94-A-15. A gas cap extends to the north.



Laterolog and microlog for discovery well d-4-J/94-A-15. Completion is at one point at 3767' (1148 metres). Fair to good permeability is indicated by the microlog across the Halfway.

200/d-015-J 094-A-15/00A
+717.6 01779



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200/d-004-J 094-A-15/00
+679.9 01610



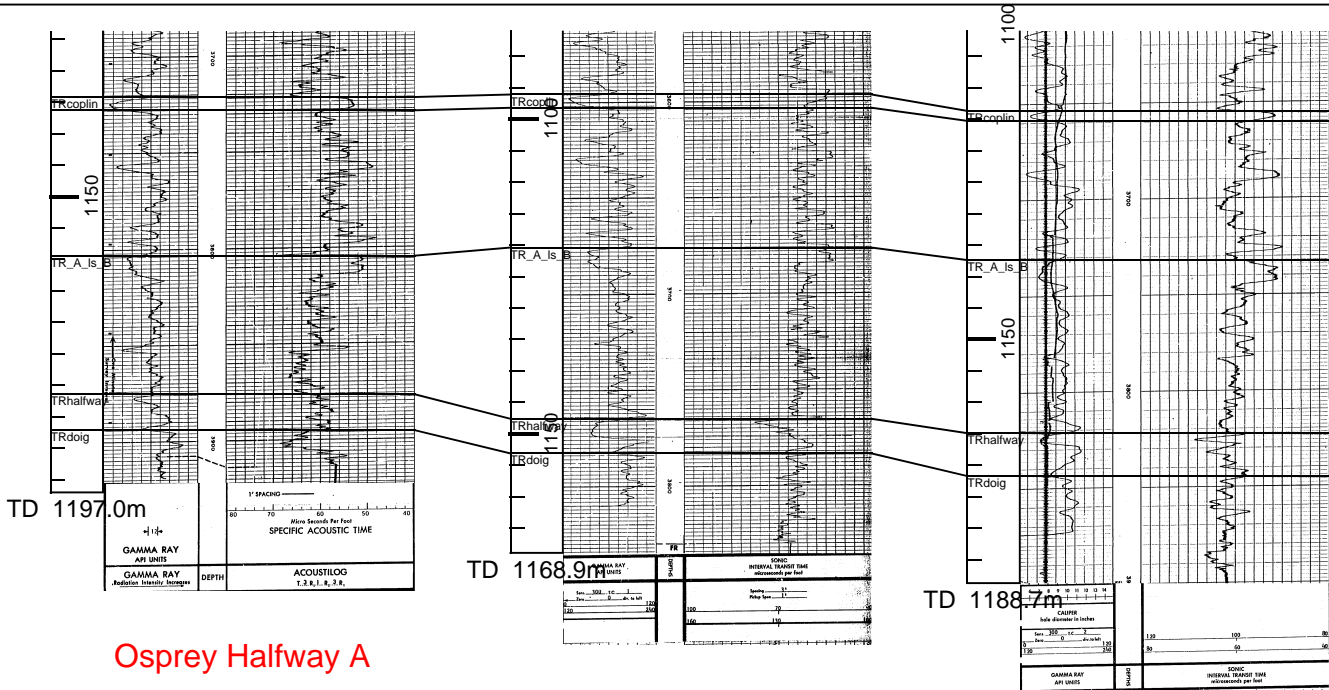
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200/d-094-G 094-A-15/00
+694.9 02347



A

A'



Osprey Halfway A

1:1200

PEEJAY OIL FIELD

Halfway Pool

Pool Parameters

Field Code: 6800

Pool Code: 4800

Discovery well original name: SINCLAIR PAC PEEJAY d-039-E 94-A-16

WA#: 00418

Rig Release: 1959/03/15

Other Oil and Gas Shows:

Number of Wells (November 2012) Oil: 115 Gas: 8 Injection: 58 Active: 49

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 3900 feet, 1189 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness:

Drive Mechanism: gas depletion

Average Porosity (%): 14

Average Net Pay: 5 metres

Average Permeability: 90 milliDarcies

Average Water Saturation (%): 16

Oil Formation Volume Factor (%): 117

Gravity (degrees API): 43

Original Pressure: 1376 psi, 9487 kPa

Reserves

Estimated original oil in place: 175,251,380 barrels, 27,862,744 m³

Recovery Factor (%): 40

Estimated Recoverable Oil: 69,402,270 barrels, 11,034,080 m³

Cumulative Oil Production: 67,598,850 barrels (material balance)

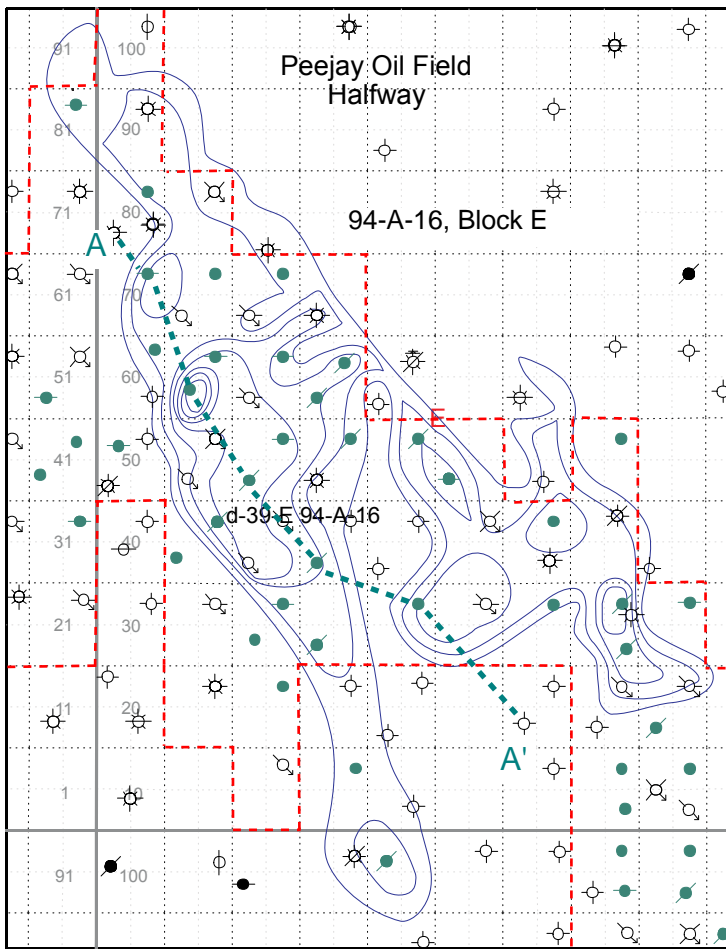
Remaining Recoverable Oil: 1,803,420 barrels

Remaining Original Oil in Place (%): 61

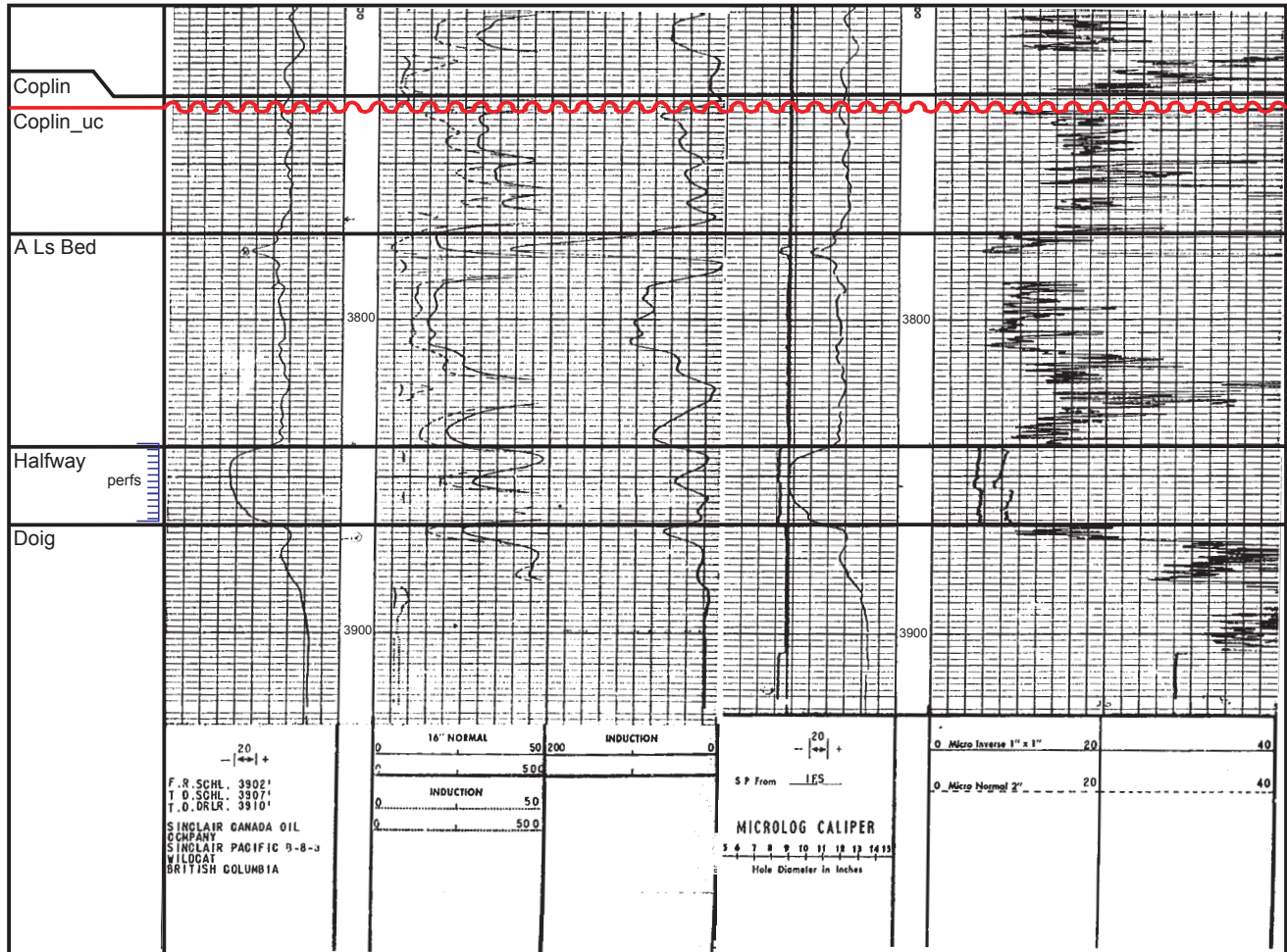
Cumulative Water Production: 56,254,970 barrels

Cumulative Water Injection: 175,987,190 barrels

Notes: Reservoir parameters above can be compared with those in Sikabonyi (1964). This is one of the oldest and most productive of BC's oil pools. A very large amount of water has been injected over the years for pressure maintenance. Peejay Halfway has A – X pools, but most have been grouped into a Halfway (no letter) pool. No horizontal wells have been drilled.



Contour interval is two metres net Halfway A oil pay. Only Halfway A is shown. Discovery well is d-39-A-94-A-16.



Elog and microlog for discovery well d-39-E/94-A-16. Permeability is clearly indicated over the entire completion interval. The Halfway according to these old logs does not appear to have a water leg.

•
+2386 ft

<=1959.8ft=>

•
+2379 ft

<=4556.8ft=>

•
+2393 ft

<=4006.6ft=>

•
+2390 ft

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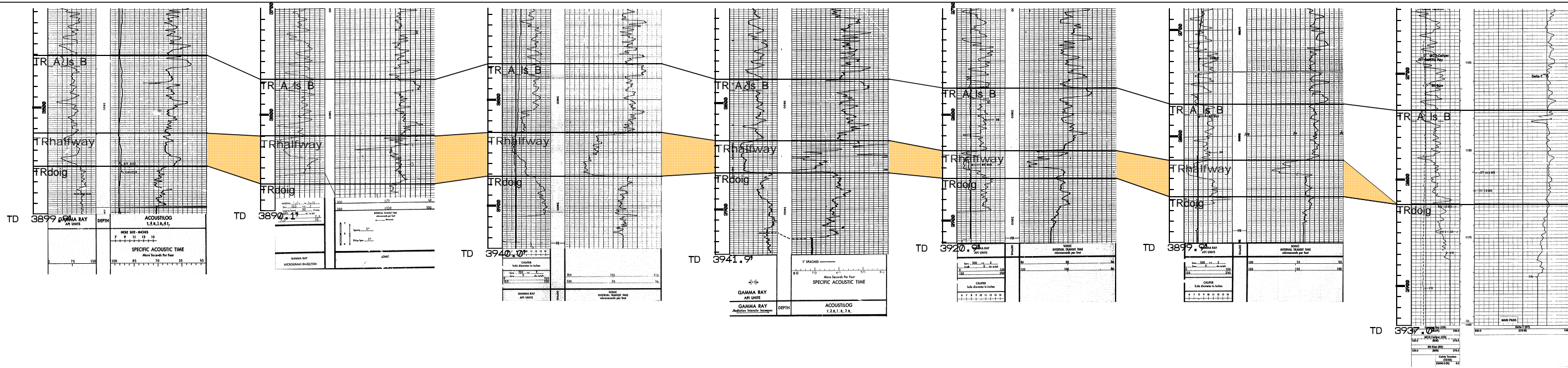
•
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•
+2359 ft

<=6084.7ft=>

○
+2318 ft



Peejay Halfway

PEEJAY OIL FIELD

Halfway R Pool

Pool Parameters

Field Code: 6800

Pool Code: 4800R

Discovery well original name: CNRL PEEJAY c-064-I/094-A-15

WA#: 08345

Rig Release: 1993/12/20

Other Oil and Gas Shows: Halfway gas, Bluesky gas, Gething gas

Number of Wells (November 2012) Oil: 3 **Active:** 0

Reservoir Data

Area of Pool: 554 acres, 224 hectares

Average Depth of Producing Zone: 1121 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 16

Average Net Pay: 1.2 metre

Average Permeability: no core, high permeability indicated on DST

Average Water Saturation (%): 19

Oil Formation Volume Factor (%): 119

Gravity (degrees API): 40

Original Pressure: 1327 psi, 9151 kPa

Reserves

Estimated original oil in place: 1,827,610 barrels, 290,567 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 274,140 barrels, 43,585 m³ (volumetric)

Cumulative Oil Production: 211,390 barrels

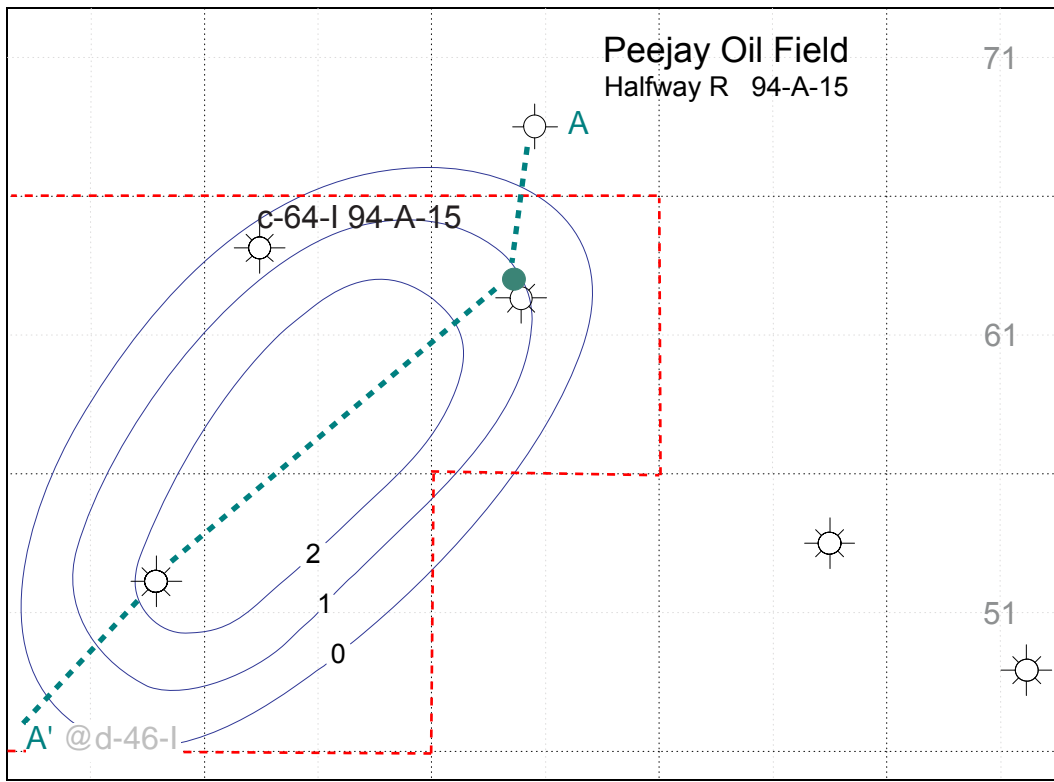
Remaining Recoverable Oil: 62,750 barrels

Remaining Original Oil in Place (%): 88

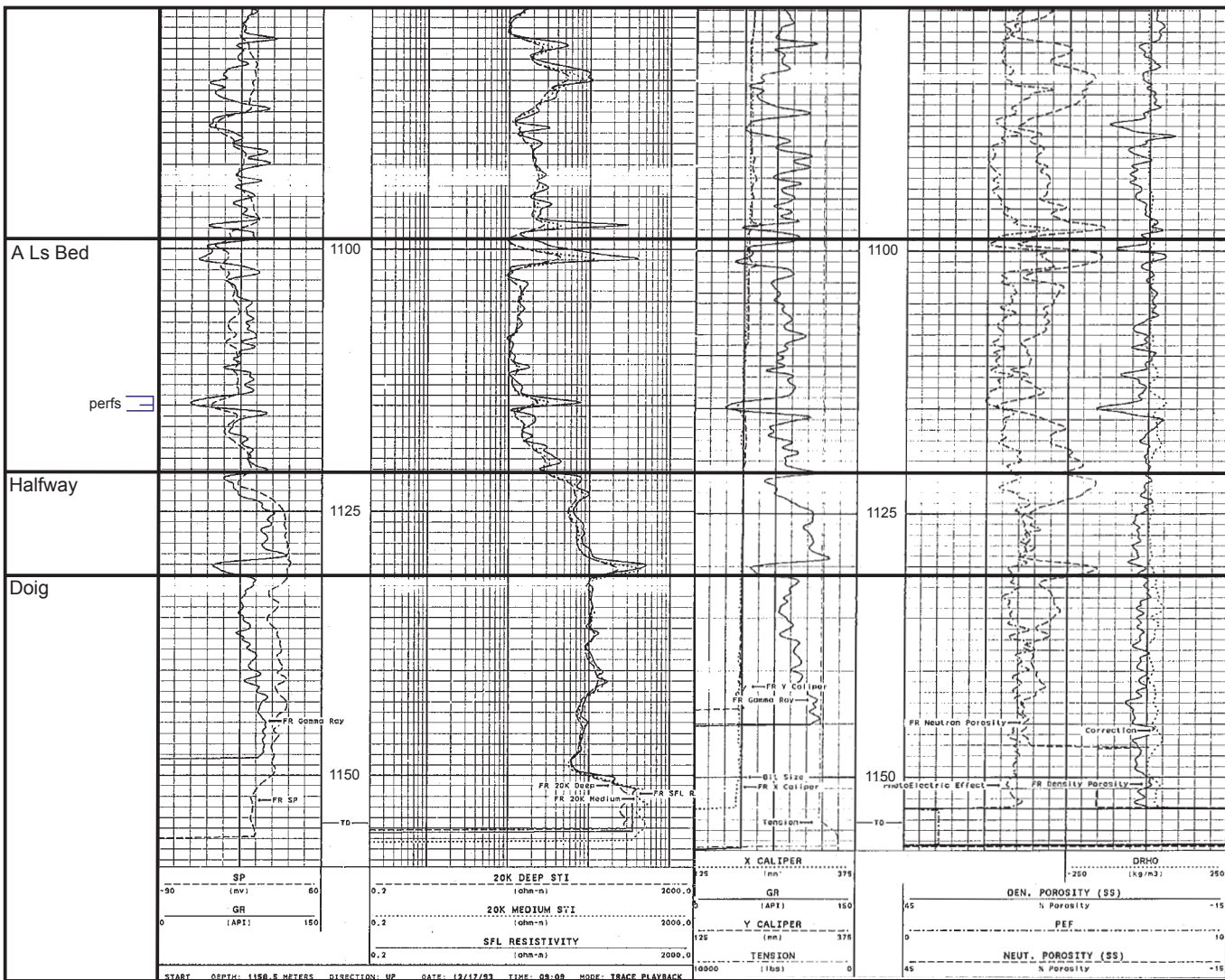
Cumulative Water Production: 3630 barrels

Notes: This pool is coded Halfway by the Oil and Gas Commission, but the geological pick for the completion interval is Triassic A.

Peejay Oil Field
Halfway R 94-A-15



Contour interval is one metre net
Halfway R oil pay. Discovery well is
c-64-l-94-A-15.

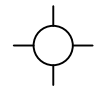


Induction and neutron-density logs for discovery well c-64-l/94-A-15. The top of the Halfway is at 1121 metres. The completion interval is 1114.0 – 1115.5 metres in the Triassic A.

A

200/b-073-I 094-A-15/00

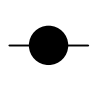
+706.1 11148



<=514.3m=>

200/c-063-I 094-A-15/00

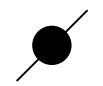
+703.6 08604



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200/d-055-I 094-A-15/00

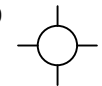
+710.5 08662



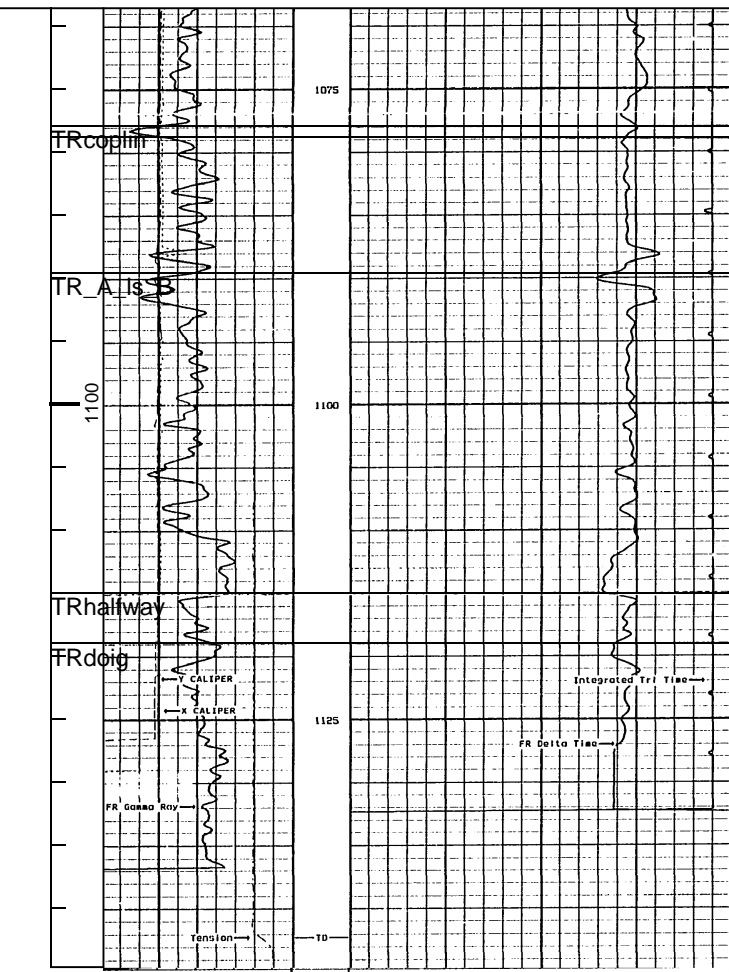
<=1124.5m=>

200/d-046-I 094-A-15/00

+704.9 01905



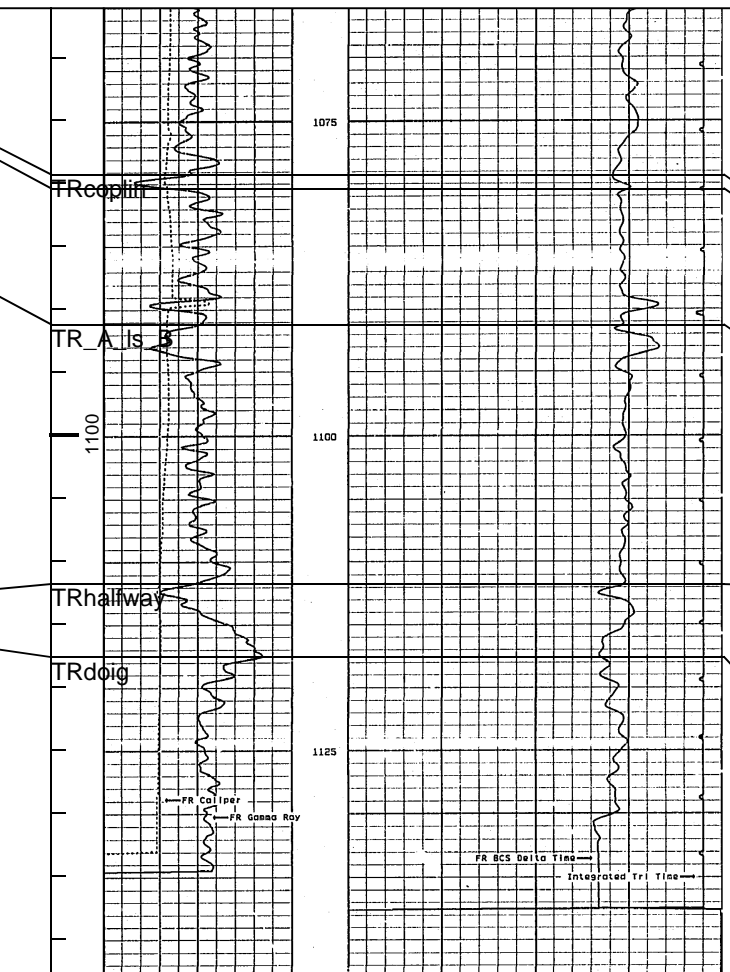
A'



TD 1144.7m

GR (API)	0	150
X CALIPER (mm)	125	275
Y CALIPER (mm)	125	375
TENSION (LBS)	10000	0

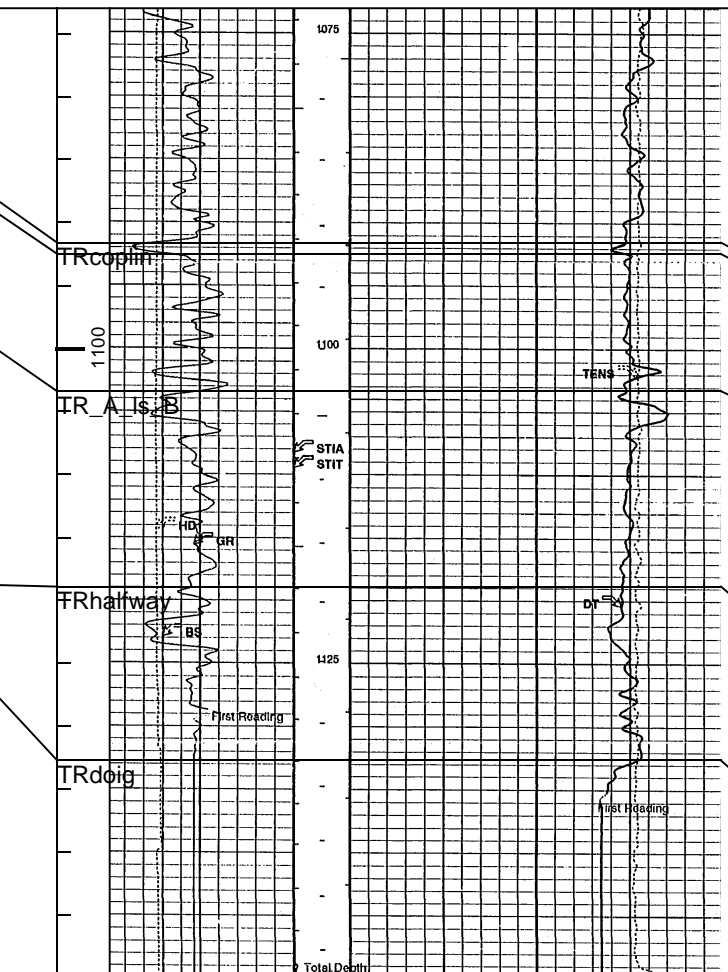
START DEPTH: 1146.8 METERS DIRECTION: UP DATE: 03/20/94 TIME: 10:01 MODE: TRACE PLAYBACK
17533ST17



TD 1143.0m

GR (API)	0	150
CALIPER (mm)	125	375
TENSION (LBS)	10000	0

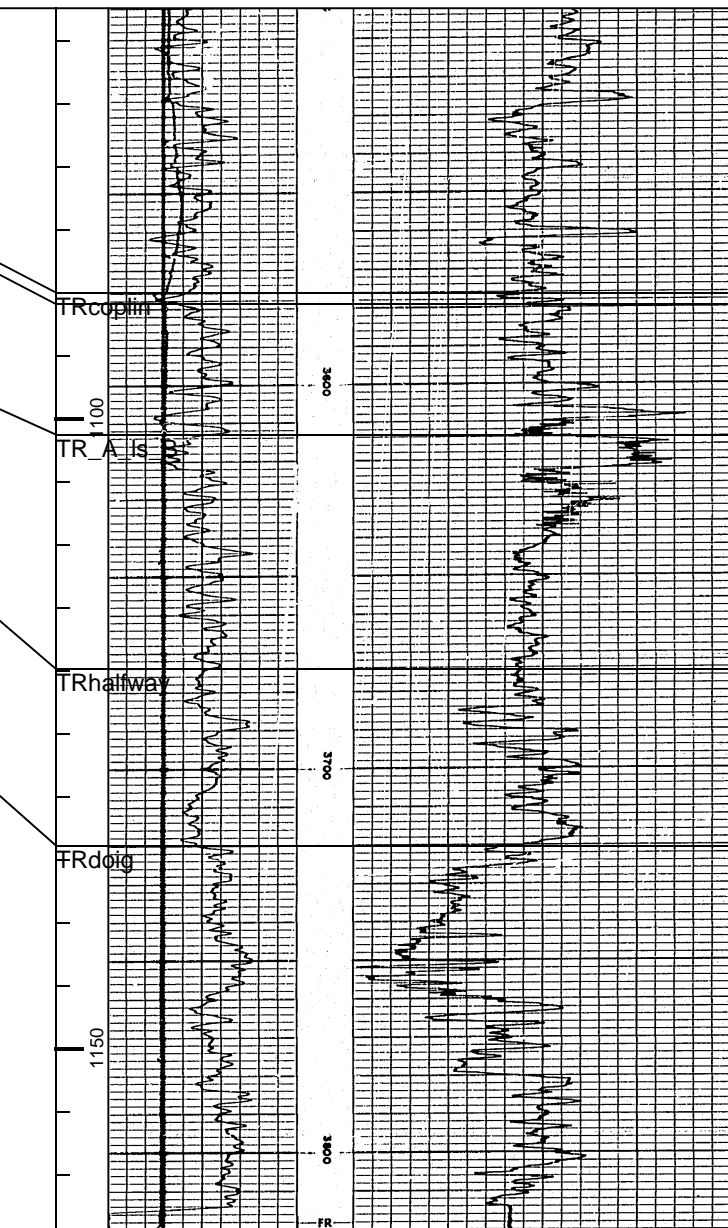
START DEPTH: 1147.7 METERS DIRECTION: UP DATE: 03/20/94 TIME: 10:01 MODE: TRACE PLAYBACK
20799DIL2



TD 1150.0m

Bit Size (BS) (MM)	125.0	375.0
Gamma Ray (GR) (API)	0.0	150.0
Hole Diameter (HD) (MM)	125.0	375.0

START DEPTH: 1150.0 METERS DIRECTION: UP DATE: 03/20/94 TIME: 10:01 MODE: TRACE PLAYBACK
20799DIL2



TD 1164.4m

CALIPER Hole Diameter In Inches	120	100	80
Gamma Ray (API)	0	120	240

SONIC INTERVAL TRANSIT TIME microseconds per foot

Peejay Halfway R

1:600

DOIG RAPIDS OIL FIELD

Halfway C Pool

Pool Parameters

Field Code: 3426

Pool Code: 4800C

Discovery well original name: CNRL et al BULRUSH b-028-K/094-A-16

WA#: 08074

Rig Release: 1993/03/05

Other Oil and Gas Shows: Halfway gas, Baldonnel gas

Number of Wells (November 2012) Oil: 1 Gas: 2 Active: 2

Reservoir Data

Area of Pool: 227 acres, 92 hectares

Average Depth of Producing Zone: 1130 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6.5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 16

Average Net Pay: 3.4 metres

Average Permeability: 264 milliDarcies

Average Water Saturation (%): 17

Oil Formation Volume Factor (%): 117.5

Gravity (degrees API): 43

Original Pressure: 1310 psi, 9032 kPa

Reserves

Estimated original oil in place: 2,163,880 barrels, 344,029 m³

Recovery Factor (%): 6.5

Estimated Recoverable Oil: 140,650 barrels, 22,362 m³ (volumetric)

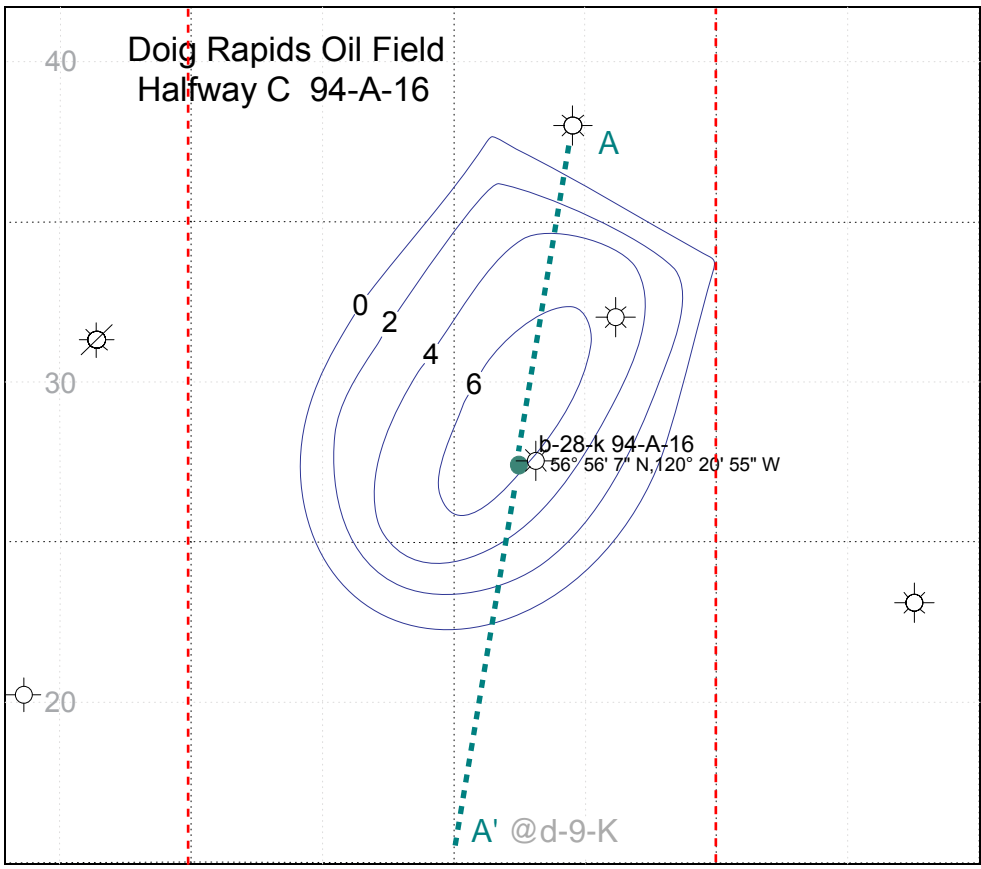
Cumulative Oil Production: 134,920 barrels, 21,451 m³

Remaining Recoverable Oil: 5,740 barrels, 914 m³

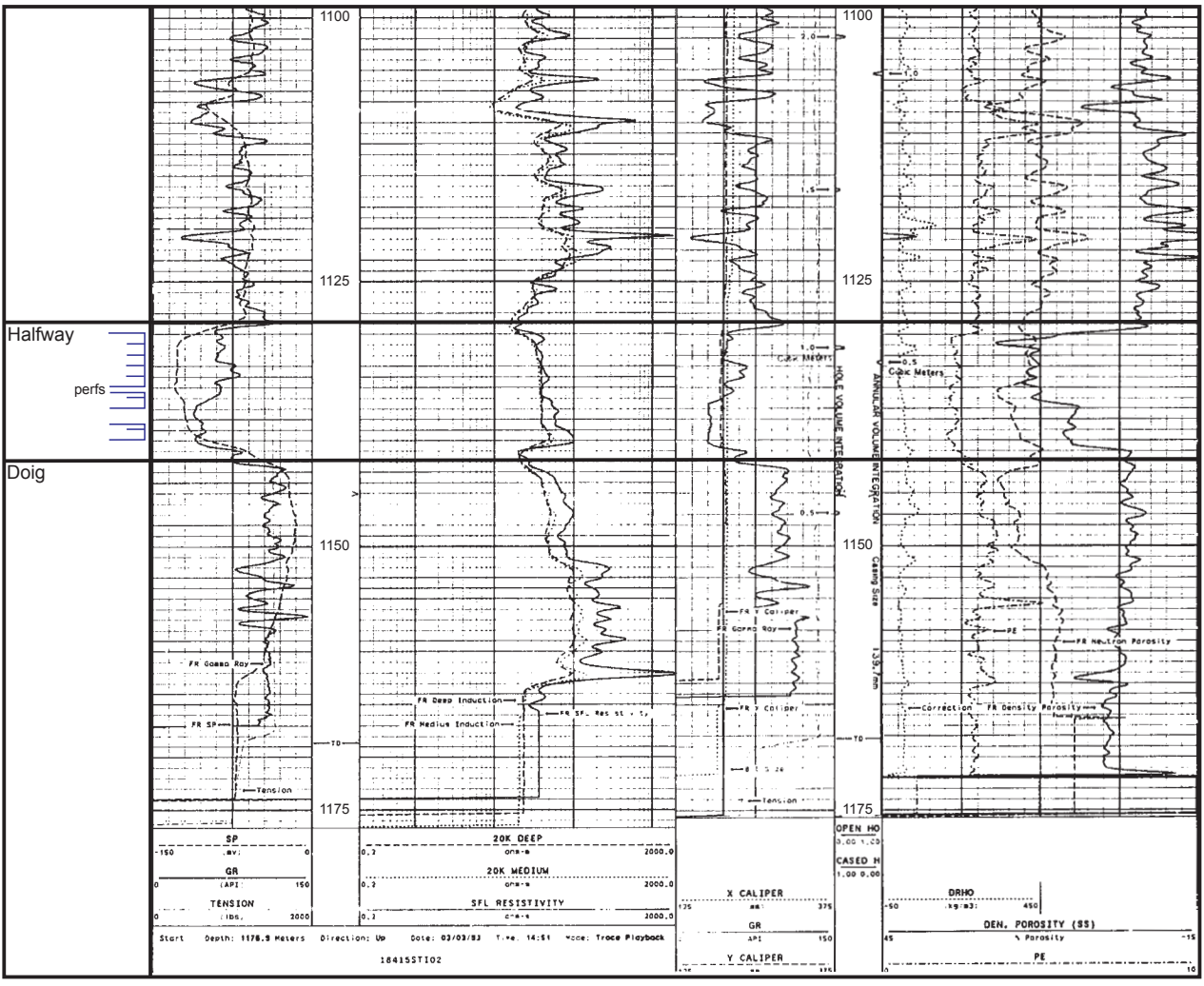
Remaining Original Oil in Place (%): 94

Cumulative Water Production: 22,280 barrels, 3,542 m³

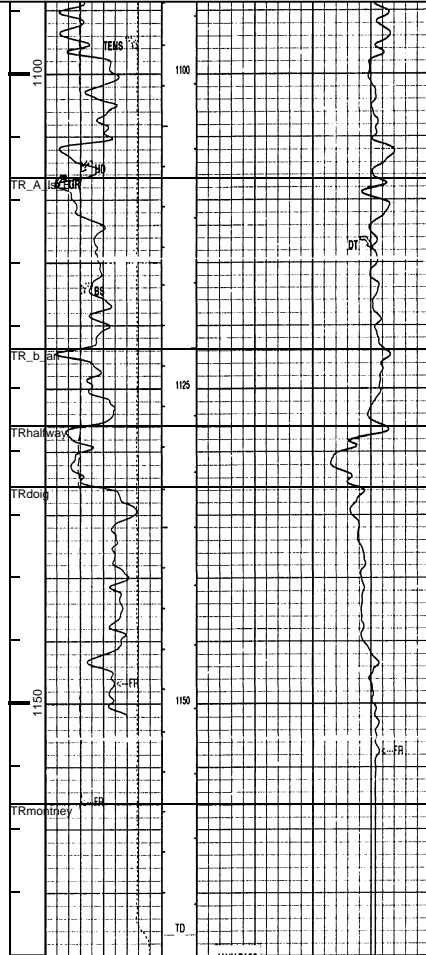
Notes: This pool has only one oil well. The limits to the pool are not well defined. A very low primary recovery suggests room for improved recovery using new technologies. The discovery well was placed in the Doig Rapids Field around 1995.



Contour interval is 1 metre net Halfway oil pay (adapted from the Oil and Gas Commission).

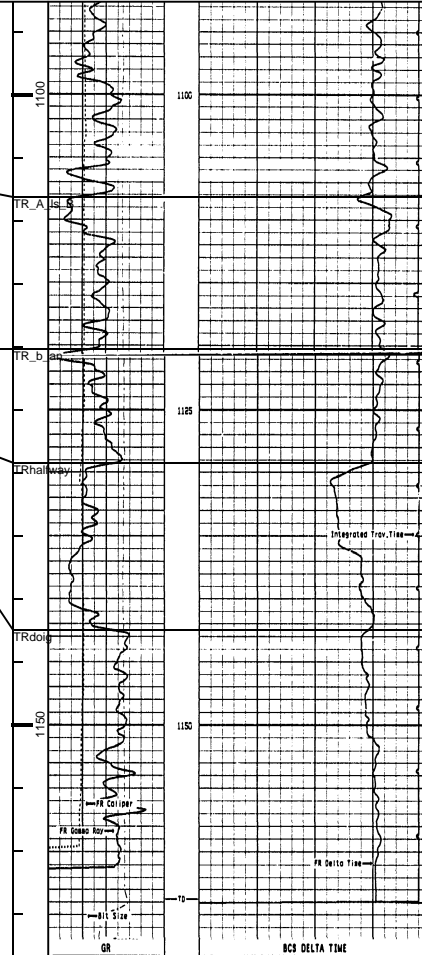


Induction and neutron-density curves for discovery well b-28-K. Good reservoir properties are shown for the Halfway. Strong neutron-density crossover show presence of gas cap. It was first perfed 1138.5-1140.5 m, but still recovered oil when later perfed higher at 1130-1135 m.

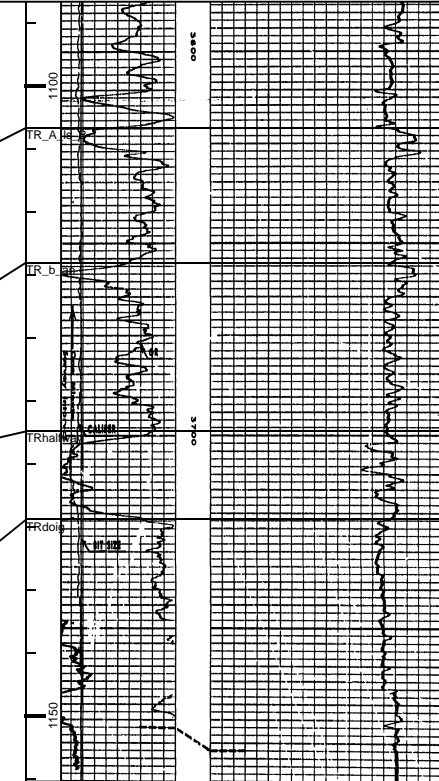


TD 1170.0m

125	375
125	375
125	375
125	375



TD 1172.0m



TD 1155.2m

GAMMA RAY Radiation Intensity Increases GAMMA RAY API UNITS $\times 10^4$ HOLE SIZE - INCHES 7 9 11 13 15	ACOUSTILOG T.R.I.R., S.R. Velocity—1000 ft/sec SPECIFIC ACOUSTIC TIME Micro Seconds Per Foot 1' SPACING

Doig Rapids Halfway C

1:600

BULRUSH OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 2820

Pool Code: 4800A

Discovery well original name: Union HB Sinclair Bulrush d-078-F 94-A-16

WA#: 01267

Rig Release: 1963/02/11

Other Oil and Gas Shows: Halfway gas, Montney gas

Number of Wells (November 2012) Oil: 3 Active: 3 Injection: 3

Reservoir Data

Area of Pool: 991 acres, 401 hectares

Average Depth of Producing Zone: 3721 feet, 1134 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 7 metres

Drive Mechanism: gas injection

Average Porosity (%): 16

Average Net Pay: 2 metres

Average Permeability: 26 milliDarcies

Average Water Saturation (%): 15.4

Oil Formation Volume Factor (%): 119.9

Gravity (degrees API): 41.1

Original Pressure: 1322 psi, 9115 kPa

Reserves

Estimated original oil in place: 5,159,920 barrels, 820,362 m³

Recovery Factor (%): 45

Estimated Recoverable Oil: 2,321,960 barrels, 369,162 m³ (volumetric)

Cumulative Oil Production: 1,979,860 barrels

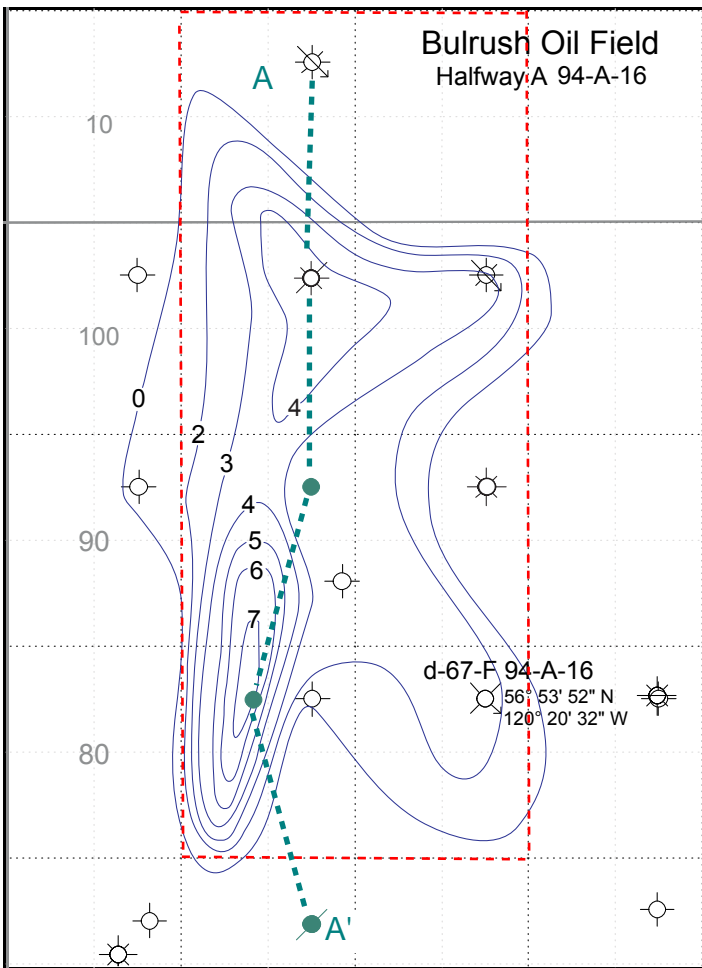
Remaining Recoverable Oil: 342,110 barrels

Remaining Original Oil in Place (%): 62

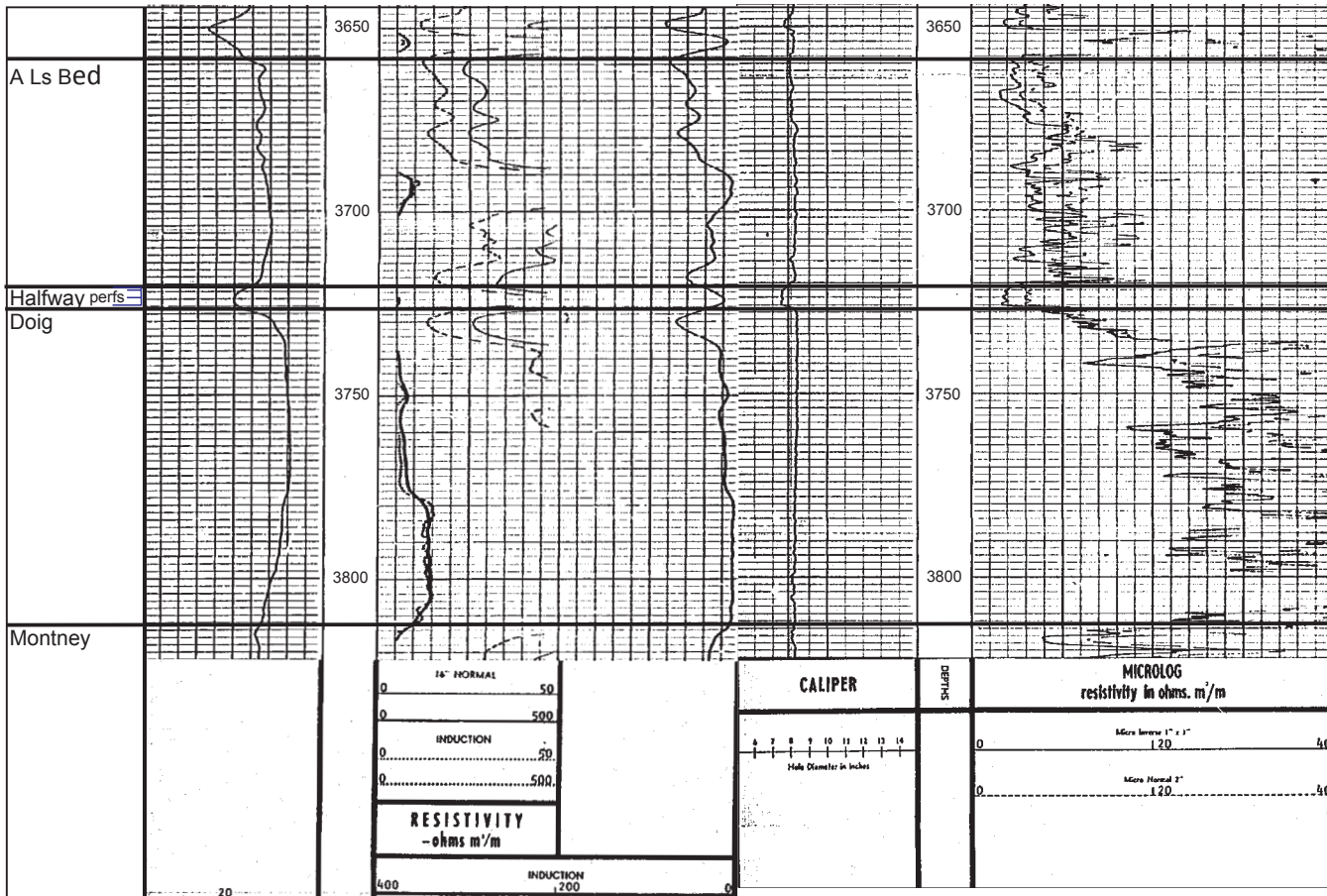
Cumulative Water Production: 35,260 barrels

Cumulative Water Injection: 2,419,770 barrels

Notes: The injection wells appear to be distant from the current producers. Discovery well d-78-F is an abandoned water injection well.



Contours (Halfway A net oil pay, 1 m interval), are adapted from the Oil and Gas Commission. Discovery well is d-78-F-94-A-16, which is now an abandoned water injection well.

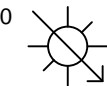


Elog and microlog for discovery well d-78-F-94-A-16. This well is now an abandoned water injector. Good permeability is indicated by curve separation on the microlog across the thin completion interval.

A

200/d-009-K 094-A-16/00

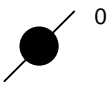
+730.0 01597



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200/d-099-F 094-A-16/00

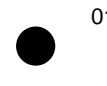
+730.1 01551



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200/d-089-F 094-A-16/00

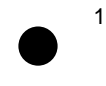
+731.8 01394



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200/c-079-F 094-A-16/00

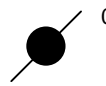
+729.9 11399



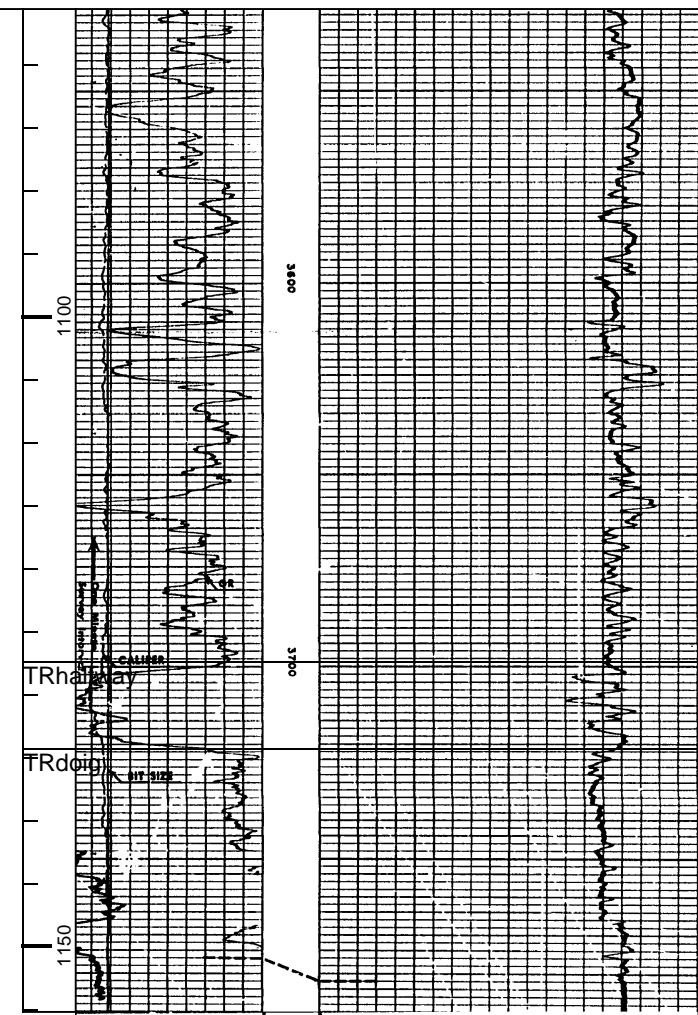
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200/d-069-F 094-A-16/00

+709.8 02386

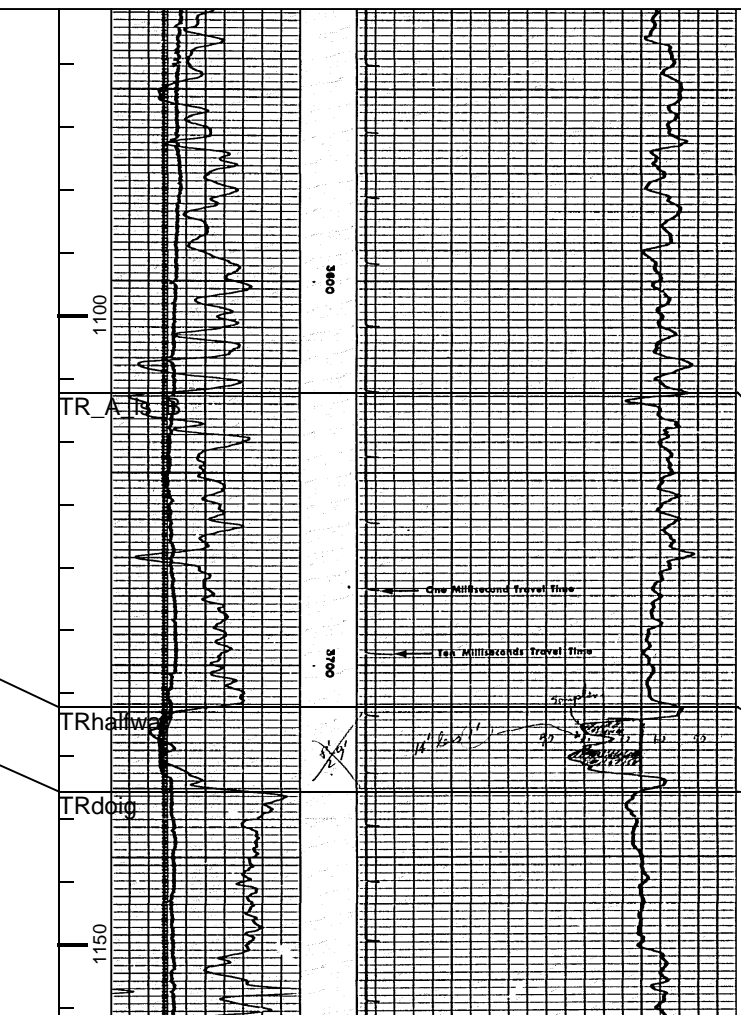


A'



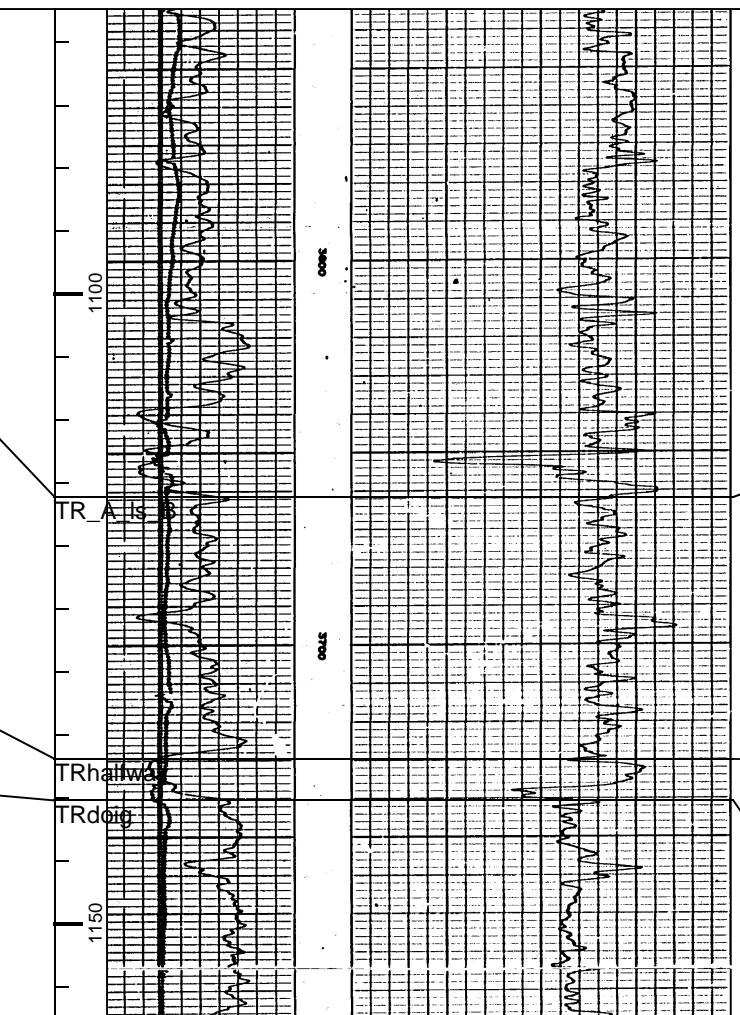
TD 1155.2m

GAMMA RAY Radiation Intensity Increases API UNITS HOLE SIZE - INCHES 7 9 11 13 15	ACOUSTILOG T, R, I, R, R, Velocity—1000s ft/sec SPECIFIC ACOUSTIC TIME Micro Seconds Per Foot 1' SPACING
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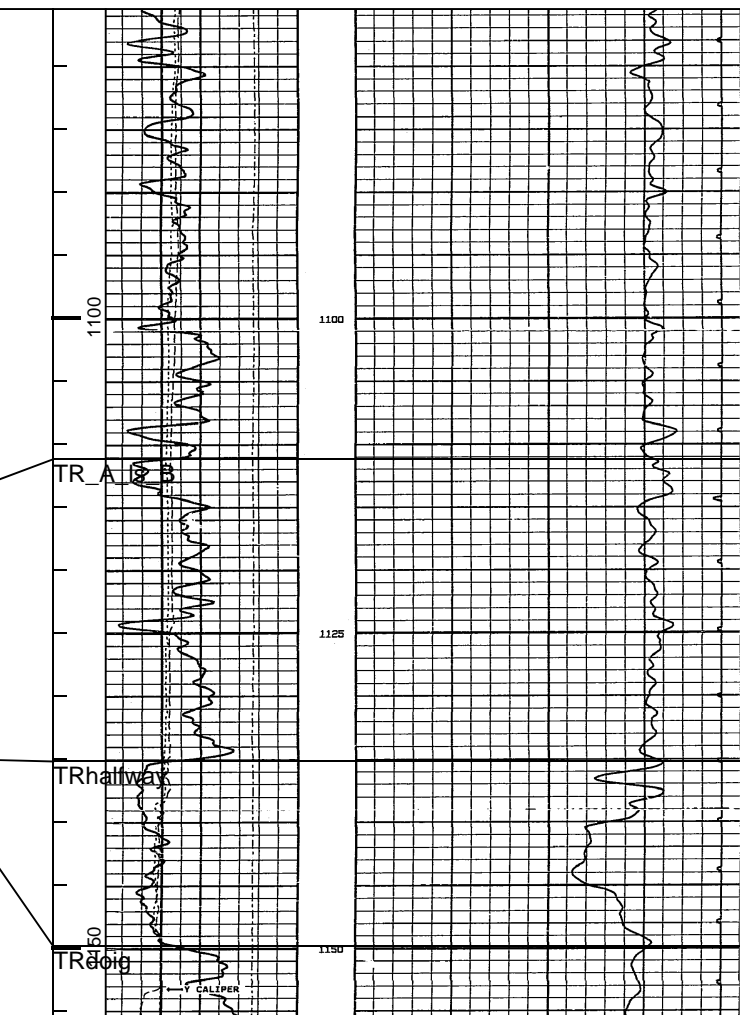
TD 1170.4m

GAMMA RAY API UNITS	ACOUSTILOG T, R, I, R, R, Velocity—1000s ft/sec SPECIFIC ACOUSTIC TIME Micro Seconds Per Foot 1' SPACING
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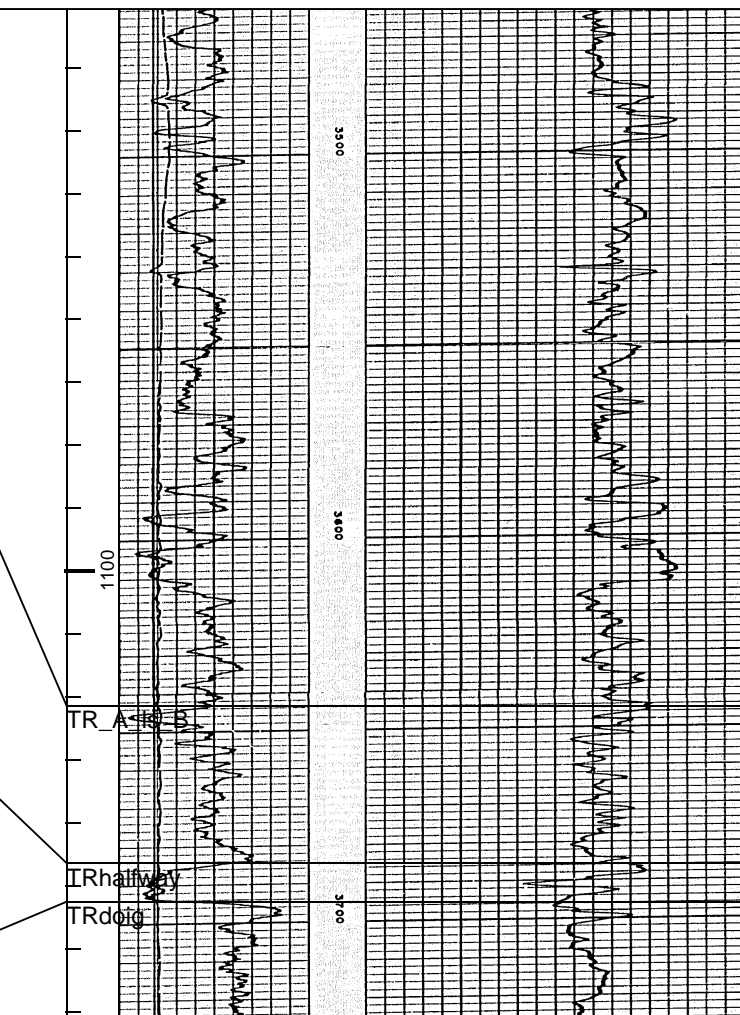
TD 1170.4m

GAMMA RAY API UNITS Interval 3200 to 3830 Sens 300 T.C. 2 Logging Speed 2.8 ft/min ZERO 0 div. to left	SONIC Interval Transit Time microseconds per foot Interval 100 to 130 Sensing 2 Pulse Sp. 1'
--	--



TD 1174.0m

GAMMA RAY API UNITS Interval 3200 to 3830 Sens 300 T.C. 2 Logging Speed 2.8 ft/min ZERO 0 div. to left	SONIC Interval Transit Time microseconds per foot Interval 100 to 130 Sensing 2 Pulse Sp. 1'	GR X CALIPER (API) 150 Y CALIPER (API) 150 TENSION LBS 0	BCS DELTA TIME (usec/m)
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TD 1149.1m

GAMMA RAY Radiation Intensity Increases API UNITS HOLE SIZE - INCHES 7 9 11 13 15	ACOUSTILOG T, R, I, R, R, Velocity—1000s ft/sec SPECIFIC ACOUSTIC TIME Micro Seconds Per Foot 1' SPACING
--	--

Bulrush Halfway A

1:600

WOLF OIL FIELD

Halfway A Pool

Field Parameters

Field Code: 8700

Pool Code: 4800A

Discovery well original name: Baysel Sinclair Wolf d-093-B 94-A-15

WA#: 01815

Rig Release: 1966/01/04

Other Oil and Gas Shows: Gething gas, Halfway gas

Number of Wells (November 2012) Oil: 6 Gas: 1 Active: 1

Reservoir Data

Area of Pool: 877 acres, 355 hectares

Average Depth of Producing Zone: 4000 feet, 1220 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 21

Average Net Pay: 3.1 metres

Average Permeability: 260 millidarcies

Average Water Saturation (%): 34

Oil Formation Volume Factor (%): 122

Gravity (degrees API): 40

Original Pressure: 1502 psi, 10,356 kpa

Reserves

Estimated original oil in place: 7,809,660 barrels, 1,241,640 m3

Recovery Factor (%): 30

Estimated Recoverable Oil: 2,342,900 barrels, 372,490 m3 (production decline)

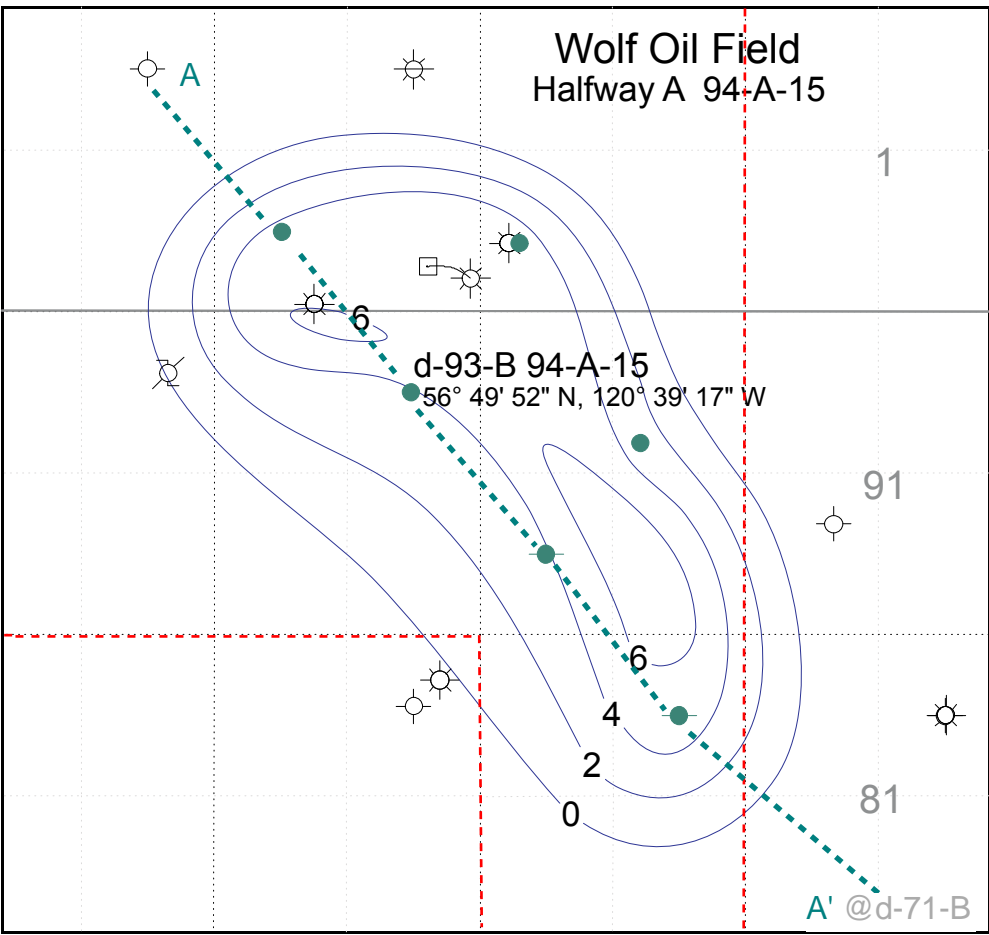
Cumulative Oil Production: 2,276,060 barrels

Remaining Recoverable Oil: 66,840 barrels

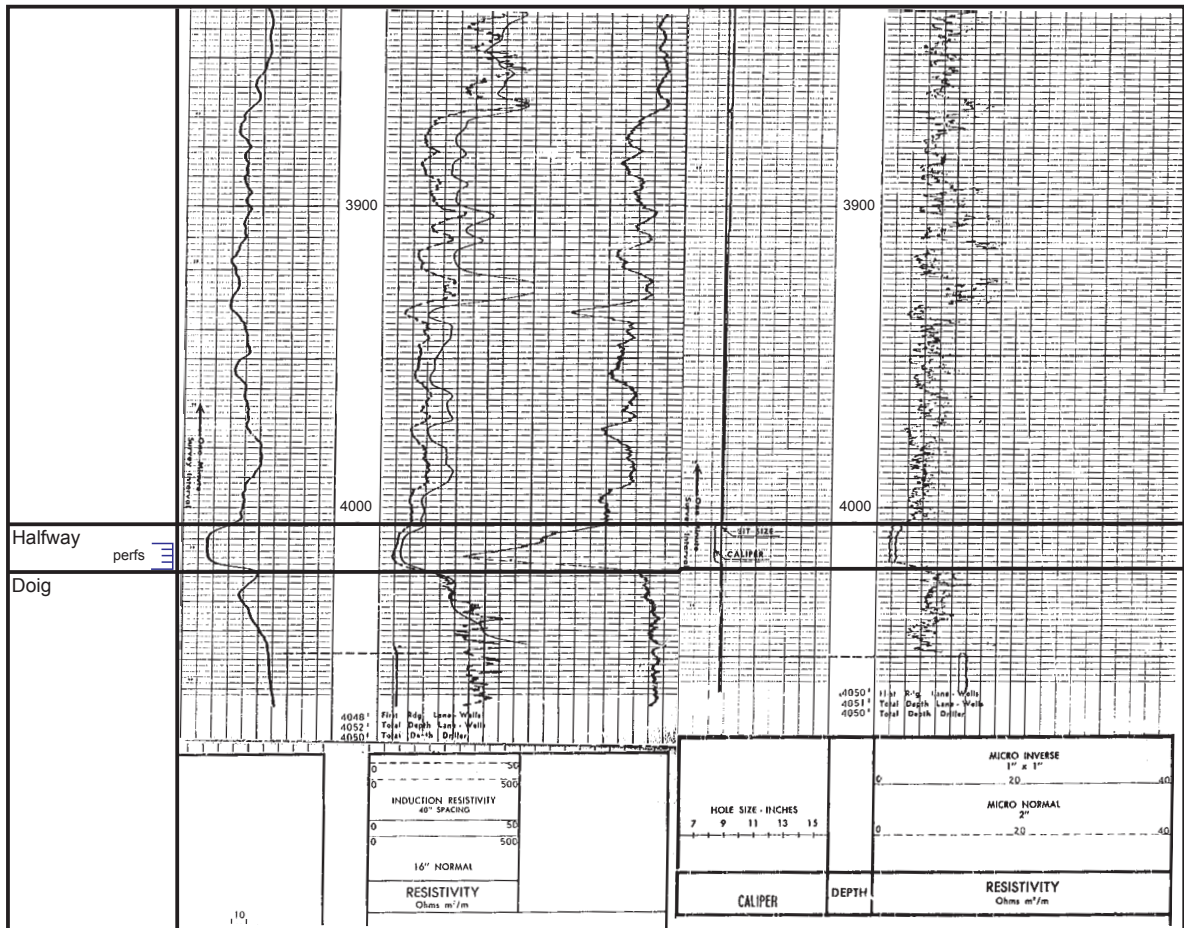
Remaining Original Oil in Place (%): 71

Cumulative Water Production: 1,970,020 barrels

Notes: The sandstone here is part of the discontinuous phase of the Halfway (GSC Paper 87-26); and trapping is determined by facies change.



Contour interval is two metres net Halfway A oil pay (Oil and Gas Commission). Discovery well is d-93-B-94-A-15.



Elog and minilog for discovery well d-93-B-94-A-15. Almost the entire Halfway has good porosity and the minilog indicates good permeability. Completion is between 4012' - 4020'.

A

200/d-004-G 094-A-15/00

+707.1 03789



<=606.5m>

200/b-003-G 094-A-15/00

+710.5 03379



<=590.7m>

200/d-093-B 094-A-15/00

+713.9 01815



<=607.2m>

200/b-092-B 094-A-15/00

+720.7 01972



<=598.2m>

200/d-082-B 094-A-15/00

+720.9 01916



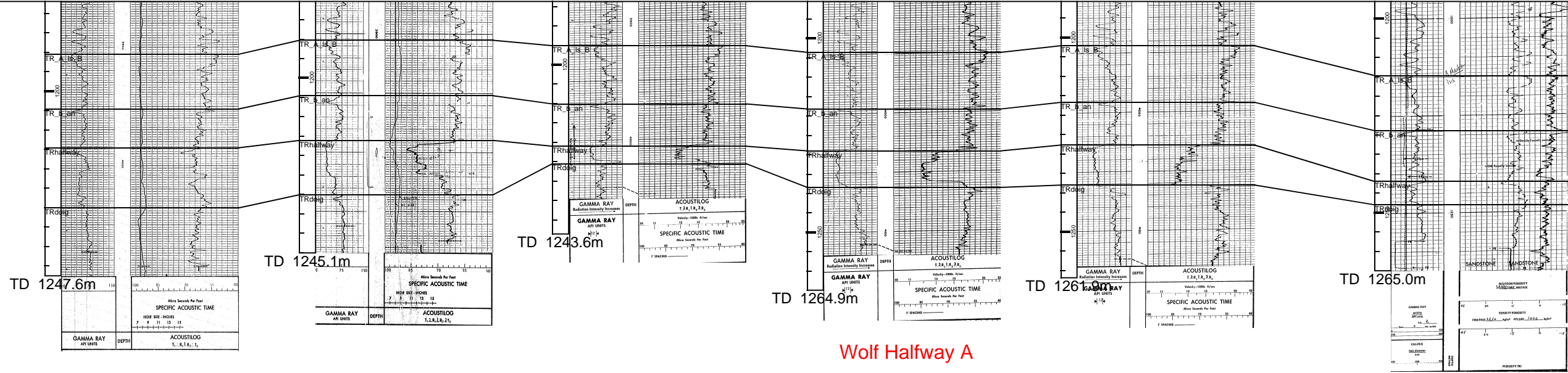
<=1198.2m>

200/d-071-B 094-A-15/00

+725.8 04504



A'



Wolf Halfway A

BEAVERTAIL OIL FIELD

Halfway B Pool

Pool Parameters

Field Code: 0760

Pool Code: 4800B

Discovery well: OIL Wolf d-080-A 94 A-15

WA#: 04508

Rig Release: 1978/12/23

Other Oil and Gas Shows: Doig gas, Cecil gas, Baldonnel gas, Dunlevy gas, Gething gas, Bluesky gas, Notikewin gas

Number of Wells (November 2012) Oil: 3 Injection: 2 Active: 1

Reservoir Data

Average Depth of Producing Zone: 1244 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: structural-stratigraphic

Estimated Maximum Reservoir Thickness:

Area of Pool:

Drive Mechanism: water flood

Average Porosity (%): 16

Average Net Pay: 4 metres

Average Permeability: 262 milliDarcies estimated from DST

Average Water Saturation (%): 42

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 42

Original Pressure: 1475 psi, 10170 kpa

Reserves

Estimated original oil in place: 3,165,310 barrels, 503,244 m³

Recovery Factor (%): 18

Estimated Recoverable Oil: 569,760 barrels, 90,585 m³ (production decline)

Cumulative Production (May 2012): 541,080 barrels

Remaining Recoverable Oil: 28,670 barrels

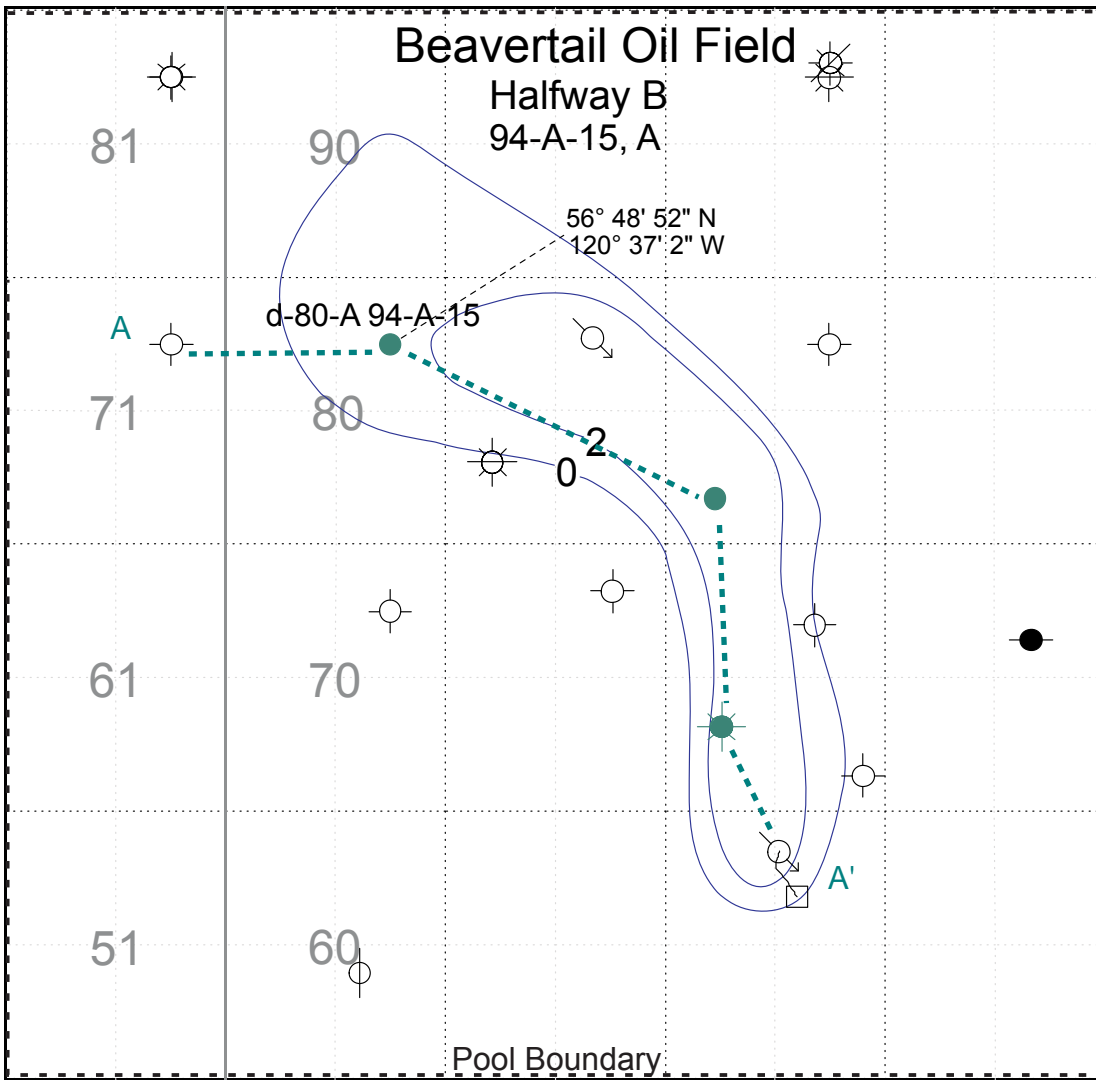
Original Oil in Place Remaining (%): 83

Cumulative Water Production: 197,530 barrels

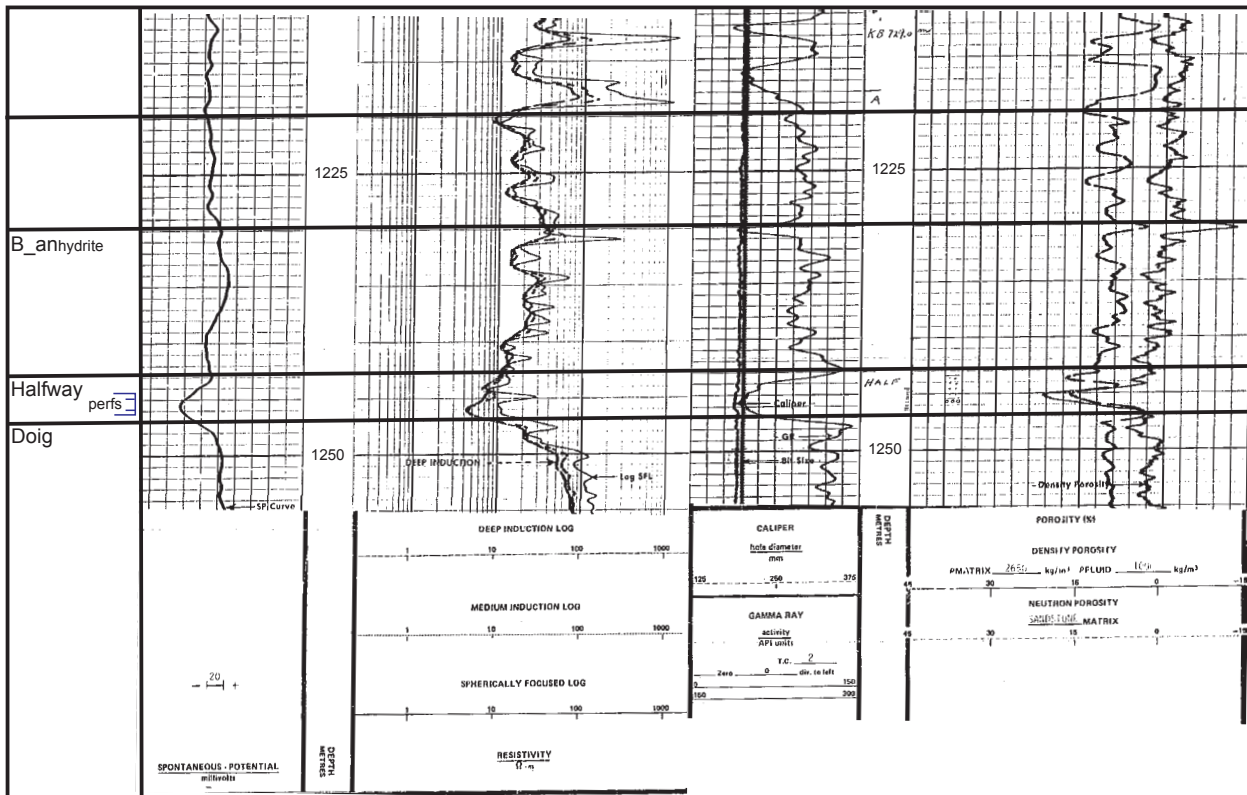
Cumulative Water Injection: 927,620 barrels

Notes:

The Halfway is perhaps too thin to be considered for horizontal drilling. Good permeability suggests the potential for further gains in recovery using secondary recovery. Both water injectors were initially Halfway oil wells and later converted. The discovery well field name was changed to Beavertail from Wolf (date uncertain).



Discovery well d-80-A was drilled in 1978. Contour interval is 2 metres net Halfway B oil pay (Oil and gas Commission). The contours around the abandoned hole on the west side is Halfway K.



Discovery well D-80-A/94-A-15 induction and neutron-density logs.

The Halfway is perfed near the top. The density curve shows roughly 4 metres of pay. Water cut was initially low despite an apparent water contact at 1247 metres. Now the pool is under water flood and water cut has increased.

CURRANT OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 3300 **Pool Code:** 4800A
Discovery well: SINCLAIR et al CURRANT d-016-C 094-A-16 **WA#:** 01635
Rig Release: 1965/03/20
Other Oil and Gas Shows: Halfway gas
Number of Wells (November 2012) Oil: 5 Gas: 4 Injection: 1 Active: 1

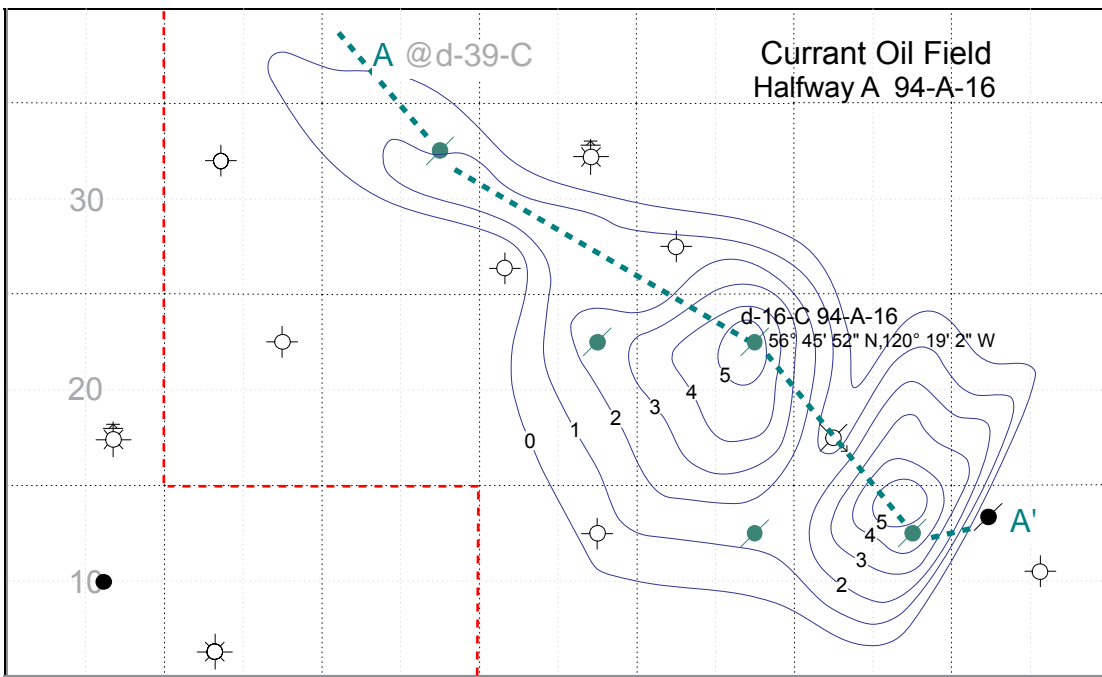
Reservoir Data

Area of Pool: 791 acres, 320 hectares
Average Depth of Producing Zone: 3930 feet, 1198 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 5 metres
Drive Mechanism: water flood
Average Porosity (%): 13.7
Average Net Pay: 9 feet, 2.7 metres
Average Permeability: 35 milliDarcies
Average Water Saturation (%): 19
Oil Formation Volume Factor (%): 120.5
Gravity (degrees API): 38
Original Pressure: 1414 psi, 9749 kPa

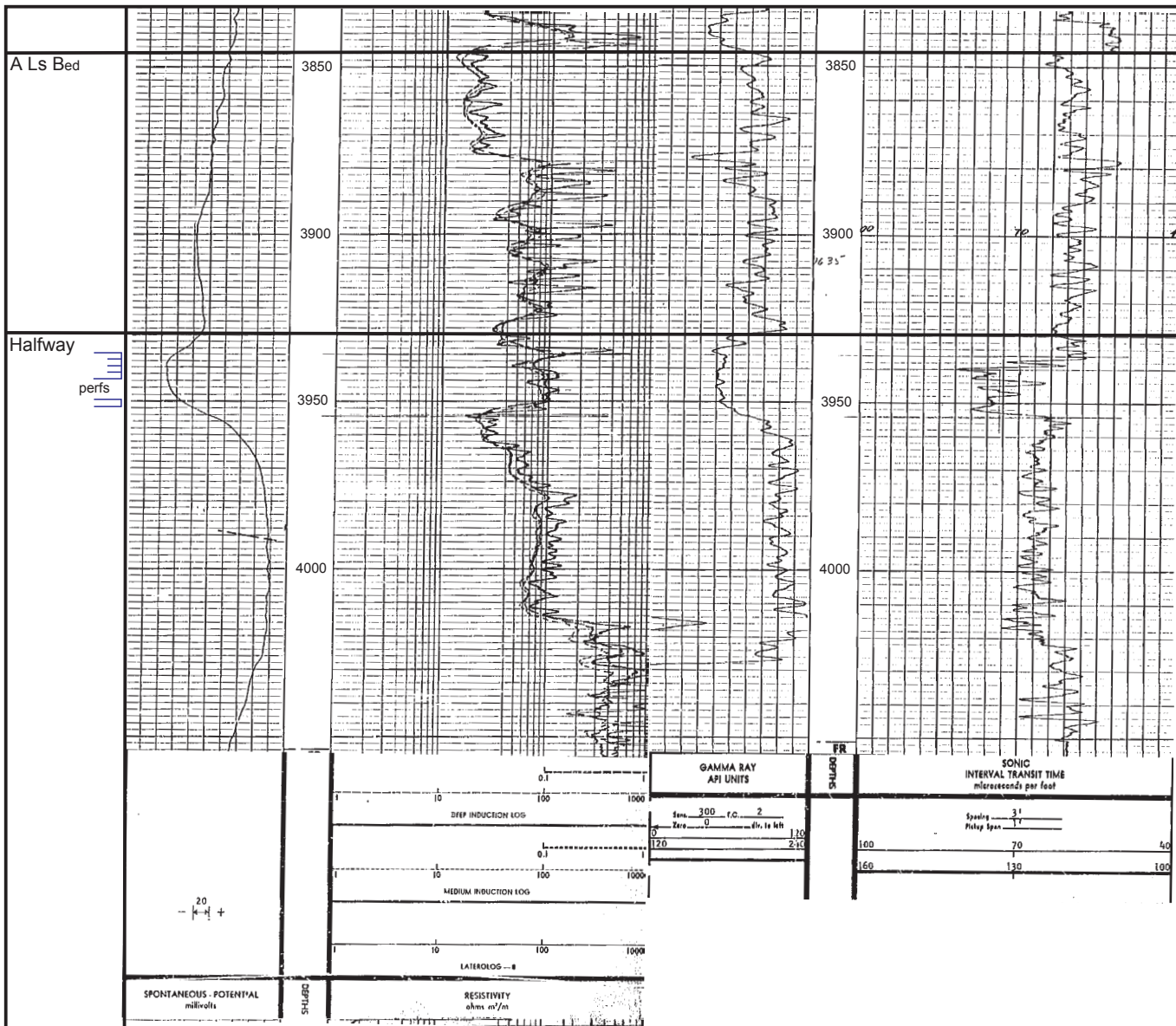
Reserves

Estimated original oil in place: 5,989,900 barrels, 952,320 m³
Recovery Factor (%): 45
Estimated Recoverable Oil: 2,699,000 barrels, 429,110 m³
Cumulative Oil Production: 2,692,830 barrels, 428,126 m³
Remaining Recoverable Oil: 6,170 barrels, 982 m³
Remaining Original Oil in Place (%): 55
Cumulative Water Production: 3,720,370 barrels, 591,492 m³
Cumulative Water Injection: 7,733,910 barrels, 1,229,593 m³

Notes: Only one injector sweeps the entire pool. It was apparently very efficient as shown by the high recovery and large volumes of water taken. The northwest arm of the pool is likely unswept.



Contour interval (adapted from the Oil and Gas Commission) is one metre Halfway A net oil pay. Discovery well d-16-C-94-A-16 was drilled in 1965. There is one water injector well for the entire pool.



Laterolog and sonic logs for discovery well d-16-C-94-A-16. The lower part of the Halfway is porous with no water leg.

A

200/d-039-C 094-A-16/00

+723.0 01320



<=1202.5m>

200/d-028-C 094-A-16/00

+724.0 01768



<=1787.4m>

200/d-016-C 094-A-16/00

+725.5 01635



<=1202.4m>

200/d-005-C 094-A-16/00

+731.8 01700



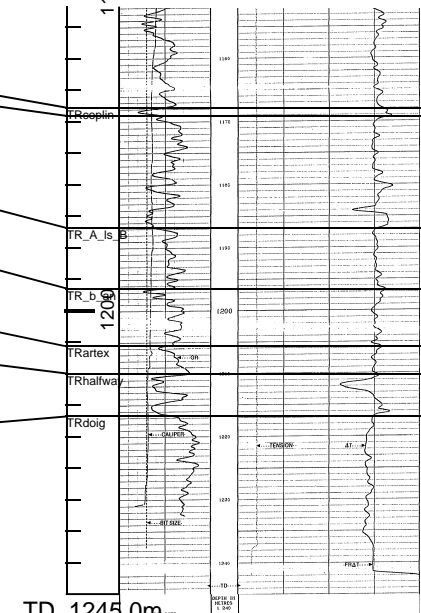
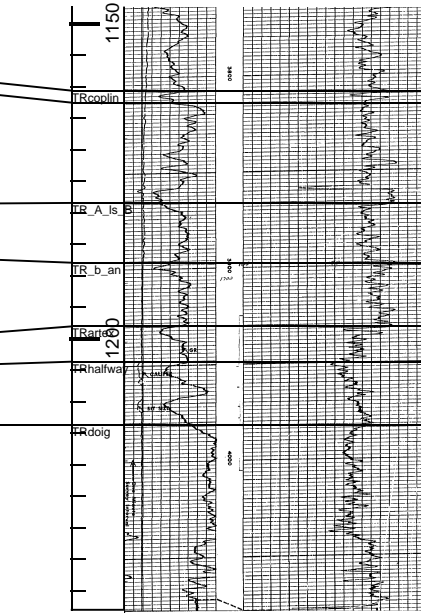
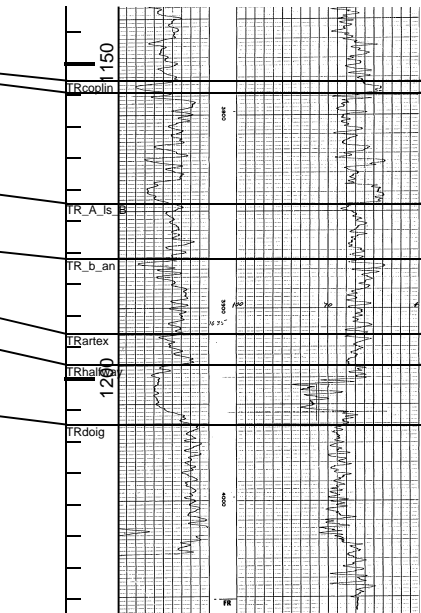
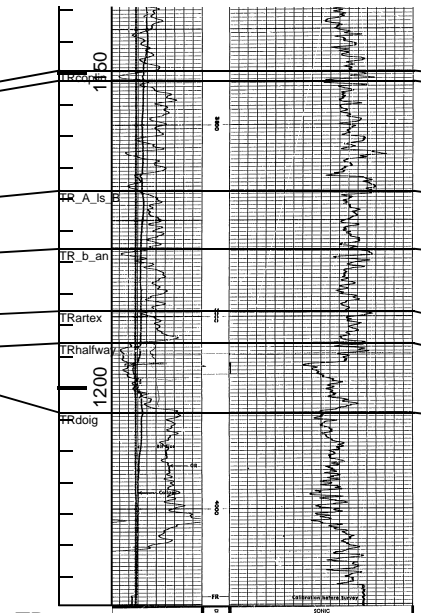
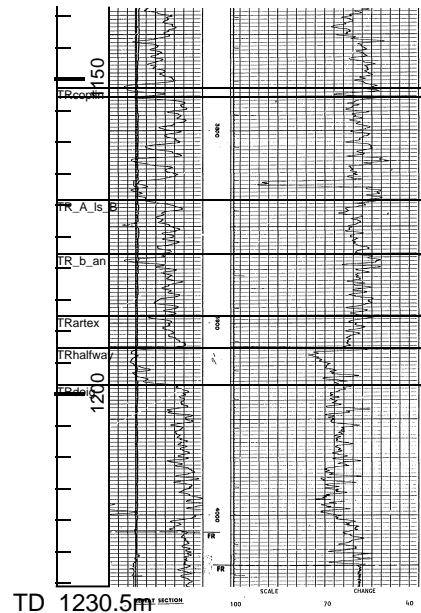
<=376.6m>

200/c-004-C 094-A-16/00

+736.3 07774

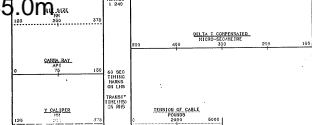
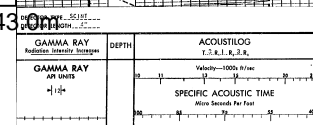
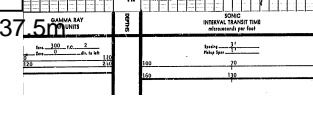
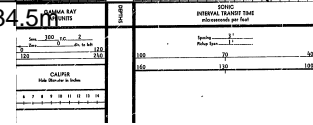


A'



Current Halfway A

1:1200



CURRANT OIL FIELD

Halfway C Pool

Pool Parameters

Field Code: 3300

Pool Code: 4800C

Discovery well original name: DEKALB ANDERSON CURRANT a-020-C 094-A-16

WA#: 07902

Rig Release: 1992/07/02

Other Oil and Gas Shows: Gething gas, Halfway gas

Number of Wells (November 2012) Oil: 2 Gas: 1 Active: 2

Reservoir Data

Area of Pool: 215 acres, 87 hectares

Average Depth of Producing Zone: 1190 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 20

Average Net Pay: 1.5 metres

Average Permeability: 196 milliDarcies

Average Water Saturation (%): 23

Oil Formation Volume Factor (%): 125.0

Gravity (degrees API): 41.3

Original Pressure: 1384 psi, 9542 kPa

Reserves

Estimated original oil in place: 1,109,240 barrels, 176,355 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 221,850 barrels, 35,270 m³ (production decline)

Cumulative Oil Production: 183,820 barrels

Remaining Recoverable Oil: 38,030 barrels

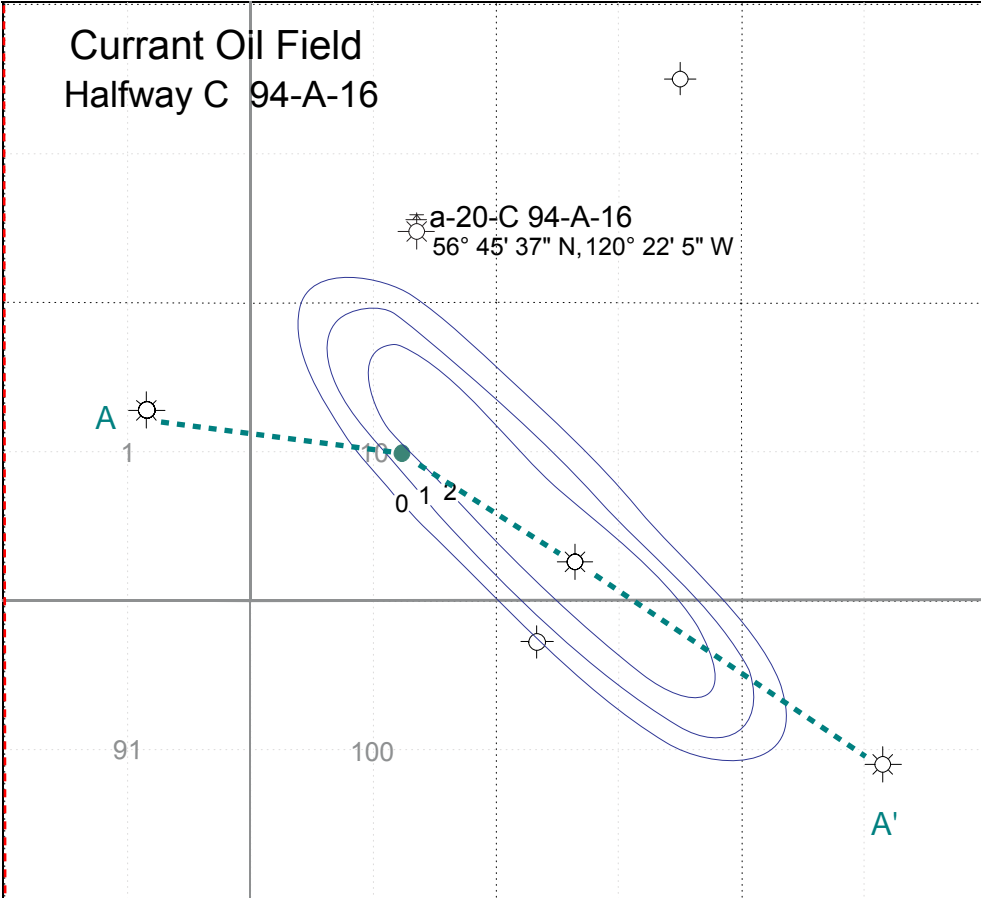
Remaining Original Oil in Place (%): 84

Cumulative Water Production: 60,760 barrels

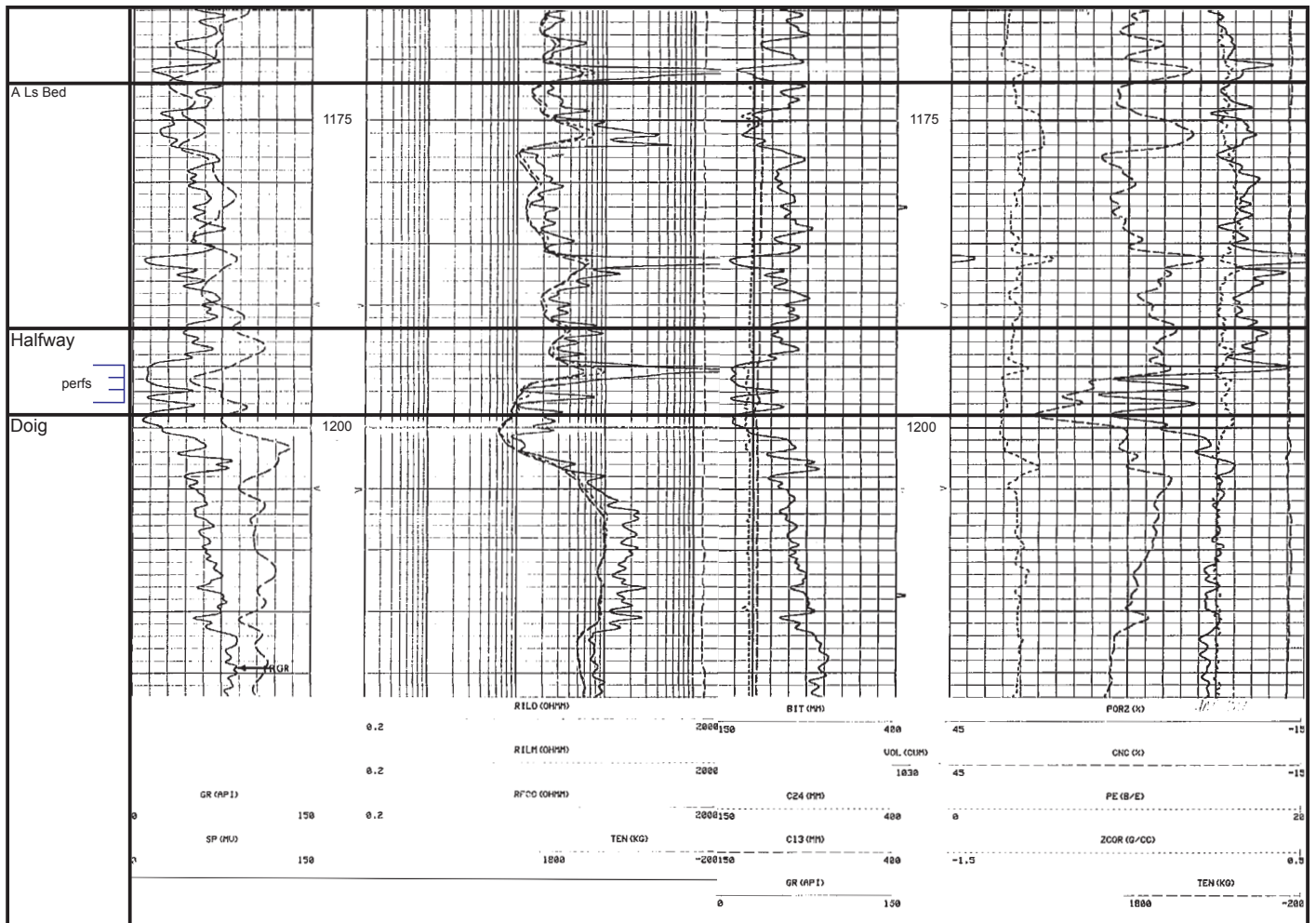
Notes: Discovery well a-20-C is in the gas leg of the pool.

Currant Oil Field Halfway C 94-A-16

a-20-C 94-A-16
56° 45' 37" N, 120° 22' 5" W



Discovery well a-20-C is in the gas cap part of the pool. Contour interval (adapted from the Oil and Gas Commission) is one metre Halfway net oil pay. Location b-9-C is in the oil leg.



Induction and neutron-density logs for oilwell b-9-C-94-A-16. The well is completed near the upper part of the Halfway, which appears to become increasingly wet with depth. Induction and neutron-density logs for oilwell b-9-C-94-A-16. The well is completed near the upper part of the Halfway, which appears to become increasingly wet with depth.

