

AUTHORITY TO DRILL A WELL



CANADA

Exploratory ☐
Development ☐Delineation ☐
Service ☐

AUTHORITY TO DRILL A WELL

APPLICATION

This application is submitted with Section 82 of the Canada Oil and Gas Drilling Regulations. When approved under Section 83 of the Regulations, it is the requisite authority for the commencement of drilling operations.

Well Name in Full: Pan Am Pointed Mountain X-45A
Operator: Amoco Canada Petroleum Company Ltd.
Contractor: Drive Well Servicing
Drilling Program No.:
Permit or Lease No.:
Drilling Rig or Unit: Drive No. 41
Estimated Well Cost: \$2,460,668
Location-Unit: Section: Grid Area:
Coordinates: Lat: 60° 24' 33.816" Long: 123° 53' 51.782"
Area: Pointed Mountain N.W.T.
Field/Pool:
Elevation-RT/KB: 373.67 (ASL) Seafloor: (BRT)
Approx. Spud Date: June 20, 1994
Estimated Days on Location: 21
Anticipated Total Depth: 3144 TvD, 3206 md
Target Horizon(s): Nahanni

EVALUATION PROGRAM

Ten-metre sample intervals
Five-metre sample intervals Yes Kop to TD
Canned sample intervals
Conventional cores at none
Logs and Tests Multi-shot gyro prior to kick-off, DLL/CN/ZDL/GR/CAL, FMI/GR

CASING AND CEMENTING PROGRAM

OD	Weight	Grade	Setting Depth	Cementing Program (Volumes)
114.3 mm	18.23 kg/m	13-CR80	KB 3073 md	5 tonnes thermal 40F cement + 0.5% D-24 + 0.5% T-10 + 0.4% R-55 + 6 L/tonne CF-1 foamer

The liner will be set to the top of the Nahanni.

BOP Equipment: 179mm, Nace trim, BOP stack with pipe rams, blind rams and annular preventer.

Other Information: Immediately after cutting the window, the casing and exposed cement and shale will be pressure tested to 11 MPa for 15 minutes. The open hole will be pressure tested again to 11 MPa for 15 minutes prior to penetrating the Nahanni formation.

Signed: Gary Russell Title: COMPLECTIONS ENGINEER
Date: JUNE 16, 1994 Company: AMOCO CANADA PETROLEUM COMPANY LTD.

APPROVAL

An approved copy of this notice is to be posted at each wellsite

Signed: Lawrence M. Baker
Chief Conservation Officer

Date: June 20/94

File: 173

Canada

APPROVAL TO
ALTER
CONDITION OF
A WELL



APPLICATION TO ALTER CONDITION OF A WELL

This application form is to be submitted in triplicate to the District Conservation Engineer at least 45 days before commencement of operations.

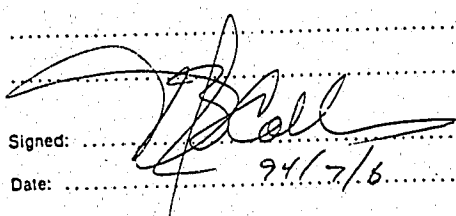
Well Name: Pan Am Pointed Mountain K-45A Area: Pointed Mountain, N.W.T.
Coordinates: Lat: 60° 24' 33.816" Long: 123° 53' 51.782"
Operator: Amoco Contractor: Drive Well Servicing
Drilling Rig or Unit: 41 Depth: 3216 mKB
Date ATDW Issued: 1967/09/12 Date of Last Operation: 1994/07/06

TYPE OF OPERATION

Complete sidetracked well in the Nahanni formation.

SUMMARY OF PROPOSED OPERATIONS

See attached program

Signed: 

Date: 94/7/6

Title: Completion Superintendent

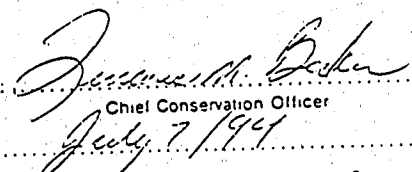
Company: Amoco Canada Petroleum Company Ltd.

APPROVAL

An approved copy of this notice should be posted at each wellsite.

Well Status

Suspended ☐
Completed ☐
Abandoned ☐

Signed: 

Chief Conservation Officer

Date: July 7/94

ATDW No:

File: 1798

Canada

WELL
TERMINATION
RECORD (with
attachment)



CANADA

WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 84 of the Canada Oil and Gas Drilling Regulations.

WELL DATA

Well Name Ran An Pointed Mainain K-45A (A-2A) Area Pointed Mainain, N.W.T.
Grid Area 60-30-122-45 Field/Pool
Permit or Lease No Final Coordinates: Lat. 60° 24' 33.816" Long 123° 53' 51.782"
Drilling Unit Drive 41 Elevations-RT/KB 373.29 SF/GL 368.29
Spud Date 94-06-20 Rig Released: 94-09-08 Total Depth 3216.0
UWI 300K456030123453

CASING AND CEMENTING

O.D.	Weight	Grade	Depth Set	Cement and Additives
339.7mm	81.1 kg/m	J-55	976.0	500 sx + 10% gel + 200 sx + 2% CaCl ₂
244.5mm	64.9 & 59	N-80, S-95, S0095	2421.64	(400 sx + 2% gel + 1.2% HR12 + 300 sx + 20% silica flour + 1.2% HR12)
177.8mm	34.3 & 38.7	N-80, S-95, S0095	3422.9	800sx + 20% silica flour + 4% gel + 2% HR12
Liner-114.3mm	18.23 kg/m	13CR-80	(2794.16 to 3082.25)	6.6t. Thermal 40F + 0.5% T-10 + 0.6% D-24 + 0.4% R6 + 61/t. CR-1

PLUGGING PROGRAM

Approval of the following program was obtained by (person) from
(person) by means of
..... on 19

Type of Plug	Interval	Felt	Cement and Additives
--------------	----------	------	----------------------

Lost Circulation/Overpressure Zones: None
Equipment left on Seafloor (Describe):
Provision for Re-entry (Describe and attach sketch):
Gores Type: Intervals:

Other Downhole Completion/Suspension Equipment: Permanent packer at 2778mkb, 1143mm, 13.99 kg/m, 1-80 and 13CR-80 tubing from packer to surface.

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed Bruce Collin P. Eng.
Name Bruce Collin

Title: Completion Superintendent
Date:

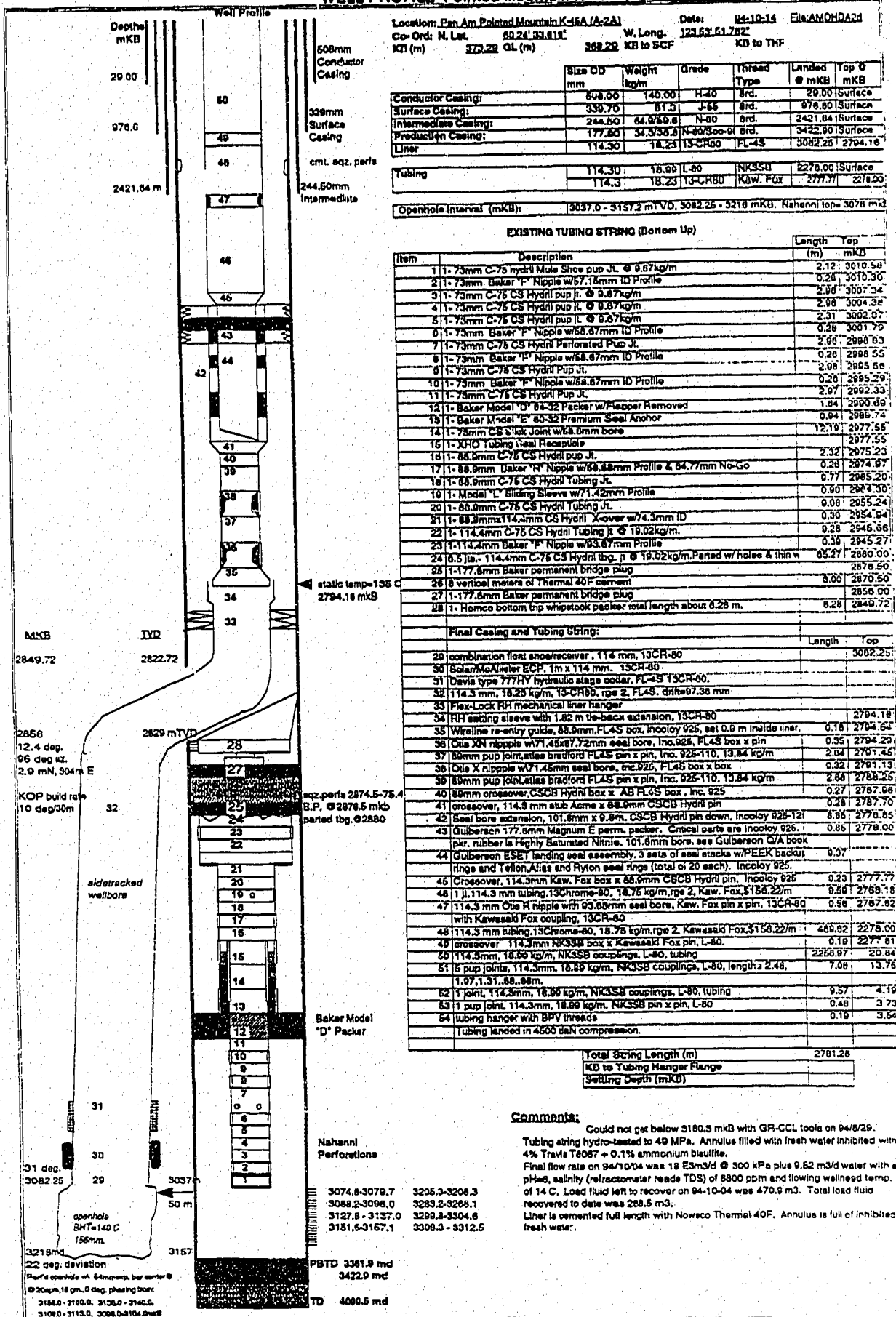
Acknowledged by: [Signature]
Engineering Branch

Date: September 1, 1994
File: 1798

Well Status
Suspended ☐
Completed ☒
Abandoned ☐

Canada

WELL PROFILE Pointed Mountain K-45A (A-2A)



Comments:

Could not get below 3180.3 mKB with GR-CCL tools on 94/8/29.
Tubing string hydro-tested to 49 MPa. Annulus filled with fresh water inhibited with 4% Travis T8067 + 0.1% ammonium bisulfite.
Final flow rate on 94/10/04 was 18 Esm3/d @ 300 kPa plus 9.62 m3/d water with a pH=6, salinity (refractometer reads TDS) of 8800 ppm and flowing wellhead temp. of 14 C. Load fluid left to recover on 94-10-04 was 470.9 m3. Total load fluid recovered to date was 288.5 m3.
Liner is cemented full length with Nowaco Thermal 40F. Annulus is full of inhibited fresh water.

APPROVAL TO
ALTER
CONDITION OF
A WELL



APPLICATION TO ALTER CONDITION OF A WELL

This application form is to be submitted in triplicate to the District Conservation Engineer at least 45 days before commencement of operations.

Well Name: Pan Am Pointed Mountain K-45A Area: Pointed Mountain Field
Coordinates: Lat: 60° 24' 33.816" North Long: 123° 53' 51.782" West
Operator: Amoco Canada Contractor: Trimat Well Servicing, Inc.
Drilling Rig or Unit: Rig #7 Depth: 3216 mKB
Date ATDW Issued: June 20, 1994 Date of Last Operation: July 17, 1994

TYPE OF OPERATION

Wellbore Abandonment

SUMMARY OF PROPOSED OPERATIONS

The program objective is to first abandon the lower section of the wellbore. Then the source of the surface casing vent flow will be determined and the vent repaired. The abandonment of the wellbore will then be completed. The wellhead will remain on the well to monitor pressures over the next year. See program for further details.

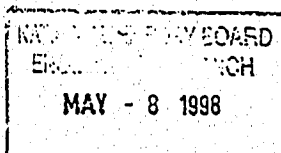
Signed: *[Signature]* Title: Abandonment Coordinator
Date: April 28, 1998 Company: Amoco Canada

APPROVAL

An approved copy of this notice should be posted at each wellsite.

Well Status
Suspended ☐
Completed ☐
Abandoned ☐

Signed: *[Signature]* Chief Conservation Officer
Date: June 3/98
ATDW No: 1798 File: 9211-A4-2-1...
300K456030123454



Canada

WELL
TERMINATION
RECORD (with
attachment)



CANADA

WELL TERMINATION RECORD

This record is submitted in triplicate in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations

WELL DATA
Well Name: Pain Am Pointed Mountain 1C-45A Area: POINTED MOUNTAIN
Grid Area: Field/Pool:
Permit or Lease No.: Final Coordinates: Lat.: 60°24'33.816"N Long: 125°53'57.782"W
Drilling Unit: Elevations-RT/KB: SF/GL:
Spud Date: JUNE 30, 1994 Rig Released: JULY 17, 1994 Total Depth: 3216 m KB

CASING AND CEMENTING

O.D.	Weight:	Grade:	Depth Set:	Cement and Additives:
Conductor 508 mm	149.0 kg/m	H-40	29.0 m KB	—
Sealcase 339.7 mm	86.3 kg/m	J-55	967.6 m KB	500 sacks 102% 1 + 2% Cccl
Intermediate 244.5 mm	64.9 kg/m	N-80 5-45	2471.6 m KB	900 sacks + 2% gel + 1.2% HR12
Production 177.8 mm	34.5 kg/m	50095	3422.9 m KB	900 sacks + 2% gel + 1.2% HR12
		50095		
		N-80		

PLUGGING PROGRAM

Approval of the following program was obtained by (person) LARRY STONE from
(person) T.M. Baker by means of
letter on June 3 1994

Type of Plug:	Interval:	Felt:	Cement and Additives:
① BP u/l 10 vertical m cement		2316 m (cement top 0.2306 m)	thermal cement
② cement retainer u/l 10 linear m cement	944.0 m KB		Class G u/l 0.5% T-10, 0.3 D-24 & 0.2% R-6
③ cement retainer u/l 100 m cement		cement top 0.994 m	Class G u/l 0.5% T-10, 0.3 D-24 & 0.2% R-6
④ Balanced plug	991-861 m		Class G u/l 0.5% T-10, 0.3 D-24 & 0.2% R-6
⑤ BP at 685 meters			3% D-24 & 1% R-6
⑥ cement retainer at 445 m KB u/l cement			22% Class G D-33, 1 R-6 & 0.5% SF-1

Lost Circulation/Overpressure Zones:

Equipment left on Seafloor (Describe):

Provision for Re-entry (Describe and attach sketch): wellhead left in place to check for gas migration next year

Cores: Type: Intervals:

Other Downhole Completion/Suspension Equipment:

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed: LARRY STONEName: LARRY STONETitle: Abandon CoordinatorDate: Dec 7, 1999Acknowledged by: T.M. Baker

Engineering Branch

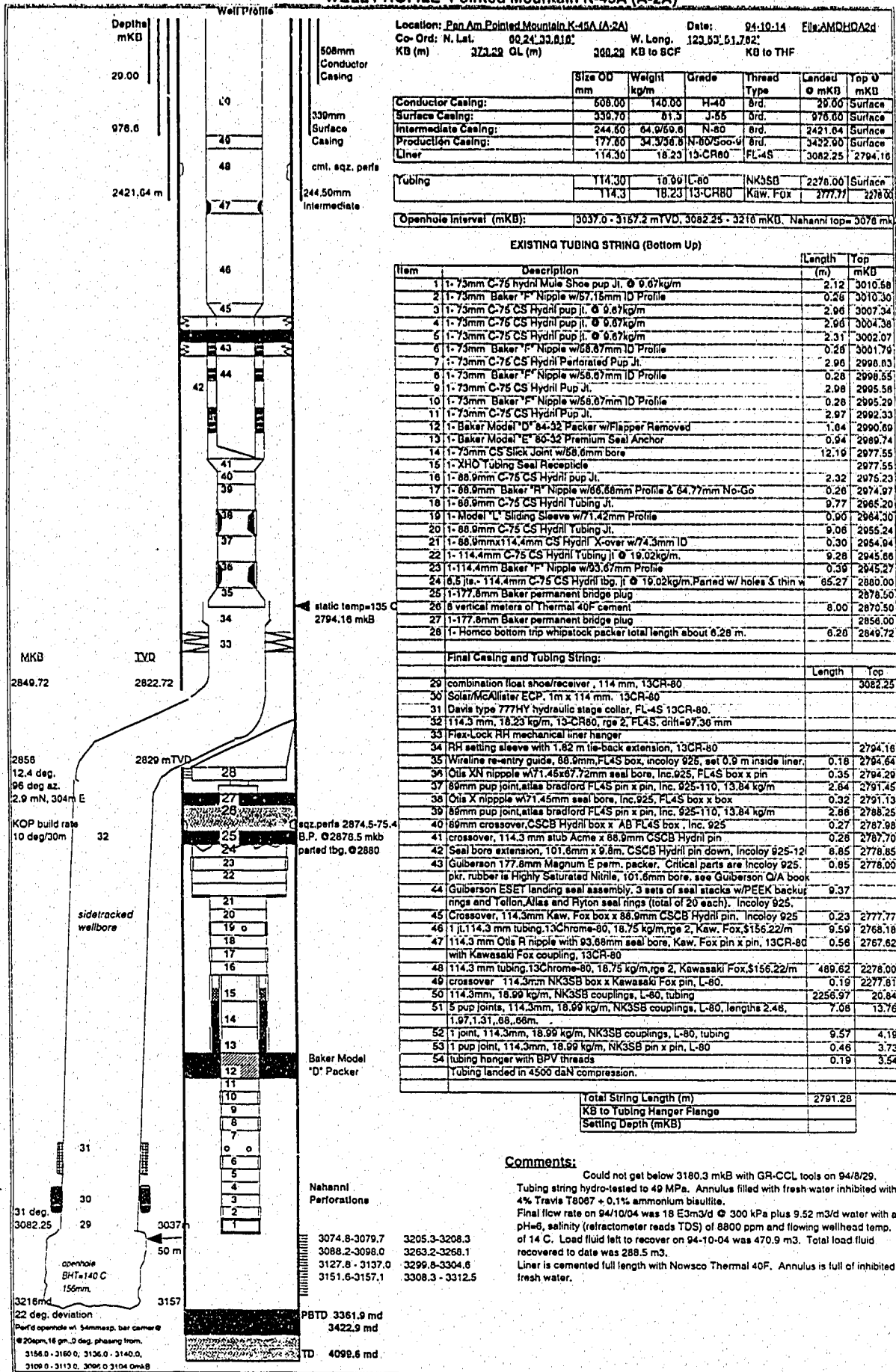
Date: Feb 15, 99

File:

Well Status
Suspended ☐
Completed ☐
Abandoned ☐

Canada

WELL PROFILE Pointed Mountain K-45A (A-2A)



Comments:

Could not get below 3180.3 mKB with GR-CCL tools on 94/8/29.
Tubing string hydro-tested to 49 MPa. Annulus filled with fresh water inhibited with 4% Travle T8067 + 0.1% ammonium bisulfite.
Final flow rate on 94/10/04 was 18 E3m3/d @ 300 kPa plus 9.52 m3/d water with a pH=6, salinity (refractometer reads TDS) of 8800 ppm and flowing wellhead temp. of 14 C. Load fluid left to recover on 94-10-04 was 470.9 m3. Total load fluid recovered to date was 288.5 m3.
Liner is cemented full length with Nowasco Thermal 40F. Annulus is full of inhibited fresh water.

