AUTHORITY TO DRILL A WELL

CANADA

Exploratory ☐ Delineation ☒
Development ☐ 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: SUNCOR NETLA P-16

Operator: SUNCOR ENERGY INC. | Drilling Program No.: NA

Contractor: AKITA DRILLING | Permit or Lease No.: ---

Drilling Rig or Unit: #37 | Estimated Well Cost: $1,659,000.00

Location-Unit: P Section: 16 Grid Area: 60° 50', 122° 45'

Coordinates: Lat.: 60° 45' 57.556" Long.: 122° 47' 07.157"

Area: NETLA | Field/Pool: DELINEATION

Elevation-RT/KB: 621.0mKB (ASL) | Seafloor: NA (BRT)

Approx. Spud Date: DECEMBER 21, 1999 | Estimated Days on Location: 21 DAYS

Anticipated Total Depth: 2137mKB | Target Horizon(s): SLAVE POINT

EVALUATION PROGRAM

Ten-metre sample intervals: ~~---~~ Surface Casing Shoe

Five-metre sample intervals: FROM ~~1900mKB~~ TO TOTAL DEPTH

Canned sample intervals: ---

Conventional cores at: ONE 18 METRE CORE IN UPPER SLAVE POINT POROSITY FROM 1962mKB TO 1980mKB

Logs and Tests: SEE ATTACHED.

CASING AND CEMENTING PROGRAM

O.D.	Weight:	Grade:	Setting Depth Below Seafloor:	Cementing Program (Volumes):
508mm	CONDUCTOR PIPE		20mKB	12.12m³
244.5mm	53.57 kg/m	J-55	540mKB	39.15m³
177.8mm	34.23 kg/m	L-80	2137mKB	36.96m³

B.O.P. Equipment: AS PER CANADA OIL & GAS DRILLING REGULATIONS, SECTION 60.
ACTUAL BOP INFORMATION: SEE ATTACHED.

Other Information: REQUEST AUTHORIZATION TO SET SURFACE CASING TO 540mKB, REQUEST BASED ON FACT THAT THE FORMATIONS ENCOUNTERED TO 540mKB AND DOWN TO ± 664mKB ARE ALL SIMILAR KOTCHO SHALES. SEE ATTACHED IMPERIAL SUN NETLA D-7 OFFSET WELL INFORMATION. AS SUCH AN EQUIVALENT AMOUNT OF SAFETY IS CLAIMED.

Signed: [signature] Title: DRILLING & COMPLETIONS ENGINEER

Date: SEPT. 10/99 Company: SUNCOR ENERGY INC.

APPROVAL

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

Signed: [signature]
Chief Conservation Officer

Date: Dec. 15/99

File: 9211-S85-2-3, WID 1874

UWI 300P166050122450

Canada

WELL TERMINATION RECORD (with attachment)

National Energy Board | Office national de l'énergie

WELL TERMINATION RECORD

This record is submitted in compliance with Section 164 of the Canada Oil and Gas Drilling Regulations.

Well Name: SUNCOR NETLA P-16 Area: NETLA

Grid Area: 60° 50' N, 122° 45' W Field/Pool: DELINEATION

Internet Identifier: --- Final Coordinates: Lat: 60° 45' 57.556" N Long: 122° 47' 7.157" W

Drilling Unit: AKITA 37 Elevations-KB/RT: KB = 607.0m (ASL) GL/Seafloor: GL = 602.3m

Spud Date: DECEMBER 21, 1999 R.R. JANUARY 13, 2000 Total Depth: 2099.0m/PBTD 0.0m

O.D. (mm)	Weight (kg/m)	Grade	Depth Set (m KB)	Cement (m³)
244.5	53.57	J-55	542.0	43.1m³ RFC + 2% SI

PLUGGING PROGRAM

Approval of the following program was obtained by (person) TIM KRYSAK, DRILLING & COMPLETIONS ENGINEER, SUNCOR from (person) ANDY GRAW, CONSERVATION/SAFETY OFFICER of the NATIONAL ENERGY BOARD, by means of TELEPHONE on JANUARY 11, 2000

Type of Plug	Interval (m KB)	Felt	Cement (m³)
ABANDONMENT #1	2099-2039mKB	NO	3m³ 0:1:0 "G" + ADDITIVES
ABANDONMENT #2	1950-1900mKB	1910mKB	2.5m³ 0:1:0 "G" + ADDITIVES
ABANDONMENT #2a	1910-1891mKB	NO	1m³ 0:1:0 "G" + ADDITIVES
ABANDONMENT #3	1000- 950mKB	955mKB	2.5m³ 0:1:0 "G" + ADDITIVES
ABANDONMENT #4	572- 512mKB	478mKB	4m³ 0:1:0 "G" + ADDITIVES

Lost Circulation/Overpressure Zones: NONE

Equipment left on Seafloor (Describe): NONE. WELL WAS CUT AND CAPPED AFTER APPROVAL FROM NEB.

Provision for Re-entry (Describe and attach sketch): NA, WELL IS ABANDONED.

Cores: Type: NONE Intervals:

Other Downhole Completion/Suspension Equipment: NONE

CERTIFICATION

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

Signed: [signature] Title: VICE PRESIDENT, MANAGER OF PROJECTS

Name: MICKEY J. SUTHERLAND, P.ENG. Date: JANUARY 21, 2000

Company: PAJAK ENGINEERING LTD.
FOR: SUNCOR ENERGY INC.

Acknowledged by: [signature]
Chief Conservation Officer

Date: Feb 2/00

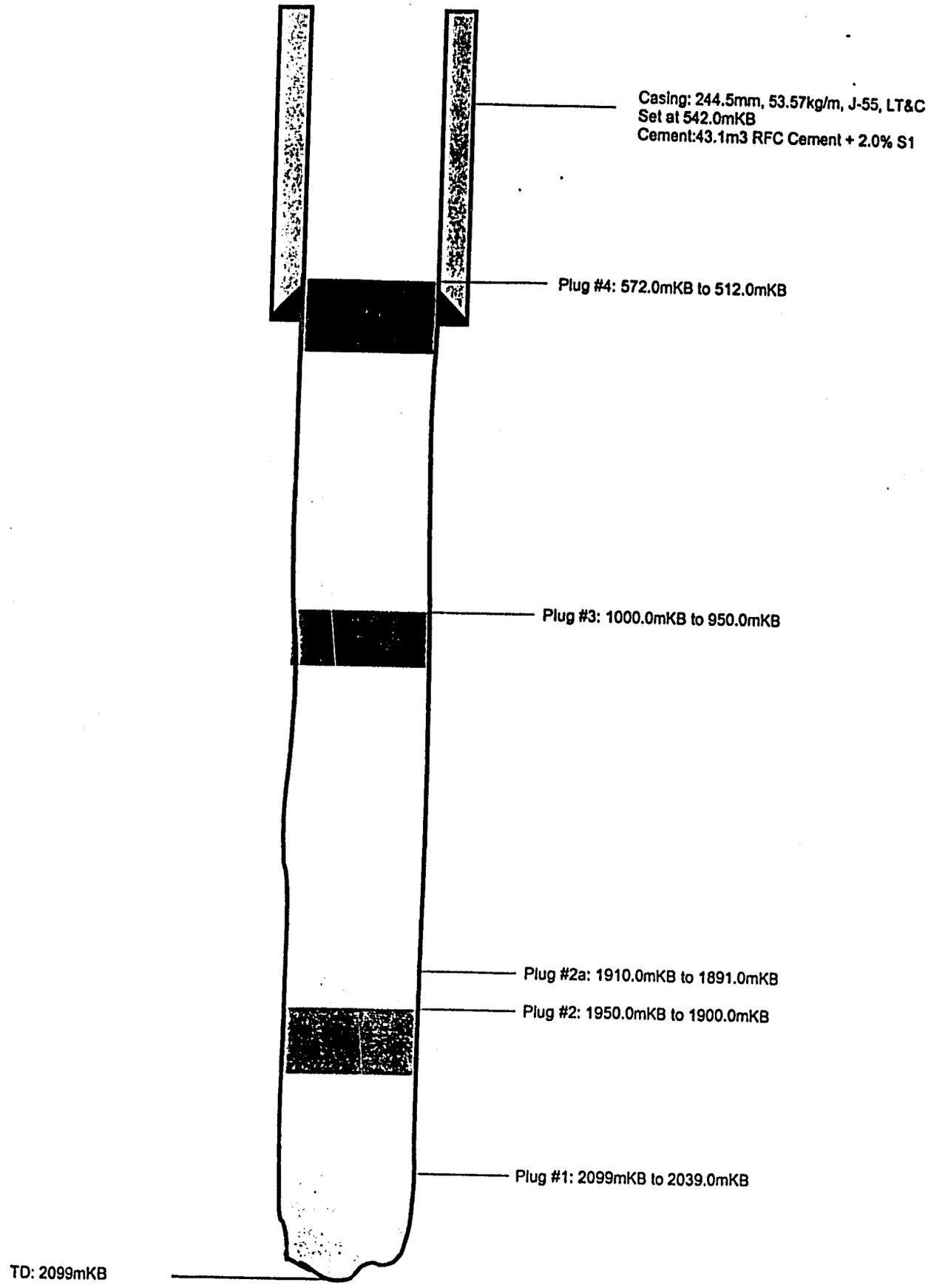
Well Status

Suspended ☐
Completed ☐
Abandoned ☒

File: 9211-S85-2-1

UWI: 300P166050122450 WID: 1874

Attachment # 1
WELLBORE SCHEMATIC
Suncor Netla P-16



FINAL WELL REPORT

N.E.B. COPY



PAJAK ENGINEERING LTD.

OILFIELD SUPERVISION & PROJECT MANAGEMENT

1660 ELVEDEN HOUSE
717- 7th AVENUE S.W.
CALGARY, ALBERTA T2P 0Z3
24 HRS (403) 264-1197
FAX (403) 264-1584

PAJAK ENGINEERING LTD.
OILFIELD SUPERVISION &
PROJECT MANAGEMENT

APEGGA
The Association of Professional Engineers, Geologists and Geophysicists of Alberta
PERMIT HOLDER

FINAL WELL REPORT

SUNCOR NETLA P-16

60° 45' 57.556" N
122° 47' 07.157" W

November, 2000

Prepared for

SUNCOR ENERGY INC.

By

Mickey Sutherland, P.Eng., V.P., Manager of Projects

Pajak Engineering Ltd.
1660 Elveden House
717 - Seventh Avenue S. W.
Calgary, Alberta T2P 0Z3

FINAL WELL REPORT
SUNCOR NETLA P-16

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(A)

FINAL WELL REPORT
SUNCOR NETLA P-16

(A) INTRODUCTION:

(i) SUMMARY:

Suncor Energy Inc. drilled the Netla P-16-60-50-122-45 well to test the potential of the Slave Point formation. The well was spudded on December 21, 1999, utilizing Akita Drilling Ltd. Rig #37. After setting surface casing to a depth of 542.0mKB, the well was drilled to a total depth of 2099mKB into the Elk Point formation. Open hole logs were run and after analysis, it was decided to abandon the well as there was no reservoir present. There were no cores or tests on the well. No other wells were drilled by Suncor in this area during this winter season.

See Attachment #1 for Well Drilling Summary Report and Daily Drilling Reports.

(ii) LOCALITY MAP:

The Suncor Netla P-16 location is located, by road, 100 kilometres north on Highway NWT-7 from the British Columbia border. 37.4 kilometres east northeast on existing seismic road and south 0.21 kilometres to location.

See Attachment #2.

(B)

(B) GENERAL DATA:

(i) WELL NAME: SUNCOR NETLA

WELL NUMBER: P-16
SURFACE LOCATION: 60° 45' 57.556" NORTH
122° 47' 07.157" WEST

BOTTOM HOLE LOCATION: NOT APPLICABLE

EXPLORATION AGREEMENT NUMBER: NETLA/910
WID: 1874

(ii) WELL LOCATION:

The Global Position System (GPS) was used as the survey system to determine the final well position. The well position was based on geological and seismic information.

(iii) UNIQUE WELL IDENTIFIER: 300P166050122450

(iv) OPERATOR AND DRILLING CONTRACTOR:

OPERATOR:
Suncor Energy Inc.
25th Floor
112 - Fourth Avenue S. W.
Calgary, Alberta
T2P 2V5

DRILLING CONTRACTOR:
Akita/Sahcho Drilling Ltd.
1110, 505 - Third Street S. W.
Calgary, Alberta
T2P 3E6

(v) DRILLING UNIT:

NAME: AKITA RIG #37
TYPE: NATIONAL 370
REGISTRY: Not Applicable
YEAR BUILT: 1988
SHIP YARD: Not Applicable

(vi) POSITION KEEPING:

Land based drilling unit using anchor and guy wire system.

(vii) SUPPORT CRAFT:

Not applicable.

(viii) DRILLING UNIT PERFORMANCE:

Not applicable. Land based drilling unit.

(ix) DIFFICULTIES AND DELAYS:

Delay:	Y2K
Day:	11 & 12
Date:	1999.12.31 & 2000.01.01
Depth:	NA
Solution:	Tripped out of hole with flow checks as required. Checked BHA and rig. Serviced rig. Functioned top blind rams. Tripped in hole to 542mKB. Waited on orders, Y2K, and monitored hole. Checked operation of all computer systems - all okay.
Time:	3.5 hours

(ix) TOTAL WELL COST:

Construction:	$ 259,081.00
Drilling:	$1,523,804.05
Abandonment:	$ 176,521.00
Completion:	$ 0.00
Clean-Up:	$ 80,000.00
Total:	$2,039,406.05

(C)

(C) SUMMARY OF DRILLING OPERATIONS:

(i) ELEVATIONS:

Kelly Bushing:	607.0m
Kelly Bushing to Ground:	4.7m
Ground:	602.3m

(ii) TOTAL DEPTH:

Drilled Depth:	2099.0mKB
Logged Depth:	2098.8mKB
Plugged-Back Depth:	0.0mKB

(iii) SPUD DATE:

1999.12.21 @ 20:00 hours.

(iv) COMPLETED DRILLING DATE:

2000.01.09 @ 14:00 hours.

(v) RIG RELEASE DATE:

2000.01.13 @ 24:00 hours.

(vi) WELL STATUS:

Abandoned.

(vii) HOLES SIZES & DEPTHS:

	Hole Size (mm)	Hole Depth (mKB)
Conductor:	508.0	19.9
Surface:	311.2	542.0
Main:	222.0	2099.0

See Attachment #3, Bit Record.

(viii) CASING & CEMENT RECORD:

See Attachment #4, Casing & Cement Record.

(ix) SIDETRACKED HOLE:

None.

(x) DRILLING FLUID:

See Attachment #5, Drilling Mud Properties Record.

(xi) FISHING OPERATIONS:

None.

(xii) WELL KICKS AND WELL CONTROL OPERATIONS:

None.

(xiii) FORMATION LEAK-OFF TESTS (FLOT):

One Formation Leak-off test was conducted on December 28, 1999. The Leak-off test was shut down after the pressure gradient of 22.0 kPa/m was reached. The formation was not fractured.

See Attachment #6 for test results.

(xiv) TIME DISTRIBUTION:

See Attachment #7 & 8.