A

200/d-001-D 094-A-16/00

+718.1 17785



<<803.9m>>

200/a-010-C 094-A-16/00

+715.6 16656



<<637.9m>>

200/b-009-C 094-A-16/00

+714.9 08403



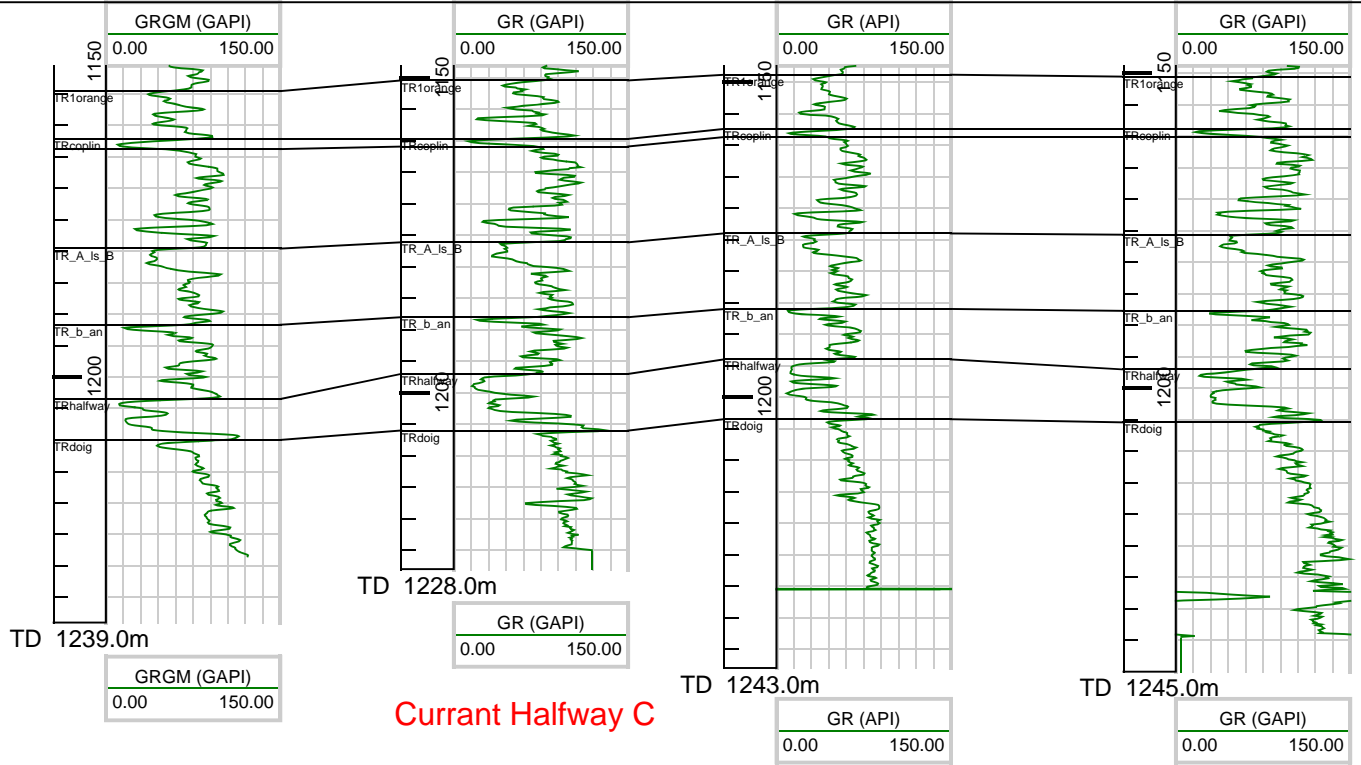
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200/a-098-K 094-A-09/00

+716.3 16180



A'



1:1200

BUICK CREEK OIL FIELD

Dunlevy A Pool

Pool Parameters

Field Code: 2400

Pool Code: 2900A

Discovery well original name: Texaco NFA E Buick c-032-A 94-A-14

WA#: 01500

Rig Release: 1964/09/05

Other Oil and Gas Shows: Dunlevy gas, Cecil gas, Artex gas, Bluesky gas, North Pine gas

Number of Wells (October 2012) Oil: 4 **Gas:** 15 **Active:** 6

Reservoir Data

Area of Pool: 1021 acres, 413 hectares

Average Depth of Producing Zone: 3540 feet, 1079 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 12

Average Net Pay: 2.9 metres

Average Permeability: 27 milliDarcies

Average Water Saturation (%): 26

Oil Formation Volume Factor (%): 122

Gravity (degrees API): 38

Original Pressure: 1304 psi, 8991 kPa

Reserves

Estimated original oil in place: 5,472,860 barrels, 870,115 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 273,640 barrels, 43,505 m³ (volumetric)

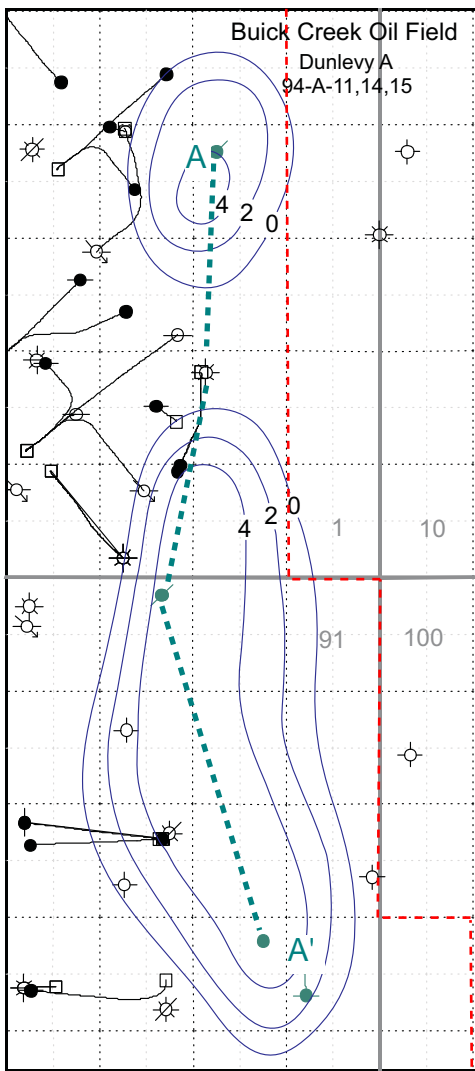
Cumulative Oil Production: 139,220 barrels

Remaining Recoverable Oil: 134,430 barrels

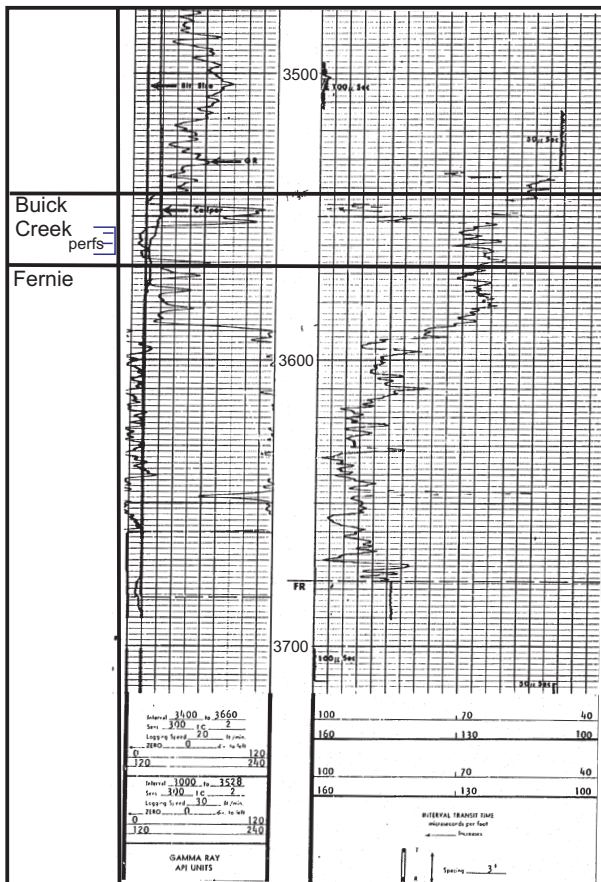
Remaining Original Oil in Place (%): 98

Cumulative Water Production: 67,160 barrels

Notes: This pool has an extensive gas cap (fifteen wells) that occupies most of the western part of the pool. Trapping may be due to preferential porosity development along structural highs. Dunlevy sandstone is widespread. The oil pool is categorized as Dunlevy but the geological pick is Buick Creek, which is an uppermost Dunlevy equivalent.



Four wells produce oil from Dunlevy A. The Oil and Gas Commission has separated discovery well c-32-A-94-A-14 from the other producers. Contour interval is two metres Dunlevy A net oil pay.



Sonic log for discovery well c-32-A-94-A-14. Porosity has been perforated near the top of what is picked geologically as Buick Creek Formation but classified as a Dunlevy A Pool by the Oil and Gas Commission.

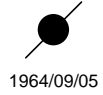
200/c-032-A 094-A-14/00

200/c-012-A 094-A-14/00

200/d-093-I 094-A-11/00

200/d-062-I 094-A-11/00

A



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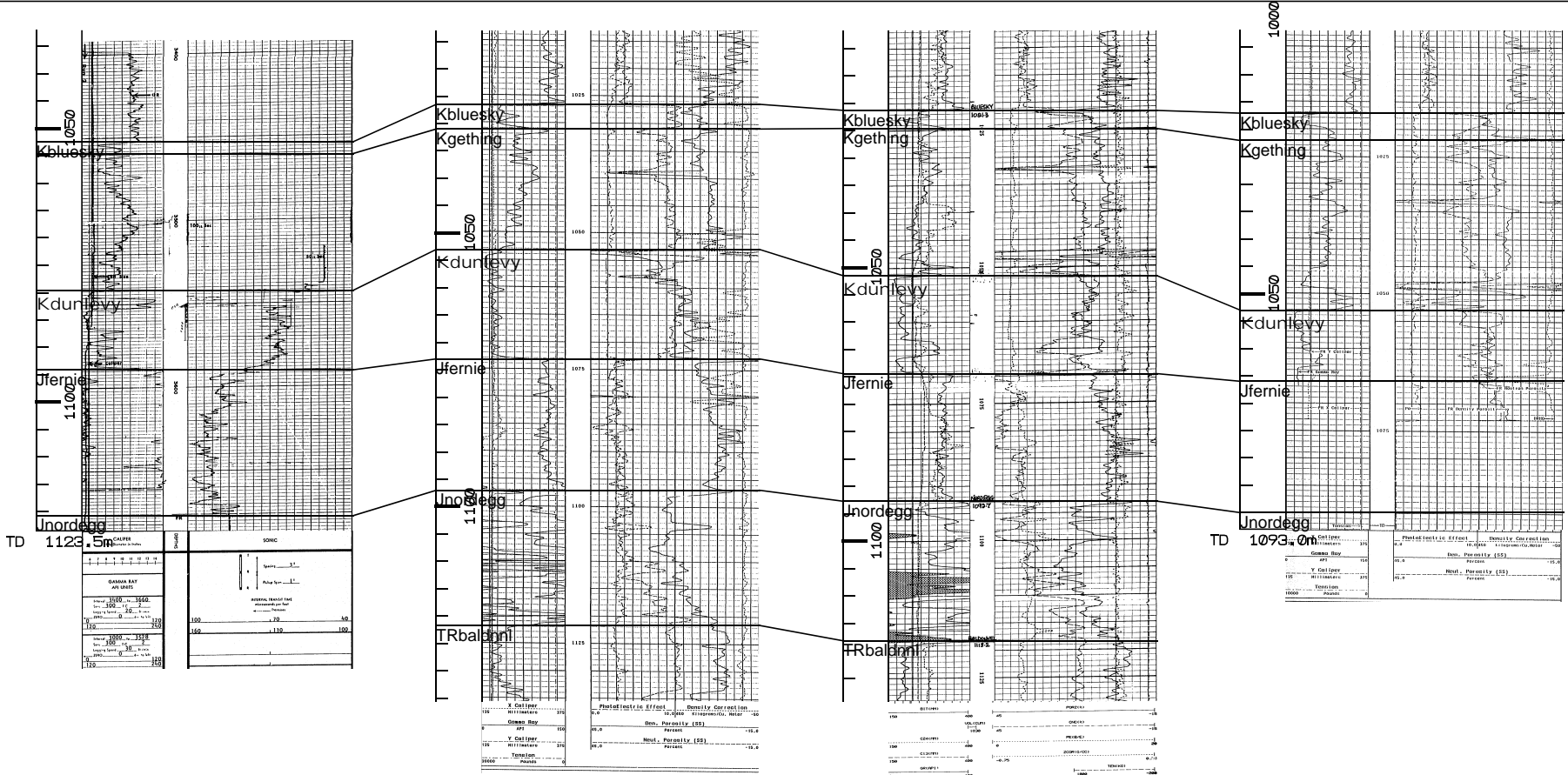
<=1852.7m=>



<=2944.7m=>



A'



Buick Creek Dunlevy A

1:1200

BUICK CREEK OIL FIELD

Lower Halfway B Pool

Pool Parameters

Field Code: 2400

Pool Code: 4805B

Discovery well: TEXACO et al BUICK b-077-I 094-A-11

WA#: 06872

Rig Release: 1988/08/24

Other Oil and Gas Shows: Lower Halfway gas, Dunlevy gas, Notikewin gas, North Pine gas

Number of Wells (October 2012) Oil: 8 Gas: 1 Injection: 3 Active: 3

Reservoir Data

Area of Pool: approximately 613 acres or 248 hectares within contour limits

Average Depth of Producing Zone: 1371 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 15 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 6.7 metres

Average Permeability: 26 milliDarcies

Average Water Saturation (%): 8

Oil Formation Volume Factor (%): 145

Gravity (degrees API): 44

Original Pressure: 2110 psi, 14548 kPa

Reserves

Estimated original oil in place: 6,796,970 barrels, 1,080,632 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 1,019,550 barrels, 162,096 m³ (production decline)

Cumulative Oil Production: 963,870 barrels

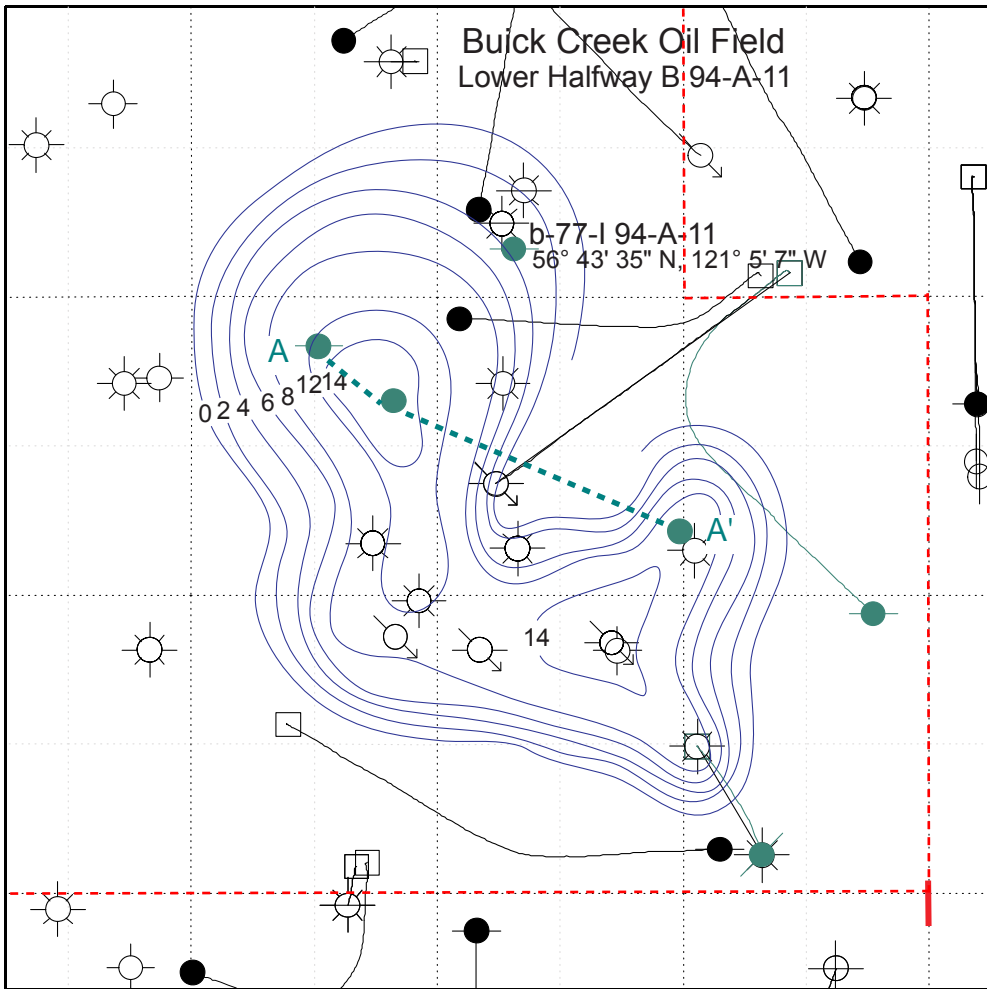
Remaining Recoverable Oil: 55,670 barrels

Remaining Original Oil in Place (%): 86

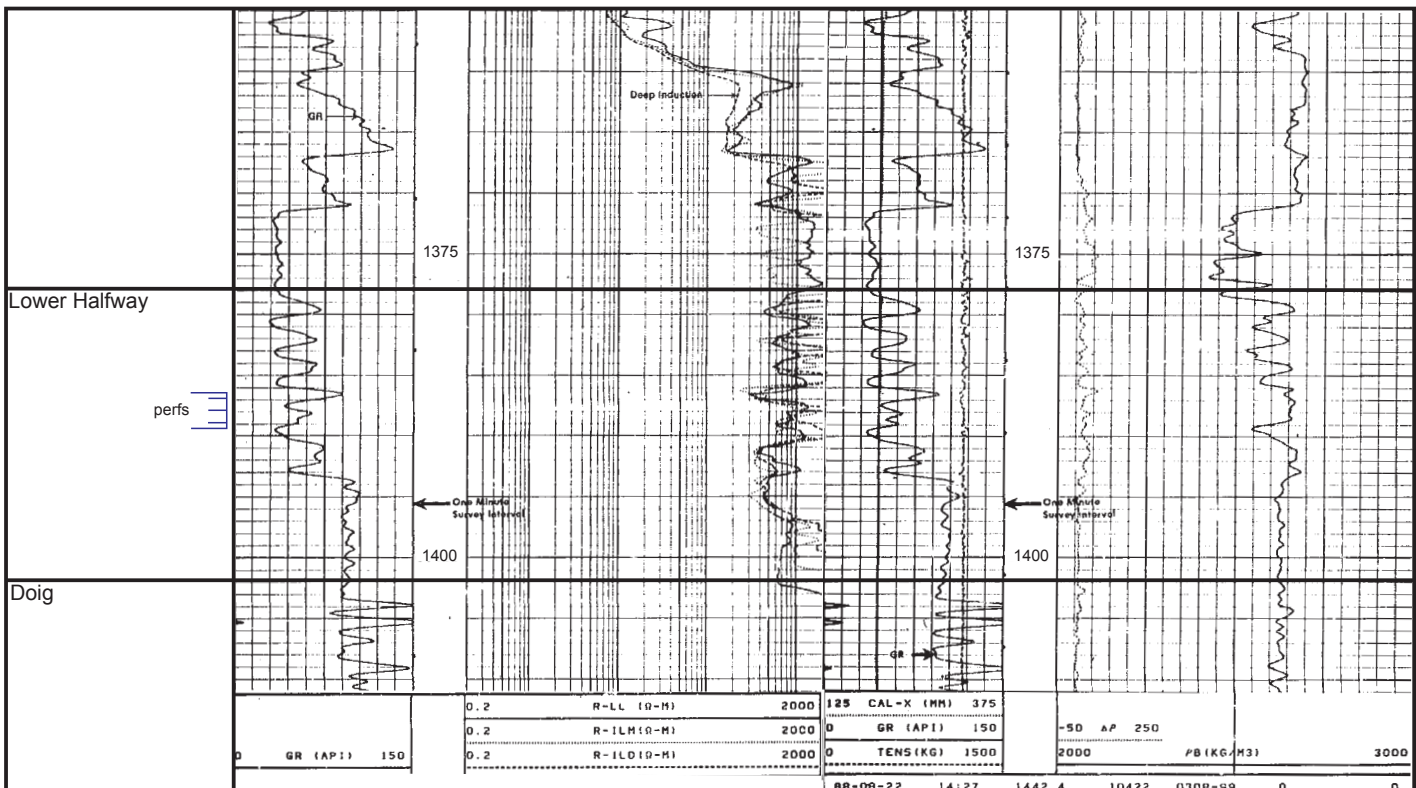
Cumulative Water Production: 344,930 barrels

Cumulative Water Injection: 1,117,640 barrels

Notes: Porosity distribution and extent of reservoir are controlled by abrupt facies changes in the Doig Formation (Evoy, 1998). The Doig Formation is often picked as Lower Halfway.



Contour interval is two metres net Lower Halfway B oil pay (Oil and Gas Commission). Discovery well is b-77-l. A gas cap is present at the south end of the pool. Water injectors are concentrated at the south end of the pool.



Laterolog and neutron-density logs for discovery well b-77-l-94-A-11. Completion is in the middle of the Doig sandstone. Gas is present at the top of the Doig sandstone.

A

A'

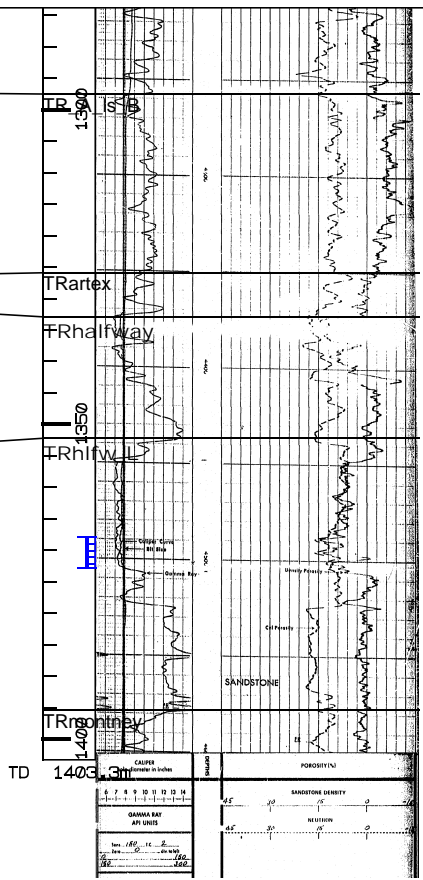
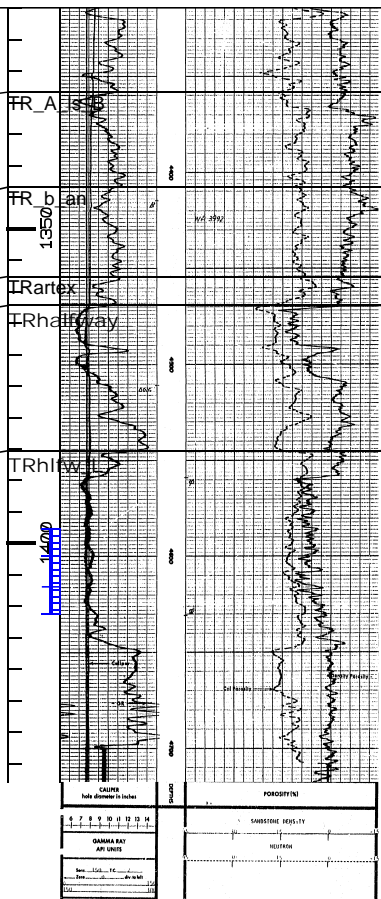
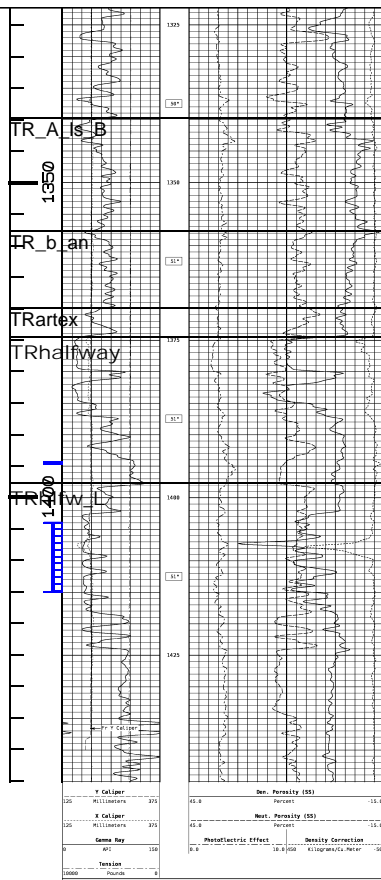
2007/11/14

1977/06/06

1976/12/24

<=290.4m=>

<=979.8m=>



1:1200

Buick Creek Lower Halfway B

BUICK CREEK OIL FIELD

Lower Halfway C Pool

Pool Parameters

Field Code: 2400

Pool Code: 4805C

Discovery well: ESSO GULF BUICK d-086-I/094-A-11

WA#: 07200

Rig Release: 1990/01/20

Other Oil and Gas Shows: Artex B, Cecil gas, Dunlevy gas

Number of Wells (November 2012) Oil: 23 Gas: 5 Injection: 3 Horizontal: 18 Active: 15

Reservoir Data

Area of Pool: 3062 acres, 1239 hectares

Average Depth of Producing Zone: 1390 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural-stratigraphic

Estimated Maximum Reservoir Thickness:

Drive Mechanism: gas cap expansion

Average Porosity (%): 10

Average Net Pay: 7.6 metres

Average Permeability: 25 milliDarcies

Average Water Saturation (%): 10

Oil Formation Volume Factor (%): 139

Gravity (degrees API): 43

Original Pressure: 1960 psi, 13514 kPa

Reserves

Estimated original oil in place: 42,927,350 barrels, 6,824,903 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 6,439,100 barrels, 1,023,735 m³

Cumulative Oil Production: 5,082,380 barrels

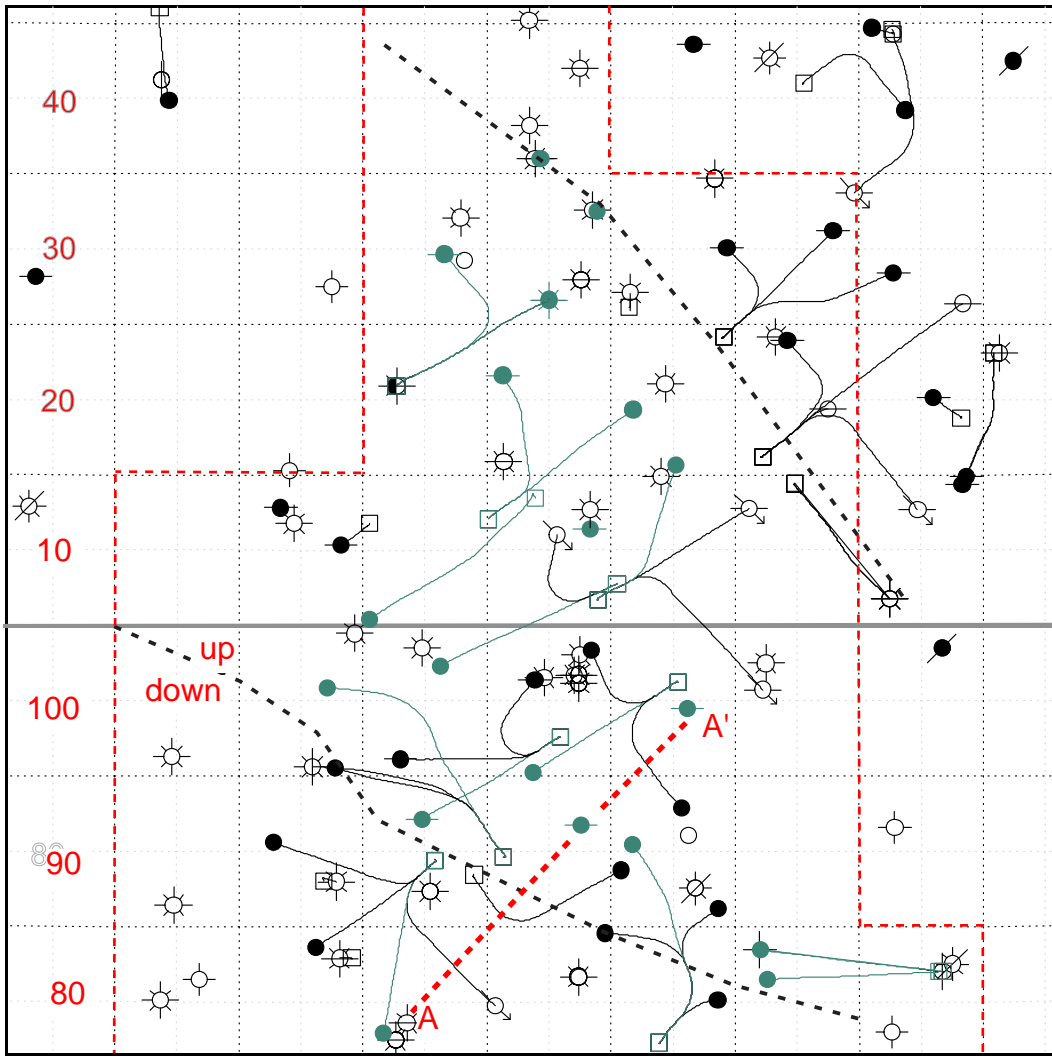
Remaining Recoverable Oil: 1,356,730 barrels

Remaining Original Oil in Place (%): 88

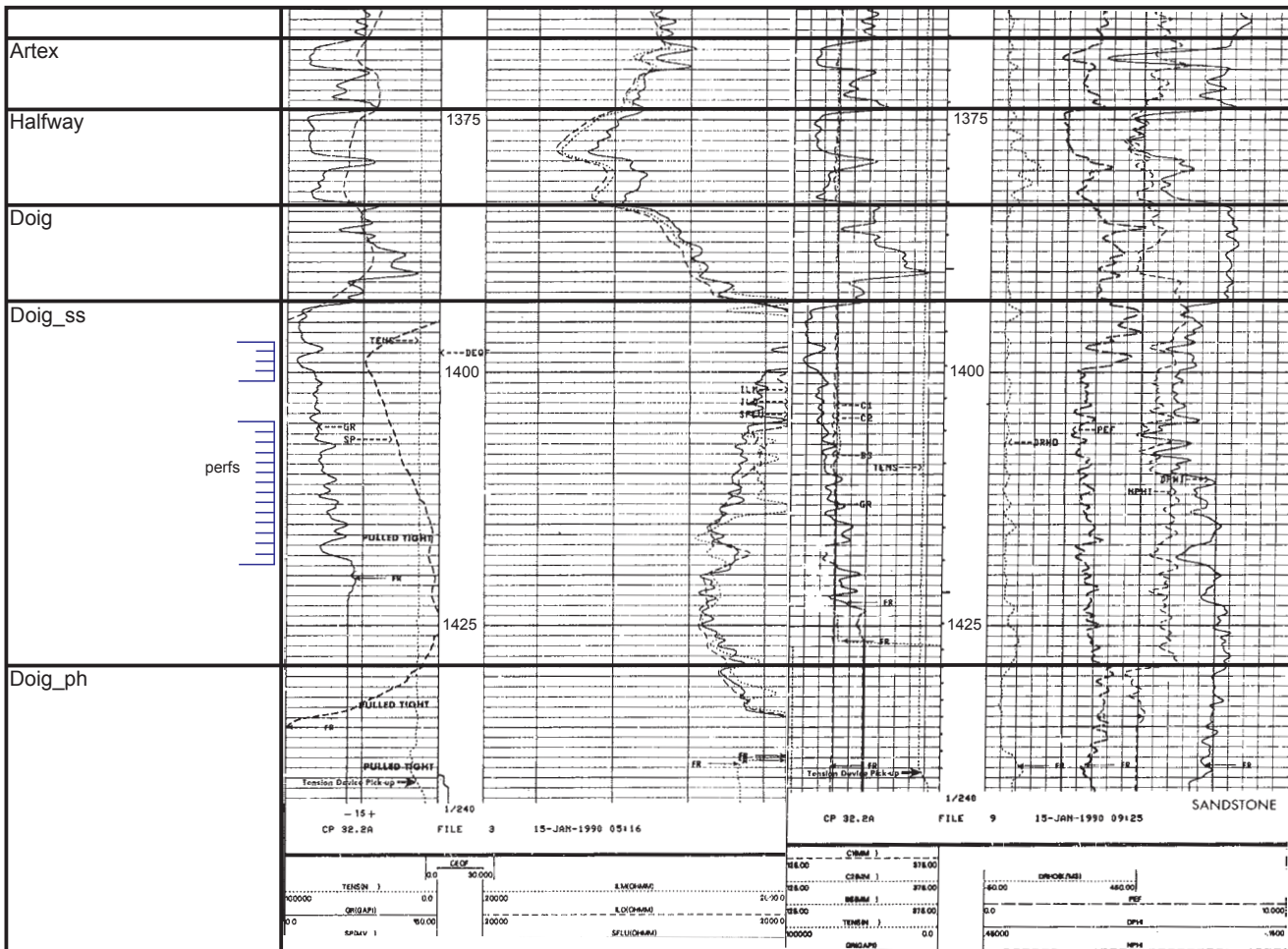
Cumulative Water Production: 223,260 barrels

Cumulative Water Injection: 357,350 barrels

Notes: Faulting determines the extent of the pool, but facies controls distribution of porosity and hydrocarbons. The Lower Halfway is often picked as Doig, or vice versa.



The Lower Halfway C oil pool is on the up-thrown block between two normal faults, whose approximate position are indicated with a stippled line. Discovery well is d-86-l-94-A-11.



Induction and neutron-density logs for discovery well d-86-l-94-A-11. Completion was initially in the lower set of perfs; the upper perfs were added later. The pool is designated as Lower Halfway by the Oil and Gas Commission but picked geologically as Doig.



2005/09/24

<=1625.7m=>



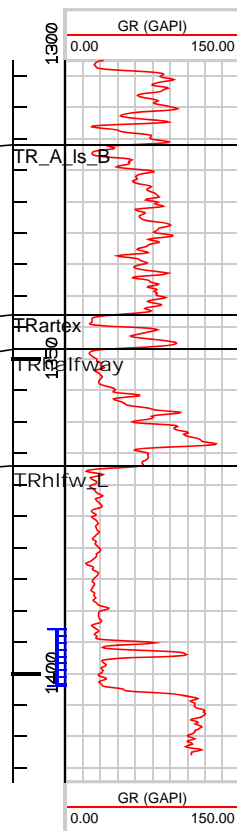
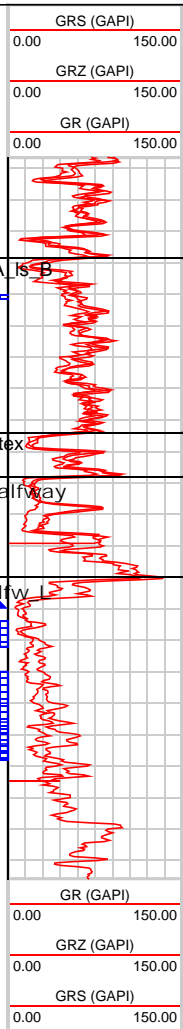
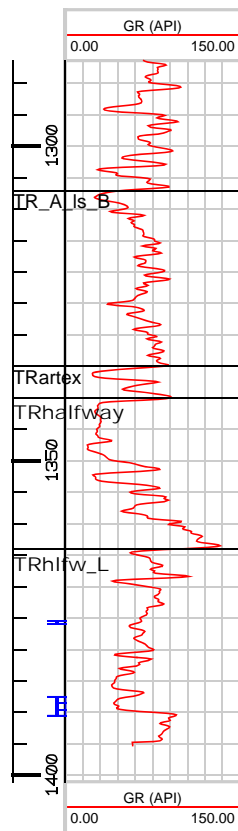
1990/01/20

<=970.8m=>



2007/11/05

A'



Buick Creek Lower Halfway C

111200

BUICK CREEK OIL FIELD

Lower Halfway D Pool

Pool Parameters

Field Code: 2400

Pool Code: 4805D

Discovery well: ESSO GULF BUICK d-035-A 094-A-14

WA#: 07679

Rig Release: 1991/03/13

Other Oil and Gas Shows: Artex B, Cecil gas, Dunlevy gas

Number of Wells (October 2012) Oil: 8 Gas: 2 Injection: 2 Horizontal: 8 Active: 2

Reservoir Data

Area of Pool: 1386 acres, 561 hectares

Average Depth of Producing Zone: 1347 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural-stratigraphic

Estimated Maximum Reservoir Thickness: 20 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 10

Average Net Pay: 9.8 metres

Average Permeability: 6 milliDarcies

Average Water Saturation (%): 11

Oil Formation Volume Factor (%): 145

Gravity (degrees API): 43

Original Pressure: 1924 psi, 13266 kPa

Reserves

Estimated original oil in place: 21,354,660 barrels, 3,395,120 m³

Primary Recovery (%): 15

Estimated Recoverable Oil: 3,203,200 barrels, 509,268 m³ (volumetric)

Cumulative Oil Production: 2,238,800 barrels

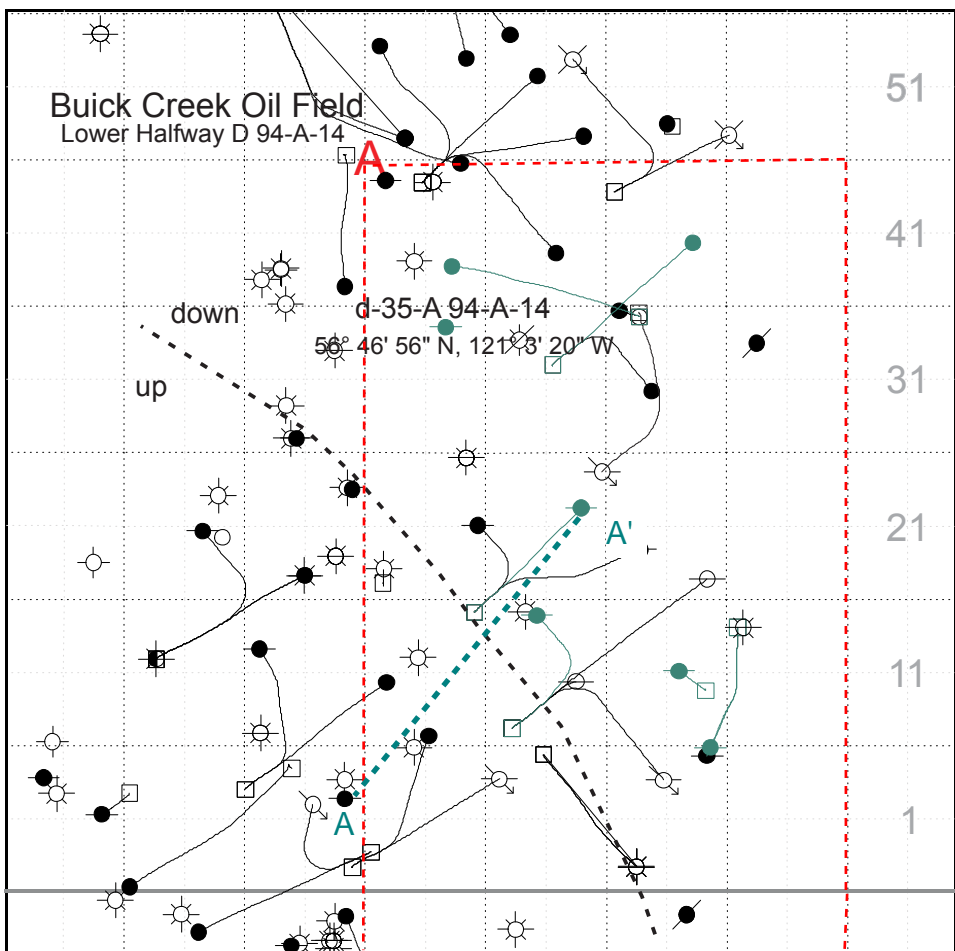
Remaining Recoverable Oil: 964,390 barrels

Remaining Original Oil in Place (%): 90

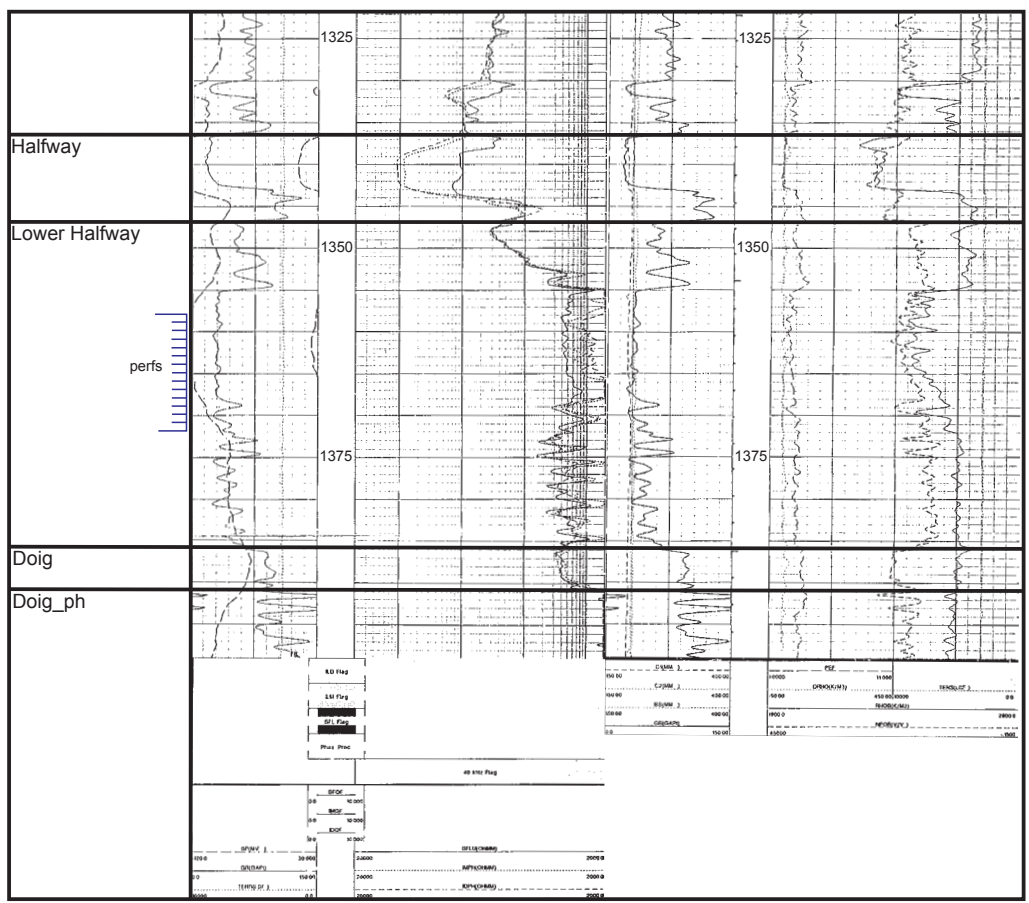
Cumulative Water Production: 111,020 barrels

Cumulative Water Injection: 651,420 barrels

Notes: The Doig reservoir rock is thick but has relatively low permeability. Those characteristics make it ideal for horizontal drilling.



The Lower Halfway D oil pool is on the down-thrown side of a normal fault. The C pool is on the up-thrown side. The fault is inferred from varying gas/oil contacts. Discovery well is d-35-A-94-A-14.



Induction and neutron-density logs for discovery well d-35-A-94-A-14. Completion is in the middle of the Lower Halfway in a zone of relatively high porosity.

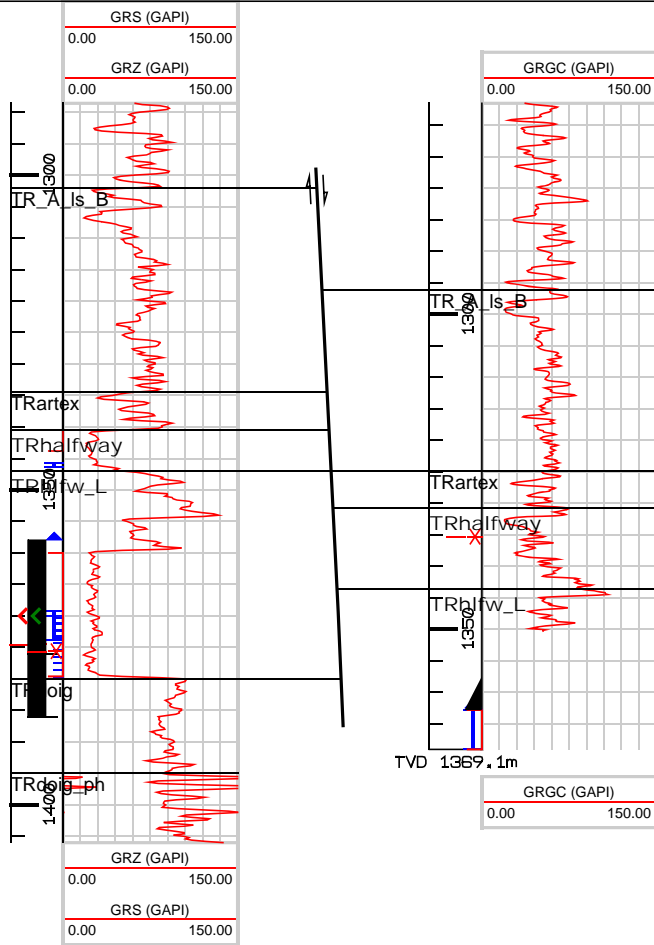


<=2373.2m=>



1991/02/04

1995/07/11



111200

Buick Creek Lower Halfway D

BLUEBERRY OIL FIELD

Debolt A Pool

Pool Parameters

Field Code: 1400

Pool Code: 7400A

Discovery well original name: WHITE & LLOYD-FARGO OIL LTD Blueberry#13 (d-050-K 094-A12)

WA#: 00242 **Rig Release:** 1957/06/21

Other Oil and Gas Shows: Nikanassin gas, Baldonnel gas

Number of Wells (December 2012) Oil: 19 Active: 15 Injection: 0 Disposal: 3 Horizontal: 2

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 6700 feet, 2042 metres

Lithology of Reservoir Rock: limestone

Trap Type: structural

Estimated Maximum Reservoir Thickness: 35 metres, 115 feet

Drive Mechanism: combination gas cap and water drive

Average Porosity (%): 10

Average Net Pay: 12 metres, 41 feet

Average Permeability: 31 milliDarcies

Average Water Saturation (%): 19

Oil Formation Volume Factor (%): 135.4

Gravity (degrees API): 39.6

Original Pressure: 2782 psi, 19,181 kPa

Reserves

Estimated original oil in place: 49,095,090 barrels, 7,805,496 m³

Recovery Factor (%): 35

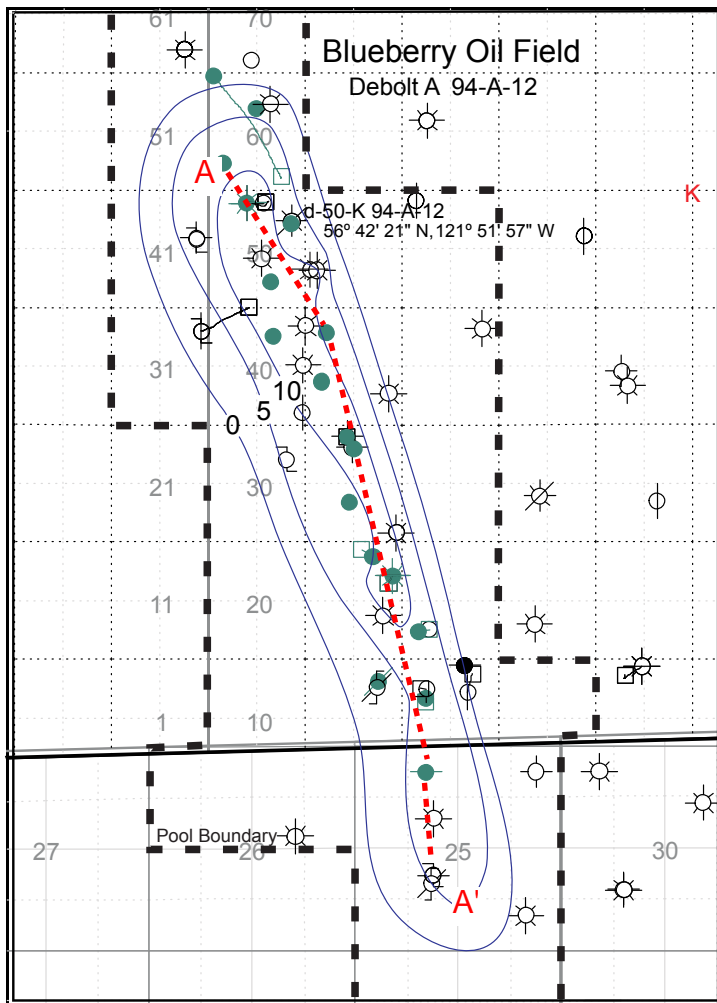
Estimated Recoverable Oil: 17,183,280 barrels, 2,731,923 m³ (production decline)

Cumulative Oil Production: 15,267,010 barrels

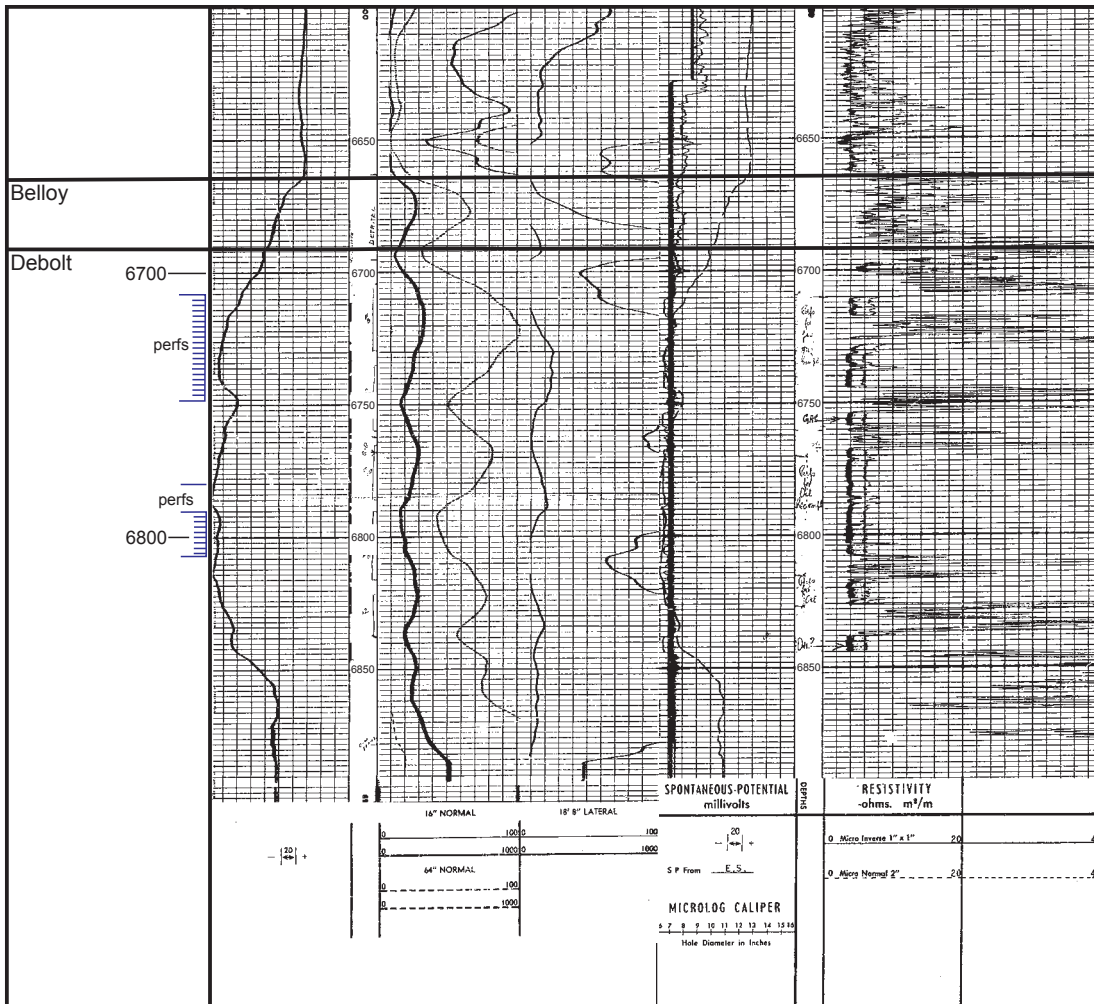
Cumulative Water Production: 16,565,710 barrels

Estimated original oil remaining (%): 69

Notes: A shallow water source well at the south end of field provides information on unconsolidated surficial deposits in the area. Hydrocarbons are trapped in the up-dip closure of a thrust fault. The high water cut, coupled with a high recovery factor, is due to a strong water drive.



Contour interval, as supplied by the Oil and Gas Commission, is 5 metres. Not shown is a thrust fault that bounds the field to the east. Cross cutting faults are also present. This has segmented the field into portions with different o/w contacts. Disposal and source wells are located along the down dip western edge. The discovery well is d-50-K/94-A-12.



Elog and microlog of discovery well d-50-K. Good permeability indicated for entire perforated interval of the Debolt.

A

<=1563.3m=>

<=927.2m=>

<=2626.9m=>

<=816.6m=>

A'

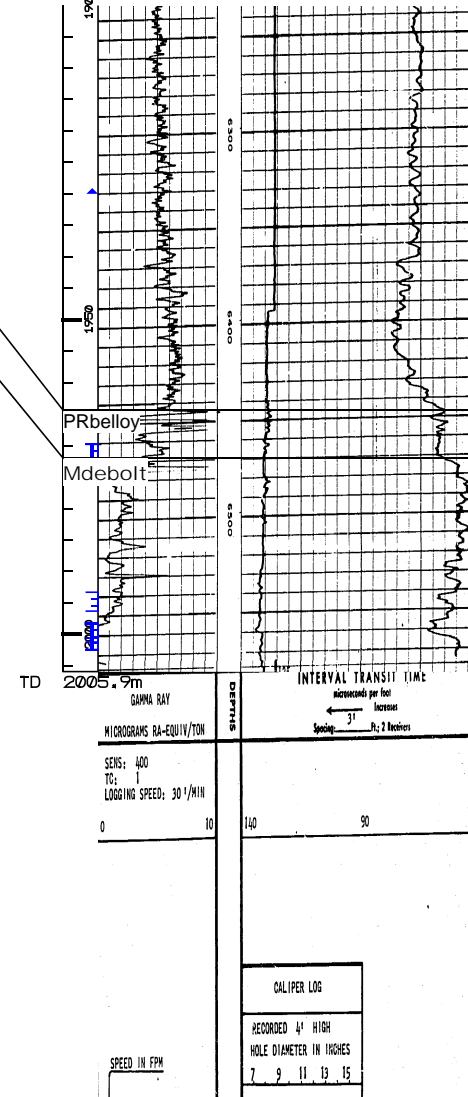
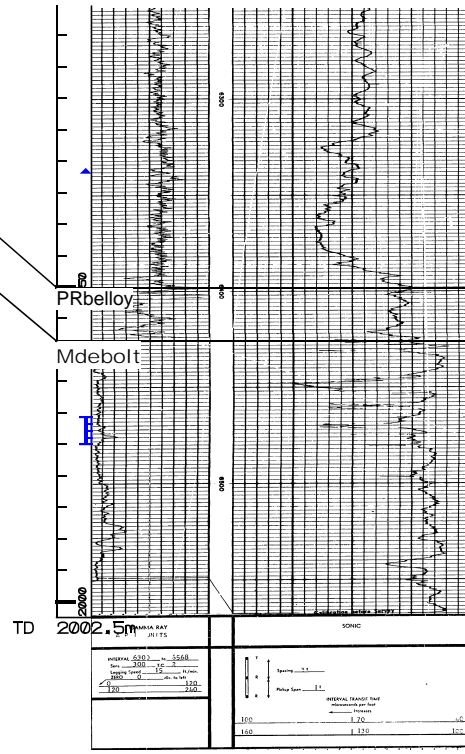
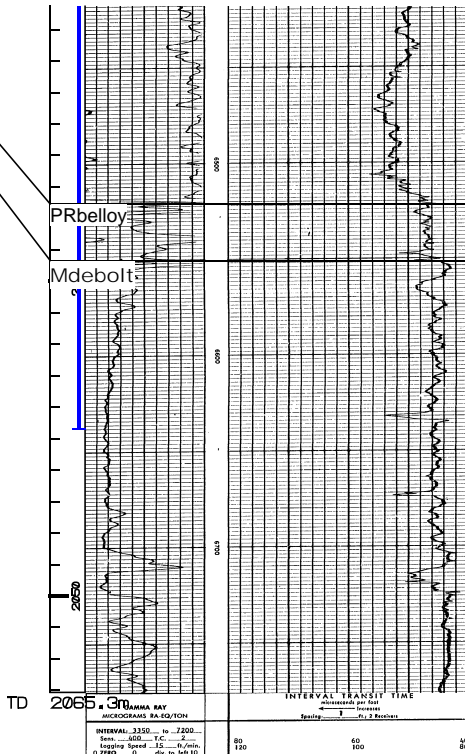
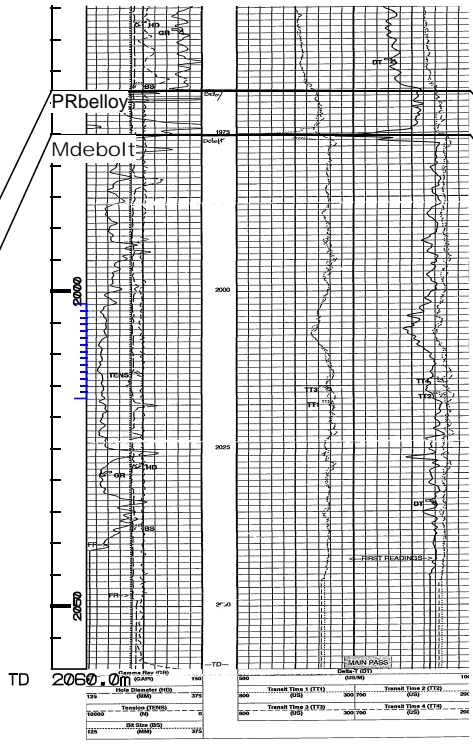
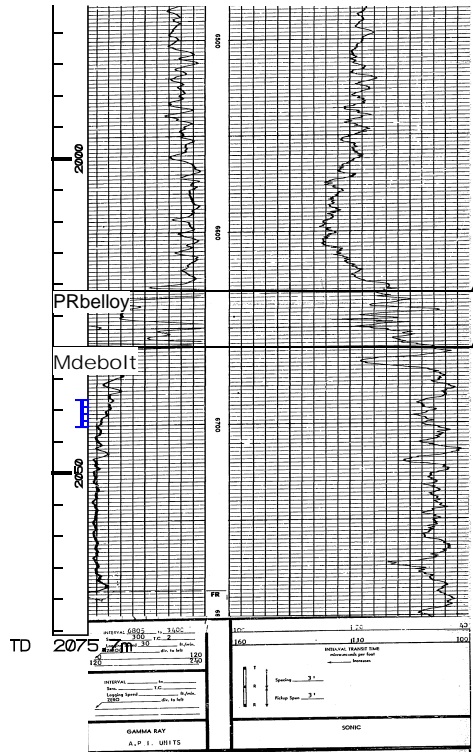
1962/03/07

1996/01/10

1992/12/14

1962/01/26

1961/08/23



Blueberry Debolt A

111200

INGA OIL FIELD

Inga A Pool

Pool Parameters

Field Code: 4900

Pool Code: 4575A

Discovery well original name: Cdn Sup et al Inga 10-25-088-24W6

WA#: 01776

Rig Release: 1966/01/10

Other Oil and Gas Shows: Inga gas, Halfway gas, Coplin gas

Number of Wells (December 2012) Oil:75 Gas: 8 Injection: 43

Active: 50

Water Observation: 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 5270 feet, 1606 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural

Estimated Maximum Reservoir Thickness: 4.5 metres

Drive Mechanism: water flood

Average Porosity (%): 6

Average Net Pay: 1.2 metres

Average Permeability: 62 milliDarcies

Average Water Saturation (%): 27

Oil Formation Volume Factor (%): 135

Gravity (degrees API):

Original Pressure: 2324 psi, 16023 kPa

Reserves

Estimated original oil in place: 124,779,010 barrels, 19,838,280 m3

Recovery Factor (%): 37

Estimated Recoverable Oil: 45,718,360 barrels, 7,268,640 m3 (material balance)

Cumulative Oil Production: 43,234,130 barrels

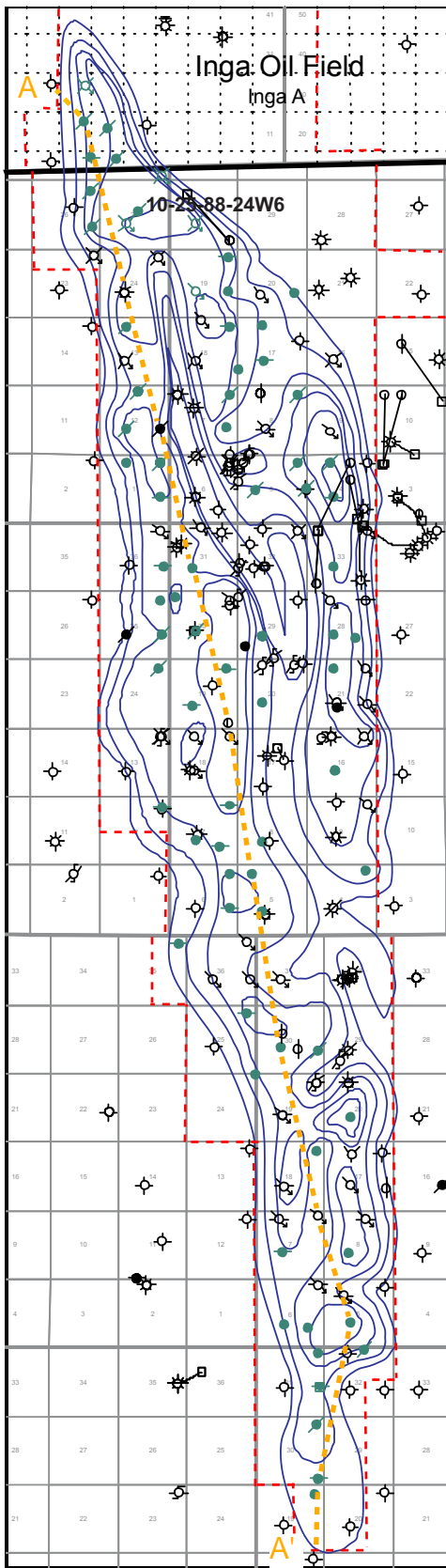
Remaining Recoverable Oil: 2,484,230 barrels

Remaining Original Oil in Place (%): 65

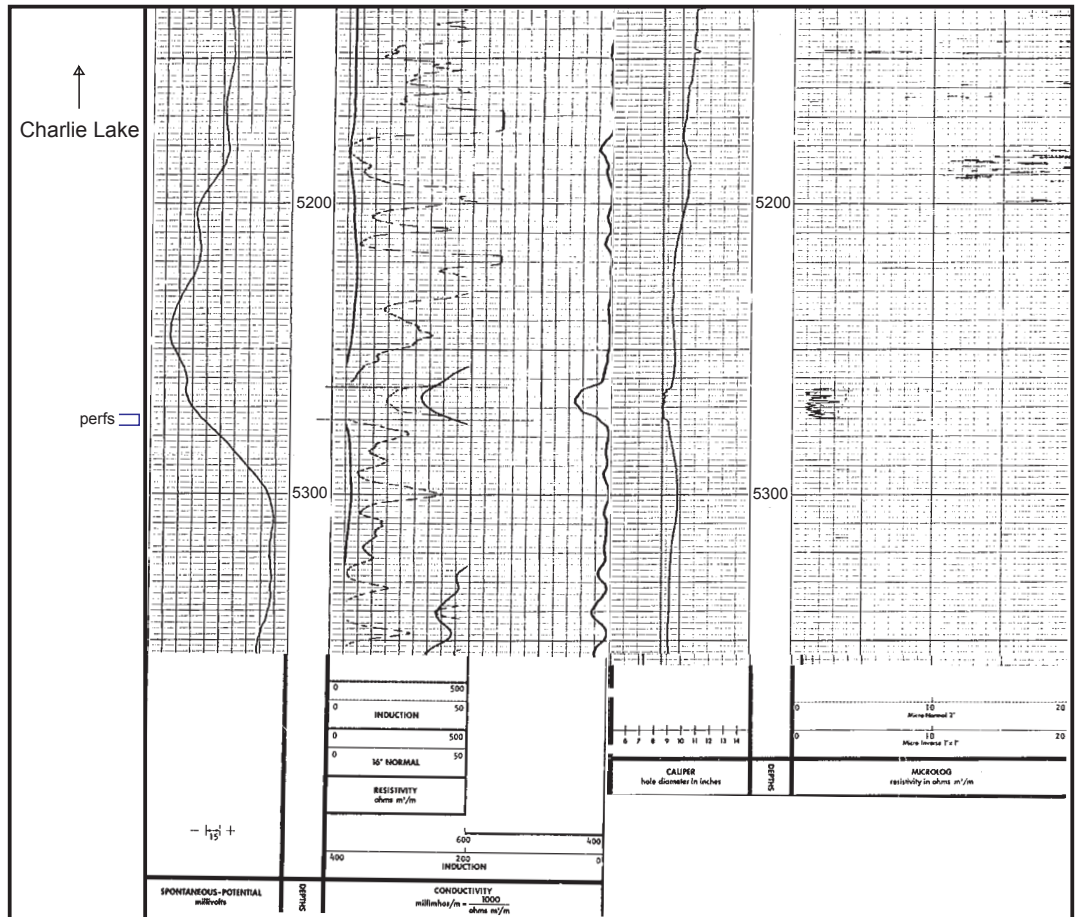
Cumulative Water Production: 9,936,340 barrels

Cumulative Water Injection: 84,396,880 barrels

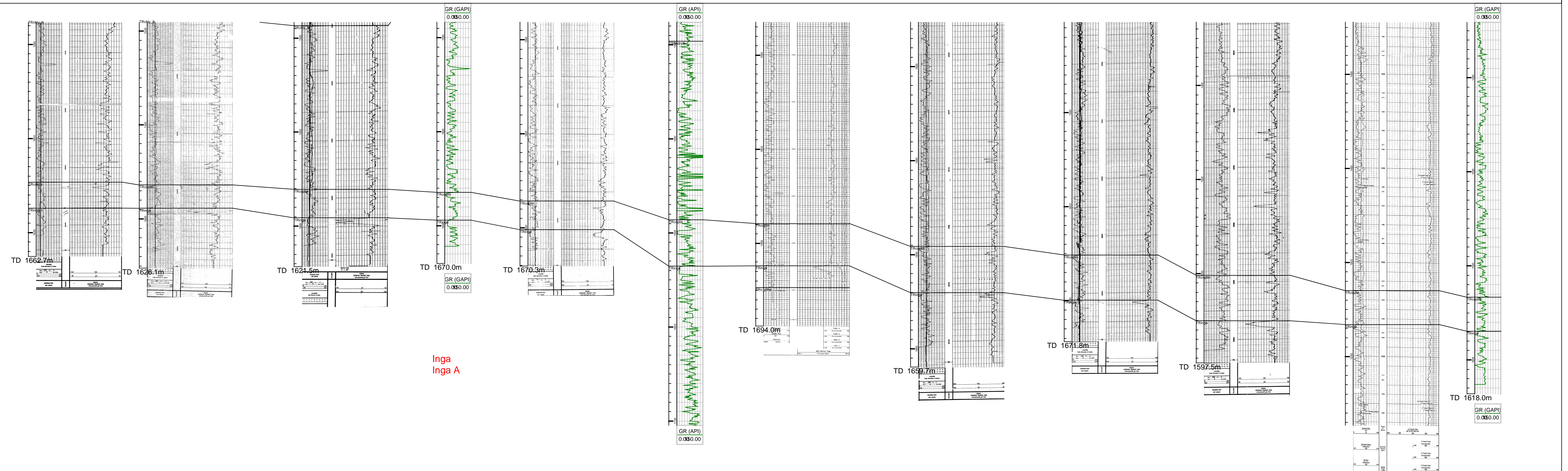
Notes: The trap mechanism is anticlinal (Podruski et al, 1988).



Contour interval is one metre of net Inga A oil pay (Oil and Gas Commission). Discovery well 10-25-88-24W6M is near the northern end of the field. The Triassic rock has been folded into an anticline.



Elog and microlog for discovery well 10-25-88-24W6M. The completion interval is 5273 – 5277 feet. Good permeability is indicated by the microlog across the completion interval. The top of Charlie Lake is at 4904' and not shown here. Charlie Lake members are difficult to pick with this old log suite.



Inga
Inga A

CACHE CREEK OIL FIELD

Doig C Pool

Pool Parameters

Field Code: 2920

Pool Code: 4900C

Discovery well original name: Remington et al Cache 04-03-088-22W6 **WA#:** 10012

Rig Release: 1996/12/03

Other Oil and Gas Shows: Doig gas, Cadomin gas

Number of Wells (November 2012) Oil: 5 Gas: 1 Active: 6

Reservoir Data

Area of Pool: 838 acres, 339 hectares

Average Depth of Producing Zone: 1668 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 11 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 2.8 metres

Average Permeability: 55 milliDarcies

Average Water Saturation (%): 7.8

Oil Formation Volume Factor (%): 162.9

Gravity (degrees API): 47.6

Original Pressure: 2790 psi, 19,236 kPa

Reserves

Estimated original oil in place: 3,346,970 barrels, 532,126 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 167,350 barrels, 26,607 m³ (volumetric)

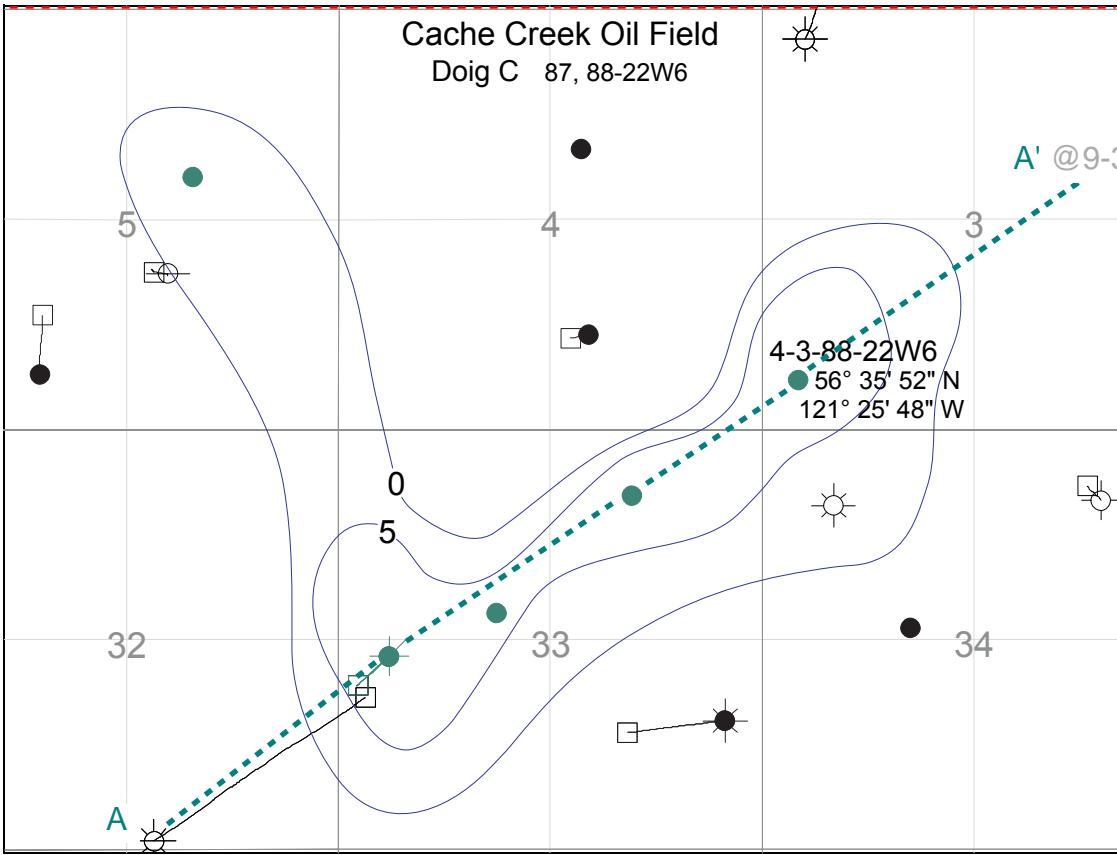
Cumulative Oil Production: 154,650 barrels

Remaining Recoverable Oil: 12,690 barrels

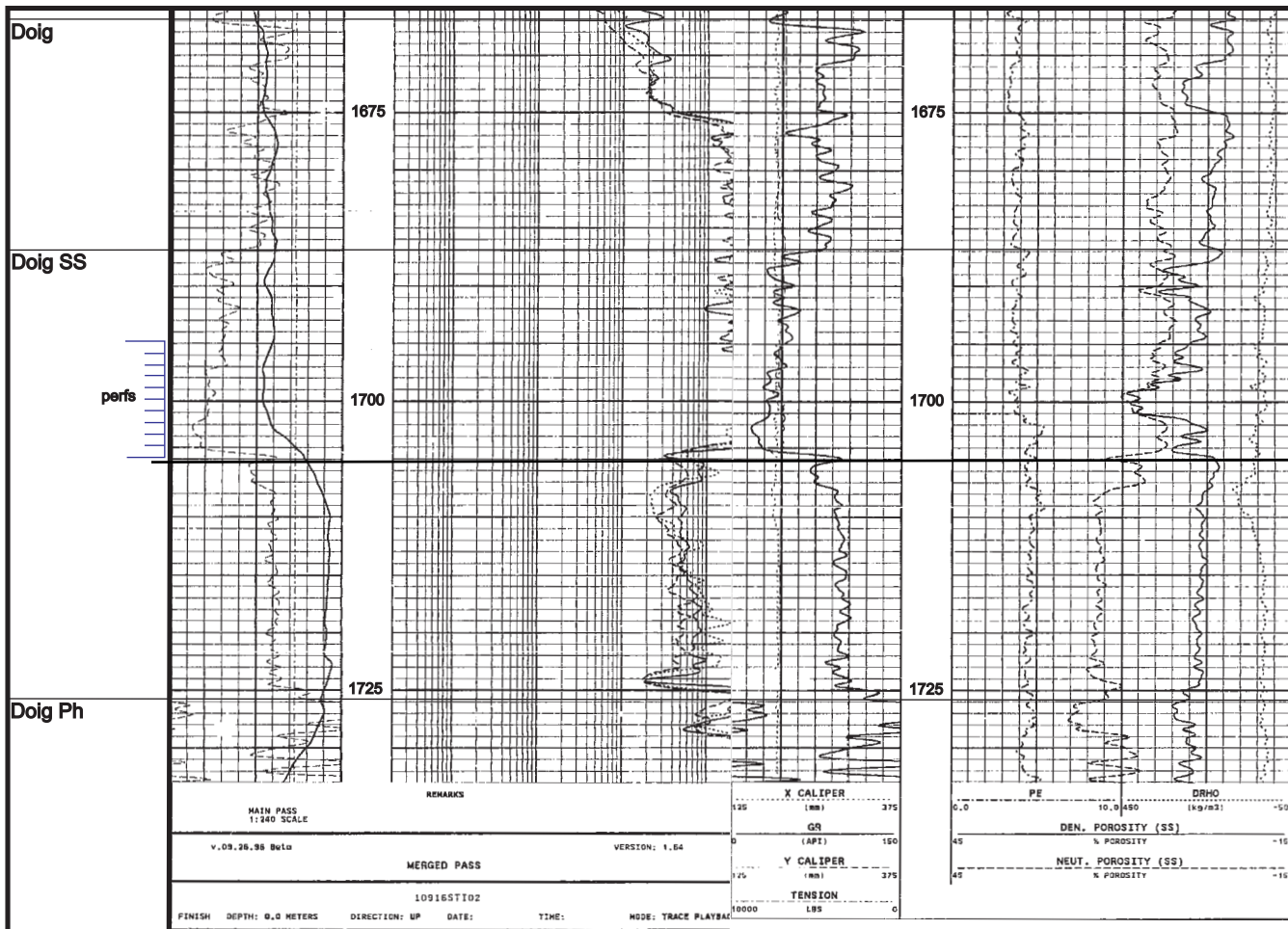
Remaining Original Oil in Place (%): 95

Cumulative Water Production: 8,860 barrels

Notes: The pool has very low primary recovery, water saturation and low water cut. Doig may have sufficient thickness for horizontal drilling. Scope for enhanced recovery is high considering the very low primary recovery.



Contour interval (as supplied by the Oil and Gas Commission) is 5 metres net Doig C oil pay. Discovery well is 4-3-88-22W6.



Induction and neutron-density curves for discovery well 4-3. Strong gas effect is evident by neutron-density crossover over the Doig

A

A'



<=1151.4m=>



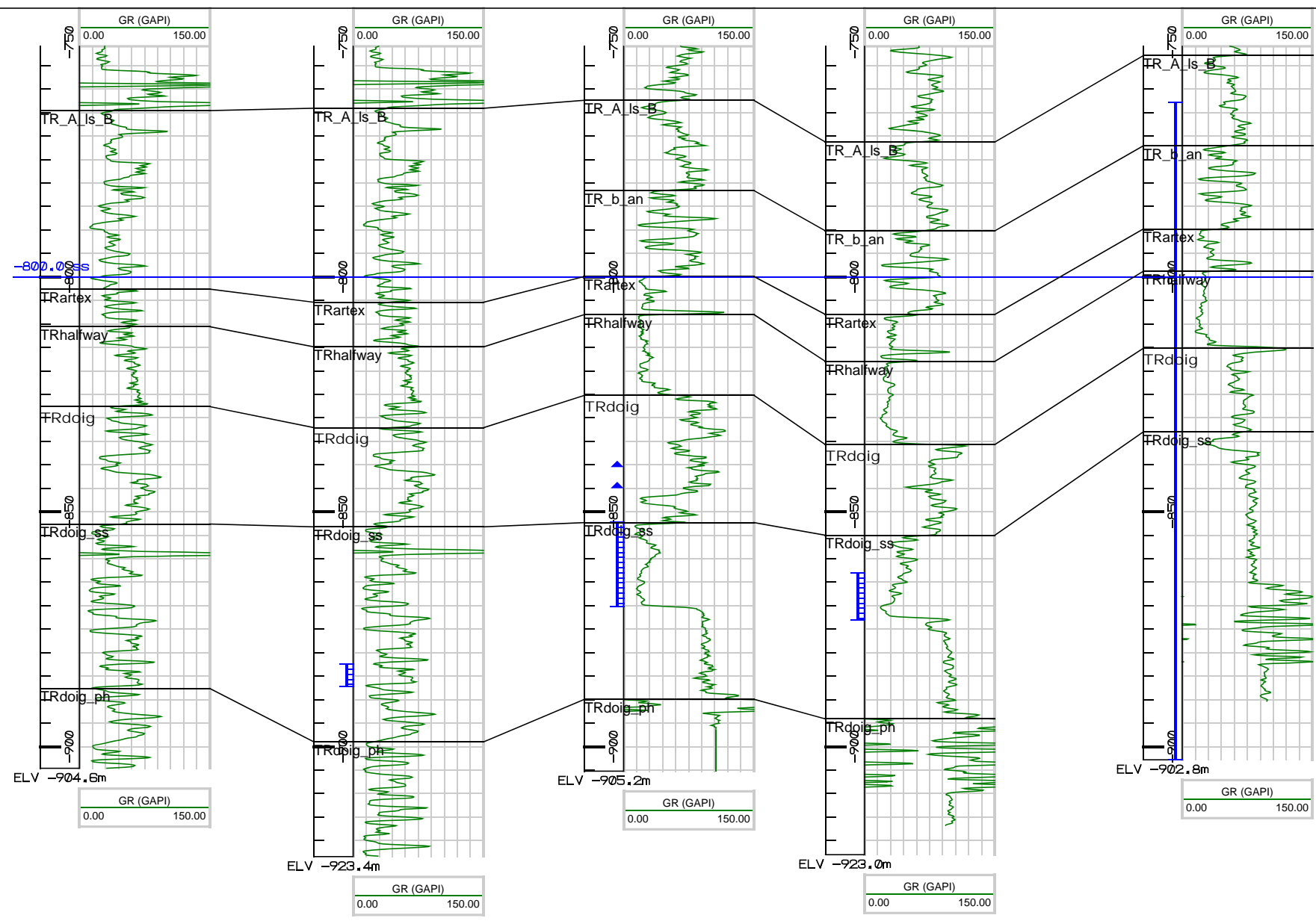
<=1115.6m=>



<=789.8m=>



<=1636.6m=>



1:1200

Cache Creek Doig C

SQUIRREL OIL FIELD

North Pine C Pool

Pool Parameters

Field Code: 7900

Pool Code: 4580C

Discovery well: 100/07-31-087-19W6/00 **WA#:** 12336

Rig Release: 1999/10/26

Other Oil and Gas Shows: North Pine gas, Bluesky gas, Bluesky oil

Number of Wells (November 2012) Oil: 15 Gas: 1 Injection: 5 Active: 2

Reservoir Data

Area of Pool: 3052 acres, 1235 hectares

Average Depth of Producing Zone: 1386 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: water flood

Average Porosity (%): 14

Average Net Pay:

Average Permeability: 207 milliDarcies

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 123

Gravity (degrees API): 38

Original Pressure: 1728 psi, 11914 kPa

Reserves

Estimated original oil in place: 8,662,010 barrels

Recovery Factor (%): 30

Estimated Recoverable Oil: 2,598,600 barrels (production decline)

Cumulative Oil Production: 2,573,060 barrels

Remaining Recoverable Oil: 25,550 barrels

Remaining Original Oil in Place (%): 70

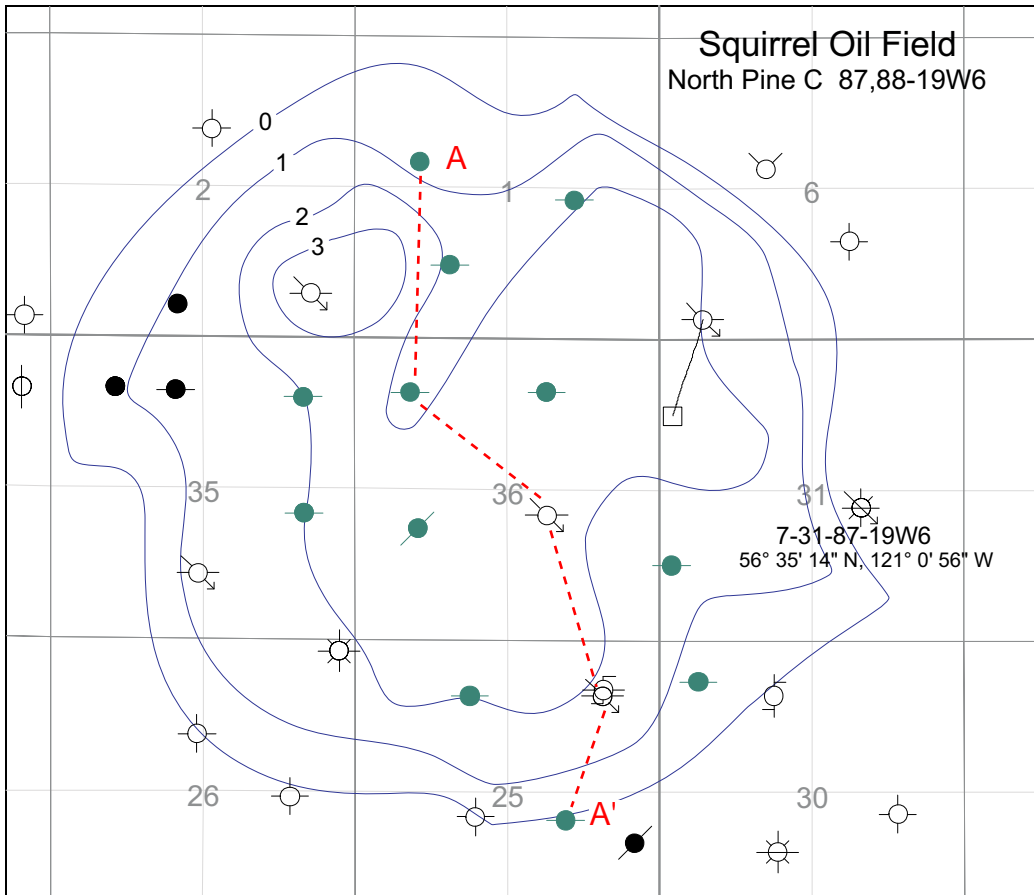
Cumulative Water Production: 1,449,490 barrels

Cumulative Water Injection: 10,262,270 barrels

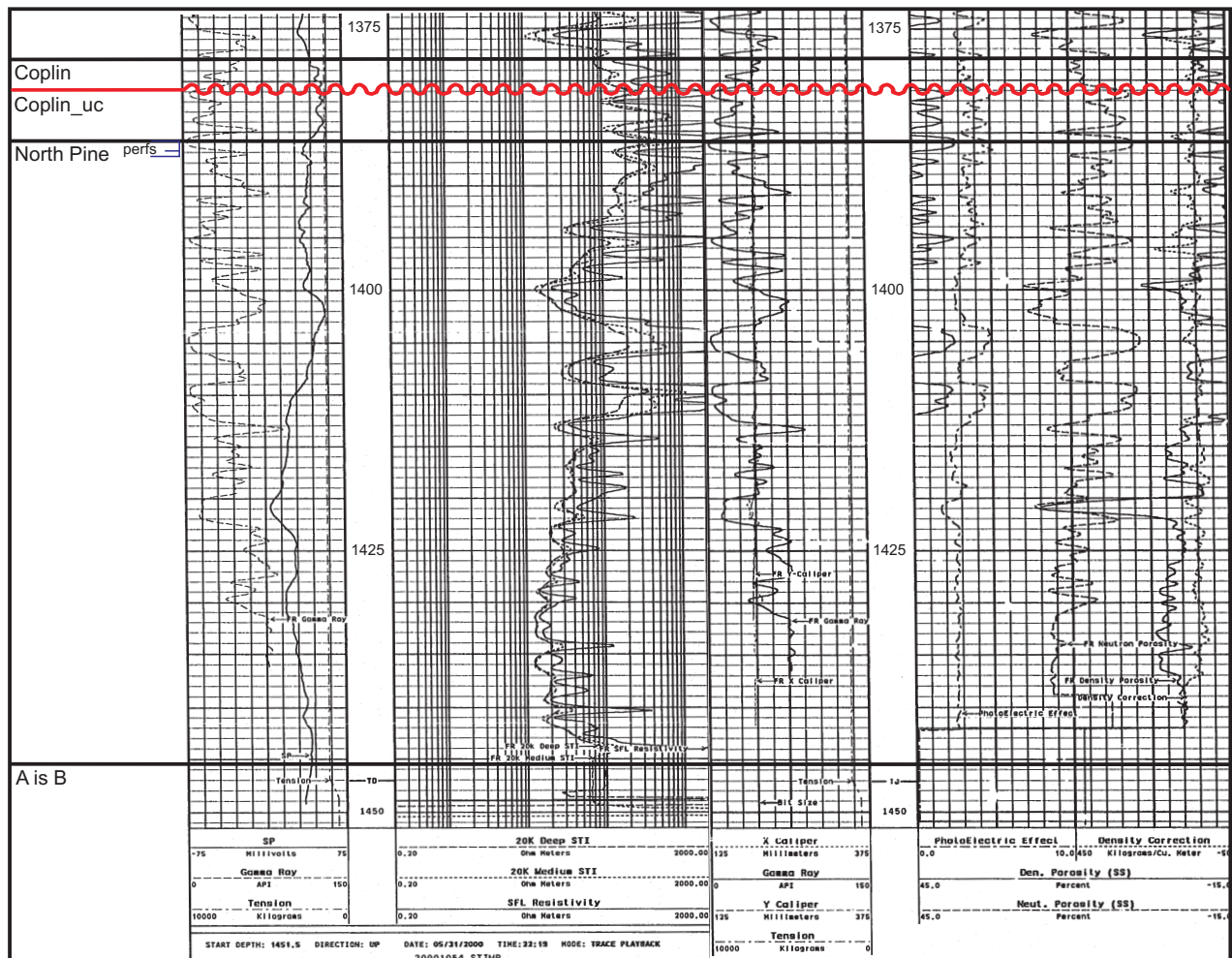
Notes: The discovery well is now a suspended gas injection well. The pool has a gas cap at the north end. The discovery well is outside the current pool zero contour limit.

Squirrel Oil Field
North Pine C 87,88-19W6

missing 3/15



Contour interval is one metre net North Pine C oil pay (Oil and Gas Commission). Discovery well 7-31-87-19W6 is a suspended gas injection well and is outside the zero contour limit for oil but within the gas cap.



Induction and neutron-density logs for 13-36-87-20W6, which is a suspended oil-well in the midst of the field. Completion is shown to be in a thin sand in the Bear Flat member.

100/12-01-088-20W6/00

100/13-36-087-20W6/00

100/07-36-087-20W6/00

100/16-25-087-20W6/00

00/07-25-087-20W6/00

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<=986.9m=>

<=1016.8m=>

<=694.9m=>

2001/04/15

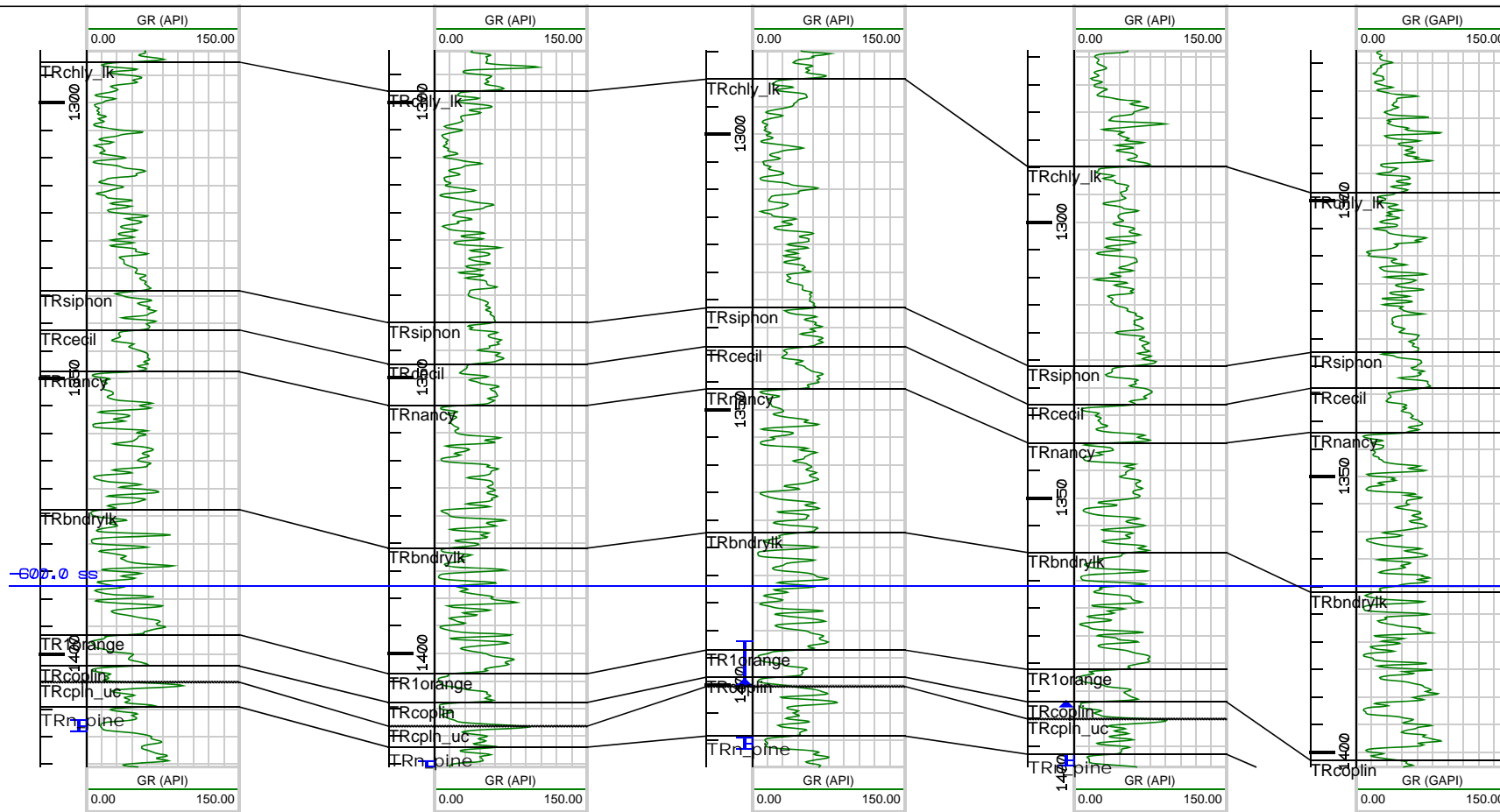
2000/06/01

2000/05/29

2000/06/10

2004/08/12

1:1200



Squirrel North Pine C

RIGEL OIL FIELD

Cecil B Pool

Pool Parameters

Field Code: 7600 **Pool Code:** 4520B
Discovery well original name: BOWTEX ET AL RIGEL 06-22-088-18W6 **WA#:** 08265
Rig Release: 1993/10/15
Other Oil and Gas Shows: Cadomin gas
Number of Wells (November 2012) Oil: 13 Active: 9 Injection: 4

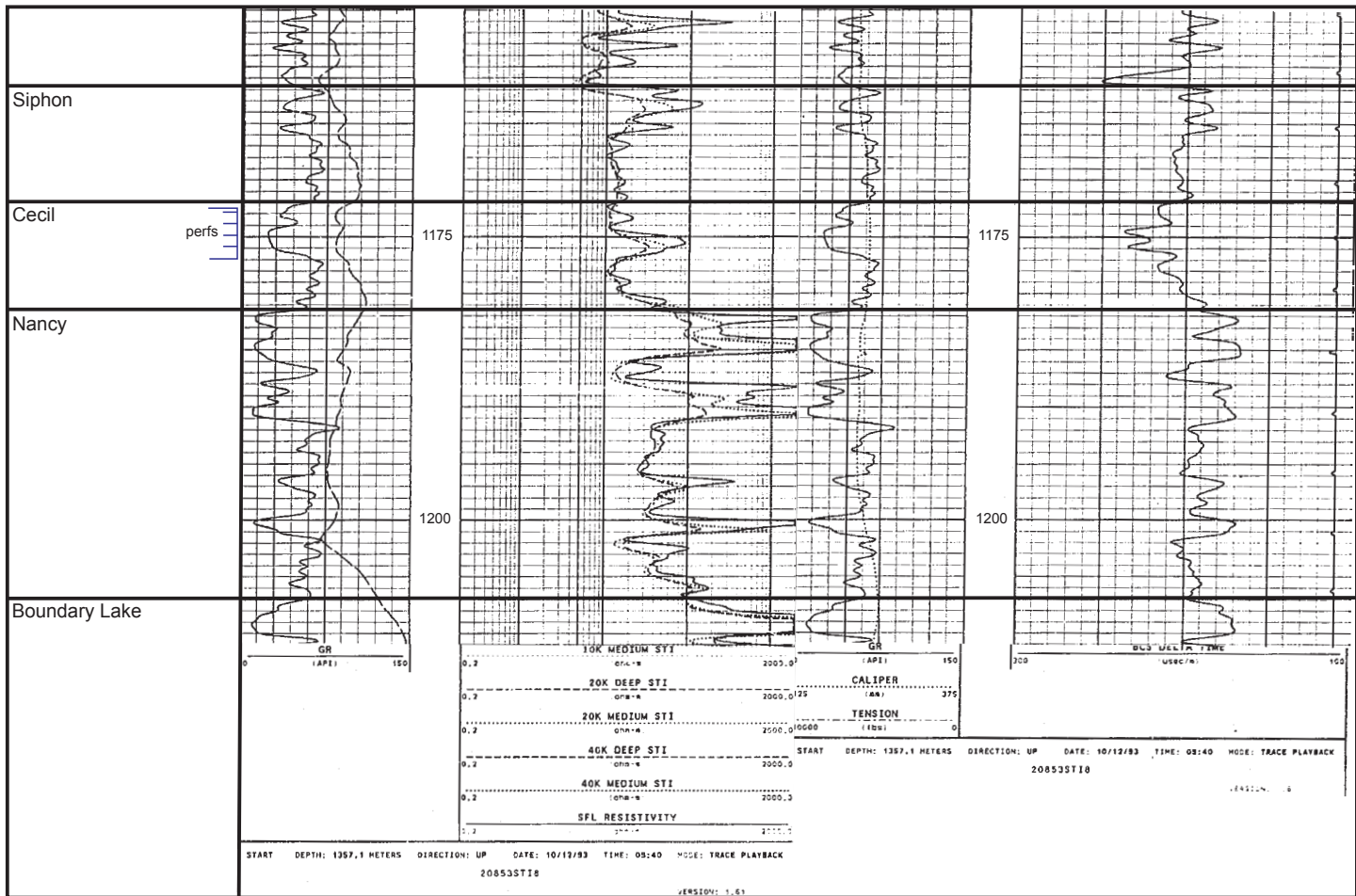
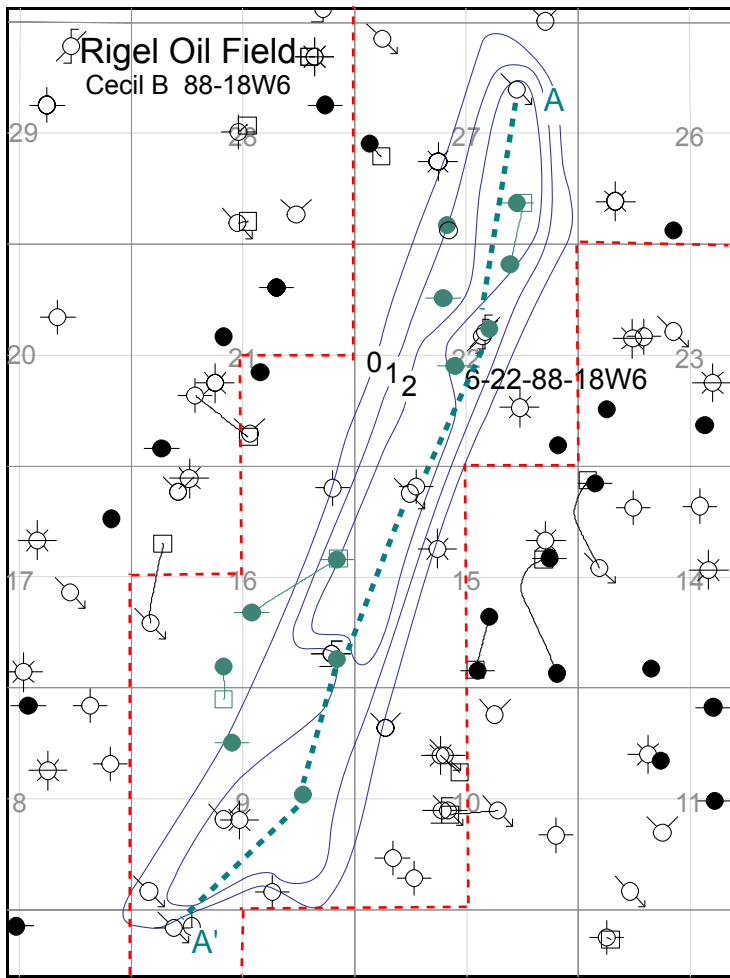
Reservoir Data

Area of Pool:
Average Depth of Producing Zone: 1172 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 2.5 metres
Drive Mechanism: water flood
Average Porosity (%): 13
Average Net Pay: 1.3 metres
Average Permeability: 72 milliDarcies
Average Water Saturation (%): 28
Oil Formation Volume Factor (%): 126
Gravity (degrees API): 33
Original Pressure: 1639 psi, 11301 kPa

Reserves

Estimated original oil in place: 7,711,280 barrels, 1,225,996 m³
Recovery Factor (%): 52 (water flood)
Estimated Recoverable Oil: 4,009,870 barrels, 637,518 m³ (production decline)
Cumulative Oil Production: 3,608,090 barrels
Remaining Recoverable Oil: 401,780 barrels
Remaining Original Oil in Place (%): 53
Cumulative Water Production: 968,390 barrels
Cumulative Water Injection: 6,139,160 barrels

Notes: Water flood appears to have been effective; recovered oil is close to recoverable.



Induction and sonic logs for discovery well 6-22-88-18W6. Good porosity is indicated on the sonic.

100/10-27-088-18W6/00

100/10-22-088-18W6/00

100/13-15-088-18W6/00

100/01-16-088-18W6/00

00/09-09-088-18W6/00

100/13-04-088-18W6/00



<=1759.7m=>



<=1332.0m=>



<=1320.7m=>



<=1018.9m=>



<=1352.0m=>



1995/03/23

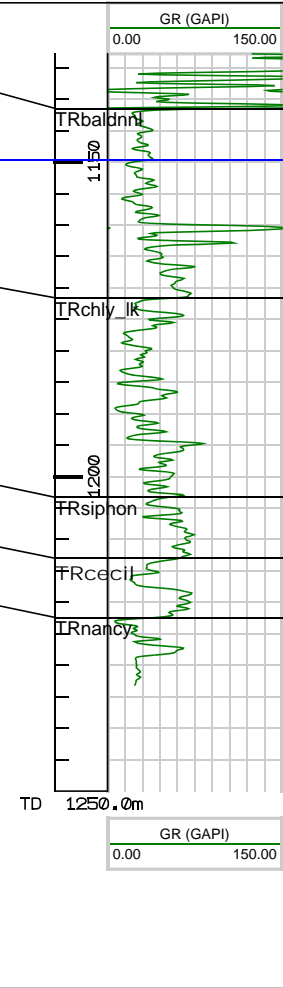
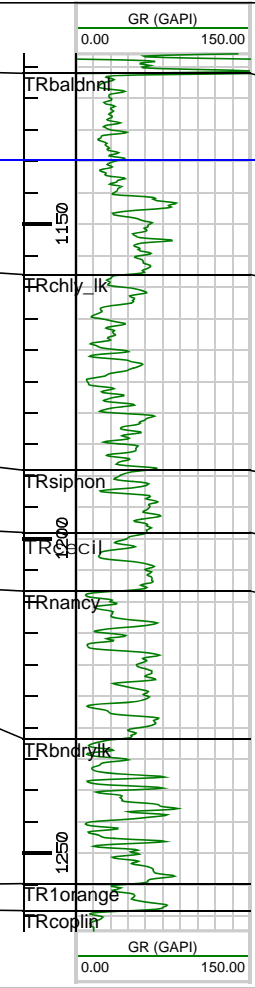
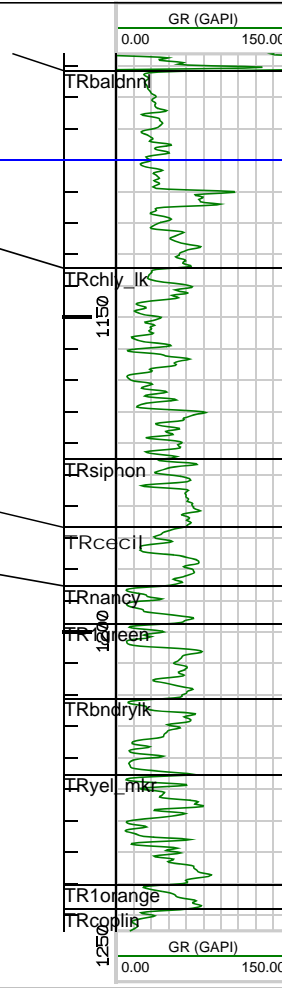
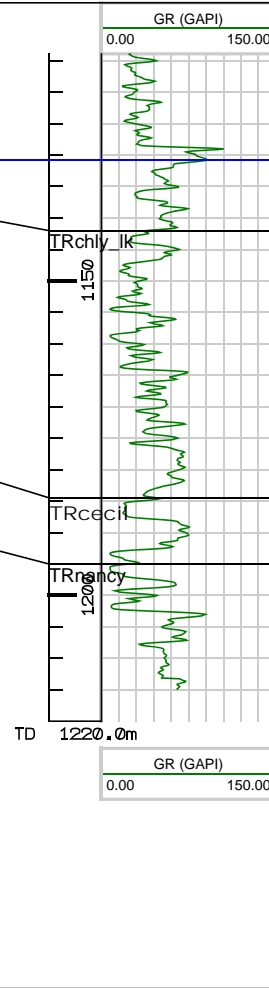
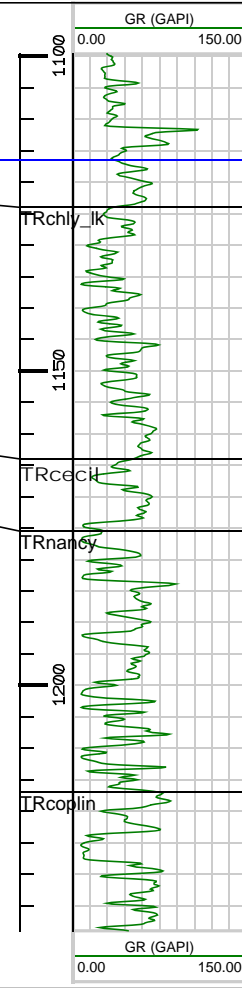
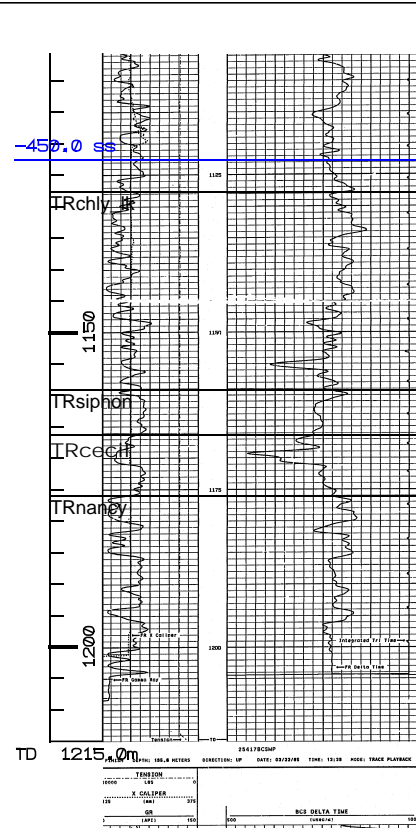
1994/01/03

1994/12/04

1995/03/22

1995/09/09

1996/08/21



Rigel Cecil B

RIGEL OIL FIELD

Halfway C

Field Parameters

Field Code: 7600

Pool Code: 4800C

Discovery well original name: Dome et al E Rigel 11-28-088-16W6

WA#: 06770

Rig Release: 1988/01/08

Other Oil and Gas Shows: Gething gas, Halfway gas, Dunlevy gas, Baldonnel gas

Number of Producing Wells (November 2012) Oil: 10 Gas: 2 Injection: 3 Horizontal: 3

Reservoir Data

Area of Pool: 450 acres, 182 hectares

Average Depth of Producing Zone: 1260 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural-stratigraphic

Estimated Maximum Reservoir Thickness: 7 metres

Drive Mechanism: water flood

Average Porosity (%): 19

Average Net Pay: 3.5 metres

Average Permeability: 117 milliDarcies

Average Water Saturation (%): 25

Oil Formation Volume Factor (%): 122

Gravity (degrees API):

Original Pressure: 1574 psi, 10852 kPa

Reserves

Estimated original oil in place: 9,006,840 barrels, 1,431,973 m³

Recovery Factor (%): 35 (water flood)

Estimated Recoverable Oil: 3,116,050 barrels, 495,412 m³

Cumulative Oil Production: 3,074,860 barrels

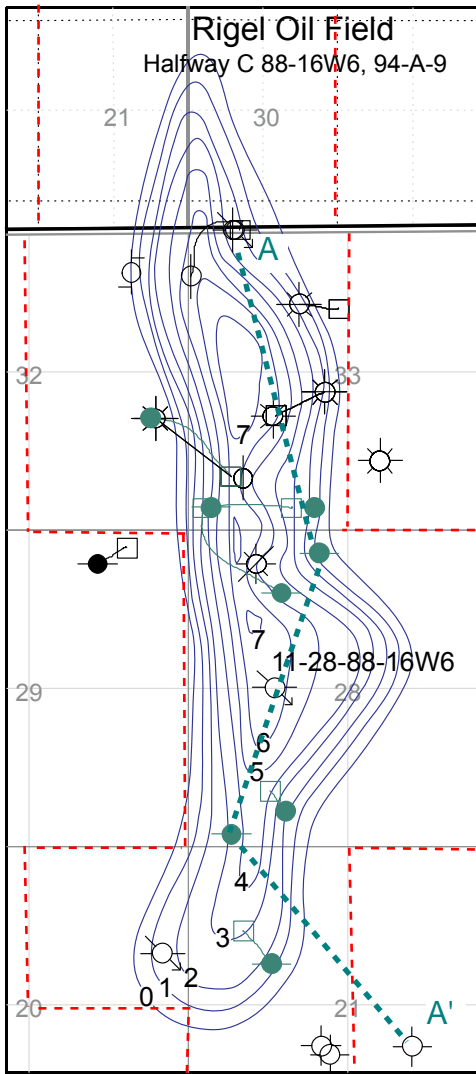
Remaining Recoverable Oil: 41,190 barrels

Remaining Original Oil in Place (%): 66

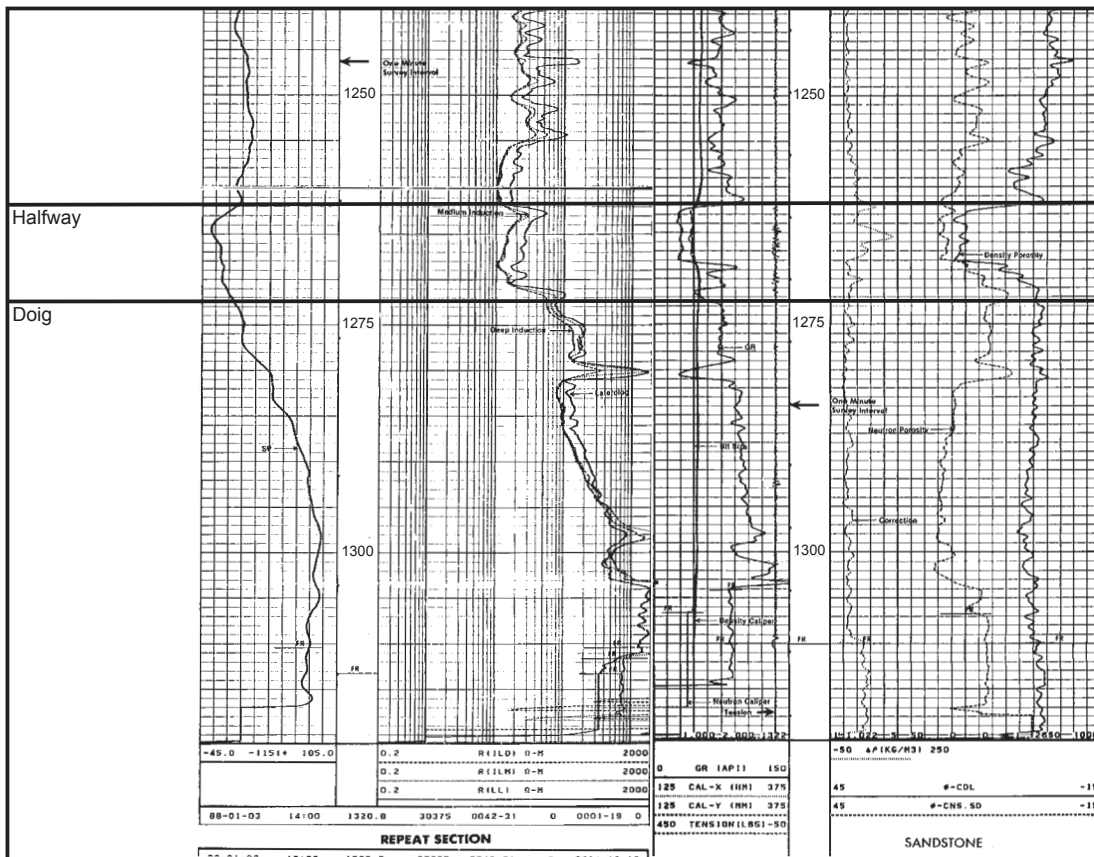
Cumulative Water Production: 4,309,390 barrels

Cumulative Water Injection: 10,262,270 barrels

Notes: A gas cap is at the north end of the pool. Discovery well 11-28 is now a water injector. Localized structure controls distribution of oil and gas within the pool (Hogg, 1998).