BOETTCHER SUPERVISION LTD.
ABANDONMENT PLUGS & CEMENT

Well: Pan Am Pointed Mln. A-2A (K-45A)

Date: 9/07/98

ITEM	DESCRIPTION	LENGTH	DEPTH	MILL TO
NO		(ft)	(ft)	(ft)
H	CEMENT RETAINER @ 175 M K.B 22 T 'G' 4% D-33, 1% R-6 & 5% CF-1 TAIL-IN WITH 11.6 T 5% T-10, 4% D-24 & 5% CF-1	98-07-08	175.00	
P9	PERFORATE 200 TO 201 WITH 39 gr @ 17 SPM	98-07-07		
G	CEMENT RETAINER @ 445 M K.B 22 TONNES CLASS 'G' 4% B-33, 1% R-6	98-07-07	445.00	
F	BRIDGE PLUG @ 685 M	98-07-07	685.00	
P 9	PERFORATED 475 TO 476 M WITH 39 gr @ 17 SPM			
P7	PERFORATE 690 TO 691 M 32 gr 17 SPM	98-07-06		
	BALANCED PLUG 991 TO 861 M 3.5 T CLASS 'G' WITH 5% T-10, 3% D-24 & 1% R-6	98-07-06		
P6	PERFORATE 991 TO 992 M WITH 39 gr 17 SPM	98-07-06		
P5	PERF 977 TO 978 M WITH 39 gr 17 SPM	98-07-06		
	SECTION MILL @ 970 M TO 977 M K.B.			
C-1		CEMENT TOP	994.80	
E	CEMENT RETAINER @ 1031 M K.B		1031.00	
P 8	CEMENTED WITH 6 M3 'G' 5% T-10, 4% D-24 & 2% R-6 1150 TO 1151 M WITH 32 gr 17 SPM	98-07-03		
P3	1026 TO 1027 M WITH 32gr 17SPM	98-07-03	1031.00	
F				
D	CEMENT RETAINER @ 344 M K.B	98-06-30	344.00	
P 7	CEMENTED WITH 10 M3 CLASS 'G' WITH 5% T-10, 3% D-24 & 2% R6			
P 6	DRILLED OUT 98-07-02			
P2	965 to 966 m K.B. 32 gram @ 17 SPM	98-06-30		
P 5				
C	Bridge plug @ 2316 M with 10 vertical m. cement	cement top	2306.00	
E	F1 SQUEEZED PERFS 2325.5 TO 2326.5	98-06-29	2316.00	
	6.6 TONNE THERMAL (5 M3) IN 6 STAGES MAX SQUEEZE 21 Mpa	94-07-12		
P 2				
B	Bridge plug @ 2770 with 10 vertical m. cement	cement top	2760.00	
D			2770.00	
P 3	A Cement Basket @ 3051.2 m K.B. Top with 10 Vertical M. cement	cement top	3040.00	
			3051.20	
P 4	PERFORATION INTERVALS	GUN	CHARGES	
	FORMATION	INTERVAL (M/KB)	SIZE	TYPE
	NAHANNI	3082.25 to 3216 M KB. OPEN HOLE SECTION		
P 1				
	REMARKS	DRAWN FROM WELL FILE AND NOT TO SCALE		
B	PREVIOUS PERFS SQUEEZED ON 94-07-12 AT 2325.5 - 2326.5 mKB Cemented with 6.6 Thermal 40F			
	Squeeze perforation: at 947-948 mKB with 8.3 m3 Thermal 40F cement			
A	NOT TO SCALE	WELLSITE SUPERVISOR	PHIL BOETTCHER & DUSTY FRY	
	TRAINING # 3 MIKE SCHRIEBER	DATE INSTALLED	98-07-04	
		CHECKED		
		REVISED		
OTHER	LINER TOP @ 2794.16 M KB			

APPROVAL TO
ALTER
CONDITION OF
WELL



APPROVAL TO ALTER CONDITION OF A WELL

This application is to be submitted to the Chief Conservation Officer at least 45 days before commencement of operations

Well Name: Pan Am Pointed Mountain K45A (A-2A) Area: Pointed Mountain
Operator: BP Canada Energy Company Contractor: Bonus Well Services
Drilling Rig or Unit: Rig #6 Depth: 3216 mKB
Coordinates: Lat: 60° 24' 33.816" North Long: 123° 53' 51.782" West
Date ADW Issued: June 20, 1994 Date of last Operation: July 22, 1998
Elevation-KB/RT: 373.29m (ASL) GL / Seafloor: 368.29m

TYPE OF OPERATION:

Wellbore Re-entry and Re-Abandonment

SUMMARY OF PROPOSED OPERATIONS:

Recent inspections of the wellhead vents have evidenced leakage of gas to surface through
Surface casing vent on the above captioned wellbore. It is proposed to move on with a service rig
and re-enter the well. Operations would initially require that existing BP's and cement be drilled
out and the casing strings pressure tested sequentially as required to determine sources of any
leaks. Based on the field observations and pressure tests, operations would be designed to
address the individual requirements of the successive casing strings. Refer to the draft program
outline which is attached

Signed: J. L. Brown Title: COMPLETION CONSULTANT
Responsible Officer

Name: J. L. BROWN Company: BP Canada Energy
Date: Dec. 14, 2000 Phone: 403-233-1573

APPROVAL

An approved copy of this notice is to be posted at each wellsite.

Current Well Status

Suspended ☐
Completed ☐
Abandoned ☒

Signed: Richard Shaw
Chief Conservation Officer

Date: Jan 19/01

File: 9211-A4-2-1

UWI: 300K456030123455 WID: 1798

WELL HISTORY REPORT

K-45A

Well History - Pointed Mountain A-2A

- 94/06/01 Moved in rig and associated equipment over seven days at cost of \$305,000.
- 94/06/08 Unable to set 93.67 mm FSG plug in F ripple at 152 m because 98 mm gauge ring fell through nipple. Set 114.3 m retrievable bridge plug at 143 mKB. Speared into tubing and pulled dognut free with 3000 daN over string weight. Pulled 289.5 joints, 114.3 mm, L-80, CS Hydril. Tubing was parted at 2880 mKB.
Severe scale build up and holes in bottom joints of tubing. The tubing condition was progressively worse as depth increased from 2632 to 2880 mKB. *The tubing string was junked.*
- 94/06/14 Ran Vertilog from 2880 mKB to surface. Few spots with wall loss of 25%. Generally very good casing. Set bridge plug at 2878.2 mKB. Ran Segmented Bond Tool with 7 MPa on casing. Cement top at 2732 mKB, but bond O.K. over proposed whipstock depth. Perforated 2874.5-2875.4 mKB, hoping to achieve injection through questionable cement bond. Pressured to 11 MPa with no bleed off. Dump bailed 8 m of Thermal 40F cement on top of bridge plug. Set another bridge plug at 2856 mKB. Set Homco bottom-trip whipstock tool on top of B.P. Mill S-95 casing with starting mill at .8 m in 80 minutes. Ran Window mill and 2 watermelon mills. Milled 1.3 m. Mill cored out in centre. Replaced Window mill and ran same watermelon mills. Milled 2.4 m. Pressure tested open hole to 11 MPa.
- 94/06/22 Run bit #1, 156 mm (ATJ-M33D) with medium speed high performance motor with 1.75° adjustable bent housing, Monel Drill collars and sperry sun MWD. Drill with HEC polymer for 60 m in 16.25 hours. Bit condition 7-8-1 RIH with bit #2 but MWD tools failed. POOH and replaced MWD. Ran bit #2 (ATJ-M33D) with 1.5° bent housing and MWD. Slide and rotate from 2914 to 2978. Pulled bit. Condition was 5-8-2. Ran bit #3 (155.6 mm TD 268 PDC) with 1.5° bent housing motor and MWD. Tight hole @ 2926. Reamed and washed to 2978 m. Motor would stall out while sliding with 4500 to 5000 daN on bit. Drilled 35 m in 15.5 hours. PDC bit condition 7-I. Ran bit #4 (F57D) with 1.5° adjustable bent housing and MWD. Drilled to 3057 mKB (44 m in 18.5 hrs). Bit condition 7-4-2. Stop every 15 stands to circulate and cool MWD temperature. Circulating BHT=105°C. Surface mud temp. = 35°C. Ran Bit #5 (F57D) without motor and MWD. Drilled into Nahanni top at 3082 m and drilled total of 104 m in 35 hrs. Bit condition was 8-2-0.
- 94/07/02 Wait on rotary table repairs. Ran in with bit #6 (F57D) and drilled from 3161 to 3216 m in 13.5 hours. No restrictions or fill on trip in. Drilled with 6-8000 daN and 60-65 rpm. No mud losses to formation throughout drilling operation. Ran Scientific Drilling gyroscope directional survey to TD @ 3216 mKB. Final bottom hole co-ordinates are 106.25 m North and 389.77 m East from surface co-ordinates.
- 94/07/05 Ran Atlas Compensated Densilog - CNL-GR-Caliper. Ran 24 joints of 114.3 mm 18.75 kg/m, 13CR-80, FL4S, Range 3 liner with Davis float shoe, stage collar, McAllister ECP, Brown Oil Tools hanger and 127 mm tie back extension. ECP set at 3080 mKB, casing shoe set at 3082.25 mKB. Liner hanger set. Cemented with 6.6 tonnes Thermal 40F.

- 94/07/08 Drilled cement out from 2693 to liner top at 2794 with 156 mm bit. Drilled out liner top with 97 mm mill and then drilled out stage tool and float shoe. Ran in hole to 3216 m and circulated to fresh water. No mud or water loss to formation.
- 94/07/09 Set retrievable bridge plug at 2400 mKB and dump bailed sand and cement on top.
- 94/07/10 Perforated 2325.5 to 2326.5 mKB @ 4 spm with 101.6 mm HSC and 32 gm charges with hole full of water. Pressure to surface at 11,400 kPa. Set cement retainer, ran drill pipe and flowed sweet gas. Flowed $155 \times 10^3 \text{ m}^3/\text{d}$ at 17,500 kPa 12.7 mm choke. Flow decreased in 4 hours to $80 \times 10^3 \text{ m}^3/\text{d}$ at 12,025 kPa on a 12.7 mm choke. Shut well in and built up to 17,000 kPa in 2 hours.
- 24 hour build up pressures on surface casing = 6200 kPa; intermediate casing = 4900 kPa
- 94/07/12 Cement squeezed perfs with 6.6 t Thermal 40F cement. Pumped 5 m^3 in 6 stages in 2 hours. Maximum squeeze pressure of 21 MPa. Stung out and backwashed 0.3 m^3 slurry. Perforated 947-948 mKB with 101.6 mm EHSC, 32 gram charges, 4 shots. Circulated water down 178 mm casing and up intermediate casing at $0.5 \text{ m}^3/\text{minute}$ at 3 MPa. Opened surface casing and closed intermediate but unable to circulate up surface casing at 6 MPa. Cement squeezed through retainer at 934 mKB with 8.3 m^3 slurry with full returns. Total of 7.8 m^3 cement behind casing. Final pump pressure of 5 MPa. WOC. 24 hours. Drilled out hard cement on top of retainer. Drilled out retainer and pressure tested to 10,200 kPa for 10 minutes. Intermediate casing pressure - 0 - no blow. Surface casing built to 9,000 kPa after 44 hour shut-in. Surface vent opened and bled to zero in 1 minute. Left open to pit with lazy 1 m. flame.
- 94/07/15 Drilled out cement retainer and hard cement to 2343 mKB. Gas in returns. Well started to flow. Set cement retainer at 2315 mKB. Established feed rate w/ water @ 30 l/m @ 26 MPa. Batch mixed 4 m^3 of Newsco Thermal 40 to $1876 \text{ kg}/\text{m}^3$ and squeeze in 6 stages at up to $0.11 \text{ m}^3/\text{min}$ @ 22 MPa. Max. squeeze pressure of 25 MPa. 1.41 m^3 slurry in formation.
- 94/07/20 Drilled out hard cement and retainer. Pressure tested to 10 MPa for 10 minutes. Ran 30 minute flow check. No sign of gas. Retrieved bridge plug from 2400 mKB.
- 94/07/21 Ran 131.1 mm polish mill and casing scraper. Reciprocate scraper over intervals 935-955 and 2310-2350 mKB. Ran to top of setting collar. Rotate @ 50-60 rpm with 1-2 daN weight. Reciprocate 1.5 m up and down 10 times at 70-80 rpm. Circulate bottom up and POH.
- 94/07/22 Ran 114.3 mm, L-80, 18.99 kg/m, NK3SB tubing to top of liner. Tally, drift, redope, use wrap-around tongs, computer torque. Pickled casing and tubing with 7 m^3 15% HCl and flush with water plus O_2 scavenger at $0.5 \text{ m}^3/\text{minute}$. Acid caused some peeling off of 'varnish' from new tubing.

- 94/07/24 Ran 1.82 m tie back extension, 13CR-80, with 3 sets of molyglass seals, plus Baker 13CR 'R' nipple, 1 joint 13CR-85 tubing, McMurry (Copeco) type FO side pocket mandrel with 25.4 mm Monel chemical injection valve and BK-2 latch, 1 joint 13CR-85 tubing, Baker Hydra-Pak retrievable packer without rubber seal, Baker HEL on-off connector with 69.85 mm 'F' profile, 1 joint 13CR-85 tubing, Daniels (Import too) side pocket injection mandrel with McMurry 25.4 mm Monel chemical injection valve and BK-2 latch, crossover, 114.3 mm, L-80, NK3SB, 18.99 kg/m tubing to surface. Dropped on L-shaped elevator pin 3/8" diameter x 8: long into hole with 80 joints in the hole. Pin will not go below the upper gauge ring on the packer. Driller forgot to install a running stripper rubber. All tubing inspected, computer torqued and hydrotested to 21 MPa. Circulated to T8067 corrosion inhibitor filtered to 3 microns. Set RZG plug in R nipple and set packer at 2769.98 mKB with tubing in 18,000 daN compression. Installed wellhead.
- 94/07/26 Pull RZG plug. No sign of any flow. Move out service rig to A-1. RIH with coiled tubing and jetting tool. Jet wash open hole with 15 m³ 15% HCl plus N₂ at .05 to .1 m³/min and holding 10 MPa back pressure on the C.T. annulus. Washed from the top down because C.T. was unable to pull slow enough while pulling from the bottom up. Blow dry with N₂. No burnable gas recovered. Recovered 36.1 m³ liquid. Shut well in for 45 minutes to rig off C.T. Open well - dead in 4 minutes.
- 94/07/30 Tagged fluid level at 1160 mKB. Recovered a fluid sample. Inhibitor and acid in water. pH=6, TDS=16% (129,000 ppm).
- 94/08/04 Shut in surface casing pressure 10,950 kPa. Shut-in intermediate casing pressure was zero. Repaired hydraulics on C.T. injector. Blew well dry to 3200 mKB. Recovered 23.2 m³, mostly inhibitor. Formation gas flowed @ 14 x 10³ m³/d decreasing to 2.3 x 10³ m³/d @ 300 kPa in 3 hours. Next day blew well dry with N₂ and recovered 8 m³ mostly inhibitor. Leave well open for 7.5 hours, then performed N₂ squeeze with C.T. @ 2850 m. Pressured up to 25 MPa with total of 8800 scm N₂. Feeds @ ~ 50 scm/min N₂. Well bleeds to 21 MPa in 30 minutes. Casing pressure built to 8900 kPa due to leaking tie-back stem seals. Bled off with very little formation gas to surface. Ran in hole with C.T. for third blowdown. Recovered 1.6 m³ fluid then straight N₂. Pulled 2000 daN over string weight 3 times between 3050-3000 mKB. Gas production @ 4.6 x 10³ m³/d @ 25 kPa. Bled casing pressure off from 8400 kPa to 100 kPa in 1 hour -- 90 % N₂, 10% formation gas. Final flow rate from tubing was 4.7 x 10³ m³/d @ 25 kPa. SI well. Built up to 3750 kPa in 5 hours.
- 94/08/08 RIH with gauge ring could not 'feel' a fluid level to 2785 mKB. Set ball check tubing plug in Baker 69.85 x 68.5 mm 'R' nipple and pressure test tubing to 21 MPa. Attempt to P-test casing -- unsuccessful. Bled to tbg side. Pulled chemical injection valves. Valves were tight in mandrel with some black grit and scale on them. Set inconel dummy valves. Pressure test casing -- leaking. Pressure tested tubing - indicated small leak. Pulled plug from R nipple and recovered some Molyglass packing from the top of the plug (from tie-back stem). Pressured up down tubing and fed into Nahanni at 0.4 m³/min at 33 MPa. Decided to pull tubing and switch to a more conventional permanent packer with tailpipe and locator seal assembly type of

completion. Surface casing was open to flare throughout operations. The intermediate casing was TSTM (shut-in).

- 94/09/05 Moved Drive #41 back to location from A-1A. Pulled 53,000 daN (17,000 daN over string weight - shear set @ 17,800 daN) to shear Baker Hydra-Pak packer (without seal rubber) and pulled tubing. Molyglass seals and AFLAZ 'O' rings 90% gone with deep scratches in near-gauge portion of mandrel between seal ring areas. Also gouges just below no go at top of stem. No go area that sits on bevel top of seal box extensions had marks every centimetre around ring as it made by a bit. Concluded that when cleaning out cmt. to top of liner (after cant. liner). Must have been too aggressive w/ bit and chewed up liner top and perhaps turned a lip inside. NOTE: The McMurry 25.4 mm Monel chemical injection valves retrieved from the well were shop tested at Copeco and found to have failed (75 % were missing from around reverse ball seat.). ~~O-rings~~ making the spring loaded valves ineffective --> allowing pressure on both annulus and tubing to equalise. 'O' rings were not made of kalrez as ordered and specified by Copeco.
- Set Guiberson Magnum permanent packer at 2778.61 mKB (COR) with seal bore extension, tailpipe (Incolloy 825 & 925) with Otis PXN plug in place with re-entry guide landed 0.9 m inside the tie-back extension. Hydro-tested to 49 MPa, thread wash and computer torqued 114.3 mm tubing into the hole. Pressure tested annulus to 10 MPa and the tubing to 35 MPa. 9.8 m locator seal assembly landed in 4500 daN compression.
- 94/09/11 Blow tubing dry with N2. Leave 9 MPa on wellhead and pulled Otis PXN plug with 7/32" braided wireline. Bled well to zero in one hour. No sign of formation gas. Filtered 86 m3 water for acid frac to 1 micron.
- 94/09/13 Acid frac Nahanni. Filled hole with 10m3 gelled water plus 4 m3 28 % HCl acid. Pumped additional 16 m3 acid + 15 m3 gelled water + 20 m3 acid + 20 m3 gelled water + 20 m3 acid + 25 m3 gelled water + 24 m3 acid and flushed with 13 m3 water plus 1710 scm N2. Pumped at 47.5 to 51.6 MPa with rate increase from 1.5 to 2.5 m3/min. ISIP 47 MPa. 15 min SIP=34 MPa. Pressure at 22 MPa in 85 minutes. Opened well and flowed back 38 m3 in 6 hours with a final pressure of 30 kPa. Shut in and built up to 2600 kPa in 2-5 hrs. Bled to zero in 10 minutes and recovered 1.17 m3. Shut-in waiting on coiled tubing to blow well dry with N2.
- 94/09/17 RIH with C.T. Found fluid at 2000 m. Could not get past 3122 mKB with C.T. Blow well dry and recover 57 m3 water.
- 94/09/19 Unload well with C.T. and N2. Recovered 4 m3 water. Gas rate at $3.5 \times 10^3 \text{ m}^3/\text{d}$. Shut well in.
- 94/09/20 Shut-in tubing pressure of 11,420 kPa. Opened well and flowed $5.3 \times 10^3 \text{ m}^3/\text{d}$ at 25 kPa. Recovered 9.5 m3 water. Continue to stop cock well as follows:
- | Date | Final rate | fluid recovery | comments |
|----------|---|----------------|------------------------|
| 94/09/21 | $14.3 \times 10^3 \text{ m}^3/\text{d}$ | 29.2 m3 | 140,000 ppm salt, pH=7 |
| 94/09/22 | | 0 7.9 m3 | Blow dry w/ C.T. & N2 |

- 94/09/23 Pumped 2 m3 FO200/xylene mix. Flowed back and recovered same clean fluid. Ran 44.5 mm Black Max mud motor on C.T. First motor would not run. Ran second motor and drilled from 3116 to 3119. Could not make any more hole. POH.
- 94/09/24 Work coiled tubing with straight joint on bottom to 3206 mKB and wash total of 6 m3 of Xylene/FO200 mix across open hole interval. Blow out with N2. Recovered the Xylene/FO200 at surface. Mixture appeared clean. No indication of asphaltene or tar.
- 94/09/25 Flow well for 3 days. Gas rates declined slightly from $19.3 \times 10^3 \text{ m}^3/\text{d}$ to $18.3 \times 10^3 \text{ m}^3/\text{d}$. Water rates dropped from 9.9 m3/d to 8.7 m3/day at flowing tubing pressure of 140 kPa. Water salinity 110,000 ppm, pH=7.
- 94/09/29 Unable to get below 3180.3 m. with GR-CCL. Perforated open hole with 54 mm, through tubing mechanically decentralised, expendable bar carrier at 20 spm, 0 deg. phasing, 16 gram Silver Jet charges from 3156.0 - 3160.0, 3136.0 - 3140.0, 3109.0 - 3113.0, 3096.0 - 3104.0 mKB. Had to flow well to dislodge guns stuck in liner.
- 94/09/30 Shut in pressure 11,660 kPa. Opened well to flow. Pressure dropped to 1070 kPa in 3 hours. Well slugging. Stop - cocked well.
- 94/10/02 Flowing $18.2 \times 10^3 \text{ m}^3/\text{d}$ at 95 kPa plus 9.9 m3/d water with pH=7, salinity= 86,000 ppm. Rates decreased in 61 hours to $17.9 \times 10^3 \text{ m}^3/\text{d}$ @ 300 kPa plus 9.5 m3/d water (pH = 6, salinity = 8800 ppm). Shut well in and rigged out testers. Production operations will tie in well to separator and flare to clean up well.
Total load fluid recovered to date = 288.5 m3.
Load fluid left to recover = 470.9 m3. (includes 28.5 m3 annular fluid, kill fluid, drilling mud and acid)
salinity indicates virtually all acid is recovered.