(xv) DEVIATION SURVEY:

See Attachment #9.

(xvi) ABANDONMENT PLUGS:

See Attachment #10.

(xvii) COMPOSITE WELL RECORD:

See Attachment #11, Geological Report and Composite Well Record.

(D) GEOLOGY:

(i) DRILL CUTTINGS:

(a) Sample frequency: 5m samples from 545mKB to 2099mKB.

(b) Distribution of samples: 4 sets of 7 ml vials, 1 set of bagged unwashed cuttings.

(c) Location of stored suites of samples:

2 sets of 7 ml vials and 1 set of bagged unwashed samples were shipped to the Geological Survey of Canada, Core and Sample Depository, 3303 - 33rd Street N. W., Calgary, Alberta T2L 2A7. Telephone 403-284-0110.

1 set of 7 ml vials was retained by the operator, Suncor Energy Inc., and stored at Kestrel Data (Canada) Limited, 4221 - 23 B Street N. E., Calgary, Alberta T2E 7V9. Telephone 403-250-1119.

(ii) CORES:

No cores were cut.

(iii) LITHOLOGY:

See Attachment #11, Geological Report and Composite Well Record.

(iv) STRATAGRAPHIC COLUMN:

See Attachment #11.

(v) BIOSTRATAGRAPHIC DATA:

Not applicable.

(E) WELL EVALUATION:

(I) OPEN HOLE LOGS:

See Attachment #12.

Date	Run Number	Log Type	Interval (mKB)	Service Company
2000.01.10	One	AIT	2085.8-28.0	Schlumberger
		TDL	2085.8-28.0	Schlumberger
		LDT	2085.8-28.0	Schlumberger
		CNT	2085.8-28.0	Schlumberger
2000.01.10	Two	DSI	2078.2-542.0	Schlumberger
		MLT	2078.2-542.0	Schlumberger
		GPIT	2078.2-542.0	Schlumberger
2000.01.10	Three	Bottom Hole Temp.	2098.8	Schlumberger

(II) OTHER LOGS:

Cement Quality Plug Log. See Attachment #13.

(III) SYNTHETIC SEISMOGRAMS, VELOCITY SURVEYS, VERTICAL SEISMIC PROFILES:

See Attachment #13.

(Iv) FORMATION STIMULATION:

None.

(v) FORMATION AND PRODUCTION TEST RESULTS:

None.

(vi) DETAILED TEST PRESSURE DATA READINGS:

Not applicable.

(F) ENVIRONMENTAL WELL REPORT:

See Attachment #14.

(G) APPENDIXES TO WELL HISTORY REPORT:

(i) OIL, GAS AND WATER ANALYSIS:

Not applicable.

(ii) RESERVOIR ENGINEERING DATA ON CORES AND CUTTINGS, POROSITY, PERMEABILITY, FLUID SATURATION, DENSITY MEASUREMENTS, ETC.:

Not applicable.

(iii) PHOTOGRAPHIC RECORD OF CORE UNDER NATURAL AND ULTRA-VIOLET LIGHT:

No cores were cut.

(iv) DETAILS OF FORMATION & PRODUCTION TESTING:

Not applicable.

(v) PETROLOGICAL REPORTS:

Not applicable.

(vi) PALEONTOLOGICAL REPORTS:

Not applicable.

(vii) PALYNOLOGICAL REPORTS:

Not applicable.

(viii) GEOCHEMICAL REPORTS:

Not applicable.

(ix) AGE DETERMINATIONS (K/AR, ETC.):

Not applicable.

(x) PROCESSED COMBINATION OF WELL LOGS:

Not applicable.

(xi) DEVIATION AND DRIFT RECORDS:

Not applicable.

(xii) GAS DETECTOR LOGS OR MUD LOGGING RECORDS.

See Section (C) (xvii), Attachment #11, Geological Report & Composite Well Record.

(xiii) COMPLETION DATA SUCH AS PERFORATED INTERVALS, DOWNHOLE EQUIPMENT, TUBING & STIMULATION RECORDS:

Not applicable.

(xiv) COMPOSITE WELL RECORDS:

See Section (C) (xvii), Attachment #11.

(xv) FINAL SURVEY PLAN:

See Attachment #2.

(xvi) MUD DATA LOGGER'S REPORT:

See Section (C) (xvii), Attachment #11.

Attachment
#1

SUNCOR INC. RESOURCES GROUP

Well Summary Report

Legal Name: Suncor Netla P16-60-50-122-45
Common Name: Suncor Netla P16-60-50-122-45

Well Location

Country: CANADA
API #: Well ID: State/Prov: NWT County:
Location: 300/P- 16 Lat: 60° 50' Long: 122° 45'
Field Name: NETLA
Block: Slot No: Platform:
License No: 1874 License Date: 12/15/1999 Licensee: SUNCOR ENERGY 0054
Spud Date/Time: 12/21/1999 - 20:00 P&A Date: 1/12/2000

Surface / Bottom Hole Coordinates

	Surface Location	Bottom Hole Location
Latitude:		
Longitude:		
Distance North/(-)South:	-78.80 (m)	-78.80 (m)
Distance East/(-)West:	203.80 (m)	203.80 (m)
Measured From:	NW Corner of Unit P Section 16	NW Corner of Unit P Sec. 16

Reference Elevations

Permanent Datum: Kelly Bushing
Kelly Bushing: 607.00 (m)
Ground Level/Mudline: 602.30 (m)
Casing Flange: 602.30 (m) Date Measured: 12/26/1999
Tubing Hanger: (m) Date Measured:
KB to Datum: (m)
KB to GL/Mudline: 4.70 (m) / (m)

Datum Elev: 607.00 (m)
Water TMD: (m)
Measured Depth: 2,099.00 (m)
TVD: 2,099.00 (m)
Plugback TMD: 5.70 (m)
Fill: (m)
Deviated Well: N

Operator / Well Information

Operator: SUNCOR INC. RESOURCES GROUP
Region: NETLA Division: EXPLORATION District: GRANDE PRAIRIE
Well Type: NEW WELL Status: DRY_ABAND
Geological Play: SLAVE POINT
Authorized TVD: 2,140.00 (m) Authorized TMD: 2,140.00 (m)

Event Summary

Event Type	Objective	Start Date	End Date	Auth. Cost	Last Est.
ORIG DRILLING	EXPLORATORY	12/17/1999	1/13/2000	2,196,622	1/15/2000

Hole Section

ST No.	Pilot Hole	Size (mm)	Top MD (m)	Bottom MD (m)	Top TVD (m)	Bottom TVD (m)	Plan MD (m)	Plan TVD (m)	Start Date	End Date
OH	N	311.00		542.00					12/19/1999	12/24/1999
OH	N	222.00	542.00	2,099.00					12/24/1999	

SUNCOR ENERGY RESOURCES GROUP
WELL HISTORY

LICENCE: 1874
WELL NAME: Suncor Netla P16-60-50-122-45
PROVINCE: NWT
LOCATION: 300/P- 16 Lat: 60° 50' Long: 122° 45'
FIELD: NETLA
POOL:

SURFACE CO-ORDINATES -78.80 m S 203.80 m E **REFERENCE:** NW Corner of Unit
BOTTOM HOLE CO-ORDINATES -78.80 m S 203.80 m E **REFERENCE:** NW Corner of Unit

ELEV.: GRD. 602.30 **KB:** 607.00 **CF:** 602.30 **TD:** 2,099.00 **PBTD:** 5.70

ORIGINAL PRODUCING ZONE: SURFACE
ORIGINAL PERFORMATIONS: -

DRILLING DATA

Contractor: AKITA DRILLING LTD.
Spud: 1999/12/21 R.R.: 2000/01/13
Productive Time: 609 Non-Productive Time: 17.5 Rig Repair Time: .25
Completed Drilling: 2000/01/09 Original Completion Date: Original Completion Status:
Last Completion Date: 2000/01/13 Last Completion Status: DRY_ABAND
Drilled Status: LOCATION Directionally Drilled: Yes: No: N

MUD

K2SO4 Visplex 40.00 (m)

HOLE SIZE

m) to (m) (OH)

PLUGS

G NEAT	SLURRY 1 OF 1	2,039.00 - 2,099.00	2000/01/09
G NEAT	SLURRY 1 OF 1	1,900.00 - 1,950.00	2000/01/10
G NEAT	SLURRY 1 OF 1	950.00 - 1,000.00	2000/01/11
G NEAT	SLURRY 1 OF 1	512.00 - 572.00	2000/01/12

LOGS

CORE SUMMARY

TYPE	No.	INTERVAL	RECOVERY	FORMATION	ANALYSED

SUNCOR INTL RESOURCES GROUP
WELL LOG ANALYSIS REPORT

FORMATION TEST

WELL NAME: Suncor Netla P16-60-50-122-45

DST No.	INTERVAL	FORMATION	TEST TYPE	RECORDER #	RECORDER DEPTH	RECORDER TYPE	CHOKE

HP I	HP F	PF	FP I	FP F	SIP I	SIP F	RECOVERY / REMARKS	BHT C°

FORMATION RECORD

MARKER	SAMPLE LOG MD	TOP LOG MD	SUB SEA
EXSHAW	610.00 (m)	610.00 (m)	-3.00 (m)
KOTCHO	627.00 (m)	624.00 (m)	-17.00 (m)
KOTCHO CARBONATE	709.00 (m)	707.50 (m)	-100.50 (m)
TETCHO	974.00 (m)	971.50 (m)	-364.50 (m)
TROUT RIVER	1,077.00 (m)	1,075.50 (m)	-468.50 (m)
KAKISA	1,142.00 (m)	1,141.00 (m)	-534.00 (m)
REDKNIFE	1,171.00 (m)	1,169.00 (m)	-562.00 (m)
FT. SIMPSON	1,379.00 (m)	1,379.00 (m)	-772.00 (m)
FT. SIMPSON MARKER	1,745.00 (m)	1,744.50 (m)	-1,137.50 (m)
MUSKWA	1,892.00 (m)	1,896.00 (m)	-1,289.00 (m)
SLAVE POINT	1,923.00 (m)	1,922.00 (m)	-1,315.00 (m)
ELK POINT	2,053.00 (m)	2,054.00 (m)	-1,447.00 (m)
TOTAL DEPTH	2,099.00 (m)	2,098.80 (m)	-1,491.80 (m)

DAILY DRILLING SUMMARY REPORT

Province: NWT
Name: Suncor Netla P16-60-50-122-45
Location: 300/P- 16 Lst: 60° 50' Long: 122° 45'
Contractor: AKITA DRILLING LTD.
Elev: 607.00
Rig No.: 37
Spud Date: 1999/12/21
Rig Release: 2000/01/13

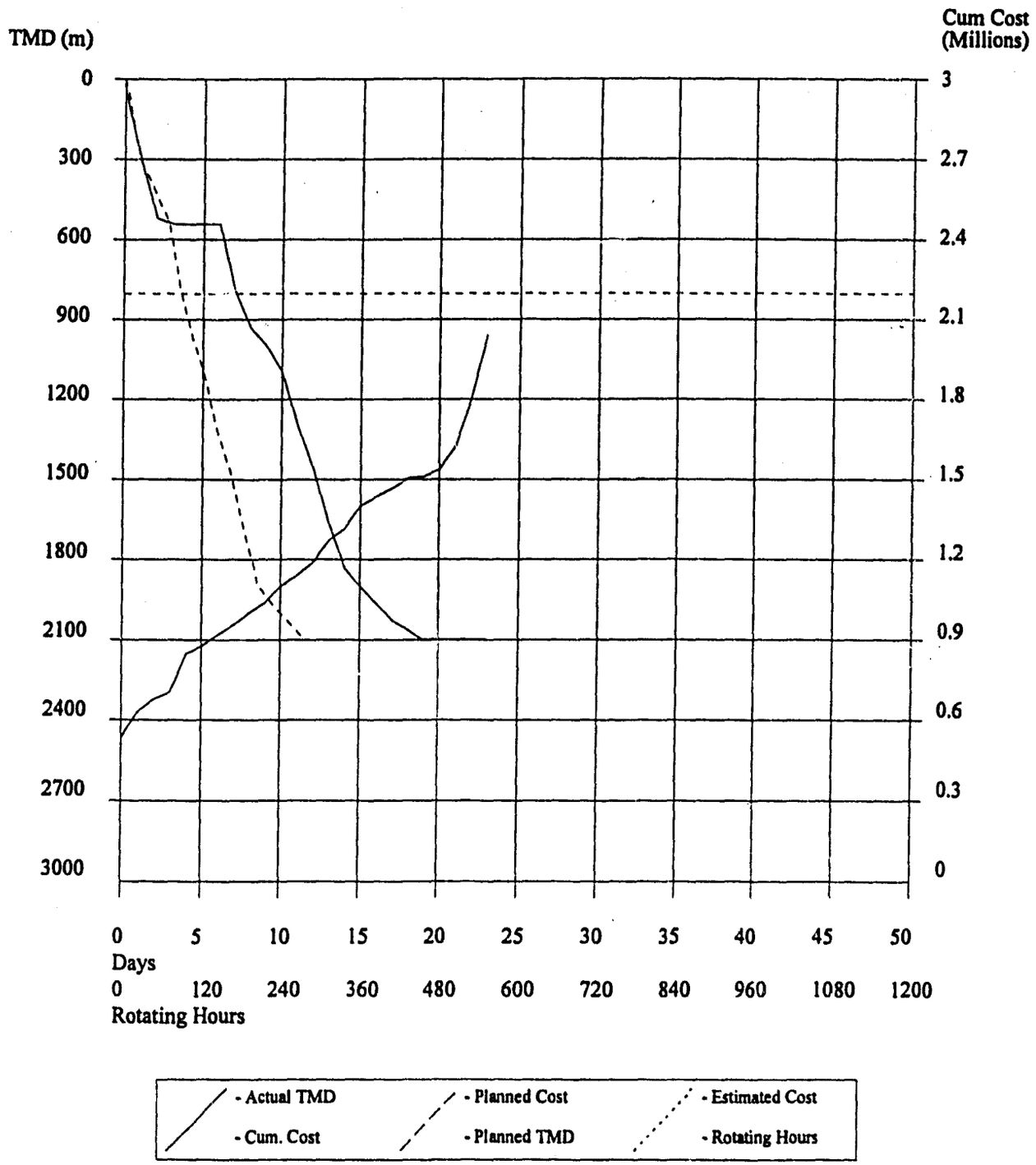
1	TRIPLEX	216/152
2	DUPLEX	357/0

K2804 Visplex	2099 m	m	m
	m	m	m
	m	m	m

1A	311.	FD88	17.5/17.5/17.5	LM8137	116	521.00	542.00	13.30	40.75	40.75	5-7-FC-H	2-1 -FC-BC	159	/ 16,000	140 200					Good		0	9	14.8
2A	311.	HP43A	15.9/15.9/15.9	87706	437	542.00	21.00	12.00	1.75	42.50	-- -	- - -	159	12,000/ 15,000	150 160					Good		28	11.5	0
1	222.	DS110	7.9/7.9/7.9 7.9/7.9/8.7	M46882	M323	1,900.00	1,358.03	9.02	138.2	180.75	6-7-CT-H	D-I -NO-BHA	159	/ 6,000	175					Good		72	10	11.6
2	222.	EHP51X	17.5/17.5/17.5	LU8223	517	2,058.00	158.00	2.85	55.50	236.25	8-7-BT-H	E-I -NO-TD	159	/ 15,000	70 80					Good		61	11	9.2
3	222.	AG426	12.7/12.7/14.3	R25YD	447	2,099.00	41.00	2.69	15.25	251.50	1-1-NO-A	E-I -NO-TD	159	12,000/ 15,000	65 75					Good		67	11	10.2