Contour interval is one metre net Halfway C oil pay (Oil and Gas Commission). Discovery well is 11-28-88-16W6. It was a Halfway oil producer but is now a water injector.



Laterolog and neutron-density logs for discovery well 11-28-88-16W6. The Halfway exhibits a thick and blocky gamma ray response typical of a bar deposit. Near crossover of the neutron-density shows the presence of solution gas. The completion interval is 1262 – 1268 metres.

200/c-020-L 094-A-09/00

102/14-28-088-16W6/00

100/04-28-088-16W6/00

100/07-21-088-16W6/00



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<=1427.9m=>



1991/01/07

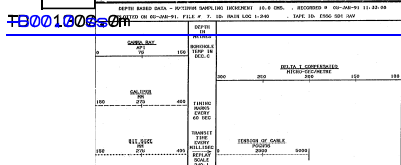
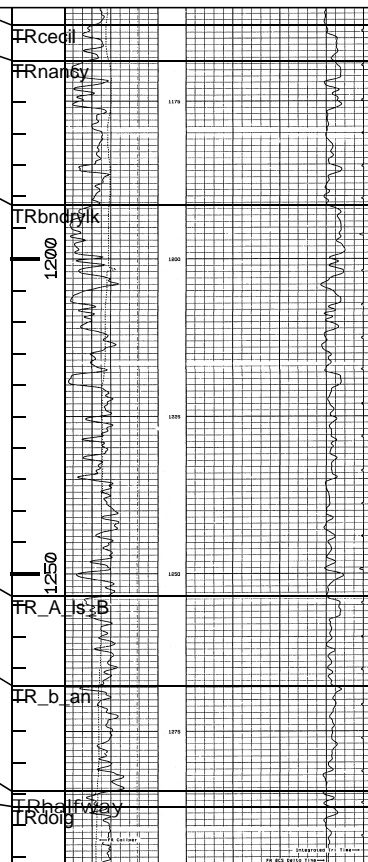
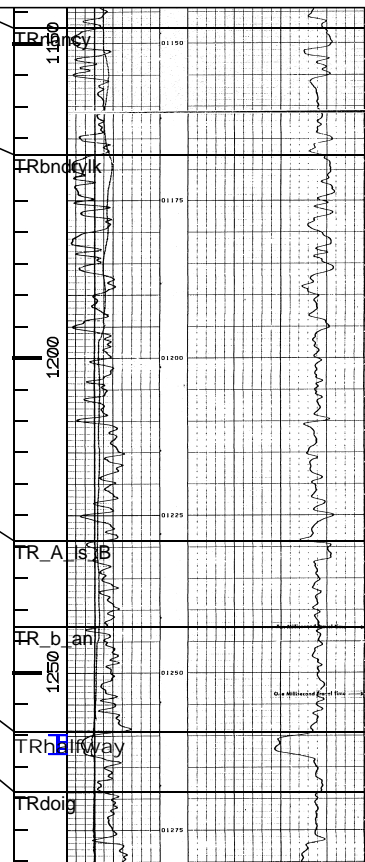
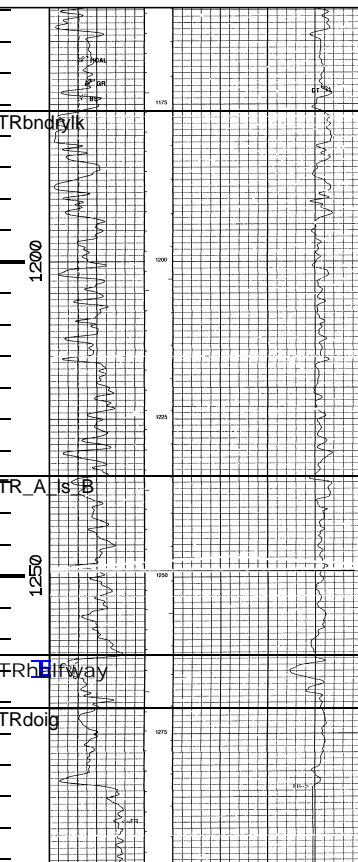
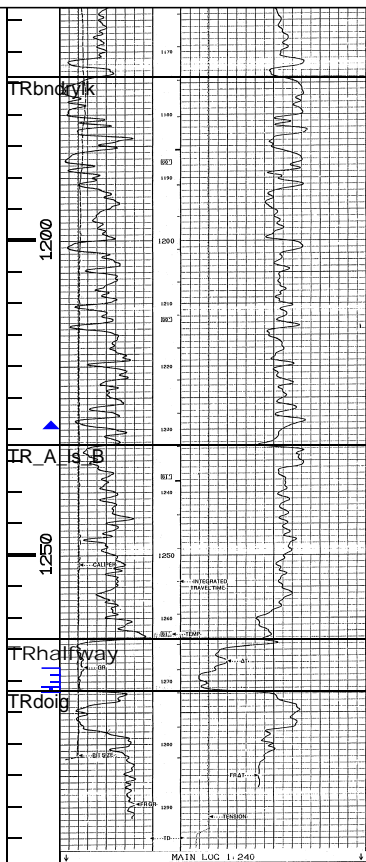
1998/03/12

1989/03/14

1994/03/06

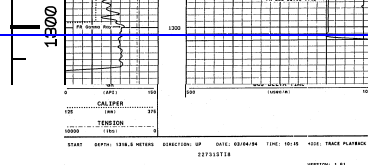
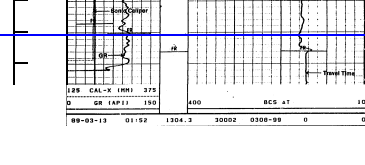
A'

1:12000



TD 1302.0m

DLIS Name	Description	Value
WELL	WELL NAME	200-C-020-L-094-A-09
WELL	WELL NUMBER	020
WELL	WELL TYPE	WELL
WELL	WELL STATUS	ACTIVE
WELL	WELL DATE	1991-01-07
WELL	WELL LOCATION	102/14-28-088-16W6
WELL	WELL DEPTH	1302.0
WELL	WELL DIAMETER	150
WELL	WELL CEMENT	CEMENT
WELL	WELL LOG	LOG
WELL	WELL SURFACE	SURFACE
WELL	WELL BOTTOM	BOTTOM
WELL	WELL TOTAL	TOTAL
WELL	WELL NET	NET
WELL	WELL GROSS	GROSS
WELL	WELL VOID	VOID
WELL	WELL FILL	FILL
WELL	WELL CEMENT	CEMENT
WELL	WELL LOG	LOG
WELL	WELL SURFACE	SURFACE
WELL	WELL BOTTOM	BOTTOM
WELL	WELL TOTAL	TOTAL
WELL	WELL NET	NET
WELL	WELL GROSS	GROSS
WELL	WELL VOID	VOID
WELL	WELL FILL	FILL



Rigel Halfway C

BOUNDARY LAKE OIL FIELD

Belloy L Pool

Pool Parameters

Field Code: 2000

Pool Code: 6200L

Discovery well original name: SCEPTRE ET AL BOUNDARY A14-06-084-13W6

WA#: 09516

Rig Release: 1995/12/22

Other Oil and Gas Shows:

Number of Wells (December 2012) Oil: 3

Active: 2

Reservoir Data

Area of Pool: 208 acres, 84 hectares

Average Depth of Producing Zone: 1835 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic - structural

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 18

Average Net Pay: 3.5 metres

Average Permeability: 54 millidarcies

Average Water Saturation (%): 33

Oil Formation Volume Factor (%): 122

Gravity (degrees API): 39

Original Pressure: 2511 psi, 17313 kPa

Reserves

Estimated original oil in place: 5,147,740 barrels, 818,425 m³

Recovery Factor (%): 7

Estimated Recoverable Oil: 357,410 barrels, 56,824 m³ (volumetric)

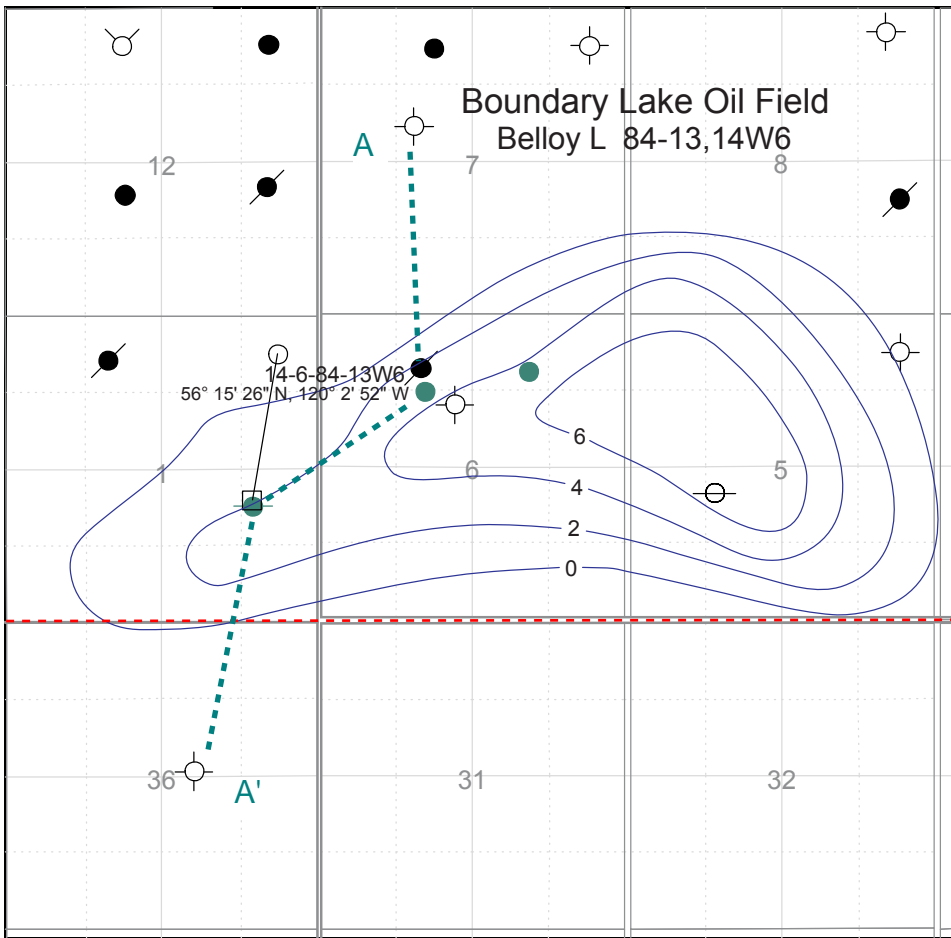
Cumulative Oil Production: 230,740 barrels

Remaining Recoverable Oil: 126,670 barrels

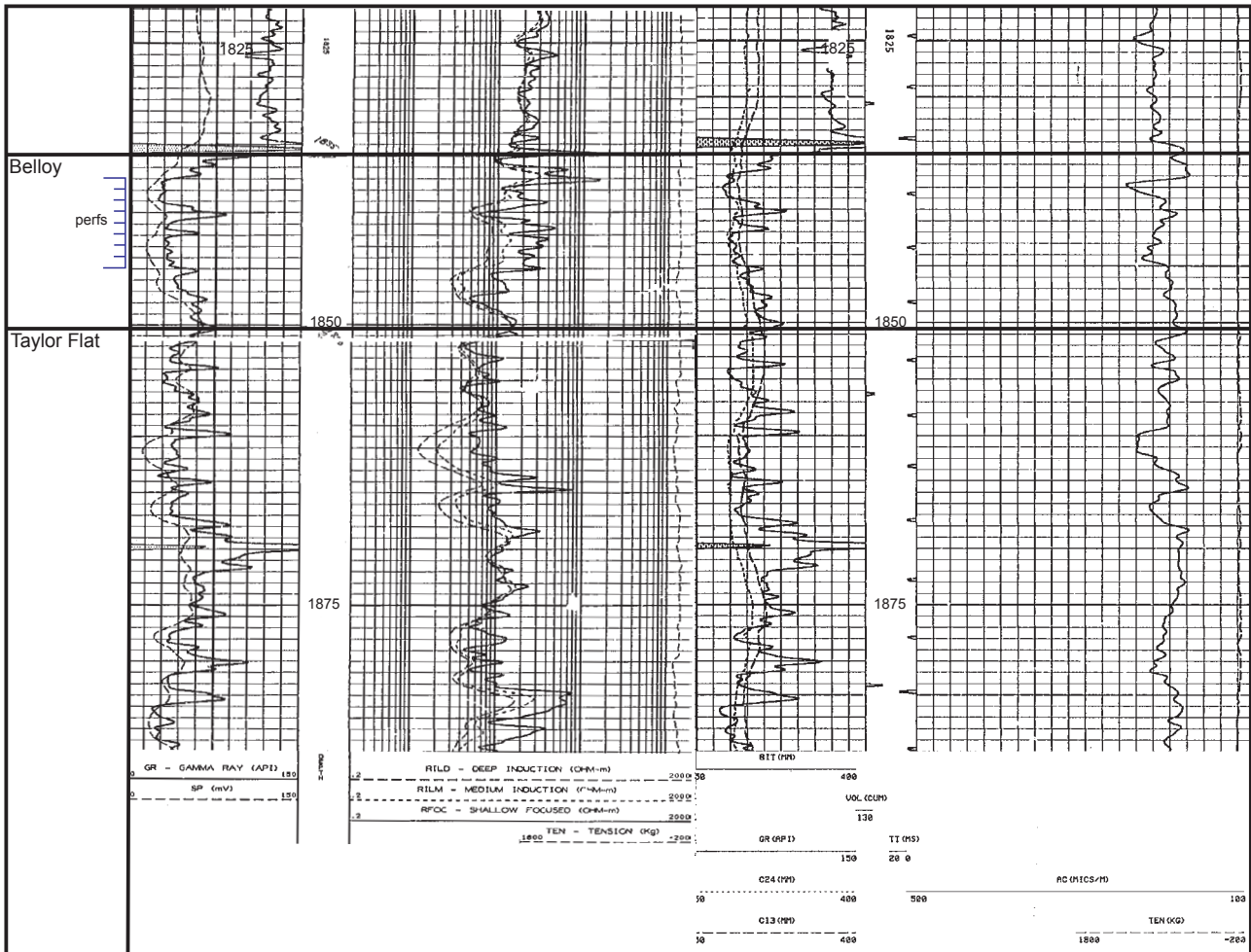
Remaining Original Oil in Place (%): 96

Cumulative Water Production: 15,267,010 barrels

Notes: Trapping here depends on a combination of structural isolation through block faulting and stratigraphical facies change. Recovery factor is low despite relatively good permeability. A gas cap is present along the north side of the pool. Horizontal drilling may improve productivity.



Contour interval is two metres net
Belloy L oil pay (adapted from Oil and
Gas Commission). Discovery well is 14-
6-84-13W6.



Induction and sonic logs for discovery well 14-6-84-13W6. Perfs are kept above what might be a water leg. Not all of the perfed interval is pay. Water cut has been relatively low.

A

A'

100/11-07-084-13W6/00

+753.2 11542



<<1397.7m>>

102/14-06-084-13W6/00

+727.1 09516



<<1088.1m>>

100/08-01-084-14W6/00

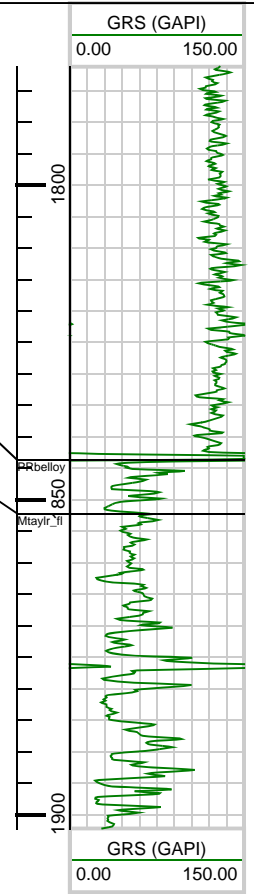
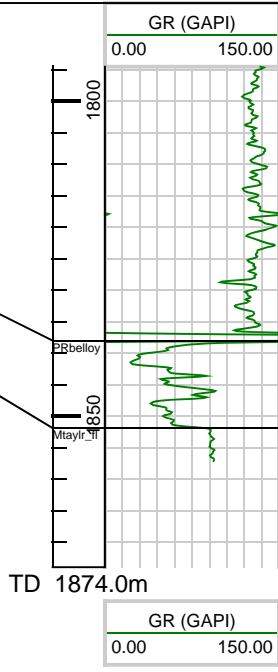
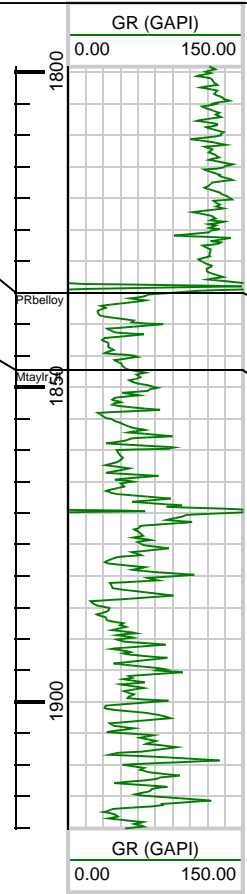
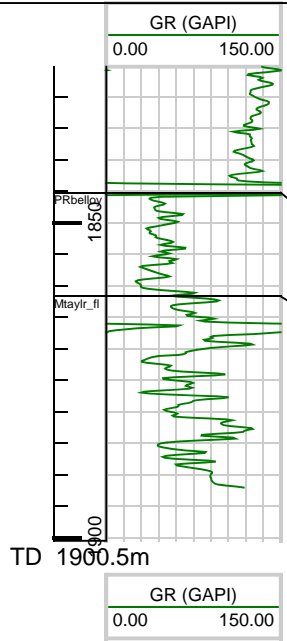
+722.5 10235



<<1430.2m>>

100/10-36-083-14W6/00

+709.2 09515



Boundary Lake
Belloy L

1:1200

BOUNDARY LAKE OIL FIELD

Boundary Lake A Pool

Pool Parameters

Field Name: Boundary Lake **Field Code:** 2000 **Pool Code:** 4535A
Discovery well original name: Texaco NFA Boundary Lake 06-06-086-13W6 **WA#:** 00101
Rig Release: 1955/02/04
Other Oil and Gas Shows: Halfway oil and gas, Baldonnel gas, Bluesky-Gething gas
Number of Wells (November 2012) Oil: 370 Gas: 1 Injection: 96 Water Observation: 3

Reservoir Data

Area of Pool: 5461 acres, 2209 hectares
Average Depth of Producing Zone: 4300 feet, 1310 metres
Lithology of Reservoir Rock: dolomite
Trap Type: Stratigraphic-structural
Estimated Maximum Reservoir Thickness: 15 metres
Drive Mechanism: gas depletion
Average Porosity (%): 18
Average Net Pay: 5 feet, 1.5 metres
Average Permeability: 22 md
Average Water Saturation (%): 30
Oil Formation Volume Factor (%): 128
Gravity (degrees API): 33
Original Pressure: 1835 psi, 12652 kPa

Reserves

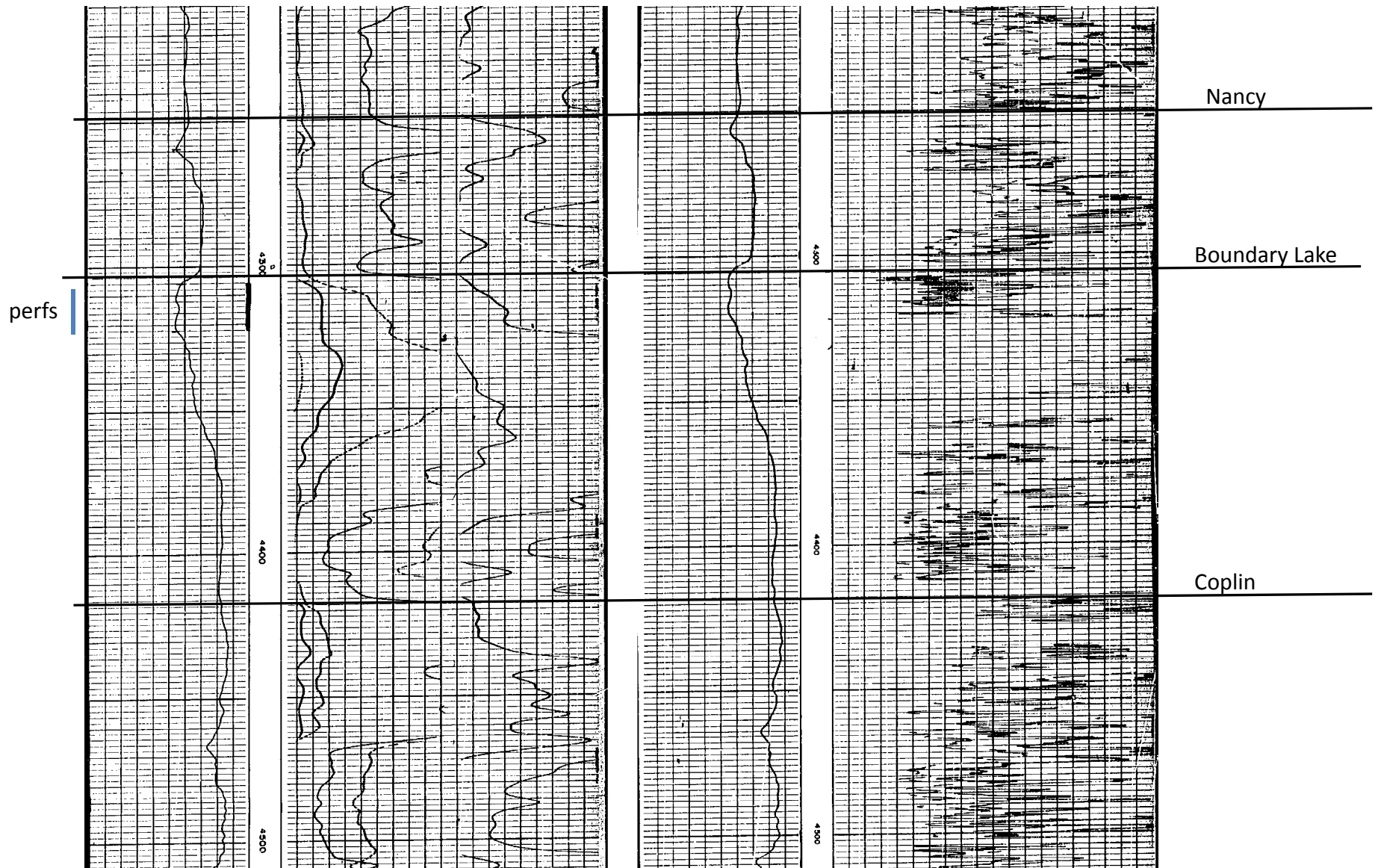
Estimated original oil in place: 540,463,240 barrels, 88,061,025 m³
Recovery Factor (%): 45
Estimated Recoverable Oil: 244,064,510 barrels, 38,863,775 m³ (production decline)
Cumulative Oil Production: 226,094,980 barrels
Remaining Recoverable Oil: 17,969,540 barrels
Remaining Original Oil in Place (%): 58
Cumulative Water Production: 26,624,282 barrels
Cumulative Water Injection: 638,412,840 barrels

Notes:

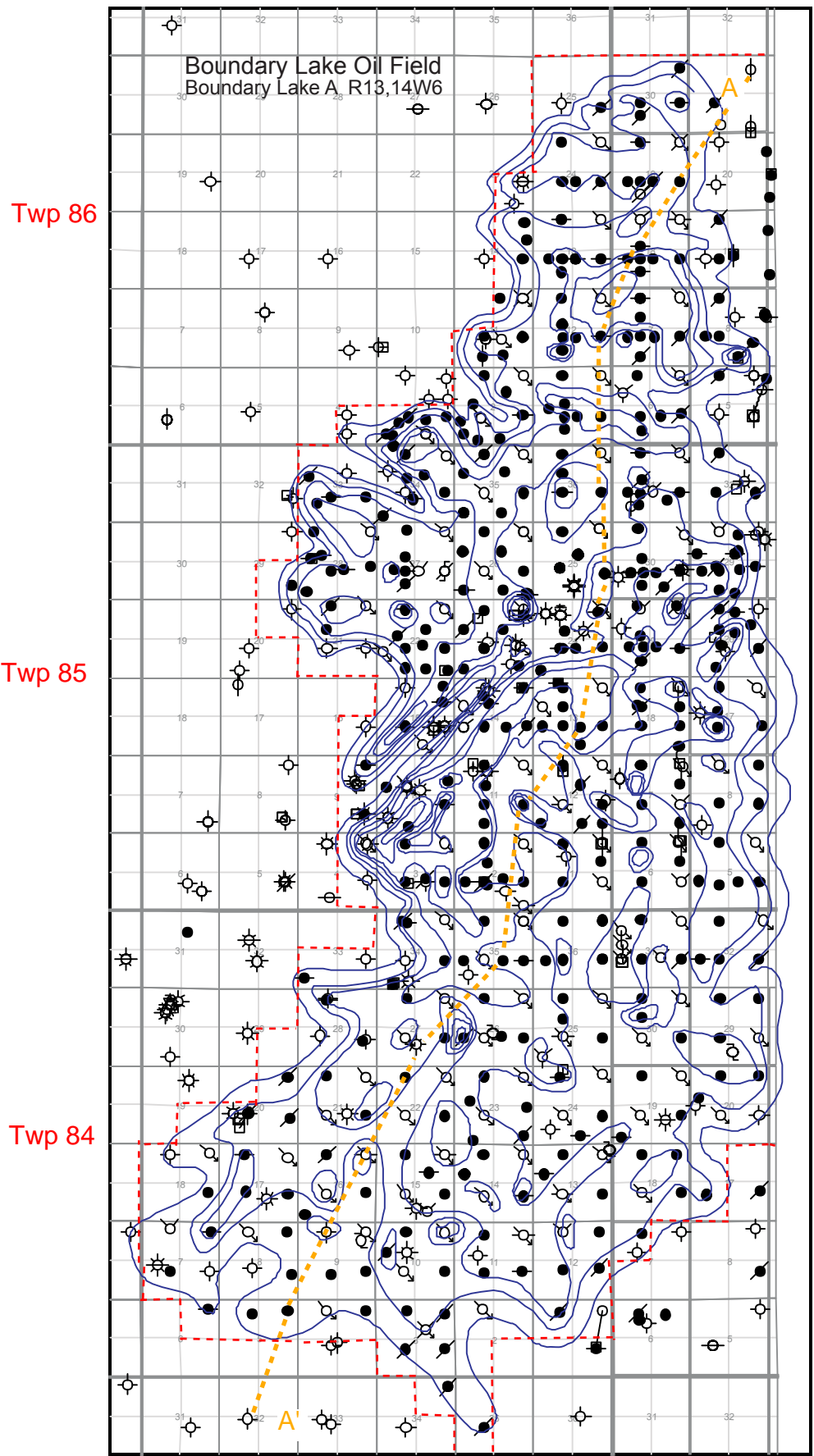
Water cut in the early years of production was very low. It began to increase in the mid 1960's, probably coincident with the introduction of water injection for secondary recovery/pressure maintenance. The three observation wells were initially injectors. One other well was briefly an injector but was abandoned.

BOUNDARY LAKE OIL FIELD

Boundary Lake A Pool



Elog and microlog for discovery well 6-6-86-13W6M. Good permeability is indicated by the microlog over approximately 10 feet (3 m) of pay. Completion is near the top of the Boundary Lake.



Net Oil Pay for the Boundary Lake A Oil Field. Discovery well is 6-6-86-13W6. Contour interval is two metres net Boundary Lake A oil pay (Oil and Gas Commission).

BOUNDARY LAKE OIL FIELD

Cecil A Pool

Pool Parameters

Field Code: 2000

Pool Code: 4520A

Discovery well original name: Texaco et al Boundary A8-30-085-13W6

WA#: 02931

Rig Release: 1971/03/25

Other Oil and Gas Shows: Halfway gas, Halfway oil, Boundary Lake oil, Bluesky gas, Baldonnel gas

Number of Producing Wells (November 2012) Oil: 2 **Active:** 0

Reservoir Data

Area of Pool: 773 acres, 313 hectares

Average Depth of Producing Zone: 4152 feet, 1265 m

Lithology of Reservoir Rock: anhydritic and dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 1.3 metres

Drive Mechanism: gas depletion

Average Porosity (%): 16

Average Net Pay: 1.2 metres

Average Permeability: 118 millidarcies

Average Water Saturation (%): 20

Oil Formation Volume Factor (%): 113

Gravity (degrees API): 21

Original Pressure: 1713 psi, 11,811 kpa

Reserves

Estimated original oil in place: 2,900,470 barrels, 461,138 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 145,020 barrels, 23,056 m³ (Volumetric)

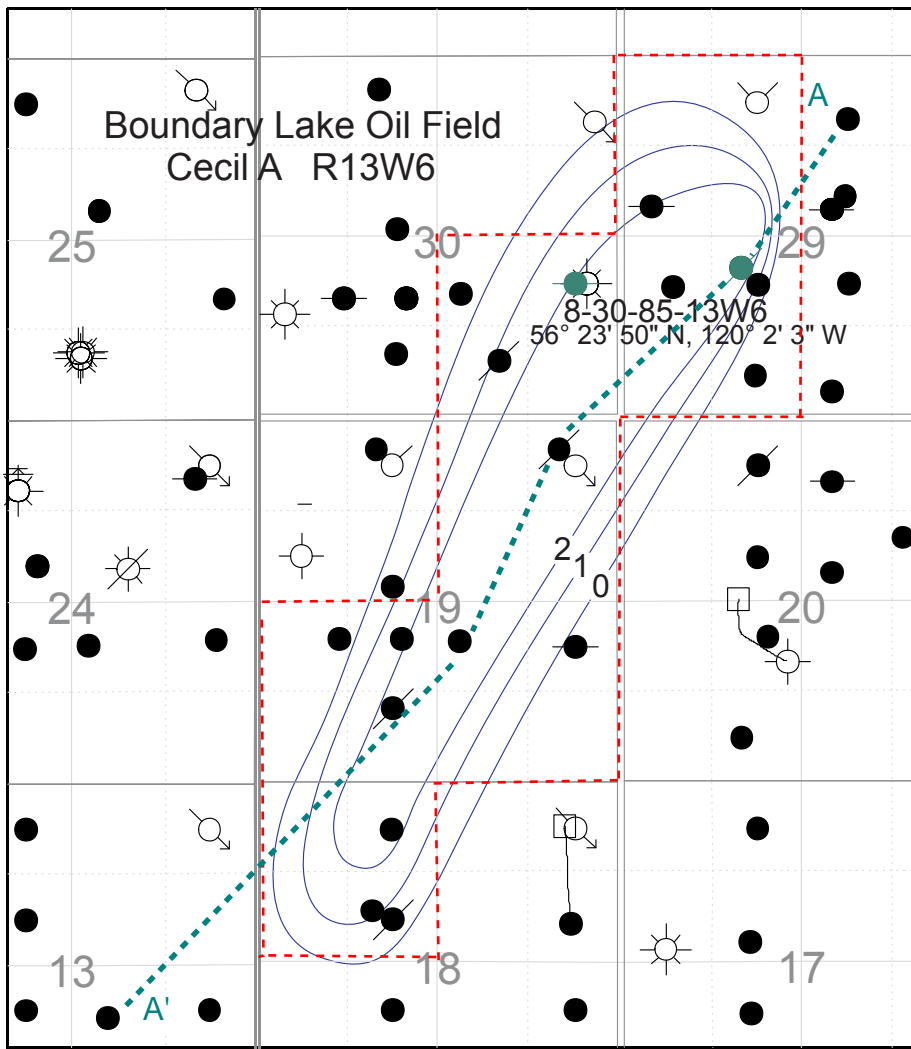
Cumulative Oil Production: 122,670 barrels

Remaining Recoverable Oil: 22,350 barrels

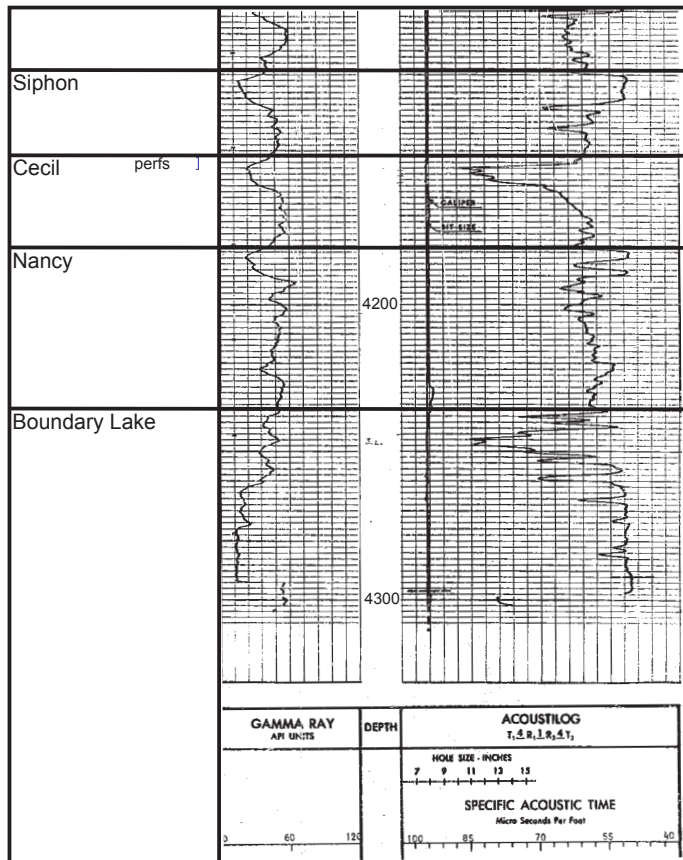
Remaining Original Oil in Place (%): 96

Cumulative Water Production: 33,440 barrels

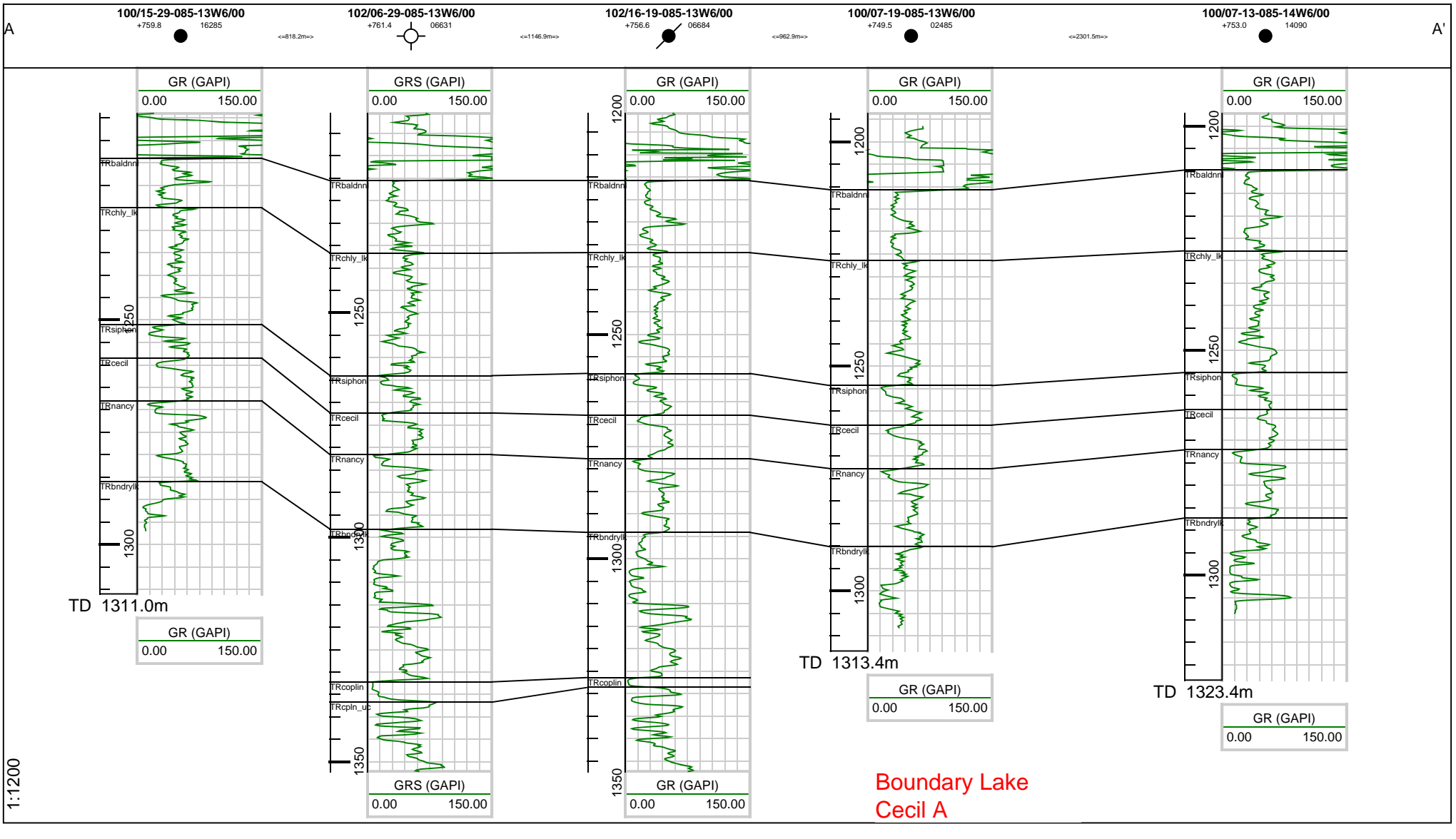
Notes: A low recovery factor may leave room for enhanced production. Permeability and porosity are good, and water cut is moderate.



Discovery well is 8-30-85-13W6. Contour interval, supplied by the Oil and Gas Commission, is one metre net Cecil A oil pay.



Sonic log for discovery well 8-30-85-13W6. No resistivity log was run. A thin and porous sandstone bed at the top of the Cecil Member of the Charlie Lake Formation is the productive interval.



1:1200

Boundary Lake
Cecil A

BOUNDARY LAKE OIL FIELD

Coplin B Pool

Pool Parameters

Field Code: 2000

Pool Code: 4540B

Discovery well original name: Petrorep et al Boundary 6-8-87-13W6

WA#: 05159

Rig Release: 1980/02/02

Other Oil and Gas Shows: Halfway gas

Number of Wells (November 2012) Oil: 1 **Active:** 0

Reservoir Data

Area of Pool: 161 acres, 65 hectares

Average Depth of Producing Zone: 1423 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 9.3

Average Net Pay: 1.5 metres

Average Permeability: not cored, no DSTs

Average Water Saturation (%): 28.3

Oil Formation Volume Factor (%): 127.8

Gravity (degrees API): 40.6

Original Pressure: 1577 psi, 10873 kPa

Reserves

Estimated original oil in place: 320,013 barrels, 50,878 m³

Recovery Factor (%): 18

Estimated Recoverable Oil: 57,620 barrels, 9,161 m³ (volumetric)

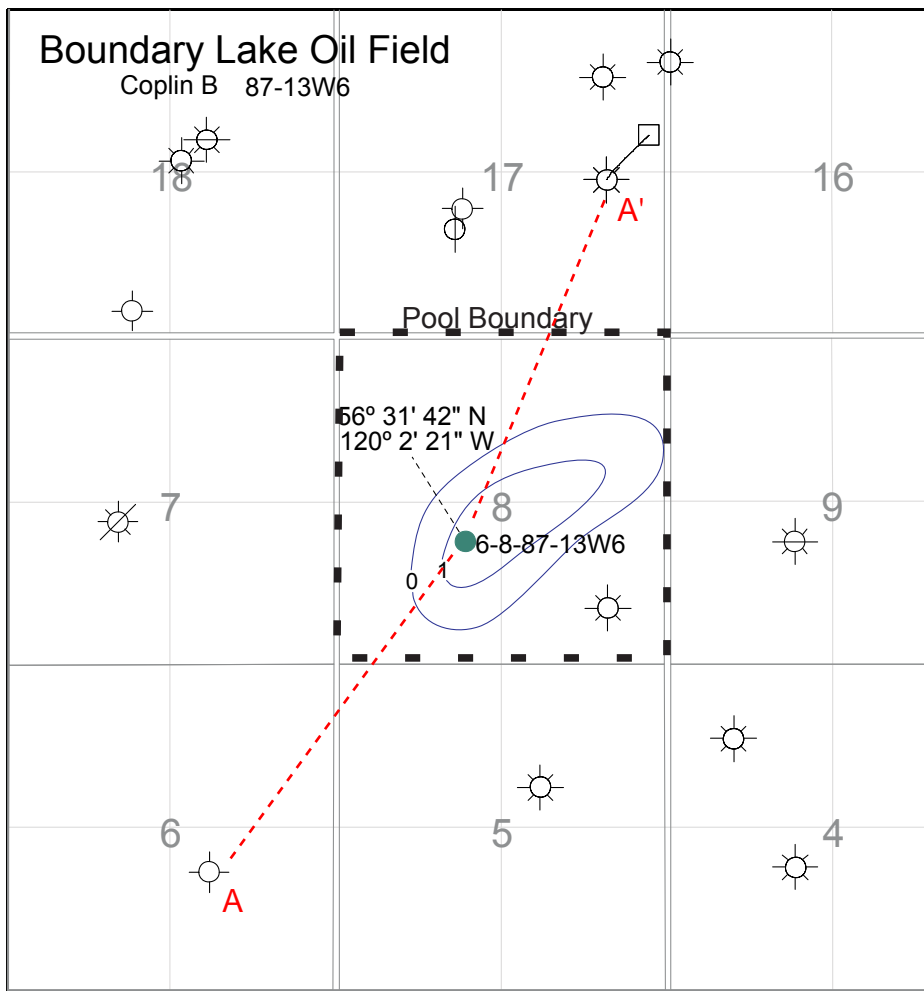
Cumulative Oil Production: 53,820 barrels, 8,557 m³

Remaining Recoverable Oil: 3,800 barrels, 605 m³

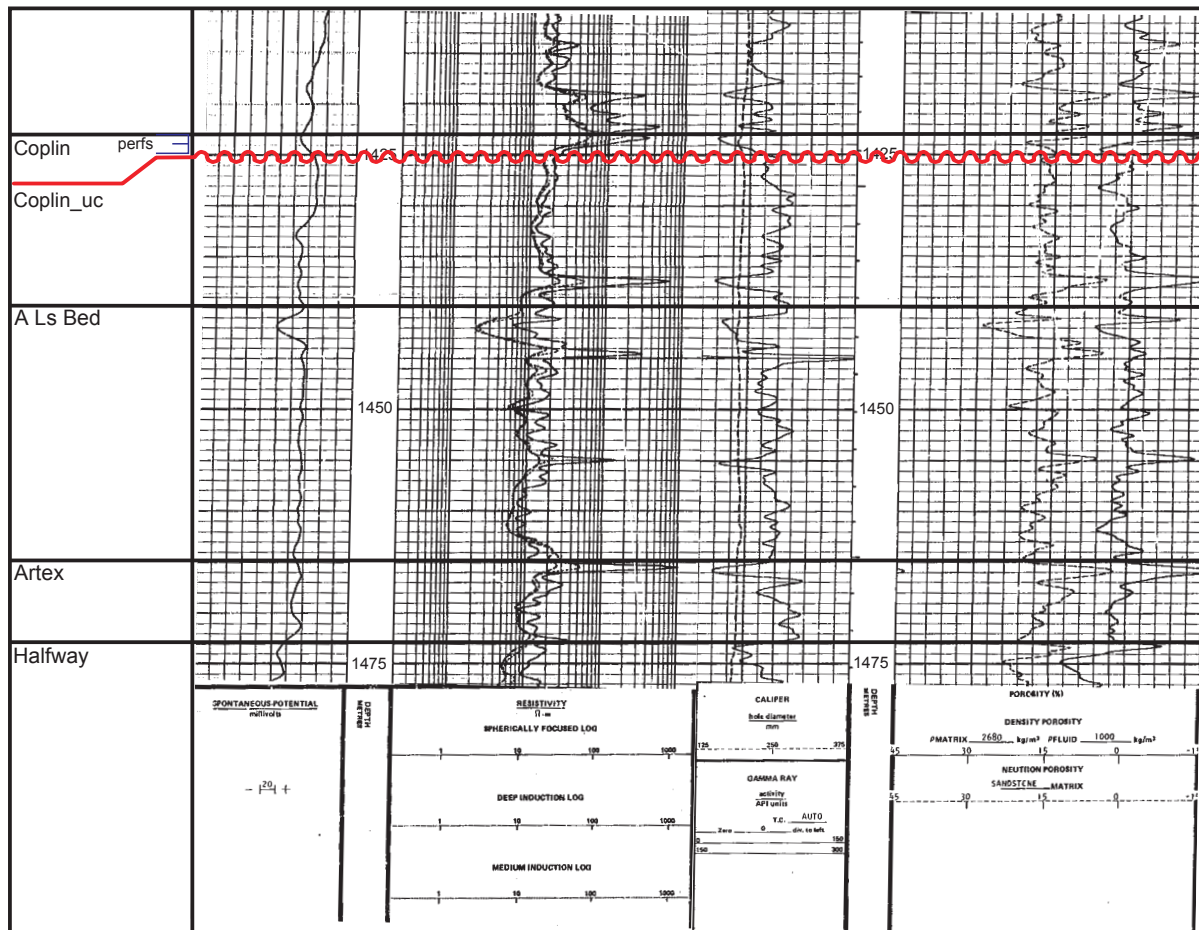
Remaining Original Oil in Place (%): 83.2

Cumulative Water Production: 4,300 barrels, 685 m³

Notes: This is a small pool of limited extent. Production graphs show a steady and steep decline.



The Coplin B pool is composed only of discovery well 6-8-87-13W6. Contour interval is one metre net Coplin B oil pay (mapping by Oil and Gas Commission).



Induction and neutron-density logs for 6-8-87-13W6M. The Coplin member is a thin sandstone of limited extent. Completion is between 1423 – 1425 metres.

A



1965/12/18

<=2052.5m=>



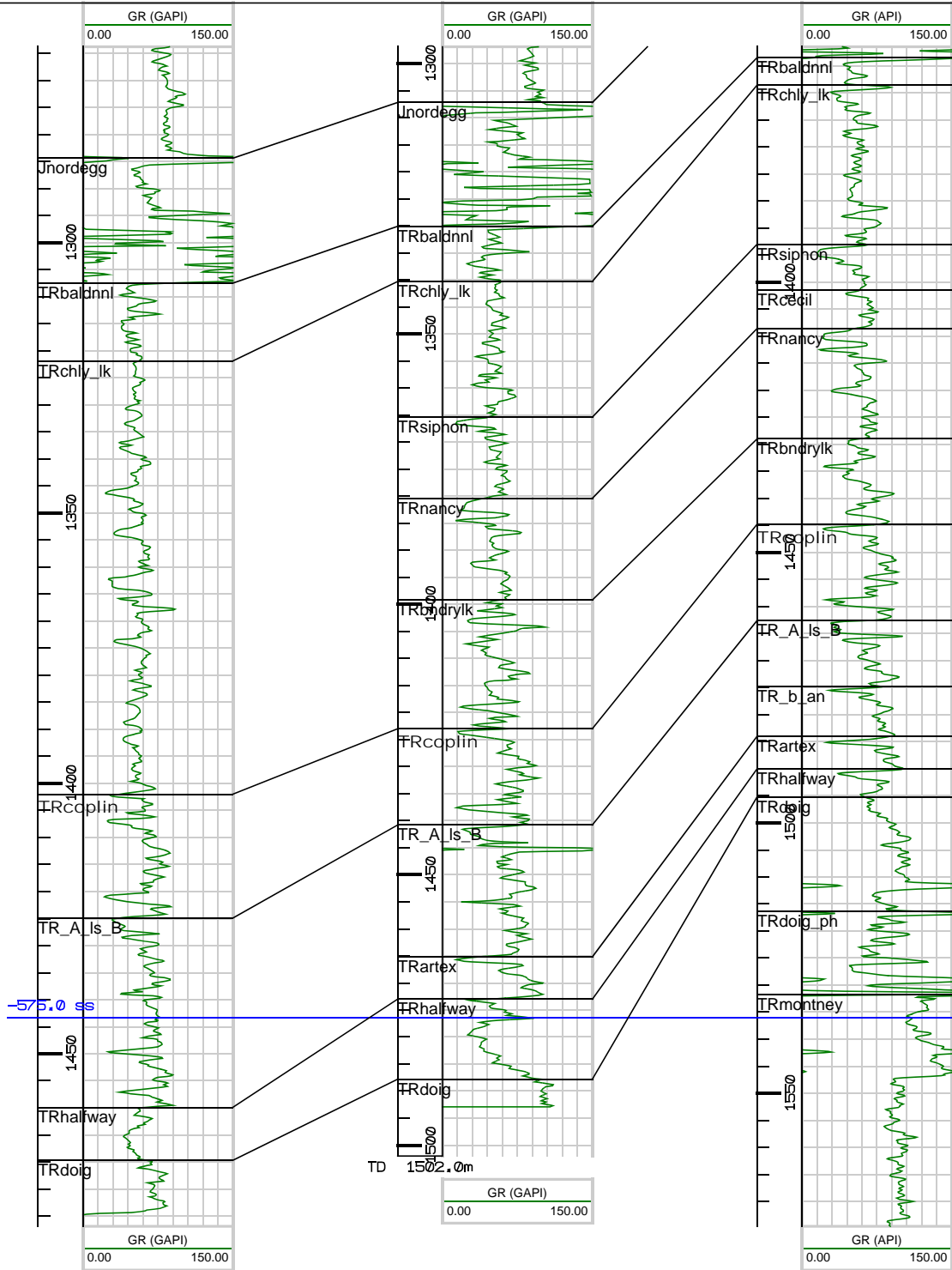
1980/02/02

<=1926.5m=>



2005/07/26

A'



Boundary Lake Coplin B

BOUNDARY LAKE OIL FIELD

Halfway K Pool

Pool Parameters

Field Code: 2000 **Pool Code:** 4800K
Discovery well original name: Kaiser et al Boundary 4-16-86-13W6 **WA#:** 14854
Rig Release: 2002/02/06
Other Oil and Gas Shows: Montney gas
Number of Wells (November 2012) Oil: 4 Active: 4 Horizontal: 1

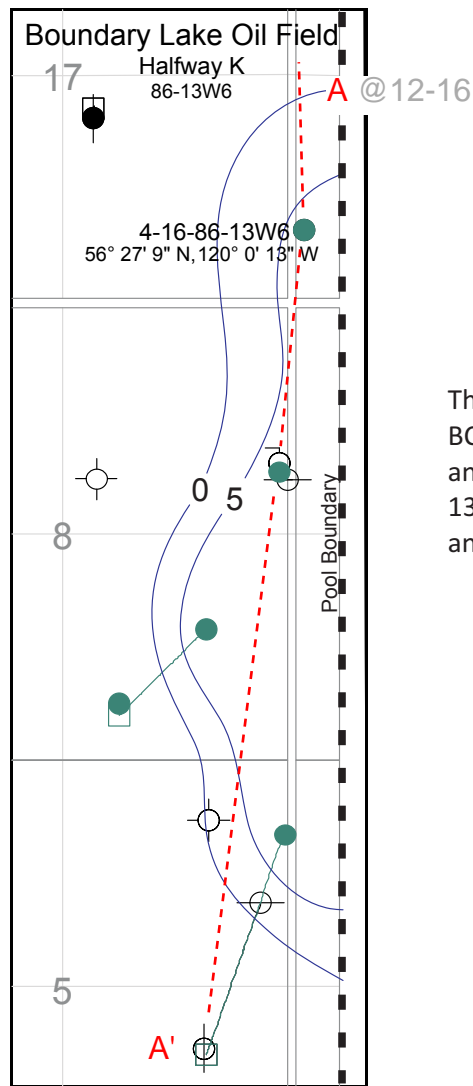
Reservoir Data

Area of Pool: 361 acres, 146 hectares
Average Depth of Producing Zone: 1357 metres
Lithology of Reservoir Rock: sandstone
Trap Type: Structural
Estimated Maximum Reservoir Thickness: 8 metres
Drive Mechanism: gas depletion
Average Porosity (%): 15
Average Net Pay: 5 metres
Average Permeability: not cored, no DSTs
Average Water Saturation (%): 38.7
Oil Formation Volume Factor (%): 124.7
Gravity (degrees API): 43.0
Original Pressure: 1600 psi, 11032 kPa

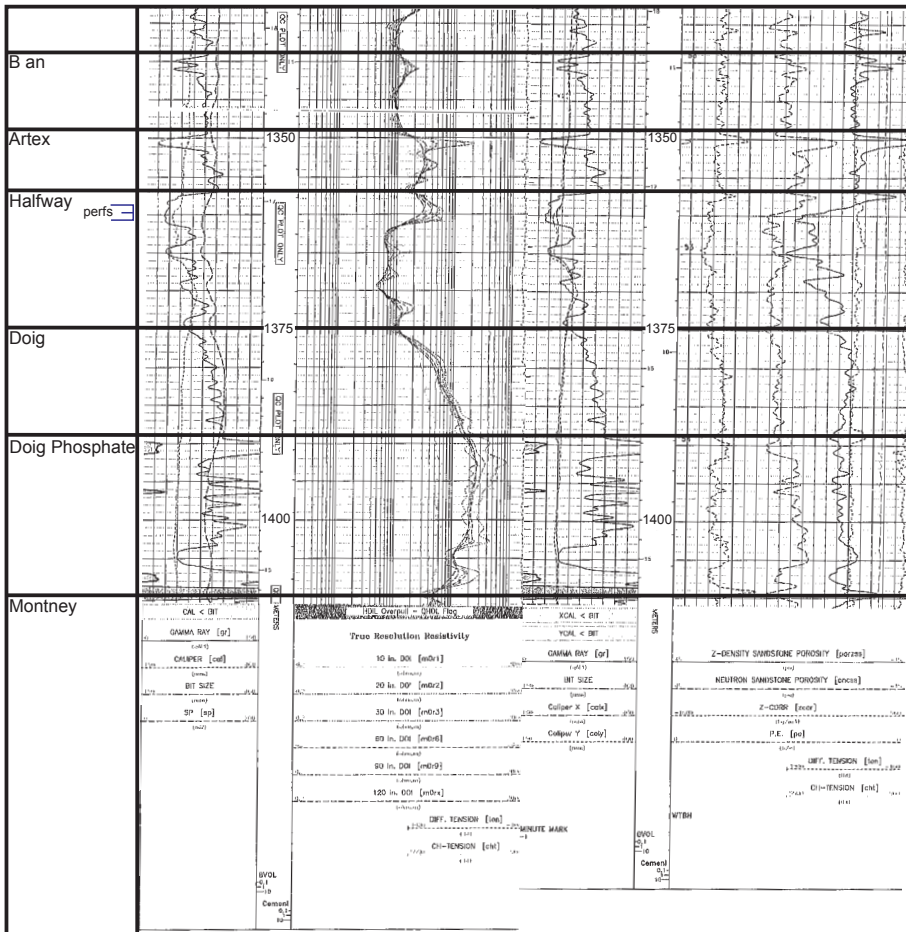
Reserves

Estimated original oil in place: 2,643,020 barrels, 420,207 m³
Recovery Factor (%): 15
Estimated Recoverable Oil: 396,450 barrels, 63,031 m³ (volumetric)
Cumulative Oil Production: 426,540 barrels
Remaining Recoverable Oil: 30,090 barrels
Remaining Original Oil in Place (%): 86
Cumulative Water Production: 62,100 barrels

Notes: Trapping for the pool is anticlinal.



The Boundary Lake Halfway K pool runs up against the BC/Alberta border. Contour interval, as mapped by the Oil and Gas Commission, is 5 metres. Discovery well 4-16-86-13W6 was drilled in 2002. The pool is centered on an anticline that continues into Alberta.



Induction and neutron-density logs for discovery well 4-16-86-13W6. The Halfway was perforated in the thin sand at the top of the Halfway from 1359-1361 metres.

100/12-16-086-13W6/00

100/04-16-086-13W6/00

100/09-08-086-13W6/00

100/08-05-086-13W6/02

A

A'

2005/07/21

2002/02/06

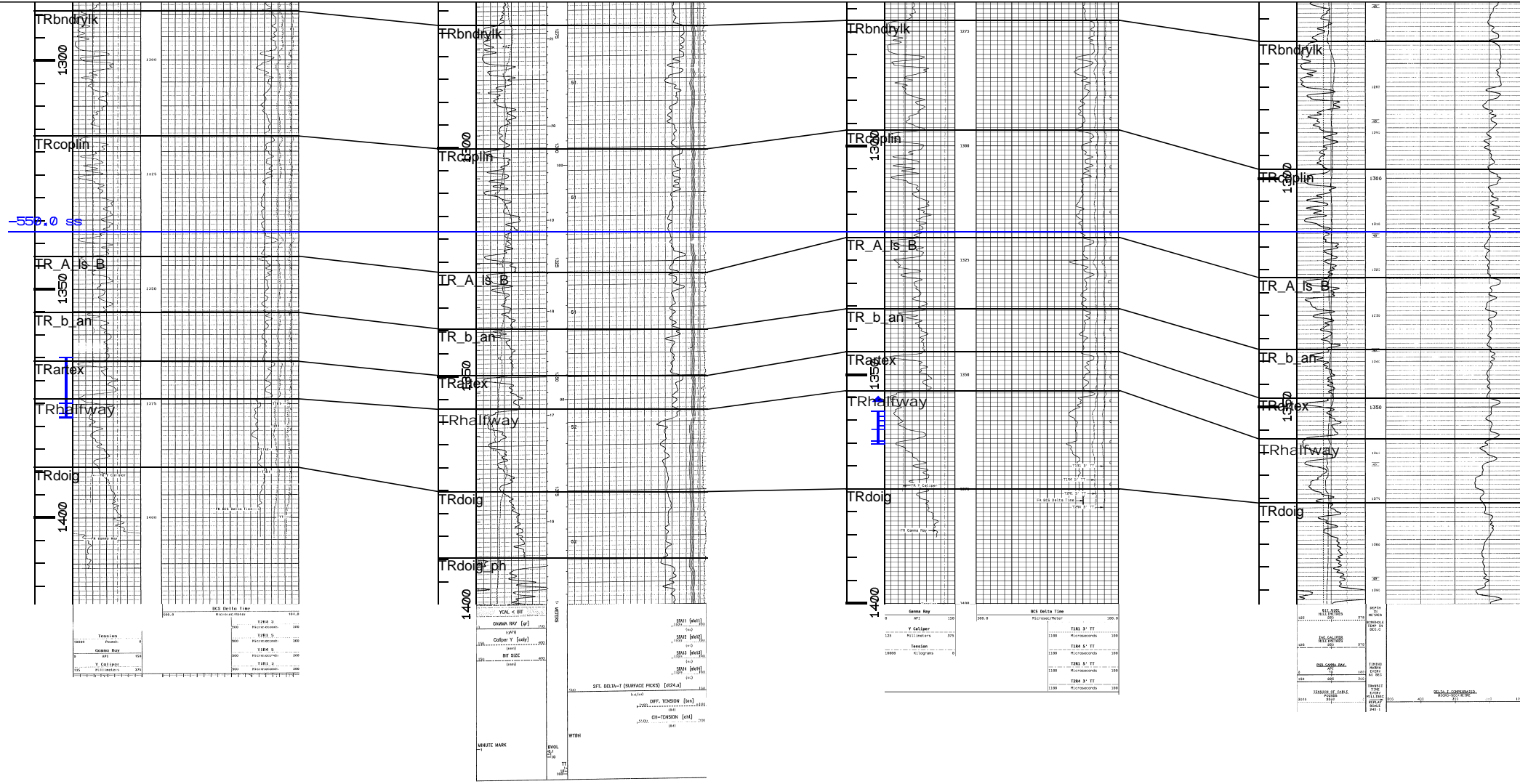
2007/02/25

1993/04/10

<=928.8m=>

<=866.2m=>

<=2091.8m=>



Boundary Lake Halfway K

MUSKRAT OIL FIELD

Boundary Lake A Pool

Pool Parameters

Field Code: 6230

Pool Code: 4535A

Discovery well original name: WAINOCO NEWPORT MUSKRAT 7-14-087-18W6 **WA#:** 09218

Rig Release: 1995/02/01

Other Oil and Gas Shows: Boundary lake gas, Halfway oil, Cadomin gas, Halfway gas

Number of Wells (October 2012) Oil: 12 Gas: 1 Injection: 2 Horizontal: 6 Active: 11

Reservoir Data

Area of Pool: 867 acres, 351 hectares

Average Depth of Producing Zone: 1277 metres

Lithology of Reservoir Rock: dolomite

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5.5 metres

Drive Mechanism: water flood

Average Porosity (%): 18

Average Net Pay: 2.5 metres

Average Permeability: 6 milliDarcies

Average Water Saturation (%): 20

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 38

Original Pressure: 1745 psi, 12031 kPa

Reserves

Estimated original oil in place: 6,308,910 barrels, 1,004,604 m³

Recovery Factor (%): 40

Estimated Recoverable Oil: 2,523,560 barrels, 401,841 m³ (volumetric)

Cumulative Oil Production: 1,923,070 barrels

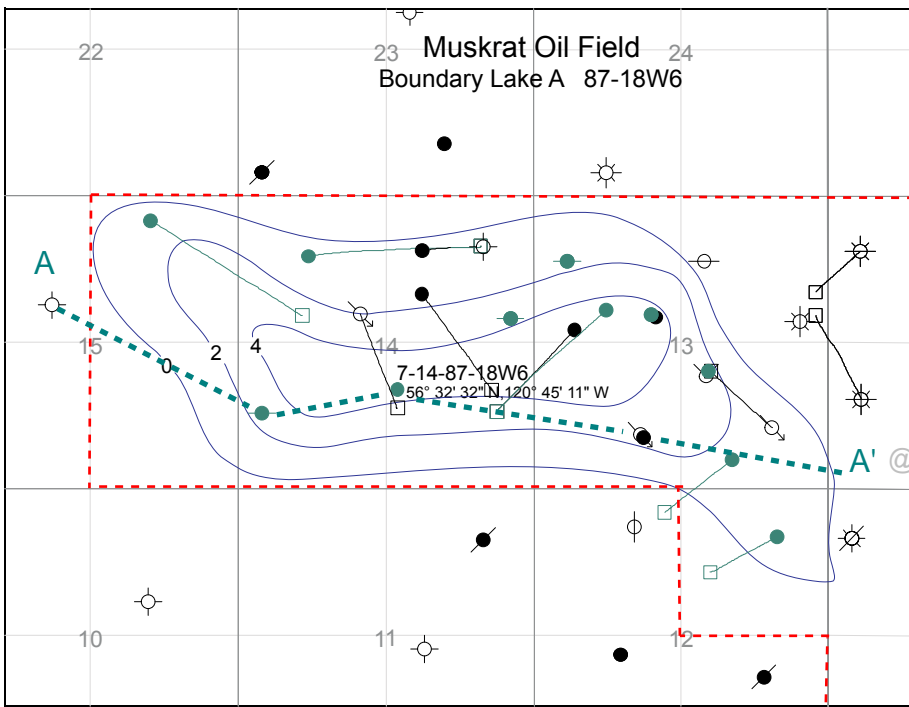
Remaining Recoverable Oil: 600,500 barrels

Remaining Original Oil in Place (%): 70

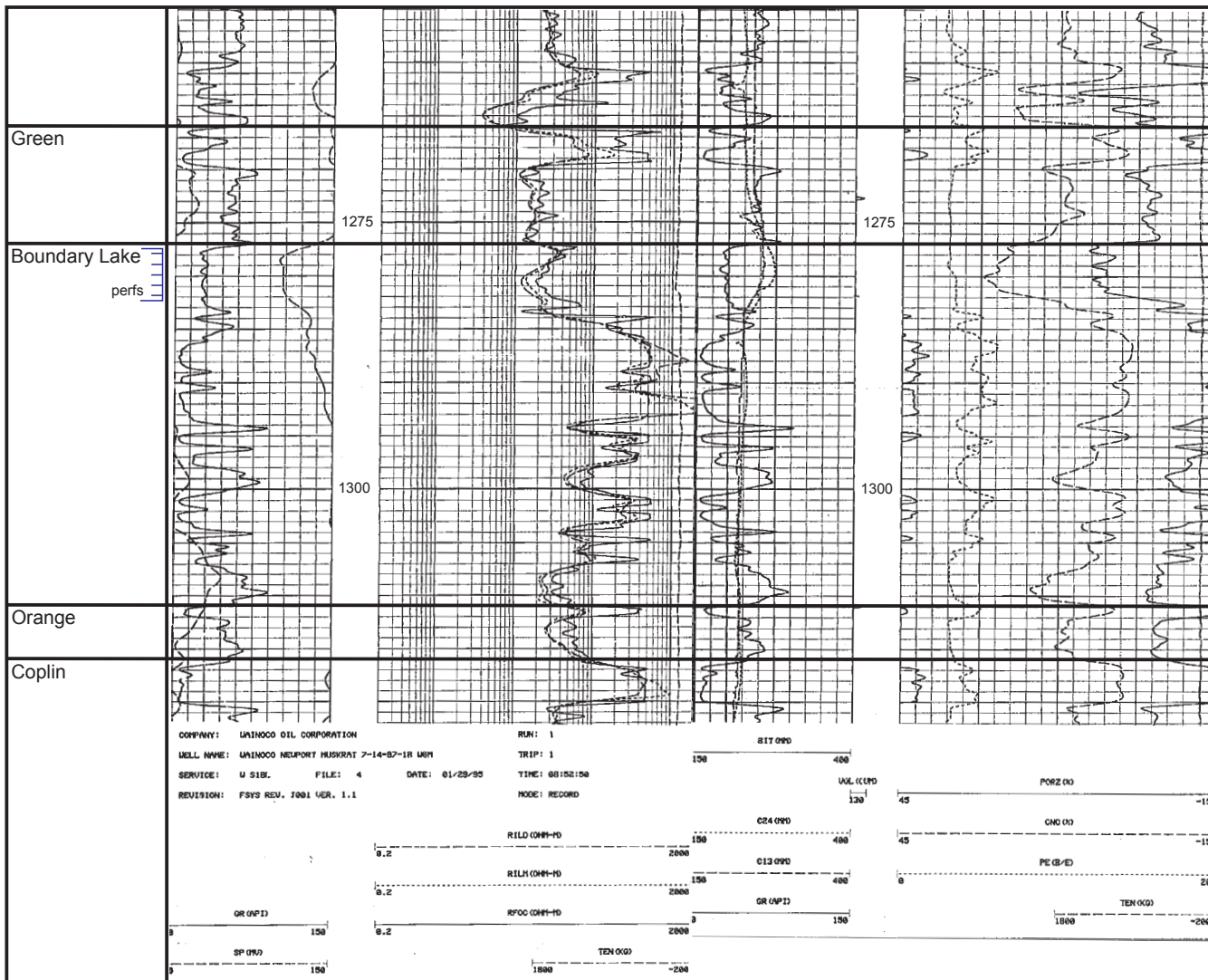
Cumulative Water Production: 148,920 barrels

Cumulative Water Injection: 1,826,780 barrels

Notes: Six of the wells are horizontal. Oil was recovered on a DST of the Boundary lake.



Contour interval is two metres net Boundary Lake A oil pay (Oil and Gas Commission).
Discovery well is 7-14-87-18W6. The field is largely drained by horizontal wells.



Induction and neutron-density logs for discovery well 7-14-87-18W6M. Good porosity and high resistivity across the productive interval. Oil recovery on the DST confirms the presence of oil.

100/11-15-087-18W6/00

100/05-14-087-18W6/00

100/07-14-087-18W6/00

100/03-13-087-18W6/00

100/15-07-087-17W6/00



<=1305.0m=>



<=759.4m=>



<=1390.7m=>



<=2177.1m=>



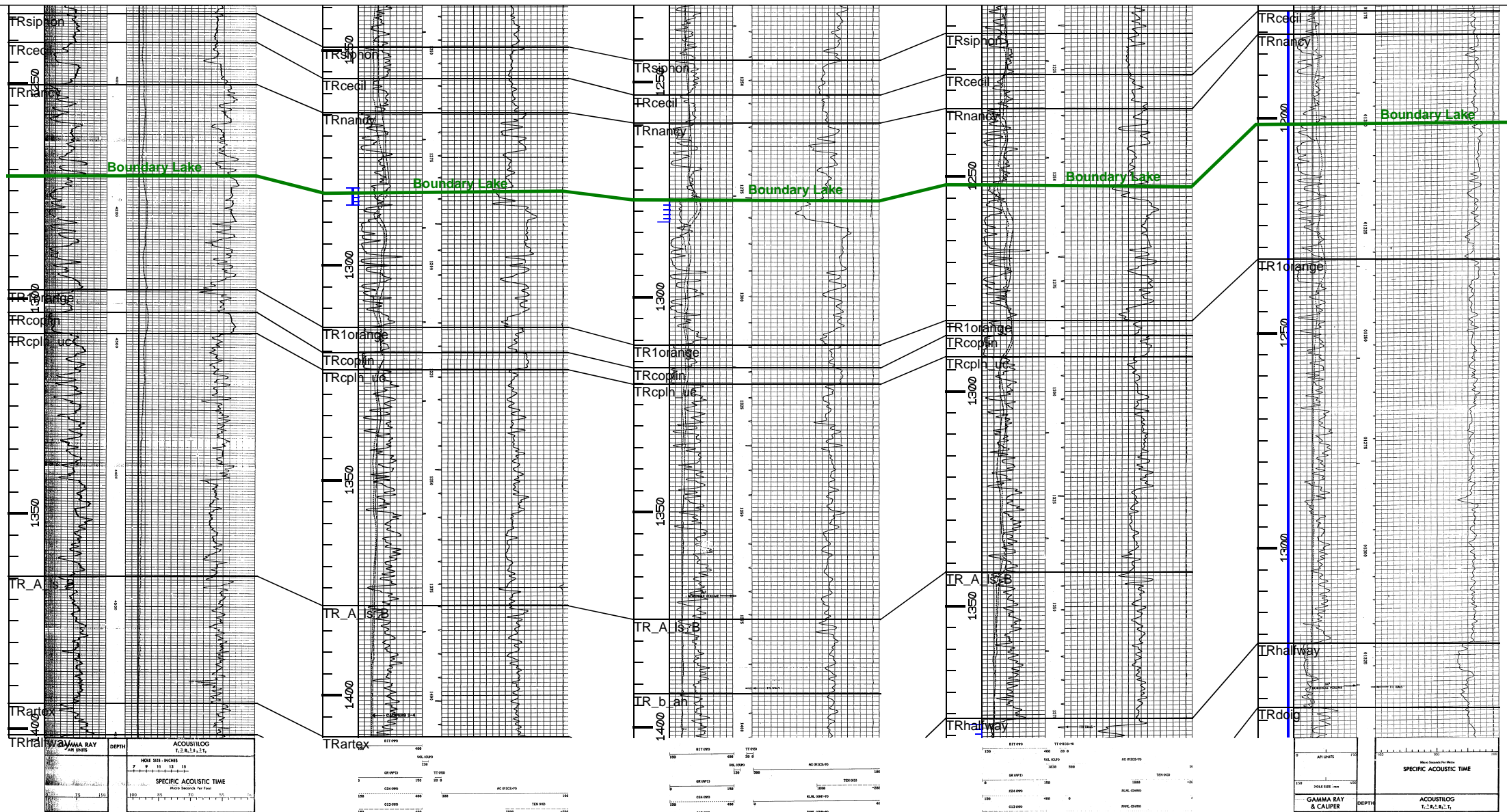
1974/08/17

1995/07/26

1995/02/01

1995/04/04

1984/12/20



Muskrat Boundary Lake A

MUSKRAT OIL FIELD

Halfway D Pool

Pool Parameters

Field Code: 6230

Pool Code: 4800D

Discovery well original name: Wainoco Newport Muskrat 3-13-087-18W6

WA#: 09358

Rig Release: 1995/04/04

Other Oil and Gas Shows: Boundary Lake gas, Boundary Lake oil, Cadomin gas, Halfway gas

Number of Wells (October 2012) Oil: 2

Active: 1

Reservoir Data

Area of Pool: 161 acres, 65 hectares

Average Depth of Producing Zone: 1376 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4 metres

Drive Mechanism: gas depletion

Average Porosity (%): 15

Average Net Pay: 3.8 metres

Average Permeability: 83 milliDarcies

Average Water Saturation (%): 21

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 37

Original Pressure: 1767 psi, 12183 kPa

Reserves

Estimated original oil in place: 1,509,310 barrels, 239,961 m³

Recovery Factor (%): 9

Estimated Recoverable Oil: 135,840 barrels, 21,597 m³ (production decline)

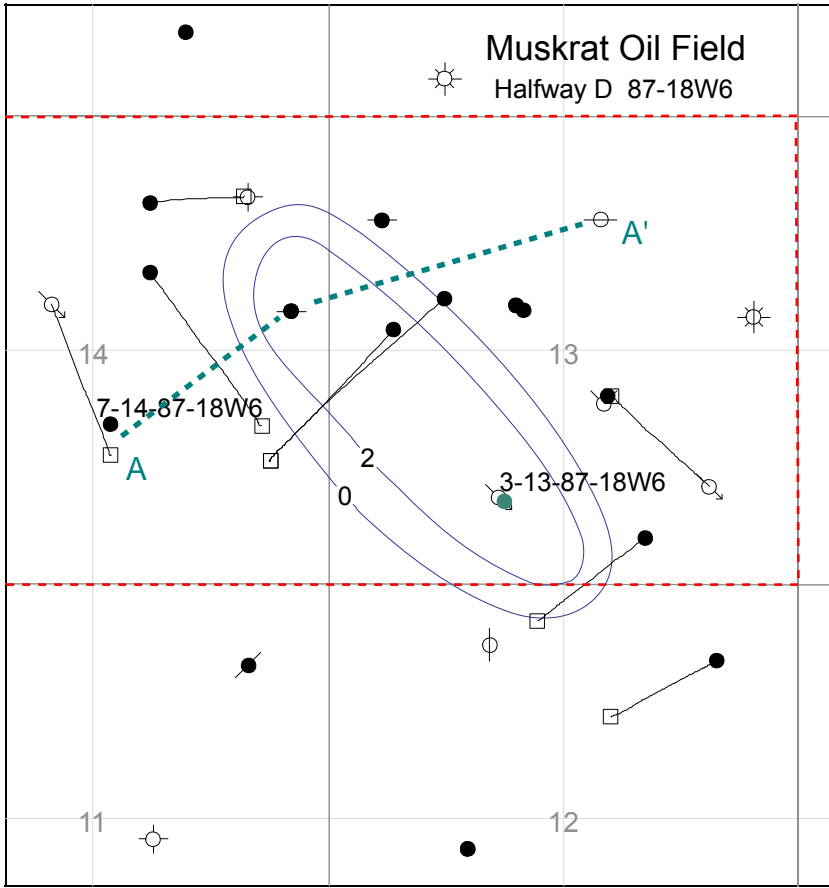
Cumulative Oil Production: 126,600 barrels

Remaining Recoverable Oil: 9,230 barrels

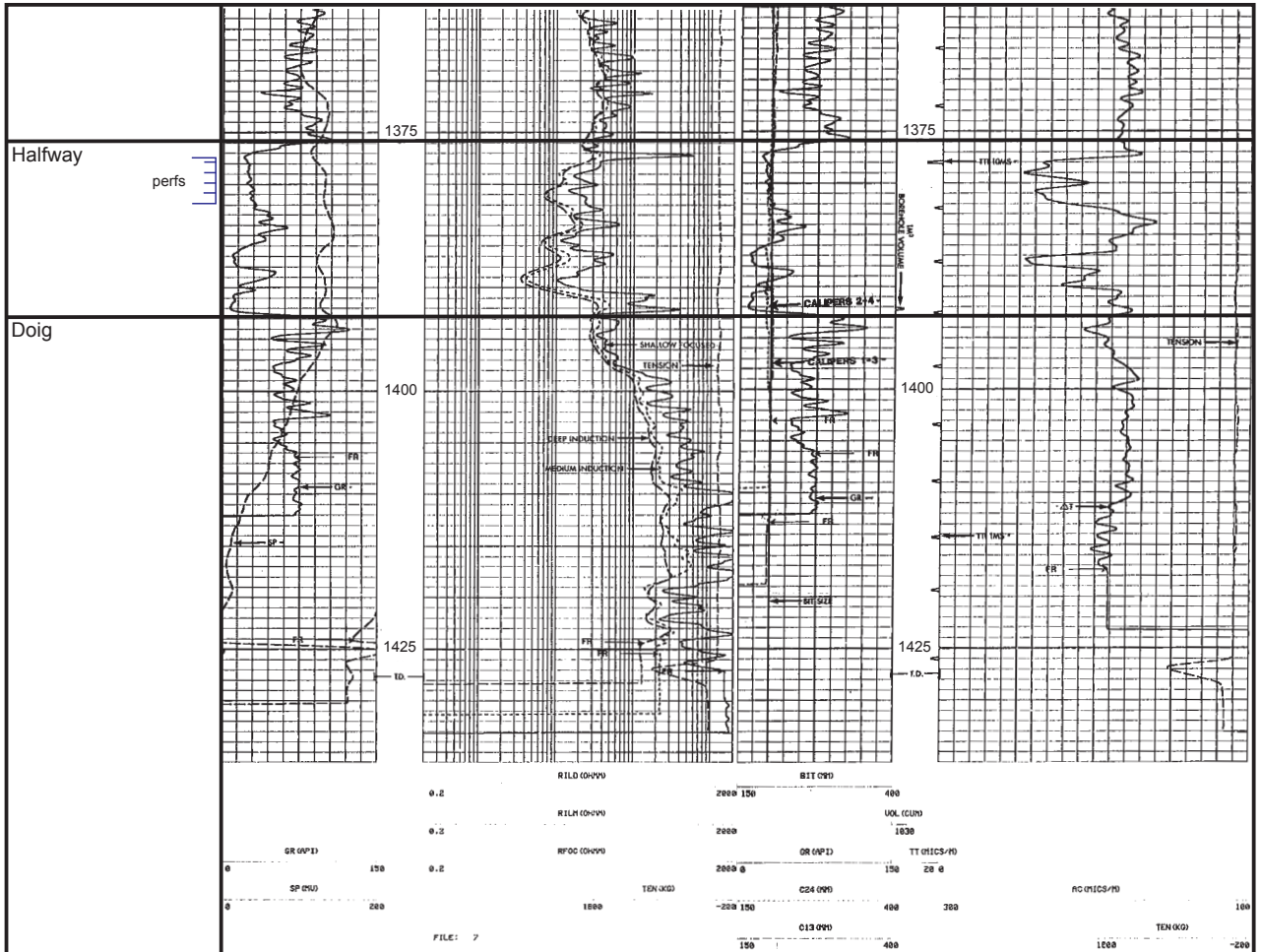
Remaining Original Oil in Place (%): 92

Cumulative Water Production: 135,130 barrels

Notes: The Halfway here is completed in an upper sand. Stratigraphically lower Halfway sands are completed in other wells in this field, and are in different pools.



Contour interval is two metres net Halfway D oil pay (oil and Gas Commission). Discovery well is 3-13; 7-14 is in the Muskrat Boundary Lake A oil pool.



Resistivity and neutron-density logs for discovery well 3-13-87-18W6. The completion interval is relatively thick, porous and perhaps appropriate for horizontal drilling. The lower portion of the Halfway is completed in other wells in Muskrat Field.

100/07-14-087-18W6/00

100/09-14-087-18W6/00

100/15-13-087-18W6/00

A

A'

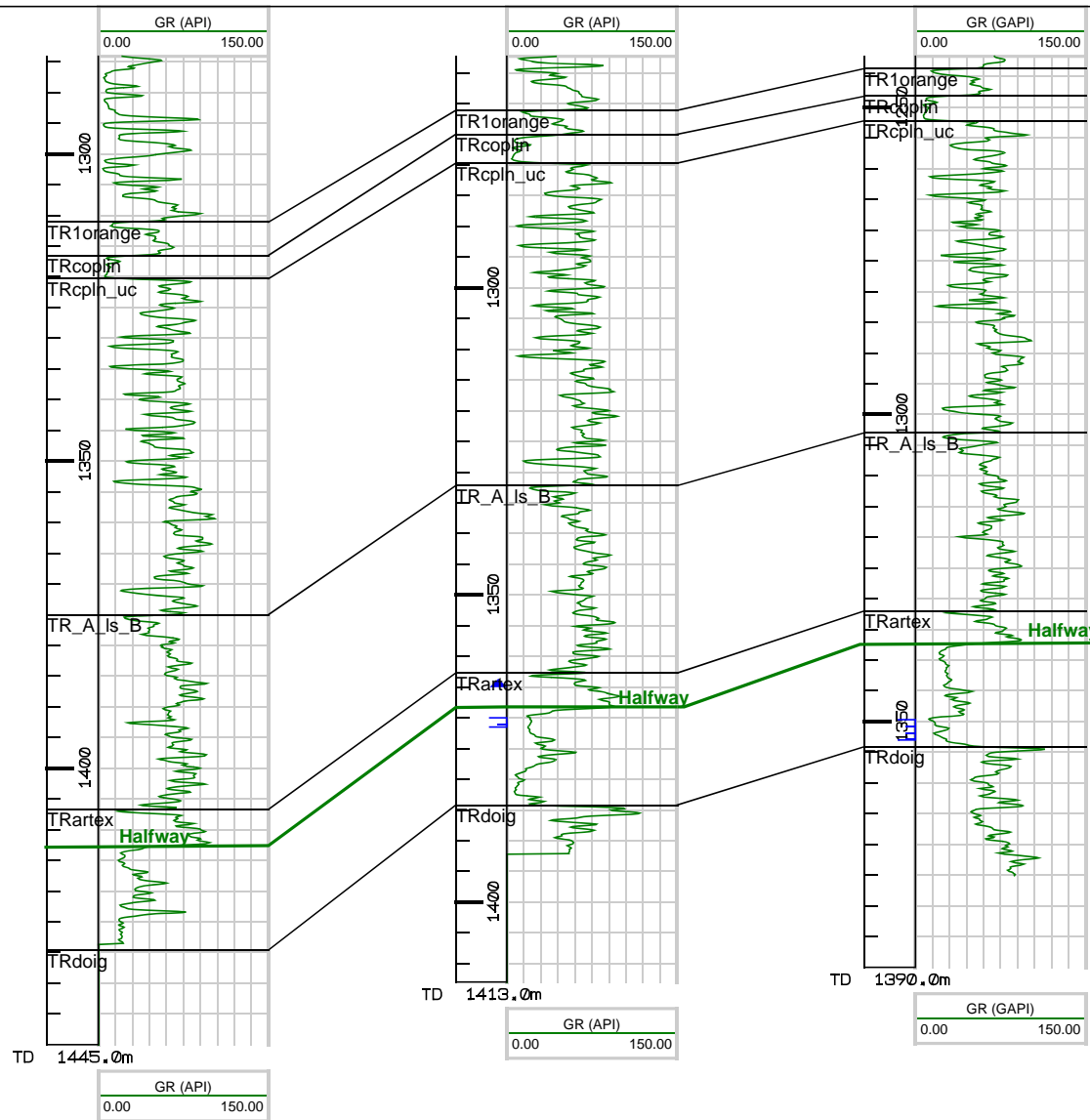
<=739.7m=>

<=1116.0m=>

1995/02/01

1996/06/22

1998/07/23



1:1200

Muskrat Halfway D

MUSKRAT OIL FIELD

Lower Halfway A Pool

Pool Parameters

Field Code: 6230

Pool Code: 4805A

Discovery well original name: Wainoco Newport Muskrat 11-13-87-18W6

WA#: 09421

Rig Release: 1995/08/10

Other Oil and Gas Shows: Boundary Lake gas, Boundary Lake oil, Cadomin gas, Halfway gas

Number of Wells (October 2012) Oil: 2 **Active:** 3 **Injection:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1369 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6 metres

Drive Mechanism: water flood

Average Porosity (%): 16

Average Net Pay: 2.8 metres

Average Permeability: high permeability indicated on DST

Average Water Saturation (%): 25

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 40

Original Pressure: 1775 psi, 12,238 kPa

Reserves

Estimated original oil in place: 2,923,040 barrels, 464,726 m³

Recovery Factor (%): 25

Estimated Recoverable Oil: 730,760 barrels, 116,182 m³ (production decline)

Cumulative Oil Production: 671,010 barrels

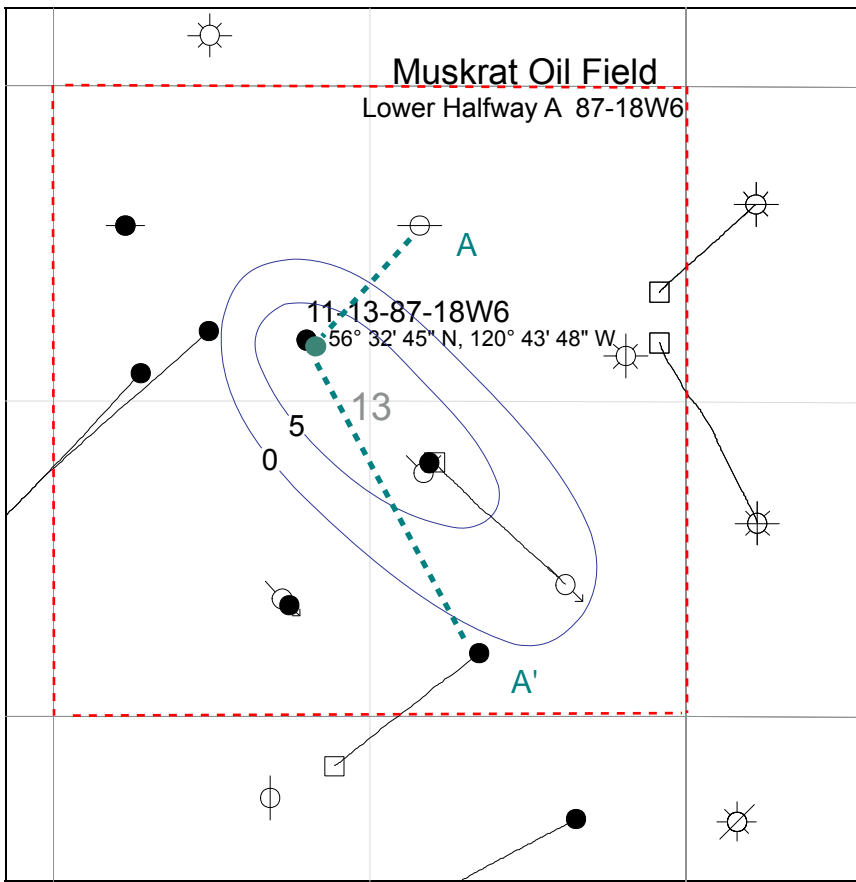
Remaining Recoverable Oil: 59,750 barrels

Remaining Original Oil in Place (%): 77

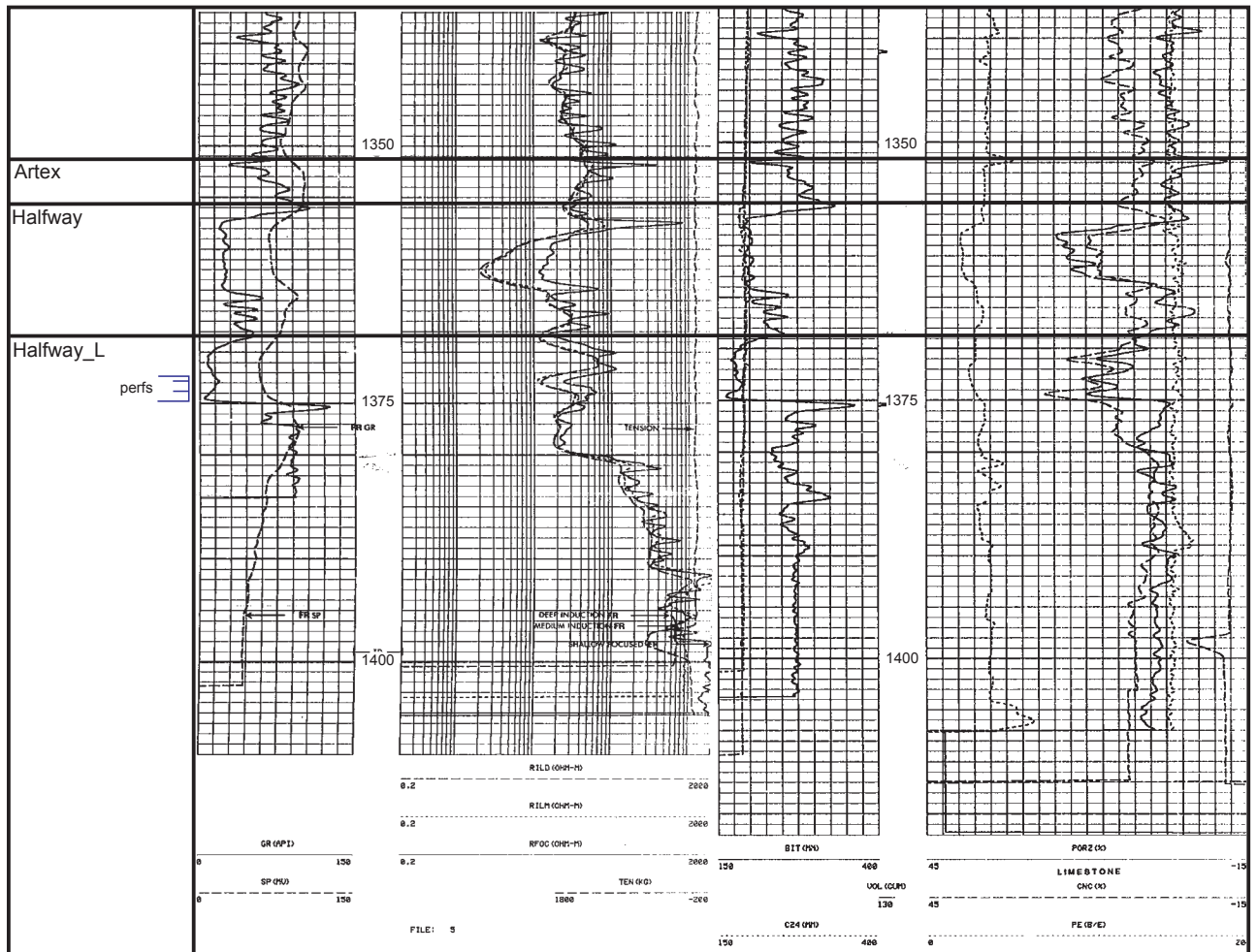
Cumulative Water Production: 81,510 barrels

Cumulative Water Injection: 307,330 barrels

Notes: The scout ticket for the discovery well reports the completion interval at 1369-1375 metres as Doig Formation and not Lower Halfway. Halfway porosity development in the Montney region appears to be preferentially developed where structural elevation is relatively high.



Contour interval is five metres net Lower Halfway A oil pay. Discovery well is 11-13-87-18W6. Locations 7-14 is in the Muskrat Boundary lake A oil pool and 3-13 is in the Muskrat Halfway D oil pool.



Resistivity and neutron-density logs for discovery well 11-13-87-18W6. The Lower Halfway may also be known as Doig Formation. Porosity and permeability are very good.

A

100/15-13-087-18W6/00

+662.0 11468



<<409.0m>>

100/11-13-087-18W6/00

+680.2 09421



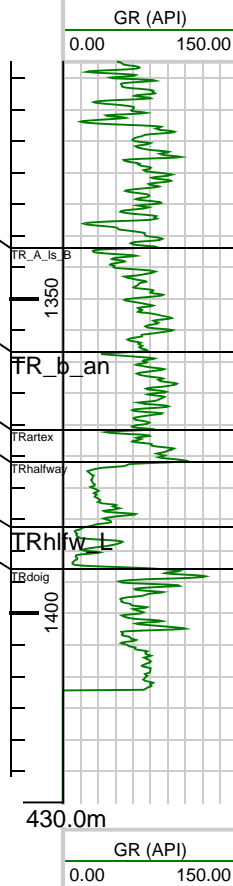
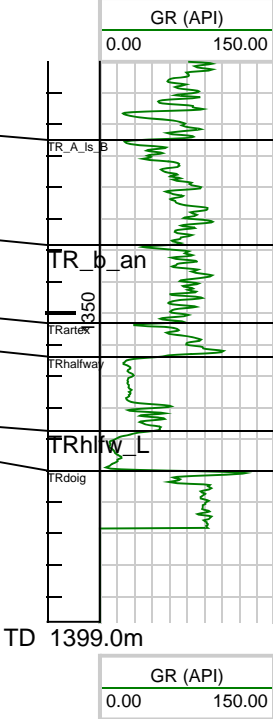
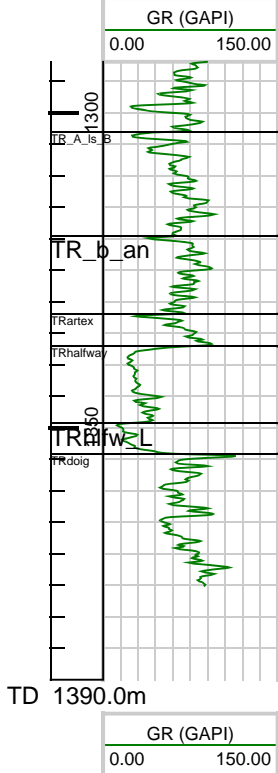
<<670.7m>>

100/03-13-087-18W6/00

+682.5 09358



A'



Muskrat Lower Halfway A

1:1200

HALFWAY OIL FIELD

Blueberry A Pool

Pool Parameters

Field Code: 4600

Pool Code: 4560A

Discovery well original name: West Nat et al Halfway 14-11-87-25W6 **WA#:** 01986

Rig Release: 1966/11/05

Other Oil and Gas Shows: Blueberry gas, Halfway gas, Bluesky gas, Baldonnel gas, Coplin gas, Inga oil

Number of Wells (October 2012) Oil: 2 **Active:** 2

Reservoir Data

Area of Pool: 163 acres, 66 hectares

Average Depth of Producing Zone: 4550 feet, 1387 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural

Estimated Maximum Reservoir Thickness: 1.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 15

Average Net Pay: 1.5

Average Permeability: no core or DST; microlog indicates permeability near top of Blueberry

Average Water Saturation (%): 24

Oil Formation Volume Factor (%): 132.4

Gravity (degrees API): 42.3

Original Pressure: 2035 psi, 14,031 kPa

Reserves

Estimated original oil in place: 535,000 barrels, 85,058 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 53,500 barrels, 8,506 m³ (volumetric)

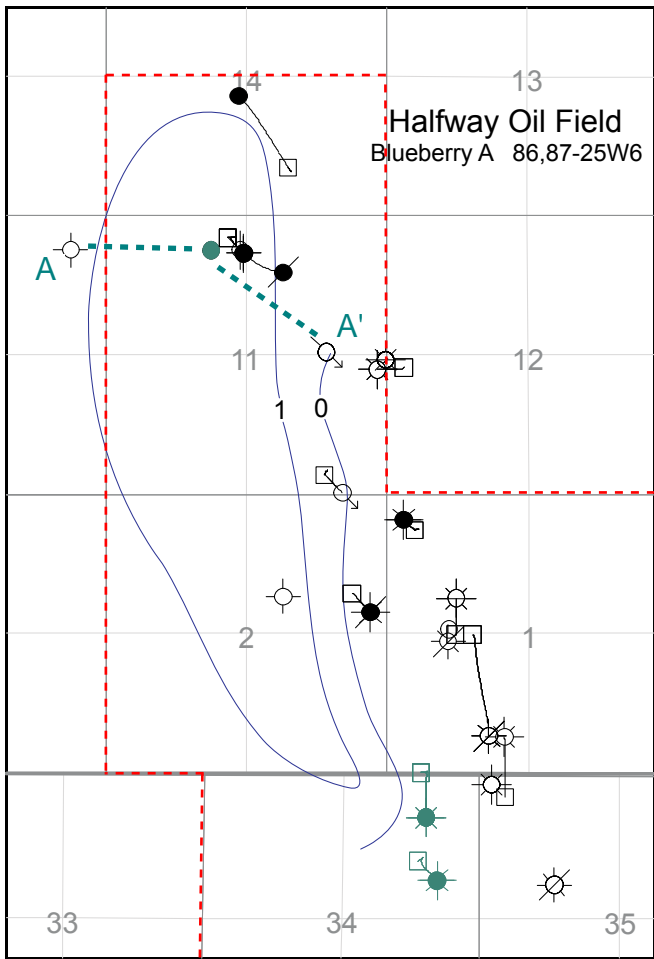
Cumulative Oil Production: 49,200 barrels

Remaining Recoverable Oil: 4,300 barrels

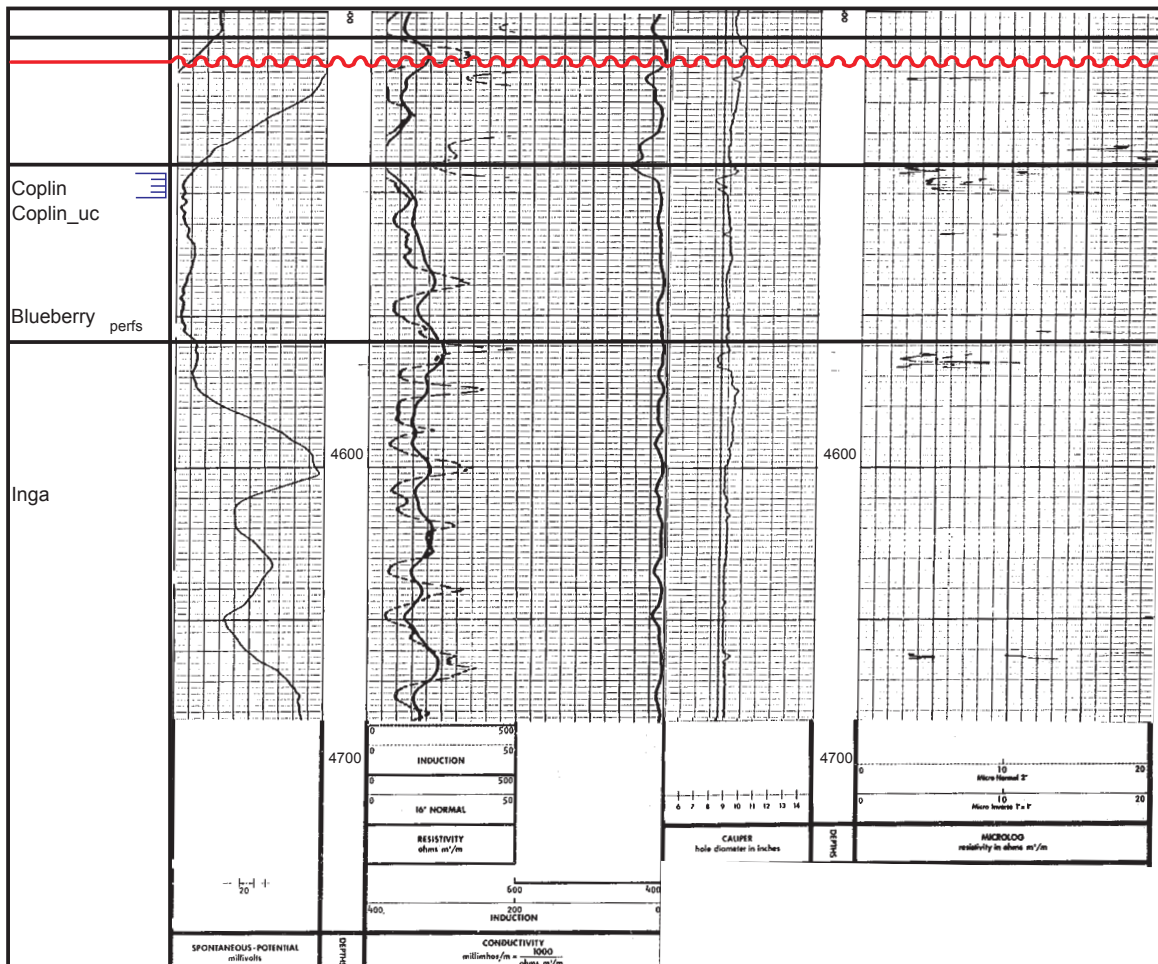
Remaining Original Oil in Place (%): 91

Cumulative Water Production: 169,690 barrels

Notes: This pool has a high water cut. Location 4-1-87-25W6 has been left outside of the pool according to OGC mapping, but it would appear to be the only well draining the southern end of the pool. Trapping is anticlinal (Podruski et al, 1988).



Contour interval is one metre net Blueberry A oil pay (adapted from Oil and Gas Commission mapping). Location 4-1-87-25W6 is in the Blueberry A Pool, but has been mapped outside of the zero contour. Trapping is anticlinal.