Total Field costs: \$3,634,152.

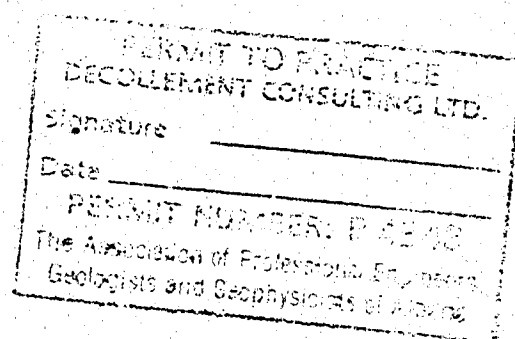
GEOLOGICAL REPORT

AMOCO CANADA PETROLEUM CO. LTD.

AMOCO A-2 POINTED MOUNTAIN K-45A
60'24"N-123'54"W

POINTED MOUNTAIN
NWT

N.E.B. COPY



GEOLOGICAL REPORT

ON

AMOCO A-2 POINTED MOUNTAIN K-45 A
60'24"N-123'54"W

FOR

AMOCO CANADA PETROLEUM CO. LTD.

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June, 1994

Keith W. Robertson, B.Sc.
Wellsite Geologist

DECOLLEMENT CONSULTING LTD.

WELL DATA SUMMARY

WELL NAME: AMOCO A-2 POINTED MOUNTAIN K-45

OPERATOR: AMOCO CANADA PETROLEUM

LOCATION: 60°24'N-123°54'W

NS CO-ORDINATES: 60°24' NORTH LATITUDE

EW CO-ORDINATES: 123°54' WEST LONGITUDE

PROVINCE: NWT

AREA: POINTED MOUNTAIN

DRILLING CONTRACTOR: DRIVE Rig #: 41

WELL LICENCE NUMBER:

ELEVATIONS - GROUND LEVEL: 368.29m

- KELLY BUSHING: 374.64m

SPUD DATE: JUN 22, 1994 at 0900 hours

T.D. DATE: JUL 04, 1994 at 1345 hours

SAMPLE INTERVAL: 2850.00m - 3225.00m

ELECTRICAL LOGS RUN:

Rep#	Log#	Description	From(m)	To(m)
1	1	CNL-LDT-PE-GR-CAL	2854.00	3216.20

DRILL STEM TESTS:

DST#	From(m)	To(m)
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CORES CUT:

Cores#	From(m)	To(m)	Formation
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WELL STATUS: NAHANNI GAS WELL

AMOCO CANADA PETROLEUM

CASING SUMMARY

String#	Name	Casing Size (mm)	Hole Size (mm)	Joints (#)	Weight (kg/m)	Landed At (m)	Cement (tonnes)	Cement Type
1	SURFACE CASING	339.00	444.50	N/A	81.30	976.60	500.00 SKS	LaFARGE "B" +3%CaCl2
2	INTERMEDIAT E CASING	244.50	311.10	N/A	64.90	2124.60	700.00 SKS	"G" +2% GEL 1.2% HR12 & "G" + 20% SILICA FLOUR + 1.2% HR12
3	PRODUCTION CASING	177.80	222.20	N/A	34.30	2788.00	400.00 SKS	OWG +4% GEL +2% HR12 & OWG + 20% SILICA FLOUR + 1.2% HR12
4	LINER	114.30	N/A	N/A	18.23	2830.00	5.00	THERMAL 40F CMT +0.5% D24 + 0.5% T-10 + 0.2% R-55

AMOCO CANADA PETROLEUM

DAILY DRILLING SUMMARY

Date	0800 Depth (m)	Progress (m)	Hours Drig.	Mud Weight (kg/m**3)	Vis (s/L)	Fluid Loss (cc/30min)	PH	Activity
JUN 22, 1994	2856.00	0.00	0.00	N/A	N/A	N/A	N/A	DRILL OUT MOUSE HOLE
JUN 23, 1994	2860.00	4.00	1.50	N/A	N/A	N/A	N/A	DIRECTION DRILL
JUN 24, 1994	2914.00	54.00	14.75	N/A	N/A	N/A	N/A	RIH WITH BIT #2
JUN 25, 1994	2920.00	6.00	2.00	N/A	N/A	N/A	N/A	DRILLING WITH MWD
JUN 26, 1994	2978.00	58.00	19.75	1010.00	33.00	N/A	10.50	TRIP FOR BIT #2
JUN 27, 1994	2992.00	14.00	4.25	1000.00	35.00	N/A	10.50	DIRECTIONAL DRILL WITH MUD MOTOR
JUN 28, 1994	3013.00	21.00	11.75	1000.00	35.00	N/A	10.50	TRIP FOR BIT #3
JUN 29, 1994	3044.00	31.00	10.75	1010.00	37.00	10.00	10.00	DRILL AHEAD WITH MUD MOTOR
JUN 30, 1994	3057.00	13.00	7.75	1010.00	37.00	10.00	10.00	RIH AFTER BIT TRIP
JUL 01, 1994	3093.00	36.00	16.00	1015.00	43.00	8.00	10.00	DRILL AHEAD
JUL 02, 1994	3161.00	68.00	18.75	1015.00	43.00	8.00	10.00	TRIP FOR BIT; RIG REPAIR
JUL 03, 1994	3161.00	0.00	0.00	1015.00	43.00	8.00	10.00	REPAIR ROTARY TABLE
JUL 04, 1994	3182.00	21.00	6.00	1030.00	47.00	7.00	10.00	DRILLING AHEAD
JUL 05, 1994	3216.00	34.00	7.50	1040.00	48.00	6.50	9.50	POOH TO LOG

DEVIATION SURVEYS

Measured Depth (m)	Angle of Inclination (Degree)	Azimuth (Degree)	T.V.D. (m)	Latitude (m)	Departure (m)	Vert. Section (m)	Dog Leg Severity (Deg/30m)
2854.00	14.00	96.020	2829.28	2.87	303.98	287.59	0.00
2862.57	17.80	89.200	2837.52	2.78	306.32	289.77	14.80
2871.97	20.80	82.900	2846.39	3.01	309.42	292.76	11.64
2881.58	21.20	77.560	2855.37	3.59	312.81	296.15	6.10
2891.11	21.00	73.150	2864.46	4.46	315.59	299.02	6.51
2900.77	22.30	70.500	2873.43	5.44	318.97	302.58	5.06
2910.00	24.00	70.300	2882.41	6.73	322.59	306.42	5.23
2920.18	24.30	66.600	2891.05	8.15	326.19	310.29	4.89
2929.85	24.00	61.500	2900.04	9.91	329.81	314.29	6.42
2939.41	23.30	56.400	2908.80	11.89	333.10	318.04	6.78
2949.13	23.20	50.300	2917.73	14.17	336.17	321.71	7.43
2958.77	22.70	46.000	2926.61	16.68	338.97	325.18	5.44
2972.00	21.90	41.500	2939.57	20.51	342.65	329.92	4.04
2982.45	21.50	41.100	2948.56	23.20	345.00	333.04	1.32
2992.13	20.80	41.800	2957.58	25.82	347.31	336.09	2.30
3001.07	21.20	38.500	2965.93	28.26	349.38	338.85	4.19
3010.58	21.80	36.600	2974.78	31.03	351.50	341.77	2.90
3020.27	23.70	36.500	2983.71	34.04	353.73	344.88	5.89
3029.85	26.00	33.000	2992.41	37.35	356.02	348.14	8.54
3039.53	29.70	30.700	3000.97	41.19	358.40	351.67	11.94
3200.00	22.26	23.650	3142.39	106.25	389.77	402.91	2.09

BIT RECORD

Bit #:	1	Size: 155.60mm	Make: HW	Type: ATJ-M33D
Serial #:	L12WG	Jets: 7.10, 12.70, 12.70, N/A		
Depth:	In: 2856.00m	Out: 2916.00m	Made: 60.00m	
Hours:	16.25hrs	Accumulated Hours: 16.25hrs		
FOB:	5000.00/N/AdaN	RPM: 30.00/N/A	PP: 6500.00kpa	
Mud Density:	1010.00kg/m**3	Viscosity: 33.00sec/l	Vertical Deviation: 22.10Deg	
Condition:	7-8-1.00			
Remark:	DRILL WITH MUD MOTOR			
Bit #:	2	Size: 155.60mm	Make: HW	Type: ATJ-M33D
Serial #:	L13W5	Jets: 7.90, 7.90, 12.90, N/A		
Depth:	In: 2916.00m	Out: 2978.00m	Made: 62.00m	
Hours:	17.75hrs	Accumulated Hours: 34.00hrs		
FOB:	9000.00/10000.00daN	RPM: N/A/N/A	PP: 9000.00kpa	
Mud Density:	1000.00kg/m**3	Viscosity: 35.00sec/l	Vertical Deviation: 22.70Deg	
Condition:	5-8-2.00			
Remark:	DRILL WITH MUD MOTOR			
Bit #:	3	Size: 155.60mm	Make: DIABT	Type: TD268PDC
Serial #:	4930324	Jets: 20.60, 20.60, 20.60, N/A		
Depth:	In: 2978.00m	Out: 3013.00m	Made: 35.00m	
Hours:	15.75hrs	Accumulated Hours: 49.75hrs		
FOB:	3000.00/7000.00daN	RPM: 40.00/N/A	PP: 9500.00kpa	
Mud Density:	1010.00kg/m**3	Viscosity: 37.00sec/l	Vertical Deviation: 20.80Deg	
Condition:	5-I			
Remark:	DRILL WITH MUD MOTOR			
Bit #:	4	Size: 155.60mm	Make: SMITH	Type: F57D
Serial #:	LA2293	Jets: 8.70, 8.70, 11.10, N/A		
Depth:	In: 3013.00m	Out: 3057.00m	Made: 44.00m	
Hours:	18.50hrs	Accumulated Hours: 68.25hrs		
FOB:	6000.00/8000.00daN	RPM: N/A/N/A	PP: 3000.00kpa	
Mud Density:	1015.00kg/m**3	Viscosity: 31.00sec/l	Vertical Deviation: 21.00Deg	
Condition:	3/8/SD/A/E/3.00/WT/PR/N/A			
Remark:	DRILL WITH MUD MOTOR			
Bit #:	5	Size: 155.60mm	Make: SMITH	Type: F57D
Serial #:	LA2290	Jets: 11.00, 11.00, 14.00, N/A		
Depth:	In: 3057.00m	Out: 3161.00m	Made: 104.00m	
Hours:	35.75hrs	Accumulated Hours: 104.00hrs		
FOB:	7500.00/9000.00daN	RPM: 60.00/65.00	PP: 9000.00kpa	
Mud Density:	1025.00kg/m**3	Viscosity: 45.00sec/l	Vertical Deviation: 23.00Deg	
Condition:	6-3-1.00			
Bit #:	6	Size: 155.60mm	Make: SMITH	Type: F57D
Serial #:	LA2292	Jets: 11.00, 11.00, 14.00, N/A		
Depth:	In: 3161.00m	Out: 3216.00m	Made: 55.00m	
Hours:	13.50hrs	Accumulated Hours: 117.50hrs		
FOB:	9000.00/N/AdaN	RPM: 60.00/N/A	PP: 9500.00kpa	
Mud Density:	1040.00kg/m**3	Viscosity: 48.00sec/l	Vertical Deviation: 26.00Deg	
Condition:	1-1-I			
Remark:	NO MUD MOTOR			

LOGGING REPORT

Date: JUL 06, 1994
Logging Company: ATLAS
Logging Engineer: EMERY MAH
Truck Number: 6334
Hole Size: 155.60mm
Depth (Driller's): 3216.00m
Depth (Strap):
Depth (Logger's): 3216.20m
Last Casing: Depth : 2854.00m Size: 114.30mm Weight: 18.23kg/m

MUD DETAILS

Mud Type: HEC POLY
Mud Type: 1040.00kg/m**3
Viscosity: 48.00sec/l
pH: 9.50
Fluid Loss: 6.50cc/30min
Salinity: 1300.00ppm

OPERATIONS SUMMARY

Hole conditions prior to logging: GOOD
Circulation time after T.D.: 5 HRS
Number of Dummy Trips: 1
Description of Dummy Trips: 20 STANDS
Number of Runs in Hole: Total: 1 Succeeded: 1 Failed : 0

LOGGING SEQUENCE

Logs	Time (Hrs)	Interval From (m)	Interval To (m)	Remarks
CNL-LDT-PE-GR-CAL	3.00	2854.00	3216.20	REPEATIBILITY POOR, BEST LOG UNDER BOREHOLE CONDITIONS.

Total Hours Logging: 3.00

FURTHER REMARKS

REPEATIBILITY IS POOR DUE TO GAS IN BOREHOLE. NAHANNI WASHED OUT, PAD NOT TOUCHING BOREHOLE SO DENSITY LOG READING HIGH WHILE NEUTRON IS DEPRESSED. HIGH TEMPS IN BOREHOLE SO TOOL CANNOT LOG FOR ANY LENGTH OF TIME.

FORMATION TOPS

Kelly Bushing : 374.64m

Formation	Prognosis (m)	Sample Top (m)	Sample TVD (m)	Log Top (m)	Log TVD (m)	Subsea (m)
2ND BLACK SHALE	2768.00	2768.00	2768.00	2768.00	2768.00	-2393.36
NAHANNI	3073.00	3083.00	3035.46	3078.00	3033.00	-2658.36

FORMATION SUMMARY

The Amoco A-2 Pointed Mountain K-45 well was serviced over the week preceding the spud date of June 22, 1994. The existing A-2 well was damaged beyond repair and after abandoning the lower section, a window was cut at 2854m. measured depth, heading north of the existing 57.0 degree azimuth. A build, turn and hold wellpath was established to get 50 metres north of the existing wellbore. The top 120 metres of the Nahanni formation was penetrated for production. An HEC polymer mud system was used in the new section. No problems were encountered while drilling; however the well was considered to be hot with temperatures of 80 to 120 degrees C.

The top of the NAHANNI was encountered 5 metres below prognosis at a depth of 3078. Drilling continued as planned approximately 120 metres (vertical) into the formation at which point a gyro survey and one log was run to comply with NEB requests.

Due to the sour nature of the formation Safety Boss supplied the wellsite with H2S detection and safety equipment. Two engineers, a directional driller and two MWD hands were always available for consultation in the event of an emergency.

A high alloy 4.5 inch liner was cemented from thirty metres above the window to the NAHANNI top. Once the liner is set an acid wash is planned and the well should return to production.

FORMATION EVALUATIONS

Formation:	NAHANNI		
Age:	DEVONIAN		
Member:	N/A		
Sample Top:	3083.00m	Sample TVD:	3035.50m
Log Top:	3078.00m	Log TVD:	3033.00m
Thickness:	1.00m	Subsea:	-2658.36m

Evaluation:

The NAHANNI formation comprises a massive, medium to dark gray dolomite that is fractured vertical throughout. Fractures and pore spaces are generally filled with secondary white dolomite although locally the fractures may be open containing clear quartz crystals. The dolomite is predominantly fine to very fine crystalline near the top of the formation but decreases to micro to macro crystalline for the remainder of the section. Pressure deformed dolomite rhombs are often visible throughout. Black bitumen and carbonaceous matrix are common at the top but decrease to "scattered " and "occasional " with increasing depth. No visible fluorescence was noted."

Conclusion:

Although there was no visible fluorescence noted through out porosity was estimated to be good. With acidization this well will be an excellent gas producing zone.

SAMPLE DESCRIPTIONS

Well Name:

AMOCO A-2 POINTED MOUNTAIN K-45

Location:

60°24'N-123°54'W"

2850.00 to 2865.00m
Interval: 15.00m

SHALE: 100%, black to dark gray, blocky to sub platy, silty, slightly micromicaceous and carbonaceous, moderately firm, slightly calcareous throughout, trace of disseminated pyrite and occasional pyrite blebs and minor laminae, minor calcite veins from fractures.

2865.00 to 2880.00m
Interval: 15.00m

SHALE: 100%, as above, black to dark gray, blocky to sub platy, silty in part, slightly micromicaceous and carbonaceous, calcareous in part with occasional calcite veins, trace of pyrite (5%), moderately firm to firm.

2880.00 to 2895.00m
Interval: 15.00m

SHALE: 100%, black to dark gray, blocky to sub platy, silty in part, micromicaceous and slightly carbonaceous in part, calcareous, trace of pyrite decreasing to 1 to 2 %, decrease in calcite veins, (less fractures), moderately firm to firm.

2895.00 to 2900.00m
Interval: 5.00m

SHALE: 100%, dark gray to black, blocky to sub platy, silty in part, micromicaceous, slightly carbonaceous in part, slightly calcareous, trace of pyrite, moderately firm.

2900.00 to 2905.00m
Interval: 5.00m

SHALE: 100%, as above with increase in calcite veins and occasional pyrite stringers indicating increase in fractures.

2905.00 to 2915.00m
Interval: 10.00m

SHALE: 100%, as above, black to dark gray, micromicaceous, carbonaceous becoming more calcareous and limy but with decrease in white calcite from fractures, 2 to 3 % disseminated pyrite and pyrite stringers, moderately firm, blocky to sub platy.

2915.00 to 2925.00m
Interval: 10.00m

SHALE: 100%, black, dark gray, blocky to sub platy, micromicaceous, slightly calcareous, mottled with white calcareous specks, (marly in part), occasional calcite crystals, trace of pyrite.

2925.00 to 2930.00m
Interval: 5.00m

SHALE: 100%, as above, black to dark gray, micromicaceous, carbonaceous, calcareous, moderately firm.