Well Elevation / Drilling Curve

Well Name: Suncor Netla P16-60-50-122-45		Country: CANADA	License: 1874
Location: 300/P- 16 Lat: 60° 50' Long: 122° 45'		Region: NETLA	
Drill TMD: 2,099.00 (m)	Drill TVD: 2,099.00 (m)	Plug Back TMD: 5.70 (m)	Spud Date: 1999/12/21
Estimated TMD: 2,099.00 (m)	Estimated Cost: 2,196,622	Well Status: DRY_ABAND	



Printed: 2000/06/06 8:21:18 AM

SUNCOR ENERGY RESOURCES GROUP

Well History / Drilling Survey

Well Name: Suncor Netla P16-60-50-122-45 | Country: CANADA | License: 1874

Location: 300/P- 16 Lat: 60° 50' Long: 122° 45' | Region: NETLA

Drill TMD: 2,099.00 (m) | Drill TVD: 2,099.00 (m) | Plug Back TMD: 5.70 (m) | Spud Date: 1999/12/21

Estimated TMD: 2,099.00 (m) | Estimated Cost: 2,196,622 | Well Status: DRY_ABAND

Hole Summary

	Move Rig
	Move rig, rig to spud
	Rig to Spud
	Nipple Divertor,Rig to spud,Premix mud, Spud in & Drill
1.00	Drill and survey ahead 311mm hole
2.00	drill 311mm. hole from 295m-521m. with required surveys.
3.00	POOH bit & wiper. battle mud rings, chg BHA. RIH, ream/wash,TD, circ.
4.00	circ./pump sweep/Wiper trip/ream/circ/wiper trip/circ./POOH/Run Csg.
5.00	St csg.@542m/mkb. cmt-cut-csg. & PT bowl, to 7mpa/ nd div. N/U BOP's.
6.00	N/U BOP's. Press. BR. RIH BHA. Press. test BOP's Drill Float collar.
7.00	Drillout, drill ahead, to 800m. trip for balled bit.
8.00	RIH, drill 222mm hole F/800-935m. Problems with bit balling, POOH.
9.00	Trip,for balled bit. chage nozzles,RIH,work on pump/mud ring,trip, dr
10.00	RIH,Drill F/998-1092m.req surveys. POOH Y2K, check bit RIH csg shoe.
11.00	Trip in the hole and drill ahead 222mm. hole. with required surveys.
12.00	Control drill 222mm hole to control dev/required. surveys.
13.00	Control drill/wiper trip/with dev. surveys.
14.00	Control drill 222mm hole, with required surveys.
15.00	Drill, trip for BHA, slip and cut, RIH, Circ. out mud ring, Drill.
16.00	Drill 222mm. hole F1900m.-1966m. Survey, Safety meeting.
17.00	Drill ahead 222mm hole.
18.00	Drill & Survey ahead, Trip for bit, Drill ahead
19.00	Drill to TD,Circulate,Wiper Trip,Circulate
20.00	Condition Wellbore, Trip out to log Log well as per program
21.00	Finish logging, Lay down BHA, Run in open ended,Circ,Run plugs
22.00	Run abandonment plugs, Rig out
23.00	Rig out, Clean & De-Ice Rig Etc.

Mud Products Summary

Product	Amount	Cost	Product	Amount	Cost
ALCOMER 110	0	0.00	ALKAPAM 1103	0	0.00
ALKAPAM1003	0	0.00	BARITE (WT)	0	0.00
BICARBONATE	0	0.00	CALCIUM CARB.	89	883.77
CAUSTIC	34	1,310.70	CELLOPHANE	40	720.00
CI 40	0	0.00	DRISPAC SUPER	0	0.00
ENVIROFLOC	0	0.00	FLOPLEX	353	34,013.16
FOAM BAN	0	0.00	GEL UNTREATED	159	2,183.58
ISOPROPANAL	0	0.00	LIGNITE	4	40.60
MSDS BOOK	0	0.00	MUD ENGINEER	39	17,550.00
PERCOL 787	0	0.00	POTASSIUM SULF.	1128	52,892.40
SAWDUST	49	235.20	SODA ASH	2	23.60
SULPHAMIC ACID	10	721.50	ULTRASEAL XP	0	0.00
VISPLEX	72	13,988.24	XL DEFOAMER	0	0.00

Well History / Drilling Summary

Well Name: Suncor Netla P16-60-50-122-45 | Country: CANADA | License: 1874

Location: 300/P- 16 Lat: 60° 50' Long: 122° 45' | Region: NETLA

Drill TMD: 2,099.00 (m) | Drill TVD: 2,099.00 (m) | Plug Back TMD: 5.70 (m) | Spud Date: 1999/12/21

Estimated TMD: 2,099.00 (m) | Estimated Cost: 2,196,622 | Well Status: DRY_ABAND

Mud Product Summary

ZINC CARBONATE	0	0.00		0	0.00

Bit Summary

1A	311.000	FDSS	17.5/17.5/17.5///	521.00	542.00	40.75	13.30	5-7-FC-H / 2-1-FC-BC
2A	311.000	HP43A	15.9/15.9/15.9///	542.00	21.00	1.75	12.00	--- / ---
1	222.000	DS110	7.9/7.9/7.9/7.9/7.9/8.7	1,900.00	1,358.00	138.25	9.82	6-7-CT-N / D-I-NO-BHA
2	222.000	EHP51X	17.5/17.5/17.5///	2,058.00	158.00	55.50	2.85	5-7-BT-H / E-I-NO-TQ
3	222.000	AG426	12.7/12.7/14.3///	2,099.00	41.00	15.25	2.69	1-1-NO-A / E-I-NO-TD

Cost Summary

AIR TRAVEL	29,200.00	DATA COMS/SATELLITE/DIMS&WIMS	8,520.00
LOSS CONTROL/SAFETY EXPENSES	12,905.00	ENERGY	74,654.84
SURFACE/LEASE RENTALS	92,050.00	DOWNHOLE EQUIPMENT RENTALS	64,156.00
SUPPLIES	555.00	WELLSITE SUPERV./CONTRACTORS	43,910.00
INSPECTIONS	3,490.00	WELDING	8,920.00
LOCATION PREPARATION	155,000.00	LOCATION CLEANUP	100,000.00
TOWING/STAND-BY/ACCESS MAINT.	11,030.00	EQUIPMENT PRESSURE TESTING	4,839.50
CONTRACT HAULING	75,875.00	FLUID HAULING	22,890.00
WELLHEAD EQUIPMENT	13,750.00	CASING	39,330.00
NON CONTROLLABLE MATERIAL	2,000.00	LOGS	58,669.00
CORES	7,037.00	CEMENTING	80,064.98
BITS	84,247.16	DRILLING MUD	124,562.75
POWER TONGS	4,307.82	GEOLOGICAL SUPERVISION	15,870.00
FEDERAL CROWN	20,000.00	DRILLING RIG	324,000.00
CAMP & SUBSISTENCE	138,662.00	RIG MOVES	382,190.00
BOILER	36,520.00		
		TOTALS	2,039,406.05

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 1P

1. Date 1999/12/17 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37
2. Depth (m) Operation Moving SDFN Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	pH	Pv	Yp	Gels	Cl(mg/l)	Polymer

4.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Dist. (m)	Hrs	ROP (m/hr)	Loss/RPM	Cond.

5. Assembly:
7. Surveys:

SPR	#1	#2	Liners	Hydraulics			
				D.P.	m/min	D.C.	m/min
				R.S.P.P	kPa	@	SPM

8. B.O.P. Check Last Drill Incident Last Rig Insp.

Personnel: Total 29 Rig 12 Service 16 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Repairs	0	Rig Service	0	Waiting	0	Other	0
Tripping	0	Reaming	0	Circulating	0	Waiting	0	Wireline	0
Coring	0	Survey	0	Testing	0	Waiting	0	Other	0
Cementing	0	Casing	0	Nipple Up	0	Waiting	10	Other	14

11. Cost: Day $ 60,810 Cumulative $ 60,810 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	TC	OPERATION
08:00	18:00	10.00	23	d	PP	Load out Akita #37 in the Edson area and start move up to Netla P 16 Location with Mullen Trucking on the 16th of December 1999 and continue moving up to Netla on the 17th By Dark on the 17th, we had a total of six loads on location including the sub matting. Most of the rest of the rig was in Ft. Nelson except the Sub which was stopped a couple of hours South of Ft. Nelson. Camp was brought in and rigged up on the 14th & 15th of December. Camp staff arrived and camp was opened on the 15th of December 1999.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Cold -32

Printed: 2000/06/08 8:21:45 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 2P

1. Date 1999/12/18 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth (m) Operation Move Rig, SDFN Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	W.L.	pH	P.V.	Y.P.	Solids	Gels	Cake	Polymer

4.

Bit No.	Size (mm)	Type	Serial No.	Nozzles	Out (m)	Drilled (m)	Hours	ROP (m/Hr)	Form/RPM	Cond.

5. Assembly:

6. Surveys:

7.

SPM	Size	Strokes	Pressure	Annular Velocities			
		216.0		D.P.	m/min	D.C.	m/min
		357.0		R.S.P.P	kPa	@	SPM

8. B.O.P. Check Last Drill Incident Last Rig Insp.

Personnel: Total 33 Rig 12 Service 20 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	0	Repairs	0	Safety	0
Trips	0	Circ. Mud	0	Rig Move	0	Rig Up/Tear Out	0	Wash	0
Survey	0	Ream	0	BOP Test	0	Testing	0	Fishing	0
Logging	0	Run Csg.	0	Cement	0	Rig Down	9	Other	15

11. Cost: Day $ 15,855 Cumulative $ 76,665 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
09:00	18:00	9.00	23	d	PP	Continue moving Akita 37 onto location with Mullen Trucking. Spot matting and Wellsite units in place. Line up and ready derrick to be pinned together. Sub on the way into location and will not be on location until well after dark. Rig components either on location or at staging area by camp, some misc. rental items still to arrive incl. mud products etc. Working on the sump with 2 cats will be completed tomorrow.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Cold -28, -34

Printed: 2000/06/08 8:21:57 AM

SUNCOR ENERGY INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 3P

1. Date 1999/12/19 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth (m) Operation Rigging to spud (String cords Hook up hoses etc.) Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	WH	Vis	WL	PH	Pv	Yp	Solids %	Gels	Fil-Cake	Polymer

4.

Bit No.	Size (mm)	Bit Type	Serial No.	Jets	Out (m)	Drlg (m)	Hours	ROP (m/hr)	Force/RPM	Condition

5. Assembly:

6. Surveys:

7.

SPM	Liner	Stroke	Pressure	Annular Velocities			
		216.0		D.P.	m/min	D.C.	m/min
		357.0		R.S.P.P	kPa	@	SPM

8. B.O.P. Check Last Drill Incident Last Rig Insp.

Personnel: Total 36 Rig 12 Service 23 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	0	Repairs	0	Other	0
Tripping	0	Circulate	0	Run Casing	0	Rig Move	0	WOC	0
Cut/Slip	0	Log	0	BOP	0	Drill Test	0	Fishing	0
Coring	0	Ream/Case	0	Cementing	0	Standby	15	Safety	9

11. Cost: Day $ 28,640 Cumulative $ 105,305 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	CLASS	OPERATIONS
09:00	18:00	9.00	23	d	PP	Spot & Level sub, Install drawworks. Build and pin derrick on sub, raise A legs, Spot and rig in building until dark, 80/90% of the building etc spotted on location. Commander broke down in the AM and was not repaired until after 12:00 Noon. When backing drawworks up the ramp he got a flat tire, so he was done for!!! rigging up was done with one bed truck and a pole truck. There was also a very bitter wind blowing throughout the day which also slowed our progress.
18:00	00:00	6.00	1	a	PP	String power cords, hook up hoses, ready derrick to be raised Put up prefabs and General rigging up to spud.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Windy, V. Cold -20, -27

Printed: 2000/06/08 8:22:09 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 4P

1. Date 1999/12/20 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth (m) Operation Installing Diverter,Rigging up, Premix K2SO4 Mud Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt.	Vis	W.L.	pH	PV	YP	Solids	Gels	Filt. Cake	Polymer

4.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drlg (m)	Hours	ROP (m/Hr)	WOB/RPM	Cond.

5. Assembly:

6. Surveys:

SPM	Liner Size	Stroke	Press.	Annular Velocities			
		216.0		D.P.	m/min	D.C.	m/min
		357.0		R.S.P.P	kPa	@	SPM

7. B.O.P. Check Last Drill Incident Last Rig Insp.

Personnel: Total 23 Rig 14 Service 8 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	0	Repair	0	Coring	0
Tripping	0	Cond Mud	0	Rig Move	0	Rig Up	0	Wait On	0
Circulate	0	BOP Test	0	BOP Drill	0	DST	0	Fishing	0
Logging	0	Ream/Clean	0	Cement	0	Run Casing	24	Other	0

11. Cost Day $ 378,803 Cumulative $ 484,108 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	CLASS	OPERATIONS
00:00	06:00	6.00	1	a	PP	String Power cords, Hook up line and ready derrick, Fill Boiler and get steam going around. Genral rig up to spud.
06:00	12:30	6.50	1	a	PP	Inspect and raise derrick, Genral rig up. When raising the derrick the blocks rubbed on one of the foot pads on the monkey board. and inspection showed it was bent and cracked.
12:30	14:00	1.50	1	a	PU	Lower derrick, Straighten pad and weld same, and raise derrick again. with no problems. General rigging up continued as we fixed the pad.
14:00	00:00	10.00	1	a	PP	Continue to rig up, Rig in 2 Wadeco centrifuges, Weld on adapter flange start nippling up divertor system, Start to premix our K2SO4 mud system in the active tanks, and ready premix tank to start premixing if volume needed after spud. Held prespud meeting with All personel and issued work permit. Installing divertor and rigging to spud at 24:00 hrs (expect to spud prior to noon)

13. Foreman in Charge P.Miller 403-284-9583/502-0217 Weather Warmer -7, -22

Printed: 2000/06/08 8:22:22 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 1

1. Date 1999/12/21 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 40.00 (m) Operation Drill 311mm Surface hole Progress 40.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	pH	PV	YP	Solids	Gels	Filtr Cake	Polymers
K2SO4 Visplex	1,060.0							/		

4.

GEL UNTREATED 35 SX	FLOPLEX 30 SX	VISPLEX 12 SX	POTASSIUM SULF. 143 SX

5.