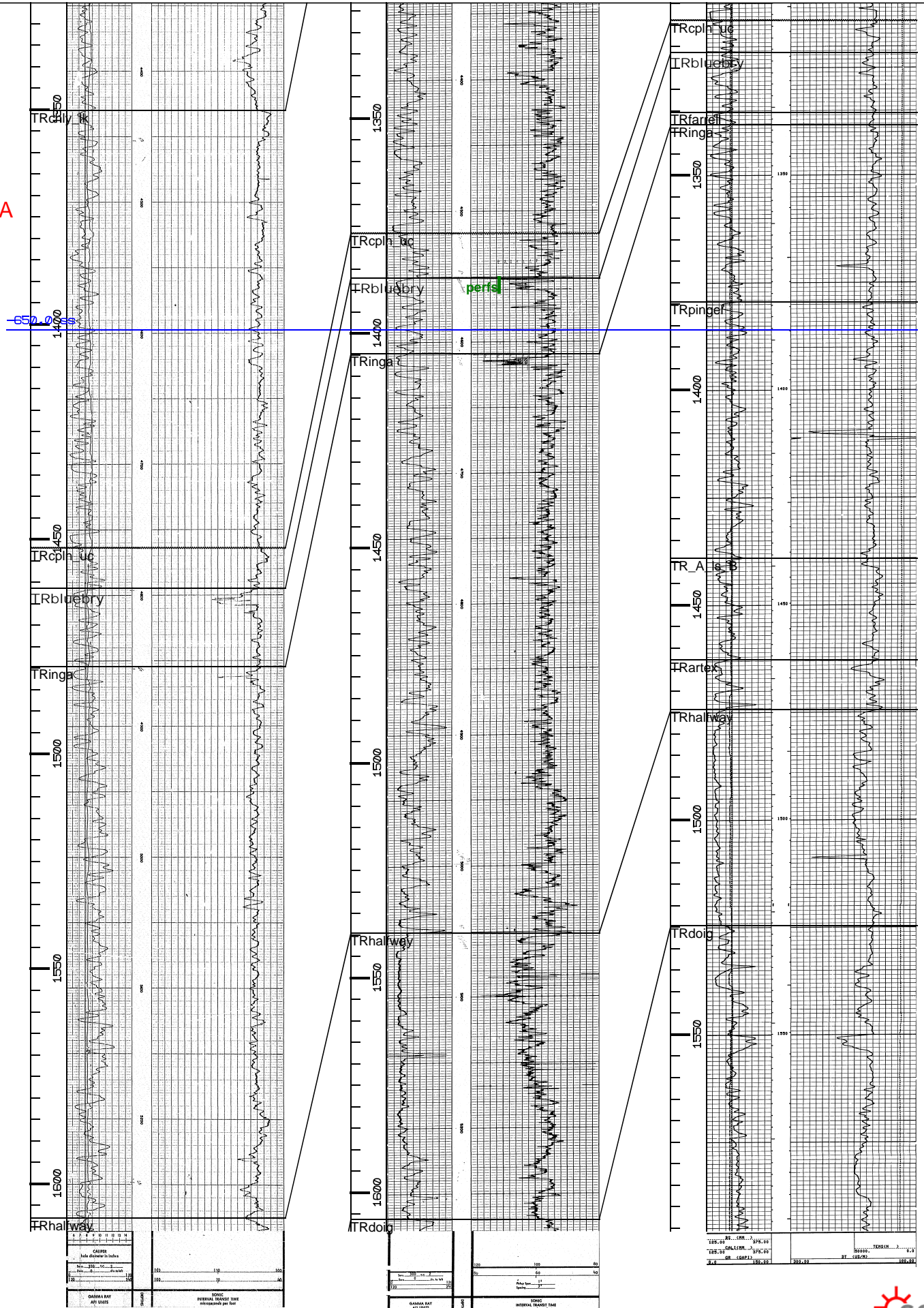


1968/06/23

1966/11/05

1989/01/14

Halfway
Blueberry A



1:1200

<p>CAUTION Hole diameter 5 inches</p> <p>Scale: 1:1200</p> <p>DATE: 1968/06/23</p> <p>WELL: 100/16-10-087-25W6/00</p> <p>DEPTH: 1350 - 1600</p> <p>UNIT: METERS</p>	<p>CAUTION Hole diameter 5 inches</p> <p>Scale: 1:1200</p> <p>DATE: 1966/11/05</p> <p>WELL: 100/14-11-087-25W6/00</p> <p>DEPTH: 1350 - 1600</p> <p>UNIT: METERS</p>	<p>CAUTION Hole diameter 5 inches</p> <p>Scale: 1:1200</p> <p>DATE: 1989/01/14</p> <p>WELL: 100/09-11-087-25W6/00</p> <p>DEPTH: 1350 - 1600</p> <p>UNIT: METERS</p>
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STODDART OIL FIELD

Belloy C Pool

Pool Parameters

Field Code: 8000

Pool Code: 6200C

Discovery well original name: Unotex Stoddart 10-31-85-19W6M **WA#:** 01519

Rig Release: 1964/11/08

Other Oil and Gas Shows: Belloy gas, Golata gas

Number of Wells (November 2012) Oil: 6 Active: 2

Reservoir Data

Area of Pool: 1473 acres, 596 hectares

Average Depth of Producing Zone: 6371 feet, 1942 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 8 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 3.4 metres

Average Permeability: 7 milliDarcies

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 131

Gravity (degrees API): 39

Original Pressure: 2444 psi, 16851 kPa

Reserves

Estimated original oil in place: 7,359,820 barrels, 1,170,118 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 1,103,970 barrels, 175,517 m³ (volumetric)

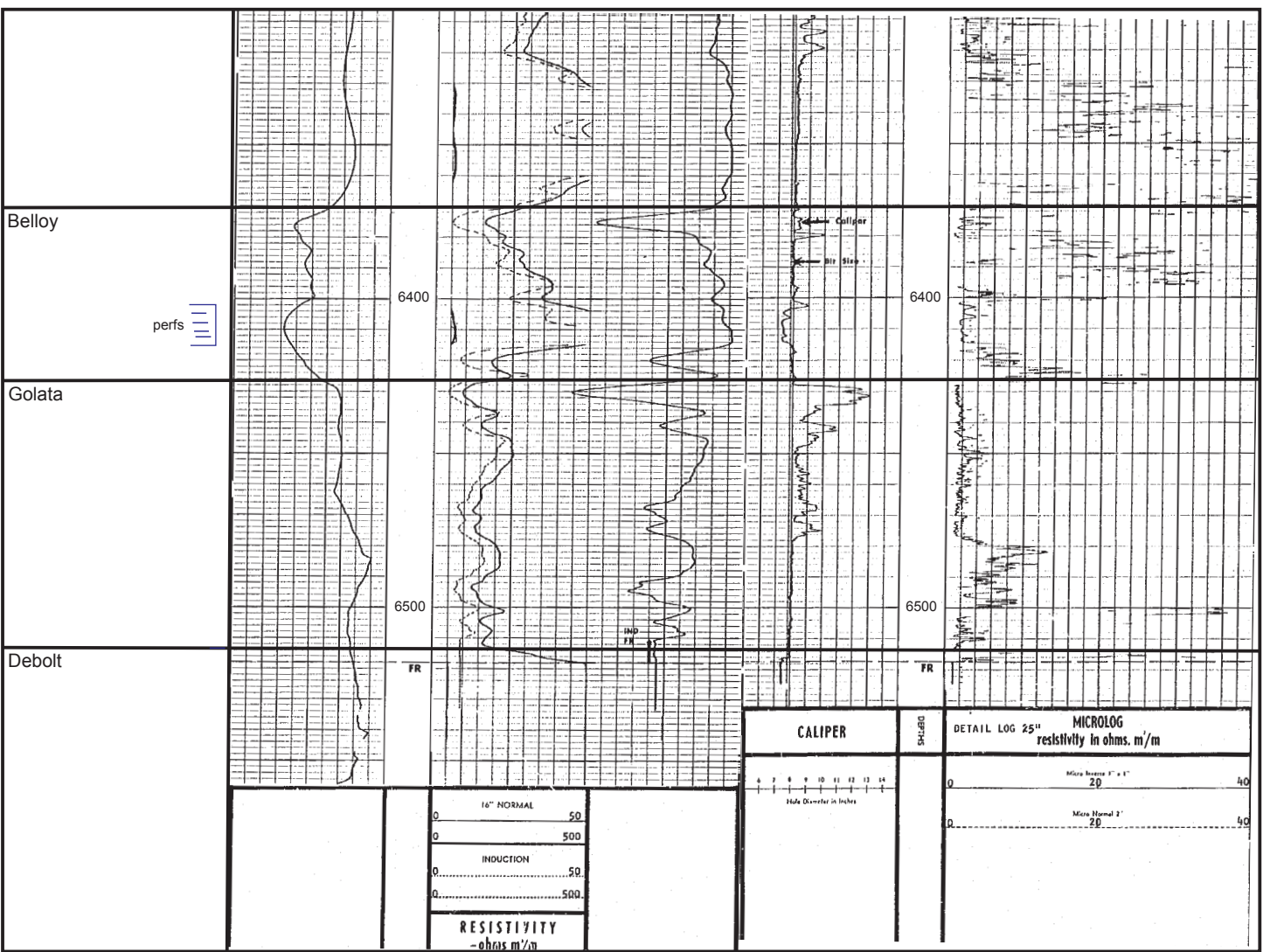
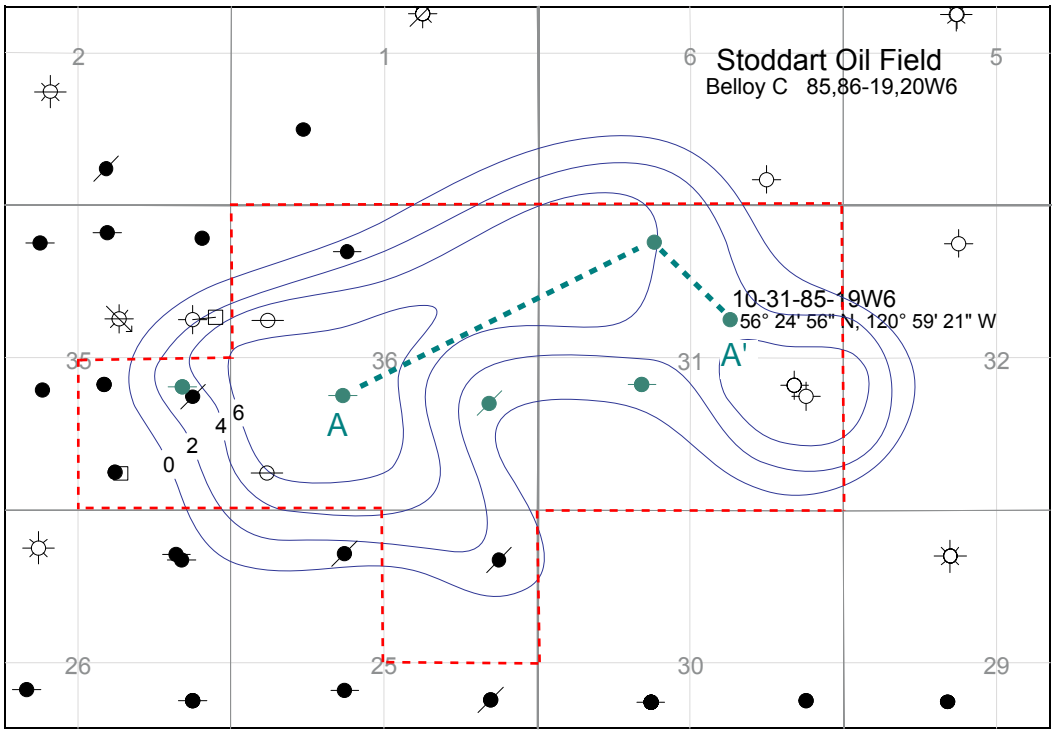
Cumulative Oil Production: 1,054,810 barrels

Remaining Recoverable Oil: 49,160 barrels

Remaining Original Oil in Place (%): 86

Cumulative Water Production: 8,680 barrels

Notes: Podruski et al (1988, page 61) argues for structural controls on porosity distribution and trapping. Other interpretations emphasize facies, erosional truncation, or other stratigraphic controls for pool configuration.



Elog and microlog for discovery well 10-31-85-19W6. Completion is in the most resistive part of the Belloy. The microlog provides an ambiguous indication of permeability.

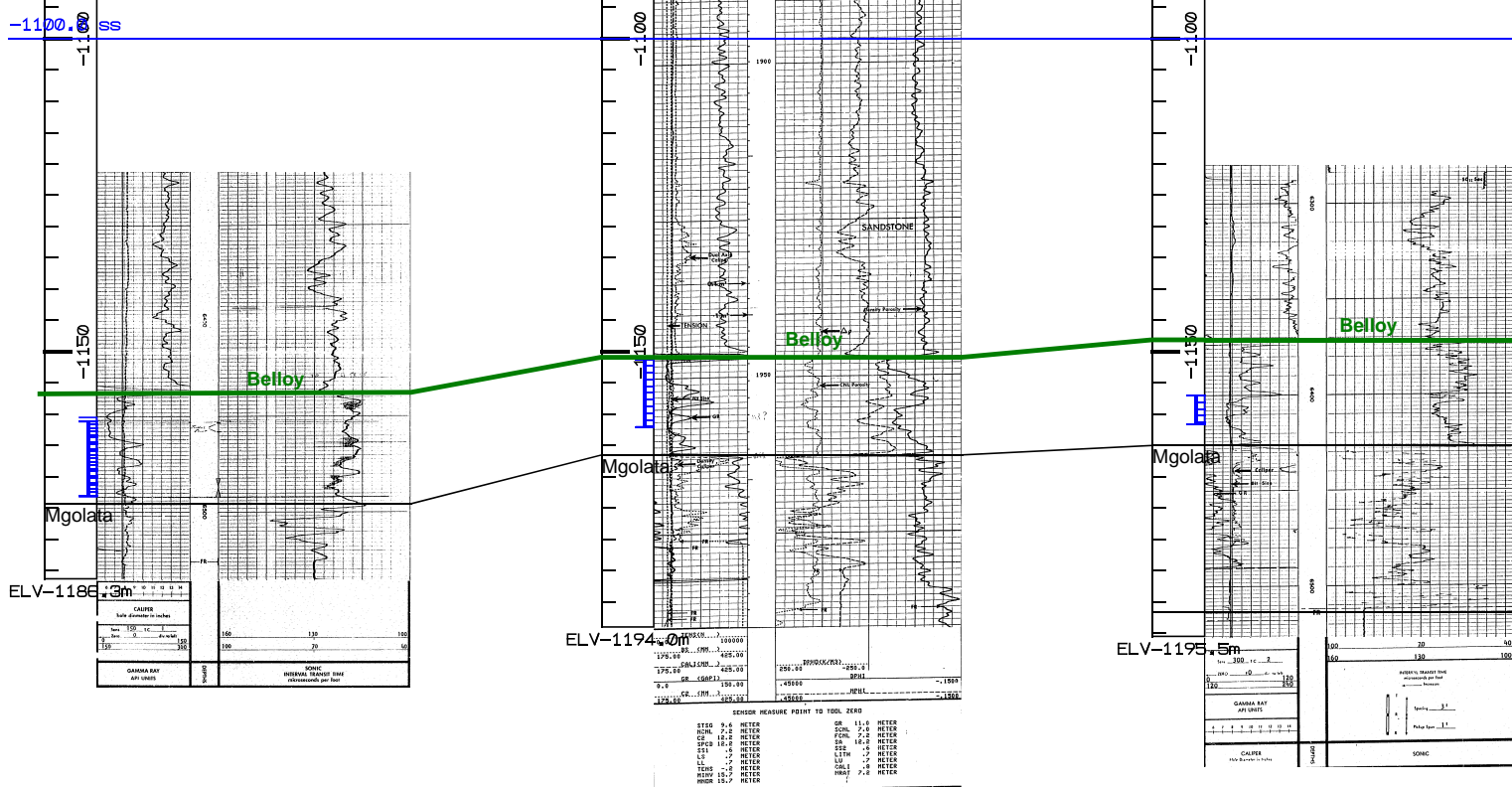
1970/08/21

1986/02/04

1964/11/08

<=1837.8m=>

<=574.3m=>



Stoddart Belloy C

STODDART OIL FIELD

North Pine F Pool

Pool Parameters

Field Code: 8000 **Pool Code:** 4580F
Discovery well original name: PC ARKOMA STODDART 14-1-86-19W6 **WA#:** 08410
Rig Release: 1994/07/22
Other Oil and Gas Shows: Belloy gas
Number of Wells (November 2012) Oil: 7 **Active:** 5

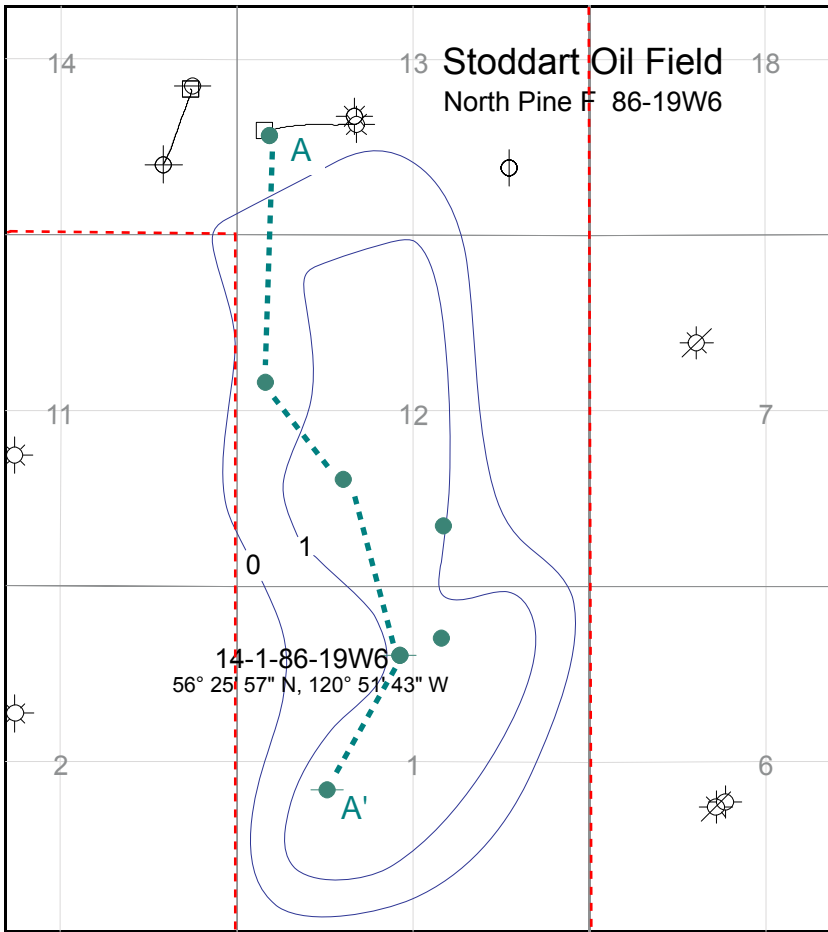
Reservoir Data

Area of Pool: 161 acres, 65 hectares
Average Depth of Producing Zone: 1383 metres
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic
Estimated Maximum Reservoir Thickness: 2 metres
Drive Mechanism: gas depletion
Average Porosity (%): 11
Average Net Pay: 1.5 metres
Average Permeability: no core or DST
Average Water Saturation (%): 20
Oil Formation Volume Factor (%): 124
Gravity (degrees API): 40
Original Pressure: 1667 psi, 11,494 kPa

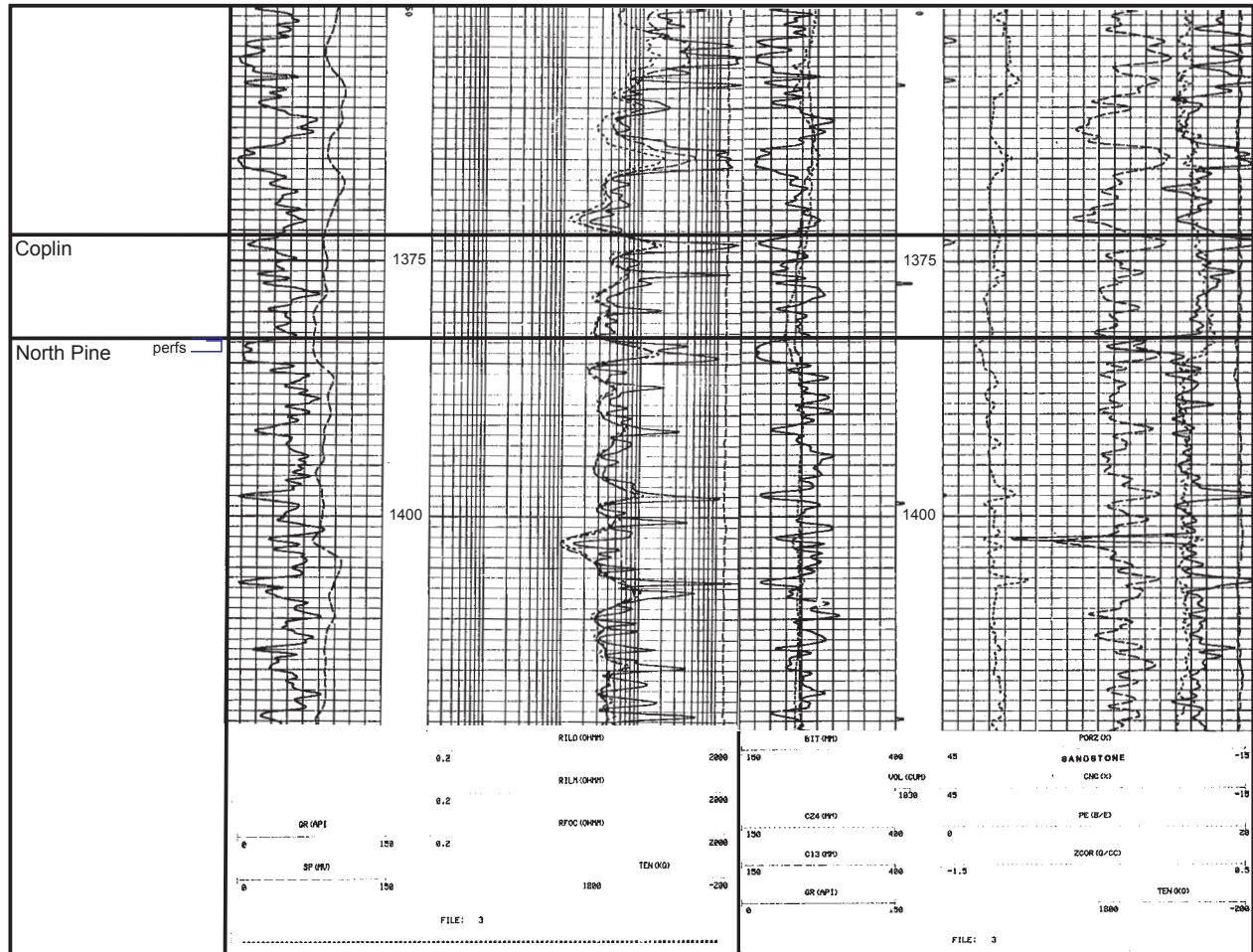
Reserves

Estimated original oil in place: 3,052,950 barrels, 485,380 m3
Recovery Factor (%): 18
Estimated Recoverable Oil: 560,300 barrels, 89,081 m3 (volumetric)
Cumulative Oil Production: 406,380 barrels
Remaining Recoverable Oil: 153,920 barrels
Remaining Original Oil in Place (%): 87
Cumulative Water Production: 11,430 barrels

Notes: Discovery well 14-1 is now suspended.



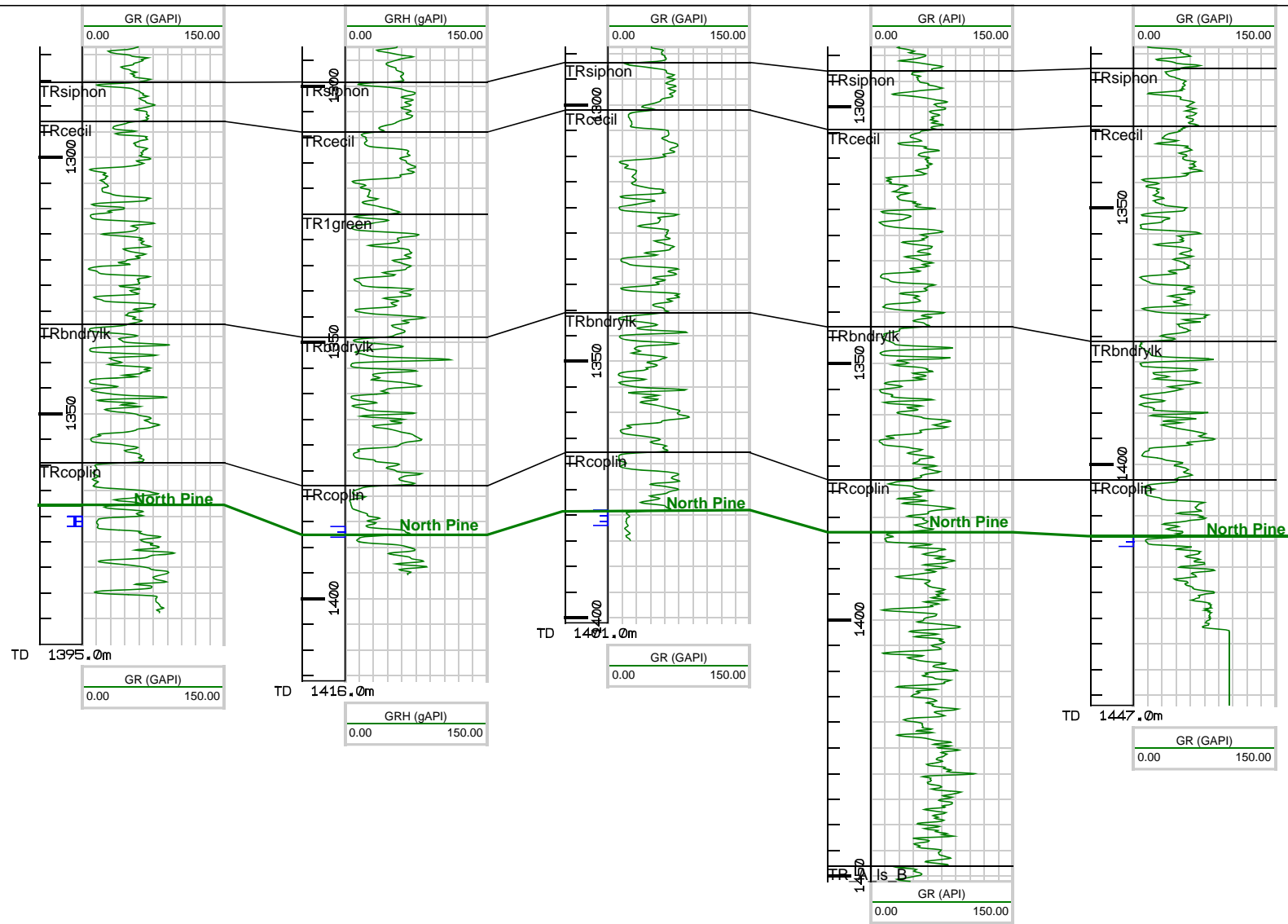
Contour interval is one metre net North Pine F oil pay (adapted from Oil and Gas Commission). Discovery well 14-1-86-19W6 is now suspended.



Induction and neutron-density logs for discovery well 14-1-86-19W6. Completion is in a thin sand between 1383 – 1384 metres.

A

A'



1:1200

Stoddart North Pine F

MONTNEY OIL FIELD

Halfway D Pool

Pool Parameters

Field Code: 6200

Pool Code: 4800D

Discovery well original name: POCO MONTNEY 8-1-87-19W6M **WA#:** 07178

Rig Release: 1989/12/12

Other Oil and Gas Shows: North Pine gas, Halfway gas, Bluesky gas

Number of Wells (October 2012) Oil: 3 **Active:** 0

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1470 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4 metres

Drive Mechanism: gas depletion

Average Porosity (%): 17

Average Net Pay: 2.5 metres

Average Permeability: 10 milliDarcies

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 59

Original Pressure: 1682 psi, 11,597 kPa

Reserves

Estimated original oil in place: 4,456,110 barrels, 708,465 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 668,420 barrels, 106,270 m³ (production decline)

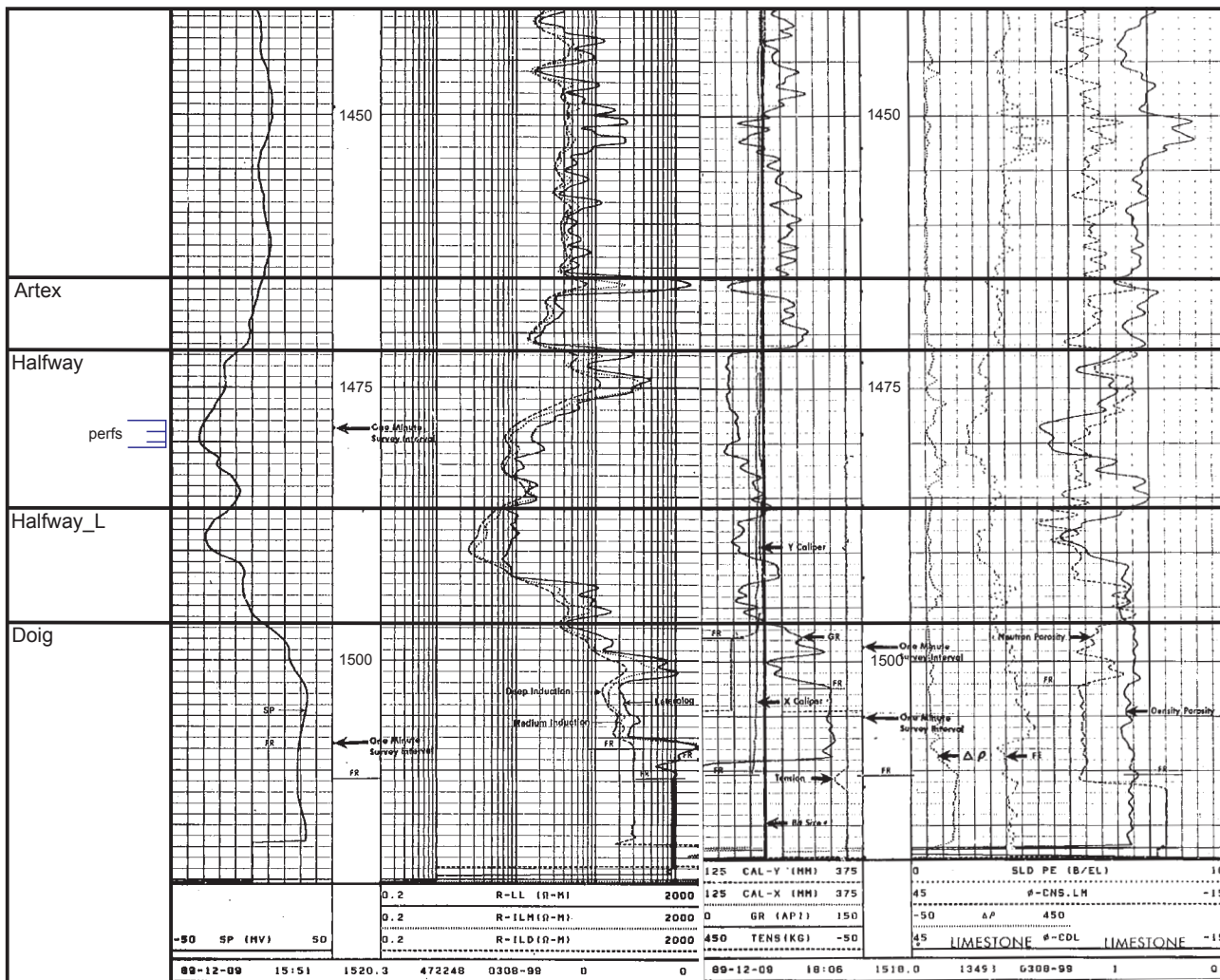
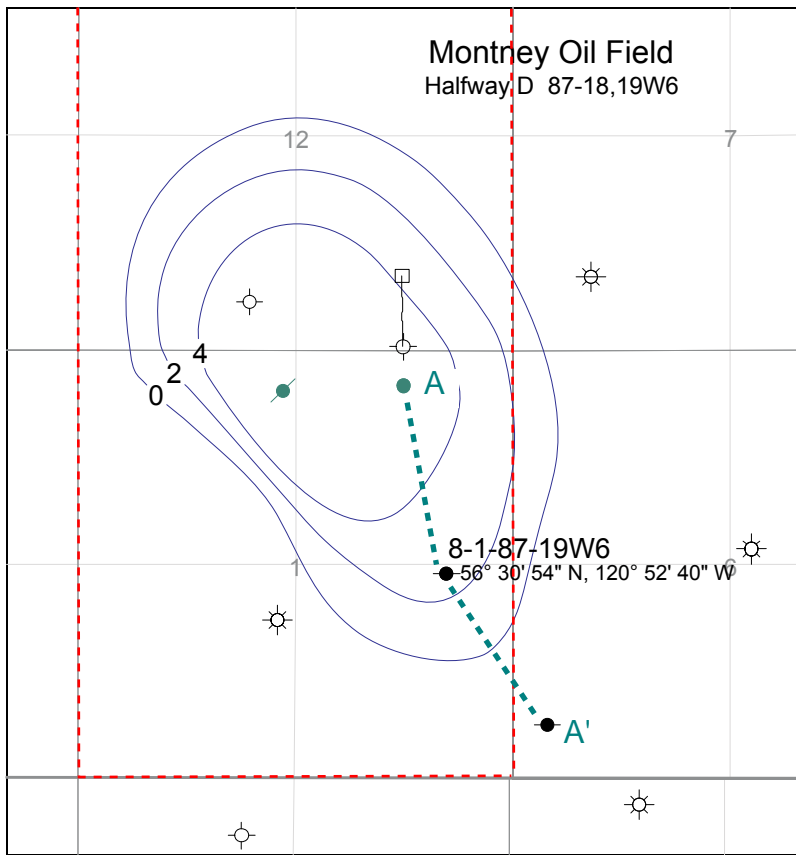
Cumulative Oil Production: 607,110 barrels, 96,523 m³

Remaining Recoverable Oil: 61,310 barrels, 9,748 m³

Remaining Original Oil in Place (%): 86

Cumulative Water Production: 35,360 barrels, 5,622 m³

Notes: A number of other Halfway oil pools are in the near vicinity.



Laterolog and neutron-density logs for discovery well 8-1-87-19W6M. Completion interval is in the lower part of the pay; a gas cap overlies.

OWL OIL FIELD

Cecil A Pool

Pool Parameters

Field Code: 6530

Pool Code: 4520A

Discovery well original name: Placer Owl 15-09-86-18W6

WA#: 06668

Rig Release: 1987/07/06

Other Oil and Gas Shows: Cecil gas

Number of Wells (October 2012) Oil: 8 **Active:** 8 **Injection:** 2

Reservoir Data

Area of Pool: 1675 acres or 678 hectares within zero net pay contour

Average Depth of Producing Zone: 1266 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 3.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 14

Average Net Pay: 2.7 metres

Average Permeability: 32 milliDarcies

Average Water Saturation (%): 35

Oil Formation Volume Factor (%): 124.6

Gravity (degrees API): 36

Original Pressure: 1799 psi, 12,404 kPa

Reserves

Estimated original oil in place: 5,797,570 barrels, 921,740 m³

Recovery Factor (%): 45

Estimated Recoverable Oil: 2,608,900 barrels, 414,782 m³ (production decline)

Cumulative Oil Production: 2,346,390 barrels

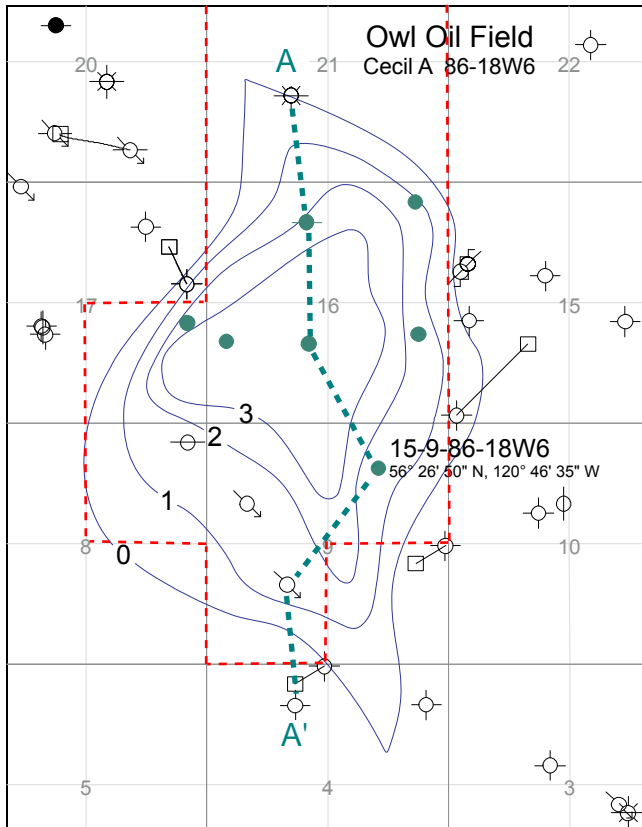
Remaining Recoverable Oil: 262,520 barrels

Remaining Original Oil in Place (%): 60

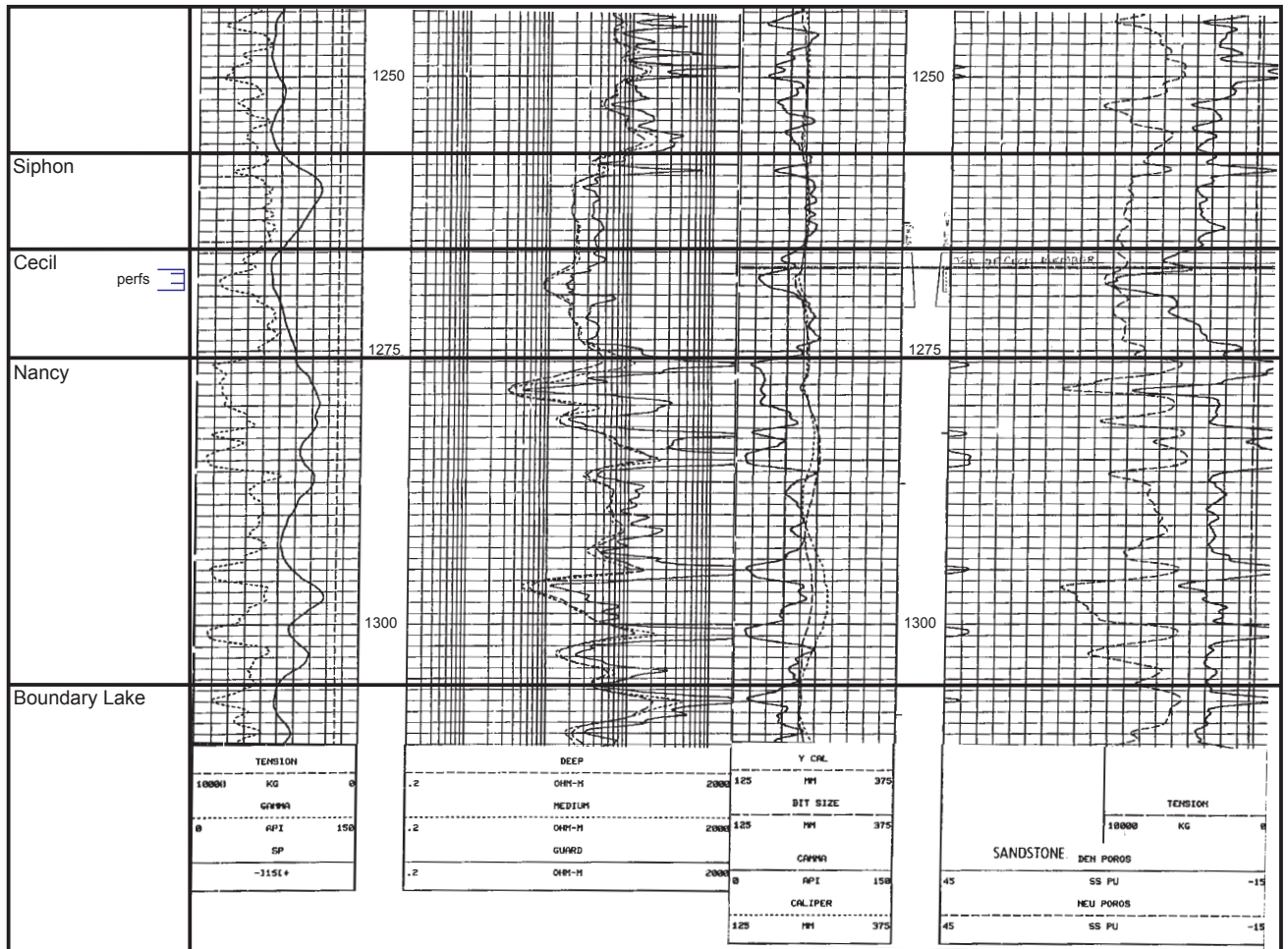
Cumulative Water Production: 625,040 barrels

Cumulative Water Injection: 2,486,540 barrels

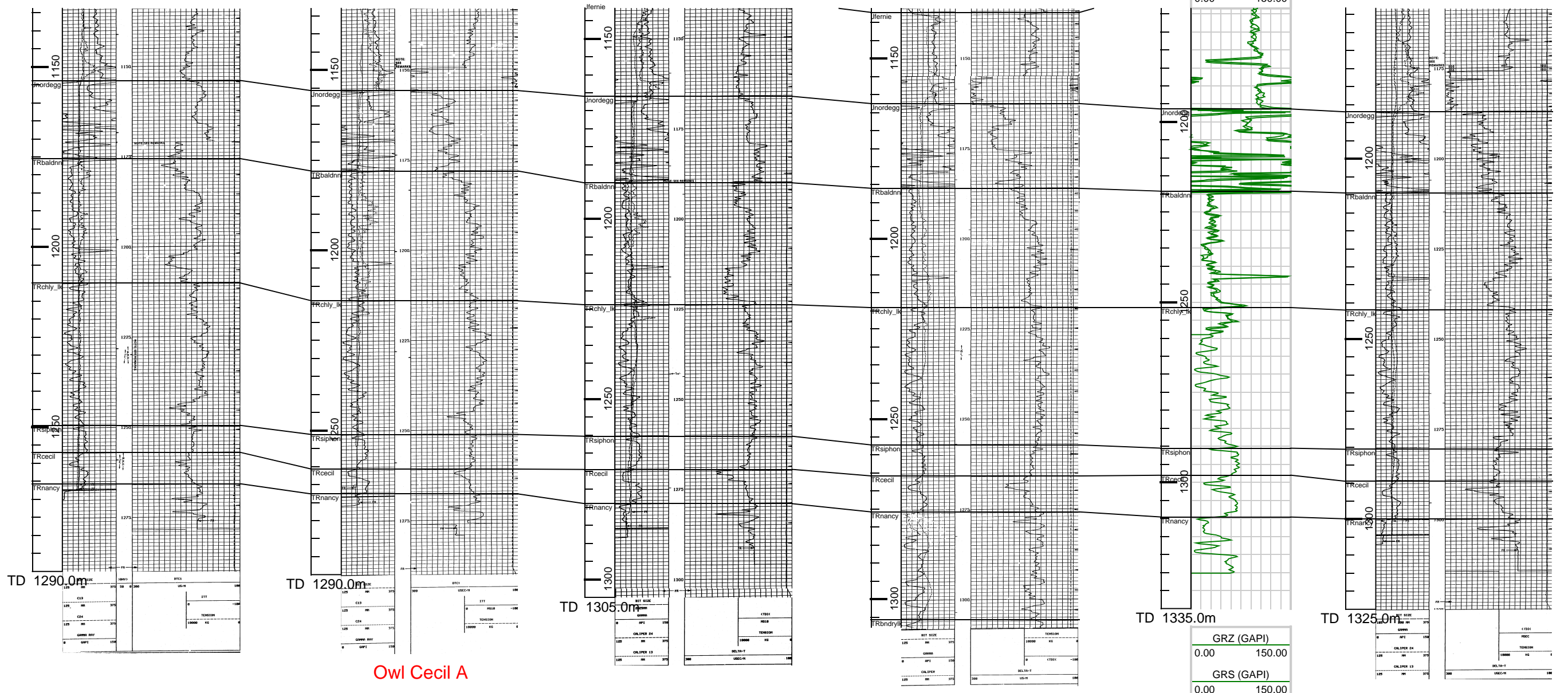
Notes: The pool appears to be rising structurally to the northeast; therefore trapping might be due in part to facies change in the up-dip direction. Water injectors are located down-dip. A gas cap extends the pool to the north.



Contour interval is one metre net Cecil A oil pay (adapted from Oil and Gas Commission). Discovery well is 15-9-86-18W6. Water injectors are located at the south end of the pool.



Induction and neutron-density logs for discovery well 15-9-86-18W6. The completion interval has neutron-density crossover indicative of a gas cap and concomitant gas cap expansion drive.



Owl Cecil A

OAK OIL FIELD

Baldonnel H Pool

Pool Parameters

Field Code: 6460

Pool Code: 4100H

Discovery well original name: Calahoo et al Stoddart 15-19-86-18W6M **WA#:** 11454

Rig Release: 2001/10/30

Other Oil and Gas Shows: Cecil Lake oil, Baldonnel gas

Number of Wells (December 2012) Oil: 3 Active: 1

Reservoir Data

Area of Pool: approximately 270 acres (109 hectares) within contours

Average Depth of Producing Zone: 1225 metres

Lithology of Reservoir Rock: dolomite

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 4.3 metres

Average Permeability: no DST or core but microlog shows good permeability across completion

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 119

Gravity (degrees API): 37

Original Pressure: 1487 psi, 10,253 kPa

Reserves

Estimated original oil in place: 1,945,640 barrels, 309,332 m³

Recovery Factor (%): 1.5

Estimated Recoverable Oil: 29,180 barrels, 4,639 m³ (volumetric)

Cumulative Oil Production: 18,190 barrels

Remaining Recoverable Oil: 10,990 barrels

Remaining Original Oil in Place (%): 99

Cumulative Water Production: 78,490 barrels

Notes: Trapping appears to be primarily stratigraphic, but porosity enhancement or dolomitization may be greatest along structural highs. The cement bond log shows patchy cement above the zone of interest in discovery well 15-19 (remedial work?).

OAK OIL FIELD

Cecil C

Pool Parameters

Field Code: 6460

Pool Code: 4520C

Discovery well original name: Luscar et al Oak 11-11-86-18W6 **WA#:** 07166

Rig Release: 1989/11/28

Other Oil and Gas Shows: Halfway gas, Cecil gas, Montney gas, Boundary Lake oil, Baldonnel oil, Halfway oil

Number of Wells (December 2012) Oil: 16 Active: 10 Injection: 4

Reservoir Data

Area of Pool: 2209 acres, 894 hectares

Average Depth of Producing Zone: 1215 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3.5 metres

Drive Mechanism: water flood

Average Porosity (%): 13

Average Net Pay: 1.1 metres

Average Permeability: 10 milliDarcies

Average Water Saturation (%): 26

Oil Formation Volume Factor (%): 123

Gravity (degrees API): 39

Original Pressure: 1663 psi, 11,466 kPa

Reserves

Estimated original oil in place: 5,712,320 barrels, 908,186 m³

Recovery Factor (%): 60

Estimated Recoverable Oil: 3,427,390 barrels, 544,911 m³ (production decline)

Cumulative Oil Production: 2,147,460 barrels

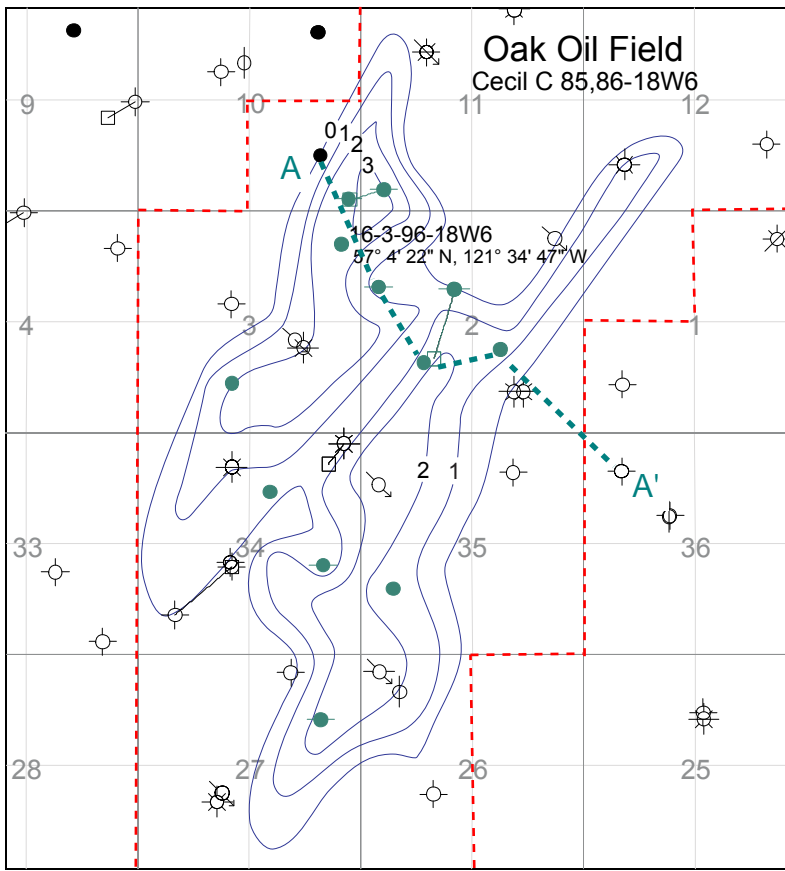
Remaining Recoverable Oil: 1,279,930 barrels

Remaining Original Oil in Place (%): 64

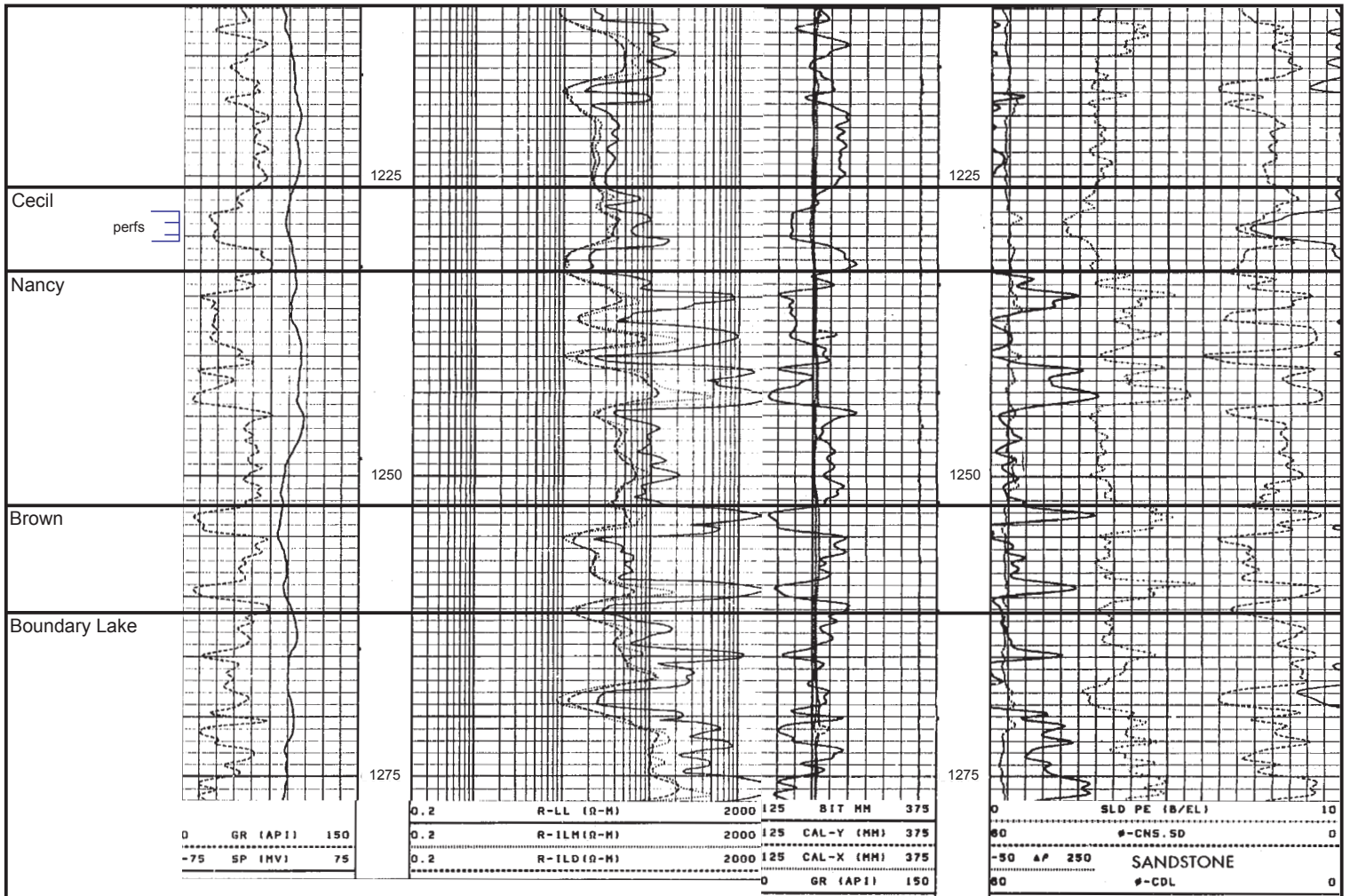
Cumulative Water Production: 849,560 barrels

Cumulative Water Injection: 3,423,640 barrels

Notes: The discovery well is in the gas cap, which truncates the oil pool into north and south segments. Recovery factor and recoverable oil were revised upward sometime between May and October 2012.



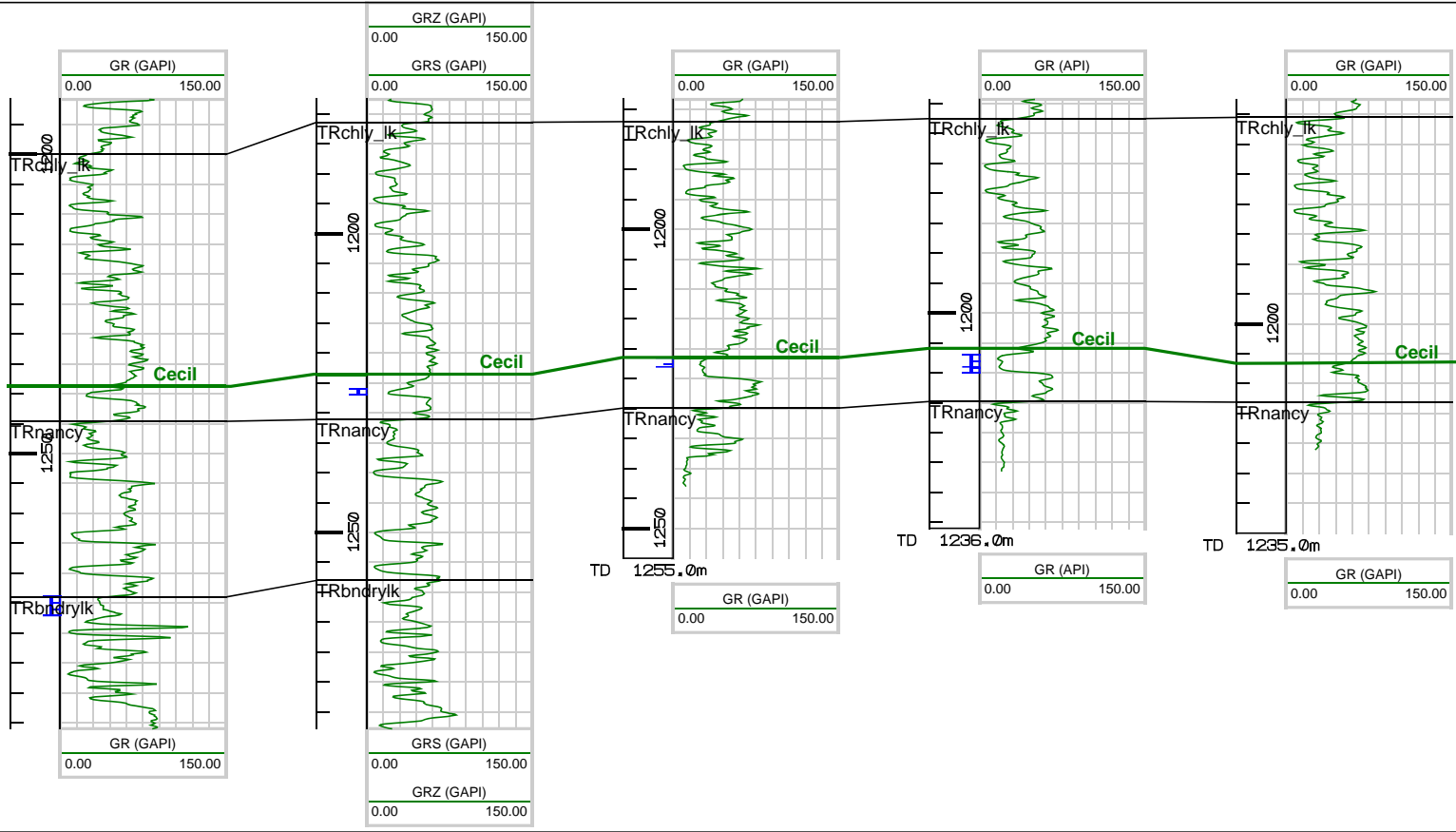
Contour interval is one metre net Cecil C oil pay (Oil and Gas Commission). The discovery well 11-11-86-18W6 is in the gas cap. Logs for 16-3-86-18W6, which is in the oil leg and completed in the Cecil, are shown below. A gas cap splits the oil leg into north and south segments.



Laterolog and neutron-density logs for 16-3-86-18W6. Oil was recovered on a DST over the completion interval, which is restricted to a thick shore-face sand.

A

A'



111200

Oak Cecil C

OAK OIL FIELD

Halfway B Pool

Pool Parameters

Field Code: 6460

Pool Code: 4800B

Discovery well original name: ASHLAND OAK 6-18-86-17W6

WA#: 03363

Rig Release: 1973/08/13

Other Oil and Gas Shows: Cecil oil, Baldonnel oil, Halfway gas

Number of Wells (October 2012) Oil: 4 **Gas:** 1 **Active:** 1

Reservoir Data

Area of Pool: 1164 acres, 471 hectares

Average Depth of Producing Zone: 1222 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness:

Drive Mechanism: gas cap expansion

Average Porosity (%): 16

Average Net Pay: 3.9 metres

Average Permeability: 15 milliDarcies

Average Water Saturation (%): 21

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 40

Original Pressure: 1850 psi, 12755 kPa

Reserves

Estimated original oil in place: 11,849,950 barrels, 1,883,992 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 2,369,990 barrels, 376,798 m³ (volumetric)

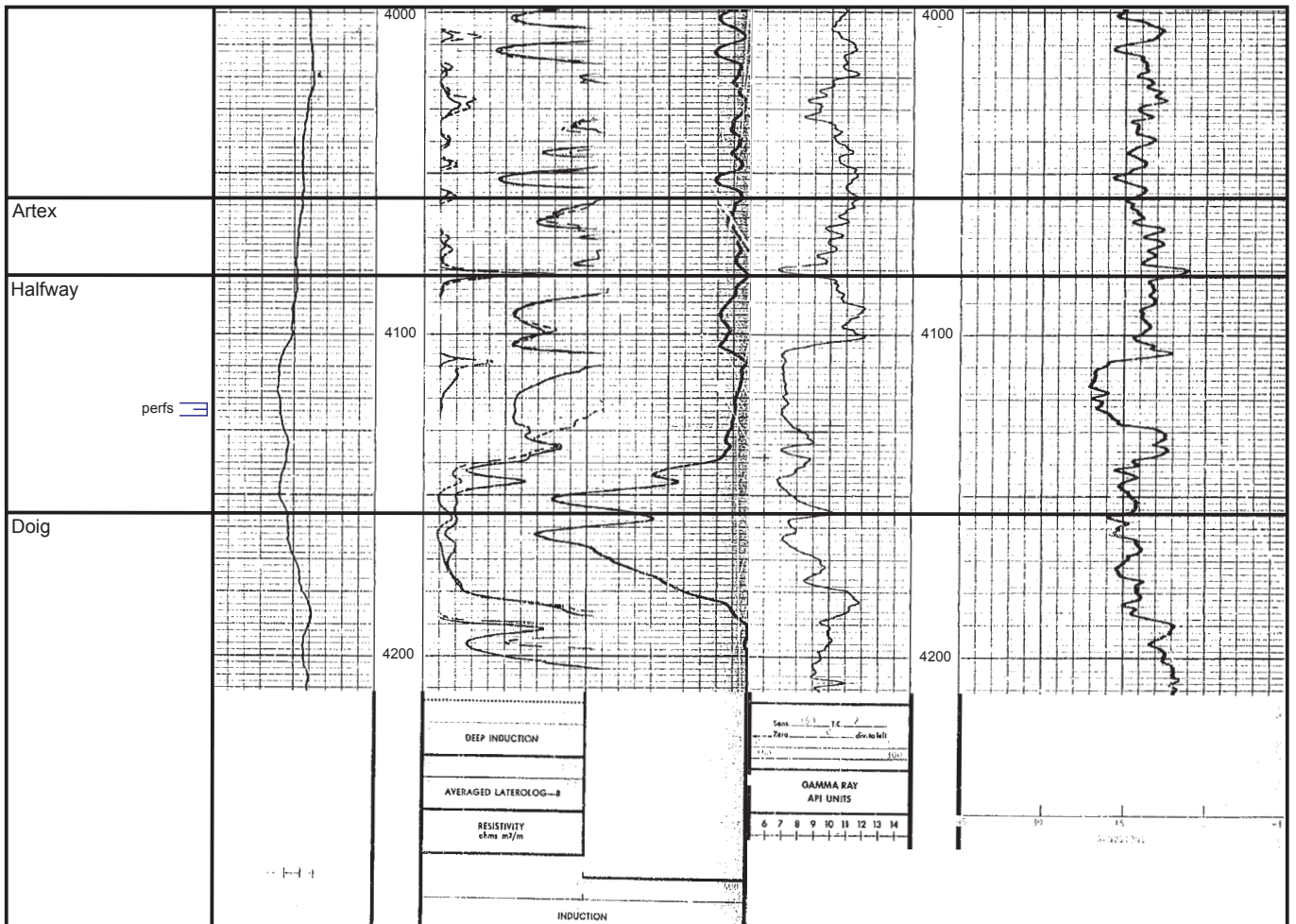
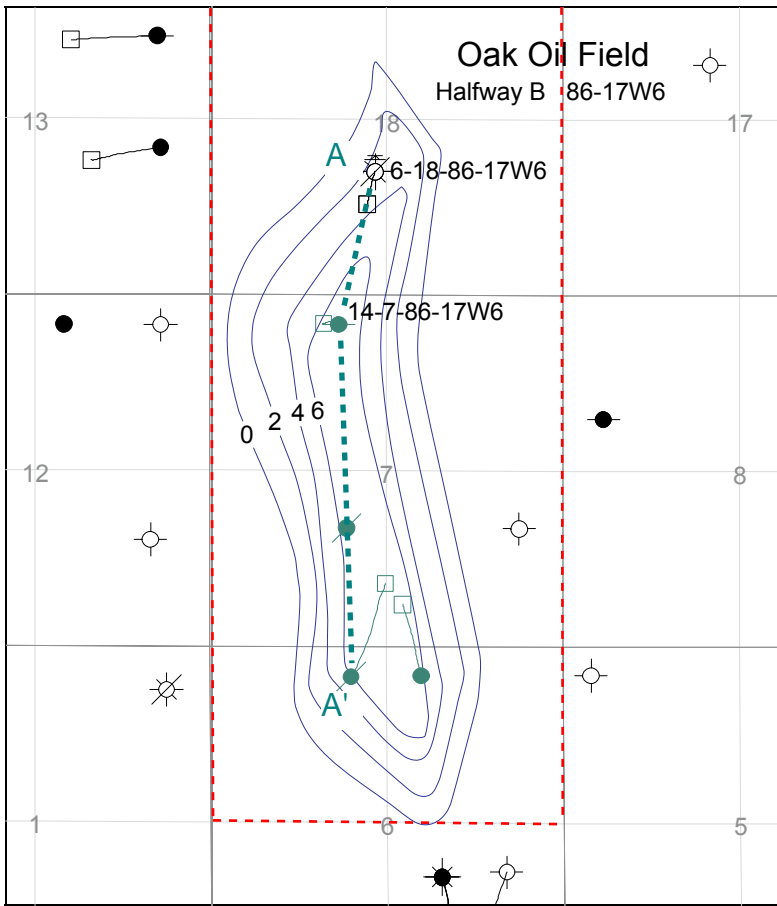
Cumulative Oil Production: 1,851,480 barrels

Remaining Recoverable Oil: 518,510 barrels

Remaining Original Oil in Place (%): 84

Cumulative Water Production: 123,910 barrels

Notes: A Halfway gas cap is located at the north end of the field. There may be a structural component to the trapping as the Halfway typically drapes over horsts in this area.



Induction and sonic logs for 14-7-86-17W6. This well is directional (MD 4225', TVD 4202') the logs show measured depth. The completion interval is in the lower part of a thick barrier bar sand. The deep induction curve shows low water saturation throughout the sand. No DSTs were run.

100/06-18-086-17W6/00

100/14-07-086-17W6/00

100/14-06-086-17W6/00



1973/08/13

<=723.1m=>



1974/11/01

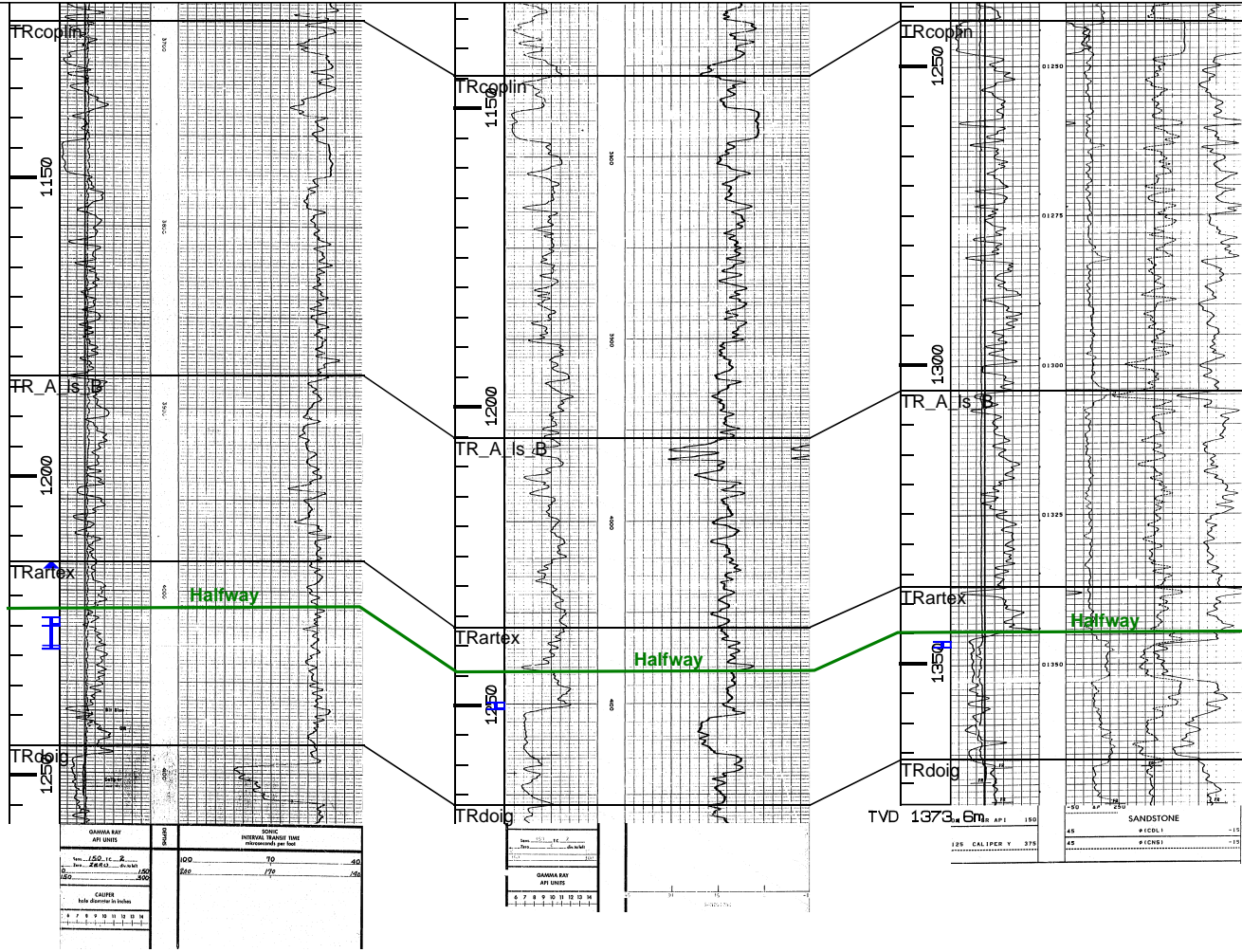
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1984/02/14

A'

1:12000



Oak Halfway B

OAK OIL FIELD

Lower Halfway A Pool

Pool Parameters

Field Code: 6460

Pool Code: 4805A

Discovery well original name: DEKALB Anderson Oak 9-28-86-17W6M

WA#: 08344

Rig Release: 1993/12/23

Other Oil and Gas Shows: Halfway gas, Cecil oil

Number of Wells (October 2012) Oil: 4

Active: 1

Reservoir Data

Area of Pool: 652 acres, 264 hectares

Average Depth of Producing Zone: 1373 metre

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 16

Average Net Pay: 1 metre

Average Permeability: 16 milliDarcies (calculated from DST)

Average Water Saturation (%): 37

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 40

Original Pressure: 1773 psi, 12,224 kPa

Reserves

Estimated original oil in place: 1,546,840 barrels, 245,928 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 77,340 barrels, 12,296 m³

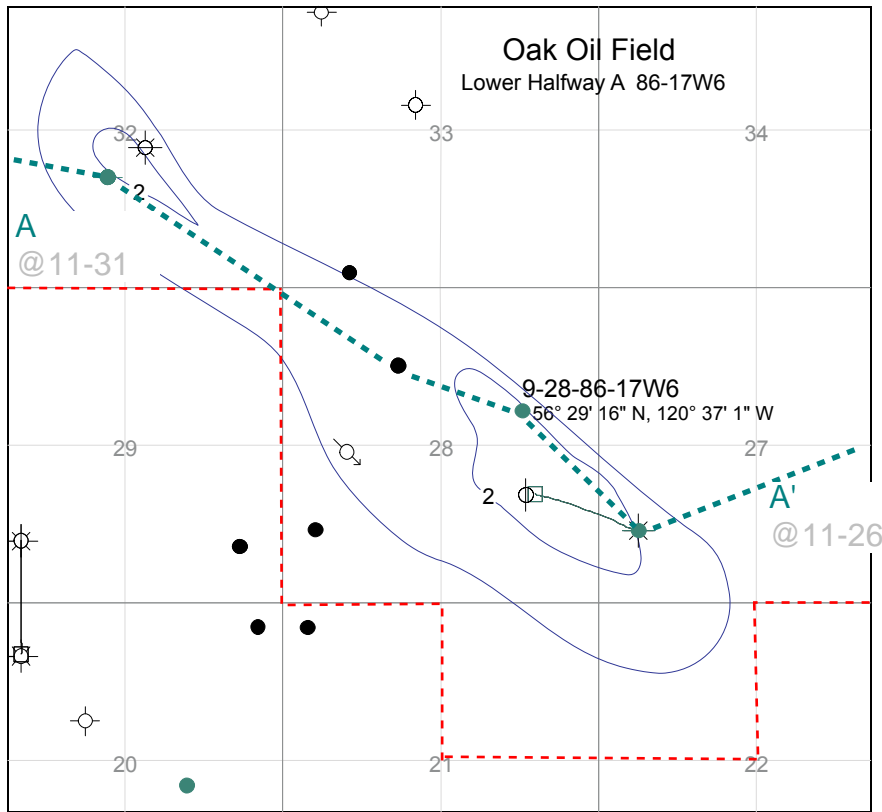
Cumulative Oil Production: 45,290 barrels

Remaining Recoverable Oil: 32,050 barrels

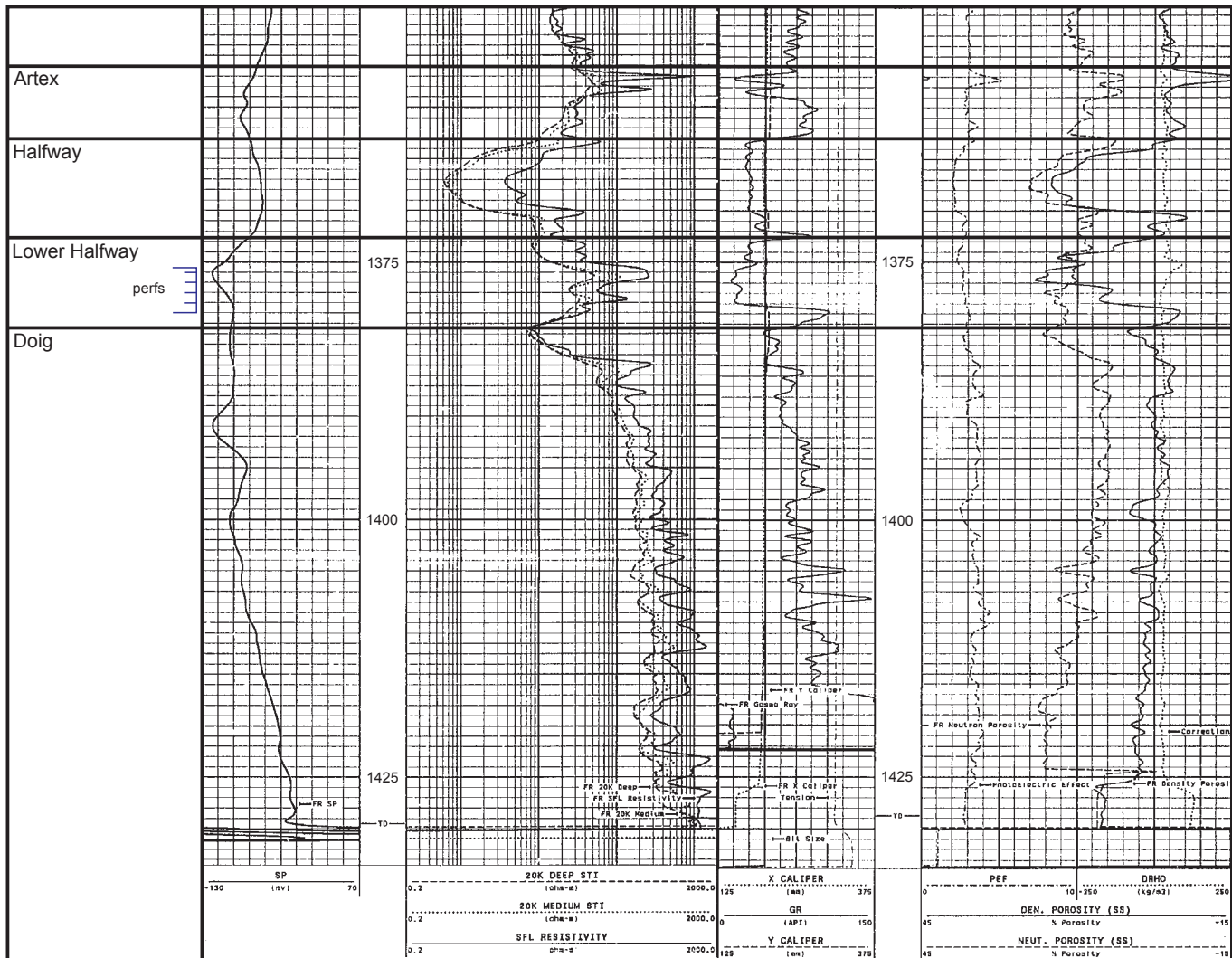
Remaining Original Oil in Place (%): 97

Cumulative Water Production: 18,610 barrels

Notes: Recovery factor seems to be disproportionately low in relation to fair porosity and permeability.



The Lower Halfway A pool is the larger pool in the middle.
 Contour interval is two metres net Lower Halfway A oil pay. Discovery well is 9-28-86-17W6.



Induction and neutron-density logs for discovery well 9-28-86-17W6. The completion interval is just below a strong gas response on the neutron-density.

A

100/11-31-086-17W6/00
+650.4 03204
◉

<=1758.0m>

100/06-32-086-17W6/00
+664.7 08877
●

<=1780.7m>

100/14-28-086-17W6/00
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100/09-28-086-17W6/00
+680.8 08344
●

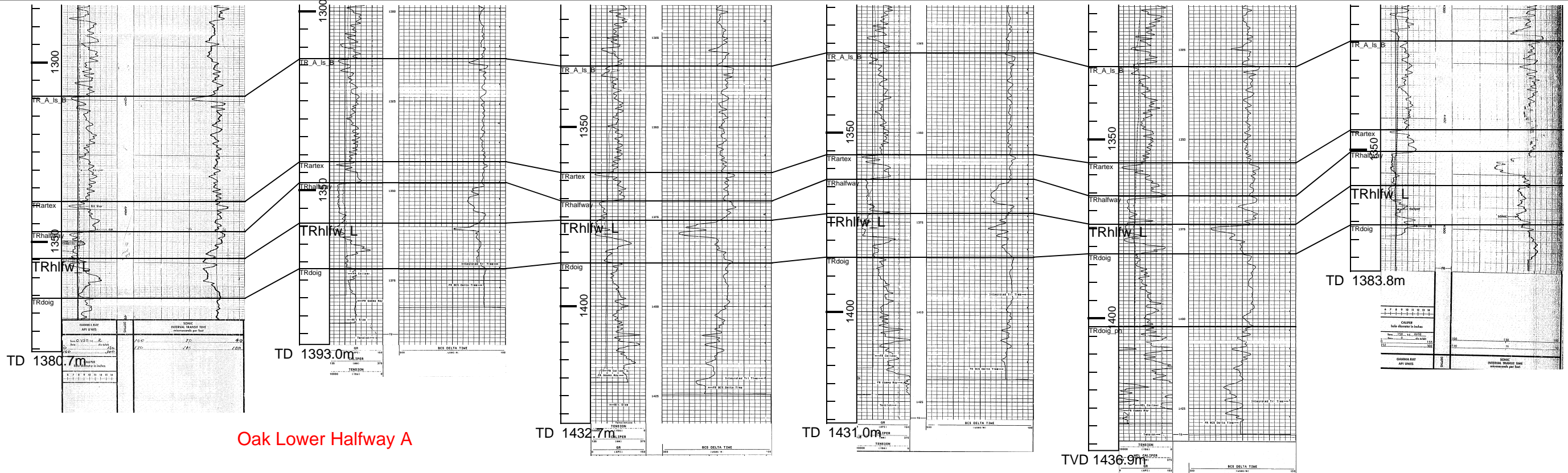
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◉

<=2224.0m>

100/11-26-086-17W6/00
+676.0 03627
◉

A'



Oak Lower Halfway A

PARADISE OIL FIELD

Boundary Lake A Pool

Pool Parameters

Field Code: 6560

Pool Code: 4535A

Discovery well original name: Titan W Boundary 5-1-86-15W6 **WA#:** 21097

Rig Release: 2006/02/15

Producing Zone: Boundary Lake A

Number of Wells (October 2012) Oil: 2 **Active:** 2

Reservoir Data

Area of Pool: 163 acres, 66 hectares

Average Depth of Producing Zone: 1300 metres

Lithology of Reservoir Rock: limestone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 1.2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 13

Average Net Pay: 1 metre

Average Permeability: Good permeability is indicated by microlog and production tests

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 43

Original Pressure: 1676 psi, 11,556 kPa

Reserves

Estimated original oil in place: 681,110 barrels, 108,288 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 102,170 barrels, 16,244 m³ (production decline)

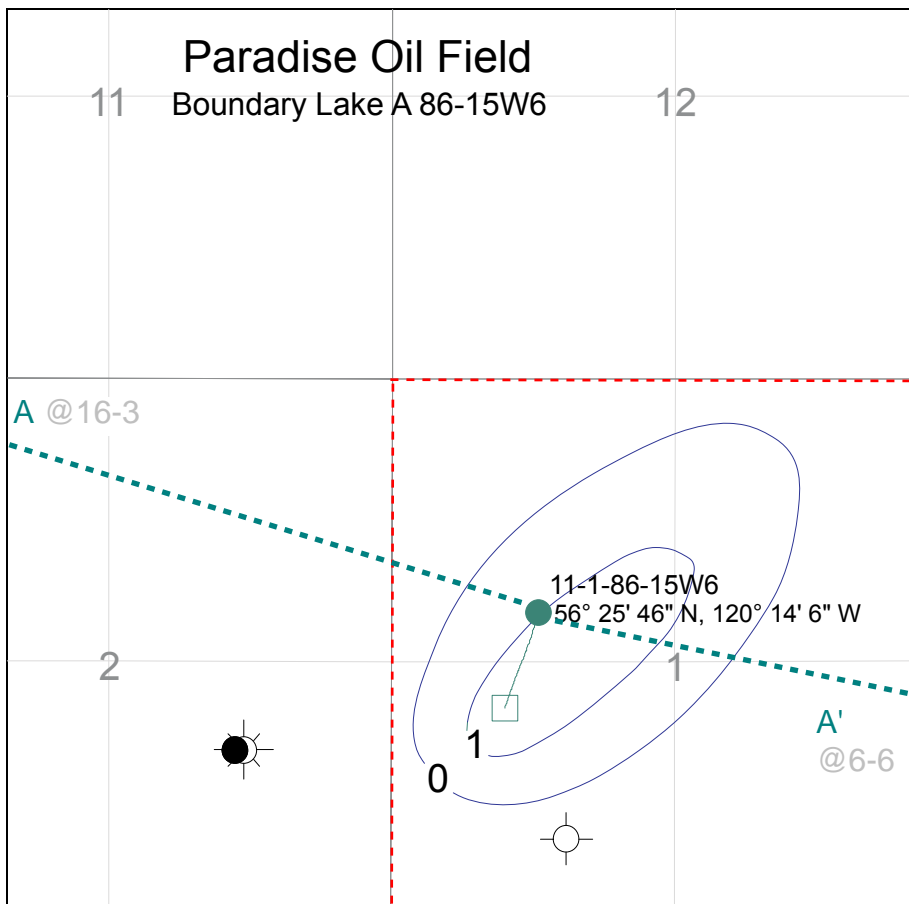
Cumulative Oil Production: 58,090 barrels

Remaining Recoverable Oil: 44,080 barrels

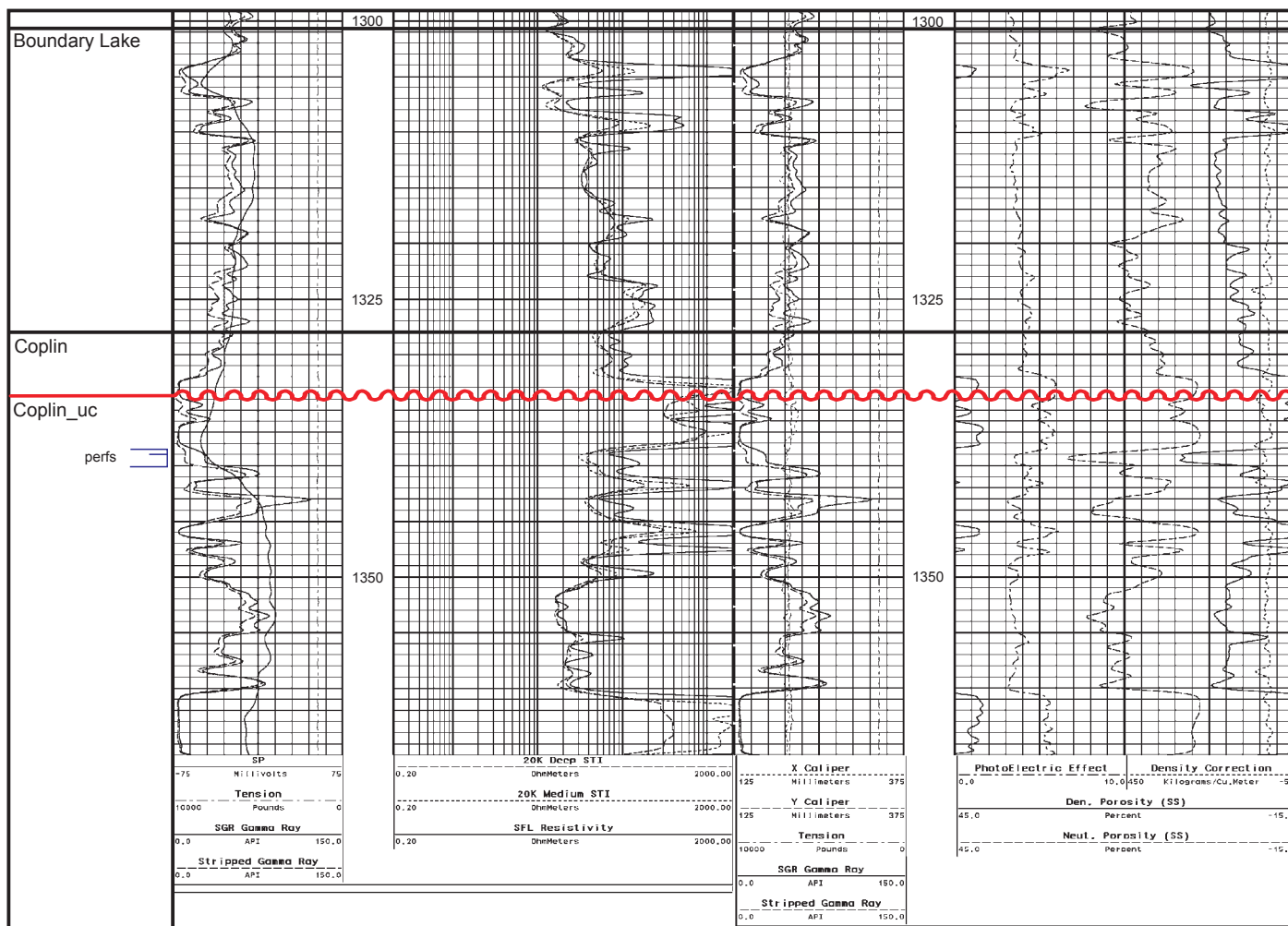
Remaining Original Oil in Place (%): 92

Cumulative Water Production: 470 barrels

Notes: The Oil and Gas Commission indicates that this pool has two oil wells, but mapping seems to show only one.



Contour interval is one metre net
Boundary Lake A oil pay (Oil and Gas
Commission). Discovery well 11-1-86-
15W6 is directional (from 5-1).



Induction and microlog (measured depth) for discovery well 11-1-86-15W6. Completion is in the zone of good permeability as indicated on the microlog.

A

100/16-03-086-15W6/00

+752.5 00723



<<2236.2m>>

100/11-01-086-15W6/00

+726.7 21097



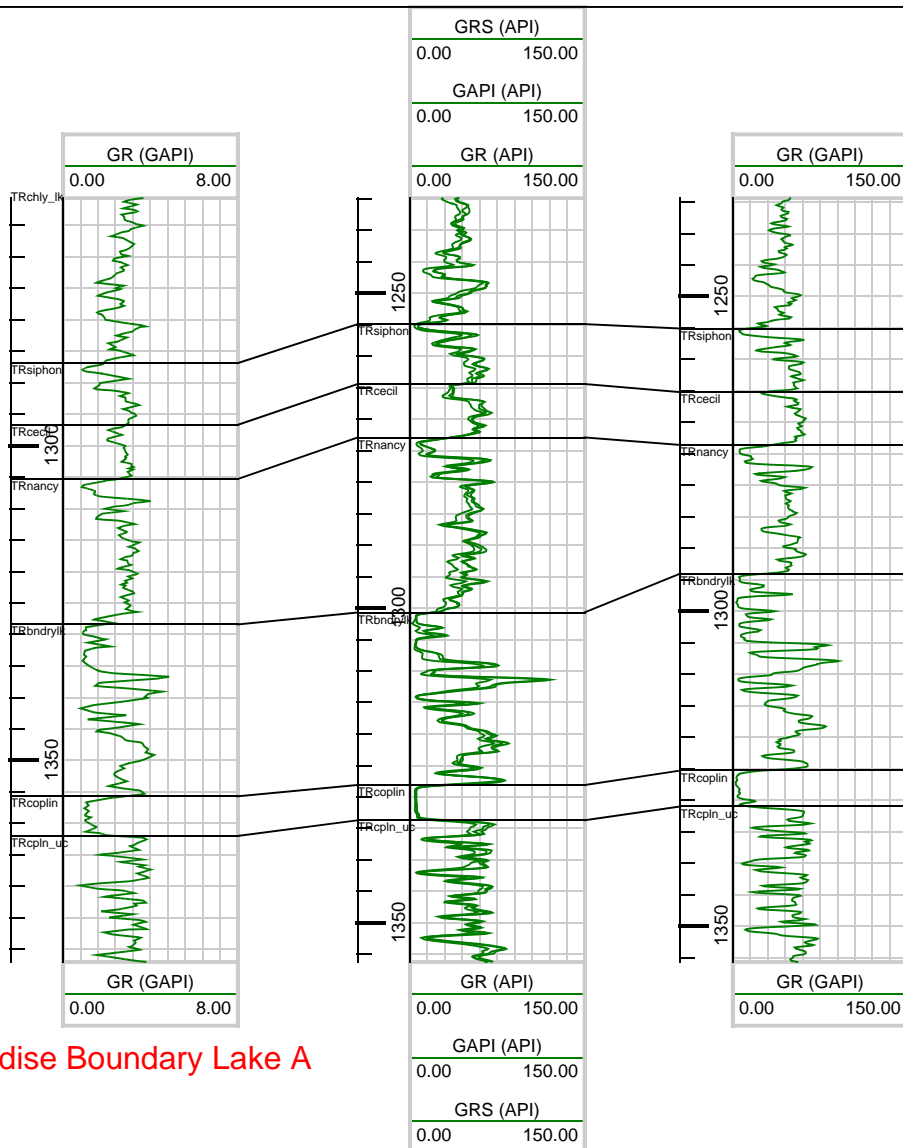
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100/06-06-086-14W6/00

+726.2 22837



A'



Paradise Boundary Lake A

1:1200

PARADISE OIL FIELD

Gething A Pool

Pool Parameters

Field Code: 6560

Pool Code: 2700A

Discovery well original name: Exalta Titan Paradise 6-35-85-15W6 **WA#:** 21481

Rig Release: 2006/08/12

Other Oil and Gas Shows: Halfway gas, Montney gas, Gething gas

Number of Wells (October 2012) Oil: 1 **Active:** 1

Reservoir Data

Area of Pool: 163 acres, 66 hectares

Average Depth of Producing Zone: 1096 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6 metres

Drive Mechanism: gas depletion

Average Porosity (%): 20

Average Net Pay: 5.3 metres

Average Permeability: no core or DSTs

Average Water Saturation (%): 16

Oil Formation Volume Factor (%): 116

Gravity (degrees API): 36

Original Pressure: 1340 psi, 9239 kPa

Reserves

Estimated original oil in place: 3,198,020 barrels, 508,445 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 319,800 barrels, 50,844 m³ (volumetric)

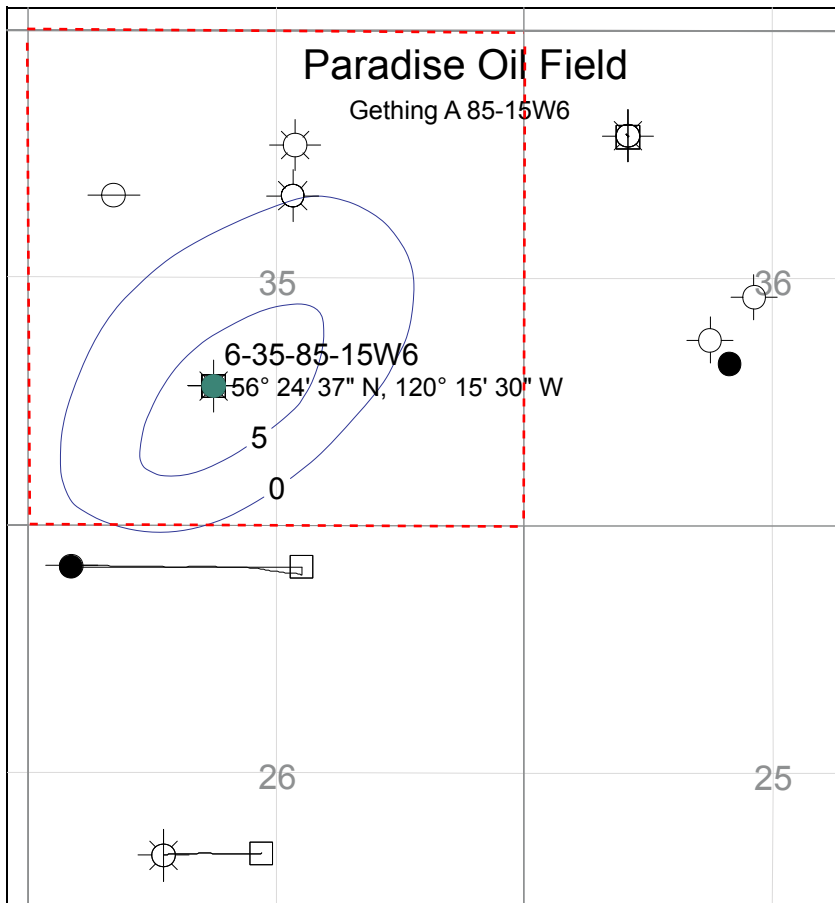
Cumulative Oil Production: 44,090 barrels

Remaining Recoverable Oil: 275,710 barrels

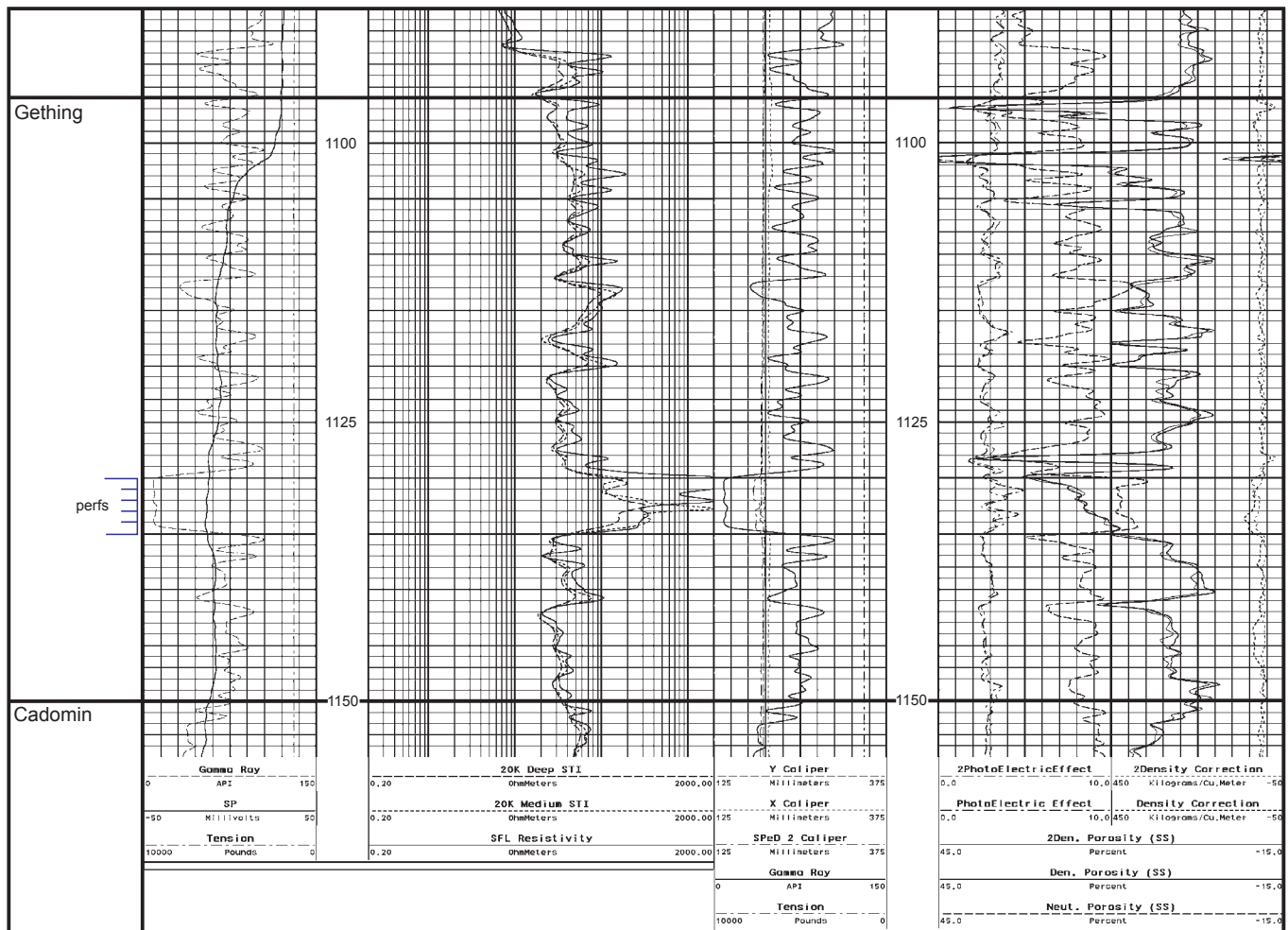
Remaining Original Oil in Place (%): 99

Cumulative Water Production: 54,940 barrels

Notes: Although the logs show a strong presence of gas, a Gething A gas cap has not been mapped by the Oil and Gas Commission.



Contour interval is five metres net Gething A oil pay (Oil and Gas Commission). Location 6-35-85-15W6 is the discovery well.



Induction and neutron-density logs for discovery well 6-35-85-15W6. Completion is from 1130 – 1135 metres in a thick channel sand. Strong neutron-density crossover over the entire completion interval indicates the presence of gas without segregation into a gas cap.

PARADISE OIL FIELD

Montney A Pool

Field Parameters

Field Code: 6560

Pool Code: 5000A

Discovery well original name: Exalta HZ 12-26-085-15W6

WA#: 24209

Rig Release: 2008/08/22

Producing Zone: Montney A

Number of Producing Wells (November 2012) Oil: 2 Gas: 2 Horizontal: 1 Active: 4

Reservoir Data

Area of Pool: 163 acres, 66 hectares

Average Depth of Producing Zone: 1500 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4.5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 13

Average Net Pay: 0.8 metres

Average Permeability: 2 milliDarcies

Average Water Saturation (%): 15

Oil Formation Volume Factor (%): 144

Gravity (degrees API): 43

Original Pressure: 2617 psi, 18,044 kPa

Reserves

Estimated original oil in place: 1,098,100 barrels, 174,584 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 109,810 barrels, 17,458 m³ (volumetric)

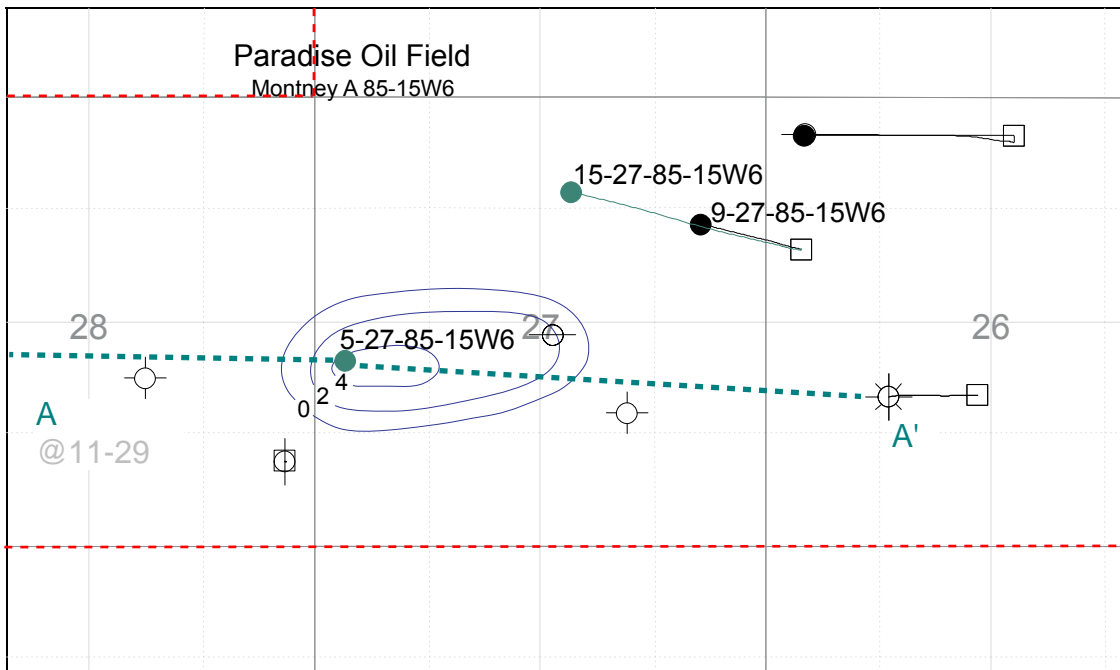
Cumulative Oil Production: 86,630 barrels

Remaining Recoverable Oil: 23,180 barrels

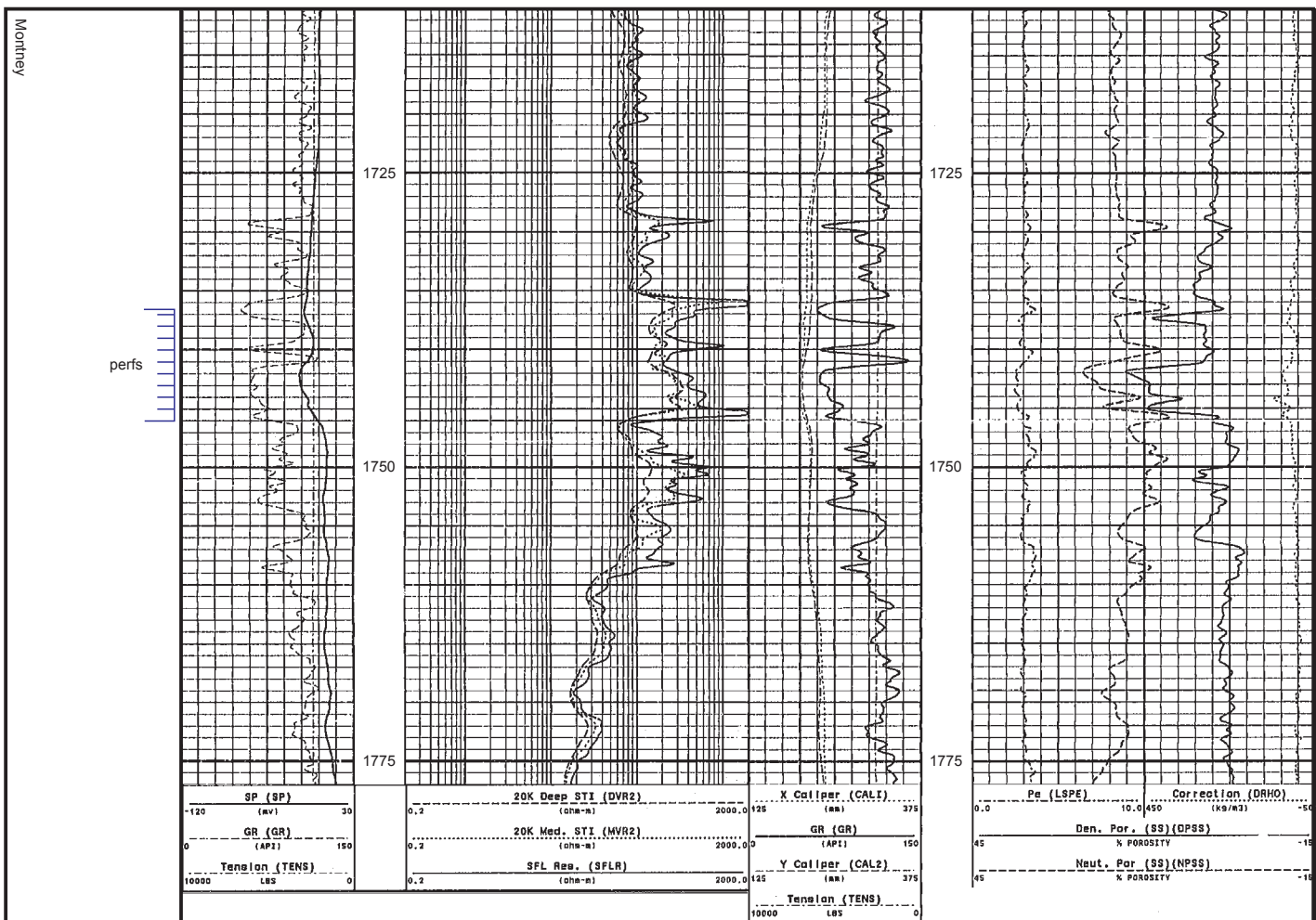
Remaining Original Oil in Place (%): 92

Cumulative Water Production: 2,340 barrels

Notes: The Montney A gas cap overlies and extends beyond the limits of the oil pool. Vertical wells have been successful in Montney turbidite sands, but these relatively tight and thick sands would likely produce better from horizontals. Both 9-27 and 15-27 were drilled from 12-26. Location 9-27 has not produced; production is from 15-27.



Contour interval is two metres net Montney A oil pay (Oil and Gas Commission). Location 9-27-85-15W6 is the discovery well although it has not produced and is outside the mapped contours. Location 15-27 produces Montney A oil but is outside the contour limits.



Induction and neutron-density logs for vertical well 5-27-85-15W6. The top of Montney is at 1531 metres. Turbidite sands, in the middle of an otherwise shaley Montney, have been completed.

A

100/11-29-085-15W6/00

+775.3 12629



<=2577.1m>

100/05-27-085-15W6/00

+761.8 10284



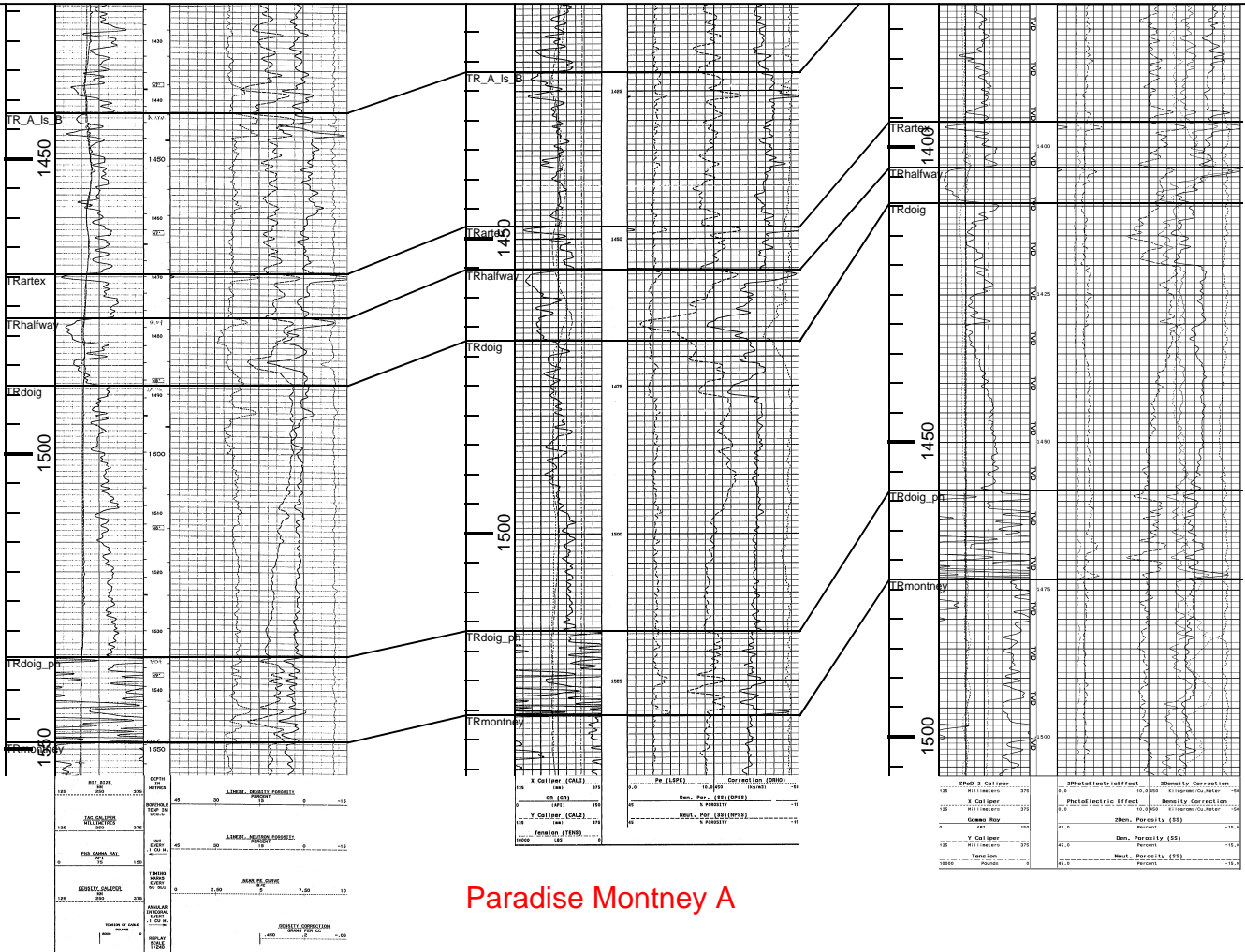
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100/06-26-085-15W6/00

+727.3 21449



A'



Paradise Montney A

1:1200

PARADISE OIL FIELD

Siphon A Pool

Pool Parameters

Field Code: 6560

Pool Code: 4510A

Discovery well original name: Titan Exalta W Boundary 7-2-86-15W6

WA#: 19770

Rig Release: 2005/09/09

Other Oil and Gas Shows: Halfway C, Boundary Lake oil, Gething gas

Number of Producing Wells (October 2012) Oil: 2 **Active:** 1

Reservoir Data

Area of Pool: 499 acres, 202 hectares

Average Depth of Producing Zone: 1262 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 0.6 metres

Average Permeability: no core, poor permeability suggested by DST

Average Water Saturation (%): 41

Oil Formation Volume Factor (%): 115.4

Gravity (degrees API): 25

Original Pressure: 1775 psi, 12238 kPa

Reserves

Estimated original oil in place: 370,440 barrels, 58,895 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 55,570 barrels, 8,835 m³ (volumetric)

Cumulative Oil Production: 18,340 barrels

Remaining Recoverable Oil: 37,230 barrels

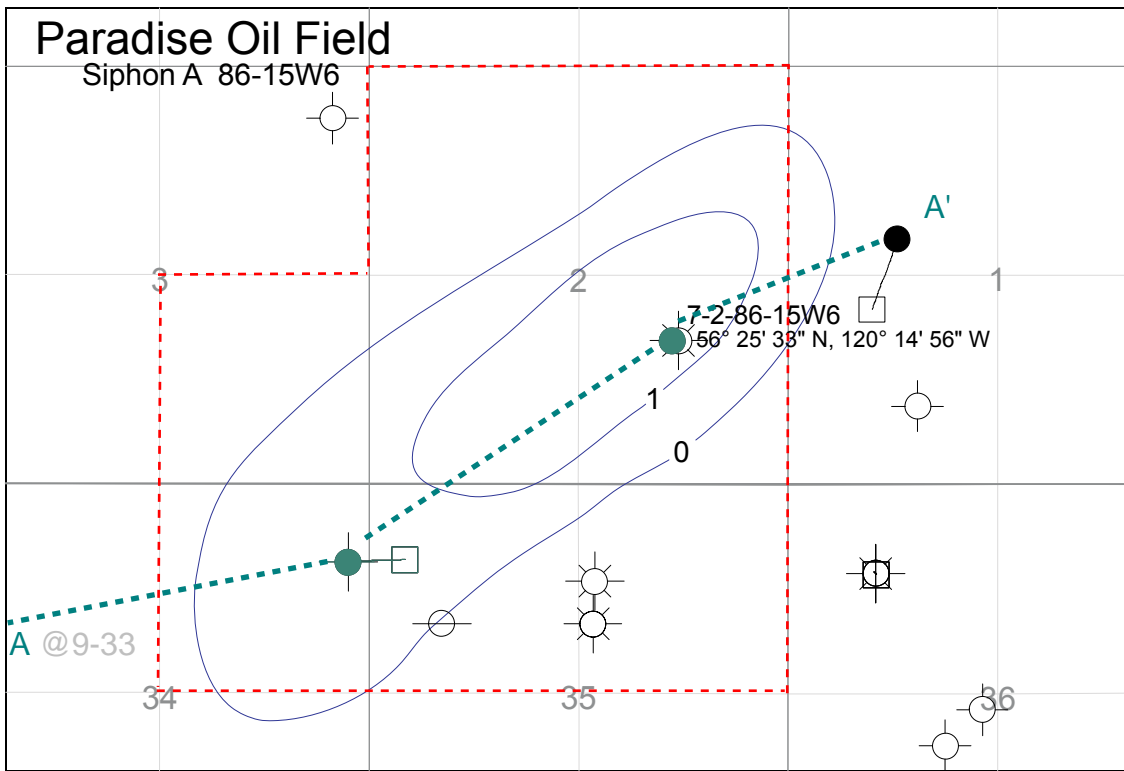
Remaining Original Oil in Place (%): 95

Cumulative Water Production: 15,070 barrels

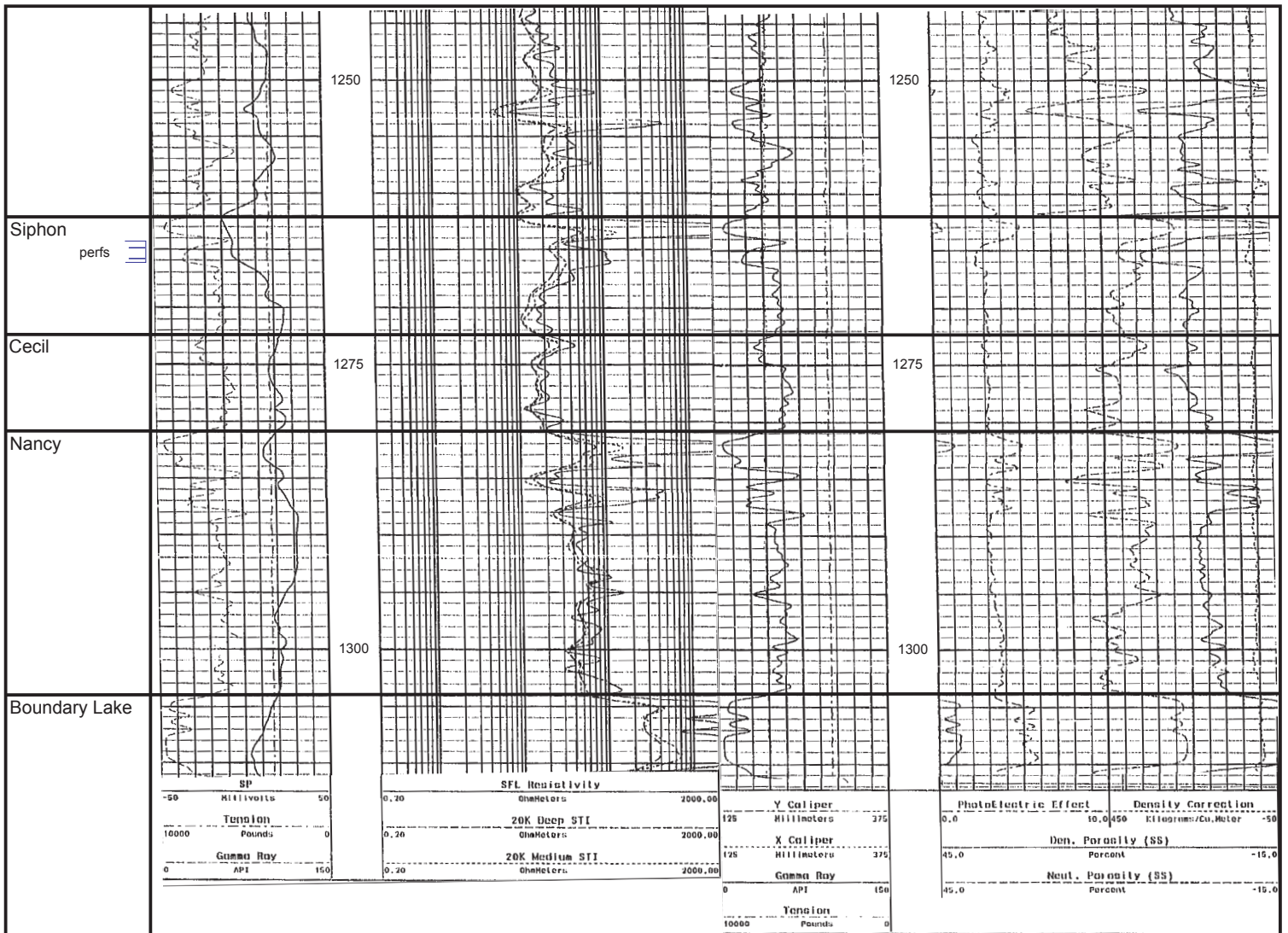
Notes: Water cut is relatively low despite high water saturation. Soon after discovery the OGC determined that discovery well 7-2 was a new discovery and placed it in the Paradise Siphon A pool.