2930.00 to 2940.00m
Interval: 10.00m

SHALE: 100%, as above, black, moderately firm, black to sub platy, calcareous with occasional light gray mottled marlstone stringers, (very dirty), 1 to 2 % white calcite crystals from minor fractures.

2940.00 to 2950.00m
Interval: 10.00m

SHALE: 100%, as above with slight increase in calcite crystals to 7% (increase in fractures), trace of pyrite but less marly than above.

2950.00 to 2965.00m
Interval: 15.00m

SHALE: 100%, black to dark gray, blocky to sub platy, micromicaceous and carbonaceous, calcareous throughout, mottled with white calcareous specks in part, trace of pyrite and pyrite stringers and blebs, moderately firm.

2965.00 to 2970.00m
Interval: 5.00m

SHALE: 100%, as above, black, blocky to sub platy, micromicaceous, carbonaceous, calcareous, trace of pyrite, moderately firm.

2970.00 to 2980.00m
Interval: 10.00m

SHALE: 100%, black to dark gray, blocky to sub platy, micromicaceous, carbonaceous, calcareous, moderately firm, trace of pyrite.

2980.00 to 2990.00m
Interval: 10.00m

SHALE: 100%, as above, black to dark gray, micromicaceous, carbonaceous, calcareous.

2990.00 to 3000.00m
Interval: 10.00m

SHALE: 100%, black to dark gray, blocky to sub platy, carbonaceous, micromicaceous, calcareous, moderately firm, trace of pyrite, occasionally medium gray marly stringers throughout.

AMOCO CANADA PETROLEUM

3000.00 to 3010.00m Interval: 10.00m	SHALE: 100%, black to dark gray, as above, carbonaceous, micromicaceous, calcareous with stringers of mottled light gray calcareous specks, marly in part.
3010.00 to 3020.00m Interval: 10.00m	SHALE: 100%, black to dark gray, blocky to sub platy, carbonaceous, micromicaceous, calcareous with stringers of light gray mottled marlstone, trace of pyrite, 7 to 10 % white calcite crystals from fractures.
3020.00 to 3025.00m Interval: 5.00m	SHALE: 100%, black to dark gray, blocky to sub platy, carbonaceous, micromicaceous, calcareous with stringers of light gray, mottled marlstone, trace of pyrite, decrease in calcite crystals.
3025.00 to 3030.00m Interval: 5.00m	SHALE: 100%, as above with 10% calcite crystals from fractures.
3030.00 to 3040.00m Interval: 10.00m	SHALE: 70%, black, dark gray, blocky to sub platy, carbonaceous, micromicaceous, calcareous becoming very limy throughout, moderately firm, decrease in pyrite and calcite crystals, (no fractures), □ 30% MARLSTONE; light gray, mottled, very argillaceous and dirty, limy.
3040.00 to 3045.00m Interval: 5.00m	SHALE: 100%, as above, black, blocky, sub platy, micromicaceous, carbonaceous, calcareous with mottled light gray marly stringers, moderately firm to hard.
3045.00 to 3055.00m Interval: 10.00m	SHALE: 80%, as above, black, micromicaceous, carbonaceous, calcareous with mottled light gray marly stringers, moderately firm to hard, blocky with 20% MARLSTONE; light gray, very argillaceous and dirty, very calcareous.
3055.00 to 3073.00m Interval: 18.00m	SHALE: 70%, black, dark gray, occasionally mottled, blocky, sub platy in part, micromicaceous, very calcareous with scattered white calcareous specks throughout, limy throughout, moderately firm to hard; 30% MARLSTONE;; medium gray, mottled, crypto to micro crystalline, very argillaceous and dirty, carbonaceous shale partings throughout, hard, dense, tight.
3073.00 to 3083.00m Interval: 10.00m	SHALE: 50%, black, dark gray, blocky, sub platy, micromicaceous, carbonaceous, very calcareous, mottled with white calcareous specks and stringers, occasional subround oolitic calcareous specks, limy, moderately firm to hard; 50% MARLSTONE;; as above becoming more marly with depth, light to medium gray, mottled, cryptocrystalline to microcrystalline, very argillaceous and dirty, carbonaceous shale partings throughout, hard, dense, tight.
3083.00 to 3090.00m Interval: 7.00m	DOLOMITE: 100%, light gray, translucent, very fine crystalline, occasionally fine crystalline, dolomite crystals throughout, well cemented with calcareous and dolomite secondary cement, abundant black bitumen in intercrystalline spaces; abundant fractures with 35% white calcite/dolomitic crystals infilling pore spaces, occasional open fractures with local clear quartz crystals, 10% porosity but variable due to amounts of fractures.
3090.00 to 3095.00m Interval: 5.00m	DOLOMITE: 100%, light to medium gray, occasionally dark gray, well indurated, visible dolomite rhombs, predominantly very fine crystalline, occasionally microcrystalline, (decrease in size from above), increase in argillaceous and shale matrix (25%), abundant black bitumen throughout in pore spaces; 30% white calcite/dolomitic secondary crystals in fractures, occasional local clear quartz crystals found in open fractures.

3095.00 to 3110.00m
Interval: 15.00m

DOLOMITE: 100%, medium gray, mottled, well indurated, microcrystalline with occasional very fine crystalline dolomite rhombs throughout, 5 to 10 % black shale matrix, occasional visible black bitumen in pore spaces, occasional bituminous cement, abundant fractures throughout with up to 30 % white, secondary dolomitic crystals from fractures and occasional local clear quartz crystals, black bitumen also associated with fractures; intercrystalline and fracture porosity.

3110.00 to 3115.00m
Interval: 5.00m

DOLOMITE: 100%, medium to dark gray, mottled, well indurated, microcrystalline, occasionally very fine crystalline and cryptocrystalline in part, argillaceous and carbonaceous throughout with occasional black bituminous cement in part, decrease in amount of fractures; 15 to 20% white secondary dolomitic crystals from fractures, occasional open fractures noted due to visible dolomite rhombs and local clear quartz crystals; 7 to 10 % fracture and intercrystalline porosity, no visible fluorescence.

3115.00 to 3120.00m
Interval: 5.00m

DOLOMITE: 100%, as above, medium to dark gray, mottled, well indurated in part, increase in very fine crystals becoming grainy in texture, microcrystalline in part, argillaceous in part, carbonaceous throughout with occasional black bituminous cement, decrease in fractures, 10 to 15% white secondary dolomitic crystals from fractures with occasional local quartz crystals, 10 % fracture porosity with increase in intercrystalline porosity, no visible fluorescence.

3120.00 to 3130.00m
Interval: 10.00m

DOLOMITE: 100%, medium to dark gray, mottled, moderately indurated, microcrystalline with very fine crystalline dolomite rhombs throughout, very fine crystals generally associated with fractures, argillaceous in part, carbonaceous in part with occasional black bituminous cement, decrease in amount of fractures, 7 to 10 % white secondary dolomitic crystals from fractures, occasional locally developed clear quartz crystals, trace of pyrite, 7 to 10% fracture porosity, no visible fluorescence.

3130.00 to 3140.00m
Interval: 10.00m

DOLOMITE: 100%, as above, becoming predominantly very fine crystalline, occasionally microcrystalline in part, grainy texture, carbonaceous in part, moderately indurated, 7 to 10% white secondary dolomitic crystals from fractures, locally developed quartz crystals, 7 to 10% fracture porosity no visible fluorescence, occasional pin point porosity.

3140.00 to 3145.00m
Interval: 5.00m

DOLOMITE: 100%, as above, becoming more consolidated (well indurated), decrease in very fine crystalline with increase in microcrystalline dolomite, fracture and intercrystalline porosity as above, no fluorescence, carbonaceous throughout.

3145.00 to 3155.00m
Interval: 10.00m

DOLOMITE: 100%, as above, medium to dark gray, mottled, moderately indurated with very fine crystalline and microcrystalline dolomite rhombs throughout, carbonaceous in part, slight increase in white secondary dolomite from fractures, 10 % fracture porosity, occasionally intercrystalline and pin point porosity, local clear quartz crystals.

3155.00 to 3165.00m
Interval: 10.00m

DOLOMITE: 100%, medium to dark gray, occasionally mottled, microcrystalline, occasionally very fine crystalline in part, clean in part, occasional carbonaceous matrix in part, moderately indurated, 10 to 15% secondary dolomite from fractures, occasional well developed dolomite rhombs visible, 7 to 10% fracture and intercrystalline porosity, no shows, occasional local clear quartz crystals indicating open fractures.

AMOCO CANADA PETROLEUM

3165.00 to 3175.00m
Interval: 10.00m

DOLOMITE: 100%, as above with slight increase in crystal size. (macro crystalline to very fine crystalline), moderately indurated, porosity and shows as above, occasional trace of black bitumen in fracture areas, slightly more carbonaceous than above.

3175.00 to 3185.00m
Interval: 10.00m

DOLOMITE: 100%, medium to dark gray, as above, occasionally mottled, microcrystalline to macrocrystalline to very fine crystalline in part, clean in part with occasional carbonaceous matrix, grainy texture, moderately indurated, 10% secondary dolomite from fractures, 7 to 10% intercrystalline and fracture porosity, occasional trace of local clear quartz crystals due to open fractures, (not common), (slight decrease in amount of fractures in formation).

3185.00 to 3190.00m
Interval: 5.00m

DOLOMITE: 100%, medium to dark gray, mottled, as above, microcrystalline to macro crystalline to very fine crystalline, clean in part, slightly carbonaceous in part, grainy texture, moderately indurated, 15 to 20% secondary dolomite from fractures, 10% intercrystalline and fracture porosity, trace of carbon and black bitumen in fractures, (increase in amount of fractures), occasional partly dev dolomite rhombs.

3190.00 to 3205.00m
Interval: 15.00m

DOLOMITE: 100%, as above, medium to dark gray, crystal size continuing to remain the same (micro to macro to very fine crystalline) but decrease in secondary white dolomite crystals from fractures to 7 to 10%; porosity increasing slightly to 10 to 15%, previous porosity spaces contains secondary dolomite, trace of clear quartz crystals and visible dolomite rhombs indicating open fractures.

3205.00 to 3216.00m
Interval: 11.00m

DOLOMITE: 100%, medium to dark gray, occasionally mottled, micro to macro to very fine crystalline, grainy texture, clean in part, visible dolomite rhombs in part, 10% white secondary dolomite from fractures throughout, 10 to 15% fracture and intercrystalline porosity, fractures may be open in part, trace of carbonaceous matrix, local quartz crystals, no visible fluorescence.

Sperry-Sun Final Report



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DRILLING SERVICES
OF CANADA

Sperry-Sun of Canada

APM v1.12A

07/04/94

FINAL REPORT

FOR

AMOCO CANADA PETROLEUM CO. LTD

WELL

POINTED MOUNTAIN, 123 53'52.78

Sperry-Sun of Canada

APM v1.12A

07/04/94

POINTED MOUNTAIN, 123 53'52.78

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POINTED MOUNTAIN, 123 53'52.78

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GENERAL DATA

Well: PAN AM A-2 POINTED MTN

Operator.....: AMOCO CANADA PET CO LTD

Country.....: CANADA

Province.....: NORTHWEST TERRITORIES

Field.....: POINTED MOUNTAIN

LSD No.....: 60 24'33.28/123 53'52.78

Drilling Contractor.: DRIVE WELL SERVICING

Rig Name.....: DRIVE 41

Rig type.....: LAND

Hole type.....: DIRECTIONAL

Well type.....: DEVELOPEMENT

RKB.....: 374.64 (m)

Ground Level.....: 368.29 (m)

Spud date.....: 06/18/94

TD Date.....: 07/04/94

Well head:

Surface latitude....: 60°24'33.28 "

Surface longitude....: 123°53'52.78 "

Operator reps.....: DOUG EASTMAN/BOB PLASCO
PHIL BOETTCHER/BOB PLASCO

Directional reps.....: PAUL THEBEAU
PAUL HILLYER

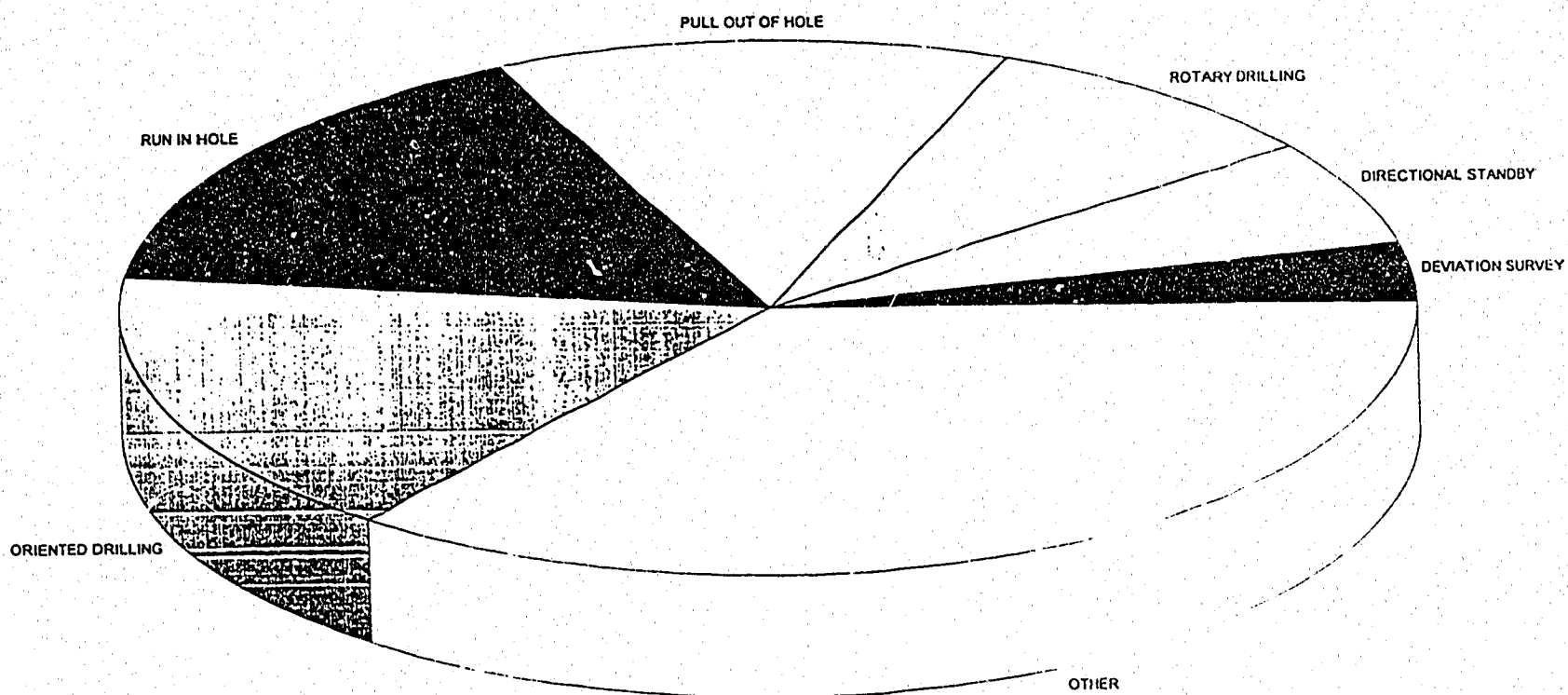
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TIME DISTRIBUTION - TOTAL WELL

Well: PAN AM A-2 POINTED MTN

Operation	Total Hours	%
OTHER	114.25	33.73
ORIENTED DRILLING	61.75	15.52
RUN IN HOLE	59.75	15.01
PULL OUT OF HOLE	48.00	12.06
ROTARY DRILLING	33.75	8.48
DIRECTIONAL STANDBY	24.00	6.03
DEVIATION SURVEY	12.75	3.20
CIRCULATING	8.75	2.20
REPAIRING RIG	4.00	1.01
ROTARY REAMING	3.75	0.94
SERVICE RIG	3.00	0.75
CUT & SLIP LINE	2.50	0.63
TEST BOPS	1.50	0.38
LEAK OFF TEST	0.25	0.06
Section Total:	398.00	100.00

AMOCO CANADA PETROLEUM CO. LTD.
POINTED MOUNTAIN, 50 24'33.28/123
53'52.78



Time Distribution - Total for Well

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TIME DISTRIBUTION CODES

Code	Description
1.1	ROTARY DRILLING
1.2	ORIENTED DRILLING
1.3	DRILL CEMENT
2.1	ROTARY REAMING
2.2	ORIENTED REAMING
2.3	WASHING
3.1	CIRCULATING
3.2	CONDITION MUD
4.1	PULL OUT OF HOLE
4.2	CHANGE BHA
4.3	RUN IN HOLE
4.4	WIPER TRIP
5.1	DEVIATION SURVEY
5.2	ORIENT MOTOR
6.1	TEST BOPS
6.2	CHANGE BOPS
7.1	CUT & SLIP LINE
8.1	REPAIRING RIG
8.2	SERVICE RIG
9.1	ROTARY CORING
9.2	ORIENTED CORING
10.1	E LOGS
10.2	RFT
10.3	SIDE-WALL CORES
11.1	WAIT ON WEATHER
11.2	OTHER
11.3	DIRECTIONAL STANDBY
12.1	FISHING
13.1	COMPLETING
15.1	RUN CASING
15.2	PULL CASING
15.3	MILL CASING
16.1	CEMENT CASING
16.2	CEMENT PLUG
16.3	PLUG BACK
16.4	WAIT ON CEMENT
17.1	WORK PIPE
17.2	BACK REAMING
17.3	MILL ON JUNK
18.1	FIT
18.2	LEAK OFF TEST
18.3	DST

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TIME DISTRIBUTION CODES

Code	Description
19.1	MOVE RIG
19.2	RIG UP
19.3	SKID RIG
19.4	TEAR DOWN

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EVENT LOG - TOTAL WELL

Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	Hours	Operation	Description
	2856.00	156	10:00	14.00	OTHER	TRAVEL FROM WISKU TO LOCATION
19/06/94	2856.00	156	00:00	24.00	OTHER	TRAVEL TO LOCATION
20/06/94		156	00:00	13.00	OTHER	TRAVEL TO LOCATION
		156	13:00	6.00	RUN IN HOLE	RUN IN HOLE W/MILL
	2856.00	156	19:00	5.00	OTHER	POLISH AND DRESS WINDOW
21/06/94		156	00:00	1.50	OTHER	MILL WINDOW
		156	01:30	4.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
		156	05:45	1.25	OTHER	CHANGE MILLS
		156	07:00	1.00	RUN IN HOLE	RUN IN HOLE
		156	08:00	0.25	SERVICE RIG	SERVICE RIG
		156	08:15	1.75	RUN IN HOLE	RUN IN HOLE
		156	10:00	0.75	OTHER	SAFETY MEETING
		156	10:45	1.25	OTHER	BOP DRILL
		156	12:00	3.25	RUN IN HOLE	RUN IN HOLE W/MILL
		156	15:15	3.50	OTHER	DRESS WINDOW W/MILL
		156	18:45	2.00	CIRCULATING	CIRCULATING AND DO FORMATION INTEGRITY TEST
	2856.00	156	20:45	3.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
22/06/94		156	00:00	4.50	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
		156	04:30	1.50	TEST BOPS	TEST BOPS
		156	06:00	1.00	OTHER	PICK UP MUD MOTOR
		156	07:00	2.00	OTHER	DRILL MOUSEHOLE W/MUD MOTOR
		156	09:00	3.00	OTHER	MAKE UP BHA # 1
		156	12:00	2.50	OTHER	PICK UP 6 DRILL COLLARS
		156	14:30	0.50	OTHER	SHALLOW PULSE TEST
		156	15:00	6.50	RUN IN HOLE	RUN IN HOLE W/BHA # 1
	2860.00	156	21:30	2.50	ORIENTED DRILLING	ORIENTED DRILLING
23/06/94		156	00:00	0.50	OTHER	ORIENT TOOL
		156	00:30	4.00	REPAIRING RIG	REPAIRING RIG REPAIR BROKEN CHAIN IN DRAWWORKS
		156	04:30	2.50	ORIENTED DRILLING	ORIENTED DRILLING
		156	07:00	4.00	ORIENTED DRILLING	ORIENTED DRILLING
		156	11:00	1.00	DEVIATION SURVEY	DEVIATION SURVEY
		156	12:00	3.50	ORIENTED DRILLING	ORIENTED DRILLING
		156	15:30	0.50	DEVIATION SURVEY	DEVIATION SURVEY
		156	16:00	1.50	OTHER	ORIENT TOOL
		156	17:30	3.25	ORIENTED DRILLING	ORIENTED DRILLING
		156	20:45	1.00	CIRCULATING	CIRCULATING
		156	21:45	2.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 1