Bit No.	Size (mm)	Type	Serial No.	In	Out	Out (m)	Drilled (m)	Hours	ROP (m/Hr)	Force/RPM	Cond.
1A	311.000	FDSS	LN8137	17.5	17.5	521.00	40.00	3.75	10.67	/ 160	5 2 1

6. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

SPM	Liner Size	Stroke	Pressure	Annular Velocities			
125	152.0	216.0	2,500	D.P.	m/min	D.C.	m/min
60	140.0	357.0	2,500	R.S.P.P	kPa	@	SPM

9. B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/21

Personnel: Total 23 Rig 14 Service 8 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling Slide	3.75	Directional	0	Rig Service	.25	Reaming	0	Coring	0
Tripping	0	Circ Mud	0	Rig Repair	0	Run Casing	0	Wash	0
Circ/Cond	0	Survey	0	BOP Drill	0	Cement	0	Fishing	0
Logging	0	Slip & Cut	0	Formation Tst	0	Rig Up/Down	20	Other	0

11. Cost: Day $ 48,275 Cumulative $ 532,383 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	OC	OPERATIONS
00:00	20:00	20.00	1	a	PP	Rig up to Spud, when preparing to pick up BHA it was noticed one of the Bales was missing, A different set was dispatched from Akita 48 drilling in the Liard area. We could still make up our BHA without the bales. When functioning Diverter system the Accumulater failed to pressure up. Worked on accumulater and found the pump had been air locked, Pressuredup and functioned system OK. Rigged up ready to spud.
20:00	20:15	0.25	7		PP	Rig service, function Diverter and check Brake Linkage.
20:15	00:00	3.75	2	a	PP	Spud in with 311mm bit at 20:00 hrs 1999-12-21 and drill ahead311mm hole with 203mm Motor from 0m to 40m @ 24:00 hrs. Average ROP = 10.6m/hr.

13. Foreman in Charge P.Miller 403-284-9583/502-0217 Weather Warm +9,-2

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SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 2

1. Date 1999/12/22 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 295.00 (m) Operation Drill ahead 311mm hole Progress 255.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	pH	PV	YP	Solids	Gels	FiltCk	Polymer
K2804 Visplex	1,120.0		14.8	9.00	8.00	33.50	10.0	20.0 / 20.0	3.0	

4.

GEL UNTREATED 30 SX	LIGNITE 1 SX	FLOPLEX 30 SX	VISPLEX 8 SX	POTASSIUM SULF. 63 SX

5.

Bit No.	Size (mm)	Type	Serial No.				Out (m)	Drlg (m)	Hours	ROP (m/h)	Bit RPM	Cond.
1A	311.000	FDSS	LN8137	17.5	17.5	17.5	521.00	295.00	22.25	13.26	16,000 / 160	5 2 1

6. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys: 34.00/0.250/0.000 56.00/0.250/0.000 86.00/0.250/0.000 117.00/0.500/0.000 155.00/0.250/0.000 174.00/0.750/0.000 221.00/0.500/0.000 248.00/0.750/0.000 283.00/0.750/0.000

8.

S.P.M.	Size	Strokes	Pressure	Annular Velocities			
125	152.0	216.0	8,600	D.P.	m/min	D.C.	m/min
60	140.0	357.0	8,600	R.S.P.P	kPa	@	SPM

9. B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/22

Personnel: Total 24 Rig 14 Service 9 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling Actual	18.5	Directional	0	Rig Service	.75	Repairs	0	Coring	0
Trouble	0	Cond Mud	0	Rig Repair	0	Fish/Lost	0	Wait	0
Preventive	0	Circ	2.25	BOP Drill	0	Dir Work	0	Ream	0
Cleaning	0	Short Circ	0	Coring	0	BOP Work	0	Other	2.5

11. Cost: Day $ 94,750 Cumulative $ 627,133 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:45	0.75	7		PP	Rig services, function Diverter system.
00:45	19:15	18.50	2	a	PP	Drill and survey ahead 311mm hole with Vector 203mm motor from 40m to 295m @ 24:00 hrs. Average ROP = 13.5m/hr. Hole appears good on connection, With this mud system and the small flow line if we drill @ more then 25/30m per hr. the flow lines will load up with shales and plug off.
19:15	21:30	2.25	10	a	PP	Circulate and Wireline surveys as required
21:30	00:00	2.50	28		PU	Unplug flowline and change shaker sreens from 110 mesh to 84 mesh

13. Foreman in Charge Pat Miller 403-284-9583 Weather Warm +9,+7

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 3

1. Date 1999/12/23 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 521.00 (m) Operation Wiper trip out of hole, pumping out singles @ 336m work tight hole. Progress 226.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

Mud Type	Wt	Vis	WL	pH	Pm	PV	YP	% Solids	Gels	Filt. Cake	Polymer
K2SO4 Visplex	1,120.0		14.8	9.00	8.00	33.50	10.0	20.0 / 20.0	3.0	
CAUSTIC S SX	FLOPLEX 23 SX		POTASSIUM SULF. 106 SX							

4.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/Hr)	Force/RPM	Cond.
1A	311.000	FDSS	LN8137	17.5 17.5 17.5	521.00	521.00	40.75	12.79	15,000 / 200	5 2 1

5.

6. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys: 312.00/0.750/0.000 329.00/0.250/0.000 368.00/0.500/0.000 406.00/0.500/0.000 434.00/0.250/0.000 460.00/0.250/0.000 489.00/0.500/0.000

8.

S.P.M.	Liner Size	Stroke	Pressure	Annular Velocities			
125	152.0	216.0	2,500	D.P.	m/min	D.C.	m/min
60	140.0	357.0	8,600	R.S.P.P	kPa	@	SPM

9. B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/22

Personnel: Total 26 Rig 14 Service 10 Suncor 2 Other 0

10. Time Breakdowns - Hours

Drilling	18.5	Directional	0	Rig Service	.75	Reaming	0	Coring	0
Tripping	0	Cond Mud	0	Rig Repair	3	Run Casing	0	W.O.C.	0
Circulate	0	Survey	1.75	BOP Drill	0	DST	0	Testing	0
Logging	0	Slip & Cut	0	Cementing	0	Rig Up/down	0	Other	0

11. Cost: Day $ 47,883 Cumulative $ 675,016 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	CLASS	OPERATIONS
00:00	18:30	18.50	2	a	PP	Drill and survey ahead 311mm hole with vector 203mm. motor from 295m to 521m. @ 24:00 hrs. Average ROP = 12.2 m/hr. The hole appears good on connections, with this mud system.
18:30	20:15	1.75	10	a	PP	Accumulated circulation & wireline surveys as required.
20:15	22:00	1.75	8	e	NU	Work on light plant fuel system.
22:00	22:45	0.75	7		PP	Rig Service.
22:45	00:00	1.25	8	a	NU	Change heads on mud pumps. two seperate events.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +9,+?

Printed: 2000/05/08 8:23:02 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 4

1. Date 1999/12/24 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 542.00 (m) Operation Attempt to POOH to run casing, but hole was tight. 30,000 dAN over. Progress 21.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	W.L.	pH	PV	YP	Solids	Gels	Filt Cake	Polymer
K2SO4 Visplex	1,175.0	120	9.6	9.50	14.00	34.50	8.8	54.0 / 55.0	3.0	

4.

BIT NO.	Size (mm)	Type	Serial No.	Nozzles	In (m)	Out (m)	Drlg (m)	Hours	ROP (m/Hr)	Force/RPM	T-B-G
2A	311.000	HP43A	87706	15.9 15.9 15.9	521.00	542.00	21.00	1.75	12.00	15,000 / 160	
1A	311.000	FDSS	LN8137	17.5 17.5 17.5	521.00	542.00	40.75	13.30		15,000 / 200	5 2 1

5. Assembly: 311.00 Tri-Cone Bit, 1 220.00 Bit Sub, 1 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

SPM	Liner Size	Stroke	Pressure	Annular Velocities			
125	152.0	216.0	2,500	D.P.	m/min	D.C.	m/min
60	140.0	357.0	2,500	R.S.P.P	kPa	@	SPM

B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/22

Personnel: Total 34 Rig 14 Service 18 Suncor 2 Other 0

10. Time Breakdowns - Hours

Drilling	3.5	Directional	0	Rig Service	.5	Reaming	0	Coring	0
Tripping	17.75	Cond / Mud	.25	Rig Repair	0	Run Casing	0	W.O.C.	0
Circulate	.75	Survey	0	BOP Drill	0	D.S.T.	0	Fishing	0
Logging	0	Slip & Cut	0	Cementing	0	Rig up/down	0	Other	1.25

11. Cost: Day $ 27,763 Cumulative $ 702,779 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	01:45	1.75	2	a	PP	Drill 311mm hole to 521m.
01:45	02:00	0.25	5	a	PU	Circulate bottoms up, to trip for bit.
02:00	03:45	1.75	6	a	PU	Trip for bit, hole became very tight at 307m.
03:45	07:45	4.00	6	a	PU	Pump out singles from 369-307m.
07:45	08:00	0.25	7		PP	Rig service,
08:00	10:30	2.50	6	a	PU	Pump out singles F/ 300-180m. plug flowline & Rig out flowline.
10:30	11:00	0.50	6	a	PU	Trip out stands.
11:00	15:45	4.75	6	a	PU	Lay down blade stabilizer, 2- 228mm DC's chang bit.
15:45	16:30	0.75	6	a	PU	Install flowline.
16:30	16:45	0.25	7		PP	Rig Service.
16:45	19:15	2.50	6	a	PU	Trip in the hole and ream bridges. Strap in the hole diff= .28m.
19:15	20:30	1.25	28		PU	Break circulation, clean flowline #2 shaker.
20:30	21:30	1.00	6	a	PU	Trip in the hole to 521m.
21:30	23:15	1.75	2	a	PP	Drill 311mm. hole F/ 521- 542m.
23:15	00:00	0.75	5	f	PP	Circulate and condition hole to run casing.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +9,+7

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 5

1. Date 1999/12/25 Well Name Suncor Netia P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 542.00 (m) Operation WOC. Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	W.L.	pH	PV	YP	Solids	Gels	Fin Calc	Polymer
K2SO4 Visplex	1,130.0	214	9.8	9.50	13.00	35.00	10.0	26.0 / 27.0	3.0	
GEL UNTREATED 22 SX	CELLOPHANE 20 SX									

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/hr)	Bit Force/RPM	Cond.

4. Assembly: 311.00 Tri-Cone Bit, 1 220.00 Bit Sub, 1 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

5. Surveys:

6.

S.P.M.	Size	Stroke	Pressure	Annular Velocities			
		216.0		D.P.	m/min	D.C.	m/min
		357.0		R.S.P.P	kPa	@	SPM

7. B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/22

8. Personnel: Total 27 Rig 14 Service 12 Suncor 1 Other 0

9. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	.25	Reaming	0	Coring	0
Tripping	12.25	Cond Mud	0	Rig Repair	0	Run Casing	4.5	WOC	0
Circulate	7	Survey	0	BOP Drill	0	Dir. Work	0	Fishing	0
Logging	0	Slip & Cut	0	Cement	0	Rig Move	0	Other	0

10. Cost Day $ 145,772 Cumulative $ 848,551 AFE $ 2,196,622 AFE # A9911480P16

11. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	04:15	4.25	5	f	PP	Condition and circulate, thaw out premix tk. Pump calibrated sweep arround, sweep was 60% longer than guage time in coming arround to surface. Seepage losses to the formation have stabilized at 0.4m3/hr.
04:15	07:45	3.50	6	g	PU	Wiper trip up to surface.
07:45	08:00	0.25	7		PP	Rig Service.
08:00	12:30	4.50	6	h	PU	RIH to 447, wash ream from 447-449m. 499-503m. and 503-542.
12:30	14:00	1.50	5	f	PP	Circulate and condition hole.
14:00	15:15	1.25	6	h	PP	Wiper trip up to 320m. the hole was in good shape with no hole drag or fill on bottom.
15:15	16:30	1.25	5	f	PP	Condition and circulate hole.
16:30	19:30	3.00	6	g	PP	Trip out of the hole to run csg.
19:30	00:00	4.50	12	a	PP	Pre-job safety meeting, rig up to and run 255.5mm. csg.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +9,-15

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 6

1. Date 1999/12/26 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 542.00 (m) Operation Nippling up the BOP's. Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt.	Vis.	W.L.	pH	PV	YP	Solids	Gels	Filt. Cake	Polymer
K2SO4 Visplex	1,135.0	218	12.0	8.50	12.00	35.00	6.0	27.5 / 25.0	3.0	

4.

GEL UNTREATED 8 SX	CELLOPHANE 20 SX	SAWDUST 21 SX	FLOPLEX 37 SX	VISPLEX 8 SX
POTASSIUM SULF. 6 SX				

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/hr)	Force	RPM	T.B.	Cond.

6. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

S.P.M.	P	Size	Stroke	Pressure	Annular Velocities			
			216.0		D.P.	m/min	D.C.	m/min
			357.0		R.S.P.P	kPa	@	SPM

9. B.O.P. Check Last Drill Incident Last Rig Insp. 1999/12/26

Personnel: Total 27 Rig 14 Service 12 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	0	Reaming	0	Coring	0
Tripping	0	Cond/Mud	0	Rig Repairs	0	Run Casing	2.5	W.O.C.	6.75
Circulate	1.75	Survey	0	BOP Drill	10.75	P.S.T.	0	Fishing	0
Logging	0	Slip & Cut	0	Cementing	2.25	Rig Up/Down	0	Other	0

11. Cost: Day $ 27,498 Cumulative $ 876,049 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	02:30	2.50	12	a	PP	Run 244.5mm. casing a total of 43 joints of J-55, 55.53kg/m. st&c, prudential casing. Total lenght of 542.70m. set at 542.0m.
02:30	04:15	1.75	5	f	PP	Circulate and condition hole prior to cementing csg. L/D power tongs.
04:15	06:30	2.25	12	c	PP	Rig up the cementers and cement the 244.5mm. casing with : Held a Pre-job safety meeting, pump 5.0m/m3 of water spacer. Pressure test surface lines up to 21MPA. Mix and pump 43.18m3, 45 tonnes of RFC system + 2% CaCl+Celophane. at 1740 kg/m3. Displace with 21.3m3 of fresh water. Returns were 23m3 of returns, bump the plug with 10mpa. for 10 minutes. held ok, blead off pressure floats held good.
06:30	13:15	6.75	13		PP	WOC.
13:15	14:14	0.98	14	a	PP	Nipple down Diverter.
14:14	17:15	3.02	14	b	PP	Cut conductor,casing and weld on the casing bowl. Pressure test the weld to 7mpa, OK. for 10 minutes.
17:15	00:00	6.75	14	b	PP	Nipple up BOP's.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +10.7, +6

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
20:00	21:45	1.75	8	d	NU	Repair work on accumulator.
21:45	22:00	0.25	28			BOP drill, and safety meeting with rig crew prior to drilling out.
22:00	00:00	2.00	28			Drillout float collar, tagged at 527m.