Paradise Oil Field

Siphon A 86-15W6



Contour interval is one metre net Siphon A oil pay. Discovery well is 7-2-86-15W6.



Induction and neutron-density logs for discovery well 7-2-86-15W6. The completion interval is 1264.5 – 1266 metres.

A

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100/16-34-085-15W6/00

+759.1 20960

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100/07-02-086-15W6/00

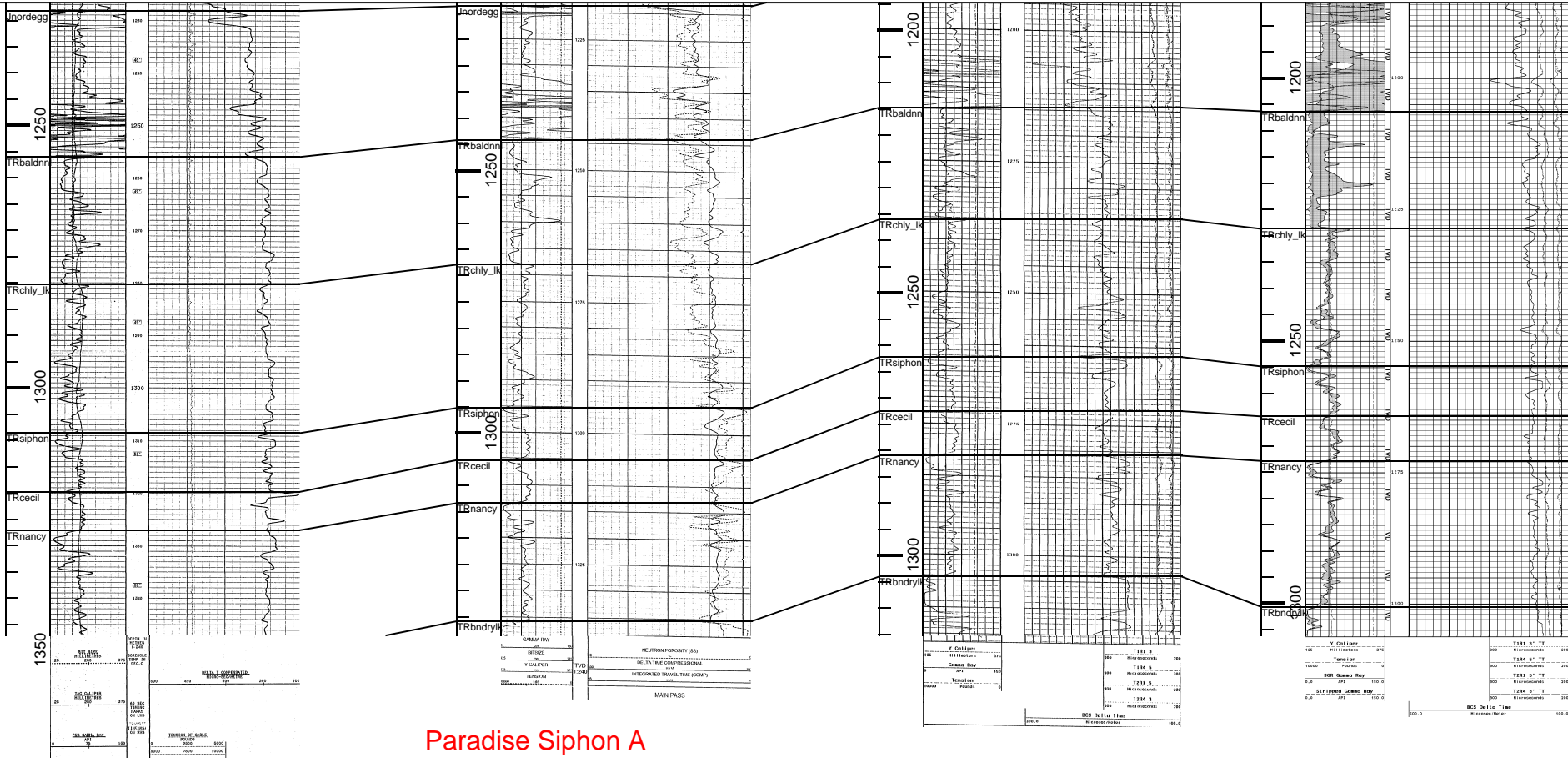
+735.8 19770

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100/11-01-086-15W6/00

+726.7 21097

A'



Paradise Siphon A

1:1200

RED CREEK OIL FIELD

Doig C Pool

Pool Parameters

Field Code: 7400

Pool Code: 4900C

Discovery well original name: CNRES HZ RED 13-3-85-21W6 **WA#:** 10108

Rig Release: 1997/02/22

Other Oil and Gas Shows: Halfway gas, Bear Flat gas, Baldonnel gas

Number of Wells (November 2012) Oil: 10 Active: 8 Injection: 2 Horizontal: 9

Reservoir Data

Area of Pool: 759 acres, 307 hectares

Average Depth of Producing Zone: 1510 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 35 metres

Drive Mechanism: water flood

Average Porosity (%): 12

Average Net Pay: 18 metres

Average Permeability: no core, DST shows high permeability

Average Water Saturation (%): 10

Oil Formation Volume Factor (%): 144

Gravity (degrees API): 44

Original Pressure: 2606 psi, 17,968 kPa

Reserves

Estimated original oil in place: 27,429,690 barrels, 4,360,972 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 1,371,480 barrels, 218,048 m³ (volumetric)

Cumulative Oil Production: 928,550 barrels

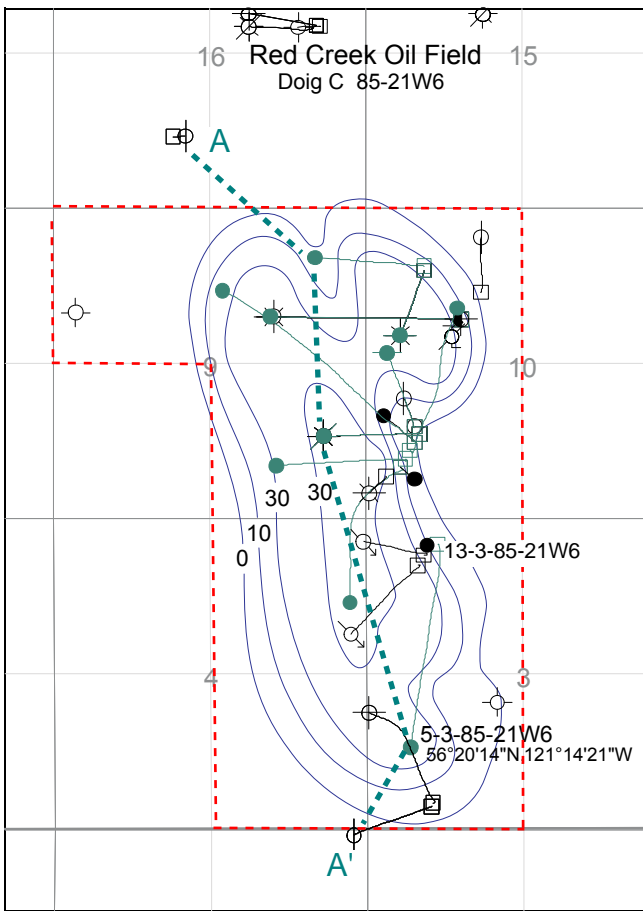
Remaining Recoverable Oil: 442,940 barrels

Remaining Original Oil in Place (%): 97

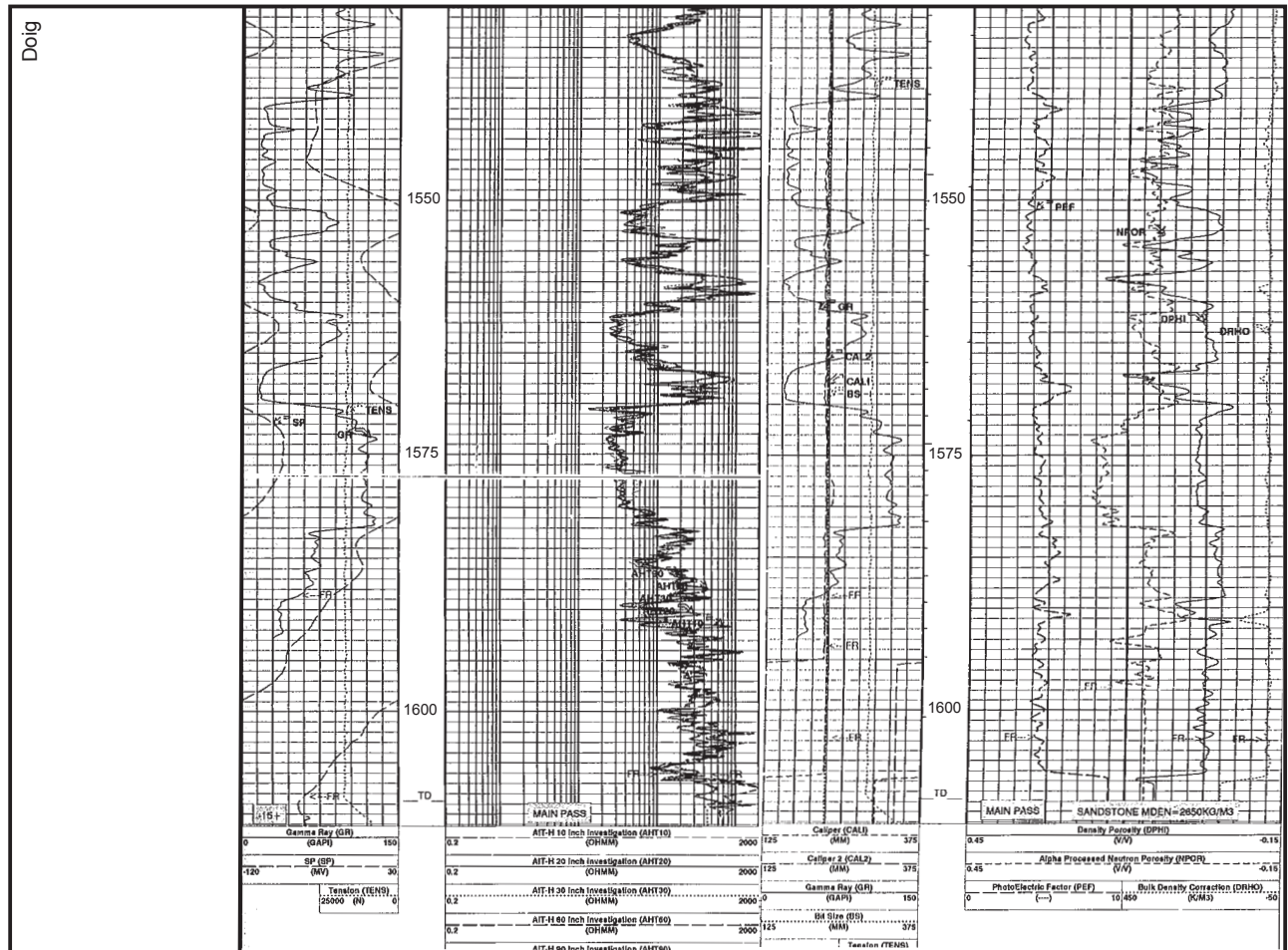
Cumulative Water Production: 168,350 barrels

Cumulative water Injection: 573,380 barrels

Notes: Location 5-3 is a horizontal well producer. Location 13-3 was the vertical pilot hole. Both wells were drilled from a pad at 13-3. The thick Doig pay section is ideal for horizontal development. Nine of the ten producers are horizontal.



Contour interval is ten metres net Doig C oil pay (Oil and Gas Commission). Discovery well is 5-3-85-21W6. Location 13-3 was the vertical pilot hole.



Induction and neutron-density logs for 13-3-85-21W6, which was the pilot hole for horizontal producer 5-3. The Doig sandstone has several thick sections of net pay between 1541 – 1570 metres. This well was not completed; it was used to verify potential in the Doig before horizontal kick-off. The top of Doig is at 1520 metres.

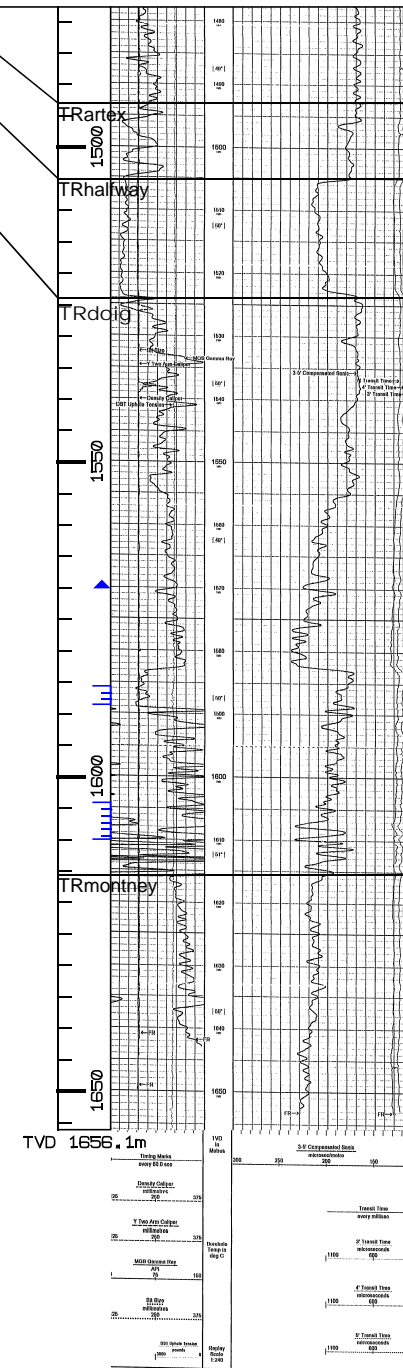
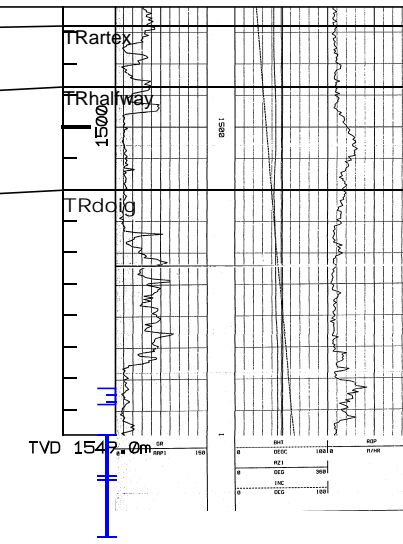
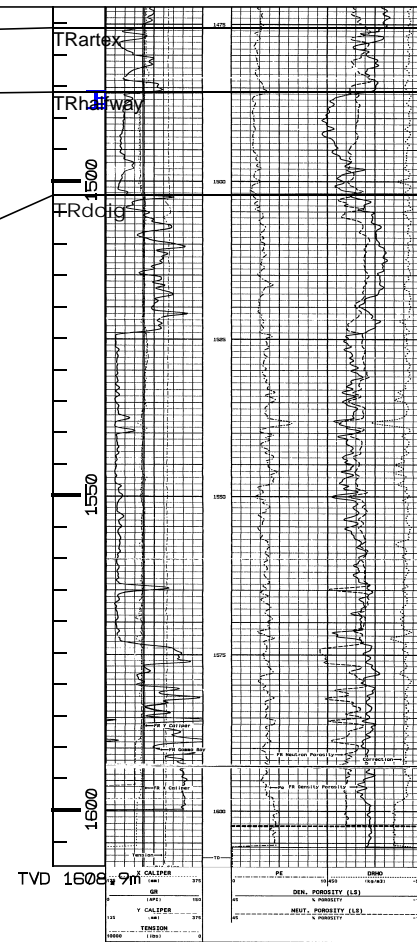
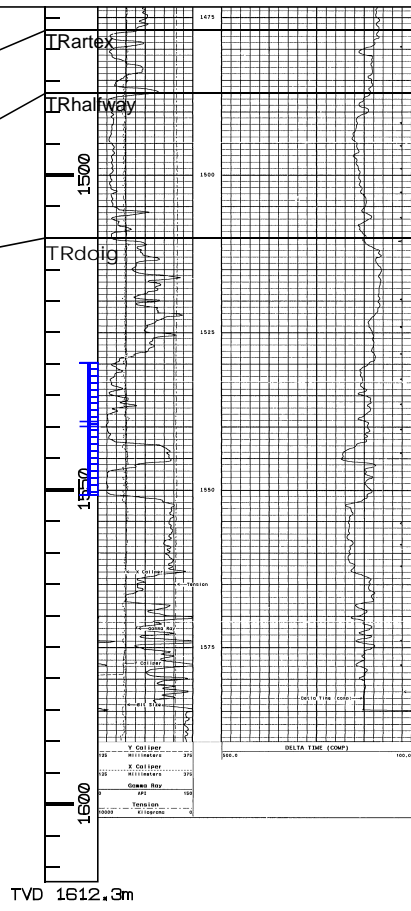
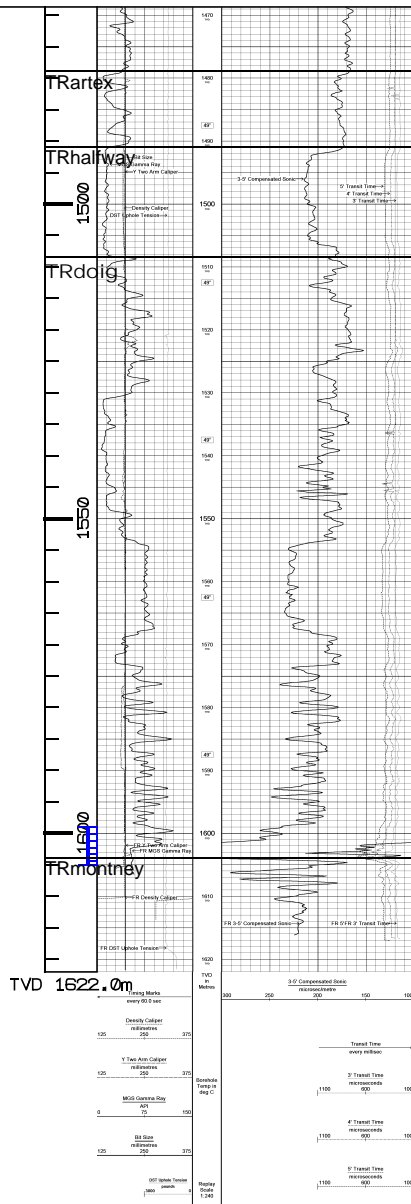
<=924.6m=>

<=930.1m=>

<=1681.9m=>

<=544.0m=>

1:1200



TVD 1612.3m

TVD 1608.9m

TVD 1547.0m

TVD 1656.1m

Red Creek Doig C

BOUDREAU OIL FIELD

Belloy A Pool

Pool Parameters

Field Code: 1880

Pool Code: 6200A

Discovery well original name: TERRA BOUDREAU 14-13-84-21W6

WA#: 10545

Rig Release: 1997/08/10

Other Oil and Gas Shows: Baldonnel, Kiskatinaw

Number of Producing Wells (December 2012) Oil: 1 Active: 1 Disposal: 1

Reservoir Data

Area of Pool: 259 acres, 105 hectares

Average Depth of Producing Zone: 2127 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: structural- stratigraphic

Estimated Maximum Reservoir Thickness: 24 feet, 7.2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 24 feet, 7.2 metres

Average Permeability: not cored; high permeability indicated on Belloy DST

Average Water Saturation (%): 32

Oil Formation Volume Factor (%): 140

Gravity (degrees API): 43

Original Pressure: 2591 psi, 17864 kPa

Reserves

Estimated original oil in place: 2,440,320 barrels, 387,980 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 244,032 barrels, 38,798 m³ (volumetric)

Cumulative Oil Production: 210,280 barrels, 33,432 m³

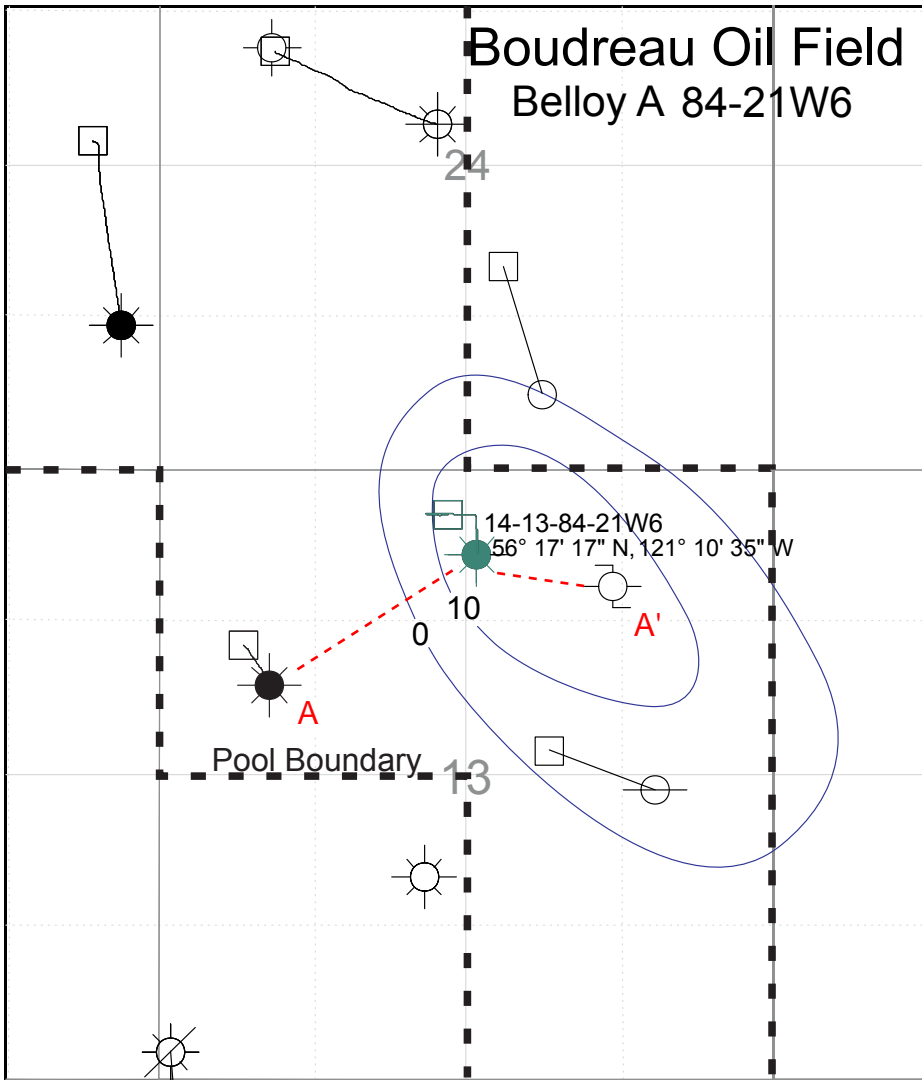
Remaining Recoverable Oil: 33,750 barrels, 5,366 m³

Remaining Original Oil in Place (%): 91

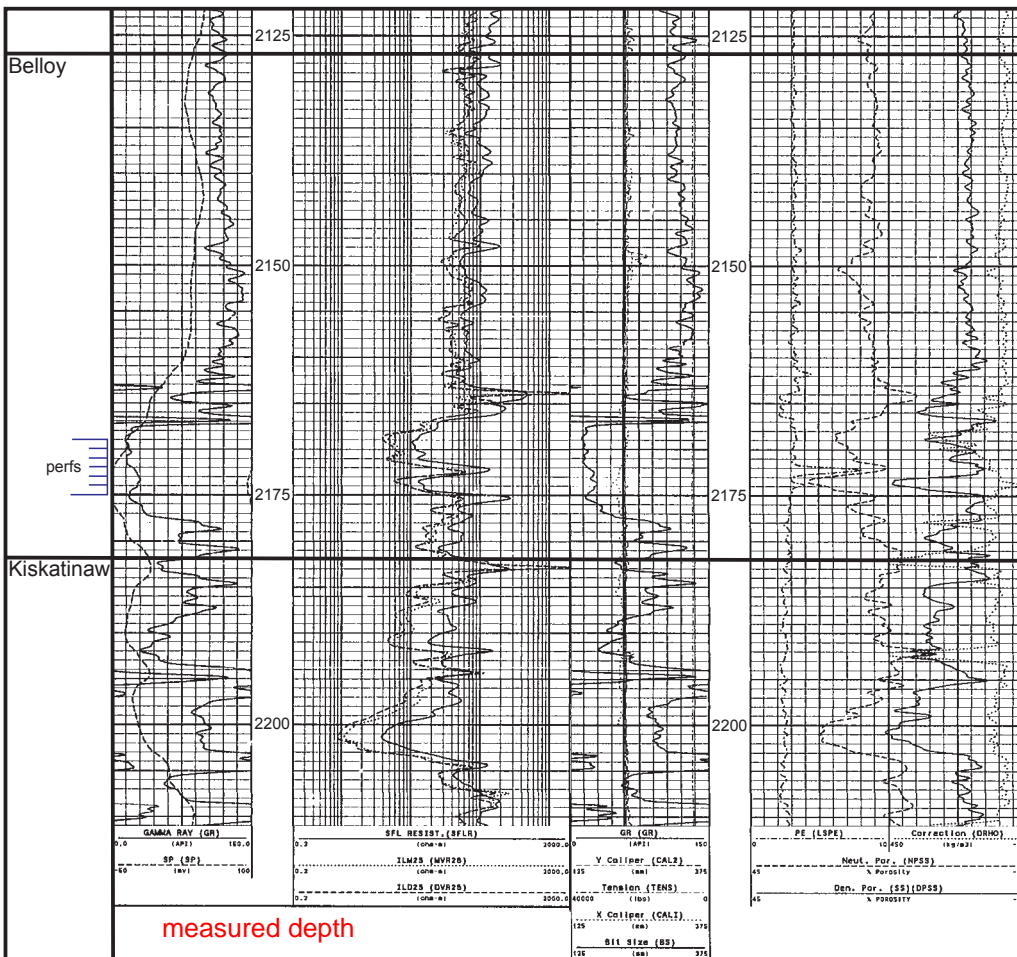
Cumulative Water Production: 75,080 barrels, 11,937 m³

Notes: Discovery well 14-13 is deviated. Water cut has increased with time, especially after disposal well 15-13 came into operation in 2004. The disposal well at 15-13 (suspended) is structurally higher than 14-13. The Belloy Formation was deposited in a shallow, stable platform, marine environment.

Boudreau Oil Field Belloy A 84-21W6



Discovery well 14-13-84-21W6 is the only oil producer in the Belloy A field. The other well in the pool at 15-13 is disposal. Contour interval, as supplied by the Oil and Gas Commission, is 10 metres.



Induction and neutron-density logs for discovery well 14-13-84-21W6. Perfs for the Belloy are 2132.8-2139.2 metres TVD. The microlog indicates fair to good permeability over the perfed interval.



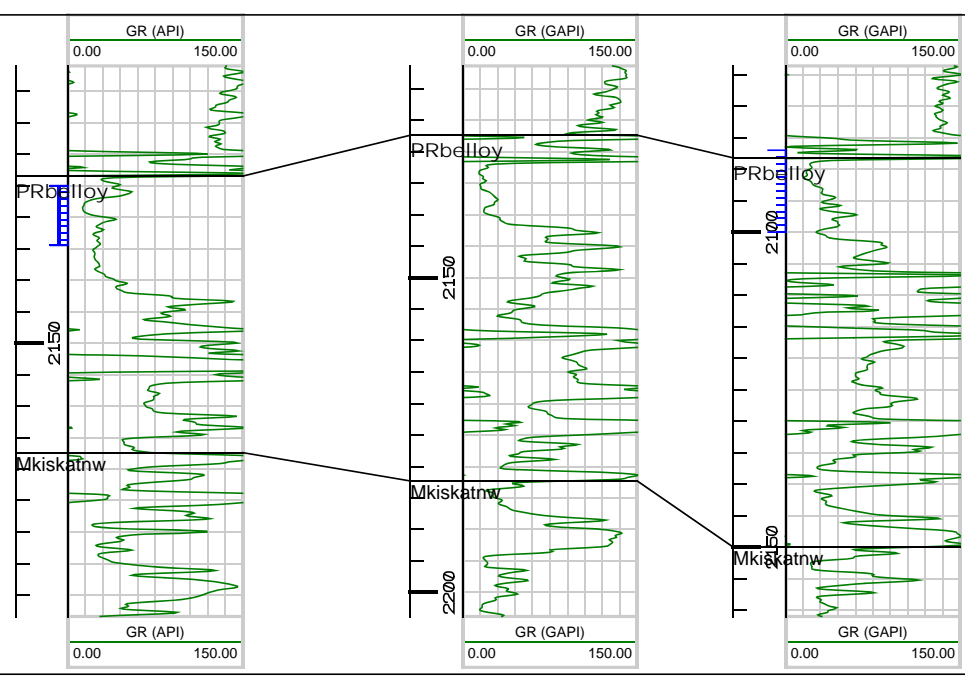
<=649.6m=>



<=371.7m=>



1:1200



Boudreau Belloy A

BEAR FLAT OIL FIELD

Bear Flat B Pool

Pool Parameters

Field Code: 0380

Pool Code: 4582B

Discovery well original name: ARL BEAR FLAT A7-29-84-20W6M

WA#: 13572

Rig Release: 2000/11/24

Other Oil and Gas Shows: Cecil gas, Halfway gas

Number of Wells (January 2013) Oil: 1 **Active:** 1

Reservoir Data

Average Depth of Producing Zone: 1426 metres

Lithology of Reservoir Rock: Anhydritic and dolomitic sandstone

Trap Type: Stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Area of Pool (acres/hectares): approximately 280 hectares or 690 acres within contour limits

Drive Mechanism: gas depletion

Average Porosity (%): 14

Average Net Pay: 1.1 metres

Average Permeability: not cored

Average Water Saturation (%): 22

Oil Formation Volume Factor (%): 126

Gravity (degrees API): 38.8

Original Pressure (psi/kpa): 1840 psi, 12687 kPa

Reserves

Estimated oil in place: 1,005,600 barrels, 159,878 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 150,840 barrels, 23,982 m³ (material balance)

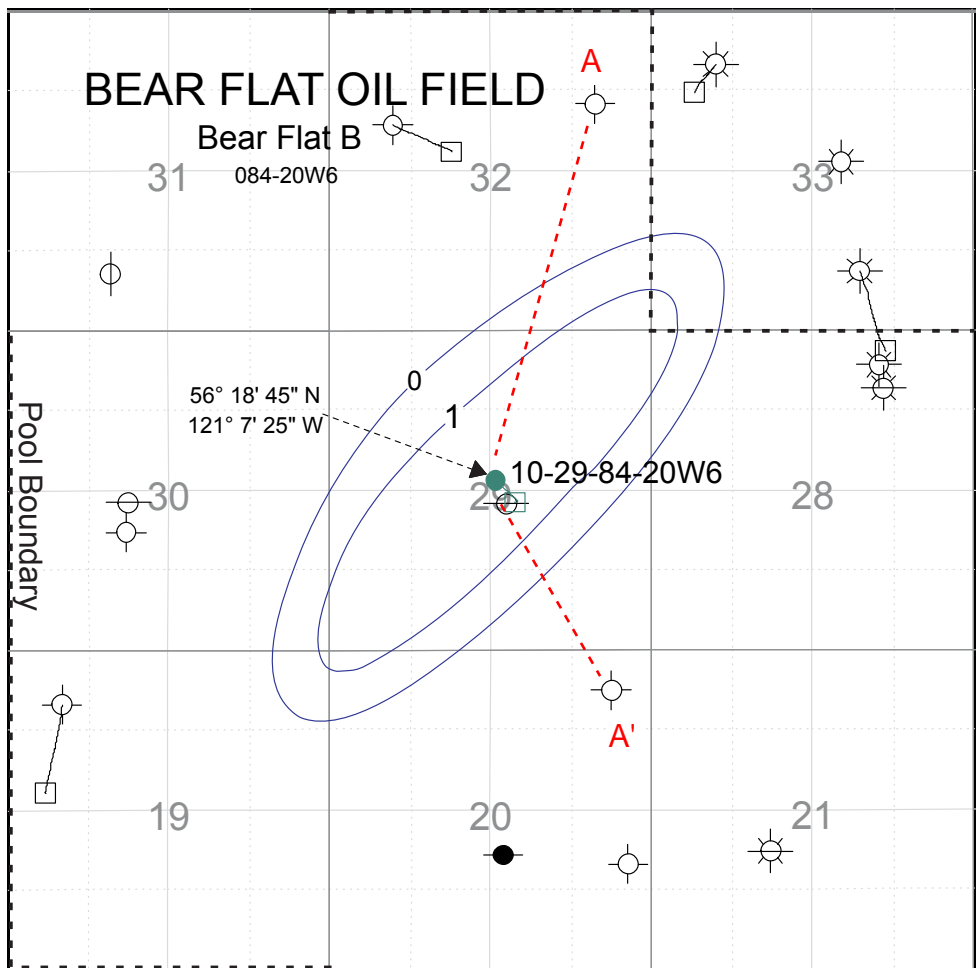
Cumulative Production: 105,820 barrels

Remaining Recoverable Oil: 45,020 barrels

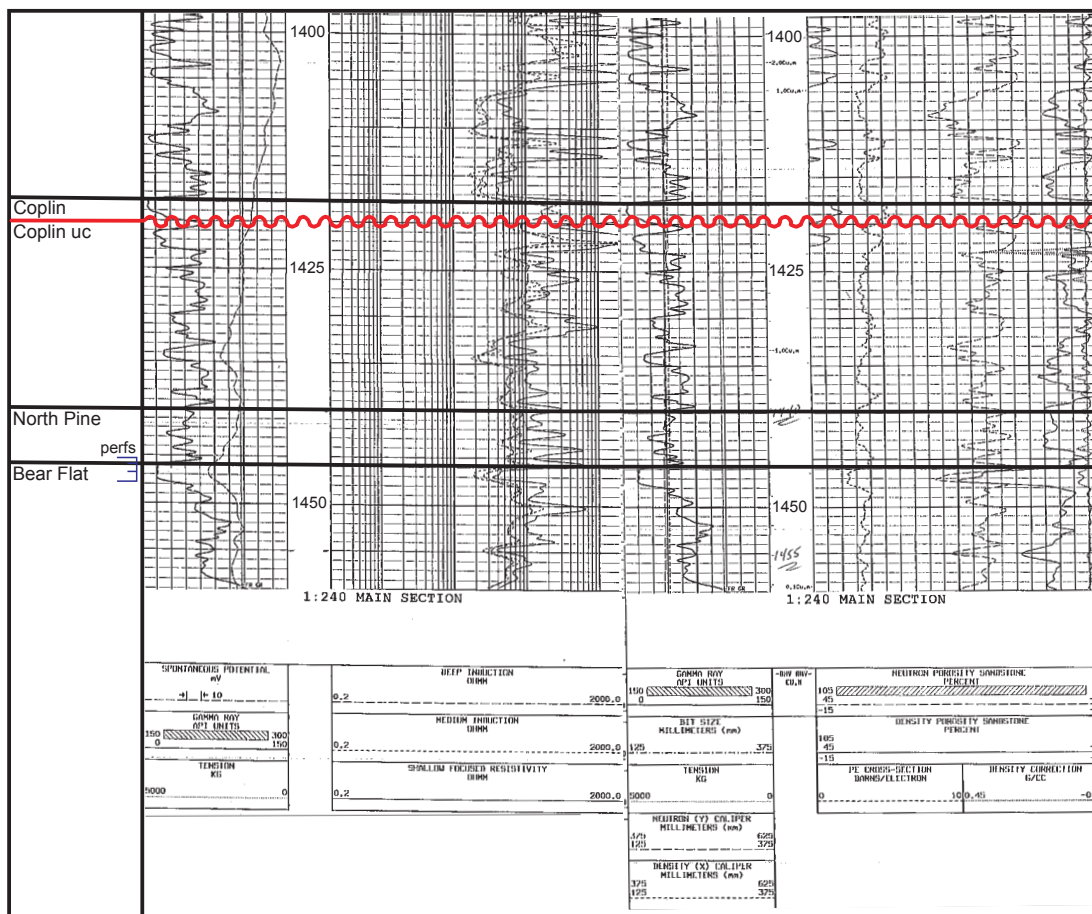
Original Oil in Place Remaining (%): 90

Cumulative water production: 4,070 barrels

Notes: Discovery well is deviated (bottom hole location 102/10-29-84-20W6M, TVD 1428.5m, MD 1480.0m). Correlative sands were not tested or completed in nearby abandoned offsets. The Bear Flat is a member of the Charlie Lake Formation.



Bear Flat B oil pool extends over sections 29 and 32 of Township 84-20W6M. The discovery well is at 10-29 (deviated). Net pay contours are courtesy of the Oil and Gas Commission.



Induction and neutron-density logs for discovery well 10-29-84-20W6M. The pay interval is the thinly bedded, clean sand at the top (1445.5-1448.0 metres measured depth) of the coarsening upward Bear Flat Formation. This log is showing measured depth.



1999/07/25

<=1995.1m=>



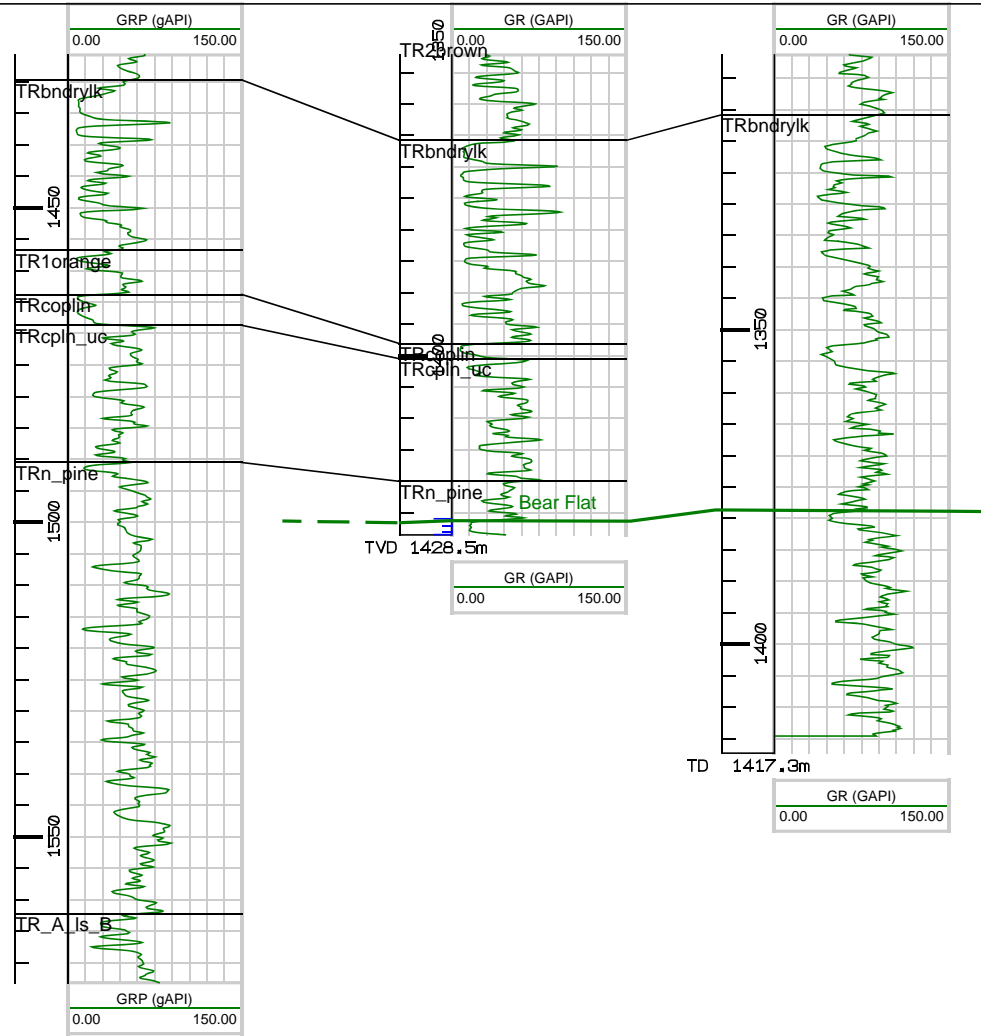
2000/11/24

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1969/03/10

1:1200



Bear Flat Bear Flat B

EAGLE WEST OIL FIELD

Belloy A Pool

Pool Parameters

Field Code: 3445 **Pool Code:** 6200A
Discovery well original name: Norcen Eagle 8-32-84-18W6 **WA#:** 04682
Rig Release: 1979/07/04
Producing Zone: Belloy A
Number of Wells (October 2012) Oil: 96 **Gas:** 2 **Injection:** 24 **Active:** 39
Water Observation: 4

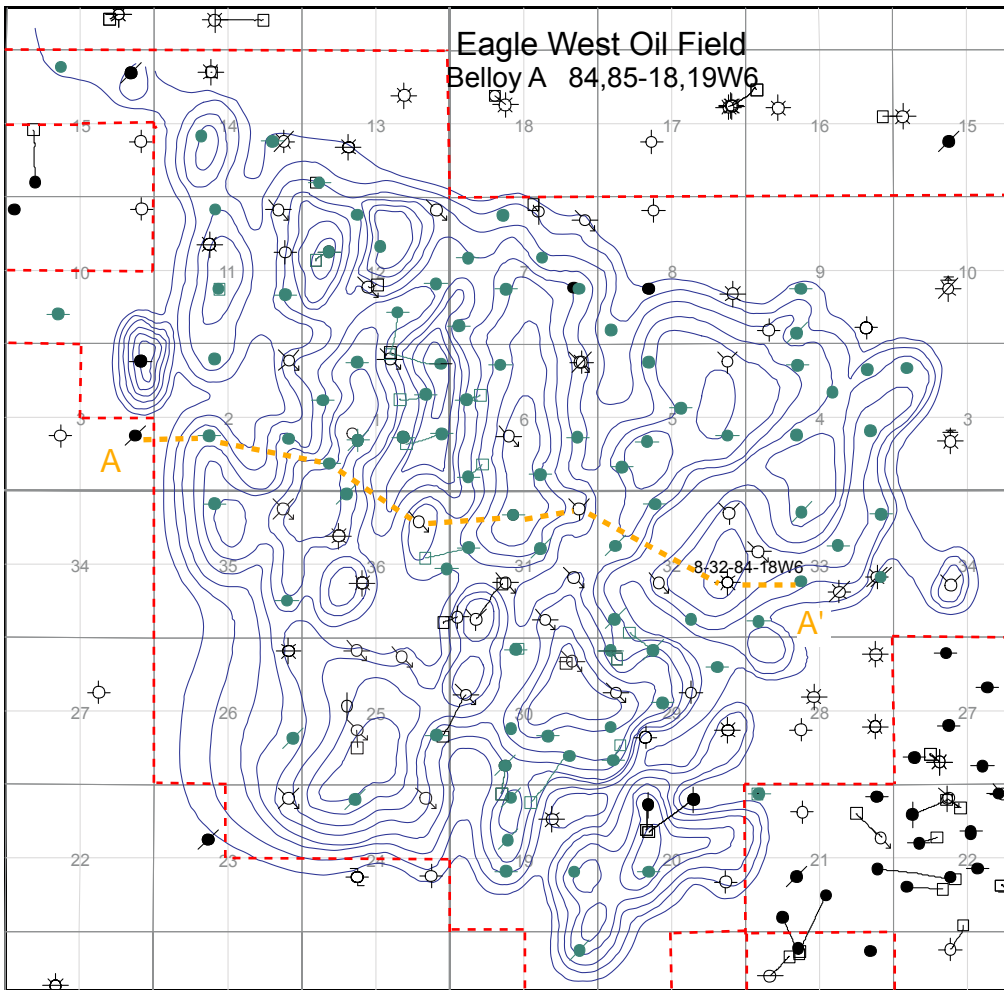
Reservoir Data

Area of Pool:
Average Depth of Producing Zone: 1850 metres
Lithology of Reservoir Rock: sandstone
Trap Type: structural-stratigraphic
Estimated Maximum Reservoir Thickness: 14 metres
Drive Mechanism: gas depletion
Average Porosity (%): 11.6
Average Net Pay: 3 metres
Average Permeability: 29 milliDarcies
Average Water Saturation (%): 30.5
Oil Formation Volume Factor (%): 129.1
Gravity (degrees API): 40.6
Original Pressure: 2437 psi; 16803 kPa

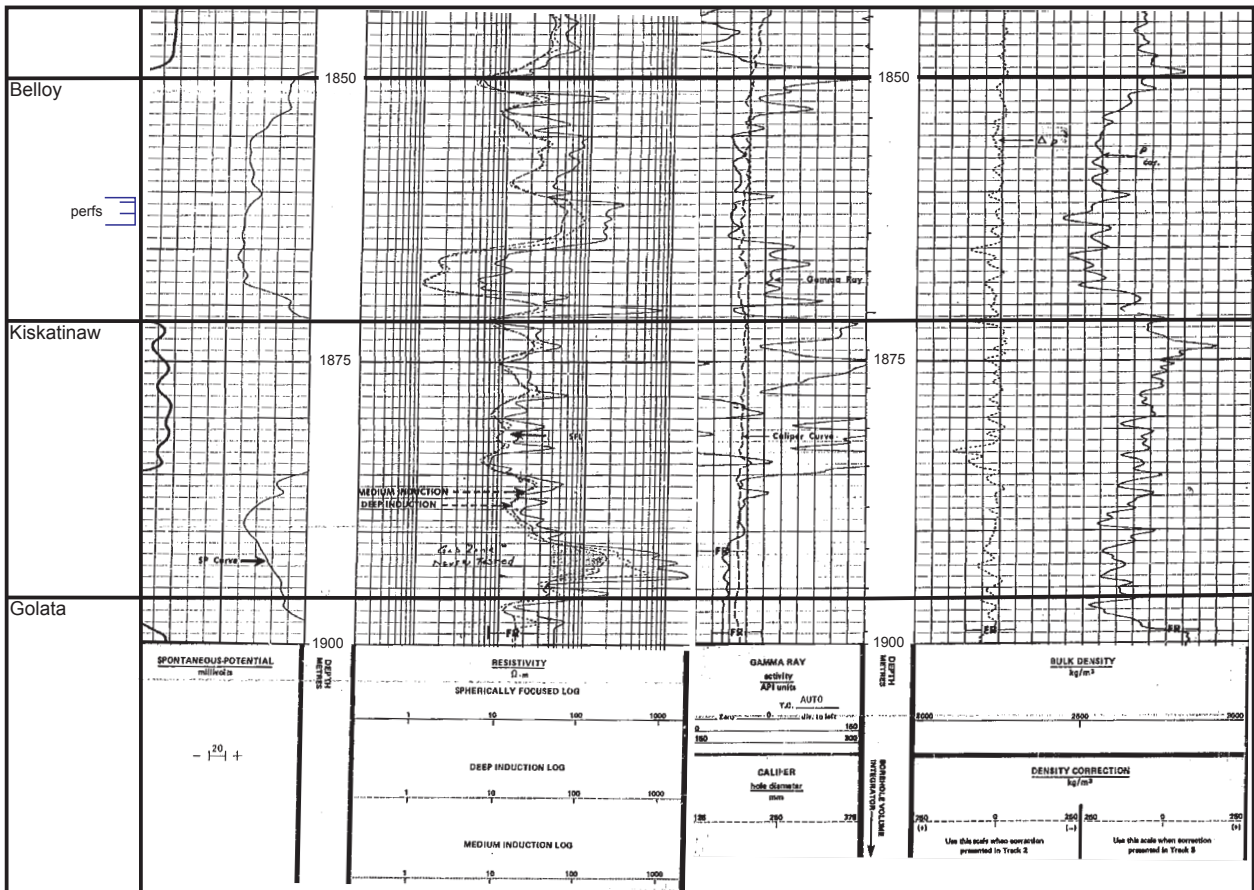
Reserves

Estimated original oil in place: 148,995,680 barrels; 23,688,421 m3
Recovery Factor (%): 31
Estimated Recoverable Oil: 46,308,010 barrels, 7,362,385 m3
Cumulative Oil Production: 42,813,200 barrels, 6,806,755 m3
Remaining Recoverable Oil: 3,494,810 barrels, 555,630 m3
Remaining Original Oil in Place (%): 71
Cumulative Water Production: 6,784,410 barrels
Cumulative Water Injection: 75,814,990 barrels

Notes: The Belloy might be sufficiently thick in the middle of the field for horizontal drilling (none yet drilled). It is bounded to the north by a fault and many small block faults within the field determine distribution of pay. Stratigraphic controls determine distribution and quality of porosity. Abundant water has been injected for enhanced recovery. Earthquake activity might be attributable to the introduction of water under pressure (Horner et al, 1994).



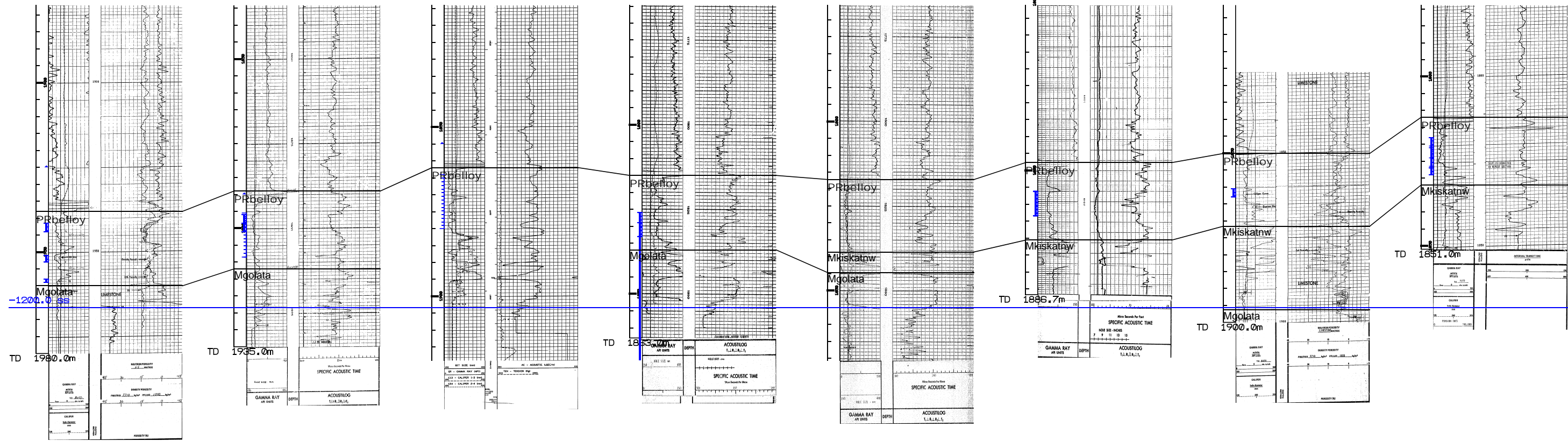
Discovery well 8-32-84-18W6 is located in the east central part of the field. Contours are 2 metres net Belloy A oil pay (Oil and Gas Commission). Not shown on the map is a normal fault bounding the northern edge of the field.



Induction and bulk density logs for discovery well 8-32-84-18W6. Completion is restricted to the oil leg. Hydrocarbon bearing rock is over 10 metres thick.

A

A'



Eagle West Belloy A

CECIL LAKE OIL FIELD

Cecil D Pool

Pool Parameters

Field Code: 2960

Pool Code: 4580A

Discovery well original name: Monsanto Cecil 6-6-85-17W6

WA#: 03806

Rig Release: 1976/11/05

Other Oil and Gas Shows: Siphon oil

Number of Wells (October 2012) Oil: 10 **Active:** 9 **Injection:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 4136 feet, 1261 metres

Lithology of Reservoir Rock: anhydritic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4 metres

Drive Mechanism: gas injection

Average Porosity (%): 15

Average Net Pay: 1.5 metres

Average Permeability: 249 milliDarcies

Average Water Saturation (%): 19

Oil Formation Volume Factor (%): 125

Gravity (degrees API): 33

Original Pressure: 1756 psi, 12,107 kPa

Reserves

Estimated original oil in place: 5,617,290 barrels, 893,078 m³

Recovery Factor (%): 40

Estimated Recoverable Oil: 2,246,920 barrels, 357,232 m³ (production decline)

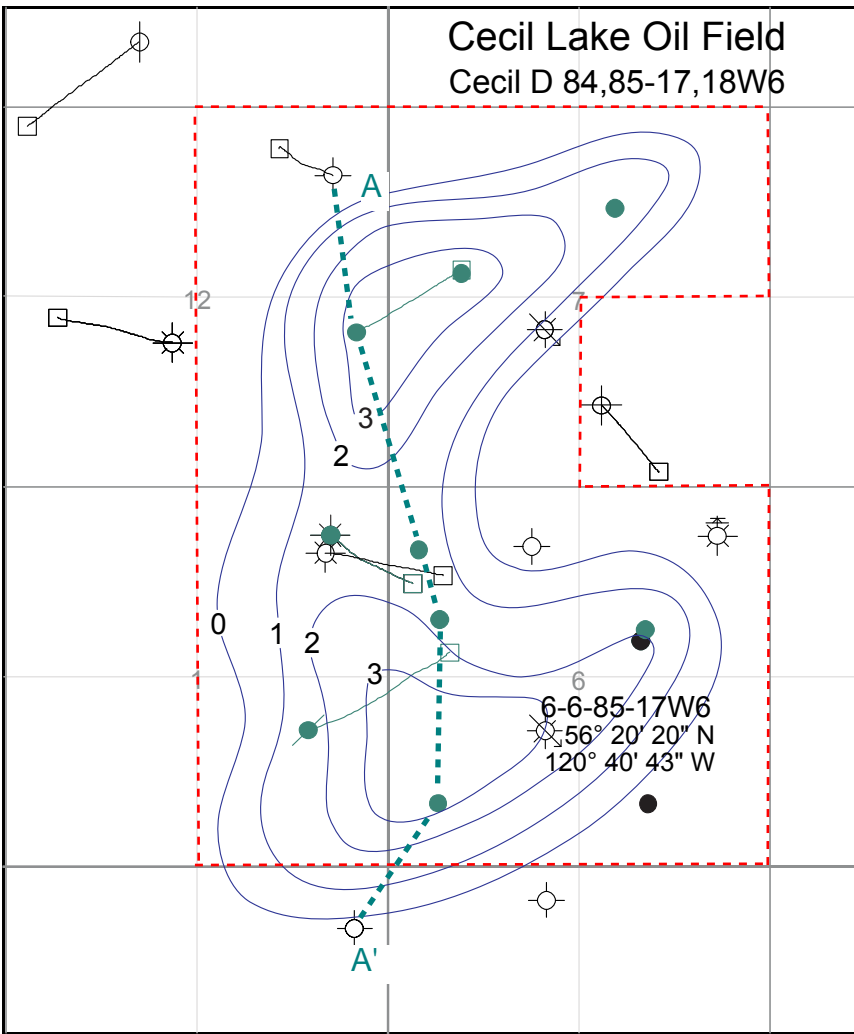
Cumulative Oil Production: 2,050,900 barrels

Remaining Recoverable Oil: 196,020 barrels

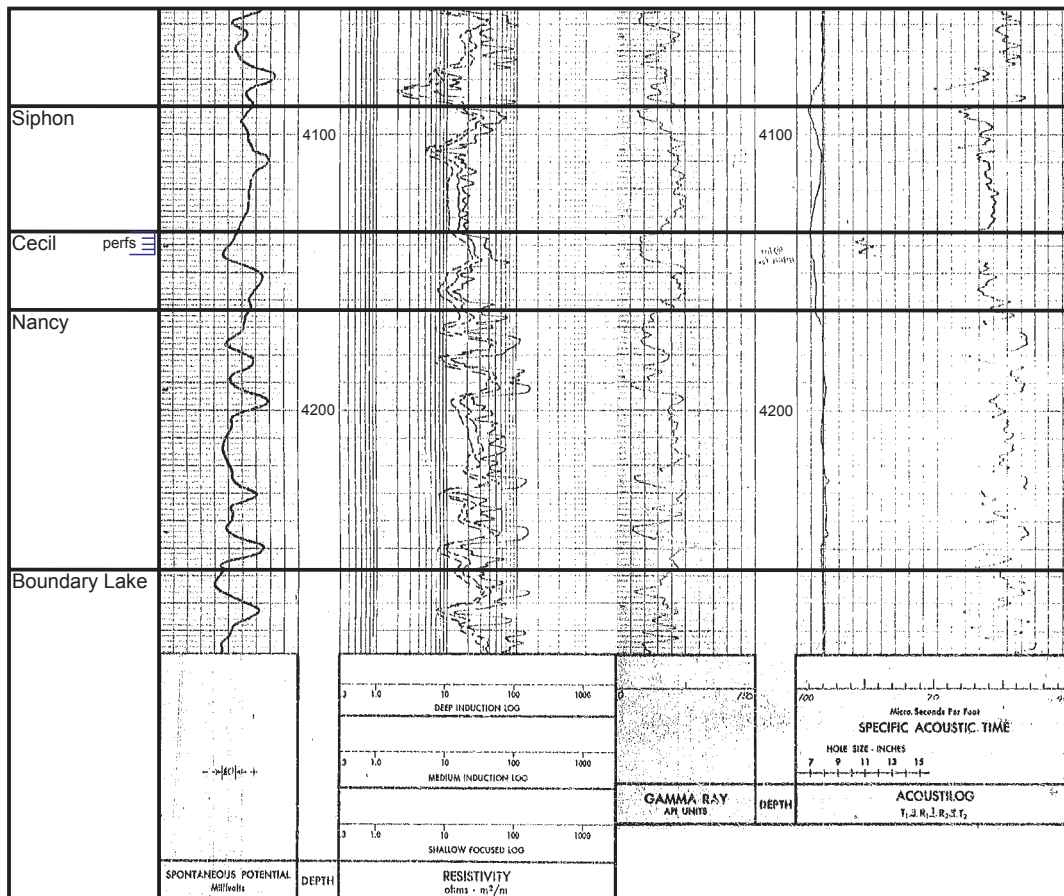
Remaining Original Oil in Place (%): 64

Cumulative Water Production: 24,620 barrels

Notes: Gas injection likely contributes to high recovery factor. The Cecil core shows streaks of permeability of over one darcy. Water cut is low.



Contour interval (supplied by Oil and Gas Commission) is one metre Cecil net pay. Discovery well 6-6-85-17W6 is now a gas injection well.



Induction and sonic log for discovery well 6-6-85-17W6. Note the low velocity (high porosity) on the sonic log for the completion interval at the top of the Cecil.

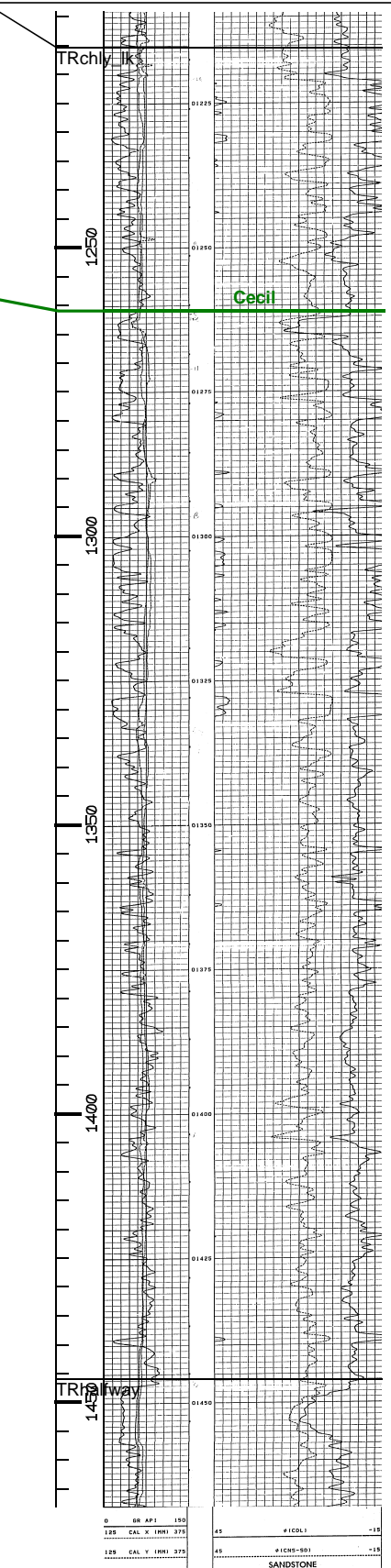
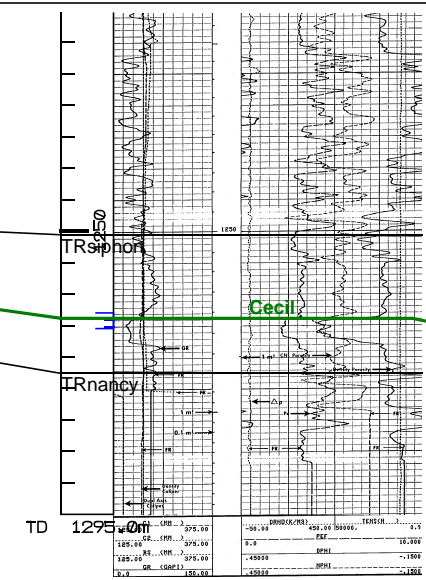
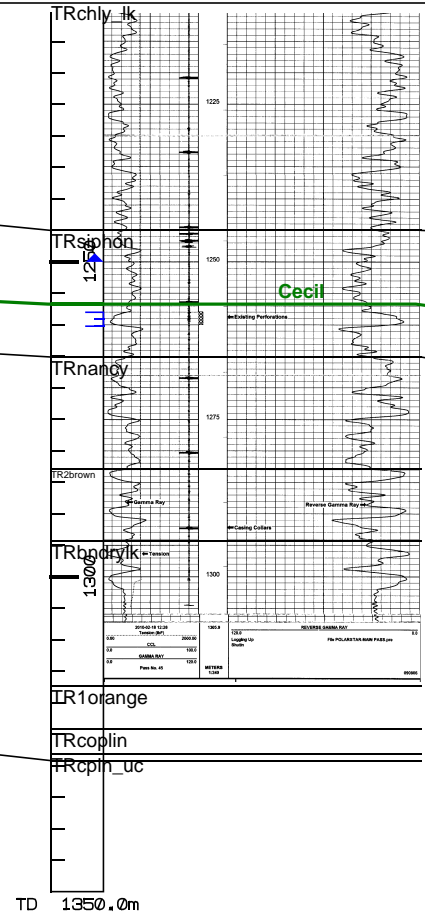
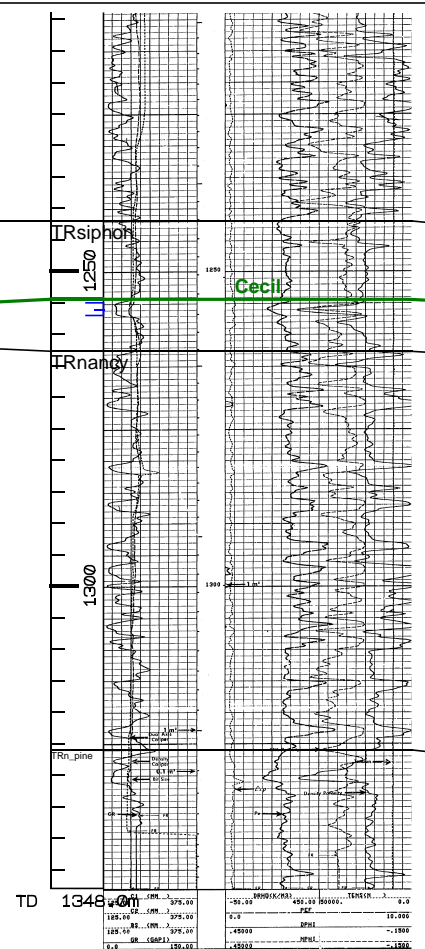
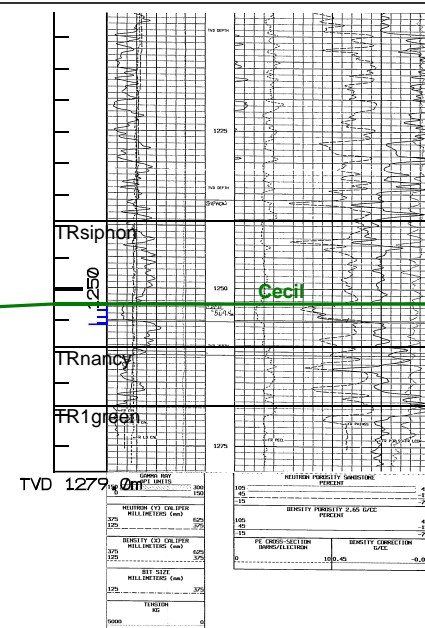
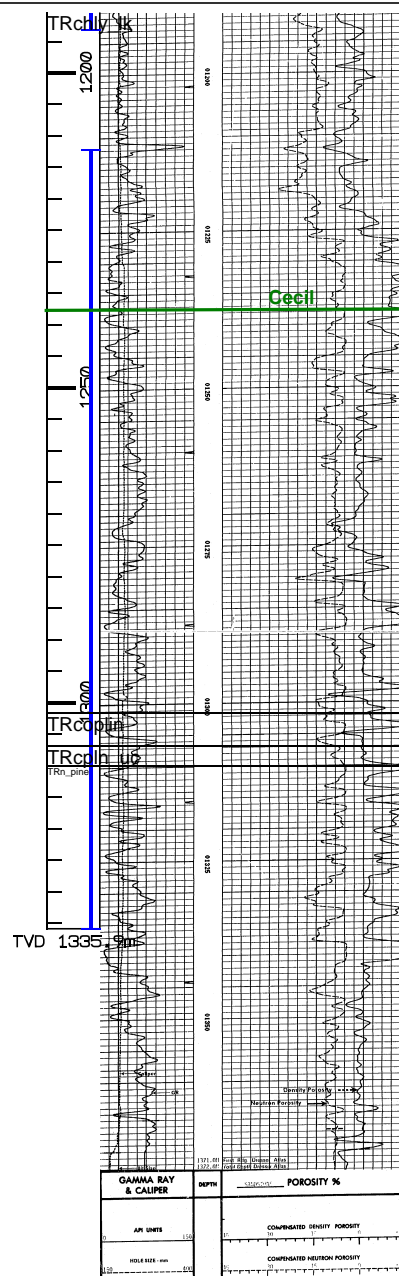
<=677.6m=>

<=963.5m=>

<=307.4m=>

<=785.4m=>

<=640.9m=>



Cecil Lake Cecil D

1:1200

CECIL LAKE OIL FIELD

North Pine A Pool

Pool Parameters

Field Code: 2960 **Pool Code:** 4580A
Discovery well original name: Scurry ML CAEL Cecil 10-24-84-18W6 **WA#:** 03045
Rig Release: 1972/02/11
Other Oil and Gas Shows: Bear Flat gas
Number of Wells (October 2012) Oil: 5 **Gas:** 6 **Injection:** 1 **Active:** 7

Reservoir Data

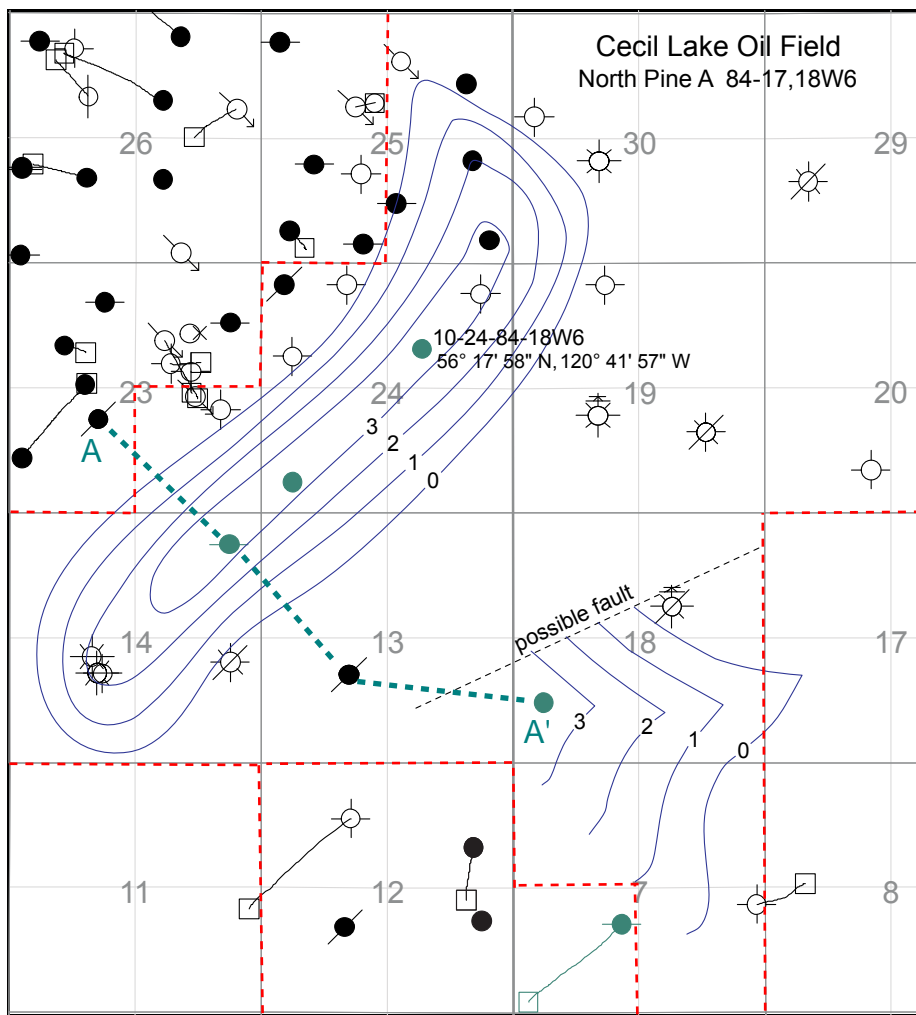
Area of Pool:
Average Depth of Producing Zone: 4561 feet, 1390 metres
Lithology of Reservoir Rock: sandstone
Trap Type: structural
Estimated Maximum Reservoir Thickness: 3.5 metres
Drive Mechanism: gas cap expansion
Average Porosity (%): 13.7
Average Net Pay: 5 feet, 1.5 metres
Average Permeability: 315 milliDarcies
Average Water Saturation (%): 13
Oil Formation Volume Factor (%): 125.9
Gravity (degrees API): 40.4
Original Pressure: 1938 psi, 13362 kPa

Reserves

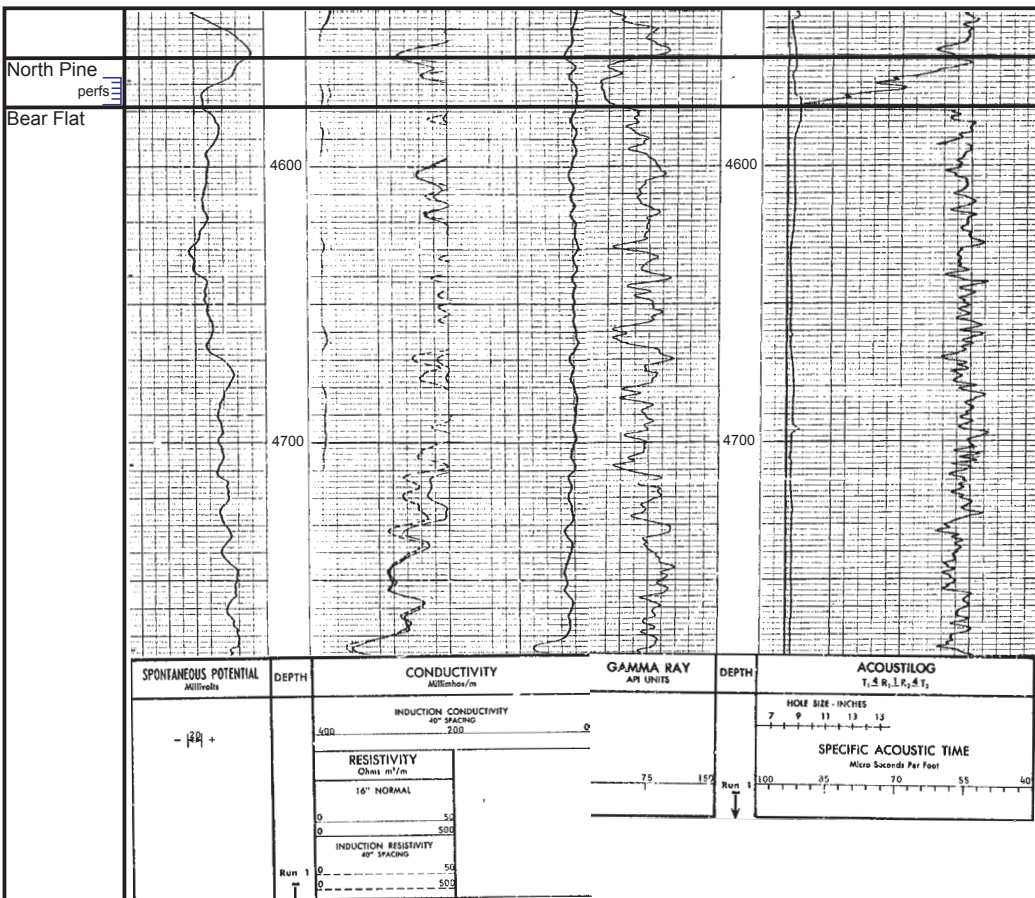
Estimated original oil in place: 5,347,100 barrels, 850,121 m³
Recovery Factor (%): 25
Estimated Recoverable Oil: 1,348,480 barrels, 214,391 m³ (production decline)
Cumulative Oil Production: 1,152,870 barrels
Remaining Recoverable Oil: 195,610 barrels
Remaining Original Oil in Place (%): 78
Cumulative Water Production: 15,310 barrels
Cumulative Water Injection: 0

Notes:

The North Pine here has very good permeability and low sw. The area of the pool to the southeast of the fault is difficult to estimate. Extent of the pool is uncertain.



The North Pine A oil pool is divided into two parts with an interpreted fault separating the two portions (Oil and Gas Commission). Throw is estimated to be about forty metres to the southeast. The extent of the pool south of the fault is unclear. Discovery well is 10-24-84-18W6



Elog and sonic log for discovery well 10-24-84-18W6. Note the very high porosity (low velocity) for the North Pine Member. 154

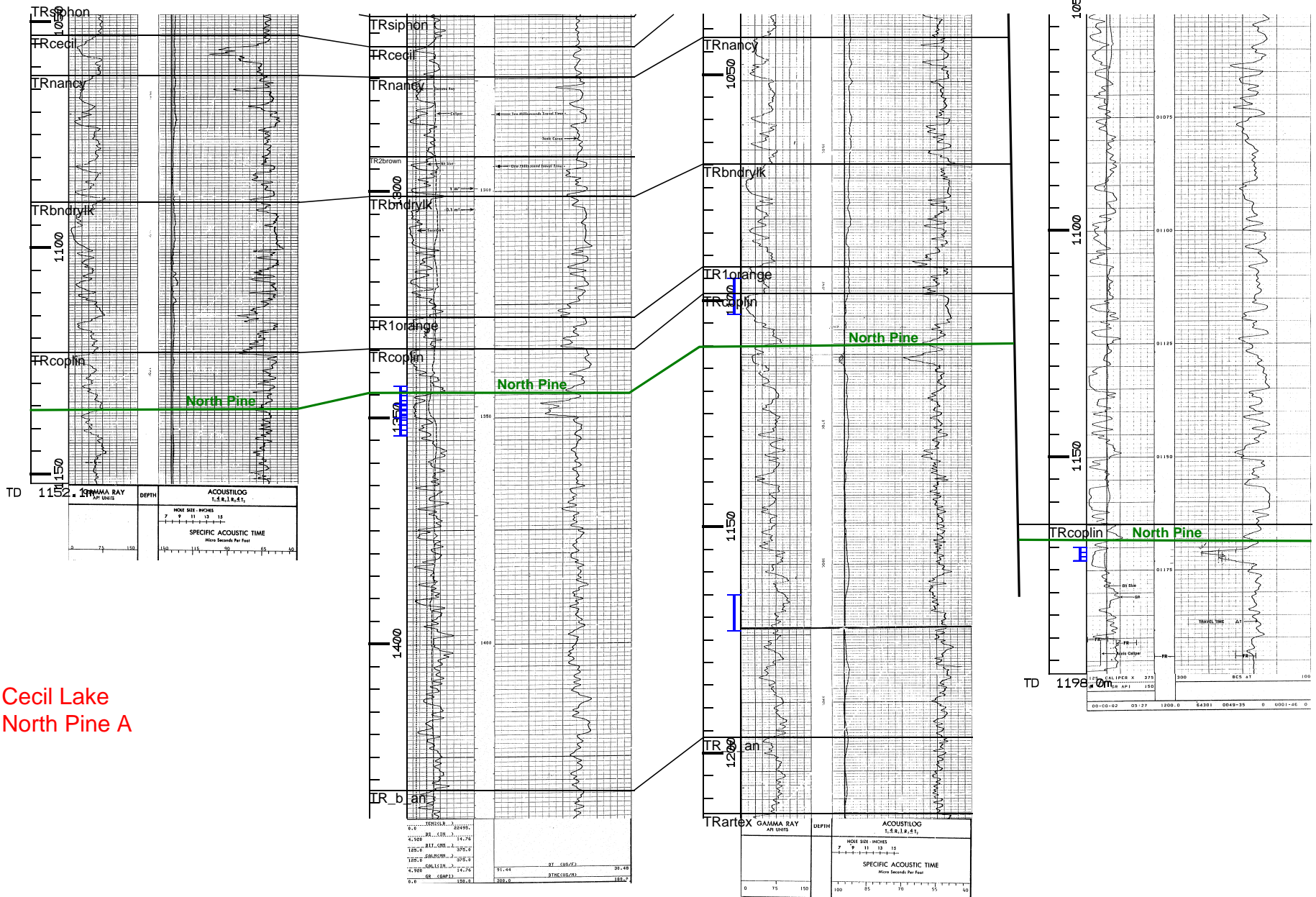
<=1170.6m=>

<=1149.1m=>

<=1275.2m=>

A

A'



CECIL LAKE OIL FIELD

North Pine C Pool

Pool Parameters

Field Code: 2960

Pool Code: 4580C

Discovery well original name: Monsanto Cecil 6-7-84-17W6

WA#: 03804

Rig Release: 1976/11/28

Other Oil and Gas Shows: Bear Flat gas

Number of Wells (October 2012) Oil: 3 Active: 2

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 4505 feet, 1373 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural

Estimated Maximum Reservoir Thickness: 13 feet, 4 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 13

Average Net Pay: 9 feet, 2.7 metres

Average Permeability: 130 milliDarcies

Average Water Saturation (%): 10.9

Oil Formation Volume Factor (%): 125.9

Gravity (degrees API): 40

Original Pressure: 1925 psi, 13,272 kPa

Reserves

Estimated original oil in place: 3,813,070 barrels, 606,230 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 762,610 barrels, 121,245 m³ (production decline)

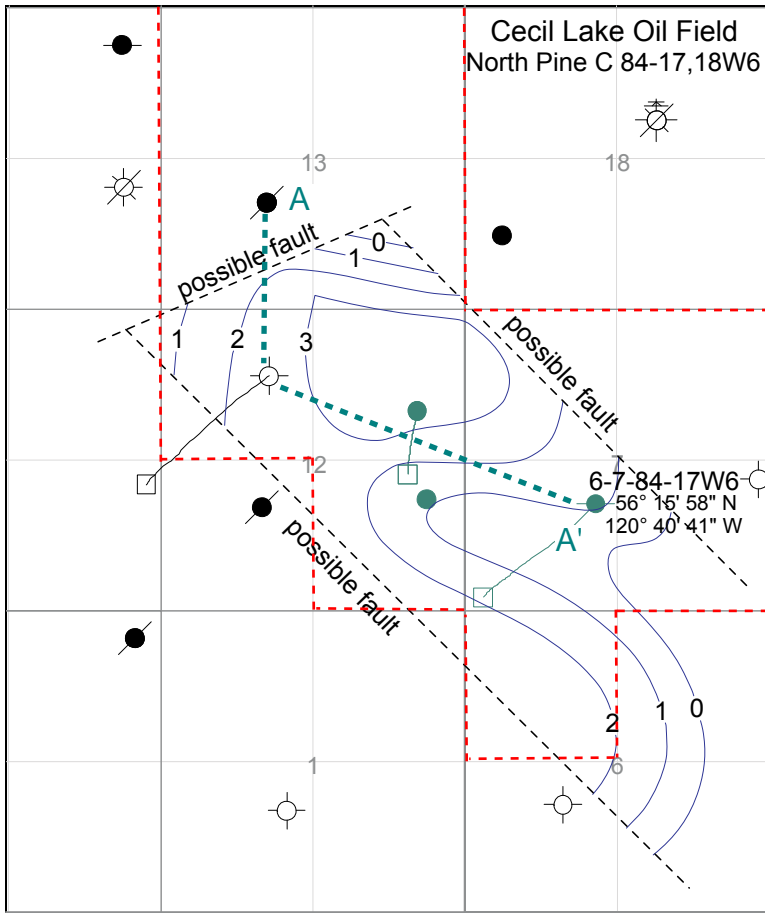
Cumulative Oil Production: 719,340 barrels

Remaining Recoverable Oil: 43,270 barrels

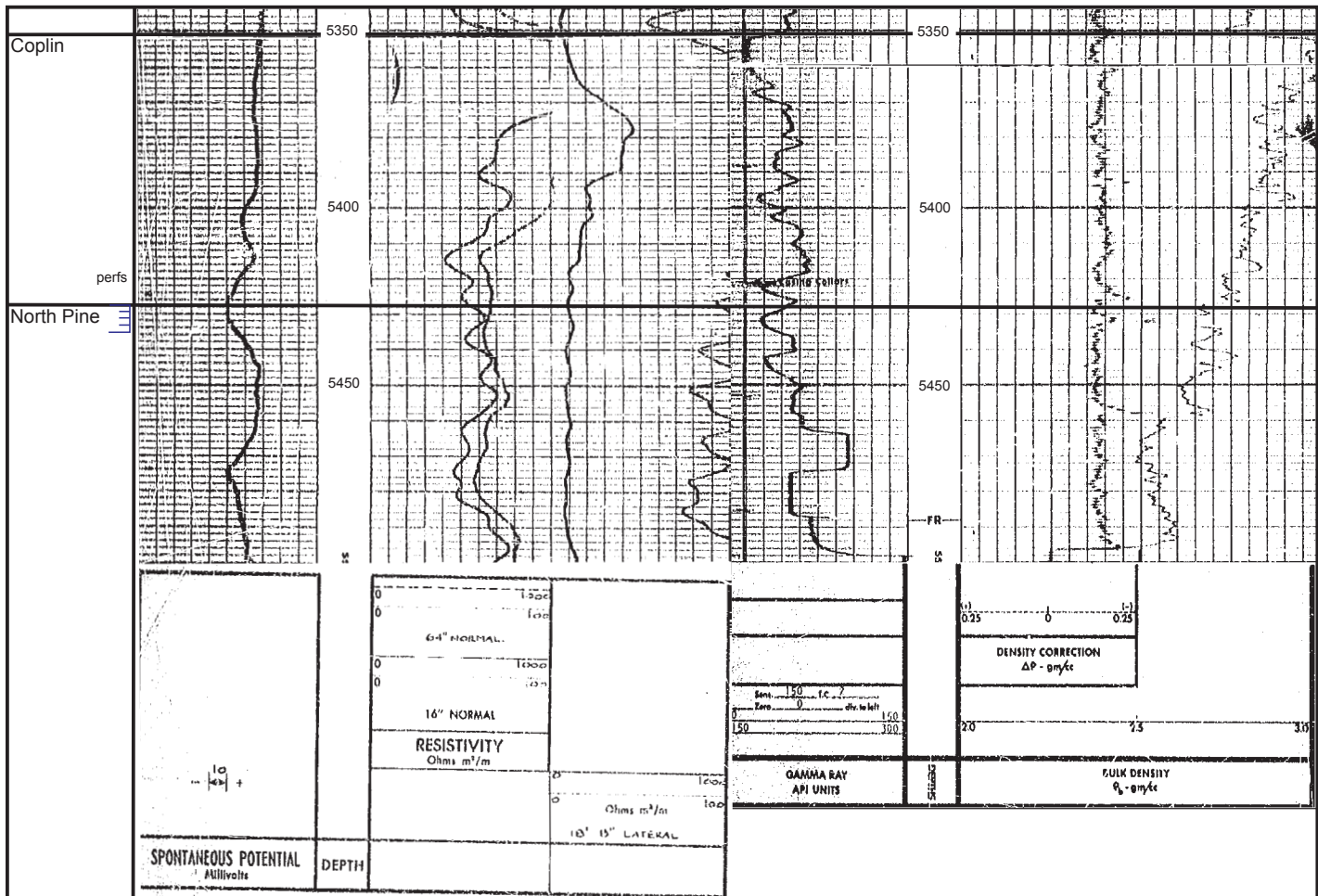
Remaining Original Oil in Place (%): 81

Cumulative Water Production: 2,650 barrels

Notes: The extent of the pool is uncertain to the southeast. It has a low water cut.



Contour interval(adapted from Oil and Gas Commission) is one metre North Pine C net oil pay. Faults constrain the pool on three sides. Southeastern extent is unclear.



Elog and bulk density logs for discovery well 6-7-84-17W6. Production is from a thin sand at the top of the North Pine. These logs show measured depth.



<=3052.7ft=>



<=6179.6ft=>

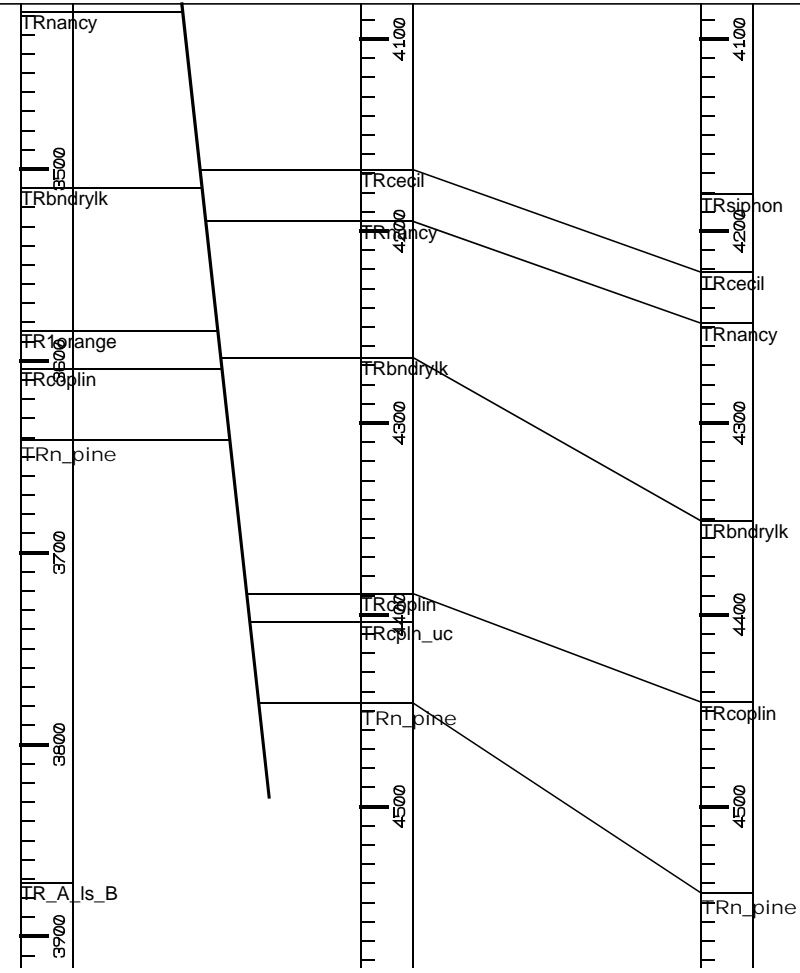


1972/09/24

1995/02/10

1976/11/28

1:1200



Cecil Lake North Pine C

CECIL LAKE OIL FIELD

Siphon A Pool

Pool Parameters

Field Code: 2960

Pool Code: 4510A

Discovery well original name: Brascan Cecil 6-5-85-17W6

WA#: 04909

Rig Release: 1979/06/19

Other Oil and Gas Shows: Cecil oil, North Pine gas

Number of Wells (November 2012) Oil: 9 **Active:** 6

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1273 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas depletion

Average Porosity (%): 9.5

Average Net Pay: 1.1 metre

Average Permeability: 100 milliDarcies based upon core at 6-8-85-17W6

Average Water Saturation (%): 24

Oil Formation Volume Factor (%):

Gravity (degrees API): 34.4

Original Pressure: 1675 psi, 11,549 kPa

Reserves

Estimated original oil in place: 5,221,600 barrels, 830,168 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 1,044,320 barrels, 166,034 m³ (production decline)

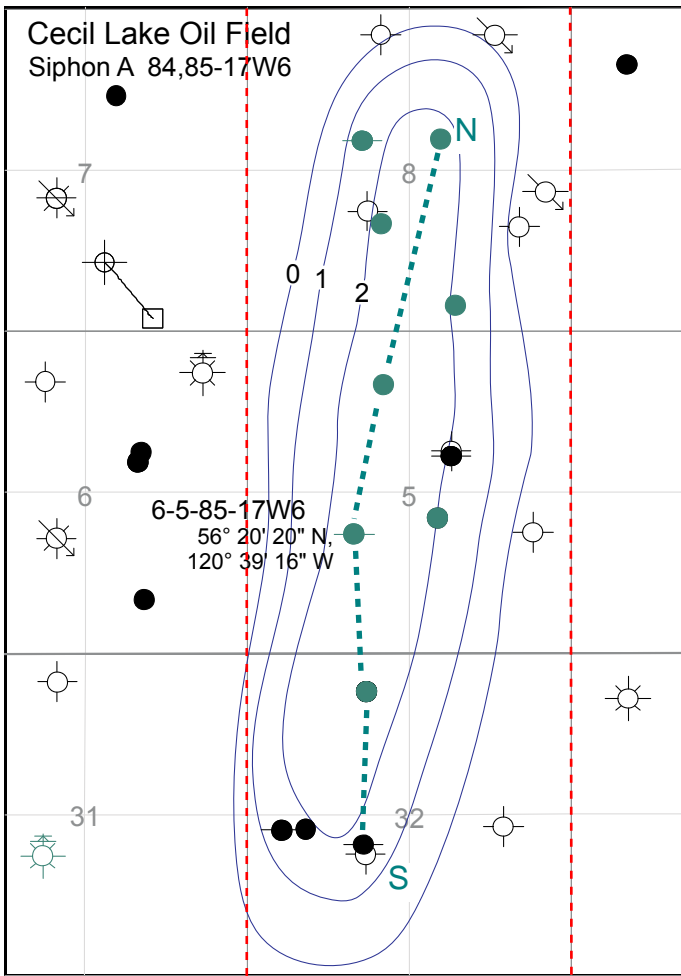
Cumulative Oil Production: 962,020 barrels

Remaining Recoverable Oil: 82,230 barrels

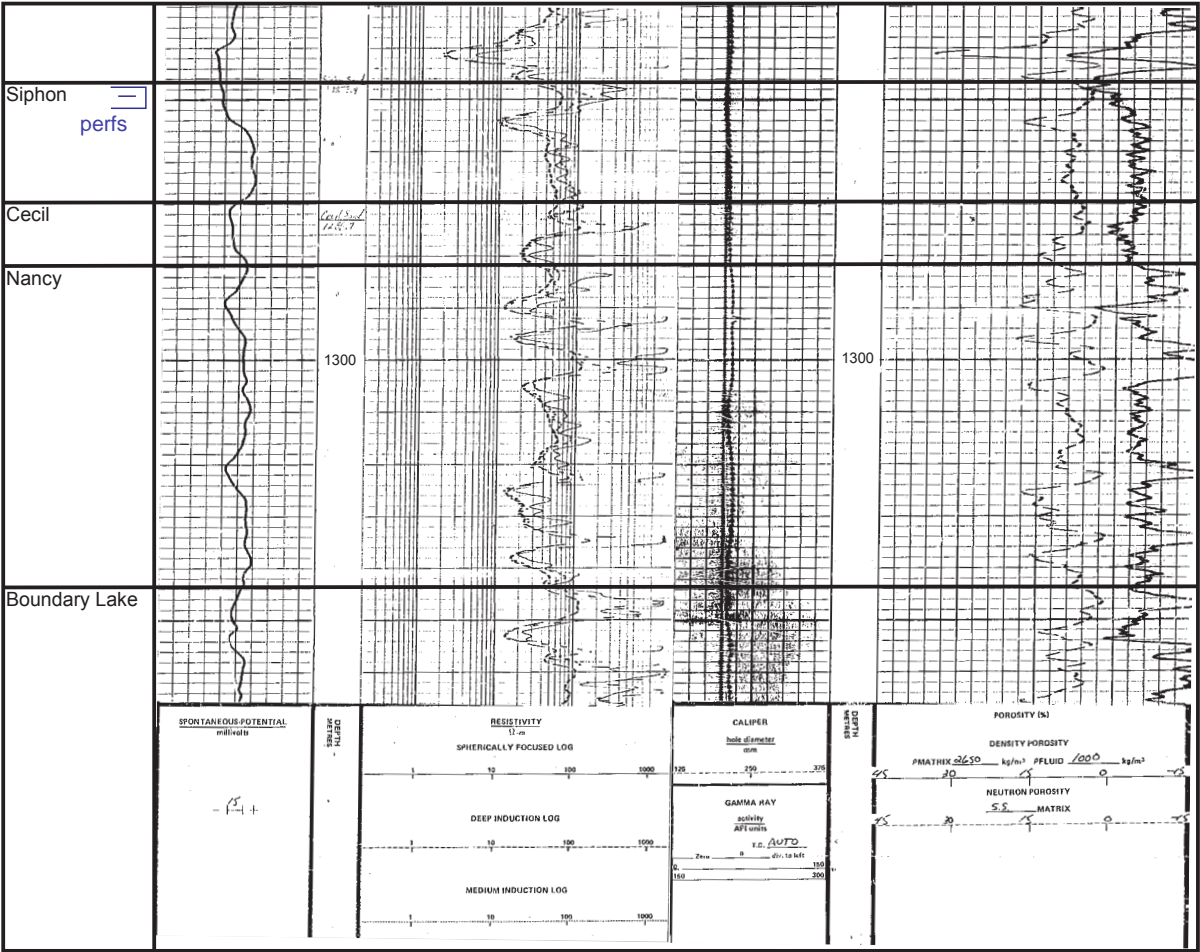
Remaining Original Oil in Place (%): 82

Cumulative Water Production: 16,150 barrels

Notes: Low water cut. Siphon is thin.



Contour interval (supplied by Oil and Gas Commission) is one metre Siphon A net oil pay. Nine oil wells are in the pool. Discovery well is 6-5-85-17W6.



Induction and neutron-density logs for discovery well 6-5-85-17W6. Note the near neutron-density crossover at the top of Siphon. This was completed from 1273-1276 for Siphon A oil production. A similar response is found at the top of the Cecil Member below, which was also completed in a separate event.

N

100/10-08-085-17W6/00

100/14-05-085-17W6/00

100/06-05-085-17W6/00

100/14-32-084-17W6/00

100/06-32-084-17W6/00

<=1266.6m=>

<=767.8m=>

<=776.2m=>

<=833.1m=>

S

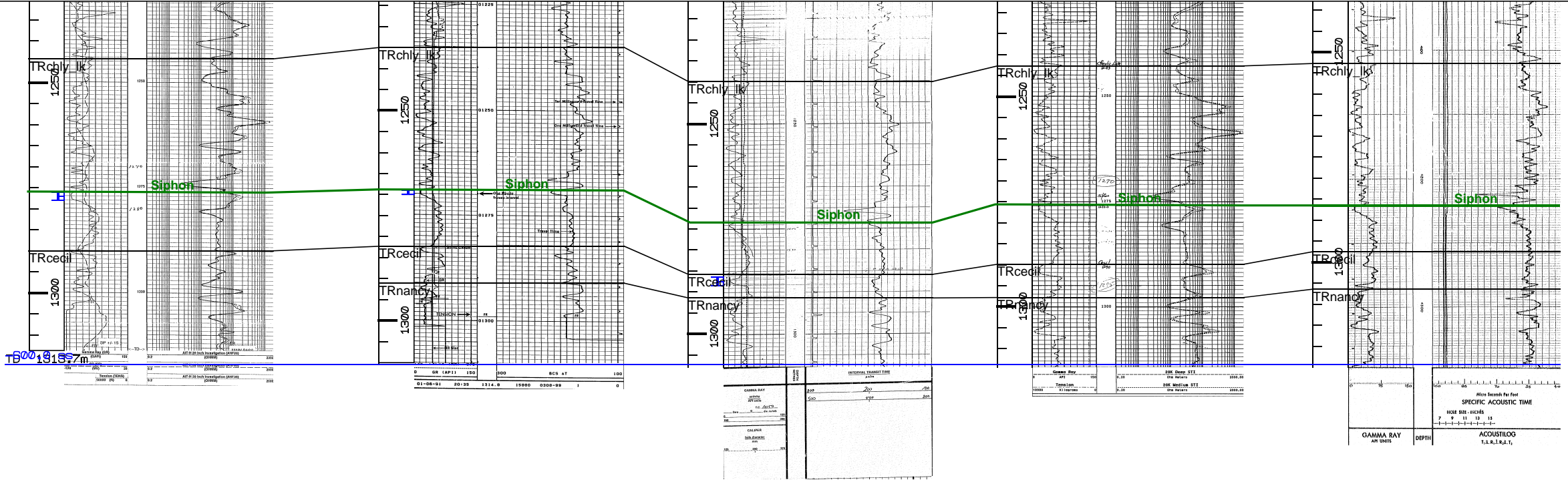
1999/12/25

1991/01/09

1979/06/19

1999/07/14

1976/12/24



1295.7m

Cecil Lake Siphon A

FLATROCK OIL FIELD

Boundary Lake B Pool

Pool Parameters

Field Code: 3560 **Pool Code:** 4535B
Discovery well original name: Turbo et al Flatrock 11-30-84-16W6 **WA#:** 04632
Rig Release: 1979/02/27
Other Oil and Gas Shows: Flatrock oil, Halfway gas
Number of Wells (October 2012) Oil: 3 **Active:** 1

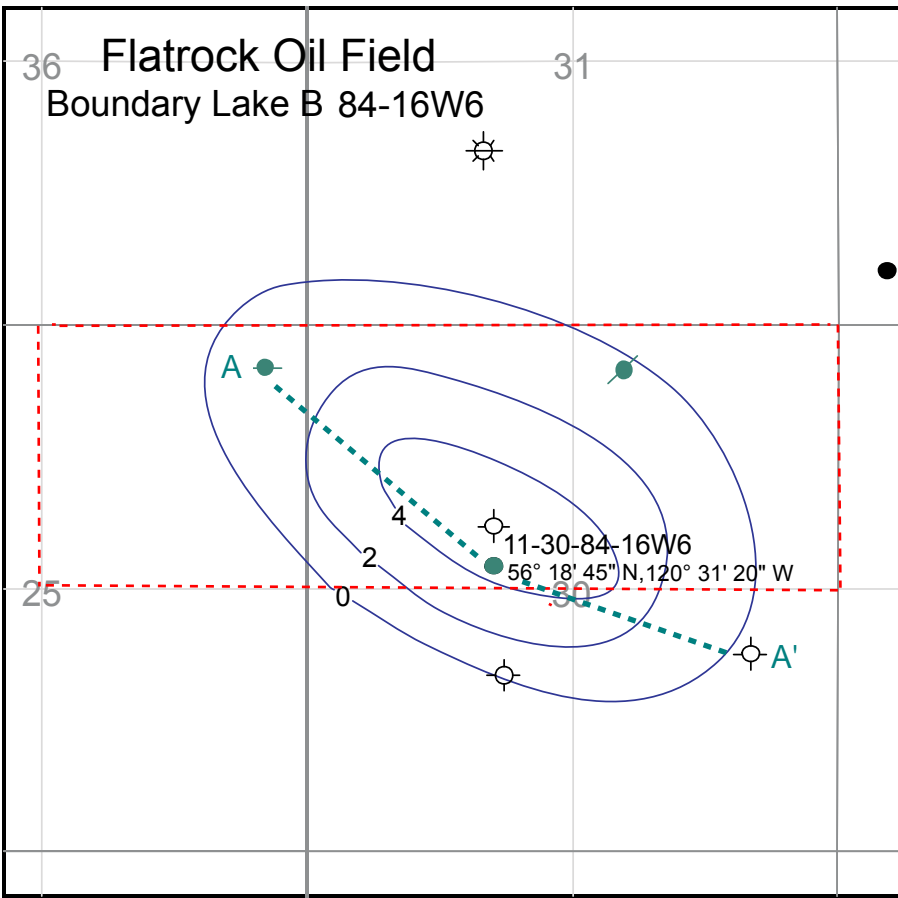
Reservoir Data

Area of Pool: 400 acres, 162 hectares
Average Depth of Producing Zone: 1341 metres
Lithology of Reservoir Rock: dolomite
Trap Type: stratigraphic-structural
Estimated Maximum Reservoir Thickness: 4.5 metres
Drive Mechanism: gas depletion
Average Porosity (%): 18
Average Net Pay: 2 metres
Average Permeability: 5 milliDarcies
Average Water Saturation (%): 9
Oil Formation Volume Factor (%): 127
Gravity (degrees API): 38
Original Pressure: 1840 psi, 12,686 kPa

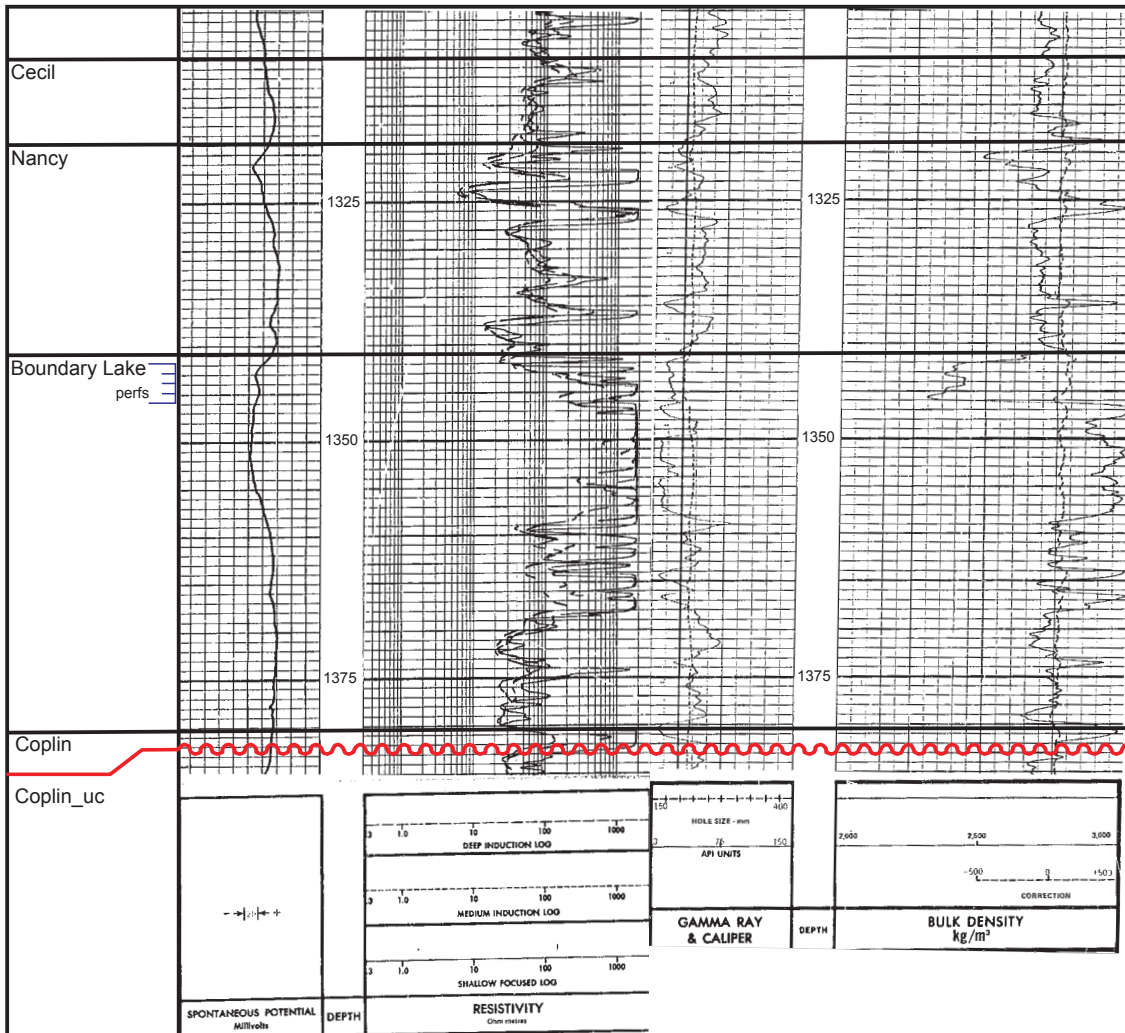
Reserves

Estimated original oil in place: 3,829,070 barrels, 608,774 m³
Recovery Factor (%): 14
Estimated Recoverable Oil: 516,920 barrels, 82,184 m³ (production decline)
Cumulative Oil Production: 426,070 barrels
Remaining Recoverable Oil: 90,860 barrels
Remaining Original Oil in Place (%): 89
Cumulative Water Production: 7,700 barrels

Notes: The completion interval is porous but thin. Faulting may separate wet Boundary Lake rock from oil bearing rock. Porous carbonates pinch out laterally and vertically.