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EVENT LOG - TOTAL WELL Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	Hours	Operation	Description
	2914.00	156	23:45	0.25	SERVICE RIG	SERVICE RIG
24/06/94	156		00:00	2.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 1
	156		02:15	0.50	OTHER	FLOW CHECK
	156		02:45	0.25	SERVICE RIG	SERVICE RIG
	156		03:00	0.75	OTHER	CHANGE BHA
	156		03:45	2.75	RUN IN HOLE	RUN IN HOLE W/BHA # 2
	156		06:30	1.00	CUT & SLIP LINE	CUT & SLIP LINE
	156		07:30	2.75	RUN IN HOLE	RUN IN HOLE W/BHA # 2
	156		10:15	1.75	OTHER	TRY TO GET MWD TO PULSE
	156		12:00	1.00	OTHER	MIX VISCOUS SWEEP AND PUMP SAME
	156		13:00	5.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 2
	156		18:00	0.75	OTHER	CHANGE MWD TOOL
	156		18:45	1.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3
	156		20:00	0.25	SERVICE RIG	SERVICE RIG
	2914.00	156	20:15	3.75	RUN IN HOLE	RUN IN HOLE W/ BHA # 3
25/06/94	156		00:00	2.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3
	156		02:15	0.25	SERVICE RIG	SERVICE RIG
	156		02:30	1.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3
	156		03:45	5.25	ORIENTED DRILLING	ORIENTED DRILLING
	156		09:00	3.00	DEVIATION SURVEY	DEVIATION SURVEY & CONNECTIONS
	156		12:00	10.75	ORIENTED DRILLING	ORIENTED DRILLING
	2975.00	156	22:45	1.25	DEVIATION SURVEY	DEVIATION SURVEY & CONNECTIONS
26/06/94	156		00:00	1.75	ORIENTED DRILLING	ORIENTED DRILLING
	156		01:45	0.75	CIRCULATING	CIRCULATING
	156		02:30	0.25	OTHER	PUMP PILL
	156		02:45	10.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA 3
	156		13:00	7.00	RUN IN HOLE	RUN IN HOLE W/BHA # 4
	156		20:00	0.25	SERVICE RIG	SERVICE RIG
	156		20:15	1.75	RUN IN HOLE	RUN IN HOLE W/BHA # 4
	2977.00	156	22:00	2.00	ROTARY REAMING	ROTARY REAMING F/2917 T/2946
27/06/94	156		00:00	1.75	ROTARY REAMING	ROTARY REAMING F/2946 T/2978
	156		01:45	7.75	ORIENTED DRILLING	ORIENTED DRILLING
	156		09:30	2.00	DEVIATION SURVEY	DEVIATION SURVEY
	156		11:30	0.25	SERVICE RIG	SERVICE RIG
	156		11:45	6.00	ORIENTED DRILLING	ORIENTED DRILLING
	156		17:45	1.00	CIRCULATING	CIRCULATING
	156		18:45	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE
	156		19:45	0.50	CIRCULATING	CIRCULATING

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EVENT LOG - TOTAL WELL Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start Time	Hours	Operation	Description
	156		20:15	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE
	156		21:15	0.50	CIRCULATING	CIRCULATING
	156		21:45	0.75	PULL OUT OF HOLE	PULL OUT OF HOLE
	156		22:30	0.25	CIRCULATING	CIRCULATING
	156		22:45	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE
3013.00	156		23:45	0.25	CIRCULATING	CIRCULATING
28/06/94	156		00:00	0.75	CUT & SLIP LINE	CUT & SLIP LINE
	156		00:45	0.25	SERVICE RIG	SERVICE RIG
	156		01:00	5.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 4
	156		06:00	2.50	OTHER	CHANGE OUT MUD MOTORS AND SERVICE TOOL
	156		08:30	8.50	RUN IN HOLE	RUN IN HOLE W/BHA # 5
	156		17:00	1.00	CIRCULATING	CIRCULATING
	156		18:00	5.00	ORIENTED DRILLING	ORIENTED DRILLING
3030.00	156		23:00	1.00	DEVIATION SURVEY	DEVIATION SURVEY
06/94	156		00:00	0.25	SERVICE RIG	SERVICE RIG
	156		00:15	6.00	ORIENTED DRILLING	ORIENTED DRILLING
	156		06:15	3.00	DEVIATION SURVEY	DEVIATION SURVEY
	156		09:15	0.25	CIRCULATING	CIRCULATING
	156		09:30	0.25	LEAK OFF TEST	LEAK OFF TEST
	156		09:45	3.50	ORIENTED DRILLING	ORIENTED DRILLING
	156		13:15	1.00	DEVIATION SURVEY	DEVIATION SURVEY
	156		14:15	1.25	CIRCULATING	CIRCULATING
	156		15:30	4.75	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 5
	156		20:15	0.25	SERVICE RIG	SERVICE RIG
	156		20:30	3.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 5
3057.00	156		23:30	0.50	OTHER	LAY DOWN BHA # 5
30/06/94	156		00:00	3.00	OTHER	LAY DOWN BHA # 5
	156		03:00	3.50	RUN IN HOLE	RUN IN HOLE W/BHA # 6
	156		06:30	0.75	CUT & SLIP LINE	CUT & SLIP LINE
	156		07:15	6.50	RUN IN HOLE	RUN IN HOLE W/BHA # 6
3067.00	156		13:45	10.25	ROTARY DRILLING	ROTARY DRILLING
01/07/94	156		00:00	0.25	SERVICE RIG	SERVICE RIG
	156		00:15	11.75	ROTARY DRILLING	ROTARY DRILLING
	156		12:00	0.25	SERVICE RIG	SERVICE RIG
3156.00	156		12:15	11.75	ROTARY DRILLING	ROTARY DRILLING
02/07/94	3156.00	156	00:00	24.00	DIRECTIONAL STANDBY	DIRECTIONAL STANDBY

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EVENT LOG - TOTAL WELL
Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	End time	Operation	Description
03/07/94	3155.00	156	00:00	24.00	OTHER	TRAVEL TO NISKU
04/07/94	3156.00	156	00:00	24.00	OTHER	TRAVEL TO NISKU

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HOLE SECTIONS

Well: PAN AM A-2 POINTED MTN

Hole diameter (cm)	Hole MD (m)	Hole TVD (m)	Casing OD (cm)	Casing MD (m)	Casing TVD (m)	Comments
156	3156.00	3098.81				MAIN HOLE

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DAYS vs DEPTH

Well: PAN AM A-2 POINTED MTN

Date	Day	Midnight	Hole	Company	Directional
	#	depth	Size	Representative	driller
		(m)	(mm)		
13/06/94	1	2856.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
19/06/94	2	2856.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
20/06/94	3	2856.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
21/06/94	4	2856.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
22/06/94	5	2860.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
23/06/94	6	2914.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
24/06/94	7	2914.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
25/06/94	8	2975.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
26/06/94	9	2977.00	156	DOUG EASTMAN/BOB PLASCO PAUL THEBEAU	
27/06/94	10	3013.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
28/06/94	11	3030.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
29/06/94	12	3057.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
30/06/94	13	3067.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
01/07/94	14	3156.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
02/07/94	15	3156.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
03/07/94	16	3156.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	
04/07/94	17	3156.00	156	PHIL BOETTCHER/BOB PLASCO PAUL THEBEAU	

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FORMATION TOPS

Well: PAN 7M A-2 POINTED MTN

Formation Names	-----MD (RKB)-----		-----TVD (RKB)-----		--TVD (Sub-sea)--		Vertical thickness
	top (m)	bottom (m)	top (m)	bottom (m)	top (m)	bottom (m)	
NAHANNI	3078.00	3214.00	3033.47	3147.40	2658.83	2772.76	113.93
2ND BLACK SHALE	2768.00	3078.00	2768.00	3033.47	2393.36	2658.83	265.47

Sperry-Sun of Canada
APM v1.12A
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POINTED MOUNTAIN, 123 53'52.78

156 MM SECTION

TIME DISTRIBUTION .

EVENT LOG

BHA RUNS

BHA TALLIES

BIT RUNS

MOTOR RUNS

MUD DATA

ORIGINAL SURVEY

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TIME DISTRIBUTION - 156 MM SECTION

Well: PAN AM A-2 POINTED MTN

Operation	Total Hours	%
OTHER	134.25	33.73
ORIENTED DRILLING	61.75	15.52
RUN IN HOLE	59.75	15.01
PULL OUT OF HOLE	48.00	12.06
ROTARY DRILLING	33.75	8.43
DIRECTIONAL STANDBY	24.00	6.03
DEVIATION SURVEY	12.75	3.20
CIRCULATING	8.75	2.20
REPAIRING RIG	4.00	1.01
ROTARY REAMING	3.75	0.94
SERVICE RIG	3.00	0.75
CUT & SLIP LINE	2.50	0.63
TEST BOPS	1.50	0.38
LEAK OFF TEST	0.25	0.06
Section Total:	398.00	100.00

Sperry-Sun of Canada
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EVENT LOG - 156 MM SECTION
Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	Hours	Operation	Description
	2856.00	156	10:00	14.00	OTHER	TRAVEL FROM NISKU TO LOCATION
19/06/94	2856.00	156	00:00	24.00	OTHER	TRAVEL TO LOCATION
20/06/94		156	00:00	13.00	OTHER	TRAVEL TO LOCATION
		156	13:00	6.00	RUN IN HOLE	RUN IN HOLE W/MILL
	2856.00	156	19:00	5.00	OTHER	POLISH AND DRESS WINDOW
21/06/94		156	00:00	1.50	OTHER	MILL WINDOW
		156	01:30	4.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
		156	05:45	1.25	OTHER	CHANGE MILLS
		156	07:00	1.00	RUN IN HOLE	RUN IN HOLE
		156	08:00	0.25	SERVICE RIG	SERVICE RIG
		156	08:15	1.75	RUN IN HOLE	RUN IN HOLE
		156	10:00	0.75	OTHER	SAFETY MEETING
		156	10:45	1.25	OTHER	BOP DRILL
		156	12:00	3.25	RUN IN HOLE	RUN IN HOLE W/MILL
		156	15:15	3.50	OTHER	DRESS WINDOW W/MILL
		156	18:45	2.00	CIRCULATING	CIRCULATING AND DO FORMATION INTEGRITY TEST
	2856.00	156	20:45	3.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
22/06/94		156	00:00	4.50	PULL OUT OF HOLE	PULL OUT OF HOLE W/MILL
		156	04:30	1.50	TEST BOPS	TEST BOPS
		156	06:00	1.00	OTHER	PICK UP MUD MOTOR
		156	07:00	2.00	OTHER	DRILL MOUSEHOLE W/MUD MOTOR
		156	09:00	3.00	OTHER	MAKE UP SHA # 1
		156	12:00	2.50	OTHER	PICK UP 6 DRILL COLLARS
		156	14:30	0.50	OTHER	SHALLOW PULSE TEST
		156	15:00	6.50	RUN IN HOLE	RUN IN HOLE W/BHA # 1
	2860.00	156	21:30	2.50	ORIENTED DRILLING	ORIENTED DRILLING
23/06/94		156	00:00	0.50	OTHER	ORIENT TOOL
		156	00:30	4.00	REPAIRING RIG	REPAIRING RIG REPAIR B. MEN CHAIN IN DRAWWORKS
		156	04:30	2.50	ORIENTED DRILLING	ORIENTED DRILLING
		156	07:00	4.00	ORIENTED DRILLING	ORIENTED DRILLING
		156	11:00	1.00	DEVIATION SURVEY	DEVIATION SURVEY
		156	12:00	3.50	ORIENTED DRILLING	ORIENTED DRILLING
		156	15:30	0.50	DEVIATION SURVEY	DEVIATION SURVEY
		156	16:00	1.50	OTHER	ORIENT TOOL
		156	17:30	3.25	ORIENTED DRILLING	ORIENTED DRILLING
		156	20:45	1.00	CIRCULATING	CIRCULATING
		156	21:45	2.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 1

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EVENT LOG - 156 MM SECTION

Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	Hours	Operation	Description
	2314.00	156	23:45	0.25	SERVICE RIG	SERVICE RIG
24/06/94	156	00:00	2.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 1	
	156	02:15	0.50	OTHER	FLOW CHECK	
	156	02:45	0.25	SERVICE RIG	SERVICE RIG	
	156	03:00	0.75	OTHER	CHANGE BHA	
	156	03:45	2.75	RUN IN HOLE	RUN IN HOLE W/BHA # 2	
	156	06:30	1.00	CUT & SLIP LINE	CUT & SLIP LINE	
	156	07:30	2.75	RUN IN HOLE	RUN IN HOLE W/BHA # 2	
	156	10:15	1.75	OTHER	TRY TO GET MWD TO PULSE	
	156	12:00	1.00	OTHER	MIX VISCOUS SWEEP AND PUMP SAME	
	156	13:00	5.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 2	
	156	18:00	0.75	OTHER	CHANGE MWD TOOL	
	156	18:45	1.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3	
	156	20:00	0.25	SERVICE RIG	SERVICE RIG	
2914.00	156	20:15	3.75	RUN IN HOLE	RUN IN HOLE W/ BHA # 3	
25/06/94	156	00:00	2.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3	
	156	02:15	0.25	SERVICE RIG	SERVICE RIG	
	156	02:30	1.25	RUN IN HOLE	RUN IN HOLE W/BHA # 3	
	156	03:45	5.25	ORIENTED DRILLING	ORIENTED DRILLING	
	156	09:00	3.00	DEVIATION SURVEY	DEVIATION SURVEY & CONNECTIONS	
	156	12:00	10.75	ORIENTED DRILLING	ORIENTED DRILLING	
2975.00	156	22:45	1.25	DEVIATION SURVEY	DEVIATION SURVEY & CONNECTIONS	
26/06/94	156	00:00	1.75	ORIENTED DRILLING	ORIENTED DRILLING	
	156	01:45	0.75	CIRCULATING	CIRCULATING	
	156	02:30	0.25	OTHER	PUMP PILL	
	156	02:45	10.25	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA 3	
	156	13:00	7.00	RUN IN HOLE	RUN IN HOLE W/BHA # 4	
	156	20:00	0.25	SERVICE RIG	SERVICE RIG	
	156	20:15	1.75	RUN IN HOLE	RUN IN HOLE W/BHA # 4	
2977.00	156	22:00	2.00	ROTARY REAMING	ROTARY REAMING F/2917 T/2946	
27/06/94	156	00:00	1.75	ROTARY REAMING	ROTARY REAMING F/2946 T/2978	
	156	01:45	7.75	ORIENTED DRILLING	ORIENTED DRILLING	
	156	09:30	2.00	DEVIATION SURVEY	DEVIATION SURVEY	
	156	11:30	0.25	SERVICE RIG	SERVICE RIG	
	156	11:45	6.00	ORIENTED DRILLING	ORIENTED DRILLING	
	156	17:45	1.00	CIRCULATING	CIRCULATING	
	156	18:45	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE	
	156	19:45	0.50	CIRCULATING	CIRCULATING	

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EVENT LOG - 156 MM SECTION
Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start Time	Hours	Operation	Description
		156	20:15	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE
		156	21:15	0.50	CIRCULATING	CIRCULATING
		156	21:45	0.75	PULL OUT OF HOLE	PULL OUT OF HOLE
		156	22:30	0.25	CIRCULATING	CIRCULATING
		156	22:45	1.00	PULL OUT OF HOLE	PULL OUT OF HOLE
	3013.00	156	23:45	0.25	CIRCULATING	CIRCULATING
28/06/94		156	00:00	0.75	CUT & SLIP LINE	CUT & SLIP LINE
		156	00:45	0.25	SERVICE RIG	SERVICE RIG
		156	01:00	5.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 4
		156	06:00	2.50	OTHER	CHANGE OUT MUD MOTORS AND SERVICE TOOL
		156	08:30	8.50	RUN IN HOLE	RUN IN HOLE W/BHA # 5
		156	17:00	1.00	CIRCULATING	CIRCULATING
		156	18:00	5.00	ORIENTED DRILLING	ORIENTED DRILLING
	3030.00	156	23:00	1.00	DEVIATION SURVEY	DEVIATION SURVEY
01/06/94		156	00:00	0.25	SERVICE RIG	SERVICE RIG
		156	00:15	6.00	ORIENTED DRILLING	ORIENTED DRILLING
		156	06:15	3.00	DEVIATION SURVEY	DEVIATION SURVEY
		156	09:15	0.25	CIRCULATING	CIRCULATING
		156	09:30	0.25	LEAK OFF TEST	LEAK OFF TEST
		156	09:45	3.50	ORIENTED DRILLING	ORIENTED DRILLING
		156	13:15	1.00	DEVIATION SURVEY	DEVIATION SURVEY
		156	14:15	1.25	CIRCULATING	CIRCULATING
		156	15:30	4.75	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 5
		156	20:15	0.25	SERVICE RIG	SERVICE RIG
		156	20:30	3.00	PULL OUT OF HOLE	PULL OUT OF HOLE W/BHA # 5
	3057.00	156	23:30	0.50	OTHER	LAY DOWN BHA # 5
30/06/94		156	00:00	3.00	OTHER	LAY DOWN BHA # 5
		156	03:00	3.50	RUN IN HOLE	RUN IN HOLE W/BHA # 6
		156	06:30	0.75	CUT & SLIP LINE	CUT & SLIP LINE
		156	07:15	6.50	RUN IN HOLE	RUN IN HOLE W/BHA # 6
	3067.00	156	13:45	10.25	ROTARY DRILLING	ROTARY DRILLING
01/07/94		156	00:00	0.25	SERVICE RIG	SERVICE RIG
		156	00:15	11.75	ROTARY DRILLING	ROTARY DRILLING
		156	12:00	0.25	SERVICE RIG	SERVICE RIG
	3156.00	156	12:15	11.75	ROTARY DRILLING	ROTARY DRILLING
02/07/94	3156.00	156	00:00	24.00	DIRECTIONAL STANDBY	DIRECTIONAL STANDBY

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EVENT LOG - 156 MM SECTION

Well: PAN AM A-2 POINTED MTN

Date	Depth (m)	Section (mm)	Start time	Hours	Operation	Description
03/07/94	3156.00	156	00:00	24.00	OTHER	TRAVEL TO NISKU
04/07/94	3156.00	156	00:00	24.00	OTHER	TRAVEL TO NISKU