13. Foreman in Charge Paul Erb @ 403-284-9583

Weather Warm +10.7, +6

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 7

1. Date 1999/12/27 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 542.00 (m) Operation Drilling ahead at 593m (15m/hr) Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

Mud Type	Wt	Vis	WL	pH	PV	YP	Solids	Gels	Filt Cake	Polymer
K2SO4 Visplex	1,000.0	28		11.50				/		

4. SAWDUST 15 SX SODA ASH 1 SX POTASSIUM SULF. 156 SX

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/h)	Force/RPM	Cond.
1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00				/	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys:

S.P.M.	Liner Size	Stroke	Pressure	Annular Velocities				
130	152.0	216.0	6,200	D.P.	49.1	m/min	D.C.	79.6 m/min
		357.0		R.S.P.P		kPa @		SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/27 Incident Last Rig Insp. 1999/12/27

Personnel: Total 26 Rig 14 Service 11 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	0	Directional	0	Rig Service	.25	Reaming	0	Coring	0
Tripping	2.25	Cond Mud	.25	Rig Repair	2.5	Run Csg	0	Wait	0
Circulate	0	Rig Up	0	BOP Pressure	14.25	Rig Move	0	Other	0
Logging	0	Slip & Cut	0	Cementing	0	Rig Down	0	Other	4.5

11. Cost: Day $ 40,600 Cumulative $ 916,649 AFE $ 2,190,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	T	C	OPERATIONS
00:00	08:00	8.00	14	b	PP		Nipple up BOP's.
08:00	12:30	4.50	15	a	PP		Pressure blind rams, hcr, inside kill & choke valves, manifold choke lines, manifold lines manifold. All test were 1500 kpa low and 13000 kpa high.
12:30	12:45	0.25	7		PP		Rig Service.
12:45	13:15	0.50	6	j	PU		Pick up 222mm BHA.
13:15	14:00	0.75	8	e	NU		Rig Repair to the hydrallic pump on draworks.
14:00	15:45	1.75	6	j	PP		Pick up 222mm BHA. and trip in the hole to 500m.
15:45	16:00	0.25	5	b	PP		Break circulation prior to pressure testing.
16:00	16:30	0.50	15	a	PP		Pressure test, bottom pipe rams, lower kelly cock outside choke, kill line, valves. All test were 10 minutes, 1500 kpa low and 13000 kpa high.
16:30	18:45	2.25	28		NU		The pressure testing truck's engine broke down, after trying to fix it another truck was ordered.
18:45	20:00	1.25	15	a	PP		Pressure test, with rig pump, upper pipe rams, bottom outside killline check valve, top outside killline valve, outside choke line valve, and the stand pipe, kelly hose, annular, and all vlaves. All test were 10 minutes 1500 kpa low and 13000 kpa high.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +10.7, +6

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUBNO	C	OPERATIONS
10:00	16:30	6.50	2	a	PP	ROP=14.46m/hr)
16:30	16:45	0.25	10	a	PP	Deviation survey @ 691.0m. (.75 degree)
16:45	21:00	4.25	2	a	PP	Drill 222mm hole F/716-800m. (Average ROP=18.66m/hr)
21:00	21:15	0.25	28		PP	Conduct BOP drill and safety meeting with crew.
21:15	00:00	2.75	6	a	PU	Trip out of the hole for suspected balled up bit.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +10.7, -4

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 8

1. Date 1999/12/28 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 800.00 (m) Operation Drilling 222mm. hole @ 814m/mkb. (20m/hr.) Progress 258.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt.	Vis.	W.L.	pH	P.V.	Y.P.	Solids	LGS	Flr. Cake	Polymer
K2SO4 Visplex	1,150.0		10.4	9.50	14.00	36.50	10.0	27.0 / 29.0	4.0	

4.

CAUSTIC 2 SX	SODA ASH 1 SX	FLOPLEX 23 SX	MUD ENGINEER 16

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	In (m)	Out (m)	Drilled (m)	Hours	ROP (m/Hr)	Bit WOB/RPM	Bit Cond.
1	222.000	DS110	H46882	7.9 7.9 7.9		1,900.00	258.00	18.00	14.33	6,000 / 140	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 592.00/0.250/0.000 691.00/0.750/0.000

8.

S.P.M.	Liner Size	Strokes	Pressure	Annular Velocity				
130	152.0	216.0	6,200	D.P.	50.1	m/min	D.C.	81.1 m/min
		357.0		R.S.P.P		kPa	@	SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/27 Incident Last Rig Insp. 1999/12/28

Personnel: Total 26 Rig 14 Service 11 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	17	Directional	0	Rig Service	.5	Reaming	0	Coring	0
Trip/Circ	2.75	Evaluation	.5	Rig Repair	0	Drill Stem Test	0	W.O.C.	0
Cement	0	Survey	.5	Testing	0	Casing	0	Fishing	0
Abandon	0	Wash & Ream	0	Completion	0	Abandonment	0	Other	2.75

11. Cost: Day $ 40,021 Cumulative $ 956,670 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	OC	OPERATIONS
00:00	01:30	1.50	28		PP	Drillout float collar and the float shoe.
01:30	02:00	0.50	2	a	PP	Control drill 222mm. hole F/ 542-550m. (Avg. ROP=16m/hr.)
02:00	02:30	0.50	28		PP	Conduct a leakoff test, the test was shut down after the pressure gradient of 22.0 kpa/m. was reached. The formation was not fractured.
02:30	03:00	0.50	5	b	PP	Displace the hole from the cement drillout water to k2S04/ visplex mud.
03:00	07:00	4.00	2	a		Control drill 222mm hole F/550-603m. (Average ROP=13.25m/hr.)
07:00	07:15	0.25	7		PP	Rig service.
07:15	08:00	0.75	2	a	PP	Control drill 222mm hole F/603-613m. (Average ROP=25.3 m/hr.)
08:00	08:15	0.25	28		PP	Held a BOP drill with crew and had a safety meeting. well secure in 67seconds. Function annular
08:15	08:30	0.25			RU	Rig repair, change out head on 8-P-80 triplex mud pump.
08:30	08:45	0.25	7		PP	Rig service.
08:45	09:45	1.00	2	a	PP	Drill 222mm hole F/613-62[illegible] Average ROP= 9.0 m/hr.)
09:45	10:00	0.25	10	a	PP	Deviation survey @ 597.0m. (.25 degree)
10:00	16:30	6.50	2	a	PP	Drill 222mm hole F/622-716m. (Average

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm +10.7, -4

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
16:00	18:15	2.25	2	a	PP	Drill 222mm hole F/ 876-895m.
18:15	18:45	0.50	10	a	PP	Deviation survey at 870m. (1')
18:45	19:30	0.75	2	a	PP	Drill 222mm hole F/ 895-904m.
19:30	19:45	0.25	7		PU	Rig service, function top pipe rams. close-4 sec.
19:45	22:45	3.00	2	a	PP	Drill 222mm hole F/ 904m-934m.
22:45	00:00	1.25	28		NU	Attempt to un-ball the bit, unable to.

13. Foreman in Charge Paul Erb @ 403-284-9583

Weather Warm -13/-20

SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 9

1. Date 1999/12/29 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 934.00 (m) Operation Tripping in the hole after nozzle change on the bit. Progress 134.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	FV	Vis/Yld	W.L.	pH	PV	YP	Solids	Gels	Filt Cake	Polymer
K2SO4 Visplex	1,155.0			10.0	8.00	13.00	26.00	6.0	20.0 / 21.5	3.0	

4.

LIGNITE 1 SX	FLOPLEX 21 SX	POTASSIUM SULF. 100 SX	MUD ENGINEER 1

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/Hr)	Force/RPM	T-B-G	Cond.
1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00	392.00	32.75	11.97	6,000 / 150		6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 810.00/1.500/0.000 870.00/1.000/0.000

8.

S.P.M.	Liner Size	Stroke	Pressure	Annular Velocities					
116	152.0	216.0	8,680	D.P.	0.0	m/min	D.C.	0.1	m/min
		357.0		R.S.P.P	3,600	kPa	@	65	SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/27 Incident Last Rig Insp. 1999/12/29

Personnel: Total 25 Rig 14 Service 10 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	14.75	Directional	0	Rig Service	.75	Reaming	0	Coring	0
Tripping	2.25	Cond Mud	0	Rig Repair	.5	Run Csg	0	WO Cement	0
Circulate	.25	Survey	1.5	BOP Drill	0	Deviation	0	Fishing	0
Logging	0	Slip/Cut DL	.75	Cementing	0	Rig Up/Down	0	NPT	3.25

11. Cost: Day $ 44,279 Cumulative $ 1,000,949 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:30	0.50	28		PU	Wash and clean bit, un-ball.
00:30	02:00	1.50	6	a	PP	Trip in the hole with BHA, and one single of drill pipe.
02:00	02:45	0.75	9		PP	Slip and cut 16m. of drill line.
02:45	03:30	0.75	6	a	PP	Trip in the hole to 795m.
03:30	03:45	0.25	5	j	PU	Condition and curculate mud, break circulation.
03:45	04:30	0.75	28		PP	Mud ring plugged flowline, clean and work mudring.
04:30	05:30	1.00	2	a	PP	Drill 222mm. hole from 800-810m.
05:30	05:45	0.25	7		PP	Rig service, function test Annular closed 14 sec.
05:45	06:30	0.75	2	a	PP	Drill 222mm. hole F/810-820m.
06:30	07:00	0.50	10	a	PP	Survey at 795m. Miss-run the mud is to thick and the barrel will not run in the pipe fast enough.
07:00	09:00	2.00	2	a	PP	Drill F/ 820-835m.
09:00	09:45	0.75	28		PU	Unball the bit.
09:45	11:30	1.75	2	a	PP	Drill 222mm. hole F / 835m-844m.
11:30	12:00	0.50	10	a	PP	Deviation survey @ 810m. (1.5')
12:00	15:15	3.25	2	a	PP	Drill 222mm. F/ 844-876m.
15:15	15:30	0.25	7		PP	Rig service, function test annular.
15:30	16:00	0.50	8	b	PP	Repair rig, tear out kelly spinner.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm -13/-20

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
20:00	20:15	0.25	7		PP	seconds.
20:15	20:45	0.50	8	a	PU	Repair rig fix hose on kelly circulating sock.
20:45	22:15	1.50	6	h	PU	Wiper trip up to 536m. to recover pipe screen.
22:15	00:00	1.75	8	b	PU	Install new kelly spinner.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm -13/-20

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 10

1. Date 1999/12/30 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 998.00 (m) Operation Drilling 222mm hole at 1022meters. Progress 64.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	W.L.	pH	PV	YP	Solids	Gels	Fltr. Cake	Polymer
K2SO4 Visplex	1,150.0	68	10.0	10.00	12.00	23.00	10.0	18.0 / 10.0	3.0	
4. CAUSTIC 2 SX	POTASSIUM SULF. 40 SX		MUD ENGINEER 2							

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/hr)	Force/RPM	T/B/G
1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00	456.00	39.50	11.54	5,000 / 140	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 964.00/0.750/0.000

8.

S.P.M.	Liner Size	Stroke	Pressure	Annular Velocities				
120	152.0	216.0	10,800	D.P.	45.8	m/min	D.C.	74.3 m/min
		357.0		R.S.P.P	3,800	kPa	@	65 SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/30 Incident Last Rig Insp. 1999/12/30

Personnel: Total 25 Rig 15 Service 9 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	7.5	Directional	0	Rig Service	.75	Reaming	0	Coring	0
Tripping	8.5	Cond. Mud	0	Rig Repair	4.25	Run Casing	0	W.O.C.	0
Circulate	0	Survey	.5	BOP Drill	0	Other	0	Fishing	0
Logging	0	Slip & Cut	0	Cementing	0	Rig up/down	0	Others	2.5

11. Cost: Day $ 37,180 Cumulative $ 1,038,129 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:45	0.75	2	a	NU	Drill 222mm. hole to 934m. attempt to un-ball bit, pump flowplex pill, apply WOB very slowly, could not un-ball bit.
00:45	03:30	2.75	6	a	PU	Trip out of the hole to un-ball bit. with required flow checks. Hole fill, Ther=4.75m.3 Actual=4.68
03:30	04:45	1.25	6	a	PU	Clean floor, change nozzzles on the PDC bit.
04:45	05:00	0.25	7		PP	Rig service, function test blind rams. O/C-4 seconds.
05:00	08:00	3.00	6	a	PP	Trip in the hole to drill 222mm hole.
08:00	09:00	1.00	8	a	NU	Change head in mud pump.
09:00	11:30	2.50	28		PU	Circulate out mud ring, clean, remove and install flowline.
11:30	15:30	4.00	2	a	PP	Drill 222mm hole from 934m. to 977m. Average ROP = 10.75m/hr.)
15:30	15:45	0.25	7		PP	Rig service function annular, O/C = 12 seconds.
15:45	16:45	1.00	8	a	NU	Repair rig, work on mud pump 4" shock hose.
16:45	18:15	1.50	2	a	PU	Drill 222mm hole from 977m.- 989m. Average ROP = 8.0m/hr.)
18:15	18:45	0.50	10	a	NU	Deviation survey at 964m. missrun.
18:45	20:00	1.25	2	a	PP	Drill 222mm hole from 989m-998m.. Average ROP = 7.2 m/hr.)
20:00	20:15	0.25	7		PP	Rig service function bottom pipe rams, O/C = 4

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather Warm -13/-20

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
19:45	21:15	1.50	6	a	PP	Trip in the hole to 542m.
21:15	00:00	2.75	28		NP	WOO for Y2K. Monitor hole.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -16/-28

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 11

1. Date 1999/12/31 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,092.00 (m) Operation Drilling 222mm. hole @ 1132m MKB. ROP of 18m/hr. Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt.	Vis.	W.L.	pH	P.V.	Y.P.	Solids	Gels	Filt. Calc.	Polymer
K2SO4 Visplex	1,140.0	57	12.5	10.00	12.00	19.50	8.7	19.0 / 19.0	3.0	

4.

GEL UNTREATED 16 SX	CAUSTIC 2 SX	FLOPLEX 33 SK	VISPLEX 6 SX	POTASSIUM SULF. 80 SX
MUD ENGINEER 2				

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	Out (m)	Drilled (m)	Hours	ROP (m/hr)	Force/RPM	Cond.
1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00	550.00	53.25	10.33	5,000 / 160	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 983.00/1.250/0.000

8.

S.P.M.	Size	Stroke	Pressure	Annular Velocities				
120	152.0	216.0	10,800	D.P.	45.8	m/min	D.C.	74.3 m/min
		357.0		R.S.P.P	3,500	kPa	@	65 SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/30 Incident Last Rig Insp. 1999/12/31

Personnel: Total 26 Rig 15 Service 10 Suncor 1 Other 0

10. Time Breakdowns - Hours

Drilling	13.75	Directional	0	Rig Service	.75	Reaming	0	Coring	0
Tripping	5	Cond. Mud	.25	Rig Repairs	0	Run Casing	0	W.O.C.	0
Circulate	.5	Survey	.5	BOP Drill	0	D.S.T.	0	Fishing	0
Logging	0	Slip & Cut	0	Cementing	0	Rig Up/Down	0	Other	3.25

11. Cost Day $ 61,525 Cumulative $ 1,099,654 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:45	0.75	6	h	PP	Trip in the hole to 998m. No fill or tight hole.
00:45	01:00	0.25	5	a	PP	Break circulation and fill pipe.
01:00	01:15	0.25	7		PP	Rig service, function annular O/C 14 seconds.
01:15	02:45	1.50	2	a	PP	Drill 222mm. hole F/998-1008m. (Average ROP=6.6m/hr.)
02:45	03:15	0.50	10	a	PP	Deveation survey @ 983m. 1.25 degrees.
03:15	08:00	4.75	2	a	PP	Drill 222mm. hole /1008m.-1031m.(Average ROP=4.8m/hr.)
08:00	08:30	0.50	28		PU	Clean pump suctions & bleed mud pump.
08:30	09:30	1.00	2	a	PP	Drill 222mm. hole /1031m.-1034m.(Average ROP=3.0m/hr.)
09:30	09:45	0.25	7		PP	Rig service, function top pipe rams, O/C 4 seconds.
09:45	16:15	6.50	2	a	PP	Drill 222mm. hole F/1034m.-1092m.(Average ROP=8.9m/hr.)
16:15	16:45	0.50	5	i	PP	Circulate bottoms up.
16:45	19:15	2.50	6	j	PP	Trip out of the hole for Y2K. with required flow checks. Trip mud ther=5.01m3 act=5.38m3
19:15	19:30	0.25	6	j	PP	Check and clean bit, mud motor, rig floor.
19:30	19:45	0.25	7		PP	Rig service, function top blind rams, O/C 4 seconds.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -16/-28

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SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 12

1. Date 2000/01/01 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,299.00 (m) Operation Control Drill ahead 222mm hole at 1341m, ROP=14min./mtr. Progress 207.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	W	Vis	W.L.							Solids
K2SO4 Visplex	1,180.0	63	12.5	9.00	13.00	21.00	11.3	17.0 / 17.5	3.0	

4.