Contour interval is two metres Boundary Lake B net oil pay (Oil and Gas Commission). The discovery well is 11-30-84-16W6.



Induction and bulk density logs for discovery well 11-30-85-16W6M. Completion interval is 1342.5 – 1346.5 metres.

100/16-25-084-17W6/00

100/11-30-084-16W6/02

100/08-30-084-16W6/00

A

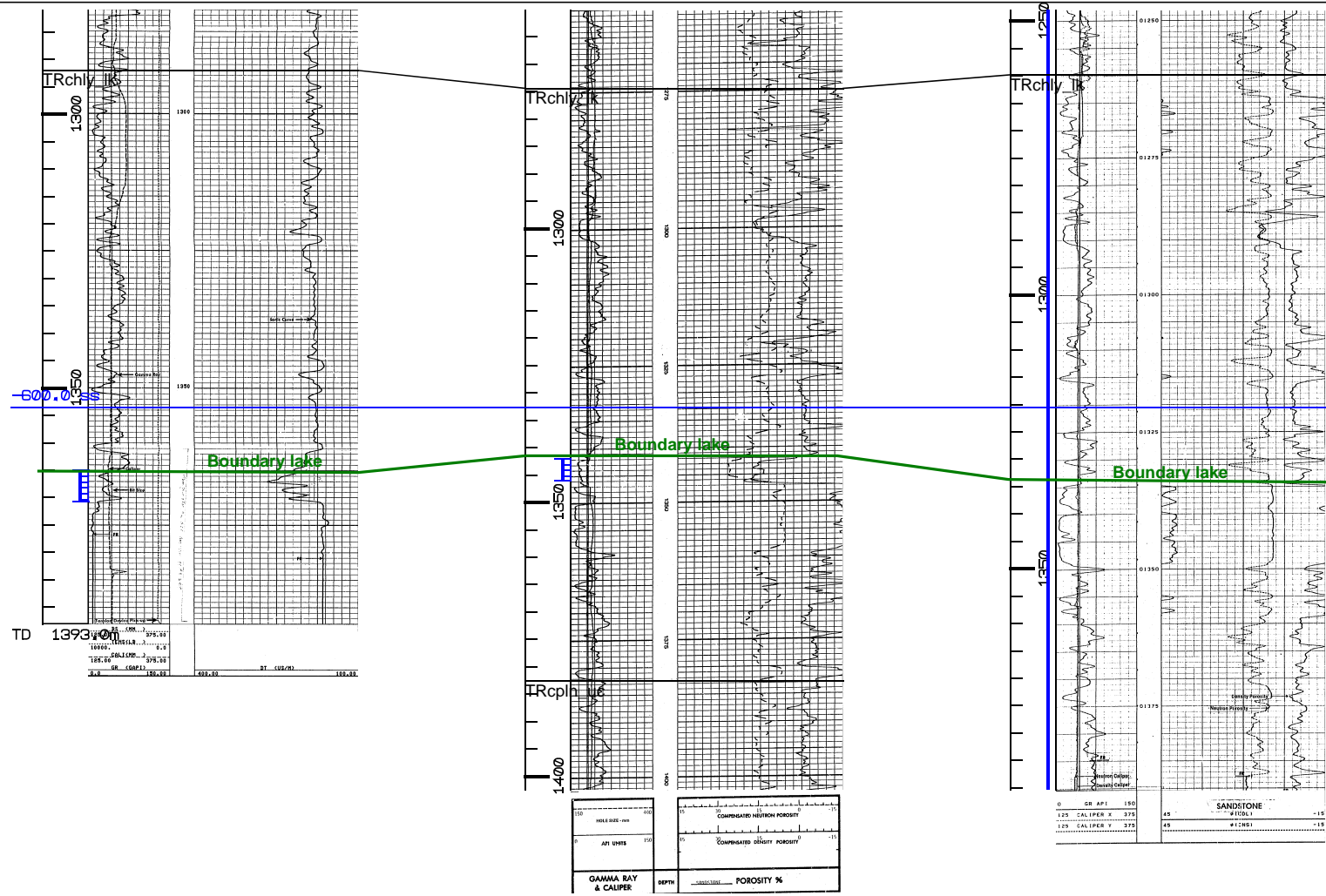
A'



<=932.9m=>



<=832.8m=>



1:1200

Flatrock Boundary Lake

FLATROCK OIL FIELD

Flatrock B Pool

Pool Parameters

Field Code: 3560

Pool Code: 4533B

Discovery well original name: NEW JORDAN ET AL FLATROCK 16-7-84-16W6 **WA#:** 07729

Rig Release: 1991/08/04

Other Oil and Gas Shows: Halfway oil, Coplin gas, Boundary Lake gas, Flatrock gas

Number of Wells (October 2012) Oil: 2 **Active:** 2

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1267 metres

Lithology of Reservoir Rock: dolomite

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 17.6

Average Net Pay: 1.5 metres

Average Permeability: low permeability indicated on DST

Average Water Saturation (%): 17

Oil Formation Volume Factor (%): 110

Gravity (degrees API): 36

Original Pressure: 854 psi, 5888 kPa

Reserves

Estimated original oil in place: 1,077,970 barrels, 171,384 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 161700 barrels, 25,708 m³ (production decline)

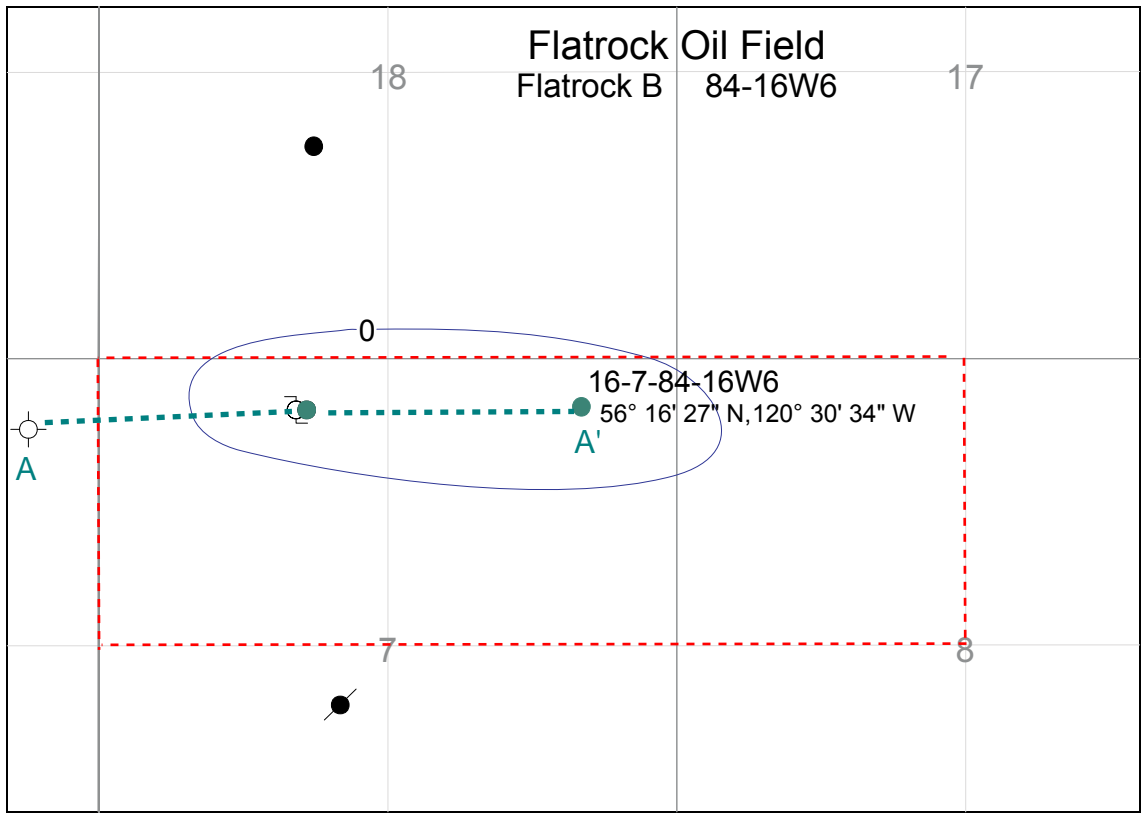
Cumulative Oil Production: 153,650 barrels

Remaining Recoverable Oil: 8,050 barrels

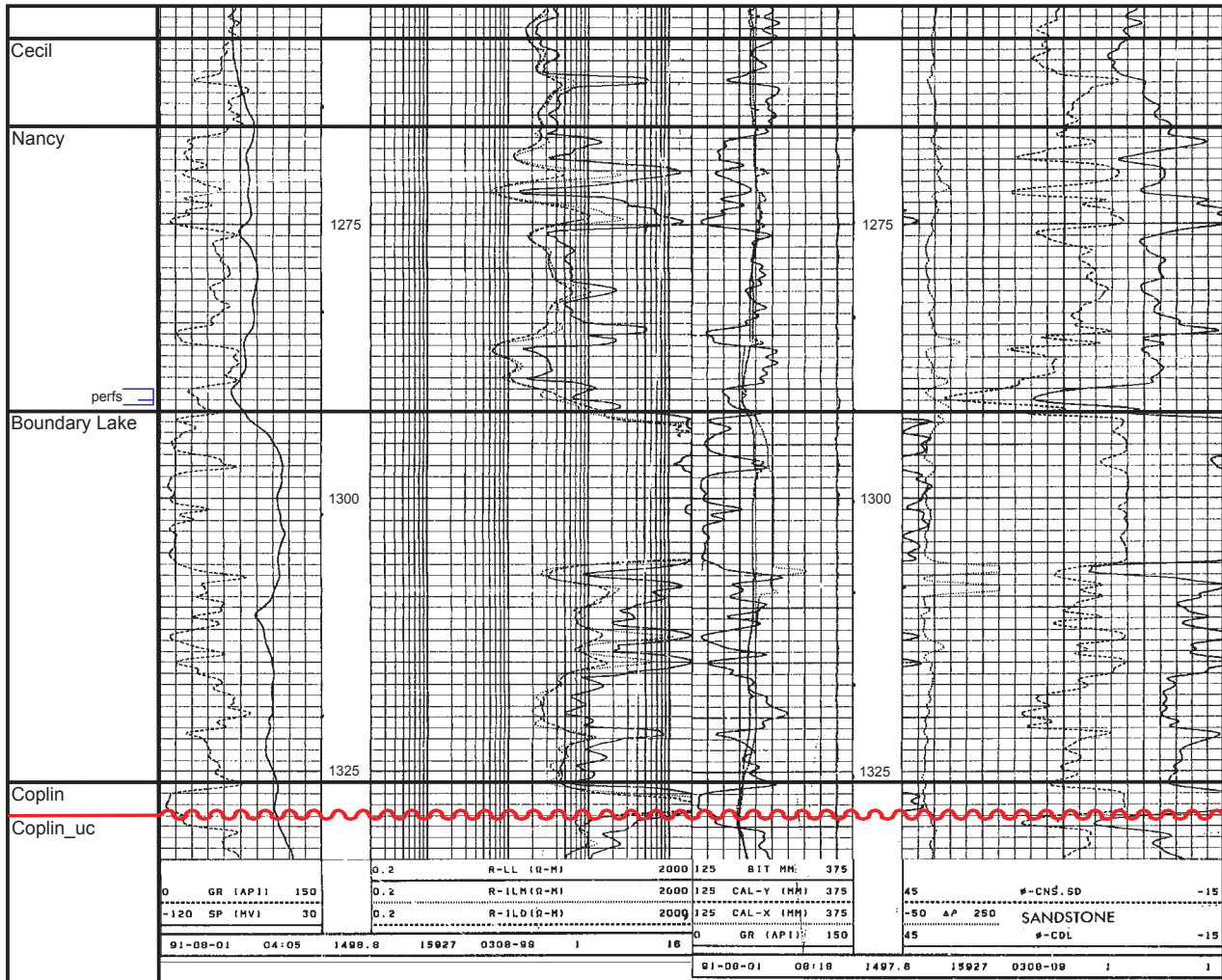
Remaining Original Oil in Place (%): 86

Cumulative Water Production: 213,460 barrels

Notes: The pool has a high water cut. Formational and pool nomenclature is confusing. It is designated as Flatrock but the geological pick can be either Tr2 or Nancy.



The only contour of this two well field is zero metres net Flatrock B oil pay (Oil and Gas Commission). Maximum pay is around 2 metres.



Laterolog and neutron-density (limestone scale) logs for discovery well 16-7-84-16W6M. The Flatrock (TR2) completion interval is a very thin, but porous, dolomite overlying tight dolomite.

100/16-12-084-17W6/00

100/14-07-084-16W6/00

100/16-07-084-16W6/00



<=760.2m=>



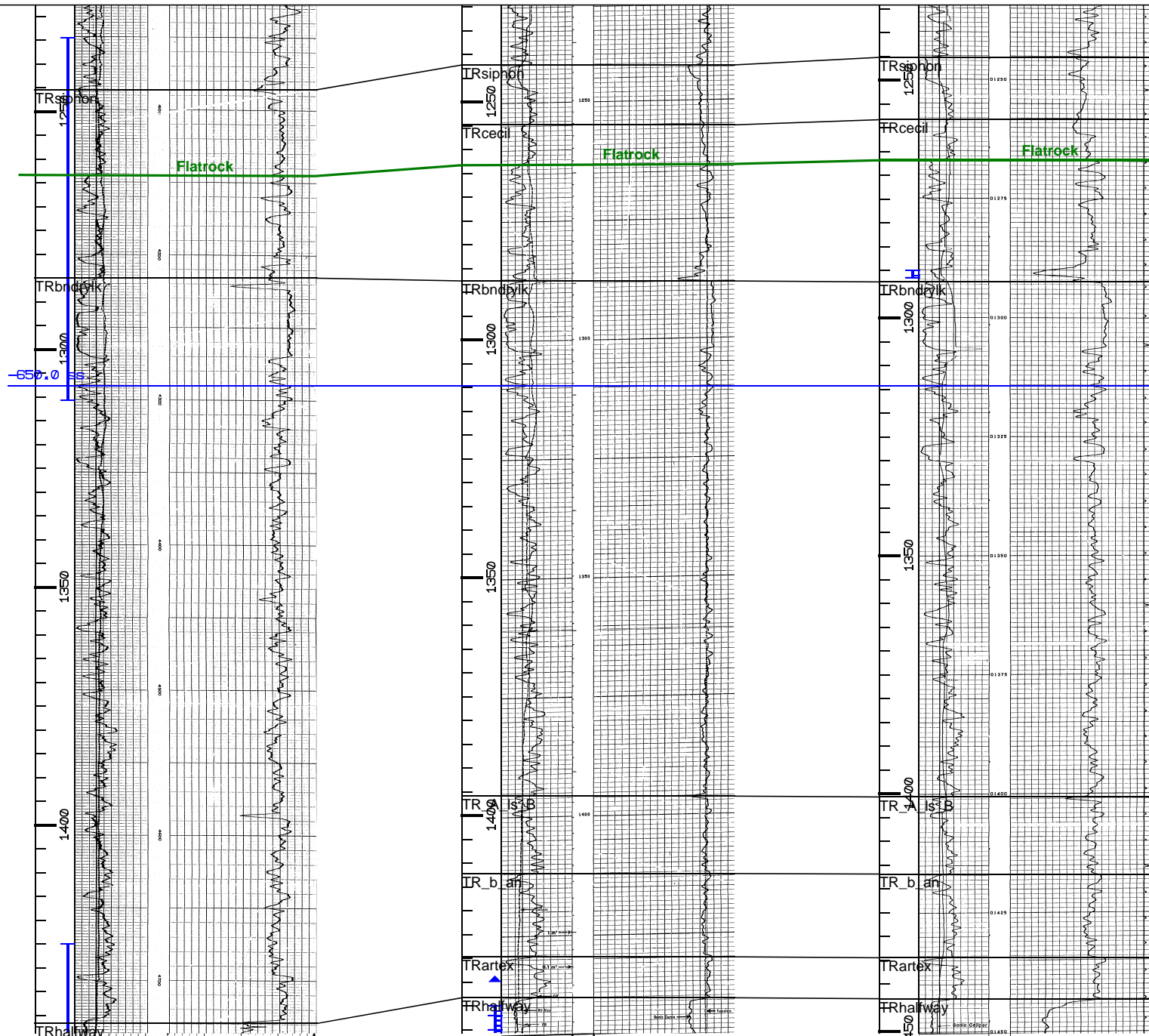
<=806.1m=>

A'

1973/07/23

1982/07/28

1991/08/04



Flatrock
Flatrock B

CALPER	
Scale alteration in inches	
Interval	100
Scale	1:100
Unit	ft
Interval	100
Scale	1:100
Unit	ft
GAMMA RAY	
API UNITS	
Interval	100
Scale	1:100
Unit	ft

GAMMA RAY	
API UNITS	
Interval	100
Scale	1:100
Unit	ft
CALPER	
Scale alteration in inches	
Interval	100
Scale	1:100
Unit	ft

CALPER	
Scale alteration in inches	
Interval	100
Scale	1:100
Unit	ft
GAMMA RAY	
API UNITS	
Interval	100
Scale	1:100
Unit	ft

FLATROCK OIL FIELD

Halfway E Pool

Pool Parameters

Field Code: 3560

Pool Code: 4800E

Discovery well original name: Wainoco et al Flatrock 6-13-84-17W6

WA#: 03221

Rig Release: 1972/11/16

Other Oil and Gas Shows: Halfway gas, North Pine oil, Gething gas

Number of Wells (October 2012) Oil: 8 Gas: 2 Active: 3

Reservoir Data

Area of Pool: 2693 acres, 1090 hectares

Average Depth of Producing Zone: 4663 feet, 1422 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 14

Average Net Pay: 2 metres

Average Permeability: 22 milliDarcies

Average Water Saturation (%): 44

Oil Formation Volume Factor (%): 131.2

Gravity (degrees API): 41.3

Original Pressure: 1921 psi, 13,245 kPa

Reserves

Estimated original oil in place: 7,605,700 barrels, 1,209,210 m³

Recovery Factor (%): 14

Estimated Recoverable Oil: 1,064,800 barrels, 169,290 m³ (production decline)

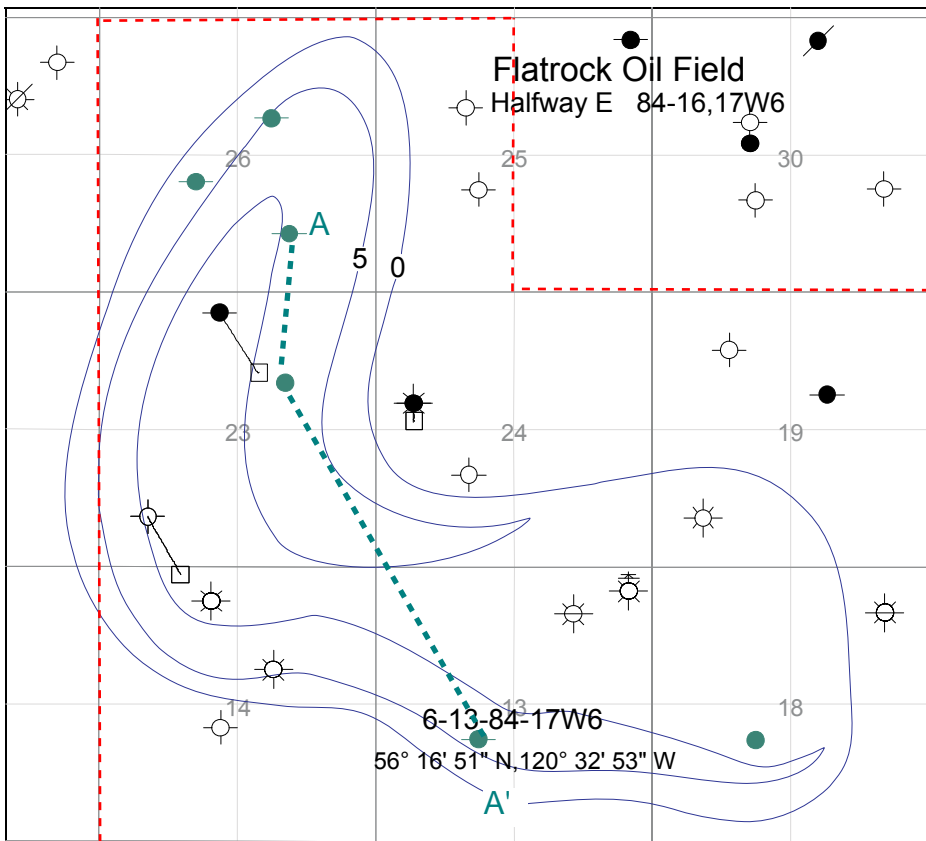
Cumulative Oil Production: 1,023,070 barrels

Remaining Recoverable Oil: 41,730 barrels

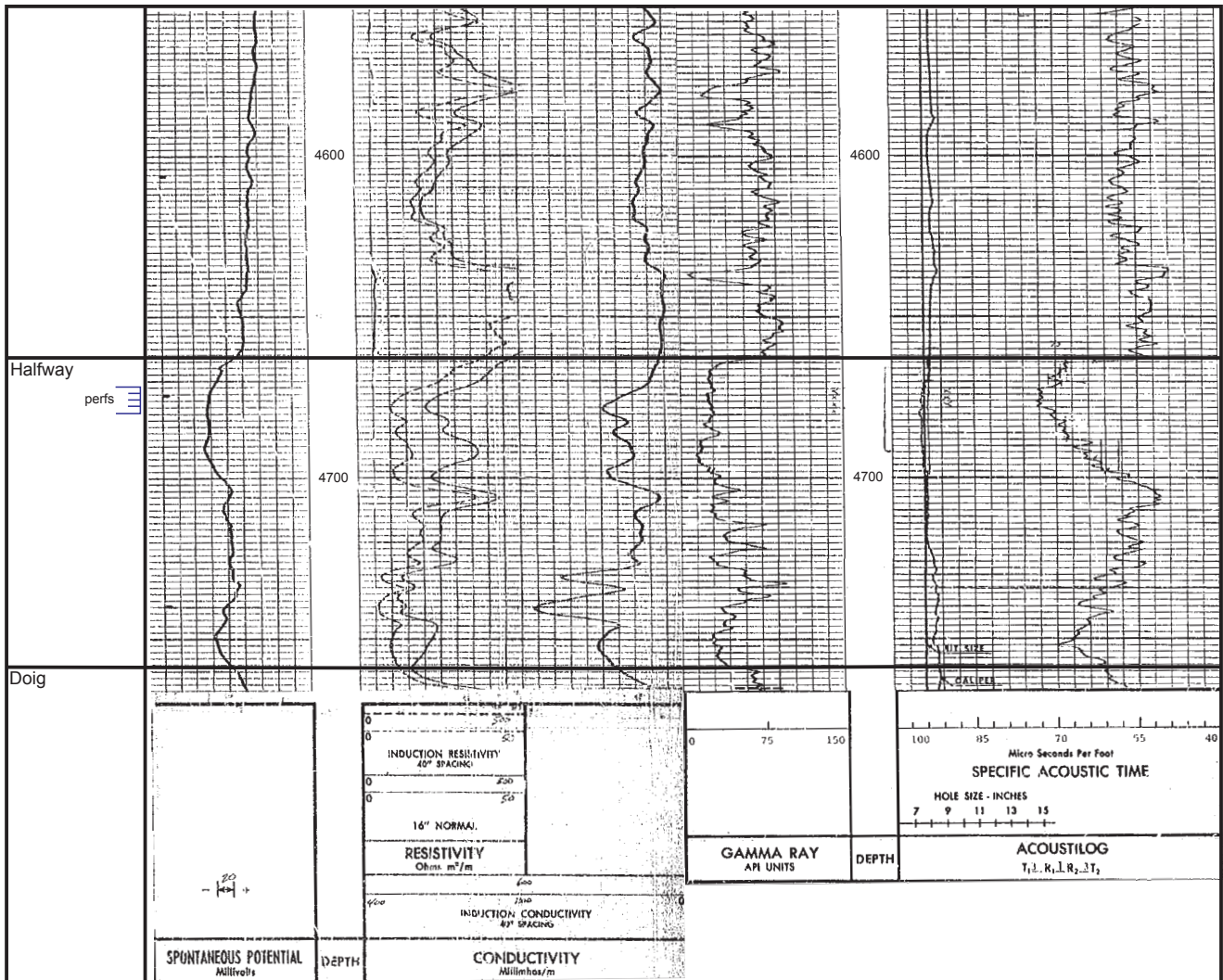
Remaining Original Oil in Place (%): 87

Cumulative Water Production: 353,440 barrels

Notes: The pay interval thinly overlies a water leg. Water cut is relatively high.



Contour interval is five metres net Halfway E oil pay (Oil and Gas Commission). The discovery well is 6-13-84-17W6M. A gas cap is centered over the southeast arm of the pool.



Elog and sonic logs for discovery well 6-13-84-17W6M. The Halfway here has a relatively thick porous interval, but the resistivity drops rapidly below the top-most portion.

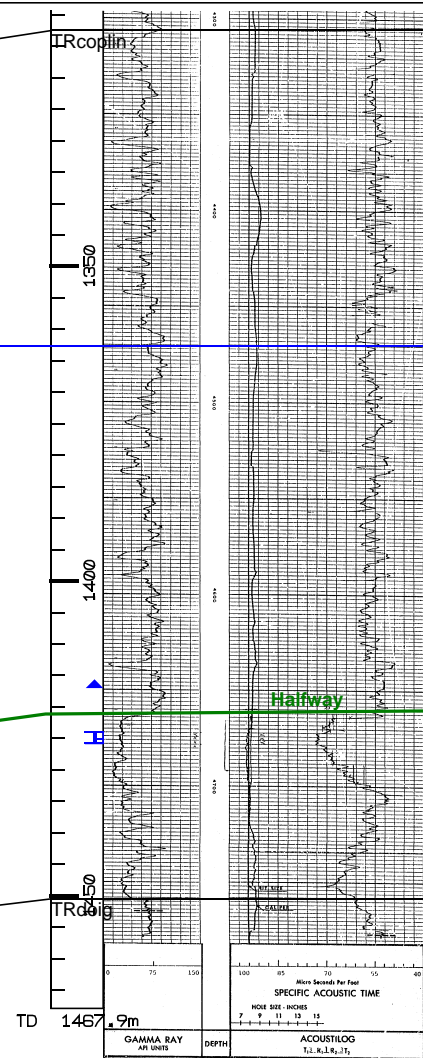
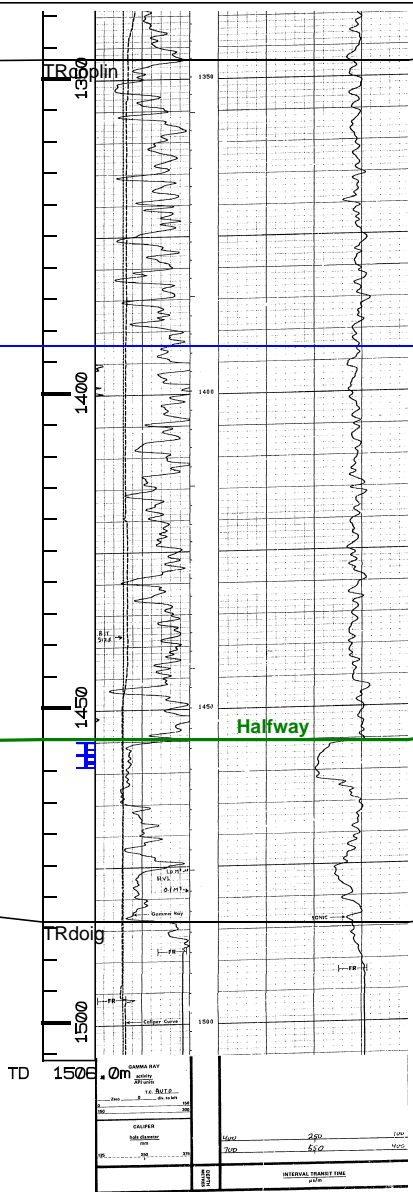
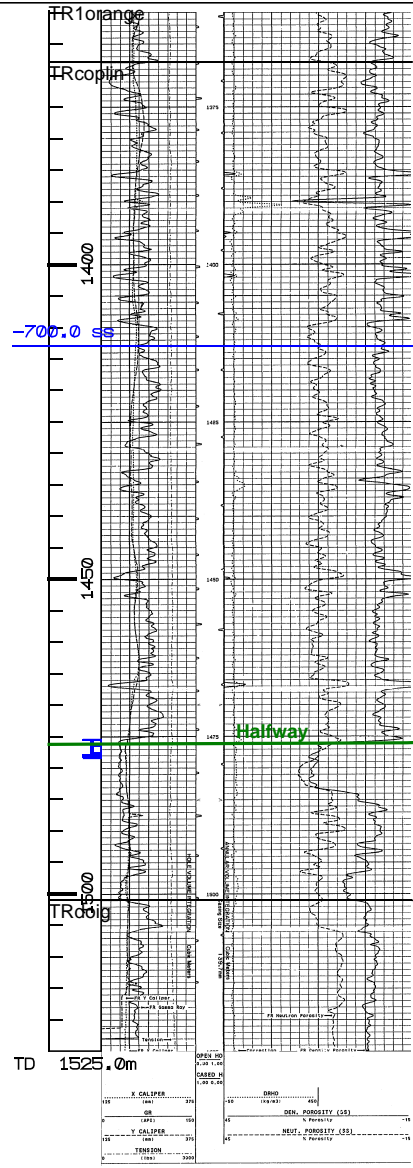
1992/10/29

<=877.1m=>

1979/07/16

<=2393.1m=>

1972/11/16



1:1200

Flatrock Flatrock E

TWO RIVERS OIL FIELD

Siphon A Pool

Pool Parameters

Field Code: 8200

Pool Code: 4510A

Discovery well: Champlin Two River 10-05-83-16W6

WA#: 02064

Rig Release: 1967/02/22

Other Oil and Gas Shows: Halfway gas, Baldonnel gas, Siphon gas, Nikanassin gas

Number of Wells (November 2012) Oil: 8 Injection: 2 Horizontal: 2 Active: 8

Reservoir Data

Area of Pool: 1675 acres, 678 hectares

Average Depth of Producing Zone: 4303 feet, 1312 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: water flood

Average Porosity (%): 12

Average Net Pay:

Average Permeability: no core in Siphon, DST indicates fair permeability

Average Water Saturation (%): 37

Oil Formation Volume Factor (%): 125

Gravity (degrees API): 40

Original Pressure: 1803 psi, 12,431 kPa

Reserves

Estimated original oil in place: 8,621,420 barrels, 1,370,696 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 1,724,280 barrels, 274,139 m³ (volumetric)

Cumulative Oil Production: 1,469,170 barrels

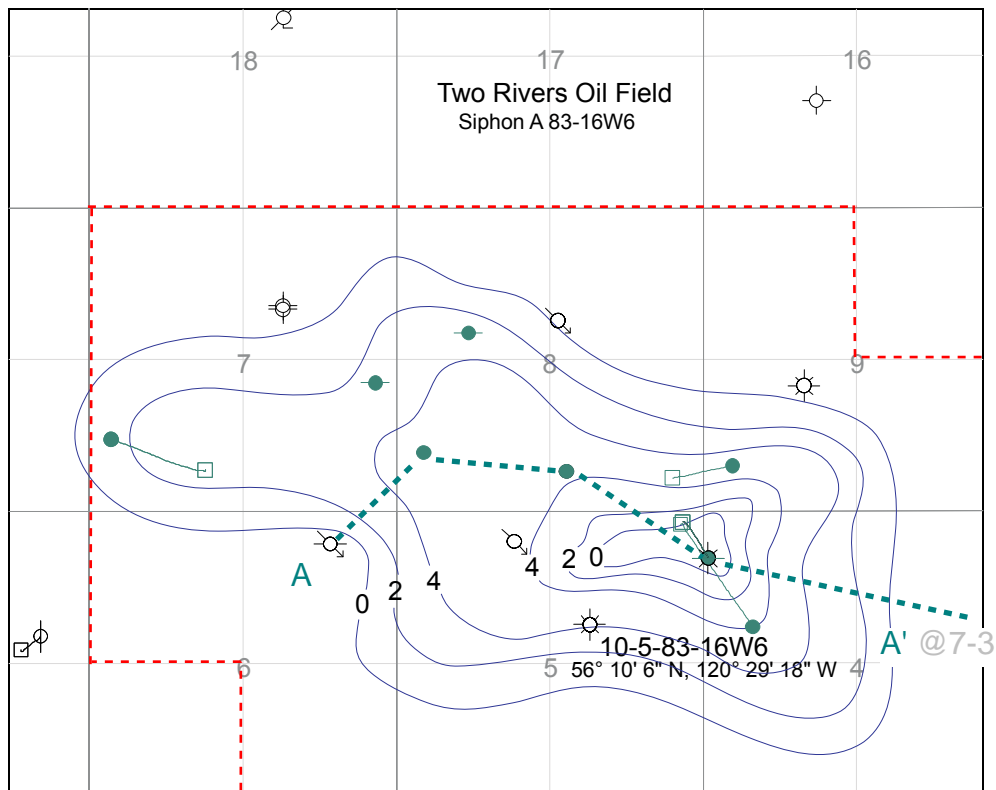
Remaining Recoverable Oil: 255,110 barrels

Remaining Original Oil in Place (%): 84

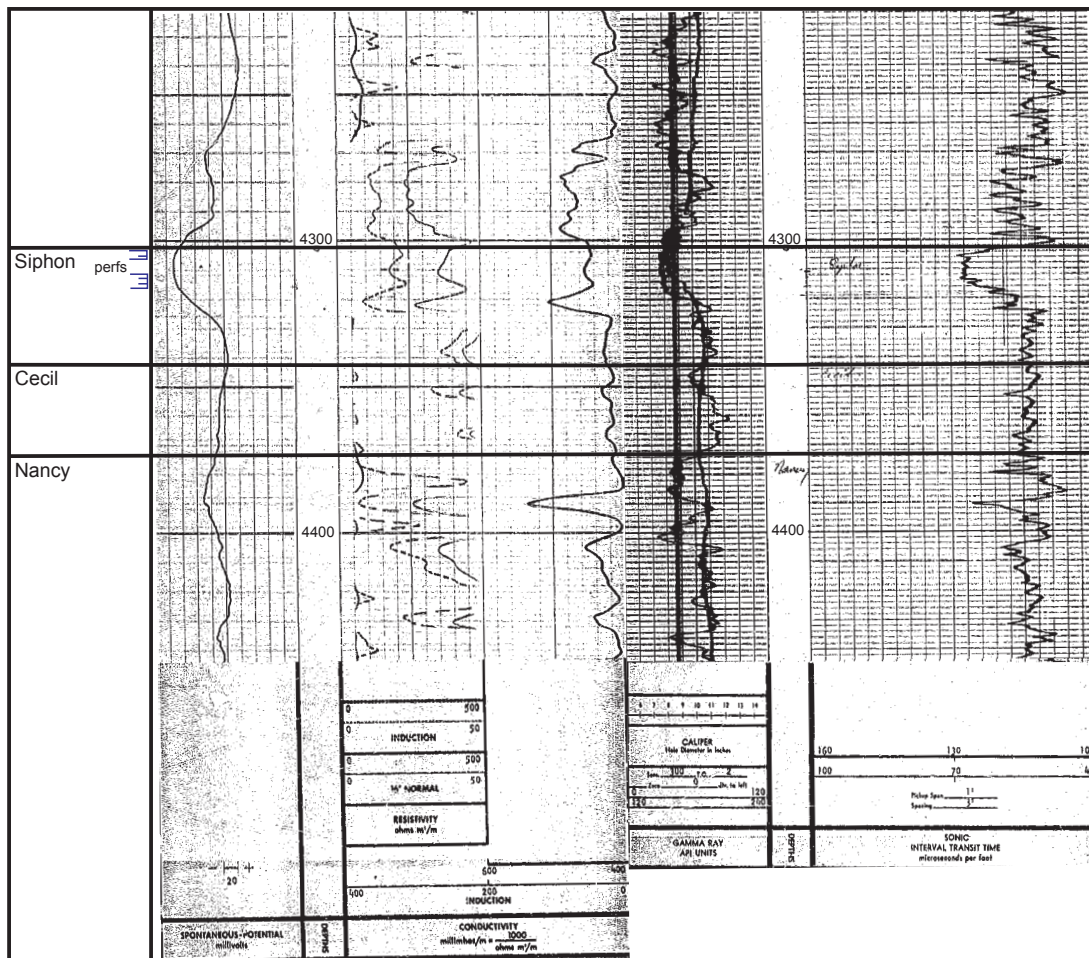
Cumulative Water Production: 2,146,420 barrels

Cumulative Water Injection: 2,635,350 barrels

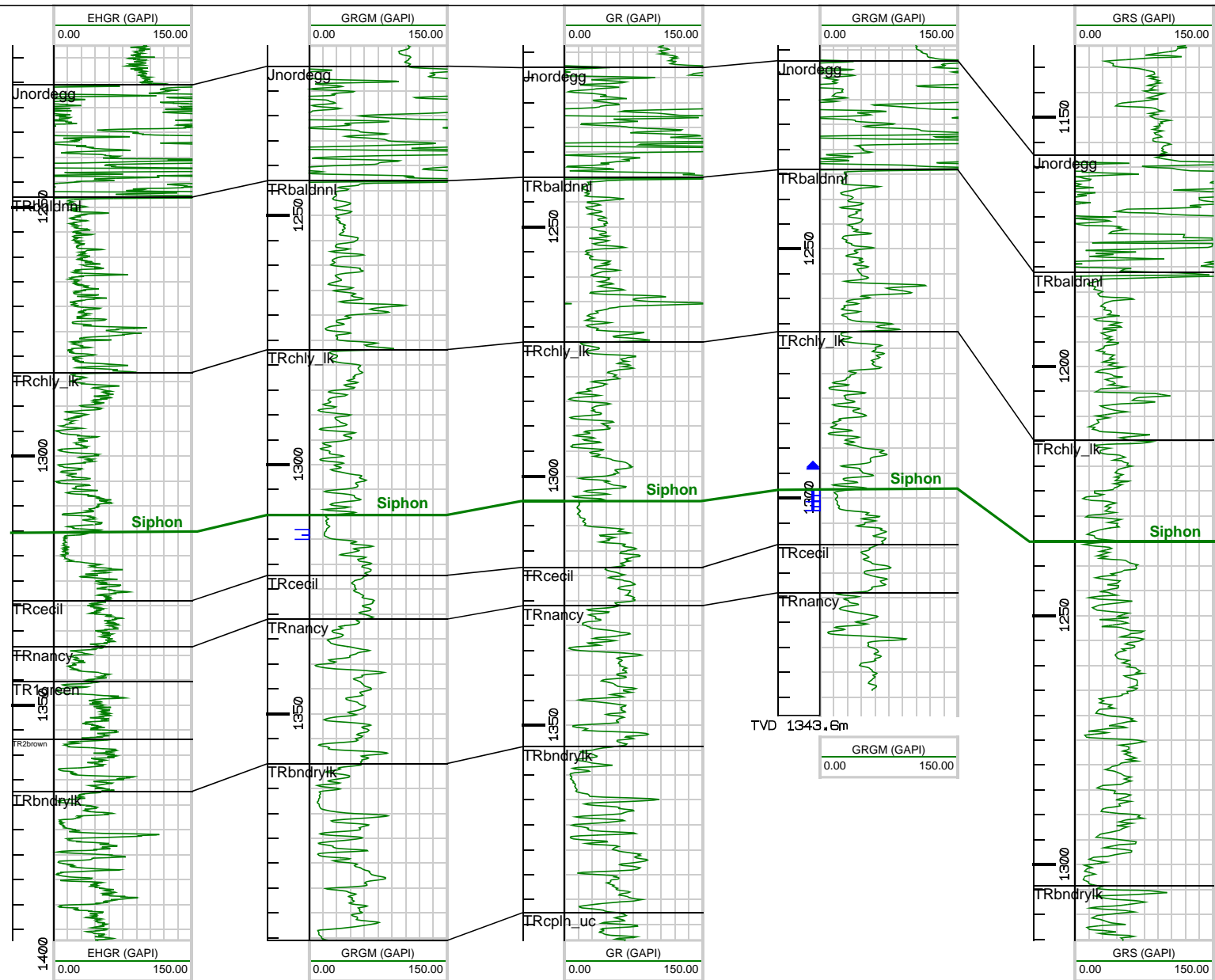
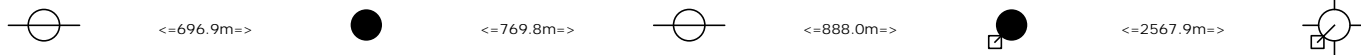
Notes: The discovery well 10-05 is now an abandoned water disposal well in event 4; it was used before water disposal for Siphon A oil production.



Contour interval is two metres net Siphon A oil pay (Oil and Gas Commission). Net pay in the centre of the pool is mapped as zero. Discovery well 10-5-83-16W6 is an abandoned water disposal well in the Siphon.



Elog and sonic log for discovery well 10-05-83-16W6. The completion interval of 4300-4319' is near the base of a thick porous zone.



1:1200

Two Rivers Siphon A

MICA OIL FIELD

Doig B Pool

Pool Parameters

Field Code: 5860

Pool Code: 4900B

Discovery well: Talisman Mica 6-36-81-14W6

WA#: 14916

Rig Release: 2002/02/21

Other Oil and Gas Shows:

Number of Wells (October 2012) Oil: 4 **Active:** 4

Reservoir Data

Area of Pool: 909 acres, 368 hectares

Average Depth of Producing Zone: 1647 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4 metres

Drive Mechanism: gas depletion

Average Porosity (%): 13

Average Net Pay: 1.7 metres

Average Permeability: 150 milliDarcies

Average Water Saturation (%): 15

Oil Formation Volume Factor (%): 137.3

Gravity (degrees API): 44.7

Original Pressure: 2310 psi, 15,927 kPa

Reserves

Estimated original oil in place: 3,136,610 barrels, 498,681 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 470,490 barrels, 74,802 m³ (volumetric)

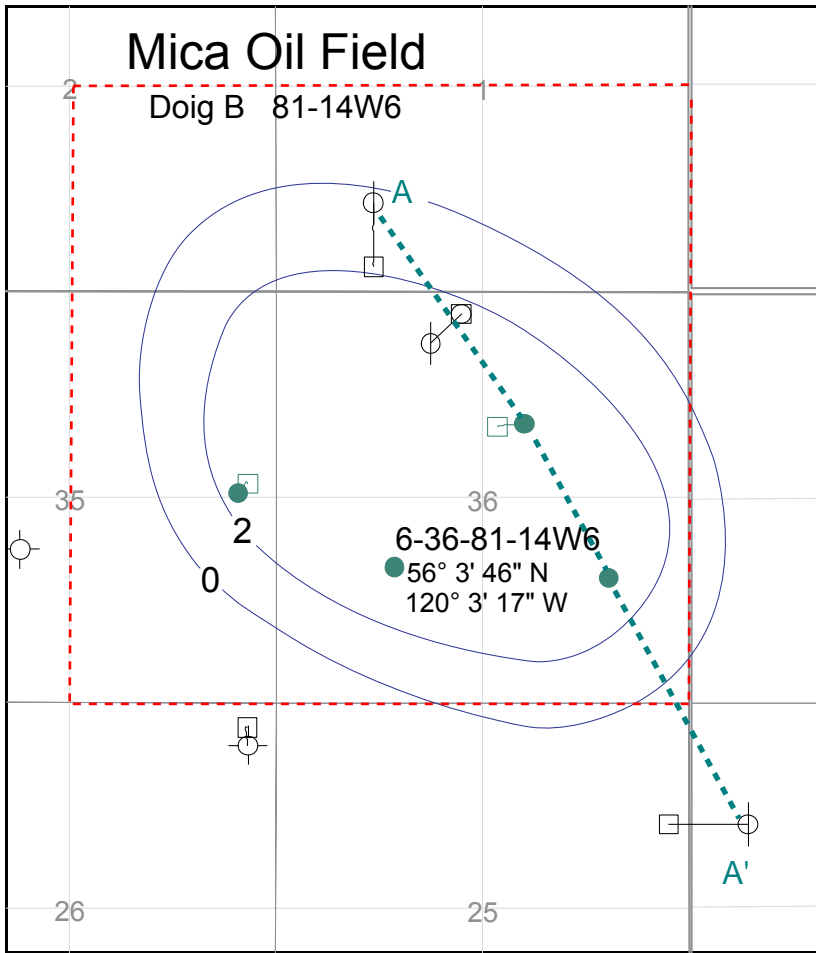
Cumulative Oil Production: 322,320 barrels

Remaining Recoverable Oil: 148,180 barrels

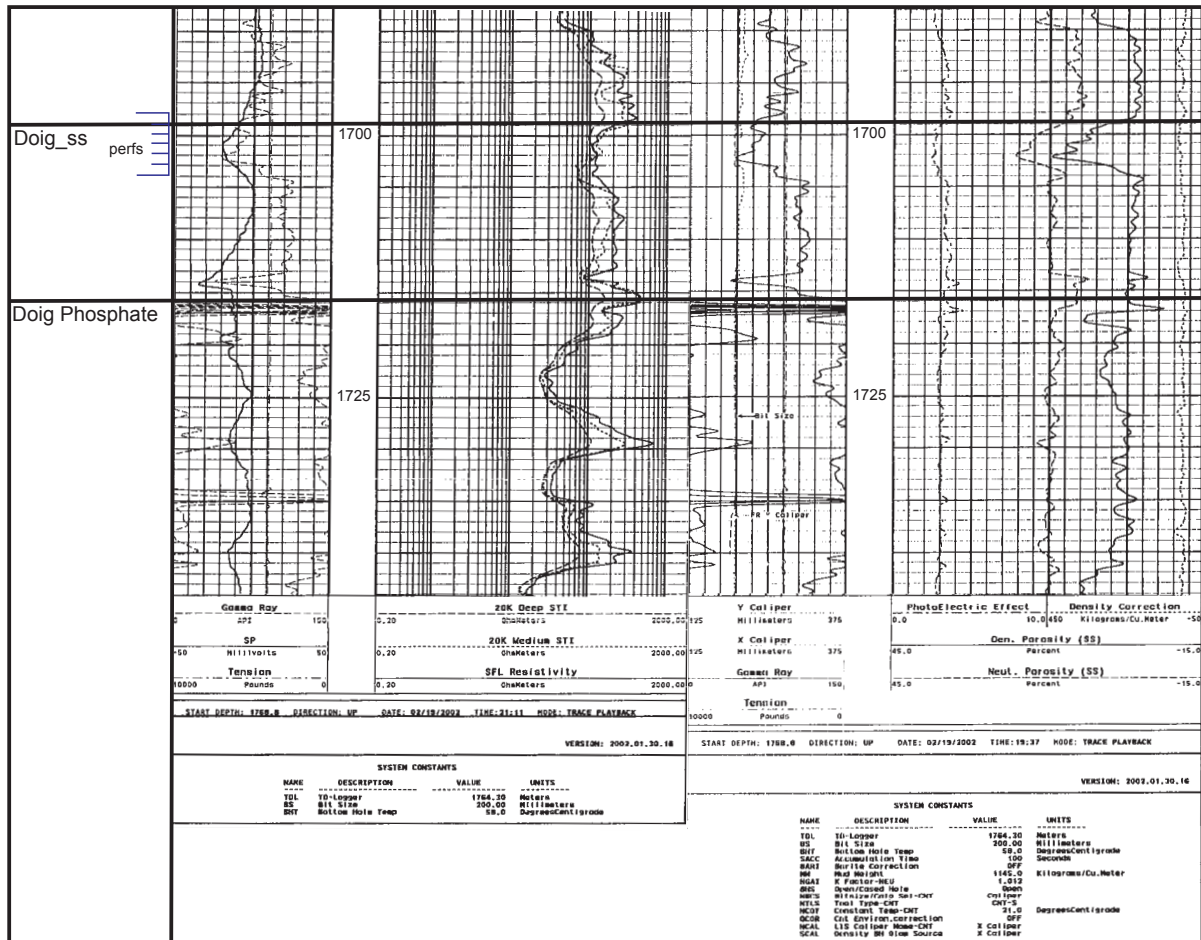
Remaining Original Oil in Place (%): 90

Cumulative Water Production: 19,620 barrels

Notes: The Doig sandstone is an elongate shore-face deposit, with good reservoir continuity along trend.



Contour interval is two metres net Doig B oil pay. Discovery well is 6-36-81-14W6.



Induction and neutron-density logs for discovery well 6-36-81-14W6. The completion interval is near the top of the Doig sandstone.

100/04-01-082-14W6/00

100/10-36-081-14W6/00

100/08-36-081-14W6/00

100/12-30-081-13W6/00

A

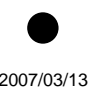
A'



<=1054.0m=>



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<=1114.1m=>

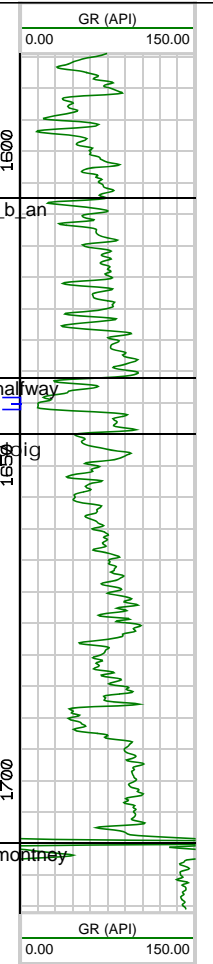
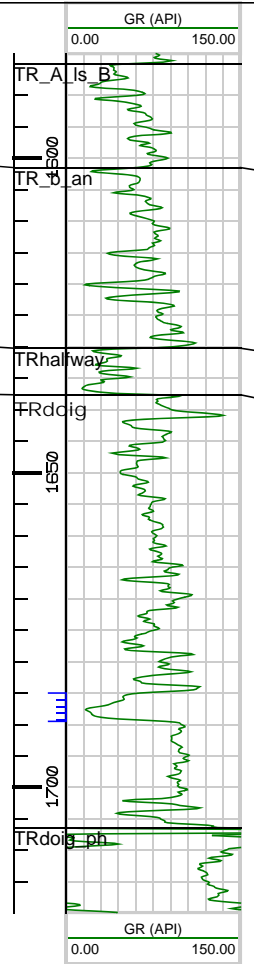
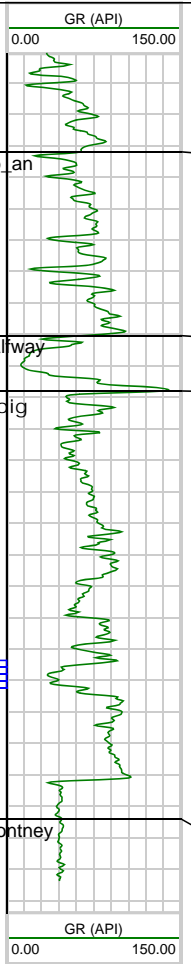
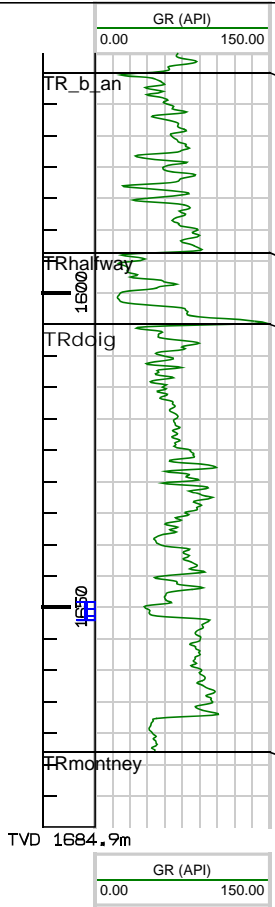


2007/09/13

2007/08/22

2007/03/13

2007/08/09



111200

Mica Doig B

MICA OIL FIELD

Mica A

Pool Parameters

Field Code: 5860

Pool Code: 4545A

Discovery well original name: IOE et al Mica 11-34-081-14W6 **WA#:** 03649

Rig Release: 1976/02/28

Other Oil and Gas Shows: Mica gas

Number of Wells (October 2012) Oil: 8 Gas: 1 Active: 8

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1520 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 17

Average Net Pay: 1.1 metres

Average Permeability: 0.6 milliDarcies

Average Water Saturation (%): 13

Oil Formation Volume Factor (%): 134

Gravity (degrees API): 42

Original Pressure: 2168 psi, 14948 kPa

Reserves

Estimated original oil in place: 7,102,550 barrels, 1,129,215 m³

Recovery Factor (%): 30

Estimated Recoverable Oil: 2,130,770 barrels, 338,765 m³ (production decline)

Cumulative Oil Production: 1,532,540 barrels

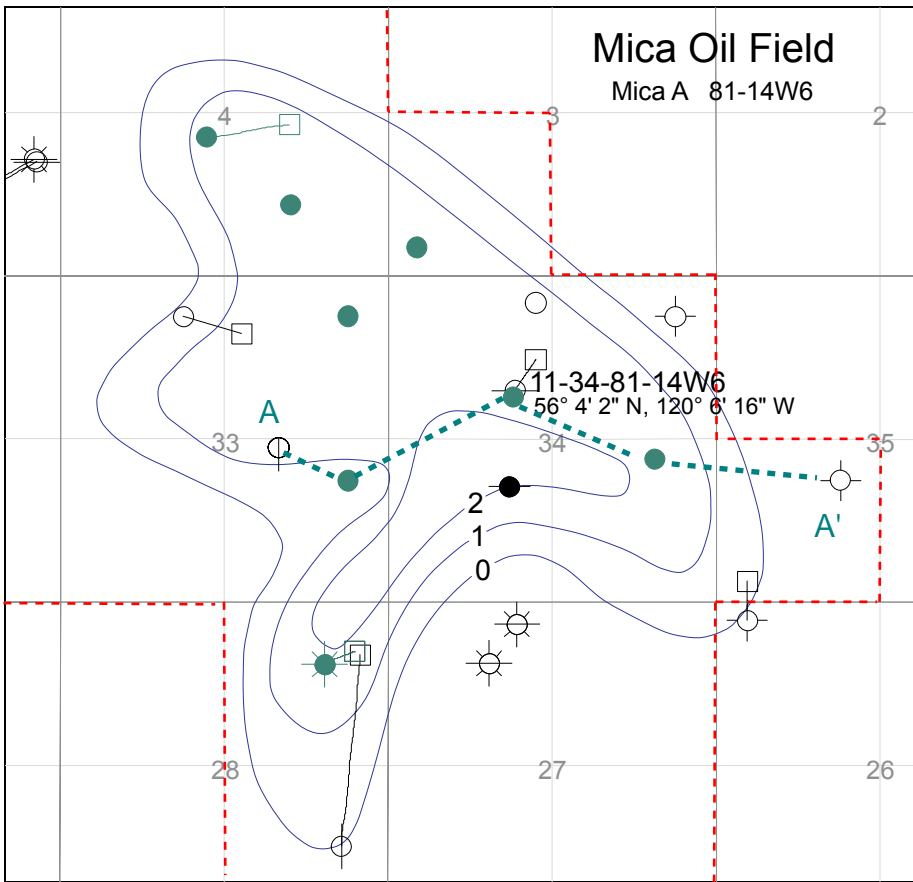
Remaining Recoverable Oil: 598,230 barrels

Remaining Original Oil in Place (%): 78

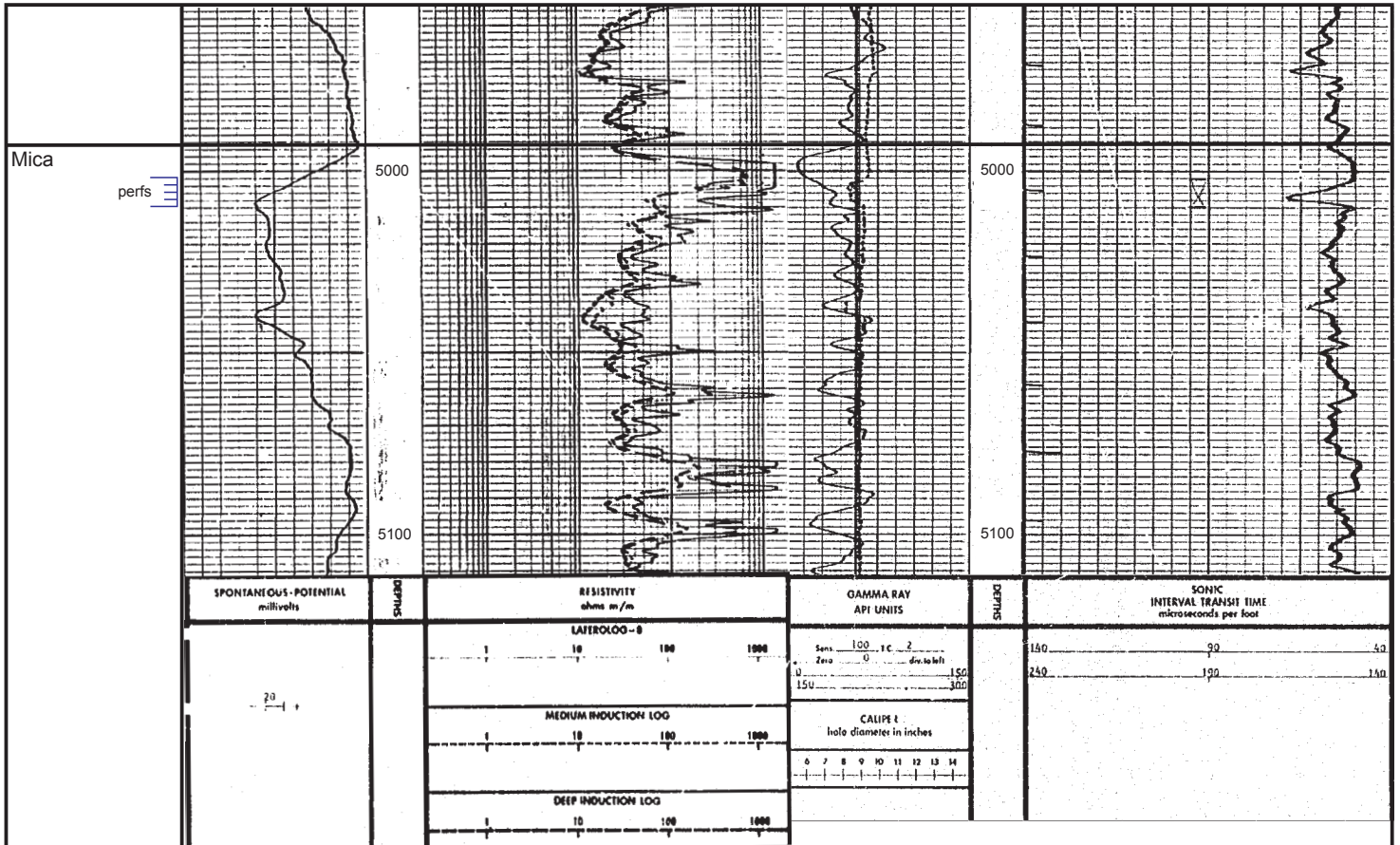
Cumulative Water Production: 28,810 barrels

Notes: Mica is a member of the Charlie Lake Formation. The Mica Member here has very low permeability, yet it has apparently not been fracked. The pool may be bounded by faulting on the northeast side. Faulting may cross-cut the field and drape over faults may influence distribution of hydrocarbons.

Mica is equivalent to North Pine



Contour interval of one metre net Mica A oil pay. Discovery well is 11-34-81-14W6.



Dual induction laterolog and sonic logs for discovery well 11-34-81-14W6. The completion interval has high porosity but low permeability.

A

A'

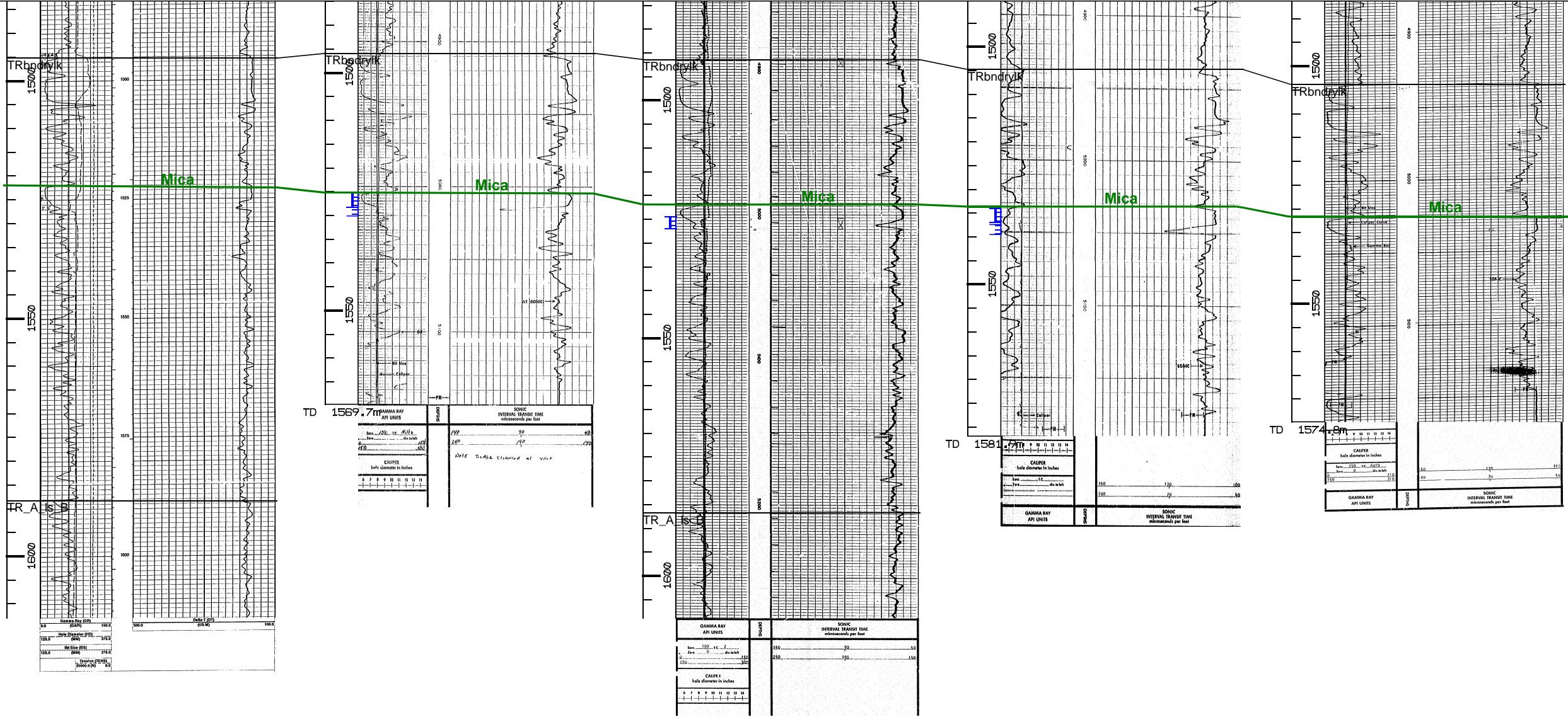


<=379.0m=>

<=924.9m=>

<=767.0m=>

<=927.1m=>



Mica
Mica A

SUNSET PRAIRIE OIL FIELD

Cecil A Pool

Pool Parameters

Field Code: 8130

Pool Code: 4520A

Discovery well original name: CANHUNTER ET AL E SCOTT 14-8-80-18W6

WA#: 07640

Rig Release: 1991/03/15

Other Oil and Gas Shows: North Pine gas

Number of Wells (November 2012) Oil: 7 Injection: 4 Horizontal: 1 Active: 6

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1845 metres

Lithology of Reservoir Rock: anhydritic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: water flood

Average Porosity (%): 10

Average Net Pay: 1.1 metres

Average Permeability: 50 milliDarcies

Average Water Saturation (%): 8

Oil Formation Volume Factor (%): 150

Gravity (degrees API): 43.4

Original Pressure: 3206 psi, 22,105 kPa

Reserves

Estimated original oil in place: 5,552,200 barrels, 882,730 m³

Recovery Factor (%): 40 (water flood)

Estimated Recoverable Oil: 2,220,880 barrels, 353,092 m³ (production decline)

Cumulative Oil Production: 2,069,780 barrels

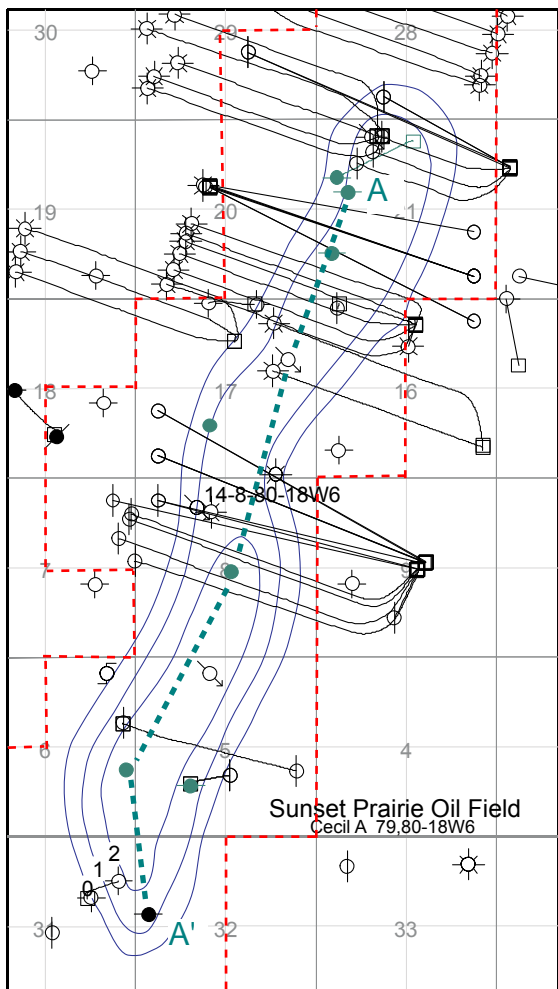
Remaining Recoverable Oil: 151,100 barrels

Remaining Original Oil in Place (%): 63

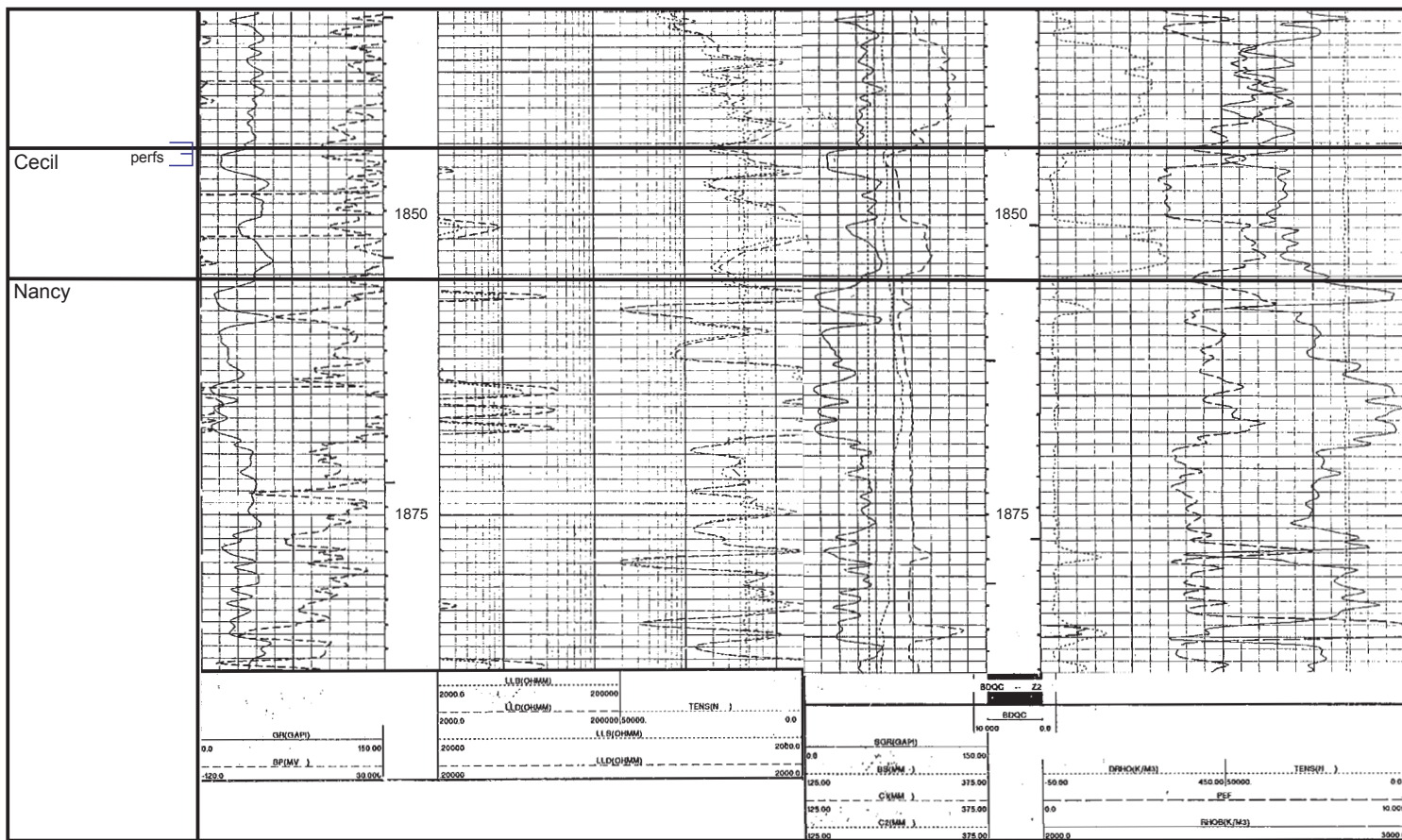
Cumulative Water Production: 547,390 barrels

Cumulative Water Injection: 3,522,940 barrels

Notes: The discovery well 14-8 has been converted to water injector. The reservoir has very low water saturation and might be oil-wet.



Contour interval is one metre net Cecil A oil pay. Discovery well is 14-8-80-18W6. Pool wells are vertical; the horizontal wells shown on the map crossing the pool are Montney gas producers.



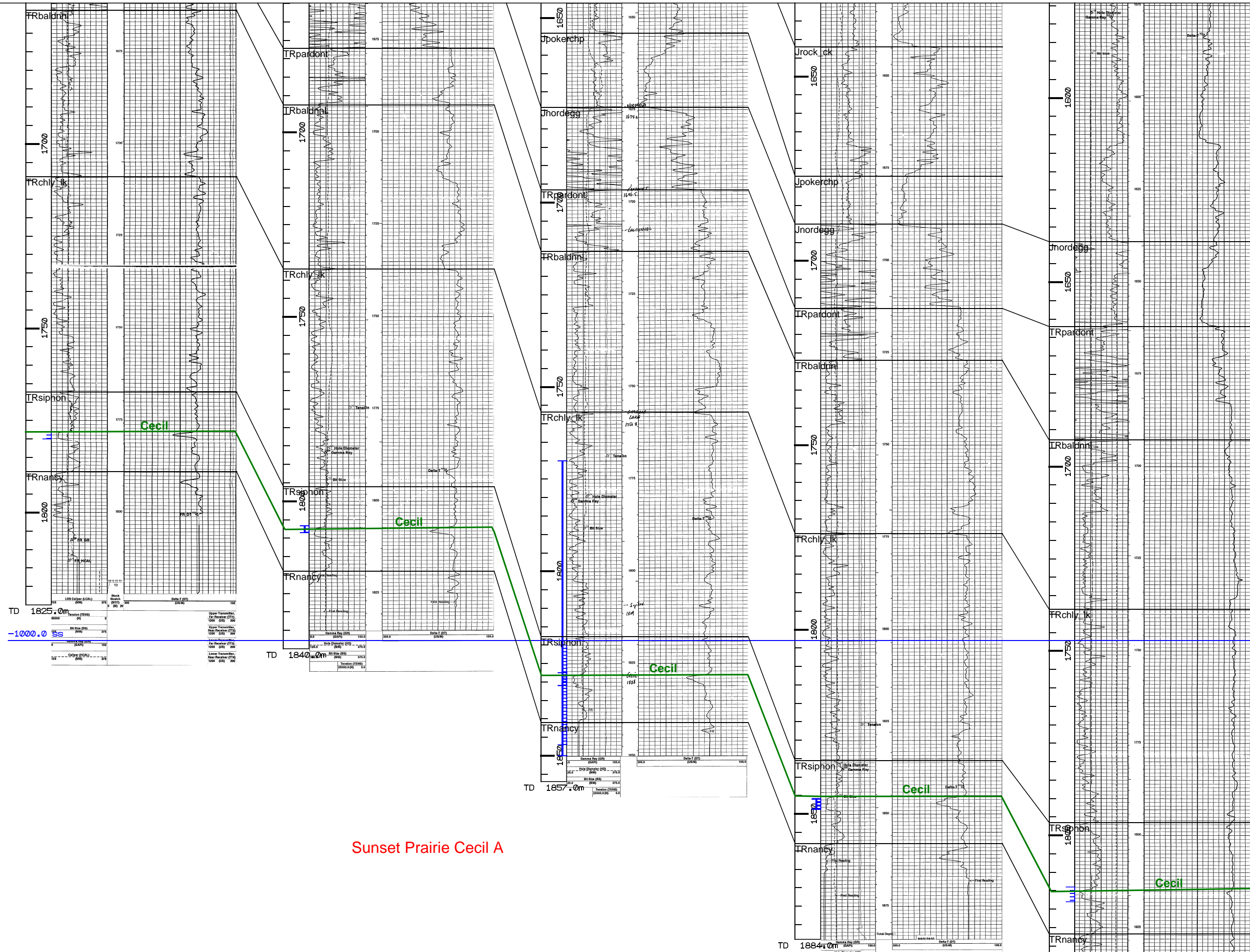
Induction and neutron-density logs for discovery well 14-8-80-18W6. Completion interval is 1844.9 – 1846 metres at the top of the Cecil in a thin porous streak.

<=1601.7m=>

<=1989.6m=>

<=2021.3m=>

<=1321.1m=>



Sunset Prairie Cecil A

GROUND BIRCH OIL FIELD

Artex B Pool

Pool Parameters

Field Code: 4390

Pool Code: 4700B

Discovery well original name: CANHUNTER GROUND BIRCH 14-32-78-19W6

WA#: 08635

Rig Release: 1994/03/24

Other Oil and Gas Shows: Cecil oil, Doig gas, Bluesky gas, Doig Phosphate Beds gas

Number of Wells (October 2012) Oil: 4 **Active:** 2

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 2328 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 17

Average Net Pay: 1.2 metres

Average Permeability: no core, high perm indicated on DST

Average Water Saturation (%): 33

Oil Formation Volume Factor (%): 158

Gravity (degrees API): 49.4

Original Pressure: 3173 psi, 21,877 kPa

Reserves

Estimated original oil in place: 2,957,650 barrels, 470,229 m³

Recovery Factor (%): 25

Estimated Recoverable Oil: 739,410 barrels, 117,557 m³ (material balance)

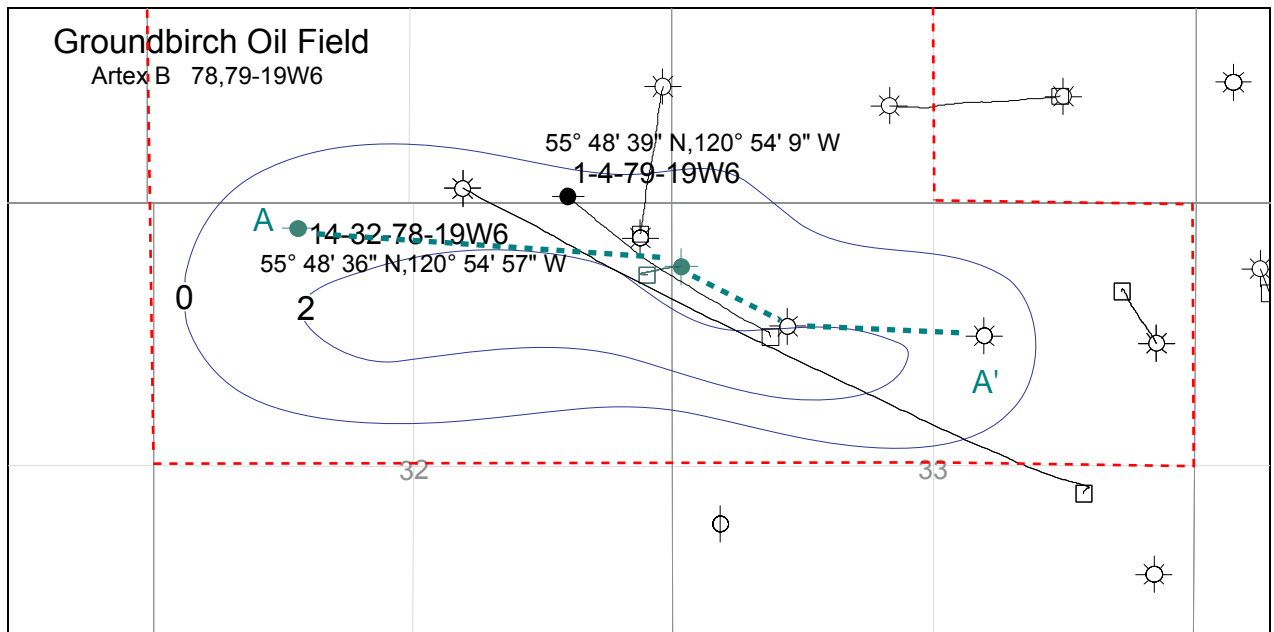
Cumulative Oil Production: 688,980 barrels, 109,539 m³

Remaining Recoverable Oil: 50,440 barrels, 8,019 m³

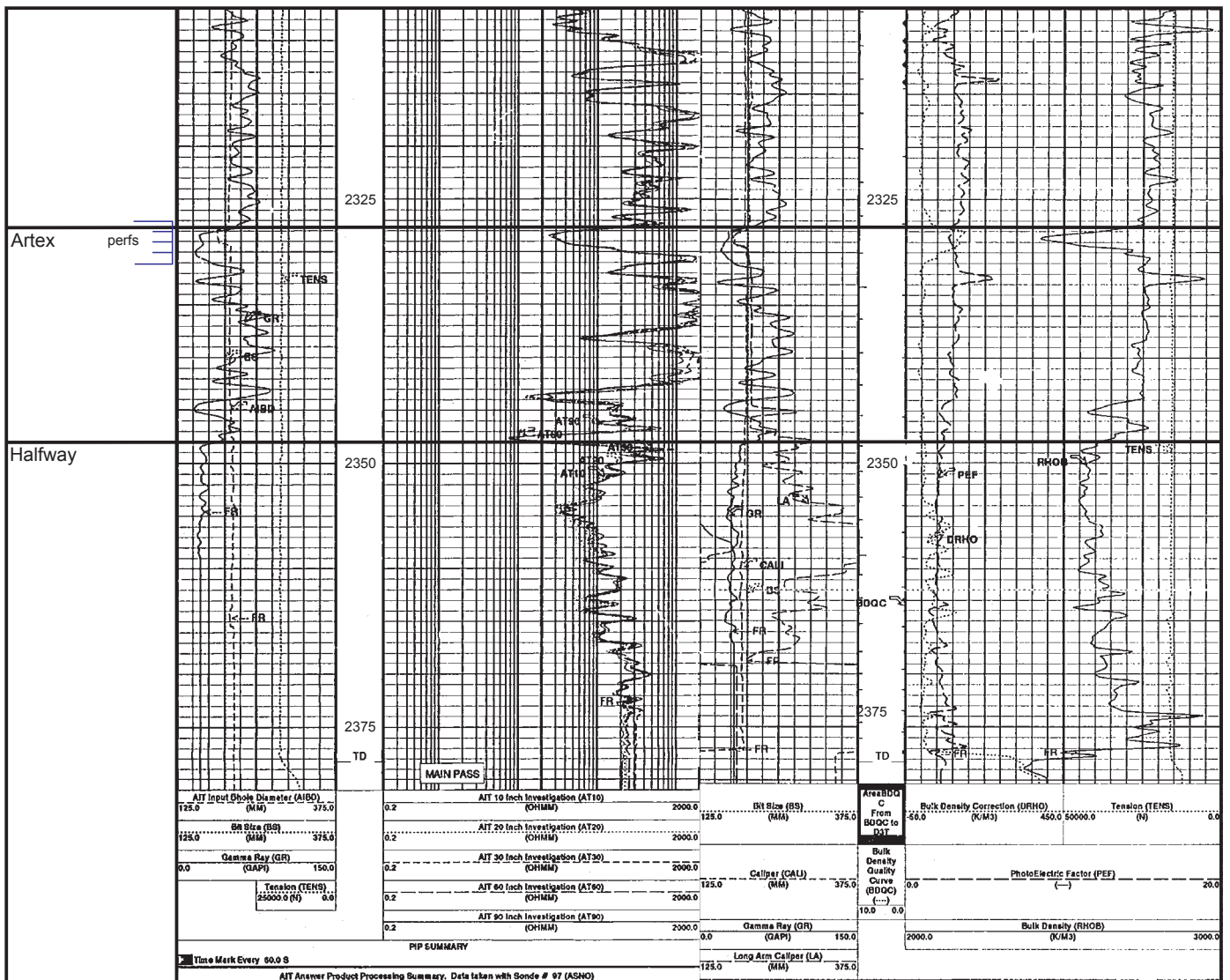
Remaining Original Oil in Place (%): 77

Cumulative Water Production: 7,130 barrels, 1,136 m³

Notes: The Artex is thin but productive. Lateral communication is limited and pool extent small, so exploration might be needed for other Artex pools.



Contour interval is two metres Artex B net oil pay (Oil and Gas Commission). Discovery well is 14-32-78-19W6.



Induction and neutron-density logs for discovery well 14-32-78-19W6. Completion is at the top of the Artex in a thin but porous sandstone streak. Induction and neutron-density logs for discovery well 14-32-78-19W6. Completion is at the top of the Artex in a thin but porous sandstone streak.

1994/03/24

<=1200.2m=>

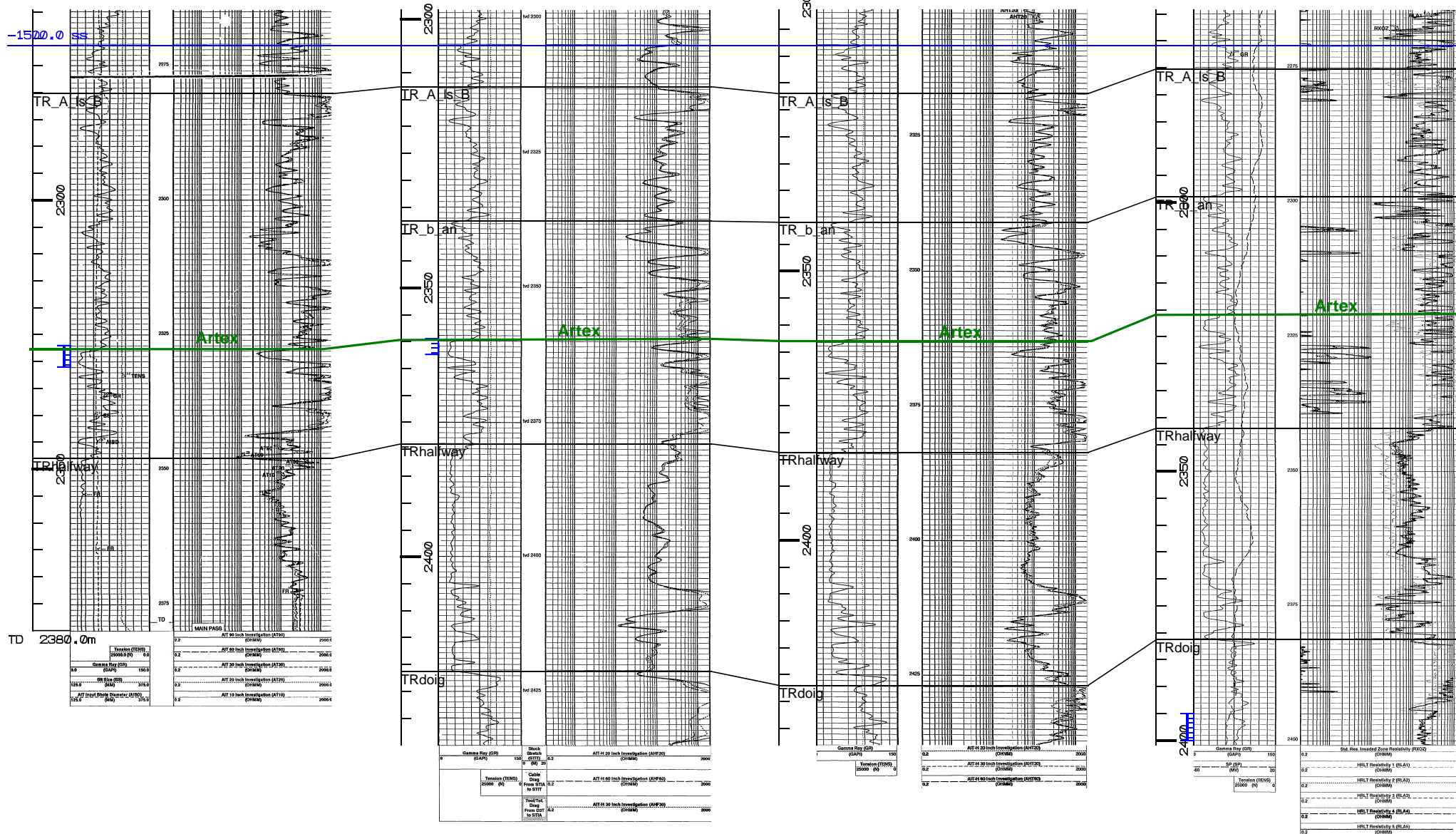
1999/10/12

<=379.2m=>

2003/06/29

<=614.0m=>

2005/11/04



1:1000

Groundbirch Artex B

GROUNDBIRCH OIL FIELD

Cecil A Pool

Pool Parameters

Field Code: 4390

Pool Code: 4520A

Discovery well original name: CANHUNTER ET AL SUNRISE 7-10-79-19W6

WA#: 08314

Rig Release: 1993/11/23

Other Oil and Gas Shows: Kiskatinaw gas, Doig gas, Artex oil

Number of Wells (October 2012) Oil: 3 **Active:** 1 **Horizontal:** 1

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1954 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 9

Average Net Pay: 1 metre

Average Permeability: 11 milliDarcies

Average Water Saturation (%): 21

Oil Formation Volume Factor (%): 158

Gravity (degrees API): 50

Original Pressure: 2794 psi, 19,264 kPa

Reserves

Estimated original oil in place: 1,157,890 barrels, 184,090 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 173,680 barrels, 27,613 m³ (production decline)

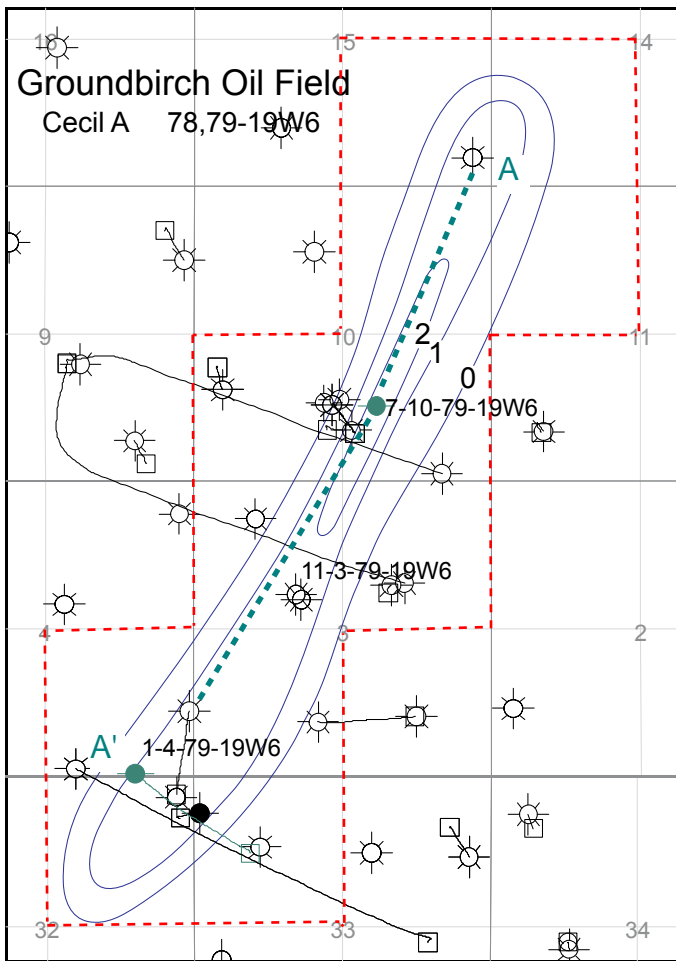
Cumulative Oil Production: 147,900 barrels, 23,514 m³

Remaining Recoverable Oil: 25,780 barrels, 4,099 m³

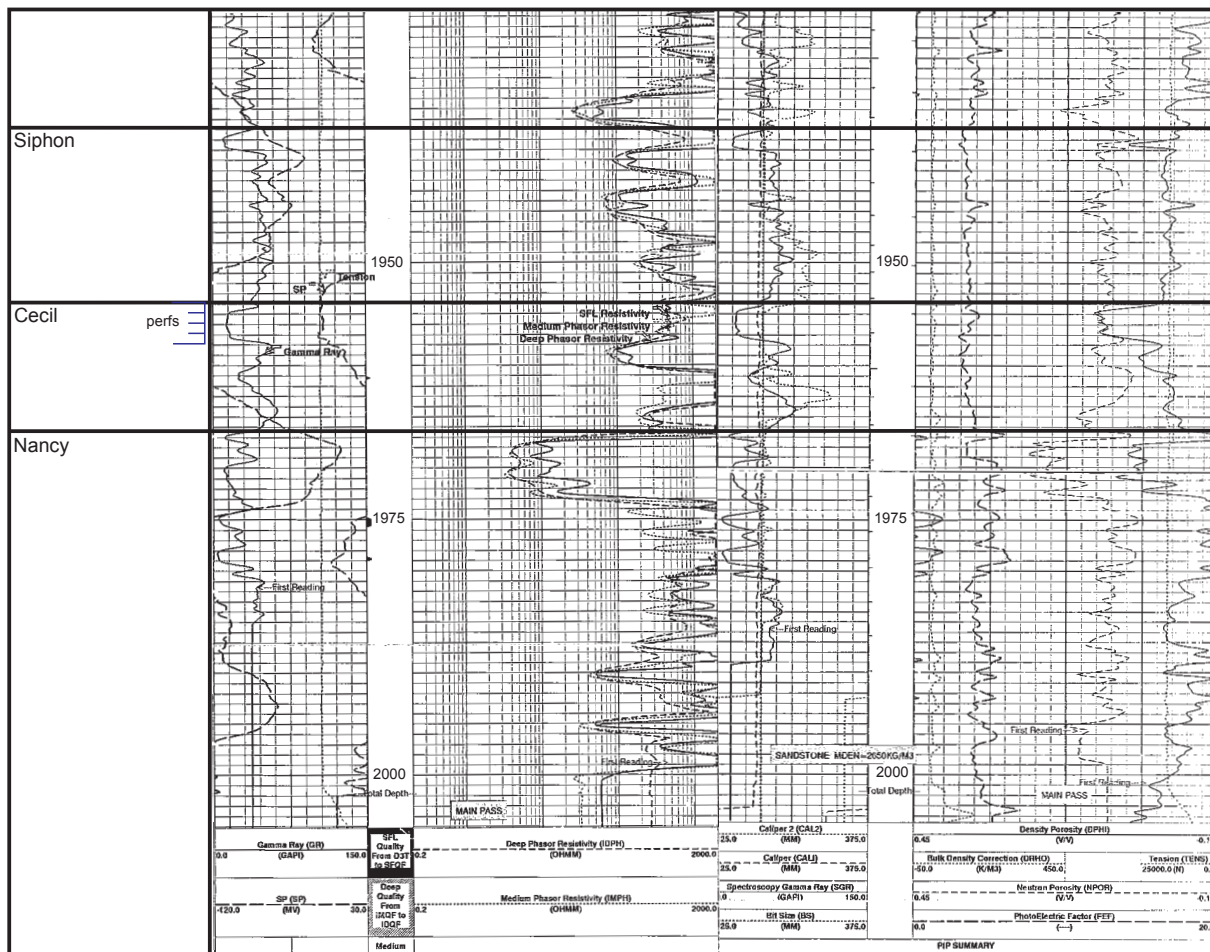
Remaining Original Oil in Place (%): 87.2

Cumulative Water Production: 740 barrels, 118 m³

Notes: In 1994 after a review of information, the OGC determined that discovery well 7-10 was in a separate Cecil oil pool and was re-named Groundbirch.



Contour interval is one metre net Cecil A oil pay (Oil and Gas Commission). Discovery well is 7-10-79-19W6; 11-03 and 1-4 are the other two oil well in the pool. Location 1-4 is directional. The northern end of the pool appears to be un-drilled.



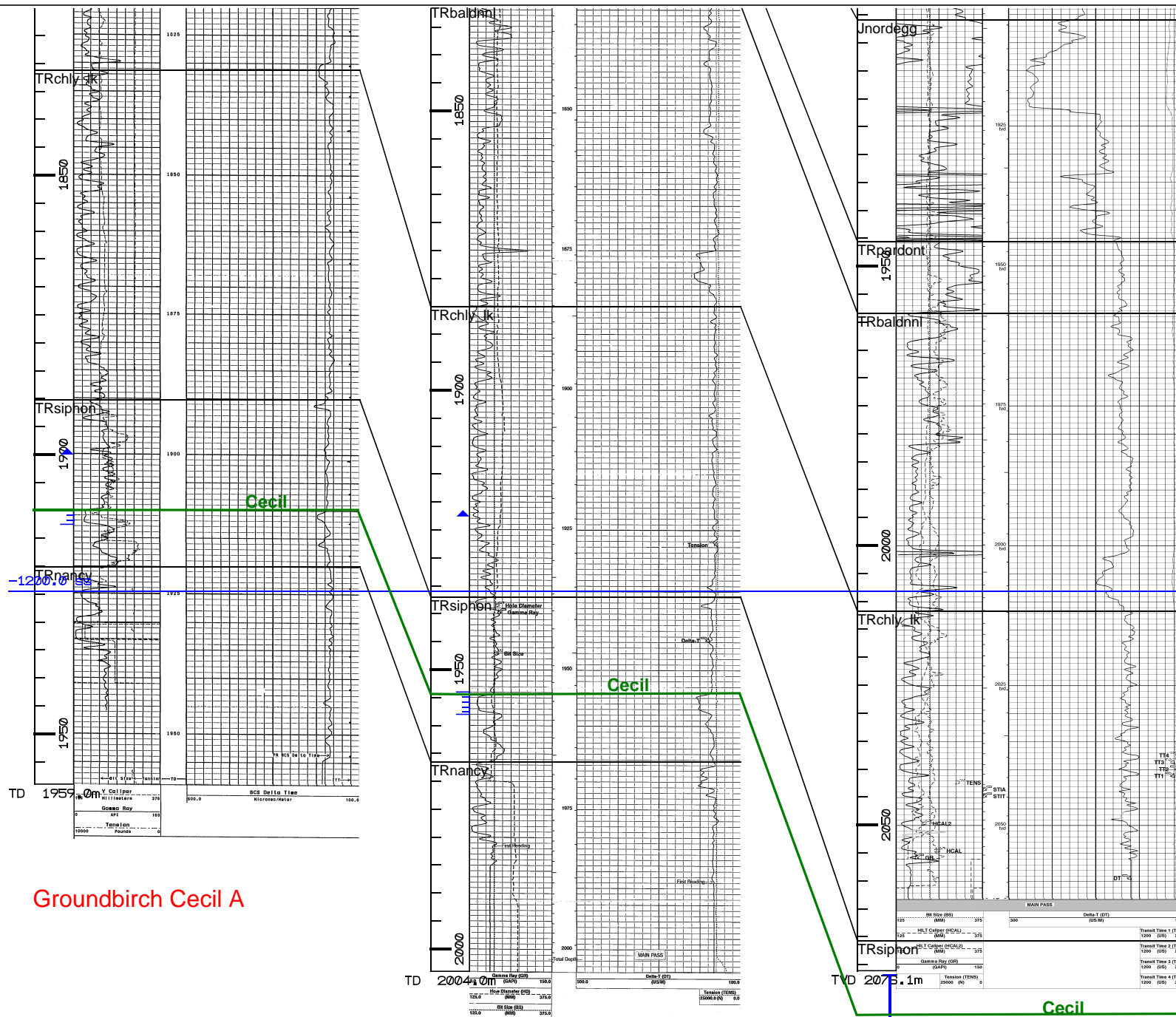
Induction and neutron-density logs for discovery well 7-10-79-19W6. Strong gas response over the completion interval in the Cecil indicates gas, which provides a relatively good drive mechanism.



<=1463.9m=>



<=2412.5m=>



Groundbirch Cecil A

1:1000

BRASSEY OIL FIELD

Artex B Pool

Pool Parameters

Field Code: 2100

Pool Code: 4700B

Discovery well original name: Canhunter Brassey c-034-F 093-P-10

WA#: 06736

Rig Release: 1987/11/29

Other Oil and Gas Shows: Halfway oil, Boundary Lake oil, Cadotte gas

Number of Wells (November 2012) Oil: 17 Active: 11 Horizontal: 2

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 2930 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 4 metres

Drive Mechanism: gas cap expansion plus gas injection pressure maintenance

Average Porosity (%): 17

Average Net Pay: 2.2 metres

Average Permeability: not cored at c-34-F; average 150 md at c-23-F

Average Water Saturation (%): 2.6

Oil Formation Volume Factor (%): 179

Gravity (degrees API): 57.2

Original Pressure: 5721 psi, 39,445 kPa

Reserves

Estimated original oil in place: 20,122,580 barrels, 3,199,235 m³

Recovery Factor (%): 54

Estimated Recoverable Oil: 10,866,200 barrels, 1,727,588 m³ (production decline)

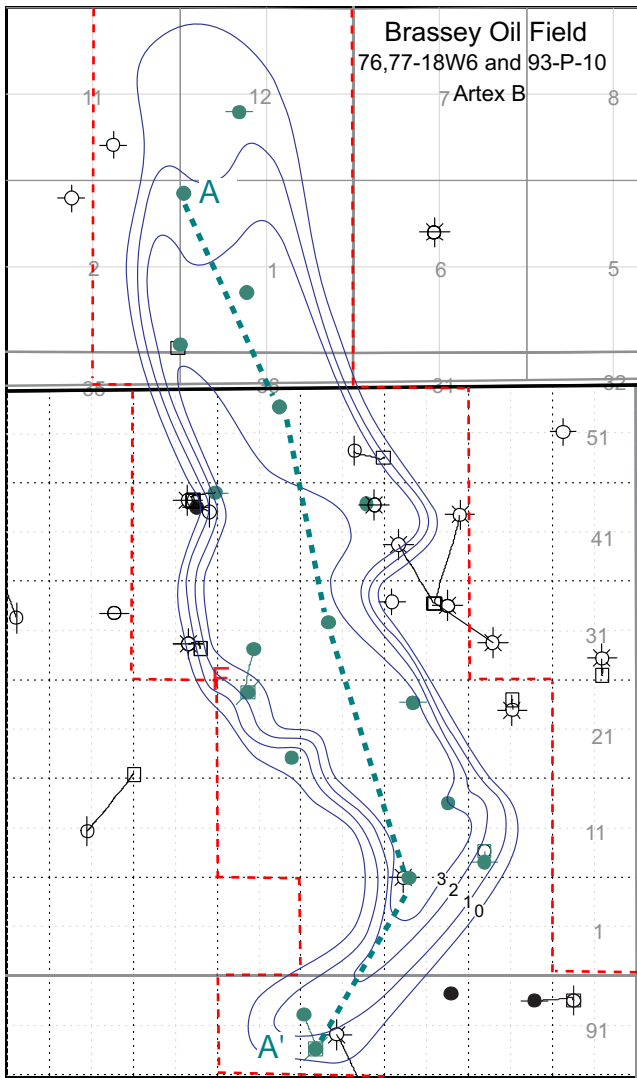
Cumulative Oil Production: 10,807,670 barrels, 1,718,282 m³

Remaining Recoverable Oil: 58,530 barrels, 9,306 m³

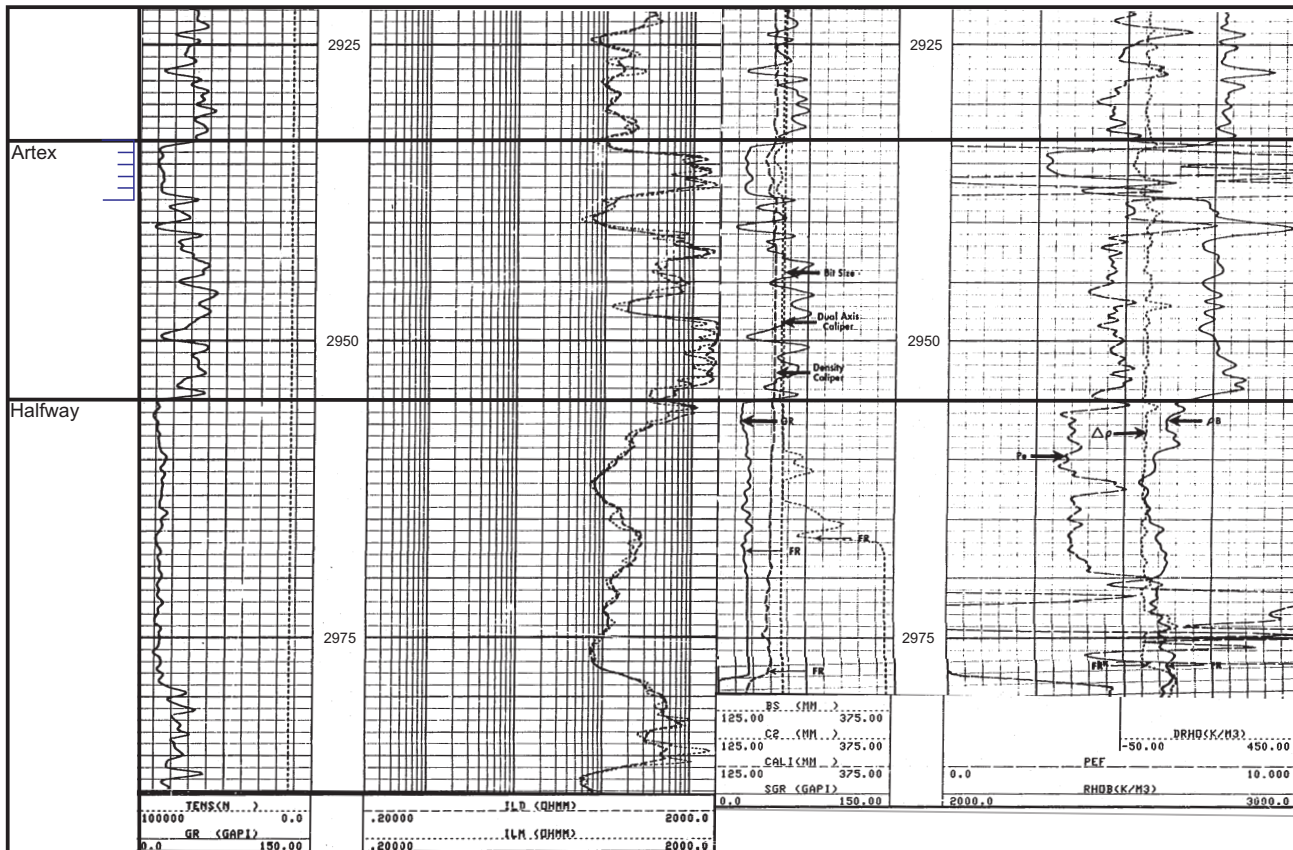
Remaining Original Oil in Place (%): 46

Cumulative Water Production: 84,700 barrels, 13,466 m³

Notes: The very high recovery factor (54%) might be partly attributed to very good reservoir characteristics, which facilitates efficient gas pressure maintenance. This pool has a gas cap whose expansion likely contributes to an efficient drive. The productive zone is very thin and probably not suitable for horizontal drilling. However, the field might be bigger than mapped, so offsets and in-fills may be economic.



Contour interval is one metre net Artex B oil pay (supplied by the Oil and Gas Commission). Discovery well is c-34-F-93-P-10. Net Artex oil pay contours are indicated. The small separate pool in the lower right is of the Artex G.



Induction and neutron-density (sandstone scale) for discovery well c-34-F-93-P-10. The upper part of the Artex is the pay zone and it displays very good reservoir characteristics that partly explain the very high recovery factor of 54%. Gas injection pressure maintenance was initiated early in the life of the pool.