Well: PAN AM A-2 POINTED MTN

BHA run	Bit # / Motor # Hole size (mm)	MD in / MD out/ Interval (m)	TVD in/ TVD out Comments (m)	Method BHA type	----- Dogleg ----- --Expected-- Actual Rot / Orient ----- (°/30m) -----	Inc .in/ Inc .out (°)	Inc Change Build rate (°/ 30m)	Dir. in Dir. out Formations (°)	Dir change Turn rate (°/ m)
1	1	2856.00	2831.20	STEERABLE	1.00 10.00	12.40	0.00	96.02	0.00
	1	2914.00	2885.58	B		12.40	0.00	96.02	0.00
	156	58.00							
2	2	2914.00	2885.58	STEERABLE	1.00 8.00	0.00	0.00	0.00	0.00
	2	2914.00	2885.58	B		0.00	0.00	0.00	0.00
	156	0.00	MWD FAILURE						
3	2RR1	2914.00	2885.58	STEERABLE	1.00 8.00	24.30	-2.40	66.60	-25.10
	2RR1	2977.00	2943.49	B		21.90	-1.37	41.50	-14.27
	156	63.00							
4	3	2978.00	2944.42	STEERABLE	1.00 8.00	21.50	0.30	41.10	-4.50
	2RR2	3013.00	2977.01	B		21.80	0.32	36.60	-4.80
	156	35.00							
5	4	3013.00	2977.01	STEERABLE	1.00 8.00	23.70	9.40	36.50	-9.40
	3	3057.00	3015.88	B		33.10	7.68	27.10	-7.68
	156	44.00							
6	5	3057.00	3015.88	ROTARY	1.00 0.00	33.10	0.00	27.10	0.00
		0.00	0.00	H		33.10	0.00	27.10	0.00
	156	0.00							

NOTES: 1: Inclination in/out and direction in/out are derived from the original survey closest to the MD in/out within the BHA run course length

2: BHA types..... B:build / D:drop / H:hold / T:turn / O:other

3: formation names:

SPERRY-SUN

Drilling Services of Canada

Well: PAN AM A-2 POINTED MTN

BHA Run 1

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
2856.00	2914.00	58.00	2831.20	2885.58	B	STEERABLE

BHA performance: (°/30m)

Expected dogleg(rotary)...	1.00	Avg.build:	0.00	Avg.turn.:	0.00
Expected dogleg(oriented):	10.00	Max.build:	0.00	Max.turn.:	0.00
		Min.build:	0.00	Min.turn.:	0.00

BHA components: BIT I, MTR AJ, SUB XO, SUB FS, MWD HS, NMDC, NMDC, 18 x 122 DC

Formations: 2ND BLACK SHALE

Bit# 1	Size: 156 mm	Type: ATJ M33D	Make: HUGHES
	TFA.: 2.936 cm2	Hrs.: 16.25	Condition: 7-8-1MM

Mtr# 1 Size: 121 mm Type: PDM Make: SPERRY DRILL
Desr: 1.83 DEG ADJ 6.3 STG 4/5 LOBE SLICK

BHA run summary:

THIS BH WAS USED TO STEER OUT OF WINDOW IN THE CASING AT 2854m AND DRILL AHEAD TO 2914m. A SURVEY WAS TAKEN WHEN THE SENSOR WAS AT 2853m AND AN ANGLE OF 14 DEGREES WAS SEEN. WE DID NOT GYRO OUT OF THE WINDOW AND AS A RESULT WE COULD NOT GET AN AZIMUTH THAT WAS GOOD UNTIL A DEPTH OF 2914m. WE THEN USED THE ANGLE WE SAW FROM THE SURVEY TAKEN IN THE SHOE AND CALLED IT THE ORIGINAL HOLE DIRECTION OF 96.02 AZ, AND PUT IN THE SURVEY AT 2900.77m OF 22.1 DEGREES AND 69.4 AZ AND INTERPOLATED BETWEEN THESE POINTS TO GET A AZIMUTH FOR THE SURVEY STATIONS IN BETWEEN THESE TWO. THIS BHA WAS PULLED TO CHANGE THE BIT. WHEN THE MOTOR REACHED SURFACE THE PROTECTOR SLEEVE WAS SCREWED OFF AND ON TOP OF THE BIT. THE SLEEVE HAD BEEN TORQUED TO 3500 FT/LBS. THE MOTOR WAS LAYED DOWN BECAUSE OF THREAD DAMAGE TO THE SLEEVE AREA.

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BHA # 1 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in...: 2956.00 m TVD in...: 2931.20 m Bit size: 156 mm
 MD out...: 2914.00 m TVD out: 2895.58 m Jets.....: 2/12.7 1/7.1 mm
 Interval: 58.00 m TFA.....: 2.935 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CB STB (m)
156mm INSERT BIT	L12WG		0.15				0.15		
ADJUS.121mm1.83DEG MSBH	475012B	1	8.65	121			8.80		
121mm CROSSOVER	2941		0.73	121	44		9.53		
121mm FLOAT SUB	3227		0.77	121	58		10.30		
119mm MWD HOS	C-514A	497	9.54	119	74		19.84		
122mm NON-MAG DC	C-568	656	9.48	122	58		29.32		
122mm NON-MAG DC	C-567	649	9.48	122	59		38.80		
121mm DRILL COLLAR x 18		11694	170.84	122	59		209.64		
		13497	209.64						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	13497	11741	11154
Excl. HWDP	13497	11741	11154
Below JARS	0	0	0
Above JARS	0	0	0

SPERRY-SUN

Well: PAN AM A-2 POINTED MTN

BHA Run 2

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
2914.00	2914.00	0.00	2885.58	2895.58	B	STEERABLE

Avg.build:	0.00	Avg.turn.:	0.00
Max.build:	0.00	Max.turn.:	0.00
Min.build:	0.00	Min.turn.:	0.00

Formations: 2ND BLACK SHALE

Mtr# 2 Size: 121 mm Type: PDM Make: SPERRY DRILL
Desr: 1.5 DEG ADJ 6.3 STG SLICK

BHA run summary:

THIS BHA WAS TRIPPED OUT BECAUSE MWD QUIT PULSING BEFORE WE GOT TO BOTTOM.

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BHA # 2 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in.: 2914.00 m TWD in.: 2935.58 m Bit size: 156 mm
MD out.: 2914.00 m TWD out.: 2935.58 m Jets: 2/7.9 1/12.7 mm
Interval: 0.00 m TFA: 2.252 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CB STB (m)
156mm INSERT BIT	L13WG		0.15				0.15		
ADJUS. 121mm 1.5Dg M/S BH	475013B		8.64	121			8.79		
121mm CROSSOVER	2941		0.73	121	44		9.52		
121mm FLOAT SUB	3227		0.77	121	58		10.29		
119mm MWD HOS	C-514A	497	9.54	119	74		19.83		
122mm NON-MAG DC	C-568	656	9.48	122	58		29.31		
122mm NON-MAG DC	C-567	649	9.48	122	59		38.79		
121mm DRILL COLLAR x 18		11694	170.84	122	59		209.63		
		13496	209.63						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	13496	11741	11154
Excl. HWDP	13496	11741	11154
Below JARS	0	0	0
Above JARS	0	0	0

SPERRY-SUN

Drilling Services of Canada

Well: PAN AM A-2 POINTED MTN

BHA Run 3

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
2914.00	2977.00	63.00	2885.58	2943.49	B	STEERABLE

BHA performance: (°/30m)

Expected dogleg(rotary)...	1.00	Avg.build:	-1.37	Avg.turn.:	-14.27
Expected dogleg(oriented):	8.00	Max.build:	0.95	Max.turn.:	-9.64
		Min.build:	-2.19	Min.turn.:	-18.83

BHA components: BIT I, MTR AJ, SUB XO, SUB FS, MWD HS, NMDC, NMDC, 18 x 122 DC

Formations: 2ND BLACK SHALE

Bit# 2RR1 Size: 156 mm Type: ATJM-33D Make: HUGHS
TFA.: 2.252 cm2 Hrs.: 20.25 Condition: 7-7-1MM

Mtr# 2RR1 Size: 121 mm Type: PDM Make: SPERRY DRILL
Desr: 1.5 DEG ADJ 6.3 STG SLICK

BHA run summary:

THIS BHA WAS USED TO DRILL FROM 2914m TO 2977m. NO PROBLEMS WERE HAD ON THIS RUN. THE BHA WAS PULLED TO CHANGE THE BIT.

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BHA # 3 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in...: 2914.00 m	TVD in...: 2985.58 m	Bit size: 156 mm
MD out...: 2977.00 m	TVD out...: 2943.49 m	Jets....: 2/7.9 1/12.7 mm
Interval: 63.00 m		TFA.....: 2.252 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CS STB (m)
156mm INSERT BIT	L13WG		0.15				0.15		
ADJUS.121mm1.5Dg M/S BH	475013B		8.64	121			8.79		
121mm CROSSOVER	2941		0.73	121	44		9.52		
121mm FLOAT SUB	3227		0.77	121	58		10.29		
119mm MWD HOS	C-514A	497	9.54	119	74		19.83		
122mm NON-MAG DC	C-568	656	9.48	122	58		29.31		
122mm NON-MAG DC	C-567	649	9.48	122	59		38.79		
121mm DRILL COLLAR x 18		11694	170.84	122	59		209.63		
		13496	209.63						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	13496	11741	11154
Excl. HWDP	13496	11741	11154
Below JARS	0	0	0
Above JARS	0	0	0

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Drilling Services of Canada
Well: PAN AM A-2 POINTED MTN

Mtr# 2RR2 Size: 121 mm Typ

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
2978.00	3013.00	35.00	2944.42	2977.01	B	STEERABLE

BHA performance: (°/30m)

Expected dogleg(rotary)...	1.00	Avg.build:	0.32	Avg.turn..	-4.80
Expected dogleg(oriented):	8.00	Max.build:	1.89	Max.turn..	2.17
		Min.build:	-2.17	Min.turn..	-11.07

BHA components: BIT P, MTR AJ, SUB XO, SUB FS, MWD HS, NMDC, NMDC, 4 x 122 DC, JAR, 14 x 122 DC

Formations: 2ND BLACK SHALE

Bit# 3	Size: 156	mm	Type: PDC	Make: DB STRATA BIT
	TFA.: 10.033	cm2	Hrs.: 13.75	Condition: INSIDE & GUAGE DAMAGE

Mtr# 2RR2	Size: 121	mm	Type: PDM	Make: SPERRY DRILL
	Desr: 1.5 DEG ADJ	6.3	STG SLICK	

BHA run summary:

THIS BHA WAS RUN TO DRILL FROM 2978m TO 3013m USING A PDC TYPE TD268. THIS BIT GAVE US PENETRATION RATES OF 6 TO 10 MINUTES PER METER ROTATING AND 10 TO 15 MINUTES PER METER SLIDING. THE MAXIMUM BIT WIEGHT WE WERE ABLE TO CARRY WAS 3 TO 4 DAN WITH A DIFFERENTIAL PRESSURE OF 1400 TO 1700 KPA. WHEN MORE WEIGHT THAN THIS WAS PUT ON THE BIT IT WOULD BIT INTO THE FORMATION AND STALL THE MOTOR. SLIDING WE GOT 7 TO 8 DAN ON THE BIT WITH THE SAME DIFFERENTIAL PRESSURE. THE BIT WAS PULLED BECAUSE THE PENETRATION RATE DROPPED TO 75 MINUTES PER METER. THE BIT CONDITION WAS ONE ROW OF CUTTERS ON THE INSIDE HAD FAILED AND THE BIT WAS CORED OUT WHERE THESE WERE MISSING. THERE WAS ALSO A ROW OF CUTTERS DAMAGED ON THE OUTSIDE GUAGE RING WHICH ALSO CORED OUT. WITH THESE CUTTERS MISSING THE BIT COULD NOT EFFECTIVELY CUT ALL OF THE FORMATION AND WAS JUST SPINNING ON WHAT IT COULD NOT CUT.

Sperry-Sun of Canada

APM v1.12A

04/07/94

BHA # 4 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in...: 2979.00 m TVD in...: 2944.42 m Bit size: 156 mm
 MD out...: 3013.00 m TVD out: 2977.01 m Jets.....: 3/20.6 mm
 Interval: 35.00 m TFA.....: 10.033 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CB STB (m)
156mm PDC	4930324		0.20			25	0.20		
ADJUS.121mm1.5Dg M/S BH	475013B		8.64	121			8.84		
121mm CROSSOVER	2941		0.73	121	44		9.57		
121mm FLOAT SUB	3227		0.77	121	58		10.34		
119mm MWD HOS	C-514A	497	9.54	119	74		19.88		
122mm NON-MAG DC	C-568	656	9.48	122	58		29.36		
122mm NON-MAG DC	C-567	649	9.48	122	59		38.84		
121mm DRILL COLLAR x 4		2598	37.96	122	59		76.80		
121mm JARS	34141704S		3.72	119	51		80.52		
121mm DRILL COLLAR x 14		9095	132.88	122	59		213.40		
		13495	213.40						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	13495	11740	11153
Excl. MWDP	13495	11740	11153
Below JARS	4400	3828	3636
Above JARS	9095	7912	7516

SPERRY-SUN
Drilling Services of Canada
Well: PAN AM A-2 POINTED MTN
BHA Run 5

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
3013.00	3057.00	44.00	2977.01	3015.88	B	STEERABLE

BHA performance: (°/30m)

Expected dogleg(rotary)...	1.00	Avg.build:	7.68	Avg.turn.:	-7.68
Expected dogleg(oriented):	8.00	Max.build:	11.47	Max.turn.:	-0.31
		Min.build:	5.84	Min.turn.:	-10.96

BHA components: BIT I, MTR AJ, SUB XO, SUB FS, MWD HS, NMDC, NMDC, 4 x 122 DC, JAR, 14 x 122 DC

Formations: 2ND BLACK SHALE

Bit# 4	Size: 156 mm	Type: F57D	Make: SMITH TOOL
	TFA.: 2.168 cm2	Hrs.: 18.25	Condition: 7-4-2MM

Mtr# 3	Size: 121 mm	Type: PDM	Make: SPERRY DRILL
	Desr: 1.5 DEG ADJ MS BH 3.5 STG SLICK		

BHA run summary:

THIS BHA WAS USED TO DRILL FROM 3013m TO 3057m. THIS RUN WAS MADE WITH A 3.5 STAGE MOTOR AND WE WERE ABLE TO CARRY 1200 TO 1400 KPA DIFFERENTIAL, ANY MORE THAN THIS AND WE WERE STALLING THE MOTOR. THE BHA WAS PULLED TO CHANGE THE

Sperry-Sun of Canada
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BHA # 5 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in...: 3013.00 m TVD in.: 2977.01 m Bit size: 156 mm
MD out...: 3057.00 m TVD out: 3015.88 m Jets...: 2/8.7 1/11.1 mm
Interval: 44.00 m TFA.....: 2.168 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CB STB (m)
156mm PDC	LA22934		0.15				0.15		
ADJUS.121mm1.5deg MS BH	475110		6.33	121			6.48		
121mm CROSSOVER	2941		0.73	121	44		7.21		
121mm FLOAT SUB	3227		0.77	121	58		7.98		
119mm MWD HOS	C-514A	497	9.54	119	74		17.52		
122mm NON-MAG DC	C-568	656	9.48	122	58		27.00		
122mm NON-MAG DC	C-567	649	9.48	122	59		36.48		
121mm DRILL COLLAR x 4			2598	37.96	122	59		74.44	
121mm JARS	34141704S		3.72	119	51		78.16		
121mm DRILL COLLAR x 14		9095	132.88	122	59		211.04		
		13495	211.04						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	13495	11740	11153
Excl. HWDP	13495	11740	11153
Below JARS	4400	3828	3636
Above JARS	9095	7912	7516

SPERRY-SUN

Well: PAN AM A-2 POINTED MTN

BHA Run 6

MD in (m)	MD out	Interval	TVD in	TVD out	BHA type	Method
3057.00	0.00	0.00	3015.88	0.00	H	ROTARY

BHA performance: (°/30m)

Expected dogleg(rotary) ...	1.00	Avg.build:	0.00 *	Avg.turn.:	0.00
Expected dogleg(oriented) :	0.00	Max.build:	5.84 *	Max.turn.:	-6.18
		Min.build:	5.84 *	Min.turn.:	-6.18

BHA components: BIT I, SUB NB, SUB FS, SUB SK, 16 x 127 DC, JAR, 6 x 121 DC

Formations: 2ND BLACK SHALE, NAHANNI

Bit# 5 Size: 156 mm Type: F57D Make: SMITH TOOL
TFA.: 2.168 cm2 Hrs.: 35.75 Condition: 5-4-I

Mtr#	Size:	0	mm	Type:	Make:
	Desr:				

BHA run summary:

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BHA # 6 - BHA TALLY

Well: PAN AM A-2 POINTED MTN

MD in.: 3057.00 m TVD in.: 3015.98 m Bit size: 156 mm
MD out.: 0.00 m TVD out.: 0.00 m Jets: 2/3.7 1/11.1 mm
Interval: TFA: 2.168 cm2

Description	S/n	Weight (daN)	Item length (m)	Item OD (mm)	Item ID (mm)	Bit/STB gauge (mm)	Len.fr. bit (m)	Belly length (m)	Bit to CB STB (m)
156mm INSERT BIT	LA2290		0.15				0.15		
124mm BIT SUB	2786		0.50	124	54		0.65		
121mm FLOAT SUB	3227		0.77	121	58		1.42		
121mm SHOCK SUB	1454711900		2.15	122	38		3.57		
121mm DRILL COLLAR x 16		7274	148.30	127	59		151.87		
121mm JARS	34141704S		3.72	119	51		155.59		
121mm DRILL COLLAR x 6		3815	57.03	121	59		212.62		
		11089	212.62						

WEIGHTS:	In air (daN)	In 1.02 gm/cc mud (daN)	With 5% safety factor (daN)
Total BHA	11089	9647	9164
Excl. HWDP	11089	9647	9164
Below JARS	7274	6328	6011
Above JARS	3815	3319	3153

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BIT RECORDS Well: PAN AM A-2 POINTED MTN

BHA Bit Run #	Size (mm)	MD in / MD out/ Interval (m)	Inc. in Inc. out Change (°)	Bit type / Make/ S/n	IADC code BHA type Motor	Jois / TFA (mm/cm2)	ROB / Av.ROP (m/hr)	Condition / Formations
2 1	156	2856.00 2914.00 58.00	12.40 12.40 0.00	ATJ M33D HUGHES L12WG	537 B 121 mm SPERRY DRILL PDM	2/12.7 1/7.1 2.936	16.25 3.57	7-8-1MM A
2 2	156	2914.00 2914.00 0.00		ATJM-33D HUGHES L13WG	537X B 121 mm SPERRY DRILL PDM	2/7.9 1/12.7 2.252	0.00	A
3 2RR1	156	2914.00 2977.00 63.00	24.30 21.90 -2.40	ATJM-33D HUGHES L13WG	537X B 121 mm SPERRY DRILL PDM	2/7.9 1/12.7 2.252	20.25 3.11	7-7-1MM A
4 3	156	2978.00 3013.00 35.00	21.50 21.80 0.30	PDC DB STRATA BIT 4930324	M646 B 121 mm SPERRY DRILL PDM	3/20.6 10.033	13.75 2.55	INSIDE & GUAGE DAMAGE A
5 4	156	3013.00 3057.00 44.00	23.70 33.10 9.40	F57D SMITH TOOL LA2293	637Y B 121 mm SPERRY DRILL PDM	2/8.7 1/11.1 2.168	18.25 2.41	7-4-2MM A
6 5	156	3057.00 0.00 0.00	33.10 33.10 0.00	F57D SMITH TOOL LA2290	637Y H	2/8.7 1/11.1 2.168	35.75 0.00	5-4-I

NOTES: 1: Inclination in/out derived from the original survey closest to the MD in/out within the BHA run course length
2: BHA types.....: B:build / D:drop / H:hold / T:turn / O:other
3: formation names:
A: 2ND BLACK SHALE