GEL UNTREATED 12 SX	CAUSTIC 3 SX	SAWDUST 5 SX	CALCIUM CARB. 56 SX	FLOPLEX 35 SX
VISPLEX 7 SX	POTASSIUM SULF. 30 SX	MUD ENGINEER 2		

5.

No.	Hours	Type	Serial No.				Depth Out	Footage	Hours	ROP	WOB / RPM	Condition
1	222.000	DS110	H46882	7.9	7.9	7.9	1,900.00	757.00	73.00	10.37	6,000 / 175	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 1,095.00/1.750/0.000 1,189.00/2.000/0.000 1,236.00/1.750/0.000

8.

120	152.0	216.0	10,800	D.P.	44.8	m/min	D.C.	72.6	m/min
		357.0		R.S.P.P	3,800	kPa	@	65	SPM

9. B.O.P. Check 1999/12/27 Last Drill 1999/12/30 Incident Last Rig Insp. 2000/01/01

Personnel: Total 25 Rig 15 Service 9 Suncor 1 Other 0

10. Time Breakdowns - Hours

	19.75		0		.75		0		0
	1.25		0		0		0		0
	0		1.5		0		0		0
	0		0		0		0		.75

11. Cost: Day $ 39,604 Cumulative $ 1,139,258 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:45	0.75	28		NP	WOO, monitor hole, check out all computer systems, OK
00:45	02:00	1.25	6	j	PU	Trip in the hole to 1092m. no fill or tight hole.
02:00	07:15	5.25	2	a	PP	Drill 222mm. hole/1092m.-1153m. AverageROP=11.6m/hr.)
07:15	07:45	0.50	10	a	PP	Deviation survey @ 1095m. 1.75 degrees.
07:45	08:00	0.25	7		PP	Rig service, function test annular preventor. O/C-14 seconds.
08:00	15:15	7.25	2	a	PP	Drill 222mm. hole/1153m.-1230m.(AverageROP=14.0m/hr.)
15:15	15:45	0.50	10	a	PP	Deviation survey @ 1189m. 2.00 degrees.
15:45	16:00	0.25	7		PP	Rig service function test bottom pipe rams.O/C 4 seconds.
16:00	23:15	7.25	2	a	PP	Drill 222mm. hole/1230m.-1299m.(AverageROP=9.5m/hr.)
23:15	23:45	0.50	10	a	PP	Deviation survey @ 1236m. 1.75 degrees.
23:45	00:00	0.25	7		PP	Rig service function test top pipe rams. O/C 4 seconds.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -16/-28

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SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 13

1. Date 2000/01/02 Well Name Suncor Netia P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,468.00 (m) Operation Control drill 222mm hole @ 1542m. — ROP of 20m./hr. Progress 371.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

Mud Type	Wt	Vis	PV	YP	Gels	Cl	Ca	LGS	Pm/Pf/Mf
K2SO4 Visplex	1,210.0	87	12.2	10.00	16.00	27.50	13.1	20.0 / 20.0	3.0	
CAUSTIC 3 SX	FLOPLEX 24 SX		POTASSIUM SULF. 112 SX		MUD ENGINEER 2					

4.

No.	Size (mm)	Type	Serial No.	Jets	Depth Out	Drilled	Hours	Cum Hrs	ROP	Grade
1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00	926.00	94.75	9.77	6,000 / 175	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Integral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 1,302.00/2.000/0.000 1,368.00/0.000/0.000 1,405.00/1.000/0.000

8.

120	152.0	216.0	12,800	D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P	4,800	kPa	@	65	SPM

9. B.O.P. Check 2000/01/02 Last Drill 2000/01/02 Incident Last Rig Insp. 2000/01/02

Personnel: Total 26 Rig 15 Service 10 Suncor 1 Other 0

10. Time Breakdowns - Hours

	21.75		0		1		0	0
	0		0		0		0	0
	0		1.25		0		0	0
	0		0		0		0	0

11. Cost Day $ 53,625 Cumulative $ 1,192,882 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	a	SUB	OPERATIONS
00:00	07:15	7.25	2	a	PP	Drill 222mm. hole/1299m.-1360m. (Average ROP=8.4m/hr.)
07:15	07:45	0.50	10	a	PP	Deviation survey @ 1302m. 2.0 degrees.
07:45	08:00	0.25	7		PP	Rig service, function test annular preventor. O/C-14 seconds.
08:00	15:30	7.50	2	a	PP	Drill 222mm. hole/1360m.-1393m. (Average ROP=4.4m/hr.)
15:30	15:45	0.25	10	a	NP	Deviation survey @ 1368m. Missrun.
15:45	16:15	0.50	7		PP	Rig service function test bottom pipe rams.O/C 4 seconds.
16:15	23:15	7.00	2	a	PP	Drill 222mm. hole/1393m.-1468 (Average ROP=10.71m/hr.)
23:15	23:45	0.50	10	a	PP	Deviation survey @ 1405m. 1.0 degrees.
23:45	00:00	0.25	7		PP	Rig service function test top pipe rams. O/C 4 seconds.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -16/-26

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SUNCOR INP RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 14

1. Date 2000/01/03 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,670.00 (m) Operation Control drilling at 1698m, at 13.7m./hr. Progress 202.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	W	V	W/L	PH	PV	YP	Solids	Oil
K2SO4 Visplex	1,225.0	75	14.2	10.00	15.00	27.50	13.9	21.0 / 22.0	3.0	

4.

GEL UNTREATED 24 SX	CAUSTIC 4 SX	SAWDUST 4 SX	FLOPLEX 9 SX	VISPLEX 3 SX
POTASSIUM SULF. 98 SX				

5.

No.	Size (mm)	Type	Serial No.	In (m)	Out (m)	Drlg (hrs)	Drlg (kPa)	Rot (kPa)	Rot (hrs)	WOB (kN)	RPM	Bit Grading
1	222.000	DS110	H46882	7.9	7.9	7.9	1,900.00	1,128.00	113.25	9.96	4,000 / 175	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 1,509.00/2.000/0.000 1,578.00/0.000/0.000 1,584.00/2.000/0.000

8.

SPM								
120	152.0	216.0	12,800	D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P	6,000	kPa	@	65	SPM

9. B.O.P. Check 2000/01/03 Last Drill 2000/01/03 Incident Last Rig Insp. 2000/01/03

Personnel: Total 28 Rig 15 Service 12 Suncor 1 Other 0

10. Time Breakdowns - Hours

	18.5		0		.75		0		0
	1.5		0		0		0		0
	.75		2.25		0		0		0
	0		0		0		0		.25

11. Cost: Day $ 78,806 Cumulative $ 1,271,689 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATION
00:00	18:30	18.50	2	a	PP	Accumulated drilling, 222mm. holeF/1468- 1670m. (Average ROP=10.92m/hr.)
18:30	19:15	0.75	5	i	PP	Circulate and condition mud, prior to wiper trip.
19:15	20:45	1.50	6	h	PP	Wiper trip from 1562m.-1262m. Hole in good shape.
20:45	21:30	0.75	7		PP	Accumulated rig services, function test annular preventor. O/C-14 seconds.
21:30	23:45	2.25	10	a	PP	Accumulated Deviation surveys @ 1509m.-2.00/1578m.-miss run/1584m.- 2.0 degrees.
23:45	00:00	0.25	28		PP	Safety meeting, held BOP drill with crew well secure in 70 seconds.

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -15/-25

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SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 15

1. Date 2000/01/04 | Well Name Suncor Netla P16-60-50-122-45 | Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,834.00 (m) | Operation Circulating and condition mud @ 1900m. Prior to wiper/BHA trip. | Progress 164.00 (m)

Ground Elevation 602.30 (m) | KB to GL 4.70 (m) | KB to CF 4.70 (m) | KB Elev. 607.00 (m)

3.

K2SO4 Visplex	1,225.0	75	12.0	10.00	19.00	24.00	14.1	20.0 / 21.0	3.0	

4.

CAUSTIC 3 SX	LIGNITE 2 SX	FLOPLEX 62 SX	VISPLEX 6 SX	POTASSIUM SULF. 148 SX
MUD ENGINEER 2				

5.

1	222.000	DS110	H46882	7.9 7.9 7.9	1,900.00	1,292.00	132.75	9.73	4,000 / 175	6 D I

6. Assembly: 1 222.00 Polycrystalline Diamond Bit, 1 171.00 Positive Displacement Motor, 1 161.00 Float Sub, 1 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 5 159.00 Drill Collar, 1 170.00 Drilling Jar, 9 159.00 Drill Collar, 1 159.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe, 1 102.00 Drill Pipe

7. Surveys: 1,694.00/1.500/0.000 1,743.00/2.000/0.000 1,819.00/1.500/0.000

8.

120	152.0	216.0	12,800	D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P	6,200	kPa	@	65	SPM

9. B.O.P. Check 2000/01/03 | Last Drill 2000/01/04 | Incident | Last Rig Insp. 2000/01/04

Personnel: Total 28 | Rig 15 | Service 12 | Suncor 1 | Other 0

10. Time Breakdowns - Hours

	19.5		0		.75		0		0
	0		0		0		0		0
	0		2.5		0		0		0
	0		0		0		0		1.25

11. Cost Day $ 44,941 | Cumulative $ 1,316,630 | AFE $ 2,196,622 | AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	P/C	OPERATIONS
00:00	19:30	19.50	2	a	PP	Accumulated drilling, 222mm. holeF/1670m.-1834m (Average ROP=8.4m/hr.)
19:30	20:15	0.75	7		PP	Accumulated rig services, function test annular preventor. O/C-14 seconds. Top pipe rams O/C= 4 seconds. Bottom pipe rams O/C= 4 seconds.
20:15	22:45	2.50	10	a	PP	Accumulated Deviation surveys @ 649m.-1.50 degrees and Broke survey line, 1743m.=2.00 , 1819m. = 1.50 degrees.
22:45	23:00	0.25	28			BOP drill and safety meeting with new crew well secure in 62 seconds.
23:00	23:45	0.75	28		NU	Payson locked up twice and had to be re-booted twice.
23:45	00:00	0.25	28		PU	Clean pump suctions as they were plugged with floplex.

13. Foreman in Charge Paul Erb @ 403-284-9583 | Weather -19/-28

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SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	OPERATIONS	
22:30	22:45	0.25	28		PP	Slave Point formation.
22:45	23:15	0.50	5		PP	Circulate out mud ring.
23:15	00:00	0.75	2	a	PP	Drill 222mm. holeF/1900m.- 1903 (AverageROP=4.0m/hr.)

13. Foreman in Charge Paul Erb @ 403-284-9583 Weather -19/-24

Printed: 2000/08/08 8:26:10 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 16

1. Date 2000/01/05 | Well Name Suncor Netla P16-60-50-122-45 | Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 1,900.00 (m) | Operation Drilling 222mm. hole at 1924m/mkb. @ 4.5m./hr. | Progress 66.00 (m)

Ground Elevation 602.30 (m) | KB to GL 4.70 (m) | KB to CF 4.70 (m) | KB Elev. 607.00 (m)

3.

Mud Type										
K2SO4 Visplex	1,235.0	72	11.6	10.00	13.00	23.00	14.4	19.0 / 20.0	3.0	

4.

CAUSTIC 1 SX	SAWDUST 4 SX	FLOPLEX 4 SX	VISPLEX 2 SX	POTASSIUM SULF. 16 SX
MUD ENGINEER 2				

5.

2	222.000	EHP51X	LU8223	17.5	17.5	17.5	2,058.00	3.00	0.75	4.00	12,000 / 80	5 E I
1	222.000	DS110	H46882	7.9	7.9	7.9	1,900.00	1,358.00	138.25	9.82	4,000 / 175	6 D I

6. Assembly: 1 222.00 Tri-Cone Bit, 1 171.00 Bit Sub, 1 161.00 Pump Out Sub, 2 161.00 Drill Collar, 1 216.00 Integral Blade Stabilizer, 8 159.00 Drill Collar, 1 170.00 Drilling Jar, 5 159.00 Drill Collar, 1 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

117	152.0	216.0	8,280	D.P.	45.8	m/min	D.C.	76.3 m/min
		357.0		R.S.P.P	3,700	kPa	@	65 SPM

9. B.O.P. Check 2000/01/05 | Last Drill 2000/01/05 | Incident | Last Rig Insp. 2000/01/05

Personnel: Total 31 | Rig 15 | Service 13 | Suncor 3 | Other 0

10. Time Breakdowns - Hours

	6.25		0		.75		0		0
	14		1		0		0		0
	0		0		0		0		0
	0		0		0		0		2

11. Cost: Day $ 83,799 | Cumulative $ 1,400,428 | AFE $ 2,196,622 | AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	TYP	OPERATION
00:00	00:15	0.25	7		PP	Rig service, function test annular preventor, O/C - 14 sec.
00:15	05:45	5.50	2	a	PP	Accumulated drilling, 222mm. holeF/1834m-1900m. (Average ROP=12.0m/hr.)
05:45	06:45	1.00	5	a	PP	Circulate bottoms up.
06:45	15:45	9.00	6	j	PP	Trip out to change BHA & wiper trip, strap out. Diff= 0.4m. flow check @ 1900m. 1740m. 904m. 390m. 249m. and when out of the hole. Lay down tools, Trip mud=Calculated 7.18m3 Actual = 9.51m3
15:45	16:00	0.25	7		PP	Rig service, function test Blind rams O/C = 4sec.
16:00	18:00	2.00	6	j	PP	Make up BHA and trip in the hole, to the casing shoe.
18:00	19:00	1.00				Slip and cut drilling line.
19:00	19:15	0.25	7		PP	rig service, Funtion test top pipe rams O/C= 4 seconds.
19:15	19:30	0.25	28		PP	Held BOP drilll and safety meeting. well secure in 74 seconds.
19:30	22:30	3.00	6	j	PP	Trip in the hole, brake circulation.
22:30	22:45	0.25	28		PP	Pre-job safety meeting on drilling into the