A

A'

1989/02/14

1988/05/11

1987/11/29

1989/04/15

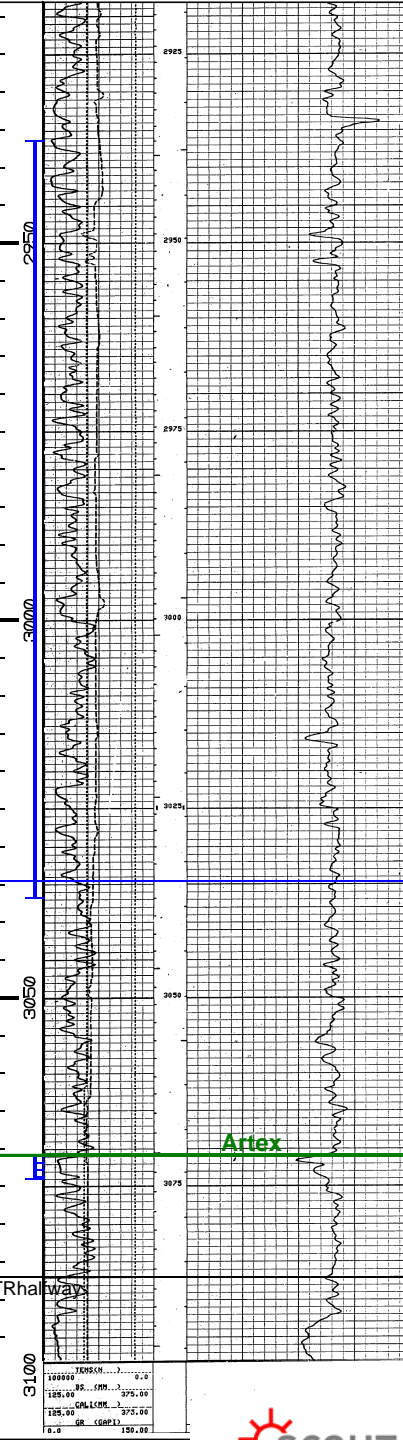
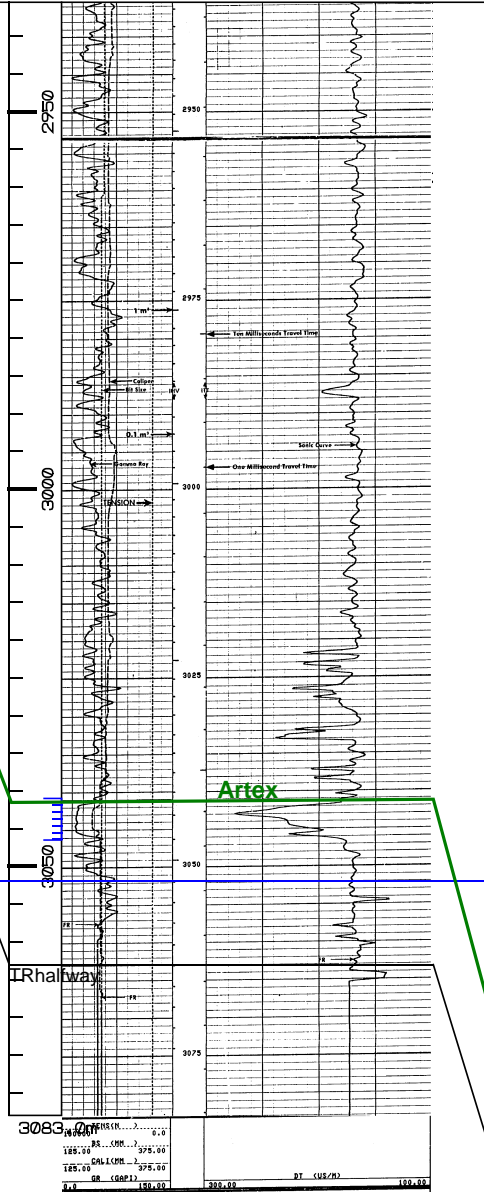
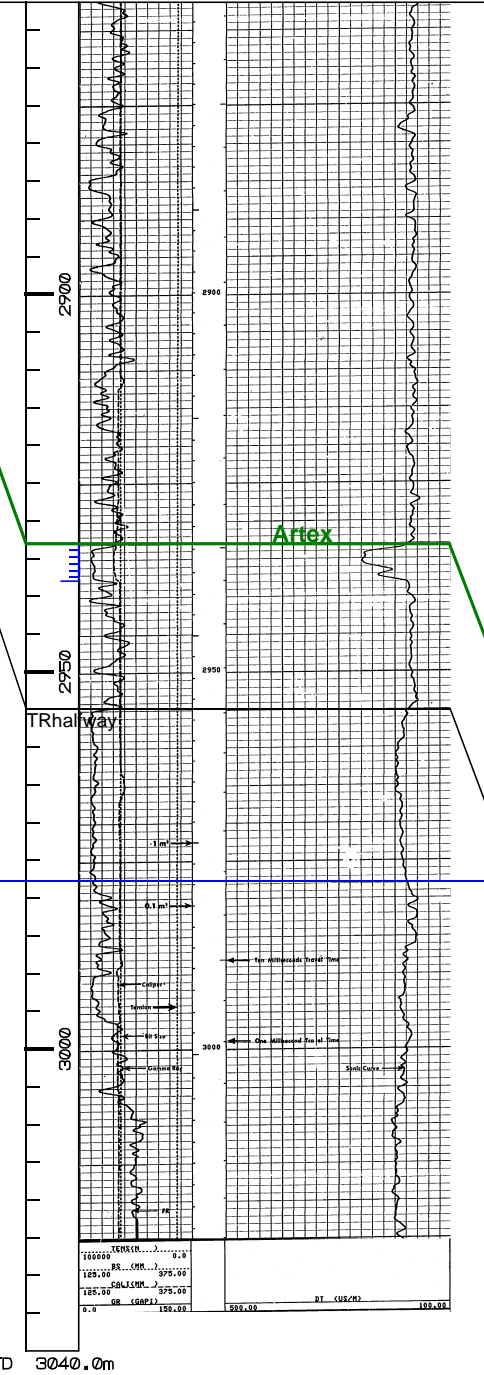
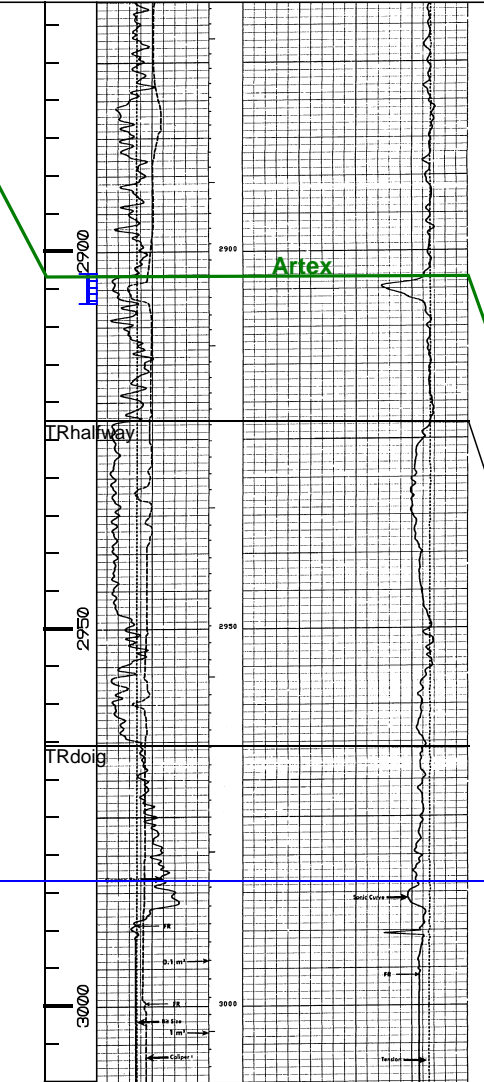
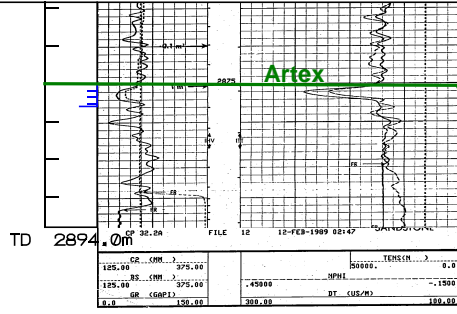
1989/03/29

<=2201.2m=>

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<=2510.4m=>

<=1841.2m=>



GR	CON	375.00	TERMIN	0.0
125.00	RS	500.00	DEPTH	5000.00
125.00	OR	375.00	DT	1500.00
0.0	OR	150.00	DT	300.00
0.0	OR	150.00	DT	100.00

GR	CON	375.00	TERMIN	0.0
125.00	RS	500.00	DEPTH	5000.00
125.00	OR	375.00	DT	1500.00
0.0	OR	150.00	DT	300.00
0.0	OR	150.00	DT	100.00

GR	CON	375.00	TERMIN	0.0
125.00	RS	500.00	DEPTH	5000.00
125.00	OR	375.00	DT	1500.00
0.0	OR	150.00	DT	300.00
0.0	OR	150.00	DT	100.00

GR	CON	375.00	TERMIN	0.0
125.00	RS	500.00	DEPTH	5000.00
125.00	OR	375.00	DT	1500.00
0.0	OR	150.00	DT	300.00
0.0	OR	150.00	DT	100.00

GR	CON	375.00	TERMIN	0.0
125.00	RS	500.00	DEPTH	5000.00
125.00	OR	375.00	DT	1500.00
0.0	OR	150.00	DT	300.00
0.0	OR	150.00	DT	100.00

Brassey Artex B

-2000.0 ss

1:1000

AIRPORT OIL FIELD

Halfway C

Field Parameters

Field Code: 0100

Pool Code: 4800C

Discovery well original name: Titan Airport A9-32-83-17W6

WA#: 19941

Rig Release: 2005/10/08

Other Oil and Gas Shows: Baldonnel gas.

Number of Wells (November 2012): Oil: 1 Active: 1

Reservoir Data

Average Depth of Producing Zone: 1526 metres

Lithology of Reservoir Rock: Sandstone

Trap Type: Stratigraphic-Structural

Area of Pool: 161 acres, 65 hectares

Drive Mechanism: Combination gas depletion and weak water drive.

Average Porosity (%): 14

Average Net Pay: 4.8 metres

Average Permeability: not cored, no DSTs

Average Water Saturation (%): 25

Oil Formation Volume Factor (%): 130

Gravity (degrees API): 42

Original Pressure: 1956 psi, 13486 kPa

Reserves

Estimated oil in place: 1,621,030 barrels, 257,723 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 162,100 barrels, 25,772 m³ (volumetric)

Cumulative Production: 28,910 barrels

Remaining Original Oil in Place (%): 98

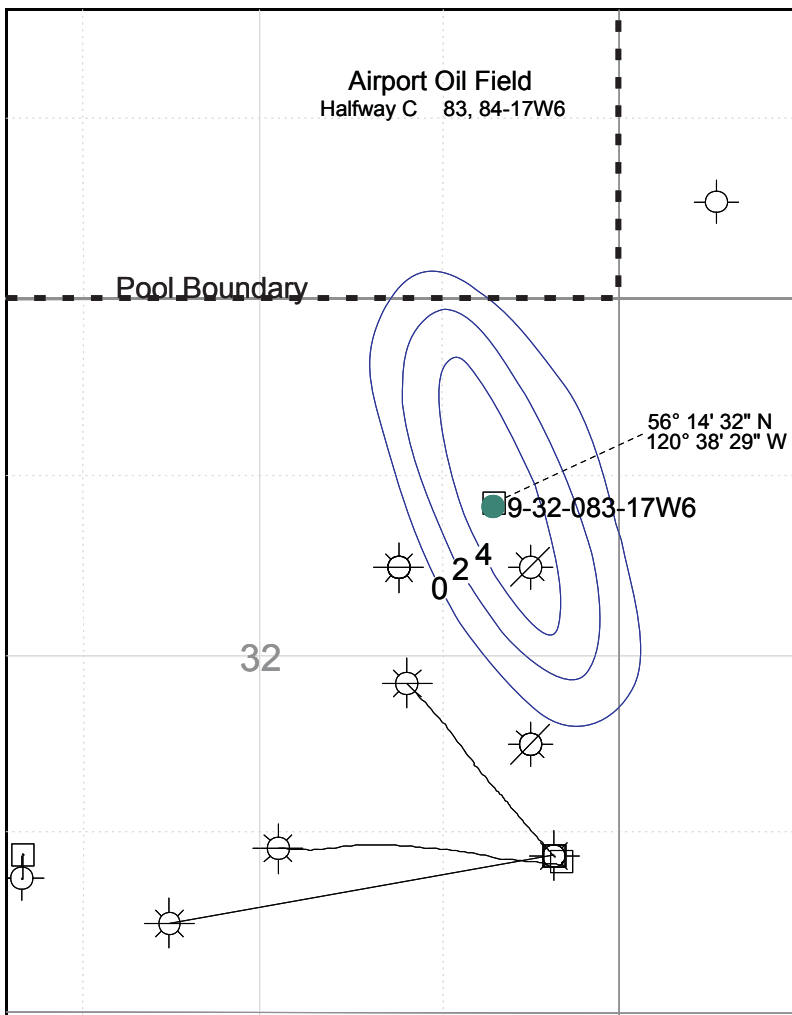
Remaining Recoverable Oil: 133,200 barrels

Cumulative Water Production: 29,710 barrels

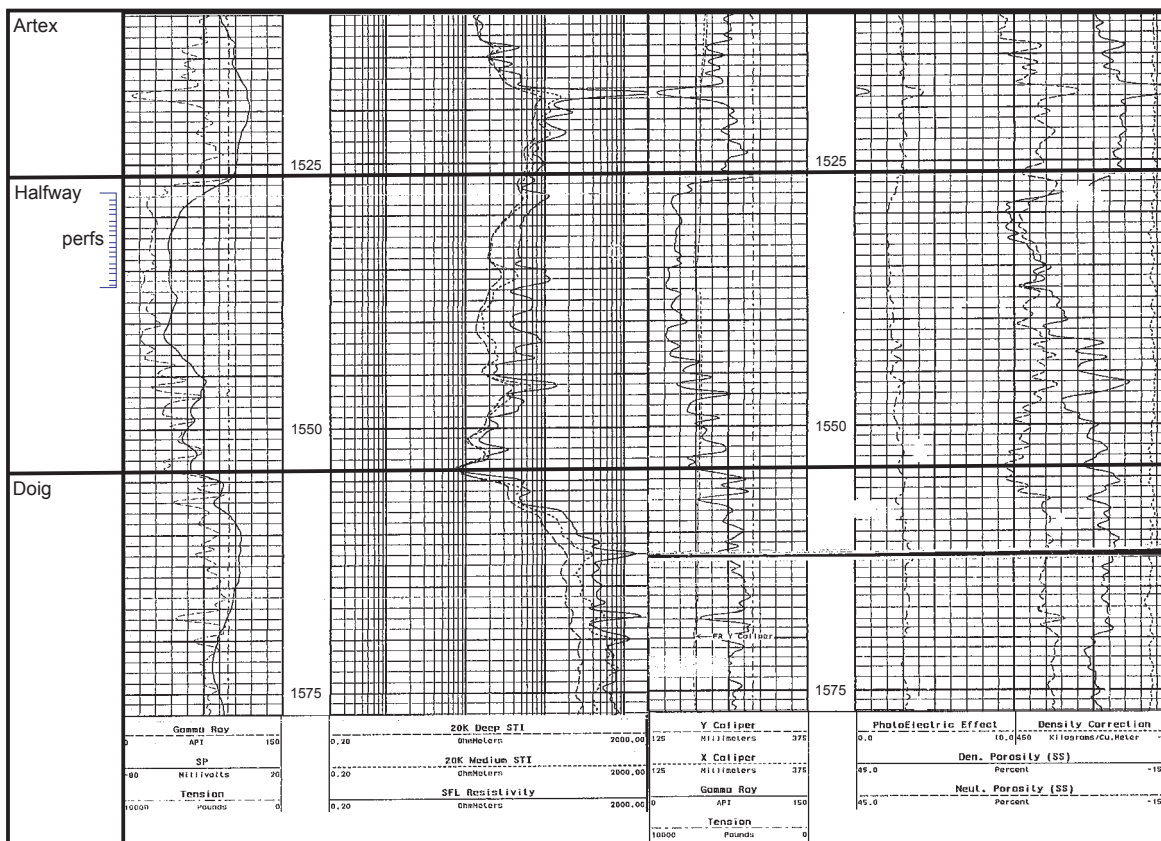
Notes:

Pyrobitumen plugging is mentioned in the sample descriptions and suggested as a limiting factor for oil production. The Halfway formation is thick, porous and appears to extend to the nearby offsets. Horizontal drilling might be worth considering because the sandstone should be relatively easy to stay within. This, combined with advanced recovery techniques, could boost recovery.

It appears to have a water leg plus gas in solution and/or gas cap.



Pool Halfway 4800C is in the northeast quarter of section 32-83-17W6. The Halfway has a similar thickness in near offsets 9-32 and 10-32. The discovery well is 102/9-32-83-17W6.



Induction and neutron-density logs for discovery well 9-32-83-17W6. The Halfway displays classic pay zone characteristics: high resistivity in the upper perfed zone; a possible water leg or wide transitional zone over the lower portion, but no obvious oil/water contact. Neutron-density crossover or near-crossover is present over the entire perfed interval

BEATTON RIVER WEST OIL FIELD

Bluesky A Pool

Pool Parameters

Field Code: 0600

Pool Code: 2600A

Discovery well original name: TRIAD BEATTON RIVER d-039-K 94-H-2

WA#: 00408

Rig Release: 1959/01/09

Other Oil and Gas Shows: Notikewin oil, Gething gas, Halfway gas

Number of Wells (November 2012) Oil: 17 Injection: 8 Active: 7

Reservoir Data

Average Depth of Producing Zone: 1022 metres; 3351 feet

Lithology of Reservoir Rock: Sandstone

Trap Type: Structural-stratigraphic

Estimated Maximum Reservoir Thickness: 15 feet, 4.5 metres

Area of Pool: 956 acres, 387 hectares

Drive Mechanism: solution gas drive, weak water drive

Average Porosity (%): 12

Average Net Pay: 4.3 metres, 14 feet

Average Permeability: 85 md

Average Water Saturation: 45.5

Oil Formation Volume Factor: 120.9

Gravity (degrees API): 43

Original Pressure (psi/kpa): 1036 psi, 7143 kPa

Reserves

Estimated original oil in place: 18,911,620 barrels, 3,006,710 m³

Recovery Factor (%): 37

Estimated Recoverable Oil: 7,040,220 barrels, 1,119,306 m³

Cumulative Production: 6,865,640 barrels

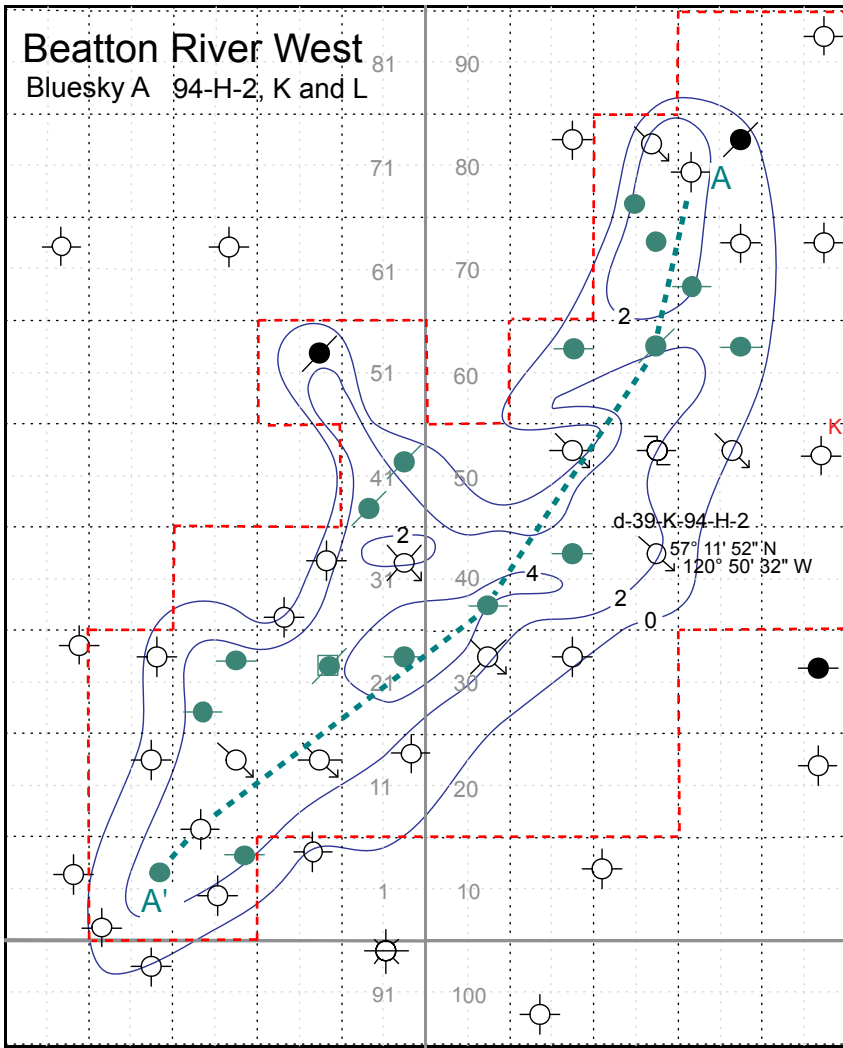
Remaining Recoverable Oil: 174,580 barrels

Original Oil in Place remaining (%): 64

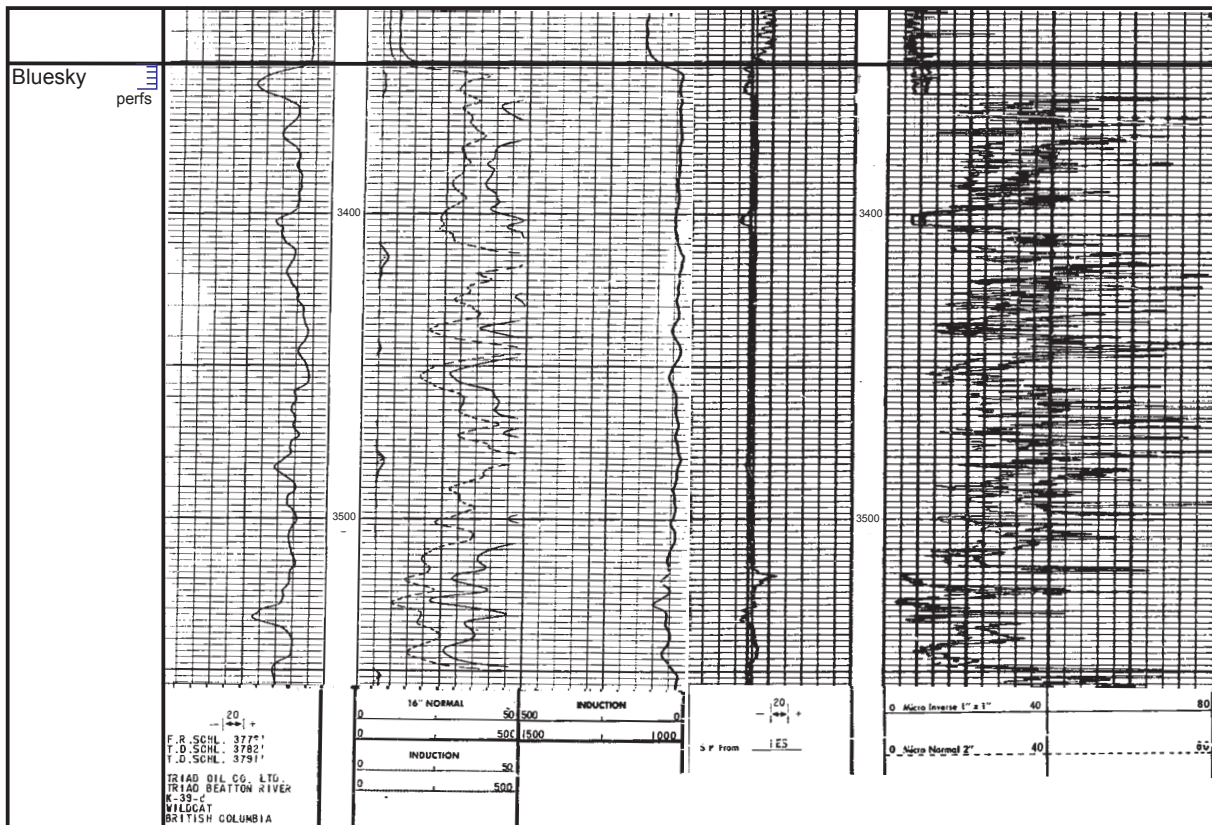
Cumulative Water Production: 4,719,130 barrels

Cumulative Water Injection: 18,890,700 barrels

Notes: Drill cuttings were taken from surface at the discovery well. Well records describe sand and gravel above siltstone bedrock at 350 feet (107 metres). All wells in the pool are vertical; most were drilled in the late 1950s. Bluesky permeability is relatively poor; horizontal wellbores could provide better production rates. Horizontals could stay above the water contact, which might also help reduce water cut. Beatton River West is one of the older oil fields in BC>



Discovery well d-39-K-94-H-2 was drilled in 1958, as were most of the other wells in the field. All of them are vertical. Contours provided by the Oil and Gas Commission (interval 2 metres).



Discovery well D-39-K-94-H-2 E-log and microlog. The top part of the Bluesky formation was perferd. The microlog indicates fair permeability over the perferd interval

BLUEBERRY WEST OIL FIELD

Debolt B Pool

Pool Parameters

Field Name: Blueberry West **Field Code:** 1800 **Pool Code:** 7400B
Discovery well original name: Texaco Blueberry 12-29-88-25W6 **WA#:** 06672
Rig Release: 1987/10/30
Other Oil and Gas Shows: Baldonnel, Dunlevy gas
Number of Producing Wells (October 2012): Oil: 2 Active: 0

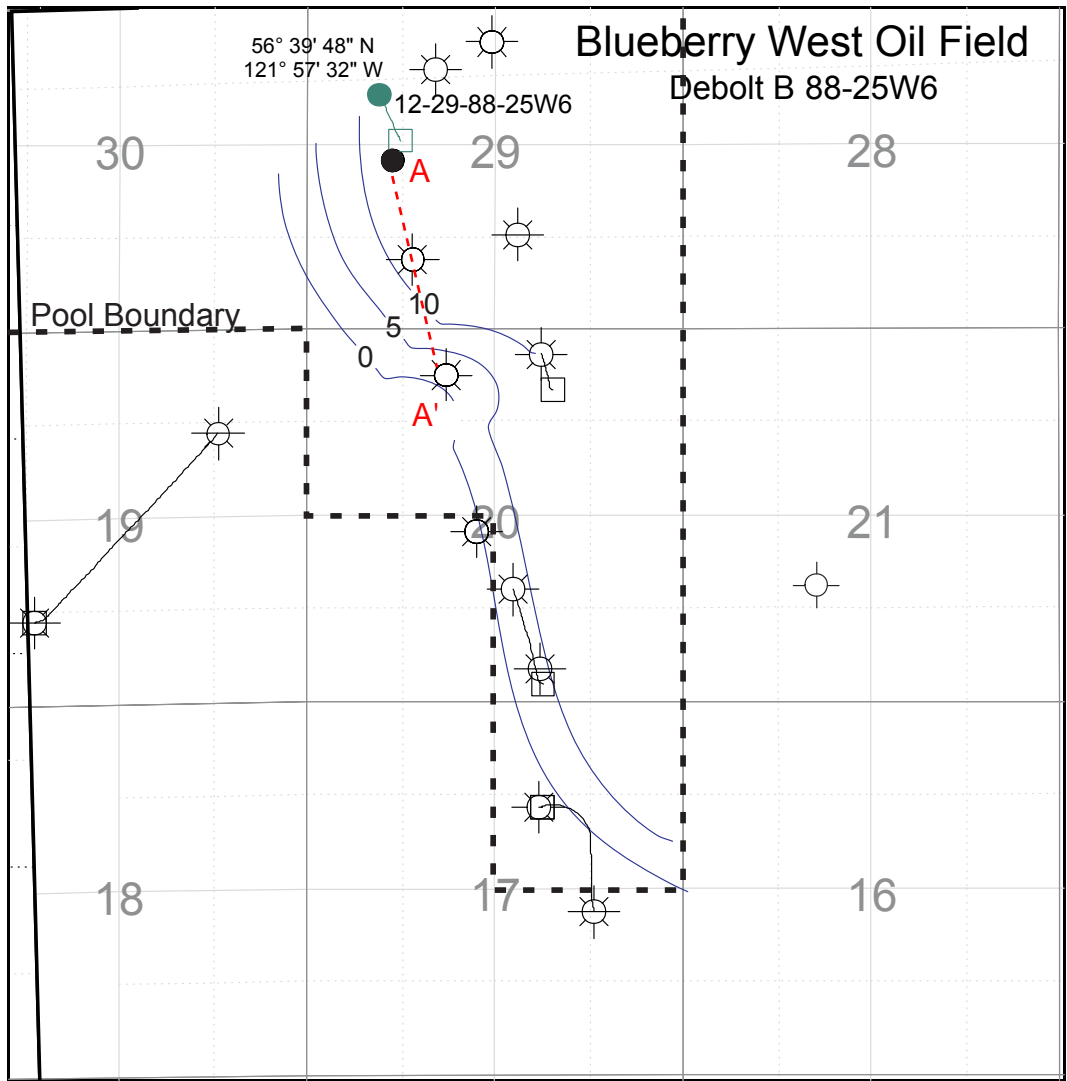
Reservoir Data

Area of Pool: 161 acres, 65 hectares
Average Depth of Producing Zone: 2000 metres
Lithology of Reservoir Rock: limestone and dolomite
Trap Type: structural
Estimated Maximum Reservoir Thickness: 15 metres, 50 feet
Drive Mechanism: gas depletion, possibly combined with water drive
Average Porosity (%): 7
Average Net Pay: 22 feet, 6.7 metres
Average Permeability: 53 milliDarcies
Average Water Saturation (%): 15
Oil Formation Volume Factor (%): 141
Gravity (degrees API): 44.5
Original Pressure: 2672 psi, 18423 kPa

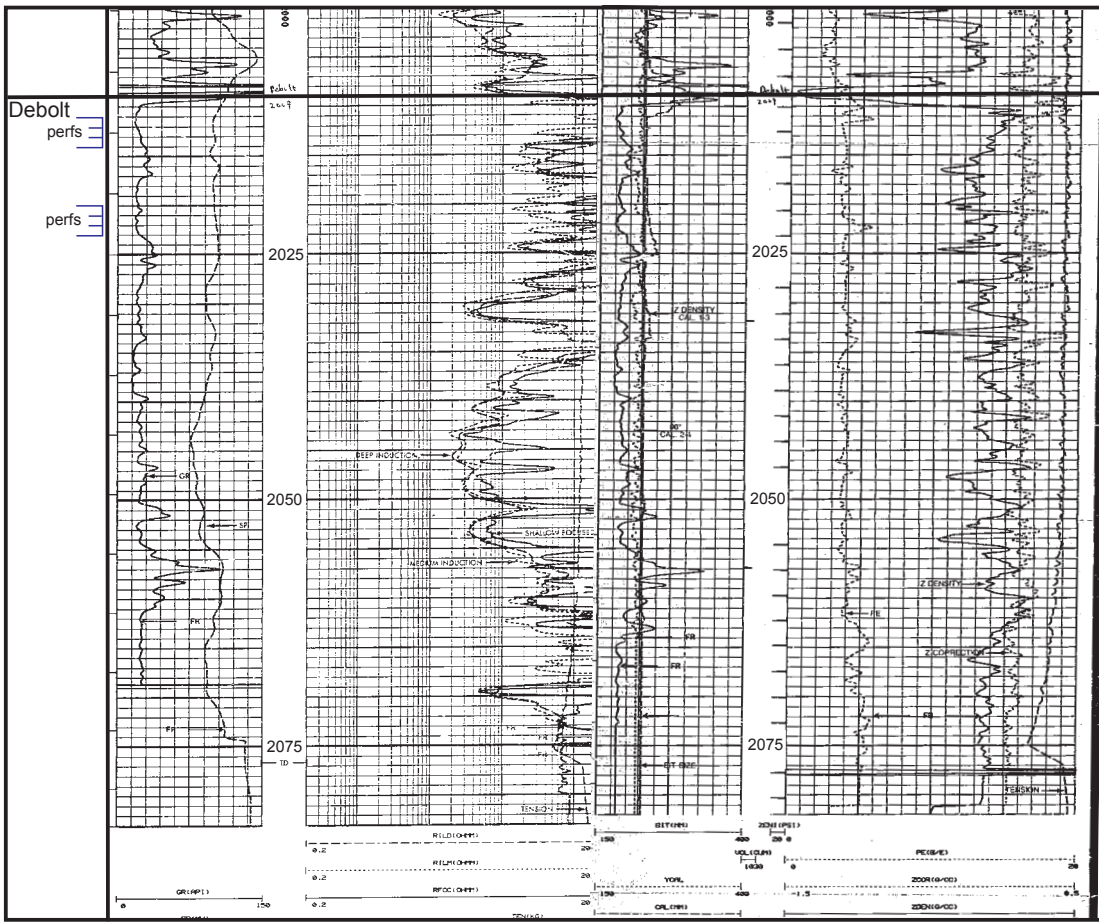
Reserves

Estimated original oil in place: 1,229,790 barrels, 195,521 m³
Recovery Factor (%): 10
Estimated Recoverable Oil: 122,979 barrels, 19,552 m³ (volumetric)
Cumulative Oil Production: 110,870 barrels, 17,627 m³
Remaining Recoverable Oil: 12,110 barrels, 1,925 m³
Remaining Original Oil in Place (%): 91
Cumulative Water Production: 149,870 barrels, 23,827 m³

Notes: If horizontal wells were drilled they might be able to stay above the water leg and reduce water cut. The Debolt is thick and pay is concentrated near the top. Trapping is at the up-dip edge of Laramide thrust sheets. The apparent presence of a water leg suggests that water drive plays a role in recovery.

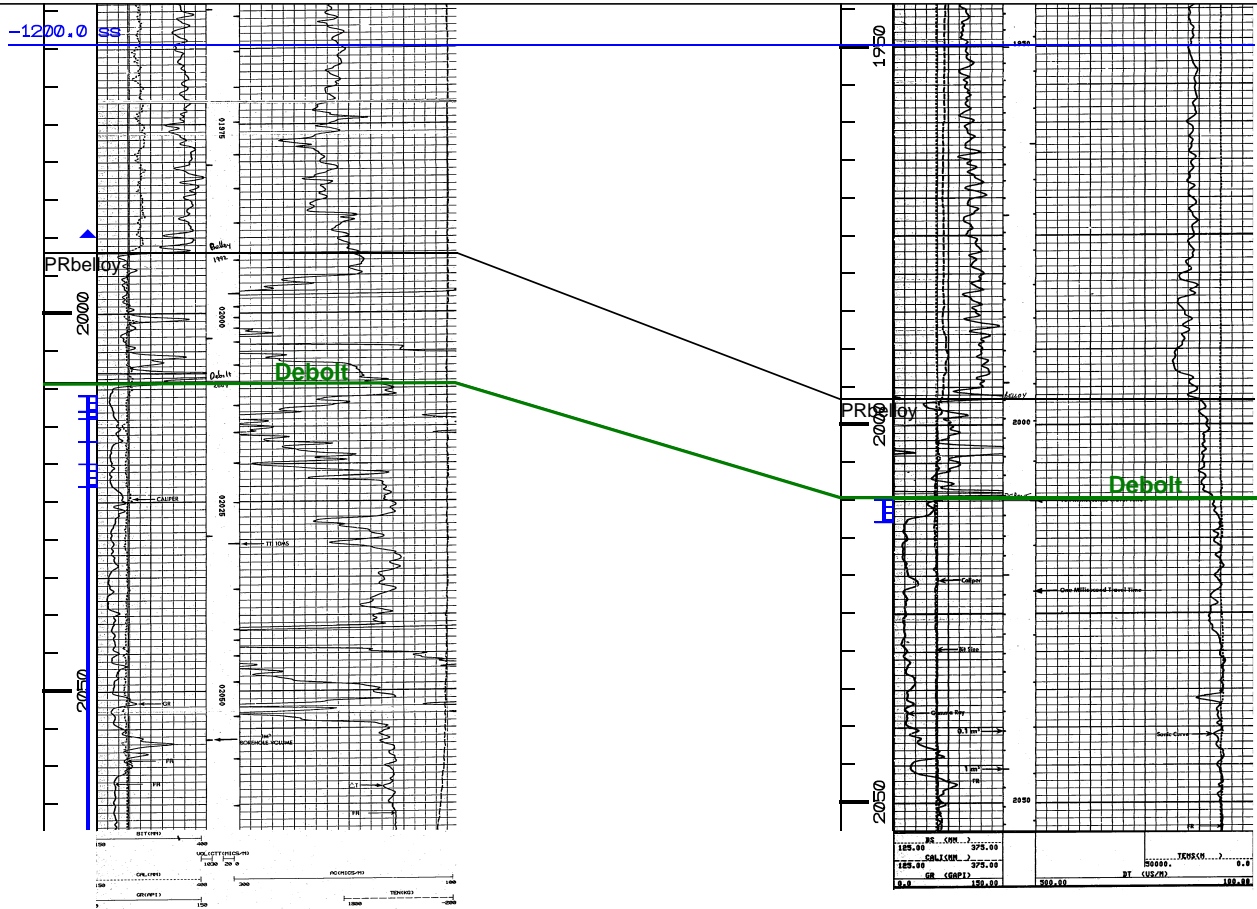


Contour interval, as supplied by the Oil and Gas Commission, is 5 metres net Debolt B oil pay. Discovery well 12-29 is deviated.



Resistivity and density logs for discovery well 12-29. The upper part of the Debolt appears to be massively bedded with numerous porous streaks. A probable water contact is at 2036 metres.

1:1000



Blueberry West Debolt B

BOUNDARY LAKE NORTH OIL FIELD

Coplin J Pool

Pool Parameters

Field Code: 2020

Pool Code: 4540J

Discovery well original name: Pointwest N Boundary 16-12-088-15W6

WA#: 15115

Rig Release: 2003/01/04

Other Oil and Gas Shows: Halfway Oil

Number of Producing Wells (November 2012) Oil: 3 **Active:** 3

Reservoir Data

Area of Pool: 633 acres, 256 hectares

Average Depth of Producing Zone: 1244 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 12

Average Net Pay: 0.4 metres

Average Permeability: not cored, no DSTs

Average Water Saturation (%): 27

Oil Formation Volume Factor (%): 118.3

Gravity (degrees API): 39.0

Original Pressure: 1376 psi, 9487 kPa

Reserves

Estimated original oil in place: 490,370 barrels, 77,963 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 73560 barrels, 11,695 m³ (volumetric)

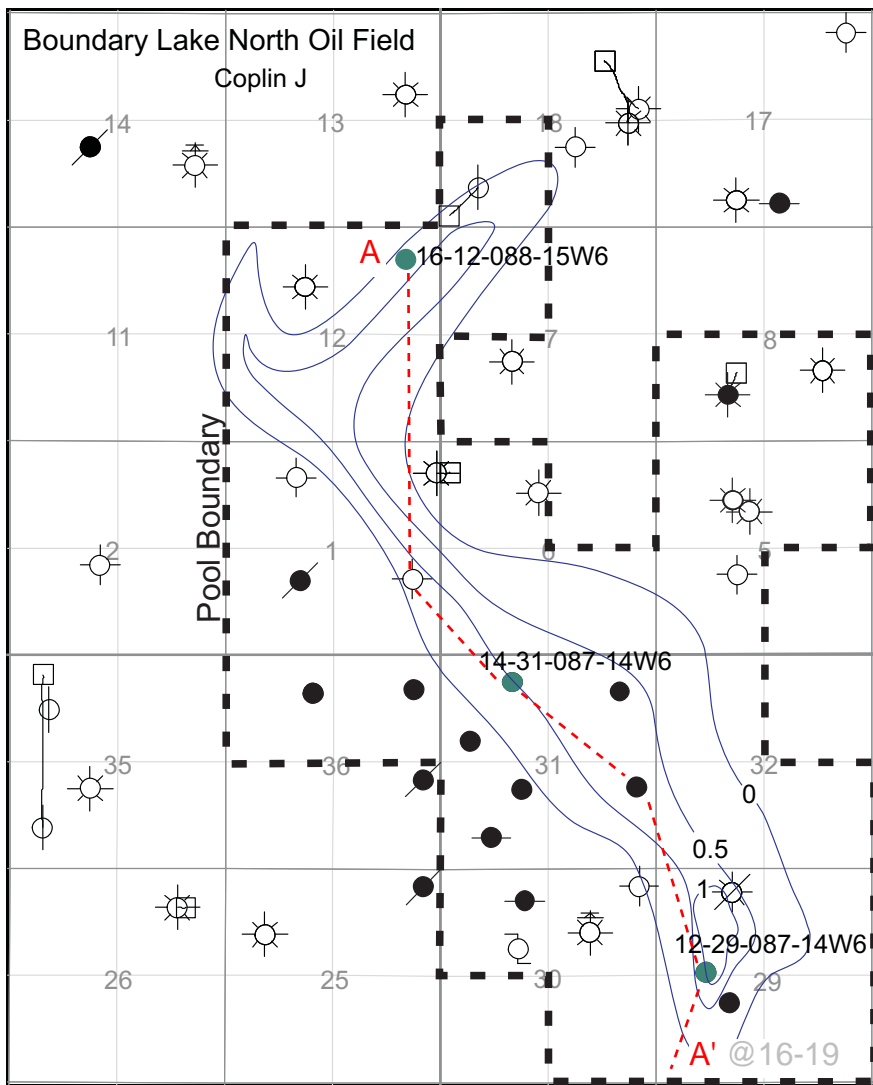
Cumulative Oil Production: 60,910 barrels

Remaining Recoverable Oil: 12,640 barrels

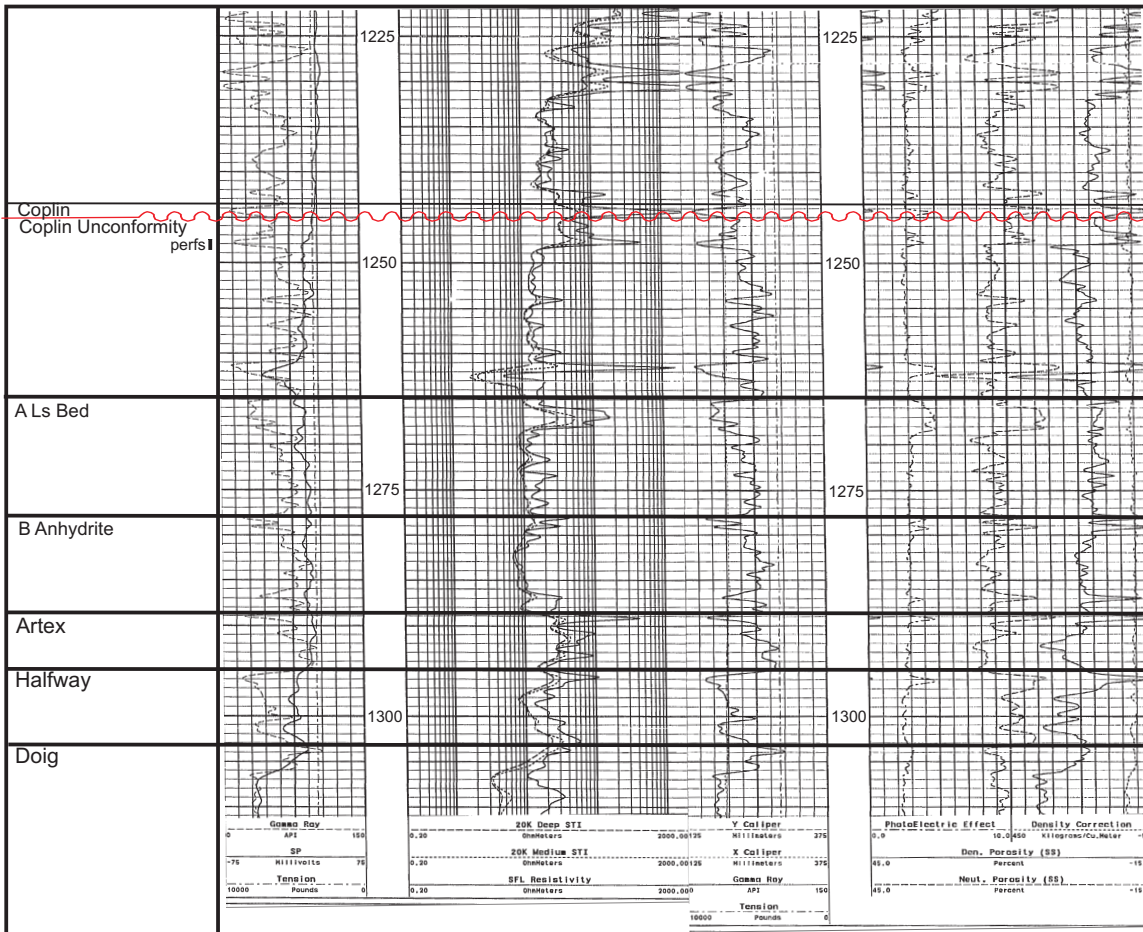
Remaining Original Oil in Place (%): 88

Cumulative Water Production: 13,060 barrels

Notes: The Coplin Member is not observed in offsetting wells. This suggests porous sand development is limited to trend.



The Boundary Lake Coplin J Pool is composed of three wells indicated in blue numbering. Discovery well is 16-12-88-15W6 near the north end of the pool. Contour interval, as supplied by the Oil and Gas Commission is 0.5 metres. The contours suggest a continuous linear sand development with undrilled branches.



Induction and neutron-density curves for discovery well 16-12. The density curve is calibrated for sandstone. It shows a gas response in the upper perfed portion of the Coplin member.

A

2003/01/04

<=2425.7m=>



1973/12/31

<=1085.4m=>

1984/02/17

<=1234.3m=>

1973/01/12

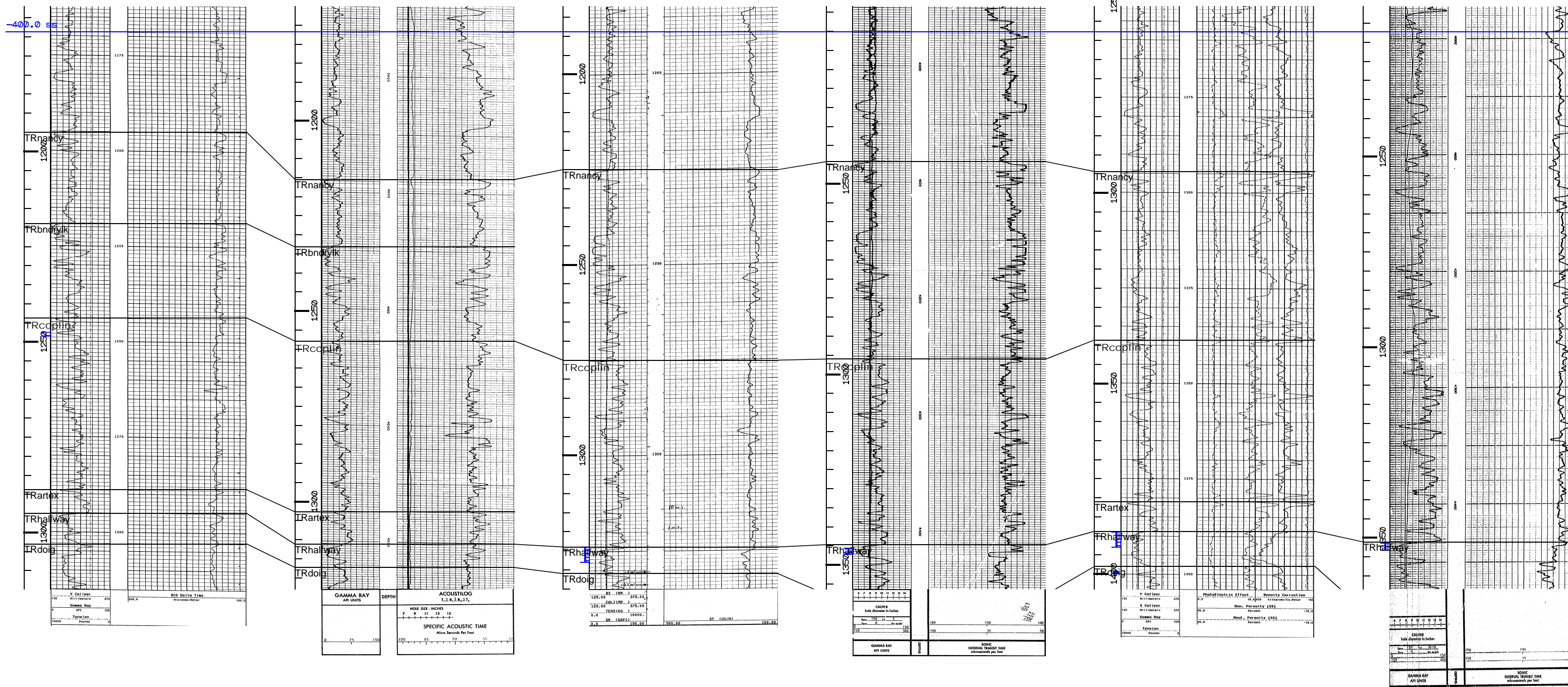
<=1493.1m=>

2003/12/21

<=1196.3m=>

1977/08/30

A'



Boundary Lake North Coplin J

BOUNDARY LAKE NORTH OIL FIELD

Doig A Pool

Pool Parameters

Field Code: 2020 **Pool Code:** 4900A
Discovery well original name: Texaco NFA N Boundary 10-09-87-14W6 **WA#:** 01451
Rig Release: 1964/03/19
Other Oil and Gas Shows: Halfway gas
Number of Producing Wells (November 2012) Oil: 4 **Active:** 3

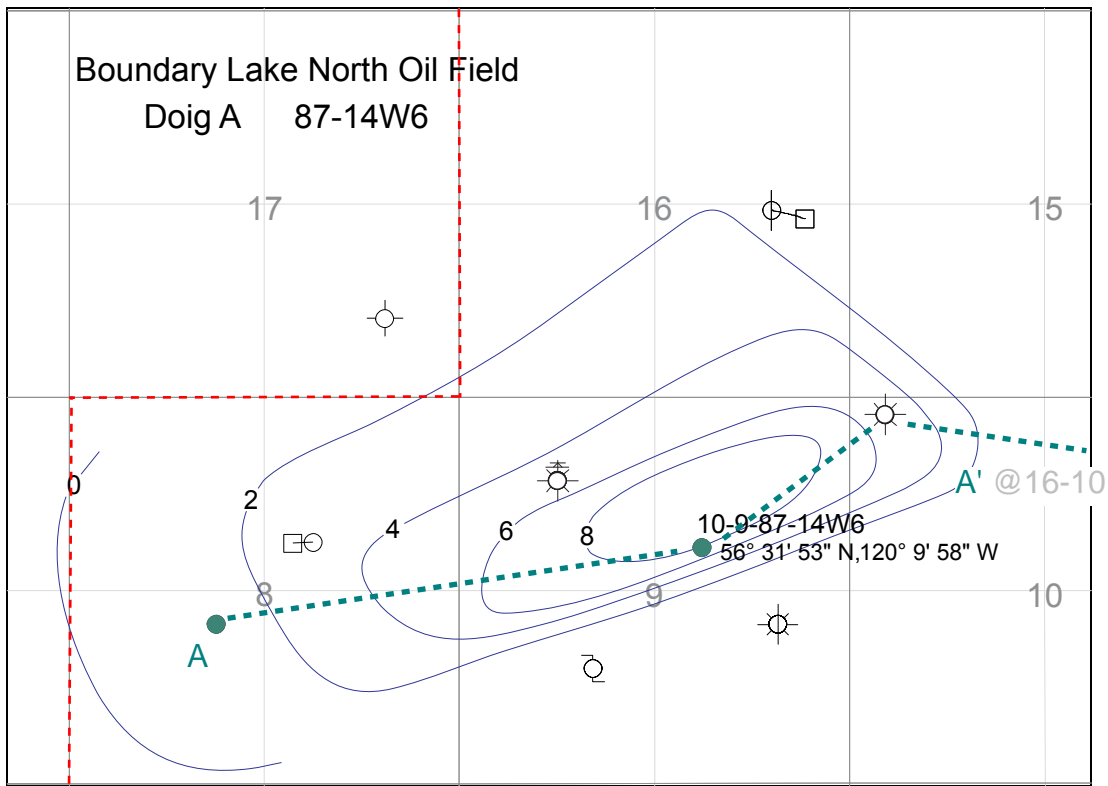
Reservoir Data

Area of Pool: 927 acres, 375 hectares
Average Depth of Producing Zone: 4500 feet, 1372 metres
Lithology of Reservoir Rock: sandstone/siltstone
Trap Type: stratigraphic-structural
Estimated Maximum Reservoir Thickness: 9 metres, 30 feet
Drive Mechanism: gravity
Average Porosity (%): 14.6
Average Net Pay: 3 metres, 10 feet
Average Permeability: Doig not cored, DST charts show good permeability; calculated 56 md
Average Water Saturation (%): 30
Oil Formation Volume Factor (%): 126.8
Gravity (degrees API): 41
Original Pressure: 1612 psi, 11114 kPa

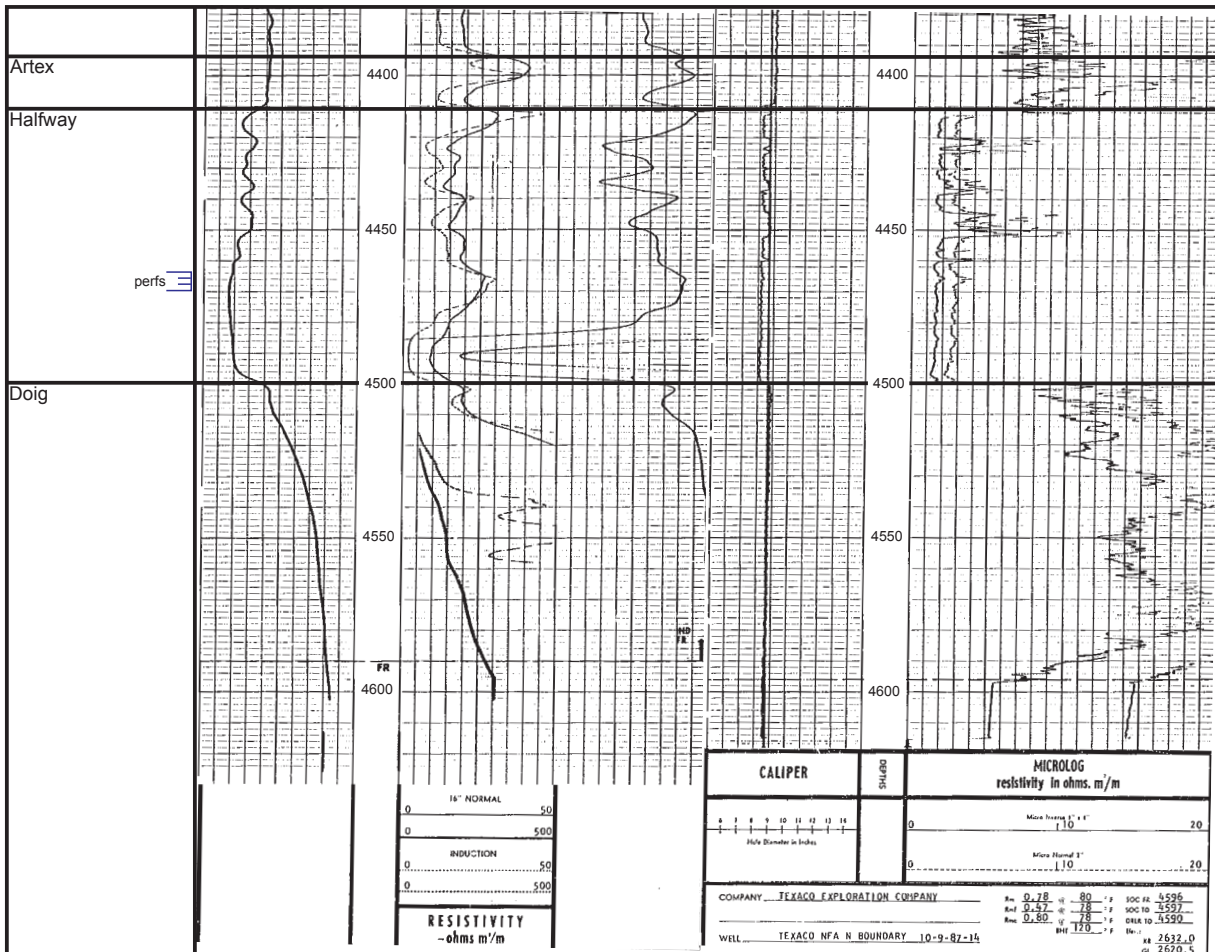
Reserves

Estimated original oil in place: 5,904,640 barrels, 938,763 m³
Recovery Factor (%): 15
Estimated Recoverable Oil: 885,700 barrels, 140,815 m³ (volumetric)
Cumulative Oil Production: 629,280 barrels
Remaining Recoverable Oil: 256,410 barrels
Remaining Original Oil in Place (%): 89
Cumulative Water Production: 629,040 barrels

Notes: This pool has a gas cap. A high water cut is suggested by a near one-to-one ratio of water to oil production. The pool is categorized as Doig but the completed interval falls within the lower Halfway, as picked by the Oil and Gas Commission. The Doig itself appears to be shale. A substantial volume of recoverable oil remains. The Doig here may involve drape over horst blocks, so structure influences trapping.



Contours (adapted from the Oil and Gas Commission) represent Doig A oil pay (interval 2 metres). Discovery well is 10-987-14W6. The gas cap is not indicated but occupies the central portion of the pool. Doig A net oil pay is indicated.



Elog and microlog for discovery well 10-09-87-14W6. The microlog shows good permeability across almost the entire Halfway. The pool is categorized as Doig by the Oil and Gas Commission, but the formation pick is Halfway. A gas interval is completed above the oil. Completion interval for the oil leg is 1357-1366 metres.

100/06-08-087-14W6/00

100/10-09-087-14W6/00

100/13-10-087-14W6/00

100/16-10-087-14W6/00

A

A'



<=2057.9m=>



<=949.1m=>



<=1354.6m=>

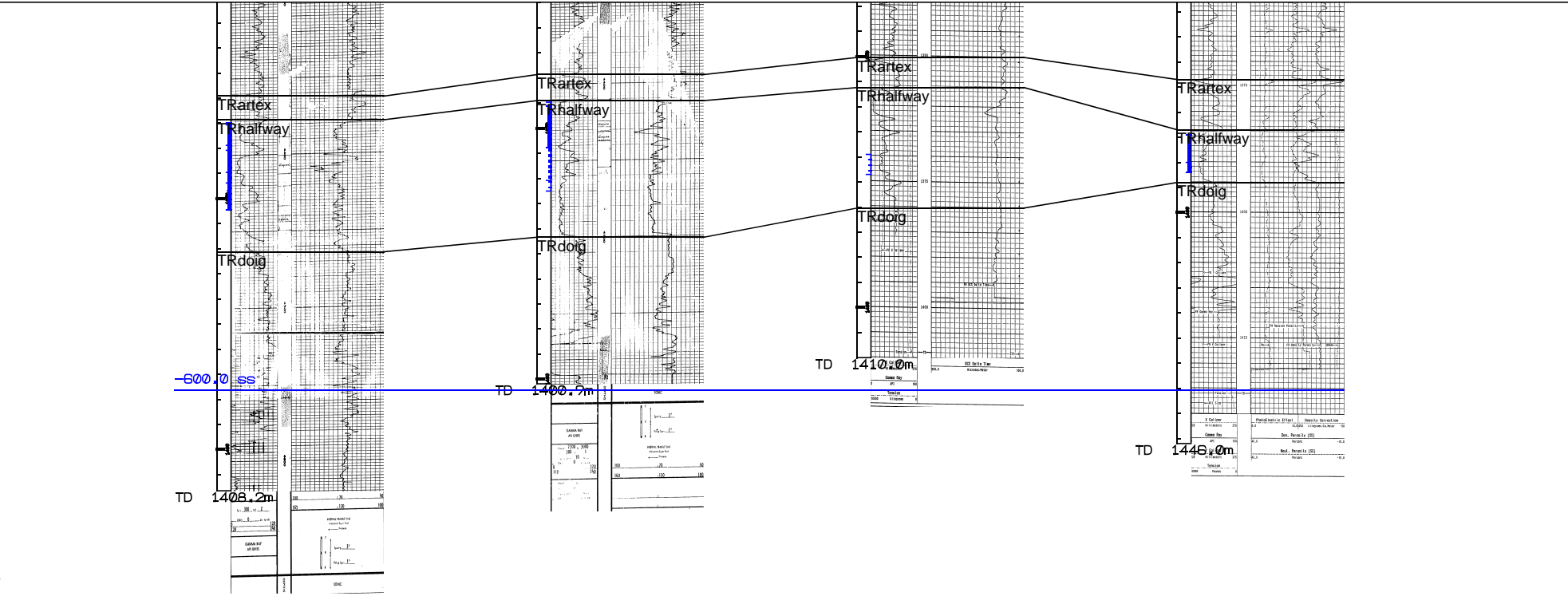


1964/11/13

1964/03/19

2001/08/04

2005/09/16



1:1200

Boundary Lake North Doig A

BOUNDARY LAKE NORTH OIL FIELD

Halfway D Pool

Pool Parameters

Field Code: 2020 **Pool Code:** 4800D
Discovery well original name: Murphy N Boundary 8-31-87-14W6 **WA#:** 03242
Rig Release: 1973/01/12
Other Oil and Gas Shows: Coplin oil
Number of Wells (November 2012) Oil: 3 **Active:** 3

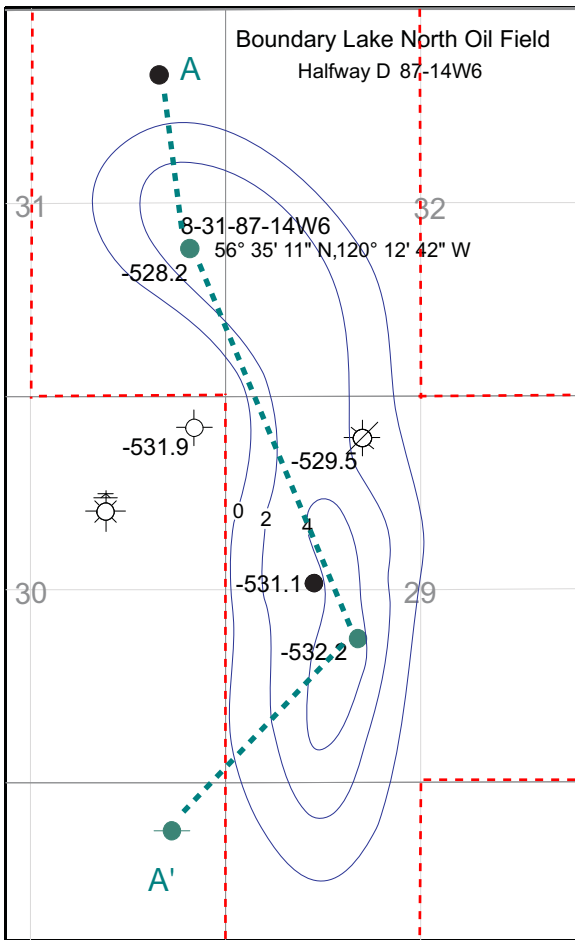
Reservoir Data

Area of Pool: 427 acres, 173 hectares
Average Depth of Producing Zone: 1339 metres, 4391 feet
Lithology of Reservoir Rock: sandstone
Trap Type: stratigraphic-structural
Estimated Maximum Reservoir Thickness: 4 metres, 13 feet
Drive Mechanism: gas cap expansion
Average Porosity (%): 17
Average Net Pay: 2.7 metres, 9 feet
Average Permeability: 75 millidarcies
Average Water Saturation (%): 35.5
Oil Formation Volume Factor (%): 121
Gravity (degrees API): 40
Original Pressure: 1520 psi, 10,480 kPa

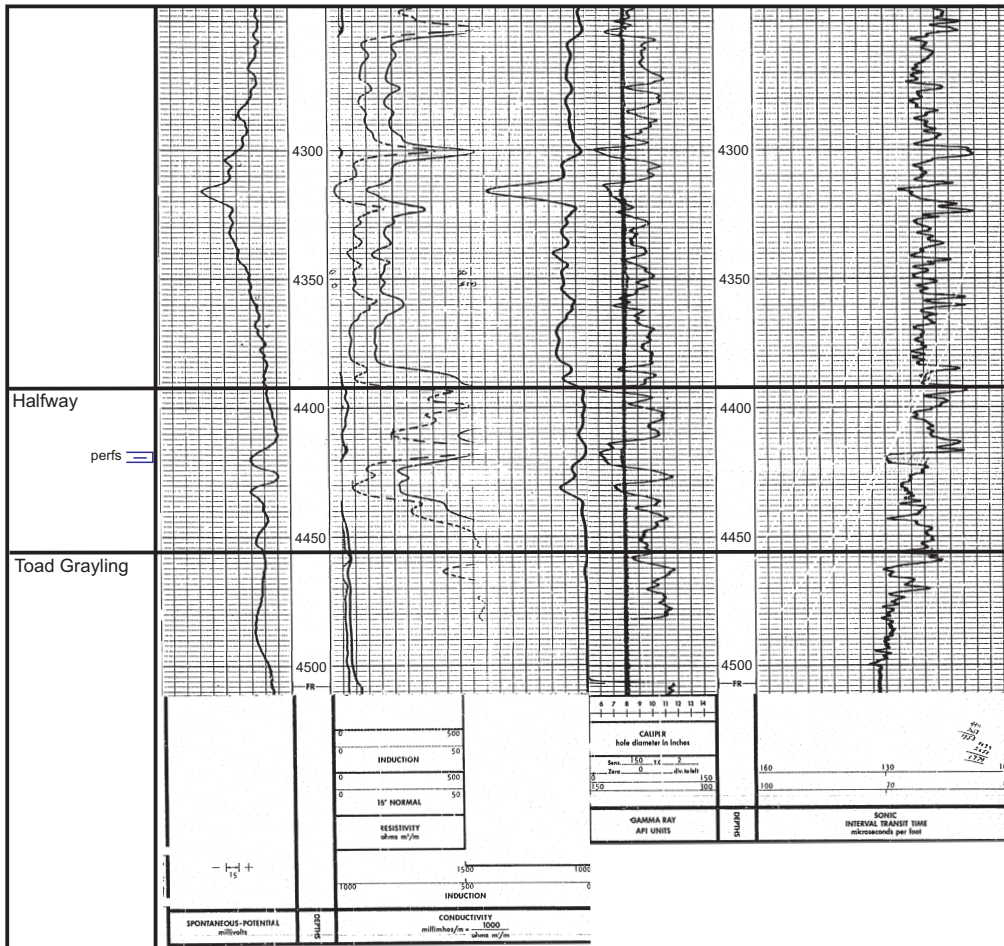
Reserves

Estimated original oil in place: 2,672,720 barrels, 424,929 m³
Recovery Factor (%): 15
Estimated Recoverable Oil: 400,910 barrels, 63,740 m³ (volumetric)
Cumulative Oil Production: 374,830 barrels
Remaining Recoverable Oil: 26,070 barrels
Remaining Original Oil in Place (%): 86
Cumulative Water Production: 36,880 barrels

Notes: The Triassic in the Boundary Lake area has been draped over horst blocks, therefore structure controls trapping at least in part. The productive interval, because it is thin, is not extensively developed, so trapping would also be influenced by facies change.



Contours are for Halfway D net oil pay (interval 2 metres, adapted from Oil and Gas Commission). Blue numbers represent elevation of Halfway Formation. Discovery well is 8-31-87-14W6.



Elog and sonic log for discovery well 8-31-87-14W6. The Halfway Formation is completed in a thin porous sand enclosed by more fine-grained intervals.

1985/07/22

1973/01/12

1978/08/17

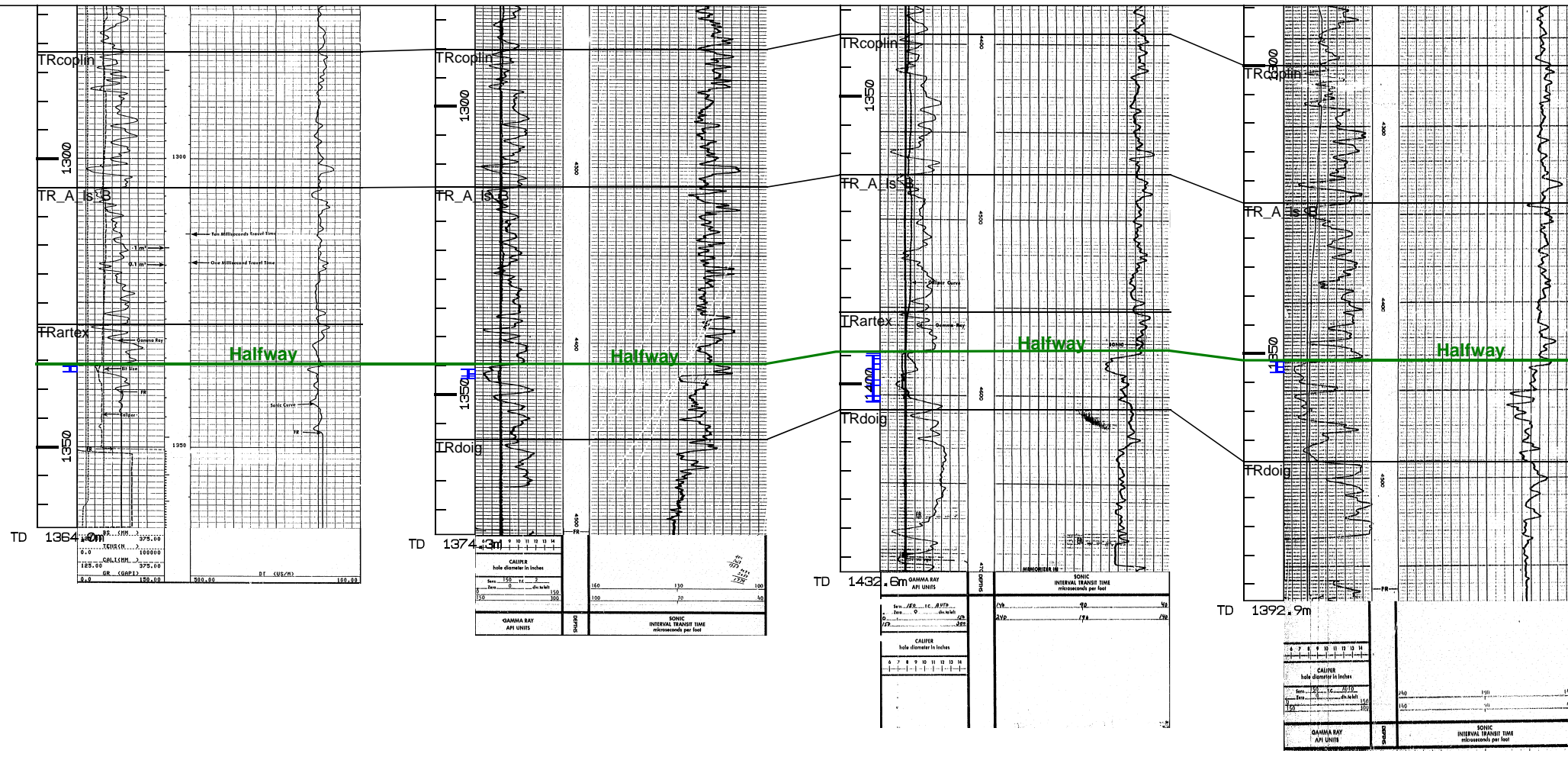
1977/08/30

<=740.4m=>

<=1780.0m=>

<=1118.7m=>

1:1000



Boundary Lake North Halfway D

BUICK CREEK NORTH OIL FIELD

Lower Dunlevy A Pool

Pool Parameters

Field Code: 2700

Pool Code: 2910A

Discovery well original name: Remington et al N Buick b-60-J/94-A-14 **WA#:** 11425

Rig Release: 1999/12/02

Other Oil and Gas Shows: Lower Dunlevy gas, Notikewin gas

Number of Wells (October 2012) Oil: 1 **Gas:** 1 **Active:** 2

Reservoir Data

Area of Pool: approximately 481 acres or 195 hectares within contour limits

Average Depth of Producing Zone: 1137 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2.5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 13

Average Net Pay: 2.1 metres

Average Permeability: high permeability indicated in DST

Average Water Saturation (%): 14

Oil Formation Volume Factor (%): 121

Gravity (degrees API): 42

Original Pressure: 1355 psi, 9342 kPa

Reserves

Estimated original oil in place: 314,640 barrels, 50,024 m³

Recovery Factor (%): 1

Estimated Recoverable Oil: 3150 barrels, 501 m³ (production decline)

Cumulative Oil Production: 300 barrels

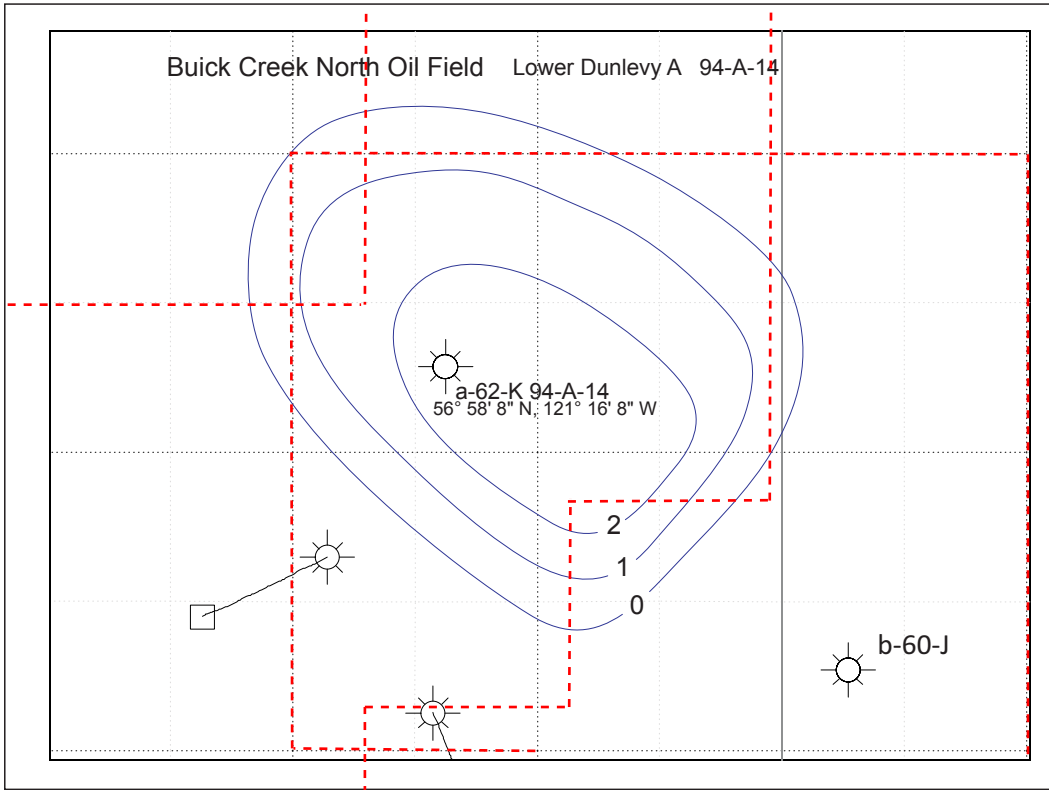
Remaining Recoverable Oil: 2850 barrels

Remaining Original Oil in Place (%): 100

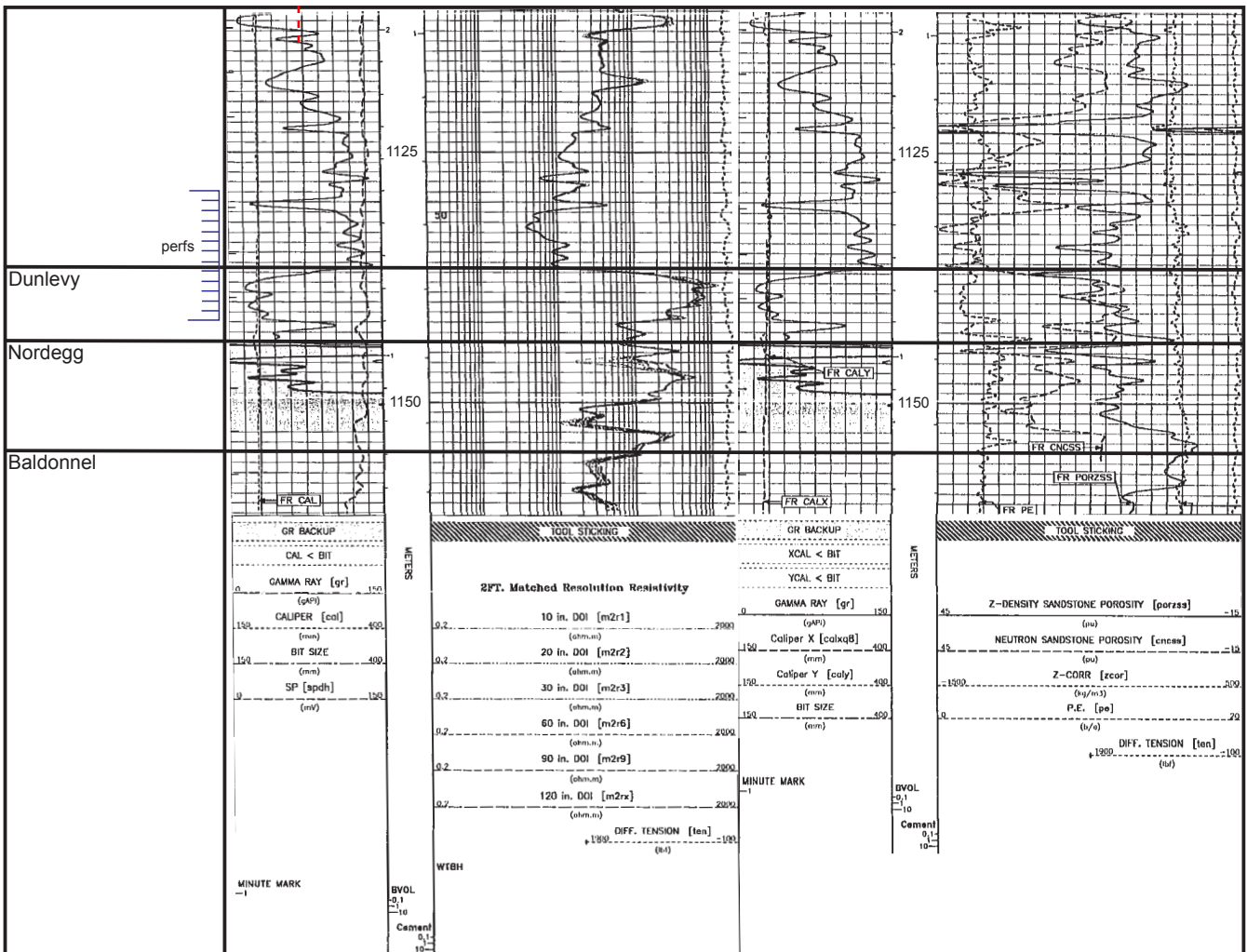
Cumulative Water Production: 1620 barrels

Notes: Discovery well b-60-J is in the gas cap. The very low recovery rate suggests there might be potential for enhanced production. It has a high water cut due to completion at the oil/water contact. Completion is across both the gas and oil leg of a-62-K where oil flows up tubing and gas up the annulus.

Buick Creek North Oil Field Lower Dunlevy A 94-A-14



Contour interval is one metre net
 Lower Dunlevy A oil pay.
 Discovery well b-60-J-94-A-14 is
 in the gas cap; a-62-K-94-A-14 is
 a Lower Dunlevy A oil producer.



Induction and neutron-density logs for oil producer a-62-K-94-A-14. The completion interval extends close to what looks like a water leg at 1142.5 metres

FLATROCK WEST OIL FIELD

Cecil A Pool

Field Parameters

Field Code: 3580

Pool Code: 4520A

Discovery well: Inverness et al W Flatrock 3-29-85-17W6

WA#: 08150

Rig Release: 1993/06/20

Other Oil and Gas Shows: Halfway oil and gas, Cecil gas

Number of Wells (October 2012) Oil: 7 **Active:** 2

Reservoir Data

Area of Pool: 754 acres, 305 hectares

Average Depth of Producing Zone: 1255 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas depletion

Average Porosity (%): 18

Average Net Pay: 1.5 metres

Average Permeability: 610 milliDarcies

Average Water Saturation (%): 19

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 32.8

Original Pressure: 1688 psi, 11,638 kPa

Reserves

Estimated original oil in place: 3,797,770 barrels, 603,797 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 759,550 barrels, 120,759 m³ (volumetric)

Cumulative Oil Production: 573,900 barrels

Remaining Recoverable Oil: 185,650 barrels

Remaining Original Oil in Place (%): 85

Cumulative Water Production: 42,360 barrels

Notes: The pool has a low water cut. The Cecil is thin but has high permeability.

100/15-18-085-17W6/00

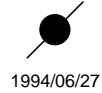
100/09-19-085-17W6/00

100/13-20-085-17W6/00

100/02-29-085-17W6/00

100/09-29-085-17W6/00

A



<=1129.5m=>



1994/09/04

<=751.9m=>



1994/12/12

<=706.6m=>



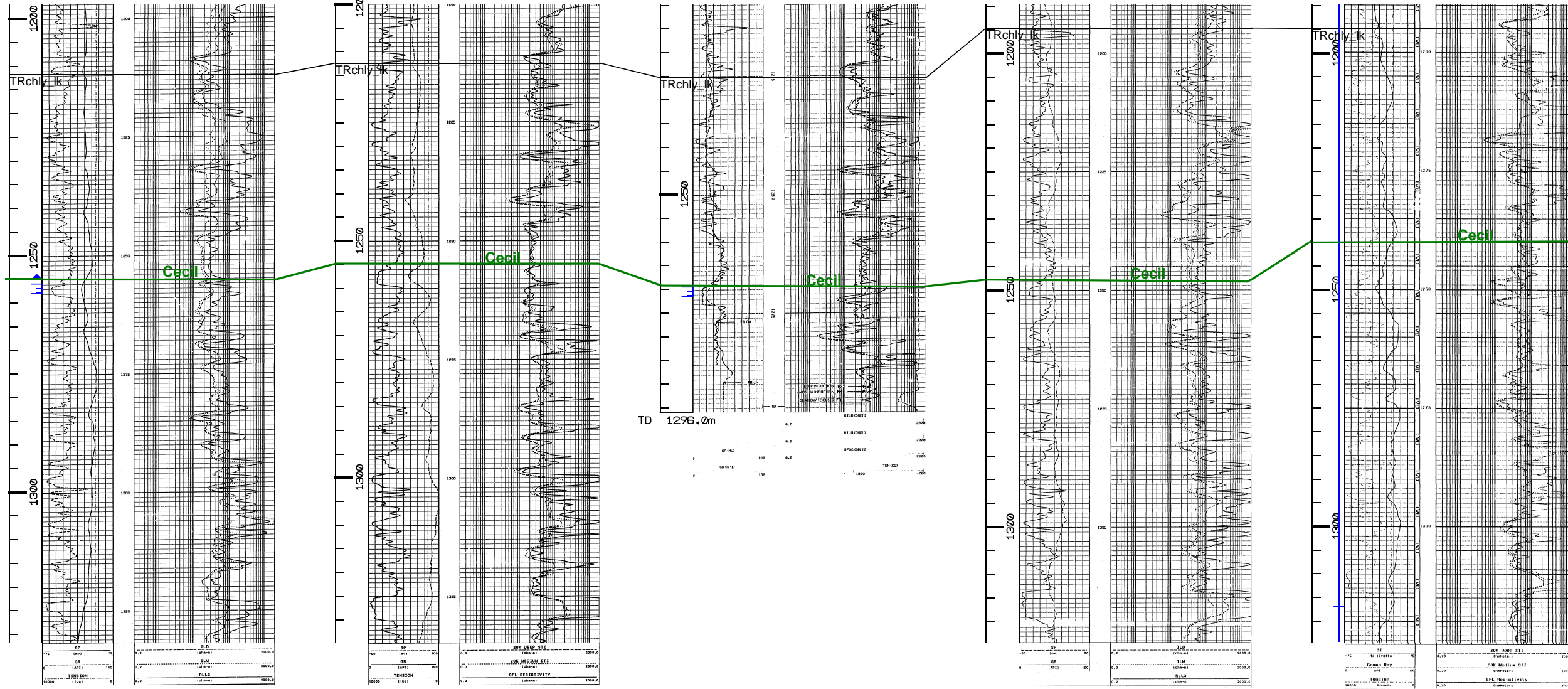
1993/03/11

<=943.9m=>



2006/07/15

A'



Flatrock West Cecil A

FLATROCK WEST OIL FIELD

Halfway D Pool

Pool Parameters

Field Code: 3580

Pool Code: 4800D

Discovery well original name: Ogy et al W Flatrock 10-34-84-17W6

WA#: 06735

Rig Release: 1988/02/10

Other Oil and Gas Shows: Boundary Lake gas, Halfway gas, North Pine gas, North Pine oil

Number of Wells (October 2012) Oil: 6 Active: 5 Injection: 1 Horizontal: 2

Reservoir Data

Area of Pool: 981 acres, 397 hectares

Average Depth of Producing Zone: 1470 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 9 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 17

Average Net Pay: 4.5 metres

Average Permeability: 35 milliDarcies

Average Water Saturation (%): 33

Oil Formation Volume Factor (%): 128

Gravity (degrees API): 42

Original Pressure: 1787 psi, 12,321 kPa

Reserves

Estimated original oil in place: 12,631,040 barrels, 2,008,175 m³

Recovery Factor (%): 18

Estimated Recoverable Oil: 2,210,940 barrels, 351,511 m³ (volumetric)

Cumulative Oil Production: 1,382,260 barrels

Remaining Recoverable Oil: 828,680 barrels

Remaining Original Oil in Place (%): 89.1

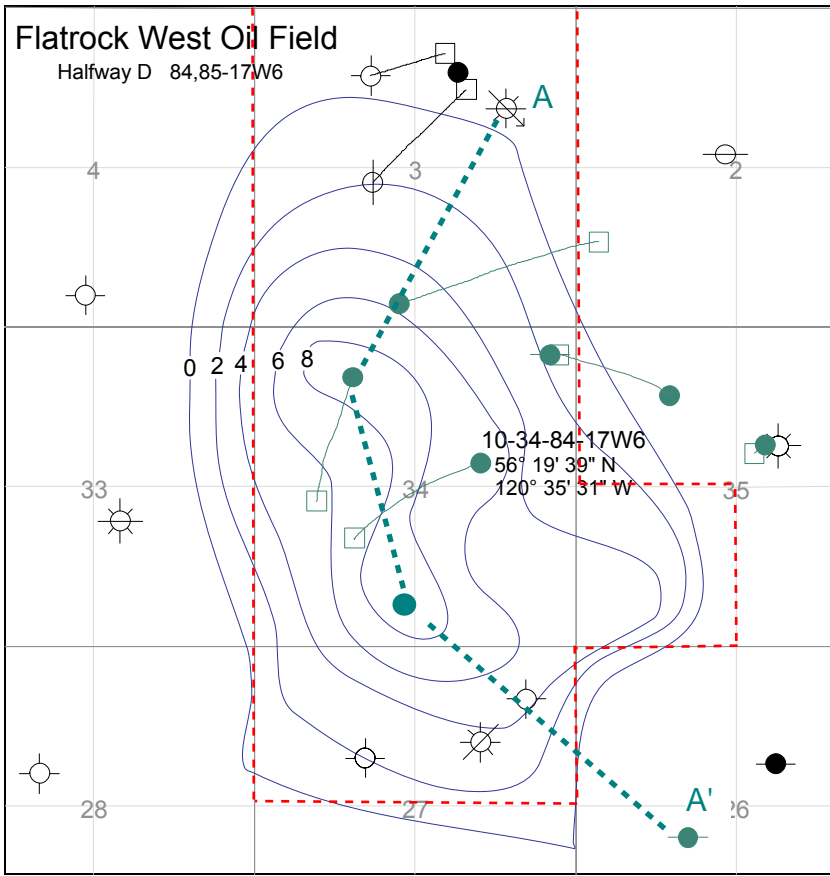
Cumulative Water Production: 236,600 barrels

Cumulative Water Injection: 15,740 barrels

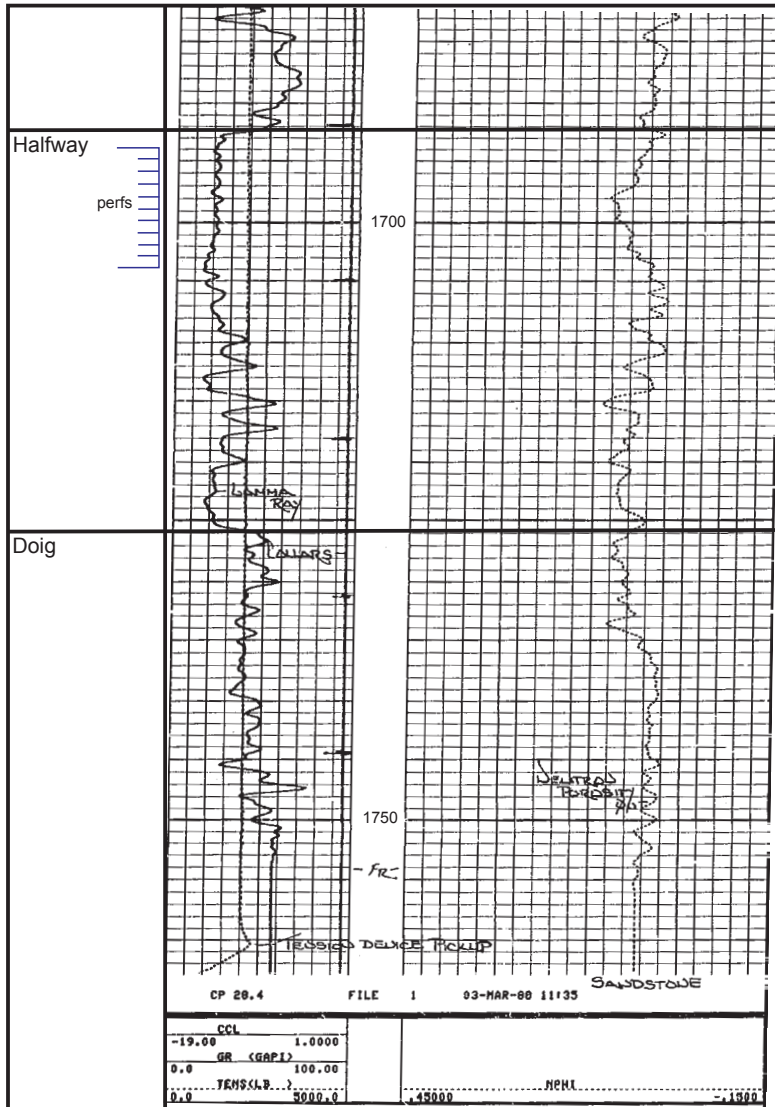
Notes: The Halfway is thick with good porosity - but with only fair to poor permeability. Some parts of the pool appear to be un-drained. The wells in the pool are directional and do not have complete suites of wireline logs.

Flatrock West Oil Field

Halfway D 84,85-17W6



Contour interval is two metres net Halfway D oil pay (adapted from Oil and Gas commission).
Discovery well 10-34 is directional.



Neutron log for discovery well 10-34-84-17W6.
This is the only available porosity log for this well.

100/09-03-085-17W6/00

100/14-34-084-17W6/00

100/03-34-084-17W6/00

100/16-27-084-17W6/00

100/06-26-084-17W6/00

A



1989/11/21

<=1571.6m=>



1989/12/19

<=1117.0m=>



1988/09/30

<=874.1m=>



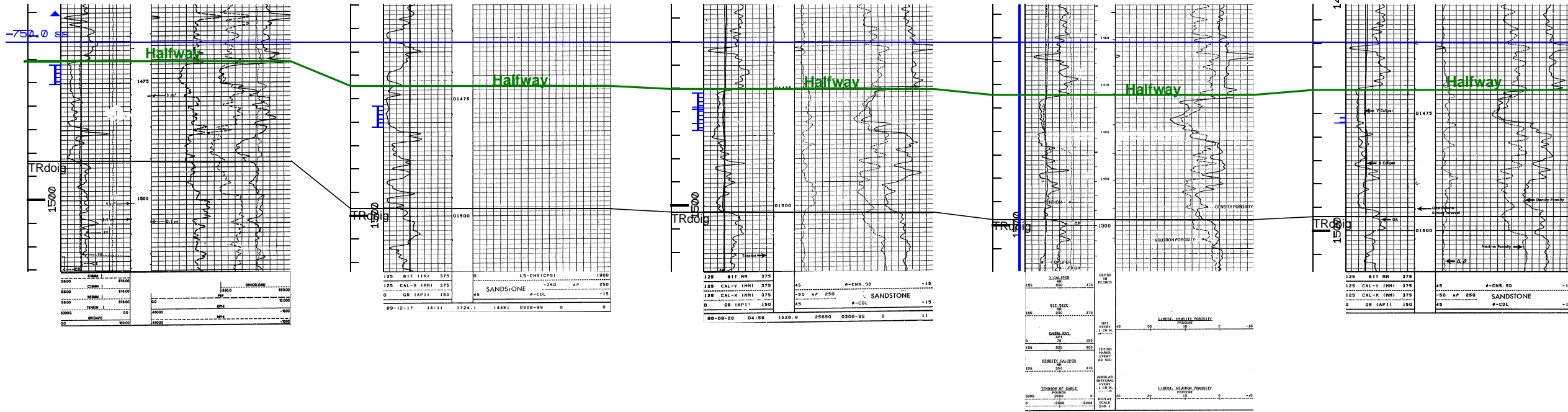
1991/01/27

<=1081.9m=>



1991/11/07

A'



1:1000

Flatrock West Halfway D

FLATROCK WEST OIL FIELD

North Pine D Pool

Pool Parameters

Field Code: 3580

Pool Code: 4580D

Discovery well original name: Progress W Flatrock 2-9-85-17W6

WA#: 16169

Rig Release: 2003/07/07

Other Oil and Gas Shows: Halfway gas

Number of Wells (October 2012) Oil: 1

Active: 1

Reservoir Data

Area of Pool: 158 acres, 64 hectares

Average Depth of Producing Zone: 1350 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 2 metres

Drive Mechanism: gas depletion

Average Porosity (%): 16

Average Net Pay: 1.5 metres

Average Permeability: no DSTs or core, good perm indicated on microlog

Average Water Saturation (%): 9

Oil Formation Volume Factor (%): 116

Gravity (degrees API): 34

Original Pressure: 1404 psi, 9680 kPa

Reserves

Estimated original oil in place: 815,530 barrels, 129,660 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 122,330 barrels, 19,449 m³ (volumetric)

Cumulative Oil Production: 30,010 barrels, 4,771 m³

Remaining Recoverable Oil: 92,320 barrels, 14,680 m³

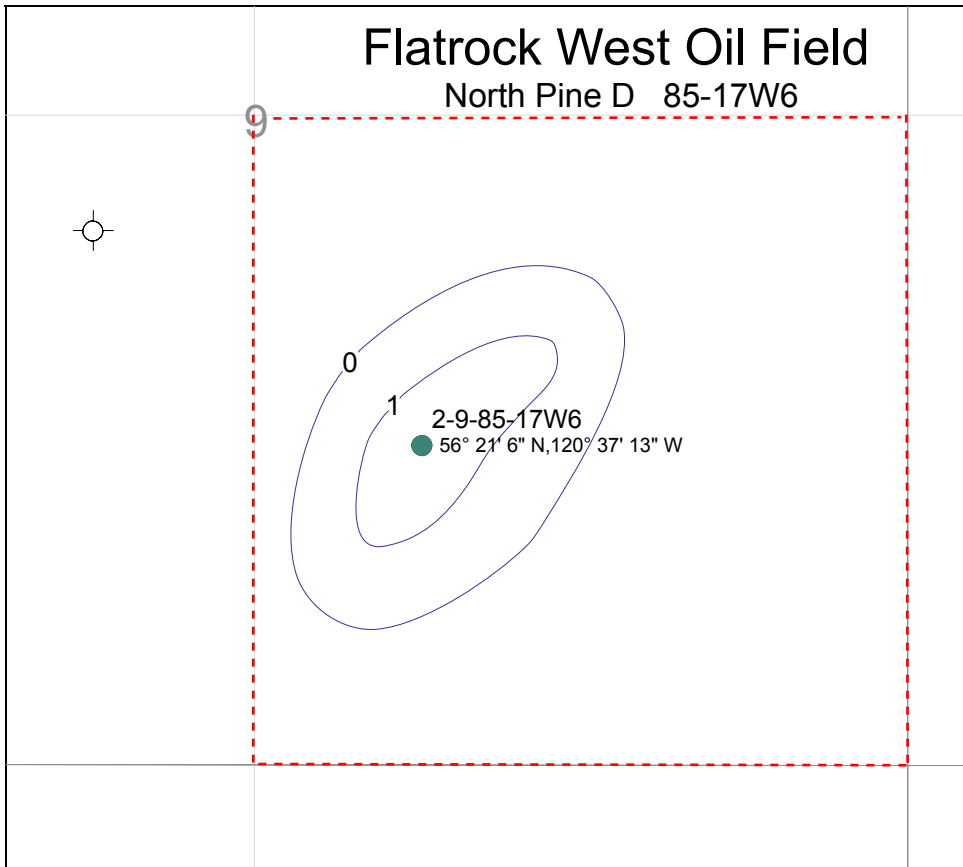
Remaining Original Oil in Place (%): 96

Cumulative Water Production: 130 barrels, 20.7 m³

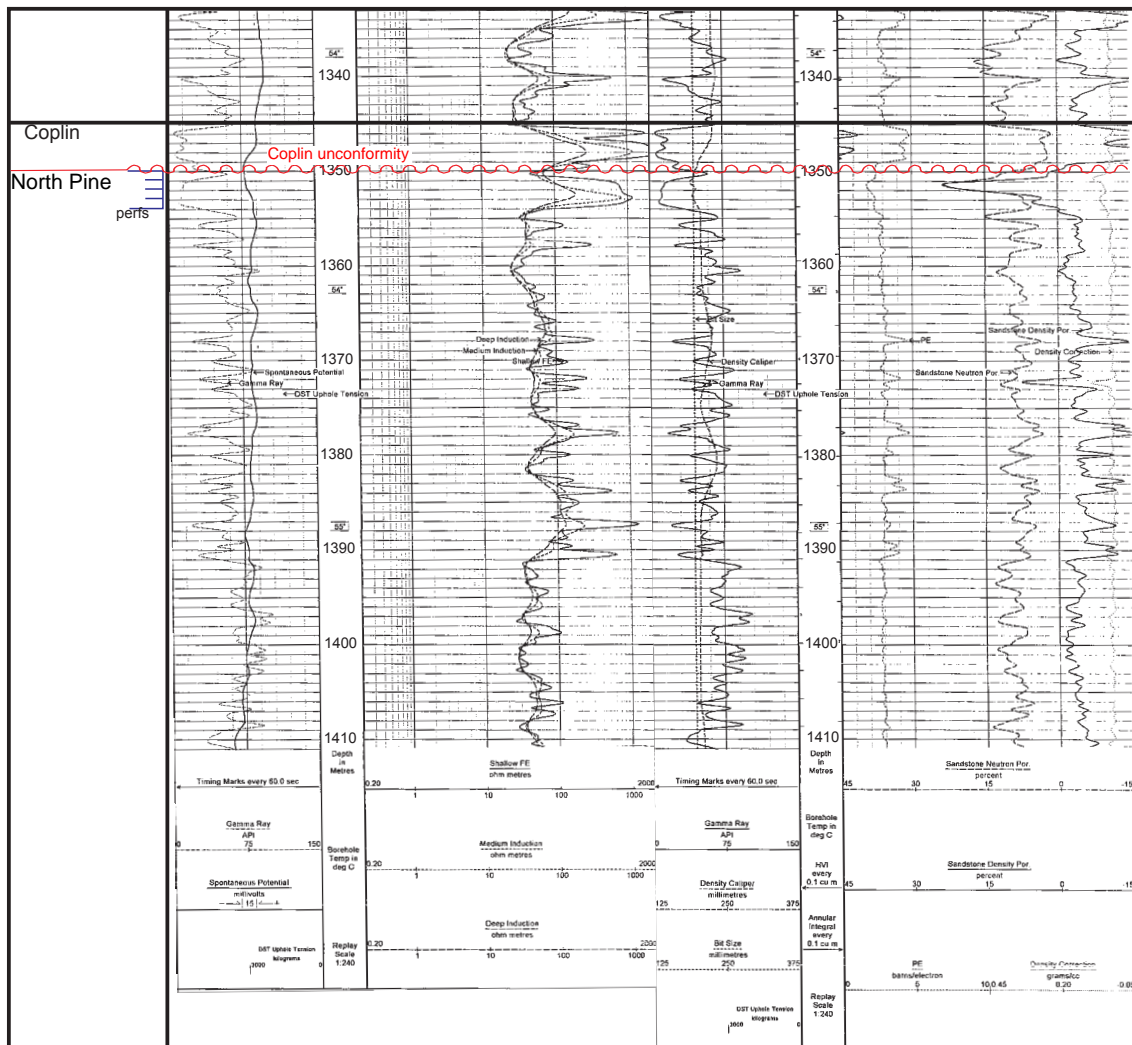
Notes: This pool is designated as North Pine A but the geological pick is Coplin. It has a very low water cut. The Coplin rests upon the North Pine in this area.

Flatrock West Oil Field

North Pine D 85-17W6



Contour interval is one metre net North Pine D oil pay (Oil and Gas Commission).
Discovery well is 2-9-85-17W6.



Induction and neutron-density logs for discovery well 2-9-85-17W6. Completion interval is 1350.5 – 1354 metres. This pool is designated as North Pine A but the geological pick is Coplin.

FORT ST JOHN OIL FIELD

North Pine A Pool

Pool Parameters

Field Code: 3600

Pool Code: 4580A

Discovery well original name: Pacific Fort St John No.9 3-14-83-18W6

WA#: 00034

Rig Release: 1952/11/07

Other Oil and Gas Shows: North Pine gas, Halfway gas, Baldonnel gas

Number of Wells (October 2012) Oil: 6 Gas: 2 Active: 2

Reservoir Data

Area of Pool: 892 acres, 361 hectares

Average Depth of Producing Zone: 4350 feet, 1326 metres

Lithology of Reservoir Rock: sandstone

Trap Type: structural/stratigraphic

Estimated Maximum Reservoir Thickness: 3.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 13

Average Net Pay: 1.5 metres

Average Permeability: 83 milliDarcies

Average Water Saturation (%): 25

Oil Formation Volume Factor (%): 127

Gravity (degrees API): 41

Original Pressure: 1919 psi, 13,231 kPa

Reserves

Estimated original oil in place: 4,231,500 barrels, 672,755 m³

Recovery Factor (%): 50

Estimated Recoverable Oil: 2,115,750 barrels, 336,377 m³ (volumetric)

Cumulative Oil Production: 2,081,810 barrels

Remaining Recoverable Oil: 33,940 barrels

Remaining Original Oil in Place (%): 51

Cumulative Water Production: 175,060 barrels

Notes: The North Pine is thin and discontinuous, so trapping appears to be primarily stratigraphic. It is truncated to the north by a fault, which structurally constrains the pool in that direction. Water cut is low. Recovery factor is unusually high. The estimate of less than 35,000 barrels of remaining recoverable oil might be increased by application of new geophysical/geological techniques on this old pool.

100/10-14-083-18W6/00

100/01-23-083-18W6/00

100/09-23-083-18W6/00

100/06-25-083-18W6/00

1956/12/12

1957/01/18

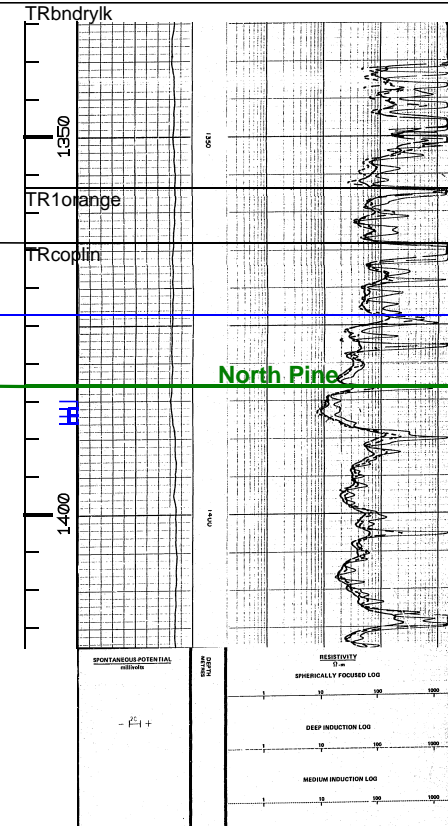
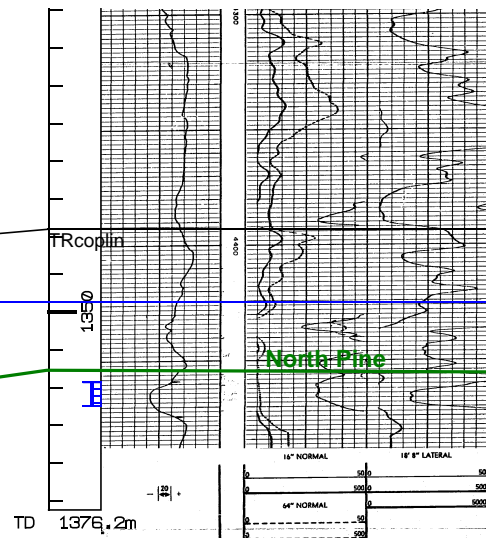
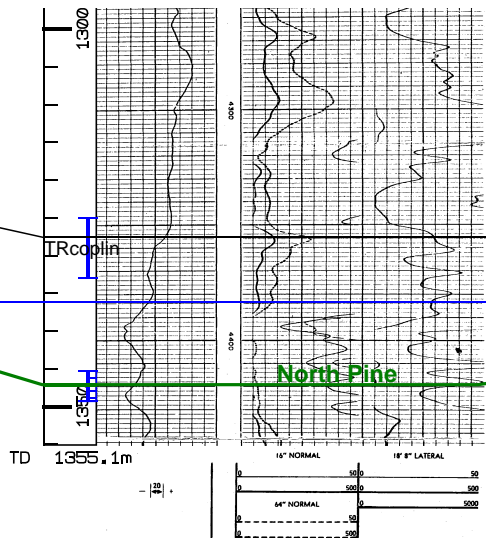
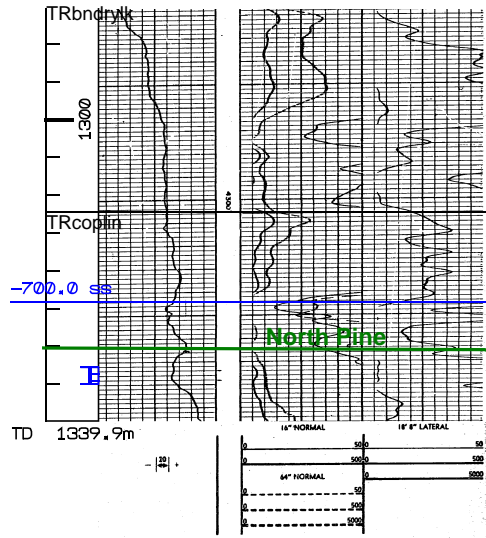
1956/12/15

1979/01/16

<=957.6m=>

<=790.1m=>

<=1450.2m=>



1:1000

Fort St John North Pine A

MILLIGAN CREEK WEST OIL FIELD

Halfway I Pool

Pool Parameters

Field Code: 6020

Pool Code: 4800I

Discovery well original name: MORRISON SUNCOR W MILLIGAN c-80-G/94-H-02 **WA#:** 07850

Rig Release: 1992/03/24

Other Oil and Gas Shows: Halfway gas, Bluesky gas

Number of Wells (October 2012) Oil: 2 Gas: 1 Active: 2

Reservoir Data

Area of Pool: 474 acres, 192 hectares

Average Depth of Producing Zone: 1147 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 24

Average Net Pay: 2 metres

Average Permeability: 377 milliDarcies

Average Water Saturation (%): 30

Oil Formation Volume Factor (%): 115.2

Gravity (degrees API): 44

Original Pressure: 1149 psi, 7922 kPa

Reserves

Estimated original oil in place: 3,643,820 barrels, 579,321 m³

Recovery Factor (%): 7.5

Estimated Recoverable Oil: 273,290 barrels, 43,450 m³ (volumetric)

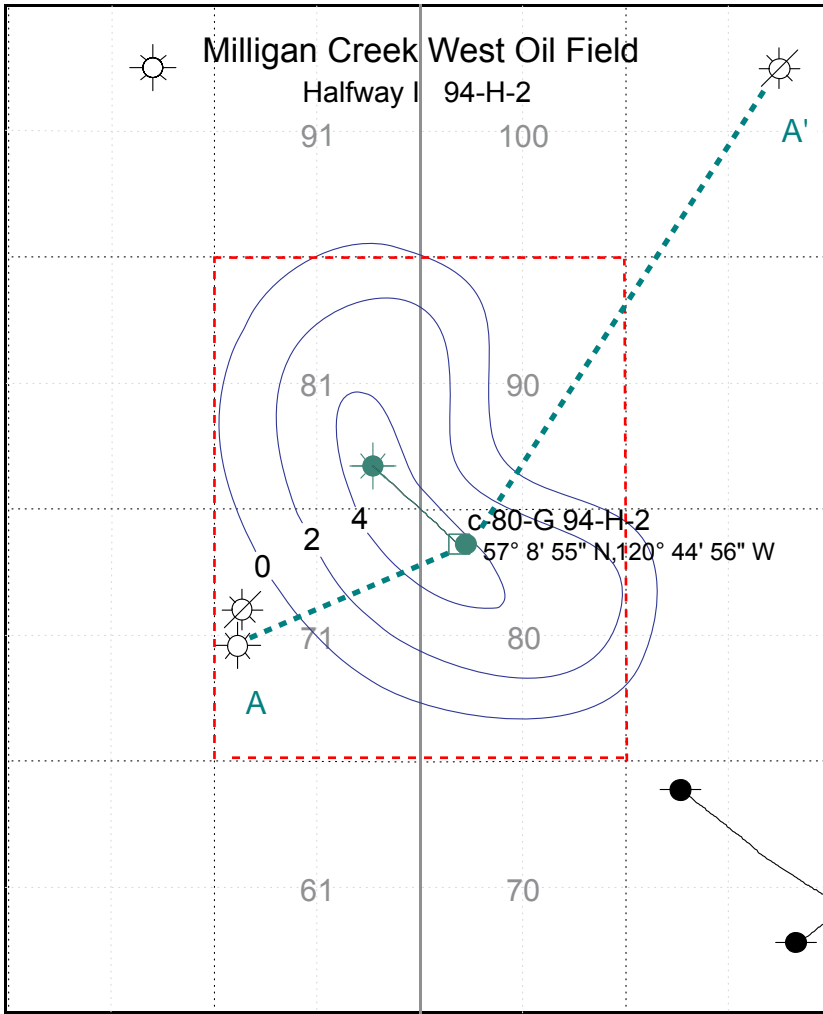
Cumulative Oil Production: 264,820 barrels

Remaining Recoverable Oil: 8,470 barrels

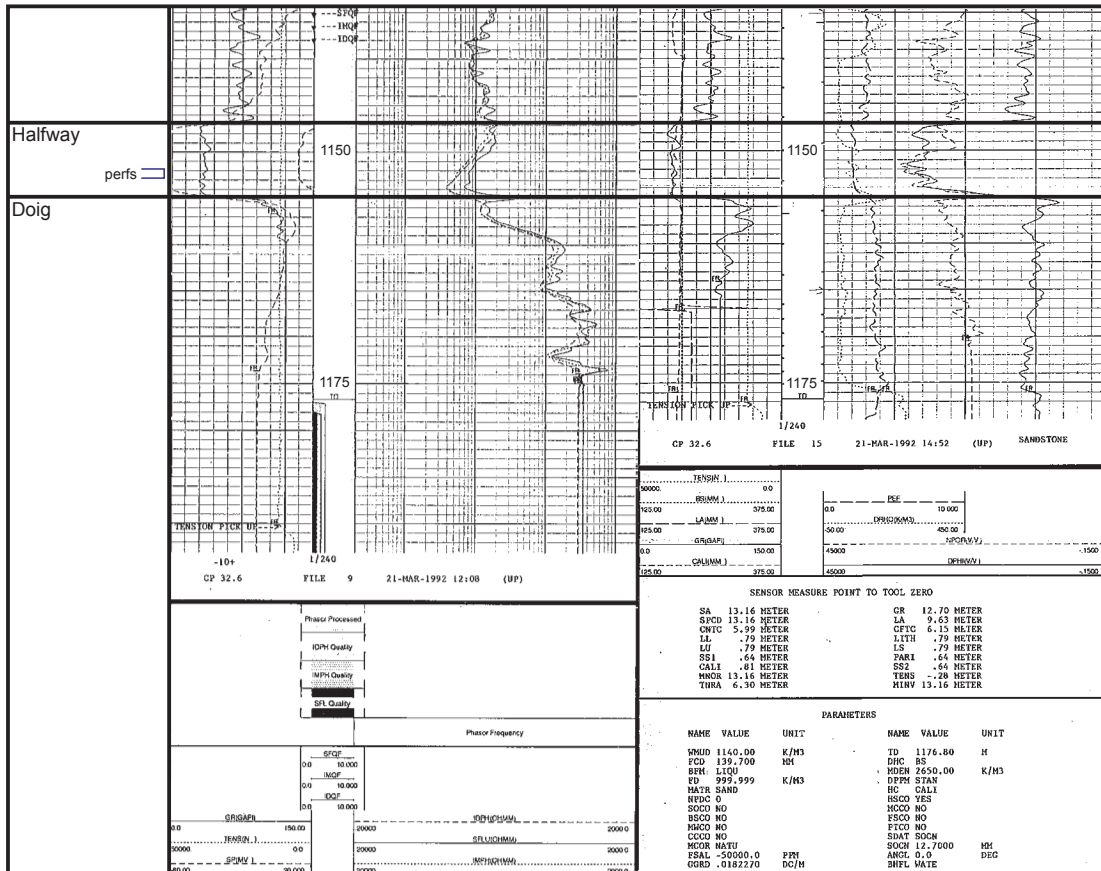
Remaining Original Oil in Place (%): 92.7

Cumulative Water Production: 261,750 barrels

Notes: This pool has a low primary recovery considering its excellent porosity and permeability. The OGC mapped gas leg of the field almost directly overlies the oil leg.