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MOTOR RUNS SUMMARY

Well: PAN AM A-2 POINTED MTN

BHA run	DHM #	Hole size / Motor size / Description (mm)	MD in / MD out / Interval (m)	Inc. in / Inc. out / Change	Dir. in / Dir. out / Change	Type / Make / s/n	Bit type / BHA type / Flow rate (m3/min)	Formations	Hours	Drig -	Drig
1	1	156	2856.00	12.40	96.02	PDM	ATJ M33D				
		121	2914.00	12.40	96.02	SPERRY DRILL	B				
			58.00	0.00	0.00	475012B	0.00	39.00	18.75	15.25	
		1.93 DEG ADJ 6.3 STG 4/5 LOBE SLICK									
2	2	156	2914.00	0.00	0.00	PDM	ATJM-33D				
		121	2914.00	0.00	0.00	SPERRY DRILL	B				
			0.00	0.00	0.00	475013B	0.00				
		1.5 DEG ADJ 6.3 STG SLICK									
3	2RR1	156	2914.00	24.30	66.60	PDM	ATJM-33D				
		121	2977.00	21.90	41.50	SPERRY DRILL	B				
			63.00	-2.40	-25.10	475013B	0.00	55.00	23.00	20.25	
		1.5 DEG ADJ 6.3 STG SLICK									
4	2RR2	156	2978.00	21.50	41.10	PDM	PDC				
		121	3013.00	21.80	36.60	SPERRY DRILL	B				
			35.00	0.30	-4.50	475013B	0.00	39.00	21.75	13.50	
		1.5 DEG ADJ 6.3 STG SLICK									
5	3	156	3013.00	23.70	36.50	PDM	F57D				
		121	3057.00	33.10	27.10	SPERRY DRILL	B				
			44.00	9.40	-9.40	475110	0.00	46.00	23.50	18.25	
		1.5 DEG ADJ MS BH 3.5 STG SLICK									

NOTES: 1: Inclination in/out and direction in/out are derived from the original survey closest to the MD in/out within the BHA run course length

2: BHA types..... B:build / D:drop / H:hold / T:turn / O:other

3: formation names:

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MUD DATA

Well: PAN AM A-2 POINTED MTN

MD	Mud type	MW	Vis	PV	YP	pH/ Aw*	Water loss	Temp out	Oil/Water/Solids	Sand
(m)		(gm/cc)	(sec/lt)	(cp)			(cc)	(°C)	----- %-----	(%)
2855.00	POLYMER WATER	1.01	30	3		9.0			0.0/ 0.0/ 1.0	0.0
2860.00	POLYMER WATER	1.01	29	3					0.0/ 0.0/ 1.0	0.0
0.00	POLYMER WATER	1.01	29	3					0.0/ 0.0/ 1.0	0.0
0.00	POLYMER WATER	1.01	29	3					0.0/ 0.0/ 1.0	0.0
2977.00	POLYMER WATER	1.01	32	3			14.6		0.0/ 0.0/ 1.0	0.0
2977.00	POLYMER WATER	1.01	32	12	2.1	10.0	8.0	35	0.0/ 0.0/ 1.0	0.0
3013.00	POLYMER WATER	1.01	32	12	2.1	10.0	8.0	35	0.0/ 0.0/ 1.0	0.0
3030.00	POLYMER WATER	1.01	38	11	2.1	10.0	10.0	26	0.0/ 0.0/ 1.0	0.0
3057.00	POLYMER WATER	1.01	38	11	2.1	10.0	10.0	26	0.0/ 0.0/ 1.0	0.0
3067.00	POLYMER WATER	1.01	38	11	2.1	10.0	10.0	25	0.0/ 0.0/ 1.0	0.0
3156.00	POLYMER WATER	1.02	45	21	4.2	10.0	7.2	26	0.0/ 0.0/ 1.0	0.0
3156.00	POLYMER WATER	1.02	45	21	4.2	10.0	7.2	26	0.0/ 0.0/ 1.0	0.0
3156.00	POLYMER WATER	1.02	45	21	4.2	10.0	7.2	26	0.0/ 0.0/ 1.0	0.0
3156.00	POLYMER WATER	1.02	45	21	4.2	10.0	7.2	26	0.0/ 0.0/ 1.0	0.0

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ORIGINAL WORKING SURVEYS

Well: PAN AM A-2 POINTED MTN

MD (m)	Angle	Direction (azimuth)	Survey type	TVD (m)	Rect.Coordinates		Vertical section (m)	Dog-leg severity (°/30m)	Rate of build (°/30m)	Rate of turn (°/30m)
					N(-S) (m)	E(-W) (m)				
2854.00	14.00	96.02	TIE ON	2829.28	2.87	303.98	0.00	0.00	0.00	0.00
2862.57	17.30	89.20	MWD	2837.52	2.78	306.32	289.77	14.30	13.30	-23.87
2891.11	21.00	73.15	MWD	2864.46	4.33	315.59	299.02	6.51	3.37	-15.37
2900.76	22.30	70.50	MWD	2873.43	5.44	318.97	302.58	5.06	4.05	-3.24
2910.53	24.00	70.30	MWD	2882.41	6.73	322.59	306.42	5.23	5.22	-0.61
2920.00	24.30	66.60	MWD	2891.05	8.15	326.19	310.29	4.89	0.95	-11.72
2929.85	24.00	61.50	MWD	2900.04	9.91	329.81	314.29	6.42	-0.92	-15.53
2939.41	23.30	56.40	MWD	2908.80	11.89	333.10	318.04	6.78	-2.19	-16.00
2949.13	23.20	50.30	MWD	2917.73	14.17	336.17	321.71	7.43	-0.31	-18.83
2958.77	22.70	46.00	MWD	2926.61	16.68	338.97	325.18	5.44	-1.56	-13.39
2972.78	21.90	41.50	MWD	2939.57	20.51	342.65	329.92	4.04	-1.71	-9.64
2982.45	21.50	41.10	MWD	2948.56	23.20	345.00	333.04	1.32	-1.24	-1.24
2992.13	20.80	41.80	MWD	2957.58	25.82	347.31	336.09	2.30	-2.17	2.17
3001.07	21.20	38.50	MWD	2965.93	28.26	349.38	338.85	4.19	1.34	-11.07
3010.58	21.80	36.60	MWD	2974.78	31.03	351.50	341.77	2.90	1.89	-5.99
3020.27	23.70	36.50	MWD	2983.71	34.04	353.73	344.88	5.89	5.89	-0.31
3029.85	26.00	33.00	MWD	2992.41	37.35	356.02	348.14	8.54	7.20	-10.96
3039.53	29.70	30.70	MWD	3000.97	41.19	358.40	351.67	11.94	11.47	-7.13
3057.00	33.10	27.10	EXTRAP	3015.88	49.16	362.79	358.46	6.66	5.84	-6.18

VERTICAL SECTION IS RELATIVE TO WELL HEAD ALONG AZIMUTH 70.55 °.
MINIMUM CURVATURE CALCULATION METHOD USED.

Sperry-Sun of Canada

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POINTED MOUNTAIN, 123 53'52.78

APPENDIX

IADC BIT CONDITION GRADING

BHA COMPONENT CODES

IADC BIT CONDITION GRADING

The IADC grading system for fixed cutter bits records 8 parameters which are as follows:

Cutting structure				B	G	Remarks	
Inner Rows	Outer rows	Dull char.	Location	Brng/seals	Gauge 1/16"	Other char.	Reason pulled
a	b	c	d	e	f	g	h

a and b
0: no wear 8: no useable cutting structure

d
C: cone N: nose T: taper S: shoulder G: gauge A: all areas/rows M: middle row H: heel row

e
Non-sealed bearings 0: no life used 8: all life used Sealed bearings E: seals effective F: seals failed X: fixed cutter bits

c and g
*BC: broken cone BT: broken teeth/cutters BU: balled up *CC: cracked cone *CD: cone dragged CI: cone interference CR: cored CT: chipped teeth/cutters ER: erosion FC: flat crested wear HC: heat checking JD: junk damage *LC: lost cone LN: lost nozzle LT: lost teeth/cutters OC: off-centre wear PB: pinched bit PN: plugged nozzle/flow passage RG: rounded gauge RO: ring out SD: shirttail damage SS: self sharpening wear TR: tracking WO: washed out - bit WT: worn teeth/cutters NO: no major/other dull characteristics * show cone # under location

f
1 in gauge 1/16 under gauge 1/8 under gauge 3/16 under gauge etc...

h
BHA: change bottomhole assembly DMF: downhole motor failure DSF: drillstring failure DST: drill stem test DTF: downhole tool failure LOG: run logs RIG: repair rig CM: condition mud CP: core point DP: drill plug FM: formation change HP: hole problems HR: hours PP: pump pressure PR: penetration rate TD: total depth/casing depth TQ: torque TW: twist-off WC: weather conditions WO: washout - drillstring

Sperry-Sun of Canada

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BHA COMPONENT CODES

Well: PAN AM A-2 POINTED MTN

Group	Description	Code
BITS	mm PDC BIT	BIT P
BITS	mm MILLED TOOTH BIT	BIT M
BITS	mm CORE BIT	BIT C
BITS	mm INSERT BIT	BIT I
BITS	mm DIAMOND BIT	BIT D
COLLARS	mm DRILL COLLAR	DC
COLLARS	mm SHORT DC	SDC
COLLARS	mm NON-MAG DC	NMDC
COLLARS	mm SHORT NON-MAG DC	SNMDC
COLLARS	mm FLEX NON-MAG DC	FNMDC
COLLARS	mm SHORT FLEX NMDC	SFNMDC
DRILL PIPE	mm GRADE E DRILLPIPE	DP E
DRILL PIPE	mm GRADE G DRILLPIPE	DP G
DRILL PIPE	mm GRADE S135 DP	DP S
FISHING TOOLS	mm OVERSHOT	O/S
HWDP	mm HWDP	HWDP
JARS	mm JARS	JAR
MILLING TOOLS	mm MILL	MILL
MOTORS	mm PDM	MTR P
MOTORS	mm TURBINE	MTR T
MOTORS	mm 1. DEG /S BH	MTR BH
MOTORS	mm x DEG /S DB	MTR DB
MOTORS	ADJUS. mm deg /S BH	MTR AJ
MWD TOOLS	mm MWD HOS	MWD HS
MWD TOOLS	mm TELECO MWD	MWD T
REAMERS	mm STG /PT REAMER	RR
REAMERS	mm NB /PT REAMER	RR NB
STABILIZERS	mm HOLE OPENER	STB HO
STABILIZERS	mm MANDREL STB	STB M
STABILIZERS	mm NEAR BIT STB	STB NB
STABILIZERS	mm NON-MAG STB	STB NM
STABILIZERS	mm NON-MAG STRING STB	STBNMS
STABILIZERS	mm NON-ROTATING STB	STB NR
STABILIZERS	mm STRING STB	STB S
SUBS	mm BIT SUB	SUB NB
SUBS	mm EXTENSION SUB	SUB XT
SUBS	mm CROSSOVER	SUB XO
SUBS	mm SHOCK SUB	SUB SK
SUBS	mm UBHO SUB	SUB UB
SUBS	mm ORIENTATION SUB	SUB OR
SUBS	mm HANG OFF SUB	SUB HO
SUBS	mm DOUBLE PIN SUB	SUB DP
SUBS	mm NM CROSSOVER	SUBNXO

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BHA COMPONENT CODES

Well: PAN AM A-2 POINTED MTN

Group	Description	Code
SUBS	mm FLOAT SUB	SUB FS
SUBS	mm PICKUP SUB	SUB PU

AMOCO ~~At~~ Pan Am Pointed Mountain A-1

(P-53)

DAY CURVE INFORMATION

SPUD - TD EST DAYS _____ ACT DAYS _____
 SPUD - RR EST DAYS _____ ACT DAYS _____
 AUTHORIZED TO _____ m

RECORD WELL

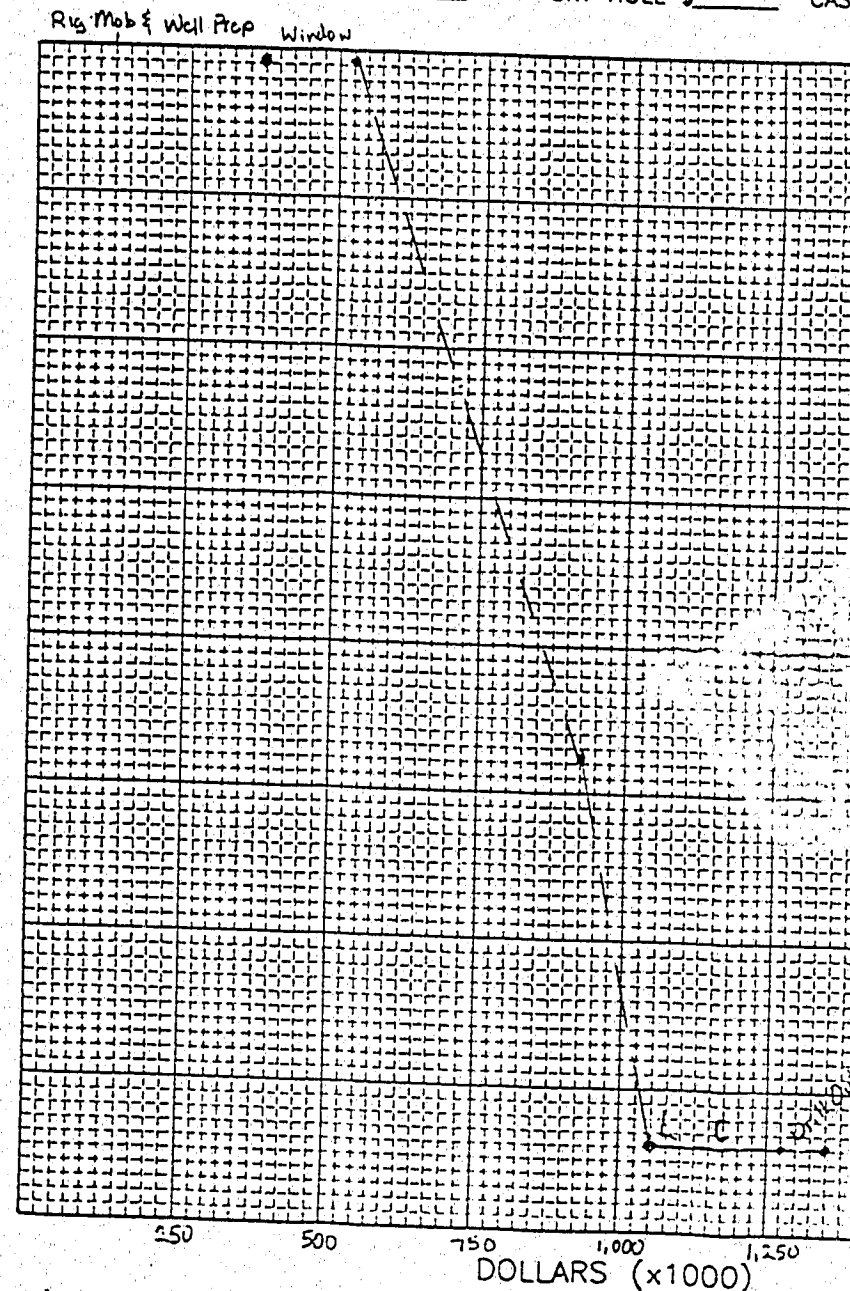
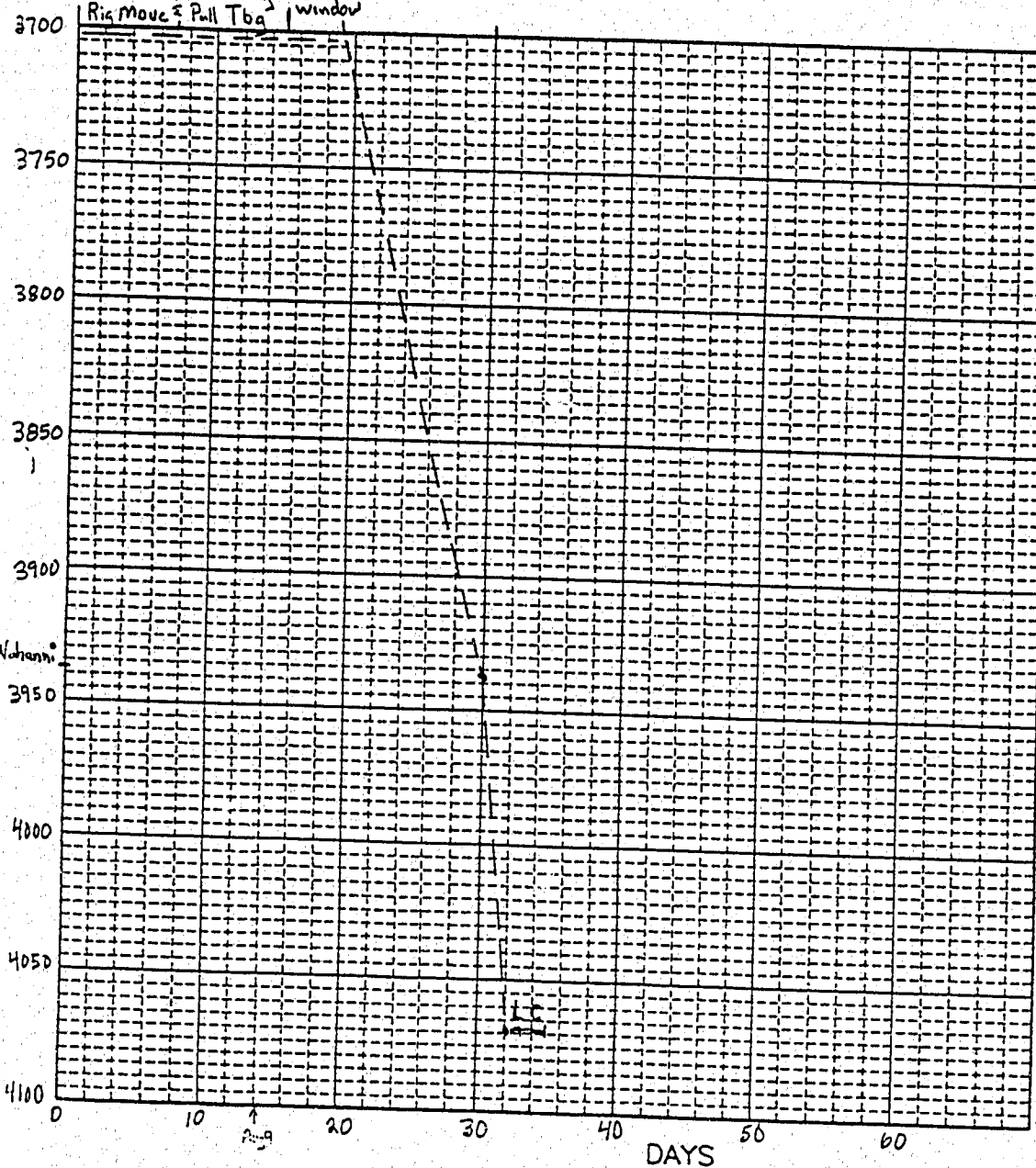
LOCATION _____
 SPUD - TD _____ DAYS _____ HRS.
 CORE _____ YES _____ NO