13. Foreman in Charge Paul Erb @ 403-284-9583 | Weather -19/-24

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 17

1. Date 2000/01/06 | Well Name Suncor Netla P16-60-50-122-45 | Contractor / Rig AKITA DRILLING LTD. / 37

Depth 1,966.00 (m) | Operation Drilling 222mm. hole looking for core pt. | Progress 66.00 (m)

Ground Elevation 602.30 (m) | KB to GL 4.70 (m) | KB to CF 4.70 (m) | KB Elev. 607.00 (m)

Mud Type	Wt	Vis	WL	PV	YP	Gels	Cl	Ca	Filter Cake	Solids
K2SO4 Visplex	1,230.0	72	9.6	11.00	13.00	22.50	14.4	19.0 / 19.0	3.0	

4. CAUSTIC 3 SX | CALCIUM CARB. 33 SX | FLOPLEX 8 SX | VISPLEX 10 SX | MUD ENGINEER 2

Bit No.	Size (mm)	Type	Serial No.	In	Out	Total Drilled	On Bottom (hrs)	ROP (m/hr)	WOB (tonnes)	RPM	Grading
2	222.000	EHP51X	LU8223	17.5	17.5	17.5	2,058.00	66.00	23.25	2.84	15,000 / 80	5 E I

6. Assembly: 1 222.00 Tri-Cone Bit, 1 171.00 Bit Sub, 1 161.00 Pump Out Sub, 2 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 8 159.00 Drill Collar, 1 170.00 Drilling Jar, 5 159.00 Drill Collar, 1 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

Surveys: 1,929.00/2.000/0.000

Liner Size	Stroke	Pump No.	Eff. %	Annular Vel.				
117	152.0	216.0	8,420	D.P.	45.8	m/min	D.C.	76.3 m/min
		357.0		R.S.P.P	3,900	kPa	@	65 SPM

9. B.O.P. Check 2000/01/06 | Last Drill 2000/01/05 | Incident | Last Rig Insp. 2000/01/06

Personnel: Total 34 | Rig 15 | Service 16 | Suncor 3 | Other 0

10. Time Breakdowns - Hours

Drilling	22.5	Reaming	0	Rig Service	.75	Repairs	0	Waiting	0
Circulate	0	Coring	0	Directional	0	Rig Move	0	Other	0
Trips	0	Slip/Cut	.75	BOP Drill	0	Perforate	0	Testing	0
Downtime	0	Survey	0	Casing	0	Run/Retrieve	0	Abdn	0

11. Cost: Day $ 36,719 | Cumulative $ 1,437,148 | AFE $ 2,196,622 | AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	OPS	OPERATIONS
00:00	22:30	22.50	2	a	PP	Accumulated drilling, 222mm. holeF/1900m.-1966m. (Average ROP=3.0m/hr.)
22:30	23:15	0.75	7		PP	Rig service, function test annular preventor, O/C - 14 sec. Moter kills, remote choke.
23:15	00:00	0.75	10	a	PP	Circulate and survey at 1929m. was 2 degrees.

13. Foreman In Charge P. Erb/P. Miller @403-284-9583 | Weather -22/-24

Printed: 2000/06/06 8:26:24 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 18

1. Date 2000/01/07 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,028.00 (m) Operation Drilling ahead 222mm hole Progress 62.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	PH	PV	YP	Gels	Cake	Solids	Polymer
K2SO4 Visplex	1,220.0	128	7.4	11.00	17.00	24.00	14.0	19.0 / 19.0	3.0	

4.

CAUSTIC 3 SX	FLOPLEX 14 SX	POTASSIUM SULF. 30 SX
MUD ENGINEER 2		

5.

Bit No.	Size (mm)	Type	Serial No.	Jets	In (m)	Out (m)	Drlg (hrs)	ROP (m/hr)	Dull Grade	Cond.
2	222.000	EHP51X	LU8223	17.5 17.5 17.5	2,058.00	128.00	45.75	2.80	/ 80	5 E I

6. Assembly: 1 222.00 Tri-Cone Bit, 1 171.00 Bit Sub, 1 161.00 Pump Out Sub, 2 161.00 Drill Collar, 1 216.00 Intergral Blade Stabilizer, 8 159.00 Drill Collar, 1 170.00 Drilling Jar, 5 159.00 Drill Collar, 1 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

SPM	Liner Size	Stroke	Eff. %	Annular Velocities				
120	152.0	216.0	8,900	D.P.	45.8	m/min	D.C.	76.3 m/min
		357.0		R.S.P.P		kPa	@	SPM

9. B.O.P. Check 2000/01/07 Last Drill 2000/01/05 Incident Last Rig Insp. 2000/01/07

Personnel: Total 33 Rig 15 Service 16 Suncor 2 Other 0

10. Time Breakdowns - Hours

Drilling	22.5	Directional	0	Rig Service	.75	Repair	0	Wait on Orders	0
Trip	0	Core / Log	0	Safety Mtg	.5	Rig Move	0	Wait on Weather	0
Circ	0	Ream	0	Other	0	Slip & Cut	0	Wait on Equipment	0
Loss	0	Survey	0	Casing	0	Rig Release	0	Wait on Personnel	.25

11. Cost: Day $ 30,218 Cumulative $ 1,467,365 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	COND	OPERATIONS
00:00	00:45	0.75	7		PP	Rig services, Functioned Annular, Pipe rams and remote choke. Daily walk around and rig check.
00:45	01:00	0.25	28		PU	Clean suction screen in pump.
01:00	01:30	0.50	8	c	NU	Repair air control to clutches on floor motors.
01:30	00:00	22.50	2	a	PP	Drill ahead 222mm hole from 1984m to 2028m @ 24:00 hrs. ROP = 2.78m/hr. Drilling Parameters: WOB 15k DaN RPM 75/80, Pump Pressure 8900 KPa @1.36m3/min, Torque @ 2100/2300 Nm, Hole drag @ 2/4K DaN both up & down. Hole appears good on connections

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Clear Cool -25, -22

Printed: 2000/06/08 8:28:38 AM

SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 19

1. Date 2000/01/08 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,063.00 (m) Operation Drilling ahead 222mm hole Progress 35.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	pH	PV	YP	Solids %	Gels	Filtrate	Remarks
K2804 Visplex	1,215.0	61	9.2	11.00	15.00	18.50	13.4	16.0 / 16.0	3.0	

4.

GEL UNTREATED 12 SX	MUD ENGINEER 2				

5.

Bit No.	Size (mm)	Type	Serial No.	In	Out	Total	Depth (m)	Drlg (hrs)	Hours	ROP (m/hr)	WOB/RPM	Cond.
3	222.000	AG426	R25YD	12.7	12.7	14.3	2,099.00	5.00	2.00	2.50	14,000 / 70	1 E I
2	222.000	EHP51X	LU8223	17.5	17.5	17.5	2,058.00	158.00	55.50	2.85	/ 80	5 E I

6. Assembly: 222.00 Tri-Cone Bit, 171.00 Bit Sub, 161.00 Pump Out Sub, 4 161.00 Drill Collar, 170.00 Drilling Jar, 11 161.00 Drill Collar, 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

7. Surveys: 2,040.00/1.250/0.000

8.

RPM		Circ		TQ					
115	152.0	216.0	9,400	D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P	4,000	kPa	@	65	SPM

9. B.O.P. Check 2000/01/08 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/08

Personnel: Total 32 Rig 15 Service 15 Suncor 2 Other 0

10. Time Breakdowns - Hours

Drlg	11.75	Circ	0	Rig Service	.5	Trip	0	Survey	0
Ream	9.5	Cond Mud	1.25	Repair	0	Wait	0	WOC	0
Surface	0	Surface	1	Logging	0	Directional	0	Testing	0
Coring	0	Other	0	Circulating	0	Fishing	0	Other	0

11. Cost: Day $ 37,510 Cumulative $ 1,504,875 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	C	OPERATIONS
00:00	00:30	0.50	7		PP	Rig services, function Annular, Pipe Rams & Remote choke, Daily walk around and rig check.
00:30	10:15	9.75	2	a	PP	Drill ahead 222mm hole from 2028m to 2058m. ROP = 3m/hr. Drilling Parameters: WOB 15k DaN RPM 75/80, Pump Pressure 8900 KPa @1.36m3/min, Torque @ 2100/2300 Nm, Hole drag @ 2/4K DaN both up & down. Hole appears good on connections
10:15	11:15	1.00	10	a	PP	Circulate and survey @ 2040M 1.25 degrees.
11:15	12:30	1.25	5	a	PP	Circulate bottoms up and ready rig to trip.
12:30	22:00	9.50	6	a	PP	Trip for bit, Hole good on trip out and in , No fill on bottom. Blind rams fnction w/ out of hole.
22:00	00:00	2.00	2	a	PP	Drill ahead 222mm hole from 2058m to 2063m @ 24:00 hrs. ROP = 2.7m/hr. Drlg. Parameters, WOB 12/14k DaN, RPM 65/70, Pump @ 1.3m3/min with 9400 KPa Hole drag @ 2/4k DaN up & down.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Clear Cold -30, -22

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SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 20

1. Date 2000/01/09 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,099.00 (m) Operation Circulate Condition hole to log. Progress 36.00 (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Weight	Vis	WL	PH	PV	YP	Solids	Gels	Fltr Cake	Polymer
K2SO4 Visplex	1,220.0	67	10.4	10.50	15.00	20.50	13.7	17.0 / 18.0	3.0	

4.

CAUSTIC 3 SX	VISPLEX 10 SX	MUD ENGINEER 2

5.

Bit No.	Size (mm)	Type	IADC No.	In (m)	Out (m)	Drilled (m)	Hours	ROP (m/h)	WOB / RPM	Cond.
3	222.000	AG426	R25YD	12.7 12.7 14.3	2,099.00	41.00	15.25	2.69	15,000 / 75	1 E I

6. Assembly: 222.00 Tri-Cone Bit, 171.00 Bit Sub, 161.00 Pump Out Sub, 4 161.00 Drill Collar, 170.00 Drilling Jar, 11 161.00 Drill Collar, 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

SPM	Pump Size	Stroke	Pressure	Annular Velocity				
115	152.0	216.0	10,100	D.P.	45.8	m/min	D.C.	76.3 m/min
		357.0		R.S.P.P	4,000	kPa	@	65 SPM

9. B.O.P. Check 2000/01/09 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/09

Personnel: Total 34 Rig 15 Service 17 Suncor 2 Other 0

10. Time Breakdowns - Hours

Drilling	13.25	Directional	0	Rig Service	.75	Reaming	0	Coring	0
Circ.	2	Fishing	1.25	Trip	0	Rig Repair	0	WOW	0
Survey	0	Rig Move	0	BOP Test	0	Drill Test	0	Flow Check	0
Logging	6.75	Slip & Cut	0	Condition	0	Pipe Handling	0	Other	0

11. Cost: Day $ 4,055 Cumulative $ 1,508,930 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	P/U/C	OPERATIONS
00:00	00:45	0.75	7		PP	Rig services, functioned Annular, Pipe Rams & Remote choke. Daily walk around and rig check.
00:45	14:00	13.25	2	a	PP	Drill ahead 222mm hole from 2063m to 2099m TD Average ROP = 2.8m/hr. Drlg Parameters: WOB 15k DaN, RPM 70/75, Pump @ 1.3m3/min w/ 10100 KPa pressure, Torque @ 2300/2500 Nm, Hole drag 2/4k Dan up & Down.
14:00	15:15	1.25	5	a	PP	Circulate up bottom sample and ready rig to trip.
15:15	17:15	2.00	6	h	PP	Wiper trip, condition well for logging
17:15	00:00	6.75	5	d	PU	Circulate, work string, condition wellbore for logging, Circulate and wait on Loggers from Grande Prairie

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Clear Cold -30, -22

Printed: 2000/06/06 8:27:05 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 21

1. Date 2000/01/10 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,099.00 (m) Operation Log well with Slumberger as per program Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Sample From	Wt.	Vis	WL	pH	PV	YP	% Solids	Gels	FC	Remarks
K2SO4 Visplex		1,220.0	67	10.2	11.00	15.00	20.50	13.7	17.0 / 18.0	3.0	

4. MUD ENGINEER 1

5.

Bit No.	Size (mm)	Type	Serial No.	Nozzles	In (m)	Out (m)	Drlg (m)	Hours	ROP (m/hr)	Dull (B/G)	Cond.
3	222.000	AG426	R25YD	12.7 12.7 14.3	2,099.00					/	1 E I

6. Assembly: 222.00 Tri-Cone Bit, 171.00 Bit Sub, 161.00 Pump Out Sub, 4 161.00 Drill Collar, 170.00 Drilling Jar, 11 161.00 Drill Collar, 159.00 Cross Over, 8 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

Pump	Liner Size	Stroke	Pressure	Annular Velocities				
		216.0		D.P.	45.8	m/min	D.C.	76.3 m/min
		357.0		R.S.P.P		kPa	@	SPM

9. B.O.P. Check 2000/01/10 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/10

Personnel: Total 37 Rig 15 Service 20 Suncor 2 Other 0

10. Time Breakdowns - Hours

[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0
[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0
[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	0
[illegible]	6	[illegible]	0	[illegible]	0	[illegible]	0	[illegible]	18

11. Cost: Day $ 27,797 Cumulative $ 1,536,727 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	LOC	OPERATIONS
00:00	01:45	1.75	5	d	PU	Circulate and condition Wellbore, Wait on logging Unit.
01:45	06:00	4.25	6	c	PP	Trip out to log. Chain out and flow check as required.
06:00	00:00	18.00	11	a	PP	Rig in Schlumberger and log well as per program and Geology requests. Loggers TD @ 2098.8 Surface csg. @ 542. Run #1: Platform Express (AIT-TDL-LDT-CNT) Run #2: DSI-MLT-GPIT * Bottom Hole Temp Run #1 = 74 degC

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Clear V. Cold -32, -29

Printed: 2000/06/08 8:27:18 AM

SUNCOR INC. RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 22

1. Date 2000/01/11 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,099.00 (m) Operation Running Abandonment plugs Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Weight	Vis	PV	YP	Gels	Filtrate	Cake	Solids	Oil %
K2SO4 Visplex	1,220.0	67	10.2	11.00	15.00	20.50	13.7	17.0 / 18.0	3.0	
MUD ENGINEER 1									

4.