Contour interval is two metres net Halfway I oil pay (adapted from the Oil and Gas Commission).
Discovery well is c-80-G. A gas leg (not shown) almost directly overlies the oil.



Induction and neutron-density logs for discovery well c-80-G/94-H-2. The completion interval is in the lower part of the Halfway within the oil leg. Neutron-density crossover above indicates a strong gas cap.

200/b-071-F 094-H-02/00

200/c-080-G 094-H-02/00

200/d-099-G 094-H-02/00

A



2007/01/27

<=920.4m=>

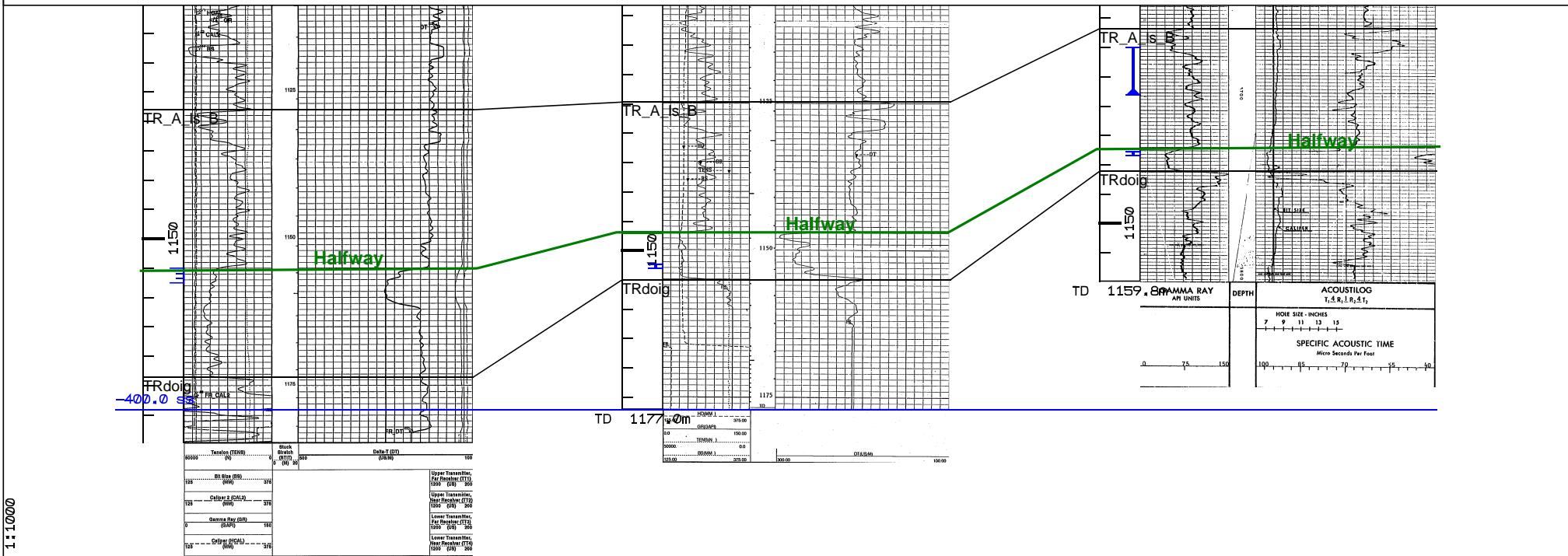
1992/03/24

<=2098.3m=>



1972/03/09

A'



Milligan Creek West Halfway I

NORTH PINE OIL FIELD

North Pine B Pool

Pool Parameters

Field Code: 6440

Pool Code: 4580B

Discovery well original name: Kilo et al N Pine 6-13-85-18W6

WA#: 04457

Rig Release: 1978/08/18

Other Oil and Gas Shows: North Pine gas

Number of Wells (October 2012) Oil: 2 **Active:** 0 **Gas:** 1

Reservoir Data

Area of Pool: 497 acres, 201 hectares

Average Depth of Producing Zone: 1306 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 1 metre

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 0.6 metres

Average Permeability: 154 milliDarcies

Average Water Saturation (%): 15

Oil Formation Volume Factor (%): 125

Gravity (degrees API): 42

Original Pressure: 1937 psi, 13,355 kPa

Reserves

Estimated original oil in place: 489,290 barrels, 77,791 m³

Recovery Factor (%): 25

Estimated Recoverable Oil: 122,320 barrels, 19,447 m³ (production decline)

Cumulative Oil Production: 114,140 barrels

Remaining Recoverable Oil: 8,180 barrels

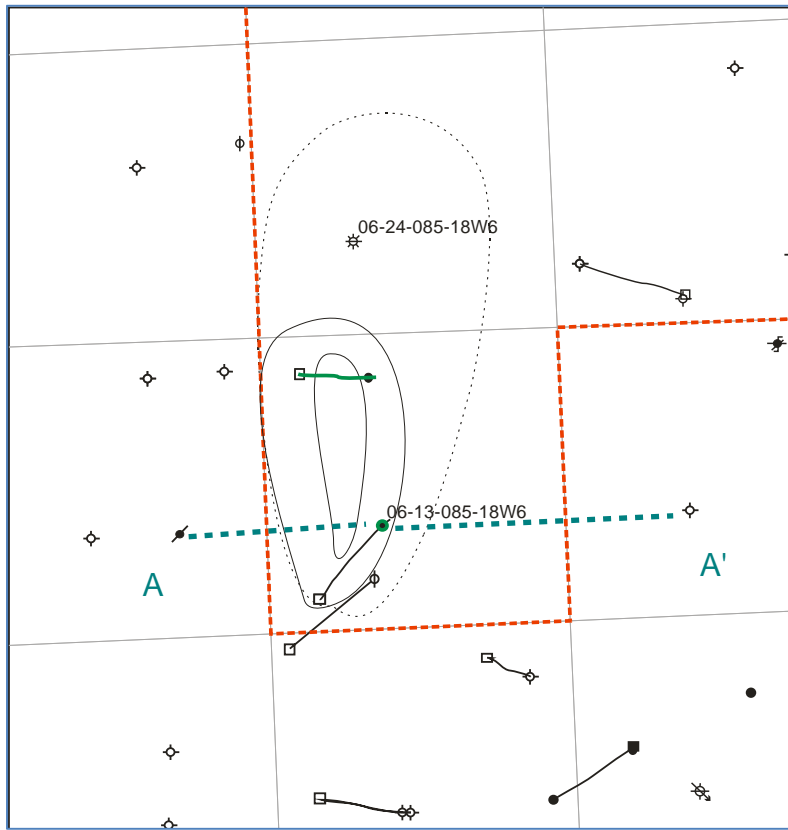
Remaining Original Oil in Place (%): 77

Cumulative Water Production: 17,530 barrels

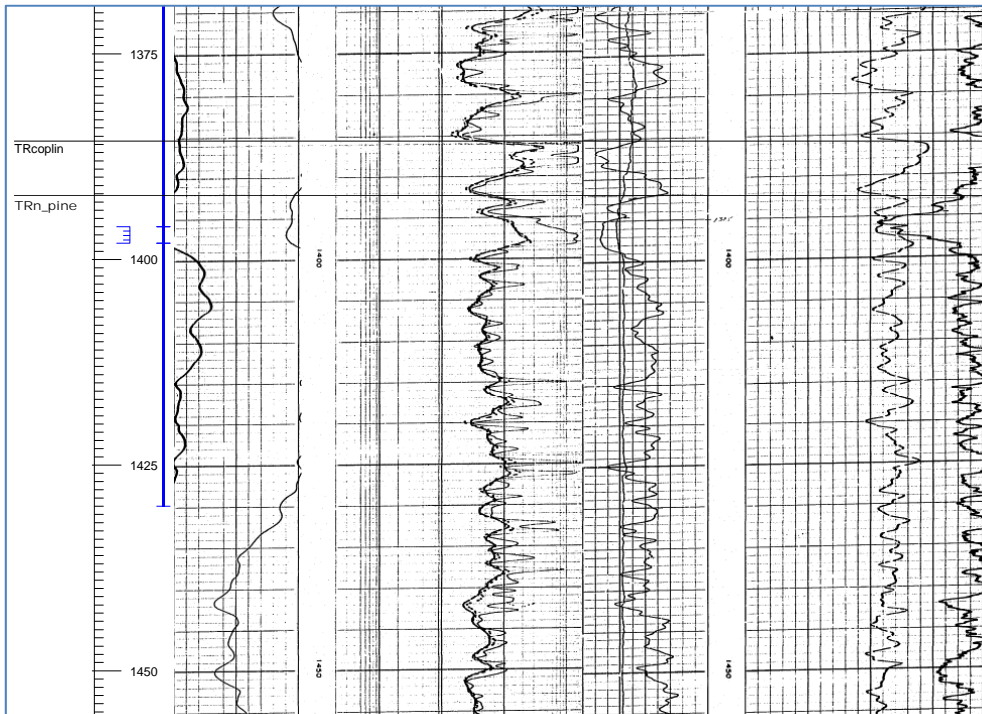
Notes: This is a Charlie Lake algal carbonate play (Podruski et al, 1988).

NORTH PINE OIL FIELD

North Pine B



Contour interval is one metre net North Pine B oil pay (based upon Ministry Energy and Mines mapping). Approximate gas cap extent is indicated by the stippled line. Location 6-24-85-18W6 is in the gas cap. Location 6-13-85-18W6 is the discovery well.



Induction and neutron-density logs for discovery well 6-13-85-18W6. Crossover on the neutron-density indicates gas, but oil was recovered on a DST.

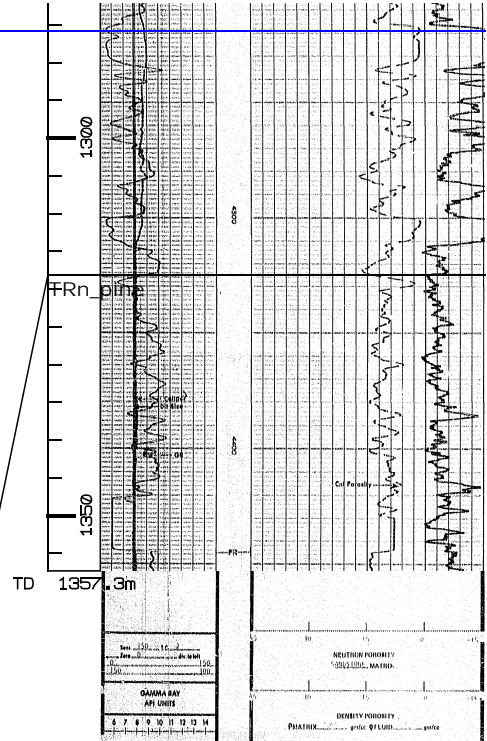
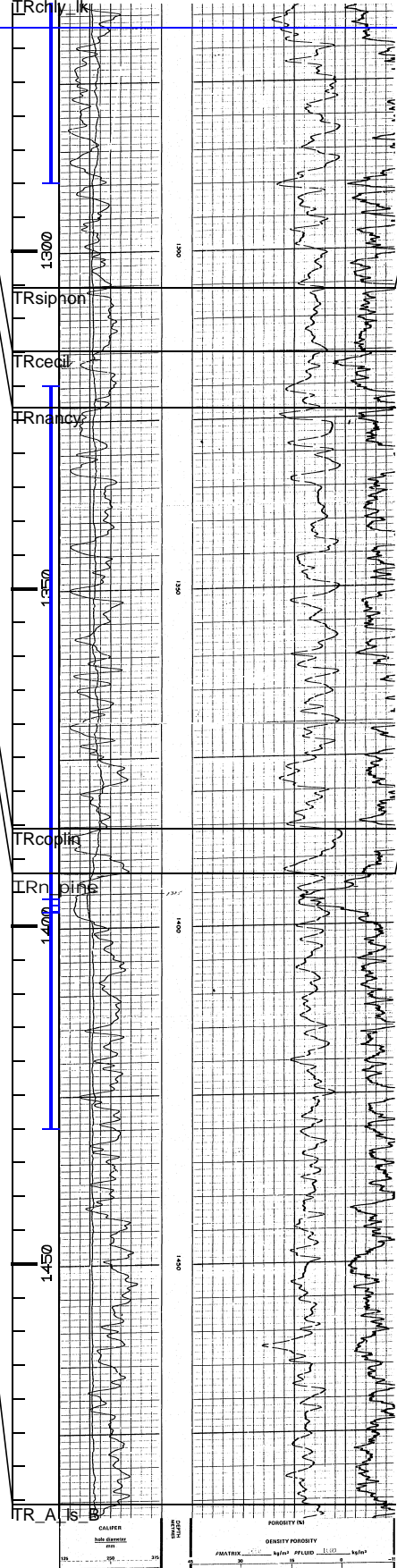
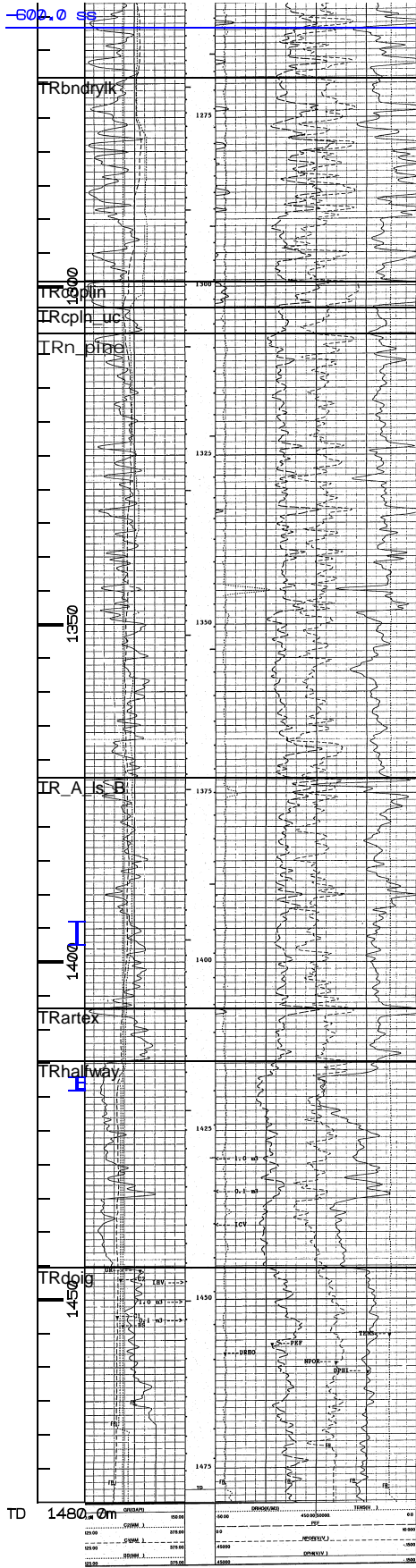
1991/02/11

1978/08/18

1977/09/15

<=1108.0m=>

<=1675.9m=>



1:1000

North Pine North Pine B

PEEJAY WEST OIL FIELD

Halfway A Pool

Pool Parameters

Field Code: 7000

Pool Code: 4800A

Discovery well original name: PACIFIC et al W PEEJAY d-054-G/94-A-15

WA#: 00956

Rig Release: 1962/02/03

Other Oil and Gas Shows: Halfway gas

Number of Wells (January 2013) Oil: 8 Active: 9 Injection: 4

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 3880 feet, 1192 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 6 metres

Drive Mechanism: water flood

Average Porosity (%): 22

Average Net Pay: 3.5 metres

Average Permeability: 448 milliDarcies

Average Water Saturation (%): 38

Oil Formation Volume Factor (%): 120

Gravity (degrees API): 40

Original Pressure: 1433 psi, 9880 kPa

Reserves

Estimated original oil in place: 6,608,810 barrels, 1,050,717 m³

Recovery Factor (%): 50 (water assist)

Estimated Recoverable Oil: 3,304,400 barrels, 525,358 m³ (production decline)

Cumulative Oil Production: 2,777,560 barrels

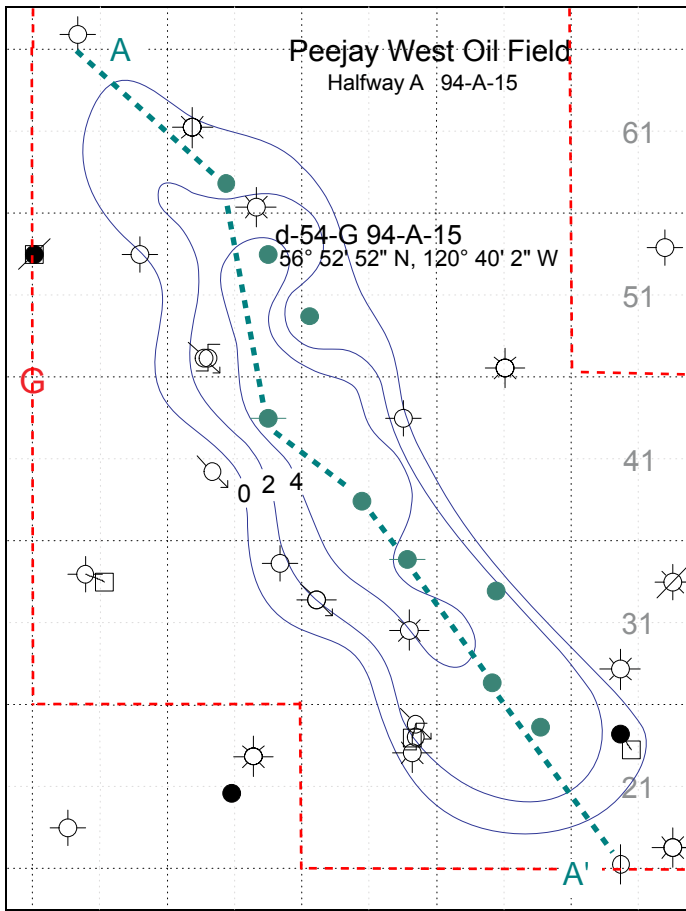
Remaining Recoverable Oil: 526,840 barrels

Remaining Original Oil in Place (%): 58

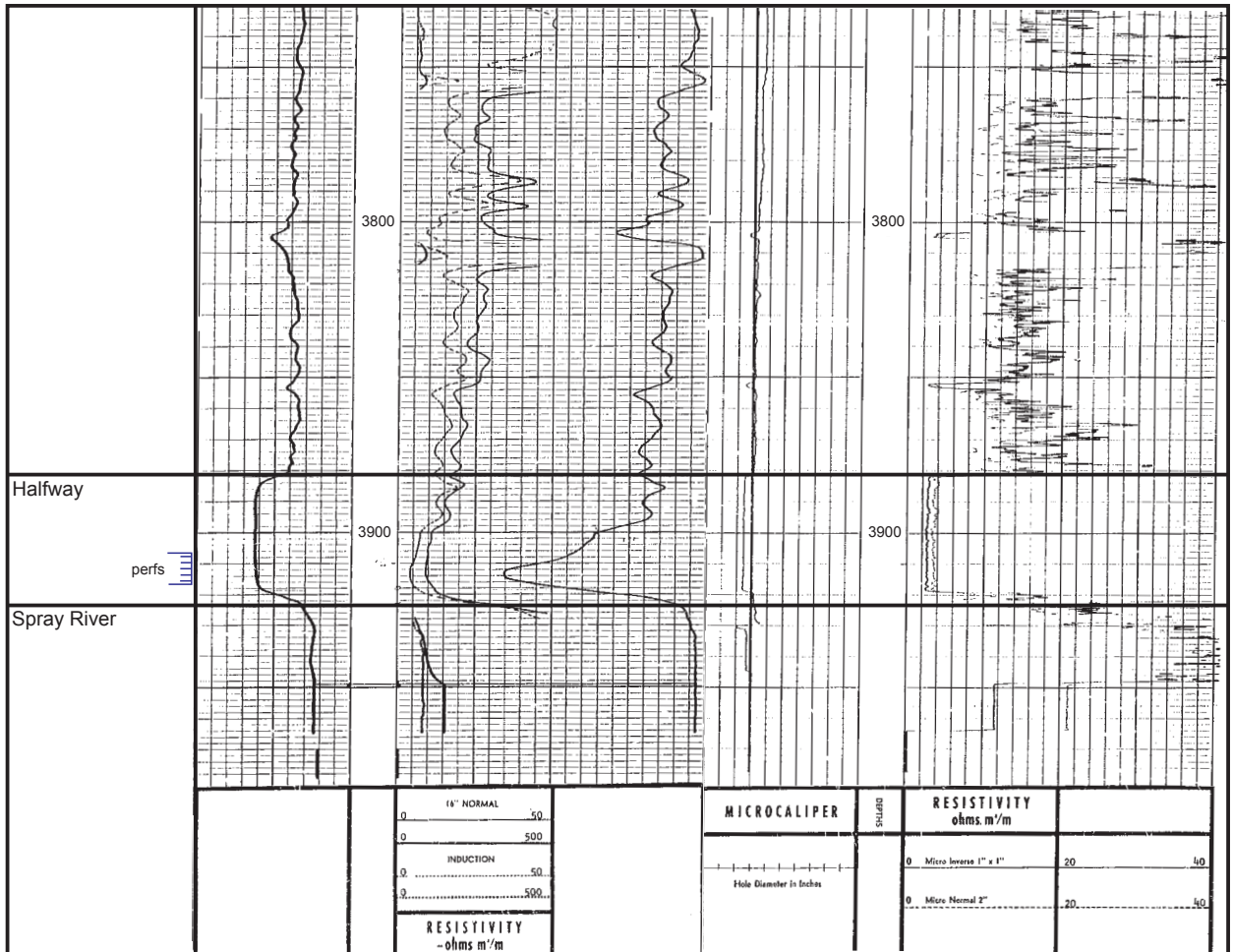
Cumulative Water Production: 1,599,730 barrels

Cumulative Water Injection: 4,198,270 barrels

Notes: West Peejay is sparsely profiled in Sikabonyi (1964). A Halfway gas cap overlies and extends to the north. A number of different Halfway sands are contiguous but not necessarily in communication. Industry has successfully applied to gain separate status for a number of Halfway pools for Peejay and Peejay West.



Contour interval is two metres net Halfway A oil pay.
Discovery well is d-54-G-94-A-15.



Elog and microlog for discovery well d-54-G/94-G-54. Completion interval is 3913 – 3917 feet in the oil leg.
There may be a water contact near the bottom of the Halfway sand.

200/b-075-G 094-A-15/00

200/b-064-G 094-A-15/00

200/d-044-G 094-A-15/00

200/d-033-G 094-A-15/00

200/b-032-G 094-A-15/00

200/b-021-G 094-A-15/00

A

A'



<=1189.6m=>



<=1348.7m=>



<=1122.2m=>



<=845.6m=>



<=1262.4m=>



1983/03/11

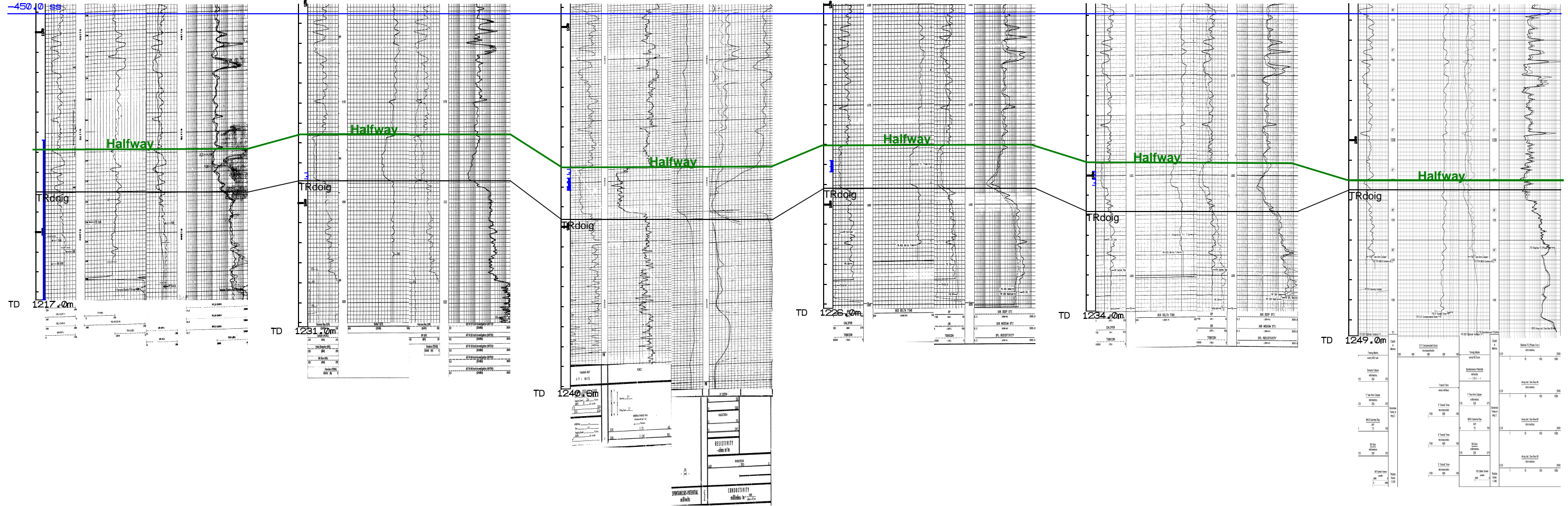
1997/03/07

1962/03/07

1994/09/07

1993/12/13

2011/07/05



Peejay West Halfway A

RED CREEK NORTH OIL FIELD

Doig B Pool

Pool Parameters

Field Code: 7410

Pool Code: 4900B

Discovery well original name: CNRES HZ N RED 4-6-86-21W6

WA#:10062

Rig Release: 1997/01/12

Other Oil and Gas Shows: Doig gas, Halfway gas, Montney gas

Number of Wells (December 2012) Oil: 4 Active: 0 Horizontal: 3

Reservoir Data

Area of Pool: 442 acres, 179 hectares

Average Depth of Producing Zone: 1720 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 9

Average Net Pay: 5.1 metres

Average Permeability: 6 milliDarcies

Average Water Saturation (%): 8

Oil Formation Volume Factor (%): 136

Gravity (degrees API): 43

Original Pressure: 2060 psi, 14,203 kPa

Reserves

Estimated original oil in place: 5,486,150 barrels, 872,228 m³

Recovery Factor (%): 5

Estimated Recoverable Oil: 274,310 barrels, 43,612 m³ (volumetric)

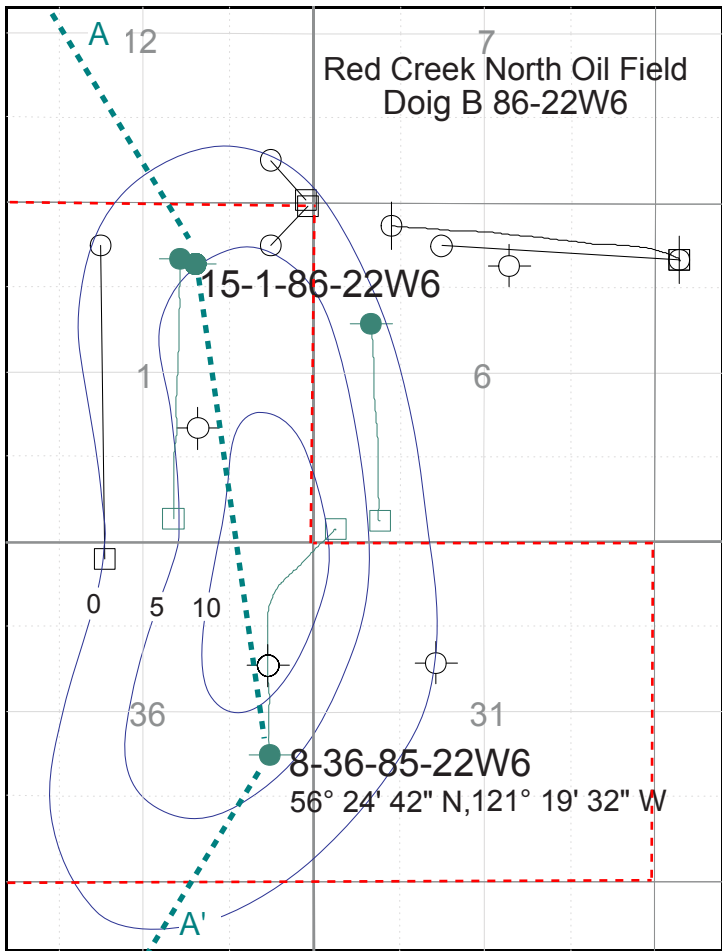
Cumulative Oil Production: 51,350 barrels

Remaining Recoverable Oil: 222,960 barrels

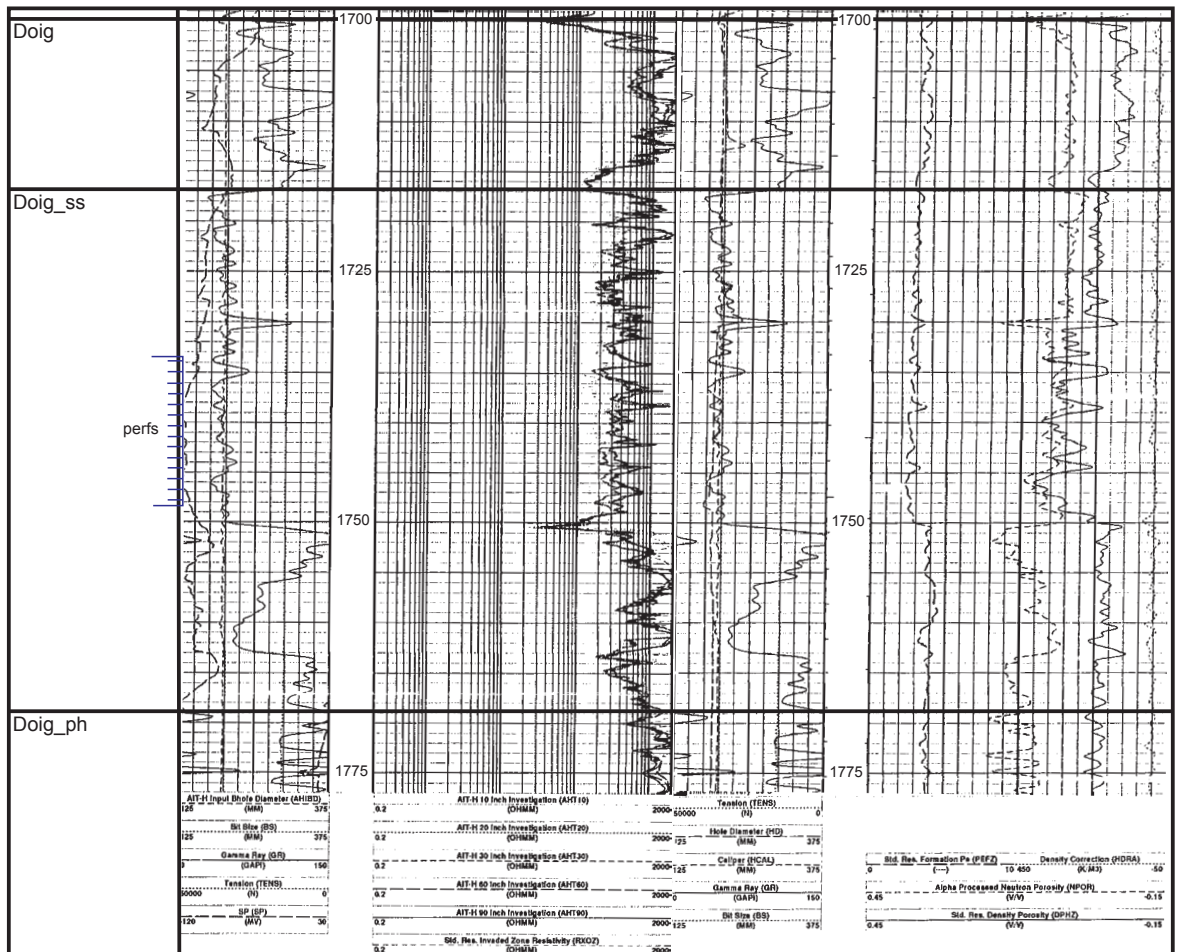
Remaining Original Oil in Place (%): 99

Cumulative Water Production: 1770 barrels

Notes: A Doig B gas cap almost directly overlies the oil pool. Most wells in the pool are horizontal, which helps production in the thick but relatively impermeable Doig. The discovery well was drilled from a pad at 4-6-86-21W6 to a bottom hole at 8-36-85-22W6.



Contour interval is five metres net Doig B oil pay. The discovery well is 8-36-85-22W6. Logs for location 15-1-86-22W6 are profiled below.



Induction and neutron-density logs for 15-1-86-22W6. Completion is in a thick and relatively porous section of the Doig.

STODDART SOUTH OIL FIELD

Belloy A Pool

Pool Parameters

Field Code: 8060

Pool Code: 6200A

Discovery well original name: Focus et al Stoddart 6-29-85-19W6

WA#: 04559

Rig Release: 1978/10/27

Other Oil and Gas Shows: Belloy gas, Cecil gas, Kiskatinaw oil

Number of Wells (November 2012) Oil: 8 **Active:** 3

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 1945 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: structural-stratigraphic

Estimated Maximum Reservoir Thickness: 7 metres

Drive Mechanism: gas depletion

Average Porosity (%): 14

Average Net Pay: 1.5 metres

Average Permeability: 12 milliDarcies

Average Water Saturation (%): 36

Oil Formation Volume Factor (%): 134

Gravity (degrees API): 40

Original Pressure: 2389 psi, 16,472 kPa

Reserves

Estimated original oil in place: 6,167,640 barrels, 980,576 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 948,650 barrels, 150,820 m³ (production decline)

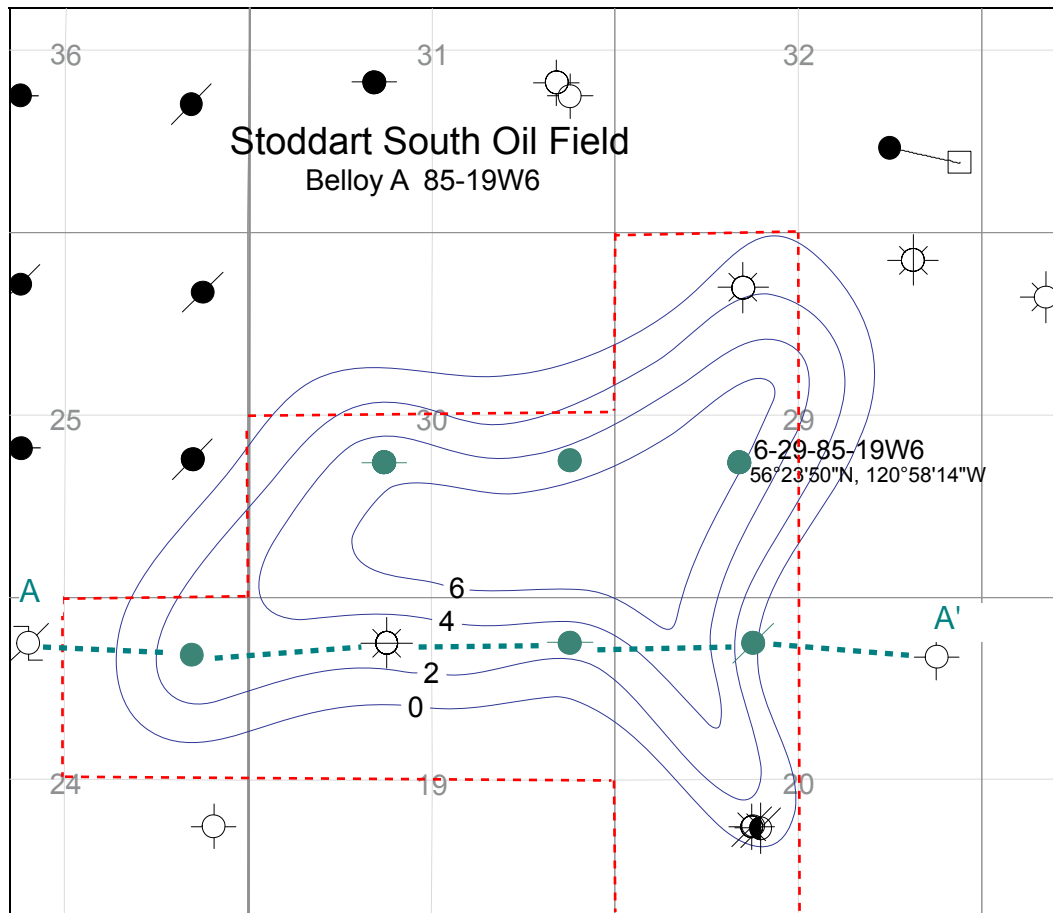
Cumulative Oil Production: 775,520 barrels

Remaining Recoverable Oil: 173,130 barrels

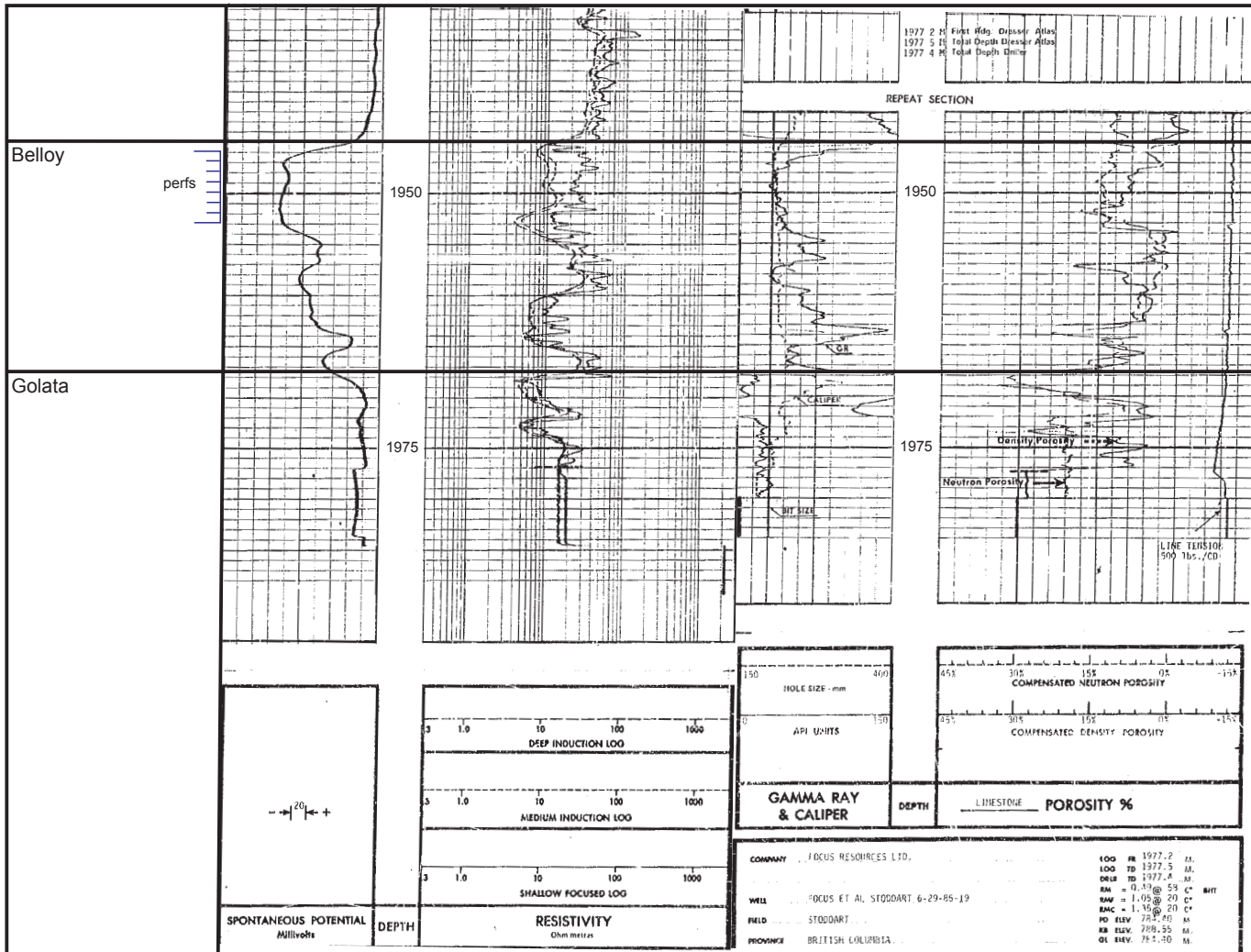
Remaining Original Oil in Place (%): 87

Cumulative Water Production: 24,400 barrels

Notes: Podruski et al(1988) provides an outline of Belloy reservoir characteristics. Trapping is primarily structurally controlled by fault blocks; however, facies controls porosity development. Some interpretations attribute trapping entirely to facies change or other stratigraphic controls.



Contour interval is two metres net Belloy A oil pay. Discovery well is 6-29-85-19W6. Depending upon interpretation, pool boundaries may be due to normal faulting, facies change, erosion or stratigraphic factors.



Induction and neutron-density logs for discovery well 6-29-85-19W6. Belloy lithology is usually described as a dolomitic sandstone, but it varies. The density curve is scaled to limestone; sandstone scale was not run to Belloy depth.

100/14-24-085-20W6/00

100/16-24-085-20W6/00

100/14-19-085-19W6/00

100/16-19-085-19W6/00

100/14-20-085-19W6/00

100/16-20-085-19W6/00

A

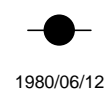
A'



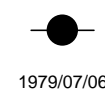
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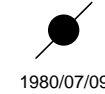
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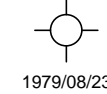
<=814.6m=>



<=811.5m=>



<=817.6m=>



1983/12/16

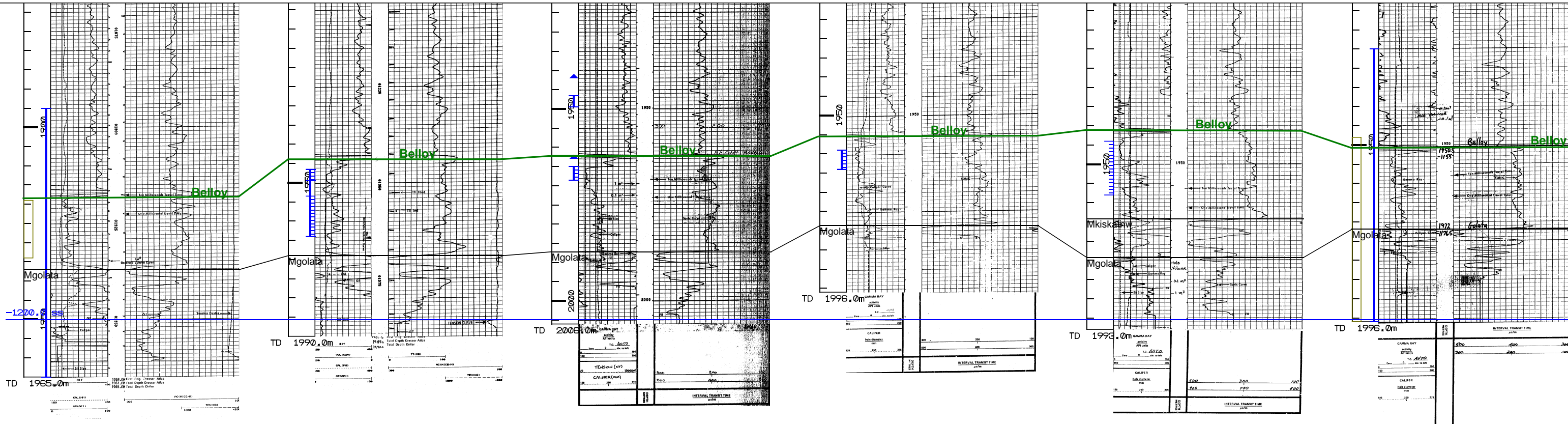
1983/07/17

1980/06/12

1979/07/06

1980/07/09

1979/08/23



Stoddart South Belloy A

STODDART WEST OIL FIELD

Baldonnel C Pool

Pool Parameters

Field Code: 8100

Pool Code: 4100C

Discovery well original name: DECL et al W Stoddart 5-25-87-21W6

WA#: 16629

Rig Release: 2003/12/11

Other Oil and Gas Shows: Dunlevy gas

Number of Wells (November 2012) Oil: 2 **Active:** 2

Reservoir Data

Area of Pool: 326 acres, 132 hectares

Average Depth of Producing Zone: 1314 metres

Lithology of Reservoir Rock: limestone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 10 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 3.9 metres

Average Permeability: no core or DSTs

Average Water Saturation (%): 28

Oil Formation Volume Factor (%): 128

Gravity (degrees API): 38

Original Pressure: 1794 psi, 12,369 kPa

Reserves

Estimated original oil in place: 1,884,290 barrels, 299,578 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 282,640 barrels, 44,936 m³ (volumetric)

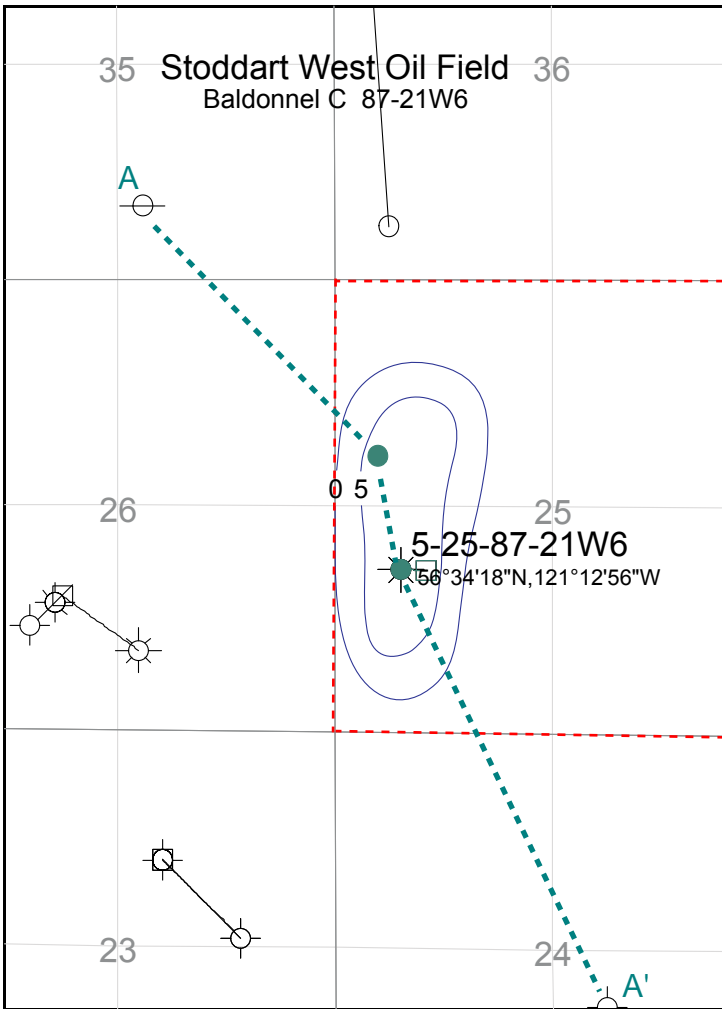
Cumulative Oil Production: 81,510 barrels

Remaining Recoverable Oil: 201,130 barrels

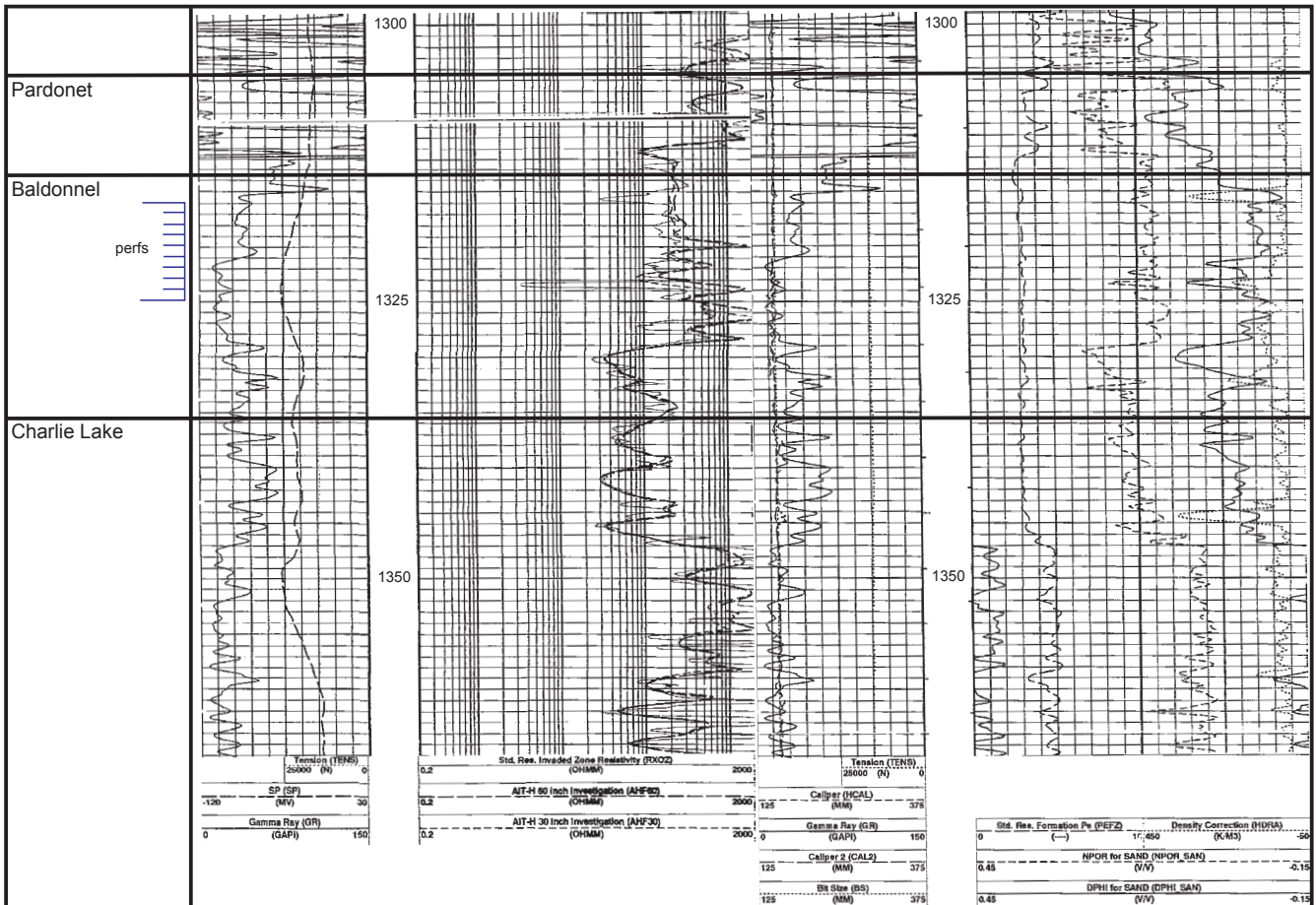
Remaining Original Oil in Place (%): 96

Cumulative Water Production: 32,790 barrels

Notes: The Baldonnel's natural fractures enhance porosity at the leading edge of a structure.



Contour interval is five metres net Baldonnell C oil pay (Oil and Gas Commission). Discovery well is 5-25-87-21W6.



Induction and neutron-density logs (measured depth) for discovery well 5-25-87-21W6. Completion interval is near the top of the Baldonnell (1316-1325 metres) in an interval showing neutron-density crossover (sandstone scale).

100/02-35-087-21W6/00

100/12-25-087-21W6/00

100/05-25-087-21W6/00

100/07-24-087-21W6/00



<=1287.7m=>



<=437.1m=>



<=1814.9m=>



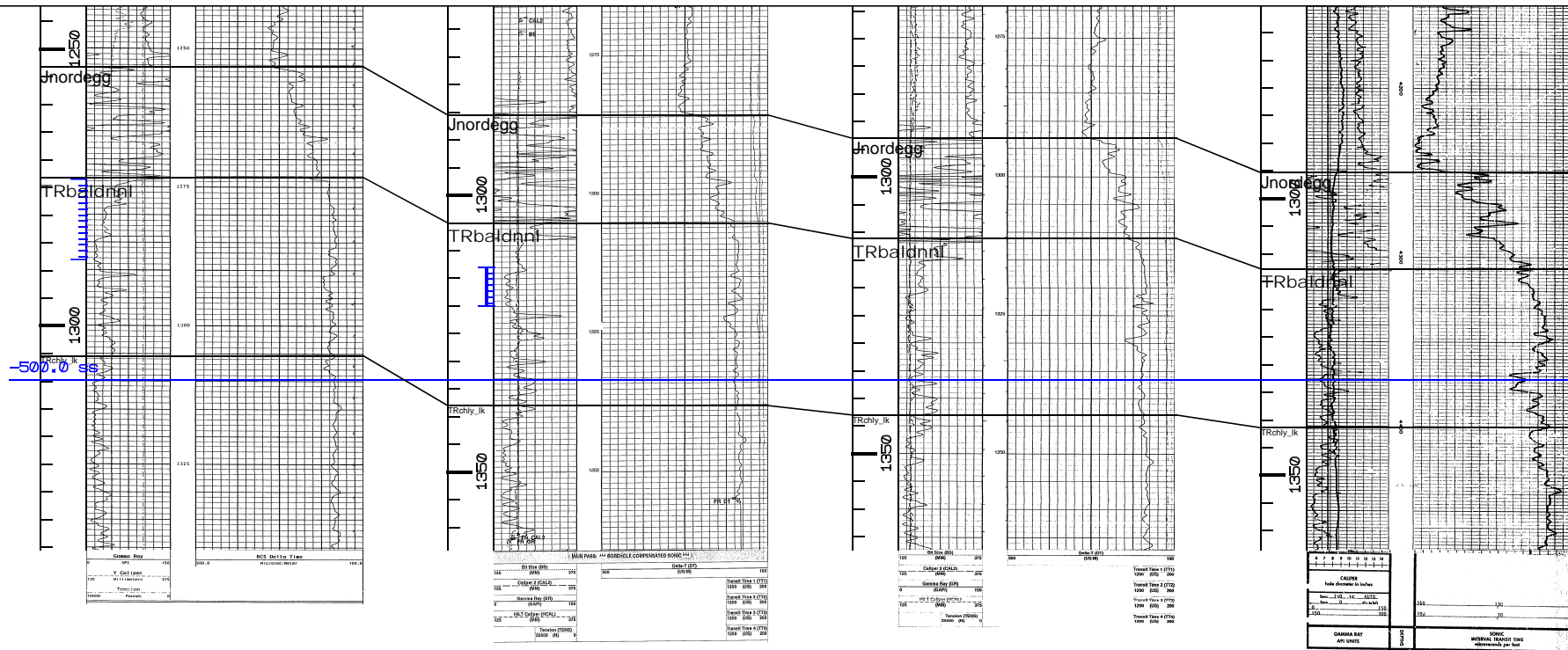
2004/03/12

2006/08/07

2003/12/11

1974/11/17

1:1200



Stoddart West Baldonnel C

STODDART WEST OIL FIELD

Bear Flat D Pool

Pool Parameters

Field Code: 8100

Pool Code: 4582D

Discovery well original name: Scurry et al W Stoddart 14-16-85-20W6

WA#: 06640

Rig Release: 1994/07/14

Other Oil and Gas Shows: Belloy oil, Artex oil, Artex gas

Number of Wells (November 2012) Oil: 6 Active: 4 Injection: 1

Reservoir Data

Area of Pool: 321 acres, 130 hectares

Average Depth of Producing Zone: 1467 metres

Lithology of Reservoir Rock: sandstone

Trap Type: Stratigraphic

Estimated Maximum Reservoir Thickness: 3 metres

Drive Mechanism: gas depletion

Average Porosity (%): 8

Average Net Pay:

Average Permeability: 119 milliDarcies

Average Water Saturation (%): 15

Oil Formation Volume Factor (%): 124

Gravity (degrees API): 36

Original Pressure: 1989 psi, 13,714 kPa

Reserves

Estimated original oil in place: 3,181,450 barrels, 505,810 m³

Recovery Factor (%): 35

Estimated Recoverable Oil: 1,113,510 barrels, 177,034 m³ (production decline)

Cumulative Oil Production: 1,061,910 barrels

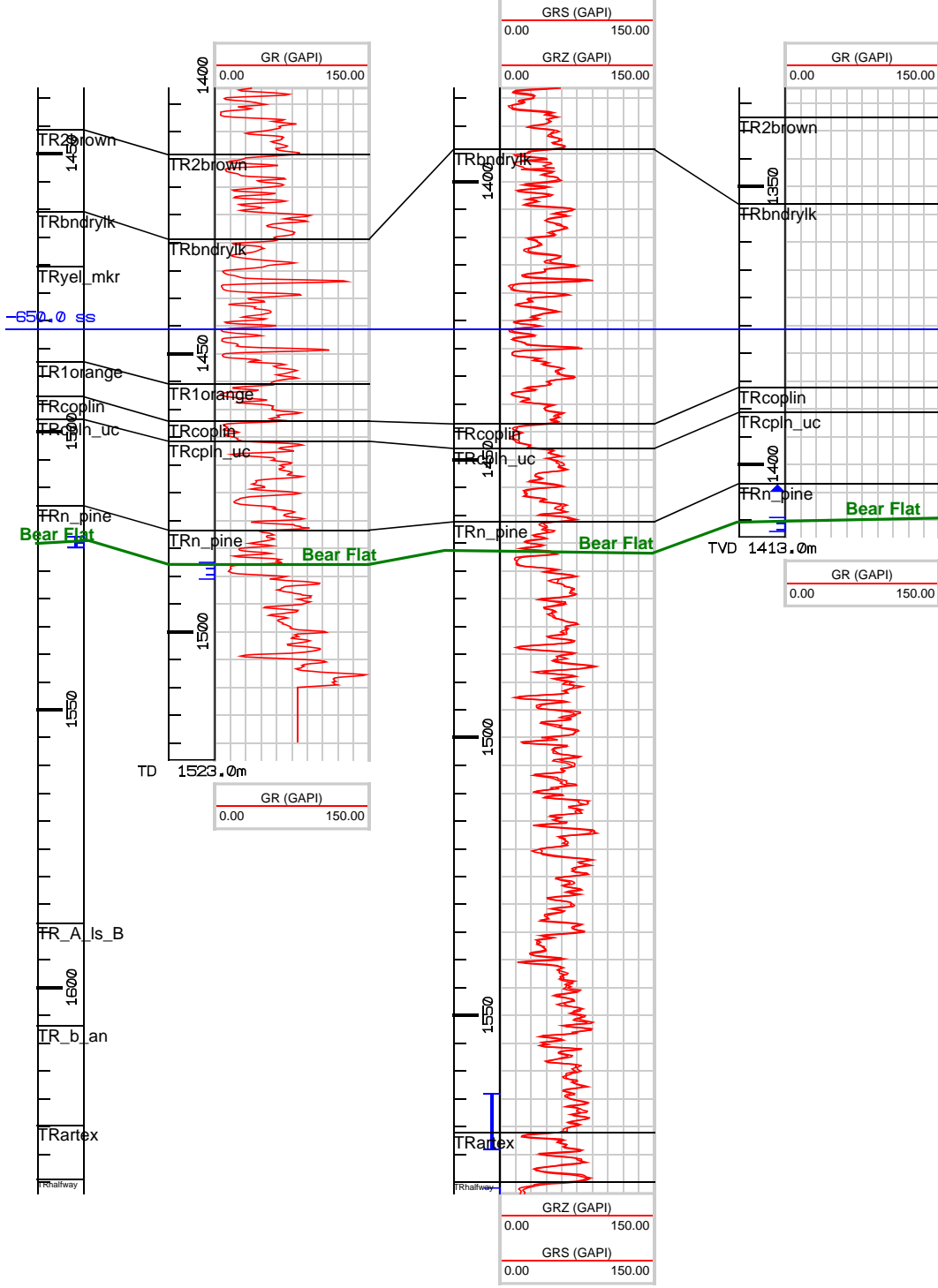
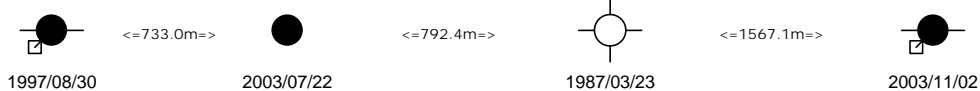
Remaining Recoverable Oil: 51,600 barrels

Remaining Original Oil in Place (%): 67

Cumulative Water Production: 751,260 barrels

Cumulative Water Injection: 1,745,570 barrels

Notes: Bear Flat is a member of the Charlie Lake Formation. It might also be known as Bear Grass. The pool has a very high primary recovery for a gas depletion reservoir. Only one injection well is located at the north end of the pool. It was initially intended as a Belloy injector, and then later converted to Bear Flat; it might not be optimally located for Bear Flat pressure maintenance.



Stoddart West Bear Flat D

STODDART WEST OIL FIELD

Belloy C Pool

Pool Parameters

Field Code: 8100

Pool Code: 6200C

Discovery well original name: Woods W Stoddart 11-7-86-20W6

WA#: 02814

Rig Release: 1970/12/29

Other Oil and Gas Shows: Belloy gas, Bear Flat gas, Doig oil, Artex oil, Bear Flat oil

Number of Wells (November 2012) Oil: 54 Gas: 1 Injection: 9 Horizontal: 1 Active: 22

Reservoir Data

Area of Pool:

Average Depth of Producing Zone: 6566 feet, 2002 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 17 metres

Drive Mechanism: gas depletion

Average Porosity (%): 11

Average Net Pay: 1.8 metres

Average Permeability: 16 milliDarcies

Average Water Saturation (%): 36

Oil Formation Volume Factor (%): 130

Gravity (degrees API): 36

Original Pressure: 2438 psi, 16,809 kPa

Reserves

Estimated original oil in place: 55,787,550 barrels, 8,869,512 m³

Recovery Factor (%): 23

Estimated Recoverable Oil: 13,078,470 barrels, 2,079,311 m³ (production decline)

Cumulative Oil Production: 11,973,430 barrels

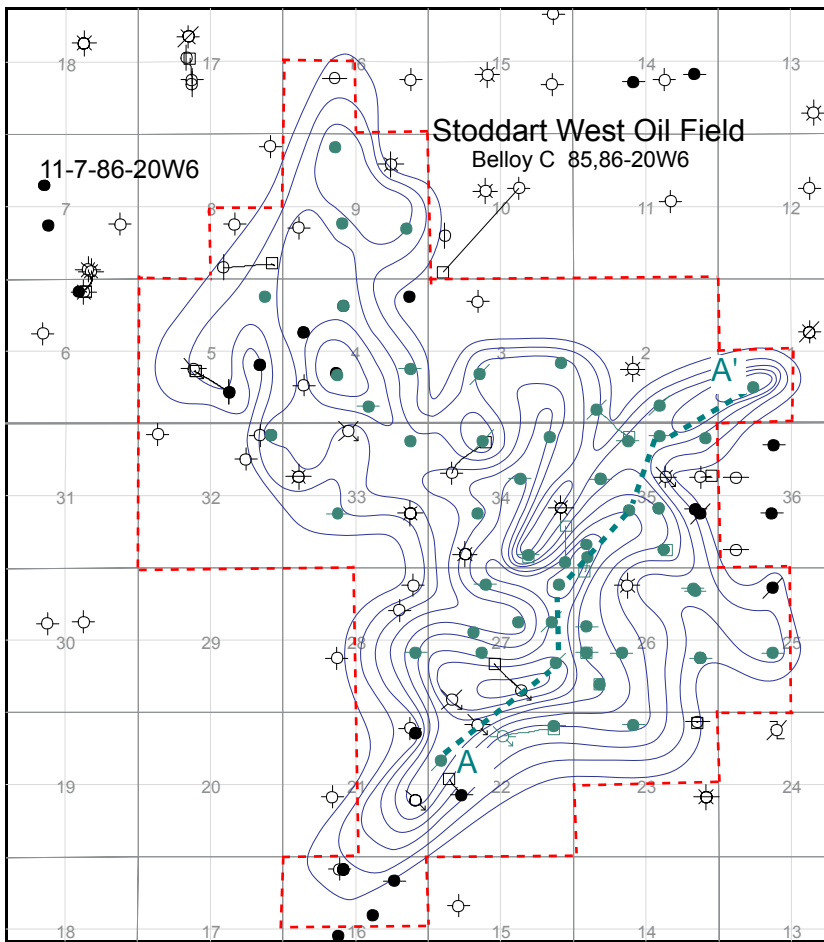
Remaining Recoverable Oil: 1,105,040 barrels

Remaining Original Oil in Place (%): 79

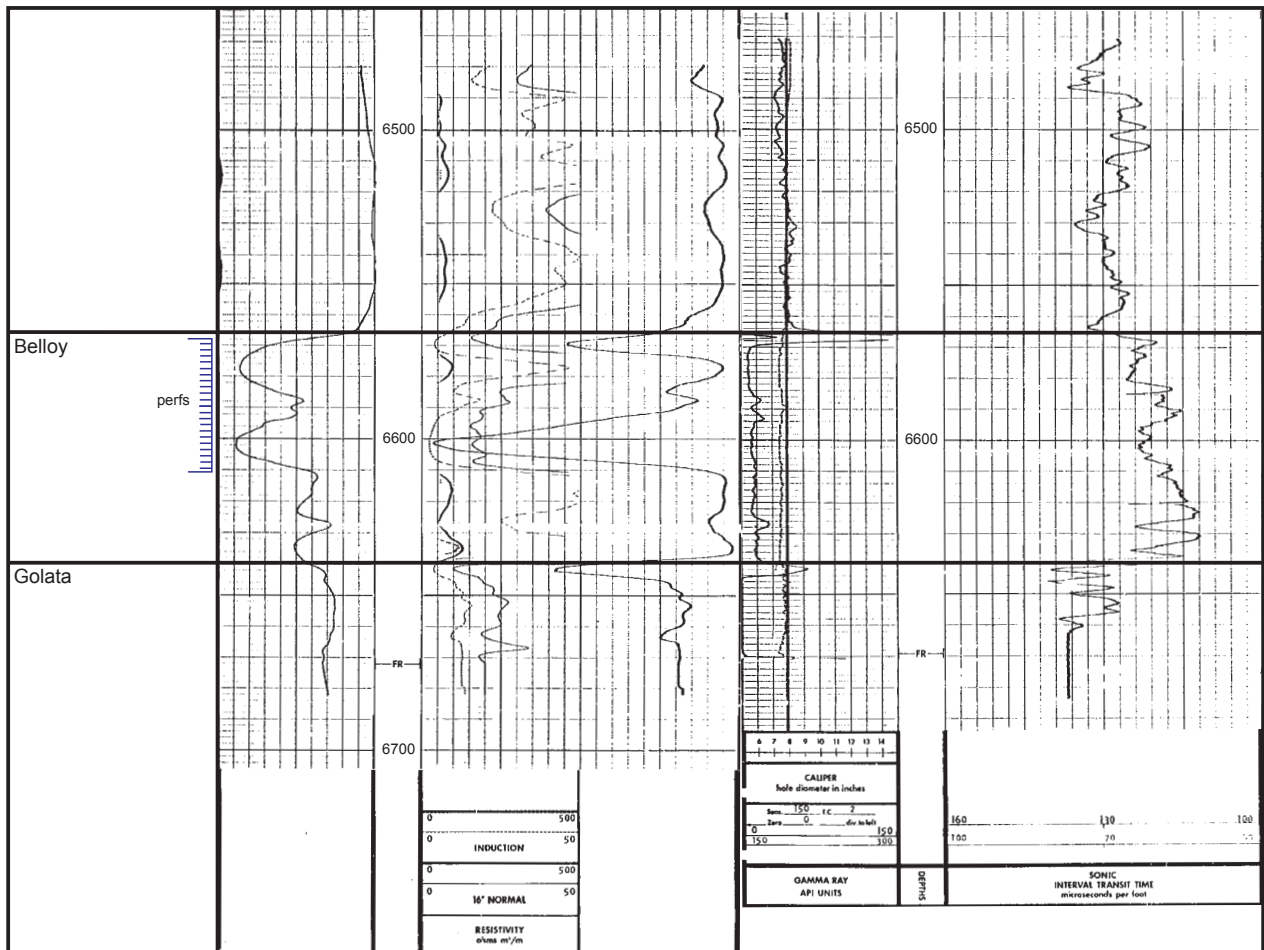
Cumulative Water Production: 447,230 barrels

Cumulative Water Injection: 8,951,640 barrels

Notes: A small Belloy C gas cap is present at the north end of the pool. Discovery well 11-07 is also the discovery well for Belloy L, which appears to be a separate pool to the northwest according to previous mapping done by the ministry in the 1990's.



Contour interval is two metres net Belloy C oil pay (Oil and Gas Commission). Discovery well 11-07-86-20W6 is outside the Belloy C pool because it is also the discovery well for Belloy L.



Elog and sonic log for discovery well 11-7-86-20W6. The completion interval is 6572-6582'.

100/12-22-085-20W6/00

100/08-27-085-20W6/00

100/16-27-085-20W6/00

100/06-35-085-20W6/00

100/15-35-085-20W6/00

100/04-01-086-20W6/00

A

A'

1989/03/01

1979/12/05

1978/10/08

1978/07/23

1987/06/23

1994/10/11

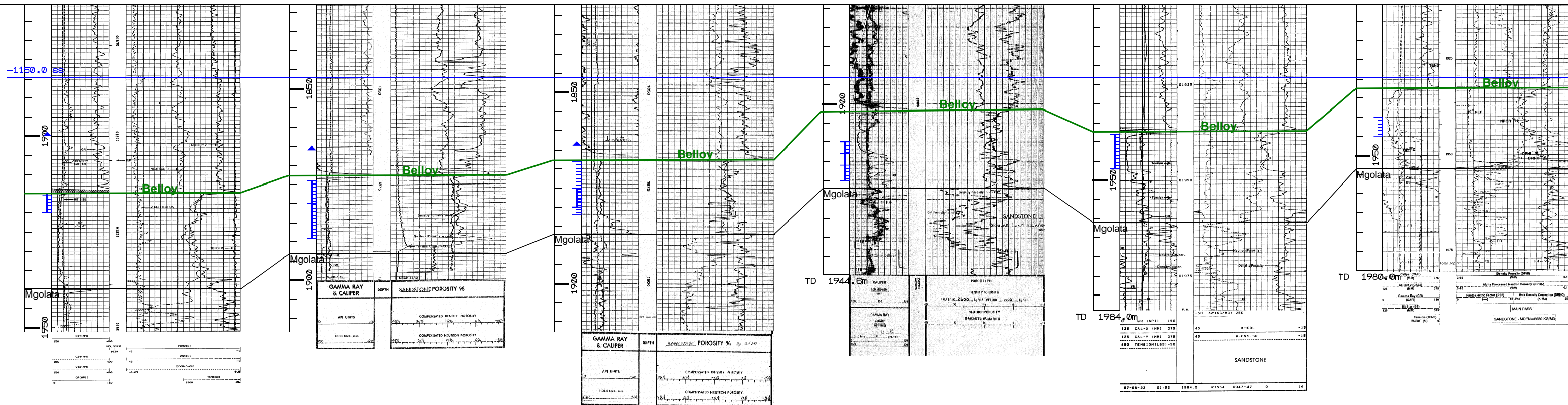
<=1689.4m=>

<=884.0m=>

<=1139.6m=>

<=903.8m=>

<=1168.8m=>



Stoddart West Belloy C

STODDART WEST OIL FIELD

Belloy L

Pool Parameters

Field Code: 8100

Pool Code: 6200L

Discovery well original name: Woods W Stoddart 11-7-86-20W6

WA#: 02814

Rig Release: 1970/12/29

Other Oil and Gas Shows: Belloy gas, Bear Flat gas, Doig oil, Artex oil, Bear Flat oil

Number of Wells (November 2012) Oil: 7 **Active:** 5 **Horizontal:** 2

Reservoir Data

Area of Pool: 1124 acres, 455 hectares

Average Depth of Producing Zone: 6566 feet, 2001 metres

Lithology of Reservoir Rock: dolomitic sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 7 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay:

Average Permeability: 3 milliDarcies

Average Water Saturation (%): 39

Oil Formation Volume Factor (%): 130

Gravity (degrees API): 41

Original Pressure: 2174 psi, 14,989 kPa

Reserves

Estimated original oil in place: 9,105,780 barrels, 1,447,703 m³

Recovery Factor (%): 10

Estimated Recoverable Oil: 910,580 barrels, 144,770 m³ (production decline)

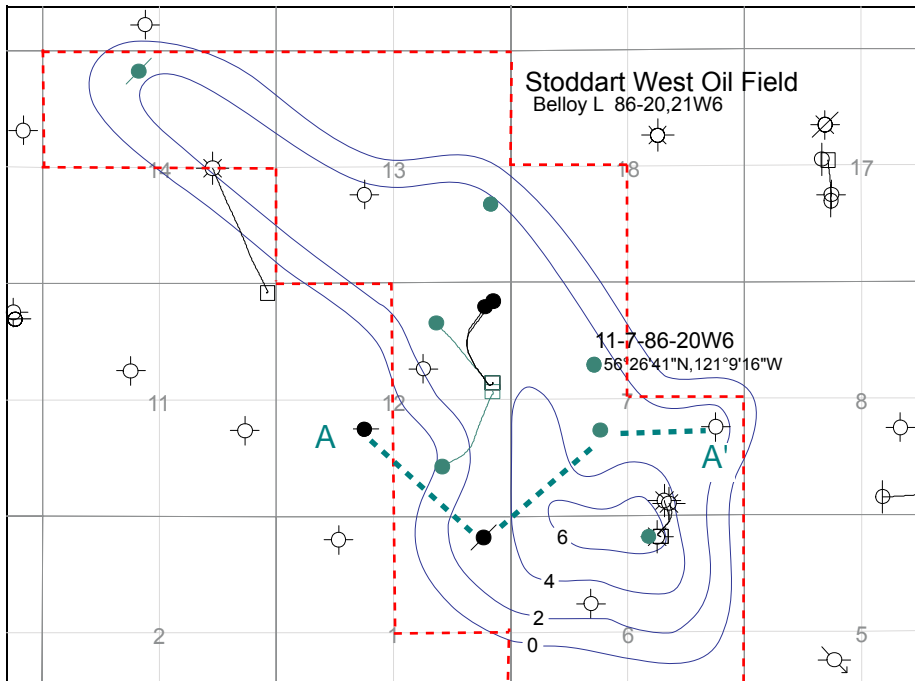
Cumulative Oil Production: 901,940 barrels

Remaining Recoverable Oil: 8,640 barrels

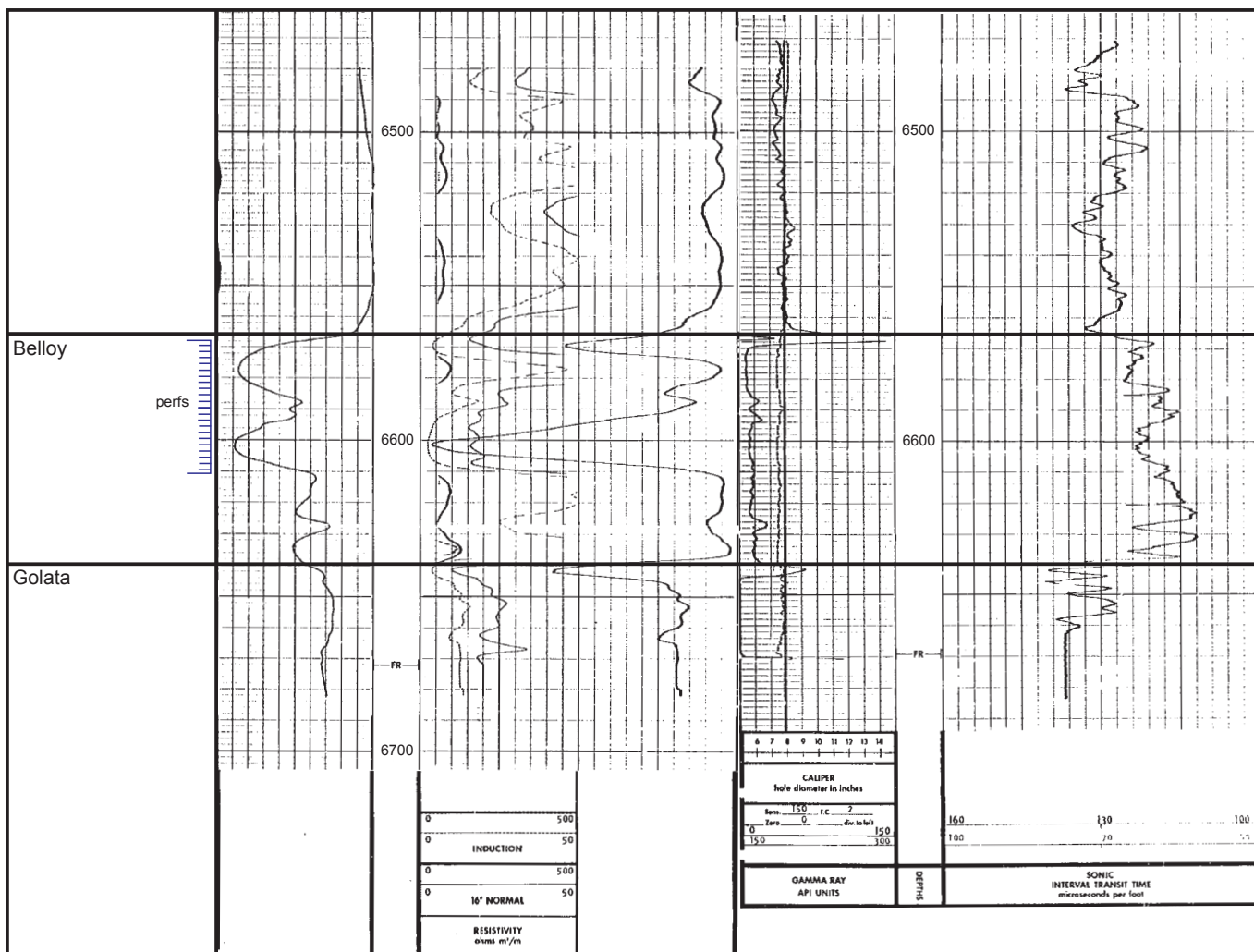
Remaining Original Oil in Place (%): 90

Cumulative Water Production: 109,530 barrels

Notes: This is the companion pool to Belloy C; both share 11-07-86-20W6 as discovery well.



Contour interval is two metres net Belloy L oil pay. Discovery well is 11-7-86-20W6.



Elog and sonic log for discovery well 11-7-86-20W6. Completion interval for Belloy L is 6570'-6606'. A gas zone (Belloy P) is completed lower down at 6614'-6639'.

100/06-12-086-21W6/00

100/16-01-086-21W6/00

100/06-07-086-20W6/00

100/08-07-086-20W6/00

1987/10/23

<=1120.4m=>

1985/06/16

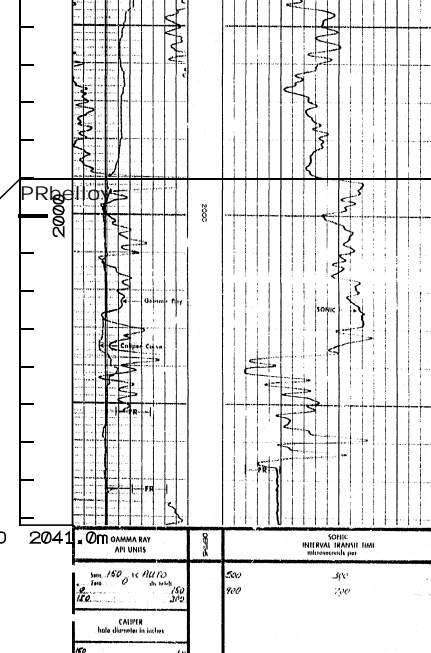
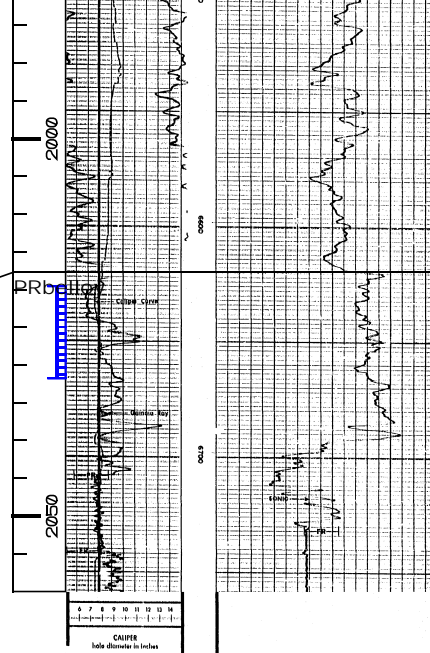
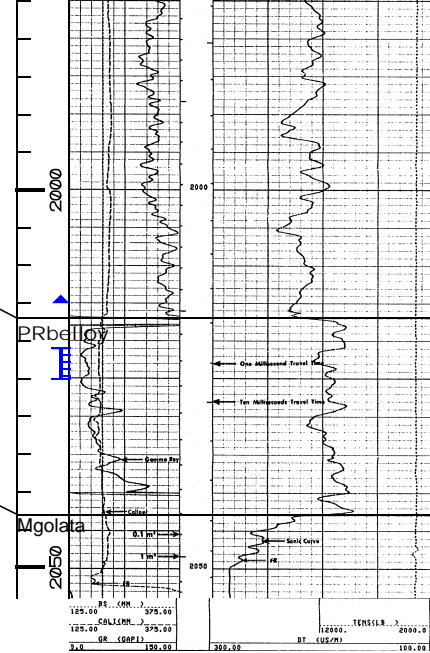
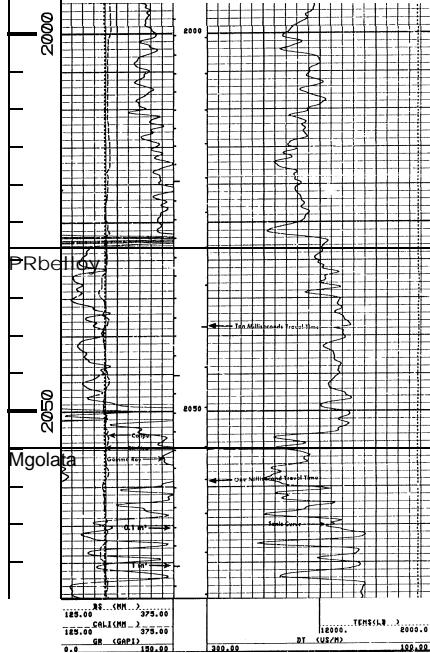
<=1094.0m=>

1978/06/29

<=803.3m=>

1978/08/03

-1150.0 ss



TD 2041.0m	GAMMA RAY API UNITS	SONIC INTERVAL MEASUREMENT microseconds per foot	
	Scale 150 to 400	Scale 500 to 1000	Scale 100 to 500
	CAPIER hole diameter in inches		
	Scale 40 to 40		
			Note: Scale change at 2033m

1:1000

Stoddart West Belloy L

STODDART WEST OIL FIELD

Doig B Pool

Pool Parameters

Field Code: 8100

Pool Code: 4900B

Discovery well original name: Scurry et al W Stoddart 16-4-086-20W6 **WA#:** 05449

Rig Release: 1980/10/27

Other Oil and Gas Shows: Belloy oil

Number of Wells (November 2012) Oil: 5 **Active:** 4

Reservoir Data

Area of Pool: 1040 acres, 421 hectares

Average Depth of Producing Zone: 1525 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic

Estimated Maximum Reservoir Thickness: 5 metres

Drive Mechanism: gas depletion

Average Porosity (%): 10

Average Net Pay: 2.1 metres

Average Permeability: 2 milliDarcies

Average Water Saturation (%): 13

Oil Formation Volume Factor (%): 139

Gravity (degrees API): 43

Original Pressure: 2653 psi, 18,292 kPa

Reserves

Estimated original oil in place: 3,452,830 barrels, 548,956 m³

Recovery Factor (%): 20

Estimated Recoverable Oil: 690,570 barrels, 109,792 m³ (production decline)

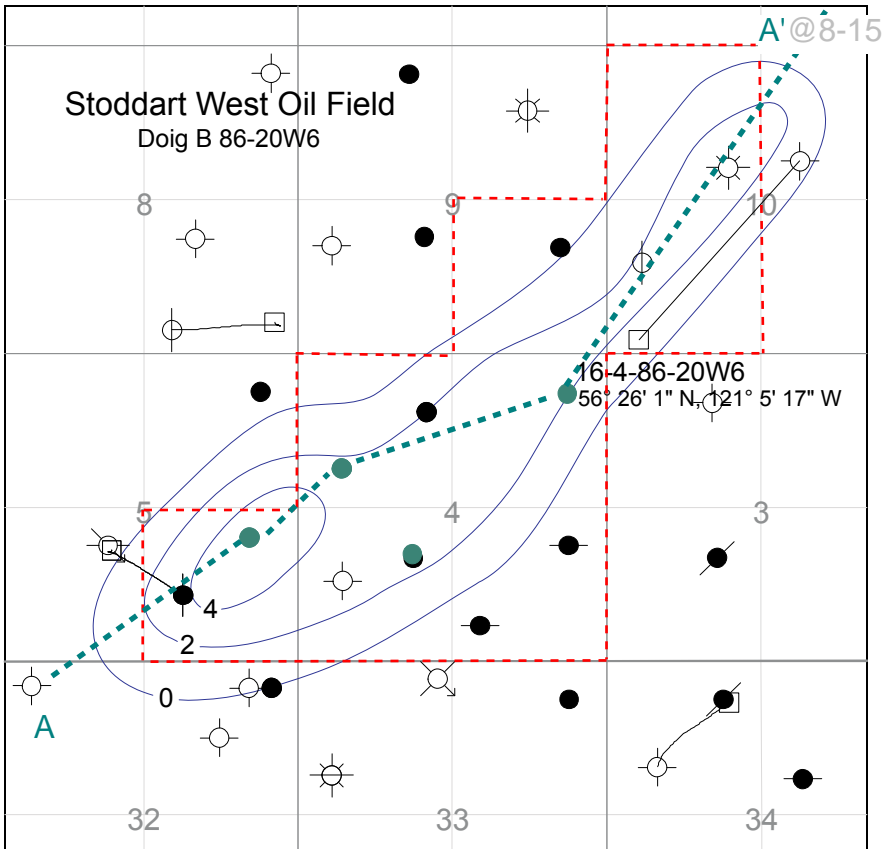
Cumulative Oil Production: 554,490 barrels

Remaining Recoverable Oil: 136,070 barrels

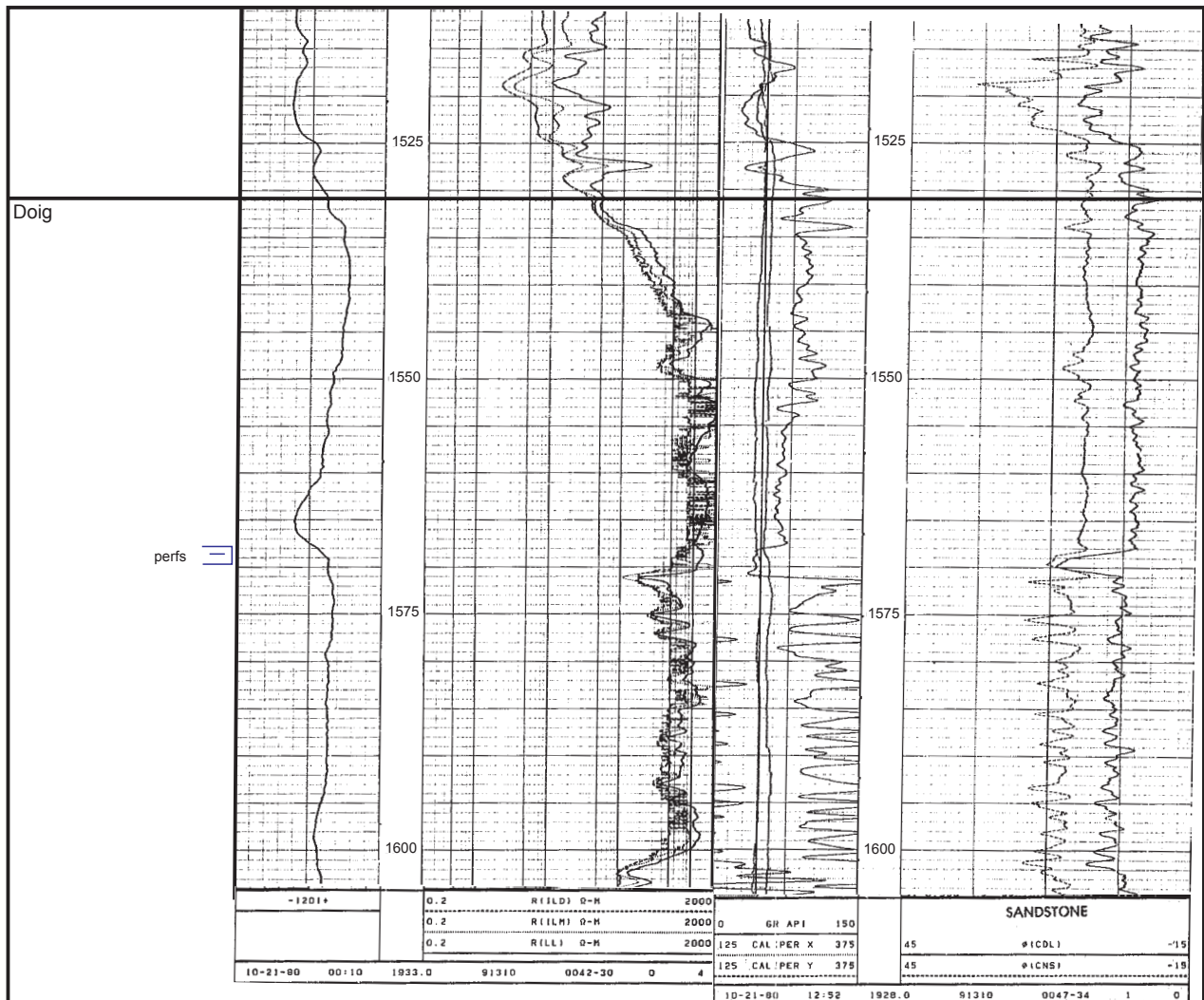
Remaining Original Oil in Place (%): 84

Cumulative Water Production: 7,030 barrels

Notes: The Doig here has poor permeability and only fair porosity in a thin sand layer. Despite this, the recovery factor is high at 20%. This might even be enhanced through modern completion techniques although such a thin sand might not be suitable for horizontal drilling or secondary recovery.



Contour interval is two metres net Doig B oil pay (Oil and Gas Commission). Discovery well is 16-4-86-20W6.



Dual induction laterolog and neutron-density logs for discovery well 16-4-86-20W6. The completion interval is in a porous streak near the bottom of a Doig sandstone unit.

100/13-32-085-20W6/00

+2774 11320



<=4554.3ft=>

100/08-05-086-20W6/00

+2607 05745



<=6019.5ft=>

100/16-04-086-20W6/00

+2366 05449



<=4791.2ft=>

100/11-08-086-20W6/00

+2664 01190



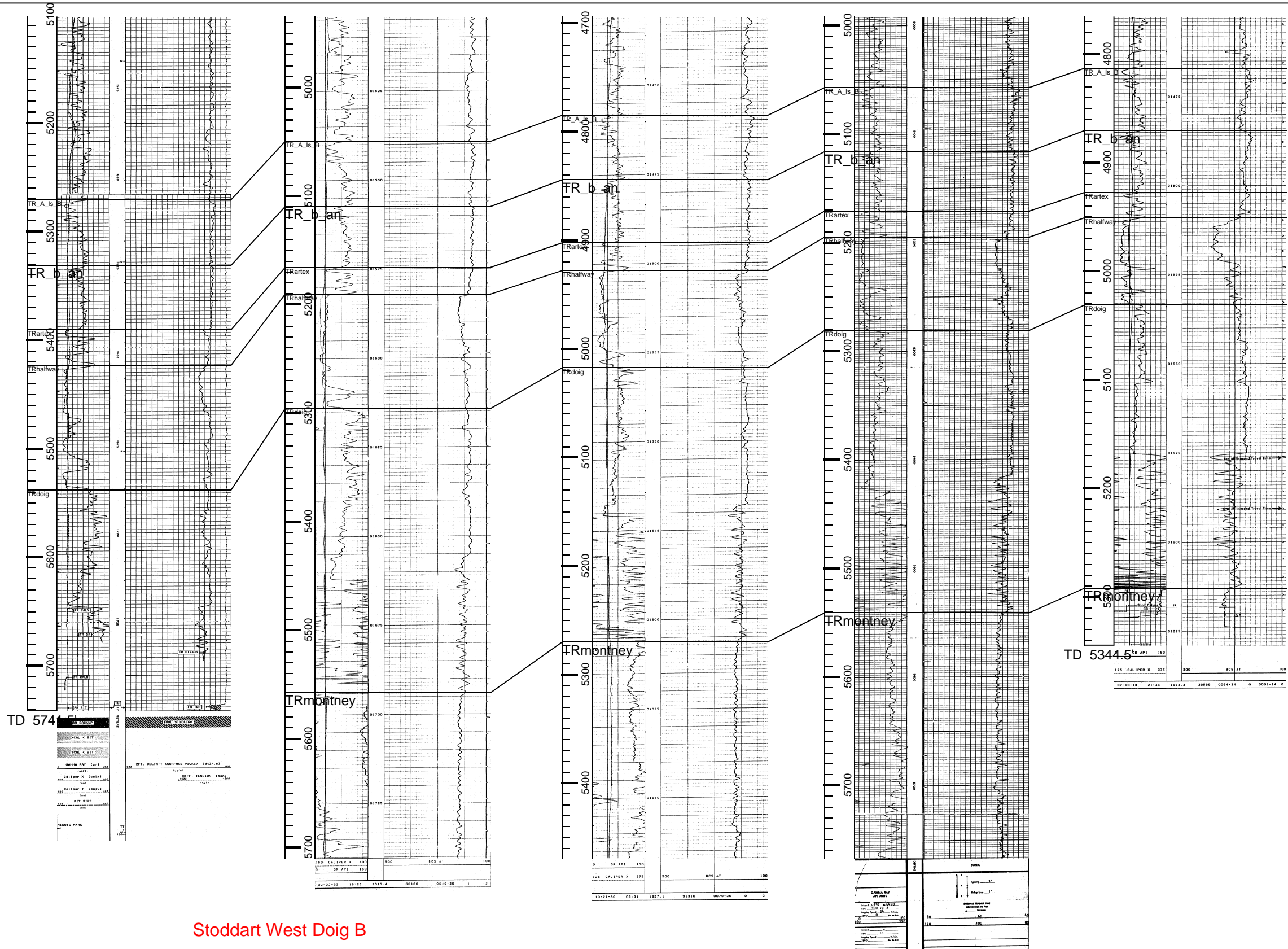
<=4627.0ft=>

100/08-15-086-20W6/00

+2437 06733



A'



Stoddart West Doig B

1:1200

WEASEL WEST OIL FIELD

Halfway B Pool

Pool Parameters

Field Code: 8320

Pool Code: 4800B

Discovery well original name: TENN ET AL W. WEASEL d-83-C/094-H-02

WA#: 03115

Rig Release: 1972/03/21

Other Oil and Gas Shows: Halfway gas

Number of Wells (November 2012) Oil: 2 Gas: 1 Active: 1

Reservoir Data

Area of Pool: 521 acres, 211 hectares

Average Depth of Producing Zone: 3776 feet, 1151 metres

Lithology of Reservoir Rock: sandstone

Trap Type: stratigraphic-structural

Estimated Maximum Reservoir Thickness: 1.5 metres

Drive Mechanism: gas cap expansion

Average Porosity (%): 20

Average Net Pay: 1 metre

Average Permeability: 68 milliDarcies

Average Water Saturation (%): 49

Oil Formation Volume Factor (%): 121

Gravity (degrees API):

Original Pressure: 1266 psi, 8729 kPa

Reserves

Estimated original oil in place: 860,190 barrels, 136,760 m³

Recovery Factor (%): 15

Estimated Recoverable Oil: 129,030 barrels, 20,514 m³ (production decline)

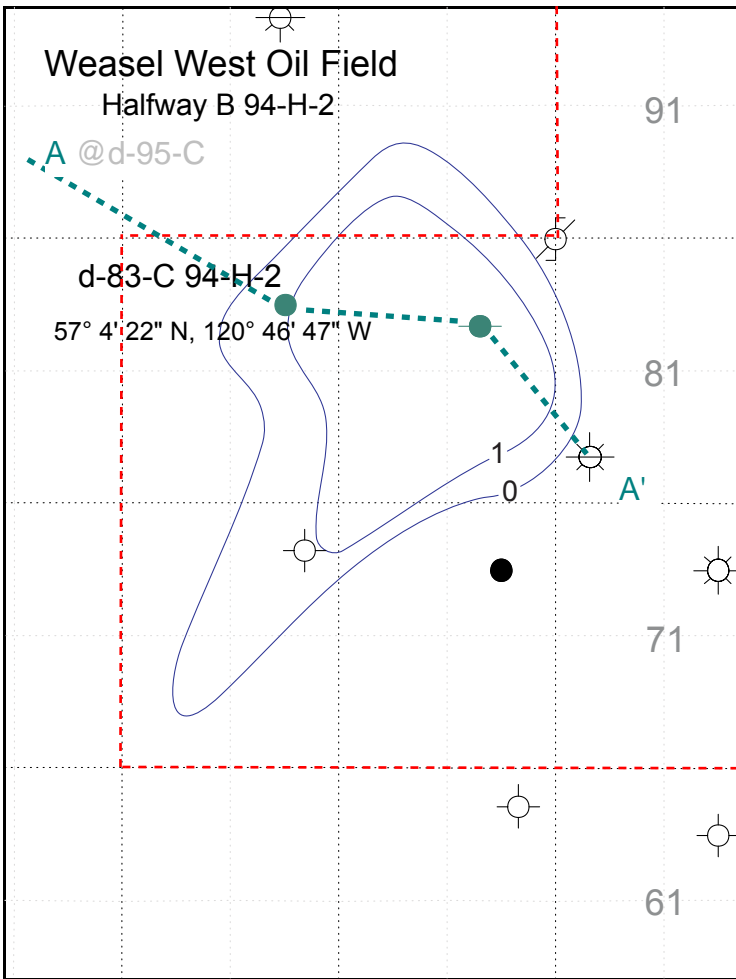
Cumulative Oil Production: 112,270 barrels

Remaining Recoverable Oil: 16,760 barrels

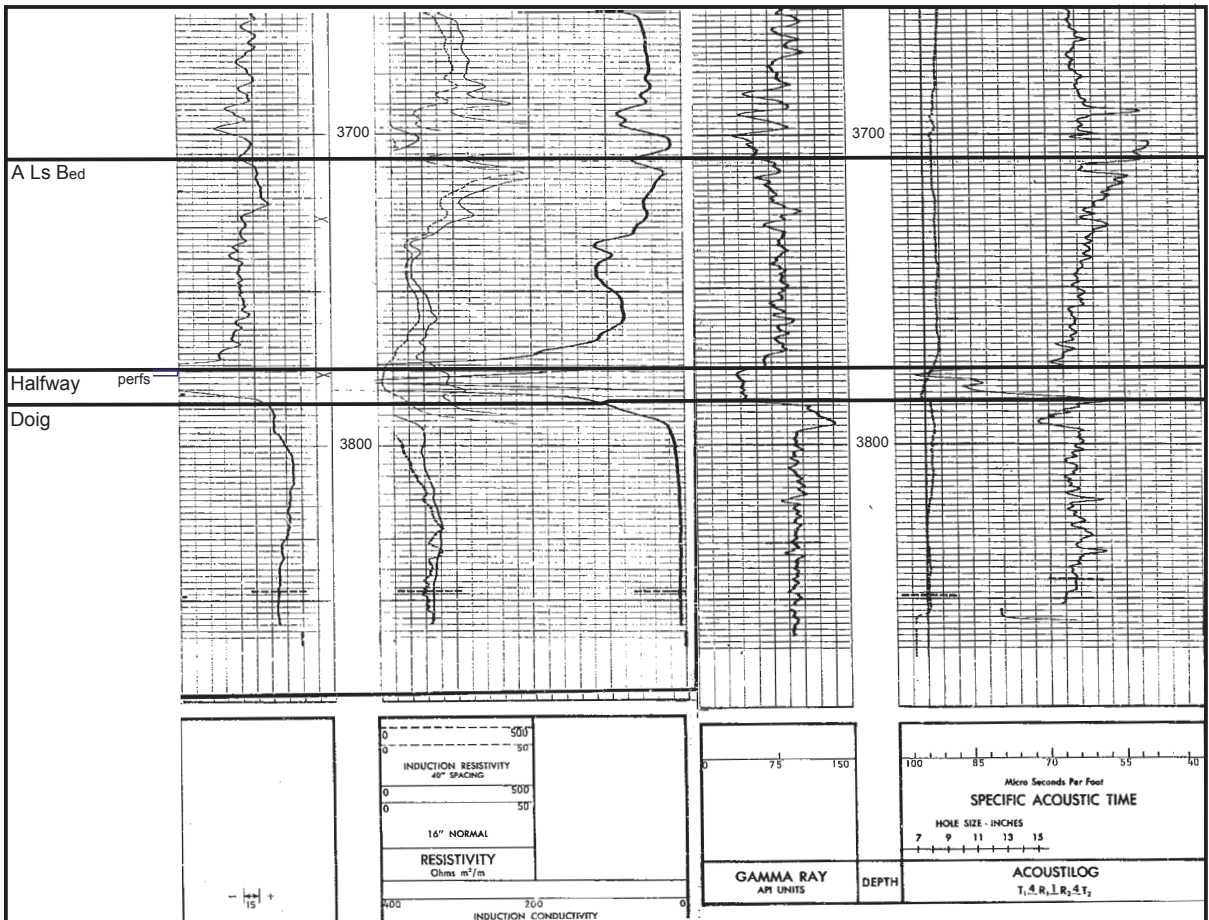
Remaining Original Oil in Place (%): 87

Cumulative Water Production: 777,530 barrels

Notes: The Halfway A oil pool is contiguous to the south. A Halfway B gas cap overlaps to the north. The Halfway is largely wet in the area, except where it is relatively high. Permeability barriers also control hydrocarbon distribution.



Contour interval is one metre net Halfway B oil pay.
Discovery well is d-83-C-94-H-2.



Elog and sonic logs for discovery well d-83-C-94-H-2. The Halfway shows very good porosity. Only the top 2' were completed between 3776' – 3778'.

A

A'



<=1785.0m=>



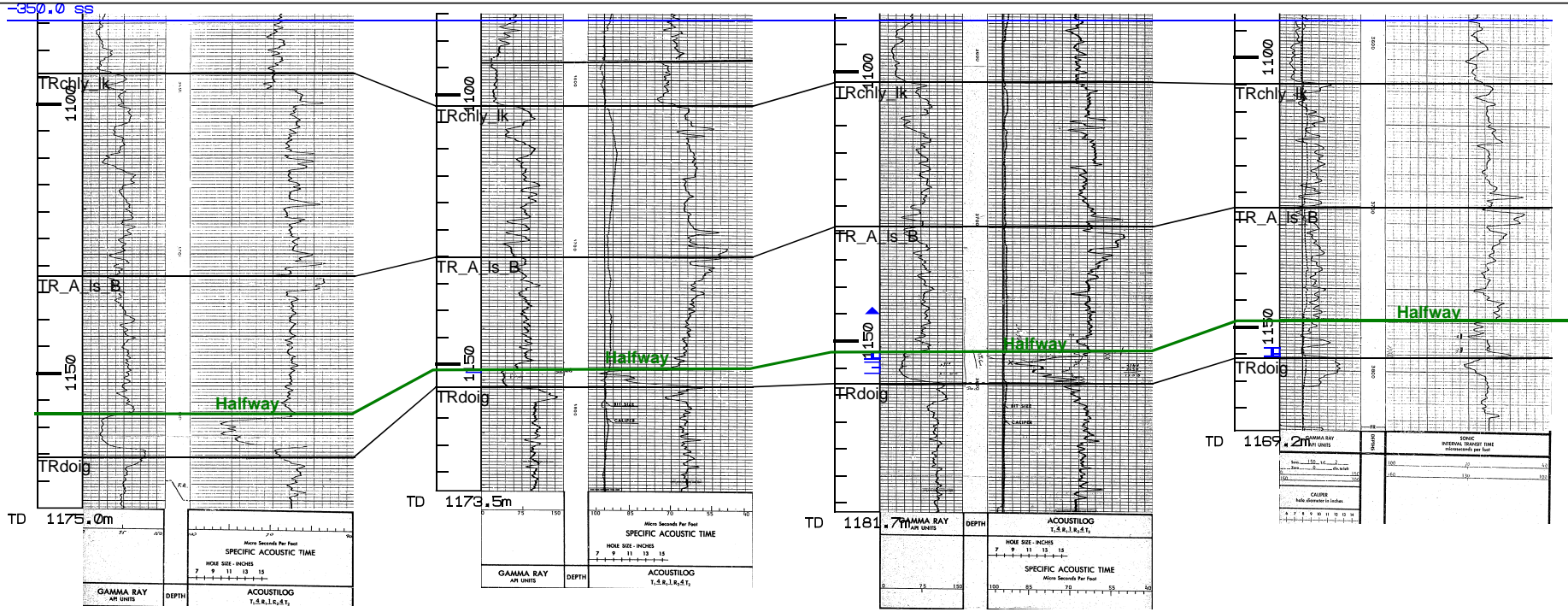
<=687.5m=>



<=599.6m=>



1973/03/18



Weasel West Halfway B