CONTRACTOR INFORMATION

RIG NAME _____
 SPUD DATE _____
 RIG RELEASE DATE _____

COST CURVE INFO

CONSTRUCTION ESTIMATE \$ _____
 MIRU ESTIMATE \$ _____
 DRY HOLE \$ _____ CASE



Deviation Survey

File with
K-45A

S C I E N T I F I C D R I L L I N G I N T E R N A T I O N A L

Calgary, Alberta Canada

"Finder" North Seeking Gyroscope

Directional Survey Report

for

Amoco Canada Petroleum Company Limited

Well Name : AMOCO POINTED MOUNTAIN

Well Number : AMOCO A2 POINTED MOUNTAIN K45AE

S.D.I. Job Number : 90-FG-0694195

Location Latitude : 60.41

Survey Date : 18-JUN-94

S.D.I. Personnel : MIKE HOWATT

North Reference : True North

Length Units : Meters

Proposal Direction : 89.470

Calculation Method : Minimum Curvature

Survey Depth Reference Information

- Zero Point on Tool : SENSOR

- Zeroed To : RKB of Drilling Rig

- RKB Height : 5.0 METERS

MULTI SHOT SURVEY RUN IN CASING

S C I E N T I F I C D R I L L I N G I N T E R N A T I O N A L

SDI Job No.
90-FG-0694195

Inrun Survey
for

Page 1

Amoco Canada Petroleum Company Limited

Well Name : AMOCO POINTED MOUNTAIN

Date : 18-JUN-94

Well No. : AMOCO A2 POINTED MOUNTAIN K45

Proposal : 89.47

Depth (Meters)	T.V.D. (Meters)	V.S. (Meters)	Inc Deg.	True North Azimuth Deg.	Co-ordinates (N+/S-)	(E+/W-)	D-leg /30
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	30.00	0.04	0.55	13.42	0.14	0.03	0.55
60.00	60.00	0.15	0.67	28.61	0.43	0.15	0.20
90.00	89.99	0.55	1.21	74.79	0.67	0.54	0.89
120.00	119.98	1.28	1.68	97.61	0.69	1.28	0.73
150.00	149.97	2.20	1.86	99.68	0.55	2.19	0.19
180.00	179.96	3.04	1.54	113.68	0.31	3.04	0.52
210.00	209.95	3.67	1.20	124.23	-0.03	3.67	0.42
240.00	239.94	4.16	1.10	125.29	-0.37	4.16	0.10
270.00	269.94	4.64	1.10	121.71	-0.69	4.64	0.07
300.00	299.93	5.13	1.10	119.22	-0.98	5.14	0.05
330.00	329.93	5.56	0.89	130.25	-1.27	5.57	0.29
360.00	359.92	5.84	0.63	140.20	-1.55	5.86	0.29
390.00	389.92	6.02	0.46	140.35	-1.77	6.04	0.17
420.00	419.92	6.28	0.94	132.15	-2.03	6.30	0.49
450.00	449.91	6.85	1.76	120.70	-2.43	6.88	0.86
480.00	479.90	7.67	1.87	118.46	-2.90	7.70	0.13
510.00	509.88	8.53	1.82	116.89	-3.35	8.56	0.07
540.00	539.87	9.42	1.92	110.96	-3.74	9.45	0.22
570.00	569.85	10.34	1.82	108.40	-4.07	10.37	0.13
600.00	599.84	11.17	1.51	102.02	-4.30	11.21	0.37
630.00	629.83	11.80	1.01	63.89	-4.27	11.84	0.95
660.00	659.83	12.14	0.70	34.48	-4.00	12.18	0.52
690.00	689.82	12.40	0.88	42.39	-3.68	12.44	0.21
720.00	719.82	12.79	1.13	50.84	-3.33	12.82	0.29
750.00	749.81	13.29	1.27	53.62	-2.94	13.31	0.15
780.00	779.80	13.80	1.07	61.23	-2.61	13.83	0.25
810.00	809.80	14.22	0.79	57.14	-2.37	14.24	0.28
840.00	839.80	14.49	0.68	29.27	-2.10	14.51	0.37
870.00	869.79	14.67	1.02	20.78	-1.69	14.69	0.36
900.00	899.79	15.02	1.68	34.20	-1.08	15.03	0.73
930.00	929.77	15.62	2.04	41.26	-0.32	15.63	0.43
960.00	959.75	16.39	2.25	43.88	0.51	16.39	0.23
990.00	989.73	17.25	2.43	43.84	1.39	17.23	0.18
1020.00	1019.70	18.16	2.56	43.74	2.33	18.14	0.14

S C I E N T I F I C D R I L L I N G I N T E R N A T I O N A L

SDI Job No.
90-FG-0694195

Inrun Survey
for

Page 2

Amoco Canada Petroleum Company Limited

Well Name : AMOCO POINTED MOUNTAIN

Date : 18-JUN-94

Well No. : AMOCO A2 POINTED MOUNTAIN K45

Proposal : 89.47

Depth (Meters)	T.V.D. (Meters)	V.S. (Meters)	Inc Deg.	True North		Co-ordinates		D-leg /30
				Azimuth Deg.		(N+/S-)	(E+/W-)	
1050.00	1049.66	19.12	2.68	44.53		3.32	19.09	0.12
1080.00	1079.63	20.15	2.80	45.89		4.33	20.11	0.14
1110.00	1109.59	21.27	2.98	47.87		5.36	21.22	0.20
1140.00	1139.55	22.51	3.25	50.52		6.42	22.45	0.30
1170.00	1169.50	23.92	3.49	54.23		7.50	23.85	0.33
1200.00	1199.44	25.49	3.70	58.51		8.54	25.42	0.34
1230.00	1229.37	27.23	3.95	60.80		9.55	27.14	0.29
1260.00	1259.29	29.17	4.36	64.22		10.55	29.07	0.48
1290.00	1289.19	31.48	5.11	72.51		11.45	31.37	1.01
1320.00	1319.06	34.19	5.60	77.90		12.15	34.08	0.70
1350.00	1348.91	37.10	5.73	78.79		12.75	36.98	0.16
1380.00	1378.76	40.09	5.91	79.40		13.33	39.97	0.19
1410.00	1408.59	43.20	6.15	80.34		13.88	43.07	0.26
1440.00	1438.41	46.45	6.45	82.14		14.38	46.32	0.36
1470.00	1468.21	49.84	6.62	82.68		14.83	49.71	0.18
1500.00	1498.01	53.28	6.65	81.40		15.31	53.14	0.15
1530.00	1527.81	56.73	6.73	79.29		15.90	56.59	0.26
1560.00	1557.60	60.21	6.85	77.27		16.62	60.06	0.27
1590.00	1587.38	63.72	6.94	76.57		17.44	63.56	0.12
1620.00	1617.16	67.25	6.92	75.91		18.30	67.08	0.08
1650.00	1646.95	70.73	6.81	75.12		19.19	70.55	0.14
1680.00	1676.73	74.23	7.01	76.08		20.09	74.05	0.22
1710.00	1706.49	77.93	7.49	78.65		20.91	77.74	0.58
1740.00	1736.21	81.95	8.13	82.09		21.59	81.76	0.80
1770.00	1765.89	86.33	8.74	85.08		22.08	86.13	0.75
1800.00	1795.52	90.98	9.14	86.38		22.43	90.78	0.44
1830.00	1825.13	95.83	9.49	87.29		22.69	95.63	0.39
1860.00	1854.70	100.86	9.82	87.93		22.90	100.66	0.35
1890.00	1884.25	106.06	10.13	88.40		23.07	105.85	0.32
1920.00	1913.77	111.42	10.43	88.81		23.20	111.20	0.31
1950.00	1943.26	116.92	10.73	89.26		23.29	116.72	0.31
1980.00	1972.71	122.59	11.06	89.93		23.33	122.39	0.35
2010.00	2002.14	128.43	11.36	90.73		23.30	128.22	0.34
2040.00	2031.54	134.40	11.62	91.67		23.17	134.19	0.32
2070.00	2060.91	140.49	11.84	92.65		22.94	140.28	0.30

S C I E N T I F I C D R I L L I N G I N T E R N A T I O N A L

SDI Job No.
90-FG-0694195

Inrun Survey
for

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Amoco Canada Petroleum Company Limited

Well Name : AMOCO POINTED MOUNTAIN

Date : 18-JUN-94

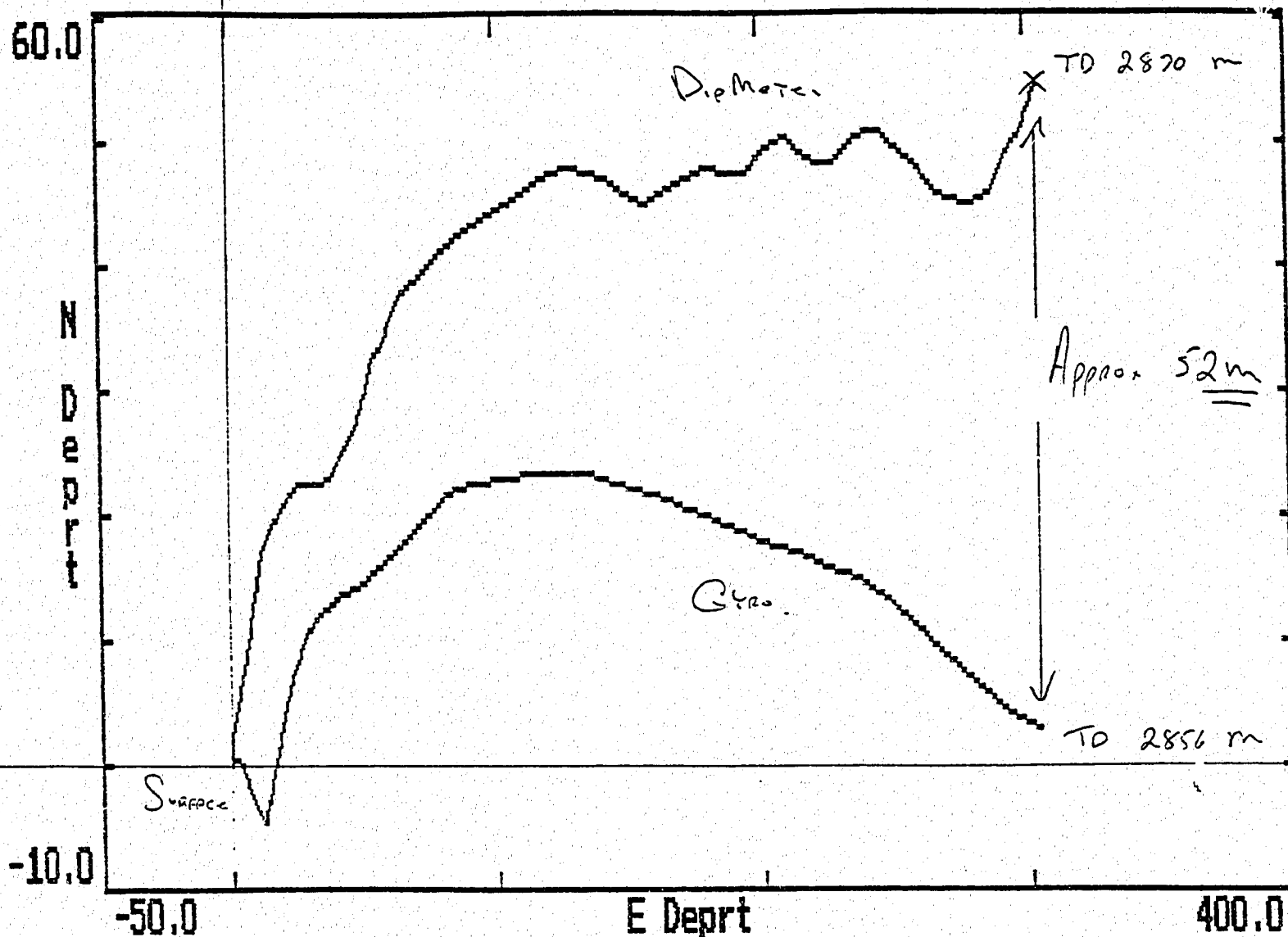
Well No. : AMOCO A2 POINTED MOUNTAIN K45

Proposal : 89.47

Depth (Meters)	T.V.D. (Meters)	V.S. (Meters)	Inc Deg.	True North Azimuth Deg.	Co-ordinates (N+/S-)	(E+/W-)	D-leg /30
2100.00	2090.26	146.69	12.05	93.55	22.61	146.48	0.28
2130.00	2119.59	153.01	12.38	94.15	22.18	152.81	0.35
2160.00	2148.87	159.52	12.76	94.54	21.68	159.33	0.40
2190.00	2178.11	166.20	13.09	95.03	21.12	166.01	0.34
2220.00	2207.31	173.03	13.37	95.23	20.51	172.85	0.29
2250.00	2236.48	180.00	13.60	95.03	19.88	179.82	0.23
2280.00	2265.64	187.01	13.57	94.79	19.28	186.84	0.06
2310.00	2294.83	193.93	13.24	94.74	18.70	193.77	0.33
2340.00	2324.07	200.60	12.56	95.39	18.11	200.44	0.70
2370.00	2353.39	206.92	11.89	95.39	17.52	206.76	0.67
2400.00	2382.77	212.96	11.47	94.20	17.01	212.82	0.49
2430.00	2412.19	218.82	11.12	94.52	16.56	218.67	0.35
2460.00	2441.64	224.51	10.86	95.86	16.04	224.37	0.36
2490.00	2471.10	230.11	10.81	95.55	15.48	229.98	0.08
2520.00	2500.57	235.71	10.80	95.43	14.95	235.58	0.02
2550.00	2530.04	241.28	10.78	96.67	14.35	241.16	0.23
2580.00	2559.50	246.86	10.91	100.07	13.53	246.74	0.65
2610.00	2588.95	252.48	11.25	103.93	12.33	252.38	0.81
2640.00	2618.34	258.31	11.84	103.34	10.91	258.22	0.60
2670.00	2647.67	264.44	12.38	101.67	9.55	264.36	0.64
2700.00	2676.96	270.79	12.63	101.22	8.27	270.73	0.28
2730.00	2706.22	277.27	12.80	100.33	7.03	277.21	0.26
2760.00	2735.47	283.81	12.83	99.18	5.90	283.77	0.26
2790.00	2764.75	290.26	12.36	99.22	4.86	290.23	0.47
2820.00	2794.08	296.50	11.97	98.90	3.86	296.48	0.39
2850.00	2823.41	302.72	12.23	96.78	3.01	302.70	0.51
2856.00	2829.27	303.99	12.40	96.02	2.86	303.98	1.18

The Horizontal Displacement (in Meters) at
Measured Depth 2856.00 is 303.99 in a Direction of 89.46 Degrees

Amoro Pointed Mountain



1870618.SI, SCLUNDIP.SI

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ADDITIONAL INFORMATION

WELL
TERMINATION
RECORD (with
attachment)



WELL TERMINATION RECORD

This record is submitted in compliance with Section 184 of the Canada Oil and Gas Drilling Regulations.

Well Name: Pointed Mountain K-45A Area: POINTED MOUNTAIN
Grid Area: 60-30-123-45 Field / Pool: _____
Interest _____ Final _____ Lat 60° 24' 33.816" N Long: 123° 53' 51.782" W
Spud Date: June 30, 1994 R.R.: 7/17/1994 Total Depth: 3216 m KB
O.D. (mm) Weight (kg/m) Grade Depth Set (m KB) Cement (m³)
508 149.0 H-40 29.0
339.7 81.3 J-55 967.6 500 SK 10% #1
244.5 64.9 J-55 2421.6 400 SK 2% #1
177.8 34.3 J-55 3422.9 800 SK 2% #1
N-80 5-95 Flow + 4% #1 + 2% HR12

PLUGGING PROGRAM

Approval of the following program was obtained by (person) J. L. BROWN
from (person) TERRY BAKER of the NEB
by means of FAX on JANUARY 19, 2001

Type of Plug	Interval (m KB)	Felt	Cement (m³)
CEMENT BASKET w/10m CEMENT ON TOP	3051.2 → 3040.0		
BRIDGE PLUG w/10m CEMENT ON TOP	2770 → 2760		
BRIDGE PLUG w/10m CEMENT ON TOP	2316 → 2306		
CEMENT RETAINER @ 1130 mKB w/CEMENT TO 845 mKB			
CEMENT RETAINER @ 480 mKB w/CEMENT TO 399 mKB			
BALANCED CEMENT PLUG FROM 240 mKB → 90 mKB			

ALSO SEE ATTACHED WELLBORE SCHEMATIC FOR MORE INFO.

Lost Circulation/Overpressure Zones:

Equipment left on Seafloor (Describe): N/AProvision for Re-entry (Describe and attach sketch): WELL HEAD LEFT IN PLACE TO CHECK FOR GAS MIGRATION.

Cores: Type: _____ Interval: _____

Other Downhole Completion/Suspension: _____

CERTIFICATION

I certify on the basis of personal knowledge of operations undertaken at the above named well that the above information is accurate.

Signed: Stan Kendrick Title: COMPLETION ENGINEER
Name: STEVEN T. KENDRICK Date: NOVEMBER 6, 2001
Company: BP CANADA

Well Status
Suspended ☐
Completed ☐
Abandoned ☒

Acknowledged by: J. M. Baker

Chief Conservation Officer

Date: Nov 21/01File: 9011-AA-2-1UWI: 300K456030123455 WID: 1798

ABANDONMENT PLUGS & CEMENT

Well: Pan Am Pointed Mtn. A-2A (K-45A)

Date: March 4, 01

		ITEM	DESCRIPTION	Date	DEPTH KB
		No.			(M)
Cement@90 200-201	H		Bal Cement to 240.0- 90mKB	01-03-04	
	P9		Bal Cement to 399mKB. Squ to 4.0mPA	01-03-03	
	J		C.Ret.@480.0MKB.	01-03-02	
Cement @399 475-476 480m,C.Ret.	G		Bal Cement to 845mKB. Squ to 7.0mPA	01-02-28	
	P8		C.Ret.@1130mKB.	01-02-27	
	P10		Perf 1140-1141. 38.5gm. DP. 60°. 18shots	01-02-27	
690-691	H		C. RET. @ 175 M K.B. Drilled out Feb1,01	01-02-04	175.00
	F		22 T & TAIL-IN11.6 T		
	P9		PERFORATE 200 TO 201	98-07-07	
Cement Top 845mKB	G		C. RET. @ 445 M K.B.Drilled Out Feb 1,01	01-02-04	445.00
			22 TONNES CLASS 'G'		
	F		B.PLUG @ 685 M Drilled out Feb 1,01	01-02-04	685.00
	P8		PERFOATED 475 TO 476 M		
	P7		PERFORATE 690 TO 691 M	98-07-06	
			BAL PLUG 991 TO 861M 3.5 T CLASS'G'		
	P6		PERFORATE 991 TO 992 M	98-07-06	
	P5		PERF 977 TO 978 M	98-07-06	
	M-1		SECTION MILL @ 970 M TO 977 M K.B.		
	E		C.RET. @1031 MKB.Drilled Cut Feb 10,01		1031.00
965 - 966 Milled section 970-977.0 mKB	P6		CEMENTED WITH 6 M3 'G'.		
	P4		1150 TO 1151 M	98-07-03	
					1031.00
977-978 991-992	P5		P3 1026 TO 1027 M	98-07-03	
	D		C. RET @ 944 M K.B. Drilled Out 98-07-02	98-06-30	944.00
			CEMENTED WITH 10 M3 CLASS 'G'		
1026 - 1027	P3		P2 965 to 966 m K.B	98-06-30	
	E				
	I				
1130C.Ret.	P10		C B.P. @ 2316M. 10m. cement	98-06-29	2306.00
	P1		PERFS 2325.5 TO 2326.5	94-07-12	
			6.6 TONNE THERMAL) IN STAGES MAX 21 Mpa		
1140 - 1141 1150-1151	P4		B Bridge plug @ 2770 with 10 vertical m. cement	cement top	2760.00
				cement top	3040.00
	A		Cement Basket @ 3051.2mKB Top10 Vert M.cement		3051.20
PERFORATION INTERVALS:					
		FORMATION	INTERVAL (M / KB)	SIZE	GUN: TYPE PHAS SPM CHARGES TYPE VT (g)
		NAHANNI	3082.25 to 3216M KB. OPEN HOLE SECTION		
Top @ 2316 2325.5-2326.5	C				
	P1				
LINER TOP @ 2794.16 M KB	B	REMARKS: DRAWN FROM WELL FILE AND NOT TO SCALE.			
		PREVIOUS PERFS SQUEEZED ON 94-07-12 AT 2325.5 - 2326.5 mKB. Cemented with 6.6t Thermal 40F.			
		Squeeze perforations at 947-948 mKB with 8.3 m3 Thermal 40F cement.			
T.D. @ 3216 M KB	A	NOT TO SCALE			
		WELLSITE SUPERVISOR		Cunningham/Fay/Bauer	
		DATE INSTALLED		Mar:3,01	
OTHER: LINER TOP @ 2794.16 M KB					