Bit No.	Size	Type	Serial No.	Jets	Depth Out	Depth In	Footage	Cum. Hrs	Dull Grade

5. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

		216.0		D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P		kPa	@		SPM

9. B.O.P. Check 2000/01/11 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/11

Personnel: Total 36 Rig 15 Service 19 Suncor 2 Other 0

10. Time Breakdowns - Hours

0	0	0	0	0	0
7.25	13	0	0	0	0
0	0	0	0	0	0
0	0	1.5	0		2.25

11. Cost: Day $ 87,223 Cumulative $ 1,623,951 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

From	To	Hours	Code	Sub	Op	Operation
00:00	01:45	1.75	11	a	PP	Finish Logging with Schlumberger as per program
01:45	04:00	2.25	6	f	PU	Run in BHA and lay down same.
04:00	09:00	5.00	6	f	PU	Run in open ended, pickup Drill pipe to replace BHA to run abandonment plugs.
09:00	22:00	13.00	5	h	PU	Circulate and wait on cementers etc. for abandonment plugs. Tim Krysak got approval for the abandonment program from Mr. Andy Graw of the NEB in Calgary, Cementers and wireline had already been dispatched to location.
22:00	22:30	0.50	28		PU	Safety and procedure meeting with all personel.
22:30	00:00	1.50	17	a	PU	Rig in cementers and run plugs Plug #1 2099m to 2039m cemented with 4t O:1:0 "G" . Plug down @ 23:45 hrs 2000 -01-11th, Start to lay down pipe for plug #2.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Lt. Snow. -32, -24

Printed: 2000/01/08 8:27:32 AM

SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 23

1. Date 2000/01/12 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,099.00 (m) Operation Nipple down BOP's Clean tanks and rig out Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud Type	Wt	Vis	WL	PV	YP	Gels	Solids	Oil %
K2SO4 Visplex	1,220.0	67	10.2	11.00	15.00	20.50	13.7	17.0 / 18.0	3.0	

4.

5.

Bit No.	Size (mm)	Make	Type	Serial No.	Jets	TFA	In @	Out @	Total Hrs	Dull Char.

6. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

SCR # 1		216.0		D.P.	45.8	m/min	D.C.	76.3	m/min
		357.0		R.S.P.P		kPa	@		SPM

9. B.O.P. Check 2000/01/11 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/12

Personnel: Total 36 Rig 15 Service 19 Suncor 2 Other 0

10. Time Breakdowns - Hours

[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0
[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0
[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0	[redacted]	0
[redacted]	0	[redacted]	0	[redacted]	15.5	[redacted]	8.5	[redacted]	0

11. Cost: Day $ 176,521 Cumulative $ 1,800,472 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

FROM	TO	HOURS	CODE	SUB	OPERATIONS
00:00	15:30	15.50	17	a	PU	Run and feel abandonment plugs as follows: Plug #1 2099m to 2039m, cemented with 4t (3m3) of 0:1:0 +0.3%D13+ 0.5%D65, Plug down @ 23:45 hrs 2000-01-11, plug not felt. Plug #2 1950m to 1900m, cemented with 3.4t (2.5m3) of 0:1:0 + 0.3%D13 + 0.5%D65. Plug down @ 00:45 2000-01-12, plug top felt with wireline @ 1910M topped up to 1891m with 1m3 of Cement still in drill pipe. Plug #3 1000m to 950m, Cemented with 3.4t (2.5m3) of 0:1:0 + 0.5%D65. Plug down @ 08:48 hrs 2000-01-12 Cement top @ 955m. Plug # 4 572m to 512m, Cemented with 5.4t (4m3) of 0:1:0 +0.5% D65. Plg down @ 12:28hrs 2000-01-12. Cement top @ 478m. Lay down the remaining drill pipe and rig out cementing & logging equipment.
15:30	00:00	8.50	1	b	PP	Nipple down BOP's. dump and clean mud tanks, rigging out equipment to move. * Tim Krysak obtained approval to cut and cap casing according to the NEB guidelines, from Mr. Andy Graw with the NEB in Calgary

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather Lt. Snow. -32, -24

Printed: 2000/08/08 8:27:45 AM

SUNCOR ENERGY RESOURCES GROUP
DAILY DRILLING REPORT

Drilling Report At Midnight

D.F.S. 24

1. Date 2000/01/13 Well Name Suncor Netla P16-60-50-122-45 Contractor / Rig AKITA DRILLING LTD. / 37

2. Depth 2,099.00 (m) Operation Rig Released. Progress (m)

Ground Elevation 602.30 (m) KB to GL 4.70 (m) KB to CF 4.70 (m) KB Elev. 607.00 (m)

3.

Mud type	Weight	Vis	PV	YP	Gels	Filtrate	Cake	pH	Pm	Pf/Mf	Chlorides

4.

Additive	Quantity	Additive	Quantity	Additive	Quantity	Additive	Quantity
SULPHAMIC ACID 10 SX							

5. Assembly: 311.00 Tri-Cone Bit, 205.00 Positive Displacement Motor, 220.00 Shock Sub - String, 1 220.00 Drill Collar, 308.00 Intergral Blade Stabilizer, 2 220.00 Drill Collar, 228.00 Drilling Jar, 213.00 Cross Over, 15 161.00 Drill Collar, 162.00 Cross Over, 9 102.00 Heavy Weight Drill Pipe

7. Surveys:

8.

		216.0		D.P.	m/min	D.C.	m/min
		357.0		R.S.P.P	kPa	@	SPM

9. B.O.P. Check 2000/01/11 Last Drill 2000/01/08 Incident Last Rig Insp. 2000/01/12

Personnel: Total 34 Rig 15 Service 17 Suncor 2 Other 0

10. Time Breakdowns - Hours

	0		0		0		0		0
	0		0		0		0		0
	0		0		0		0		0
	0		0		0		24		0

11. Cost: Day $ 238,935 Cumulative $ 2,039,406 AFE $ 2,196,622 AFE # A9911480P16

12. Operation Summary

From	To	Hours	Code	Sub	Phase	Comments
00:00	00:00	24.00	1	h	PP	Finish rigging out equipment. Cut and cap casing 1m below ground, install sign, all as per NEB regulations. Modify and fabricate flow line to better accomodate the two shale shakers. Clean & de-ice rig, matting etc. Rig Released @ 24:00 hrs 2000-01-13th ** NOTE:** Rig costs and all other standby costs will be either charged to this well (Netla P-16), or the next well depending on what happens to the rig. The estimated day cost for the rig & misc. rental equipment while on standby is +- $ 20k/$24k, The cost for crews to fly back & forth will be +- $15k. Due to the high activity in the oilfield the cost for standby are nearly the same rate as they are to actively drill.

13. Foreman in Charge Pat Miller @ 403-284-9583 Weather V.Cold Windy -40, -34

Printed: 2000/06/08 8:27:59 AM

Attachment
#2

PLAN AND FIELD NOTES

OF SURVEY OF

PROPOSED EXPLORATORY WELL

SUNCOR NETLA

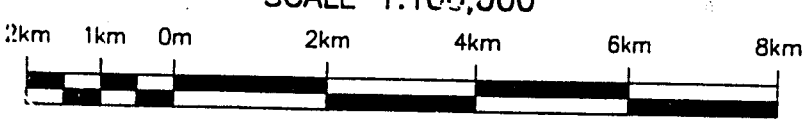
IN UNIT P, SECTION 16

GRID AREA 60° 50' , 122° 45'

NORTHWEST TERRITORIES

CANADA OIL AND GAS LAND REGULATIONS

SCALE 1:100,000



SURVEYED FOR

SUNCOR ENERGY INC.

BY : W.V. JOHNSON, CLS

AUGUST, 1999.

[illegible]or Zone 10, central meridian 123° W.
[illegible]earing 89° 55' 55" computed between
[illegible]S C-07-1 and Fd.CLS C-07-2
[illegible]3° W.
[illegible]res and decimals thereof.
[illegible]measured distances reduced to
[illegible]level.
[illegible]ates measured distances have been
[illegible]multiplying them by an average combined
[illegible]inates were then adjusted to fit the

[illegible]ubdivisions are UTM plane.
found ..... ●
[illegible]..... ○
[illegible]2.0m long placed 0.30m N.
[illegible]odetic Survey of Canada Monument

[illegible]illing; therefore well as drilled may
[illegible]ed location.

[illegible]11 to August 13, 1999

Certified Correct and completed on the 18th day of August, 1999.

Walter Johnson Canada Land Surveyor

Date: Aug. 19, 1999

ASSOCIATION OF CANADA LANDS SURVEYORS ★ ASSOCIATION DES ARPENTEURS DES TERRES DU CANADA ★

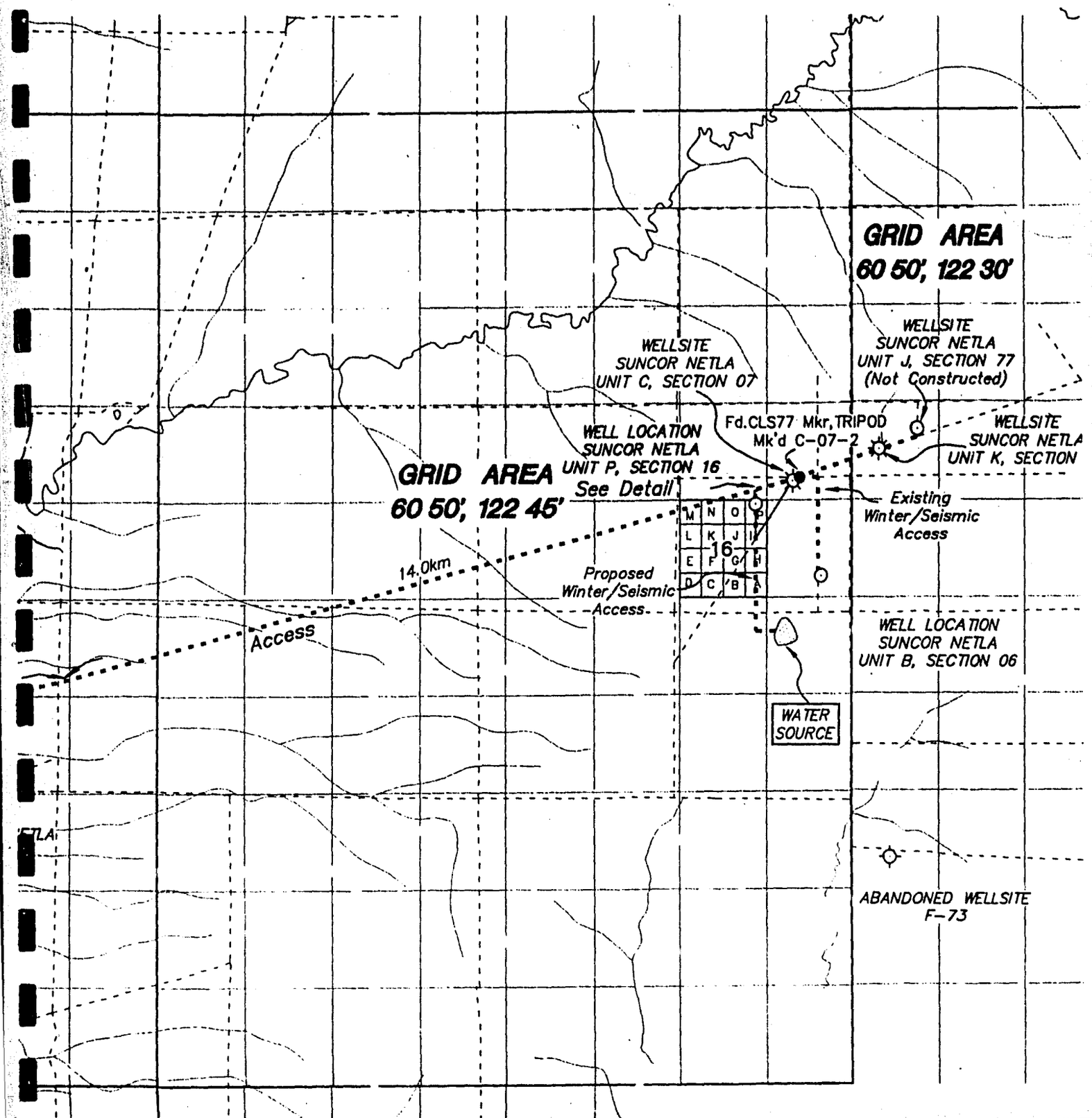
W.V. Johnson
Comm. No. 1393

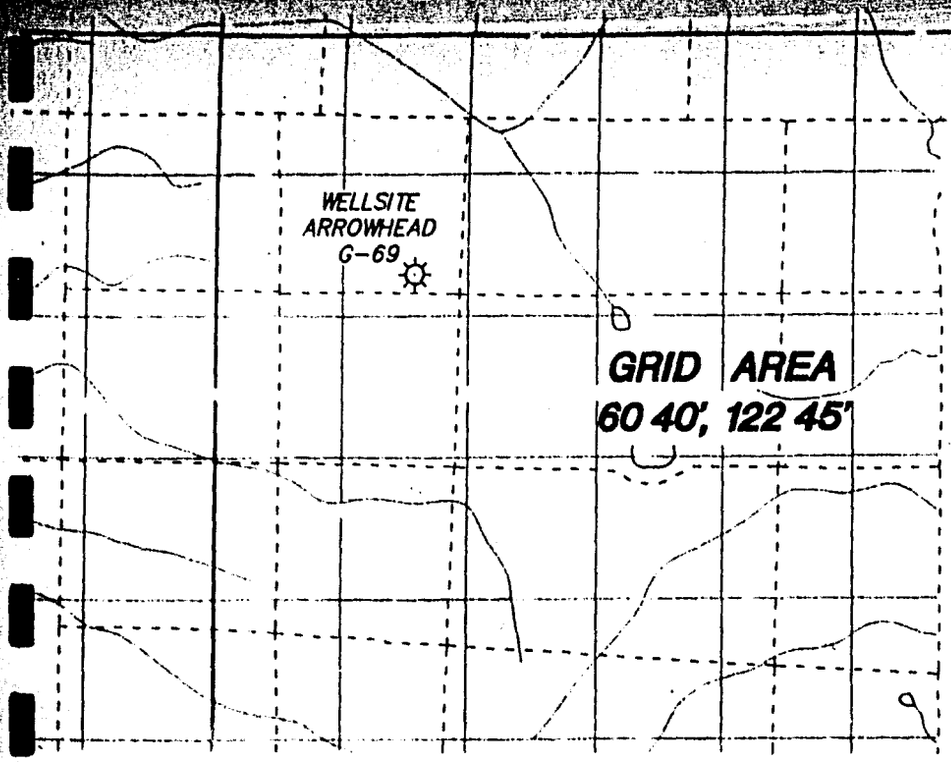
SUNCOR ENERGY INC.

_____

_____
WITNESS

_____
DATE


GRID AREA
60 50', 122 30'
WELLSITE
SUNCOR NETLA
UNIT J, SECTION 77
(Not Constructed)
WELLSITE
SUNCOR NETLA
UNIT C, SECTION 07
Fd.CLS77 Mkr, TRIPOD
Mk'd C-07-2
WELLSITE
SUNCOR NETLA
UNIT K, SECTION
WELL LOCATION
SUNCOR NETLA
UNIT P, SECTION 16
See Detail
GRID AREA
60 50', 122 45'
Existing
Winter/Seismic
Access
M N O P
L K J I
16
E F G H
D C B A
14.0km
Proposed
Winter/Seismic
Access
Access
WELL LOCATION
SUNCOR NETLA
UNIT B, SECTION 06
WATER
SOURCE
ABANDONED WELLSITE
F-73



LEGEND

UTM coordinates are compu
Bearings were derived from
Wellsite Control Monuments
and are referred to Meridia
Distances are expressed in
Distances shown in traverse
the horizontal at general g
For the computation of co
reduced to the UTM plane
scale factor of 0.9995059.
control.
Distances shown on grid ar
Authorized control monume
Monuments placed .....
Mkr. denotes metal marker
Elevations were derived fror
'Petitot' Elev. = 218.241m

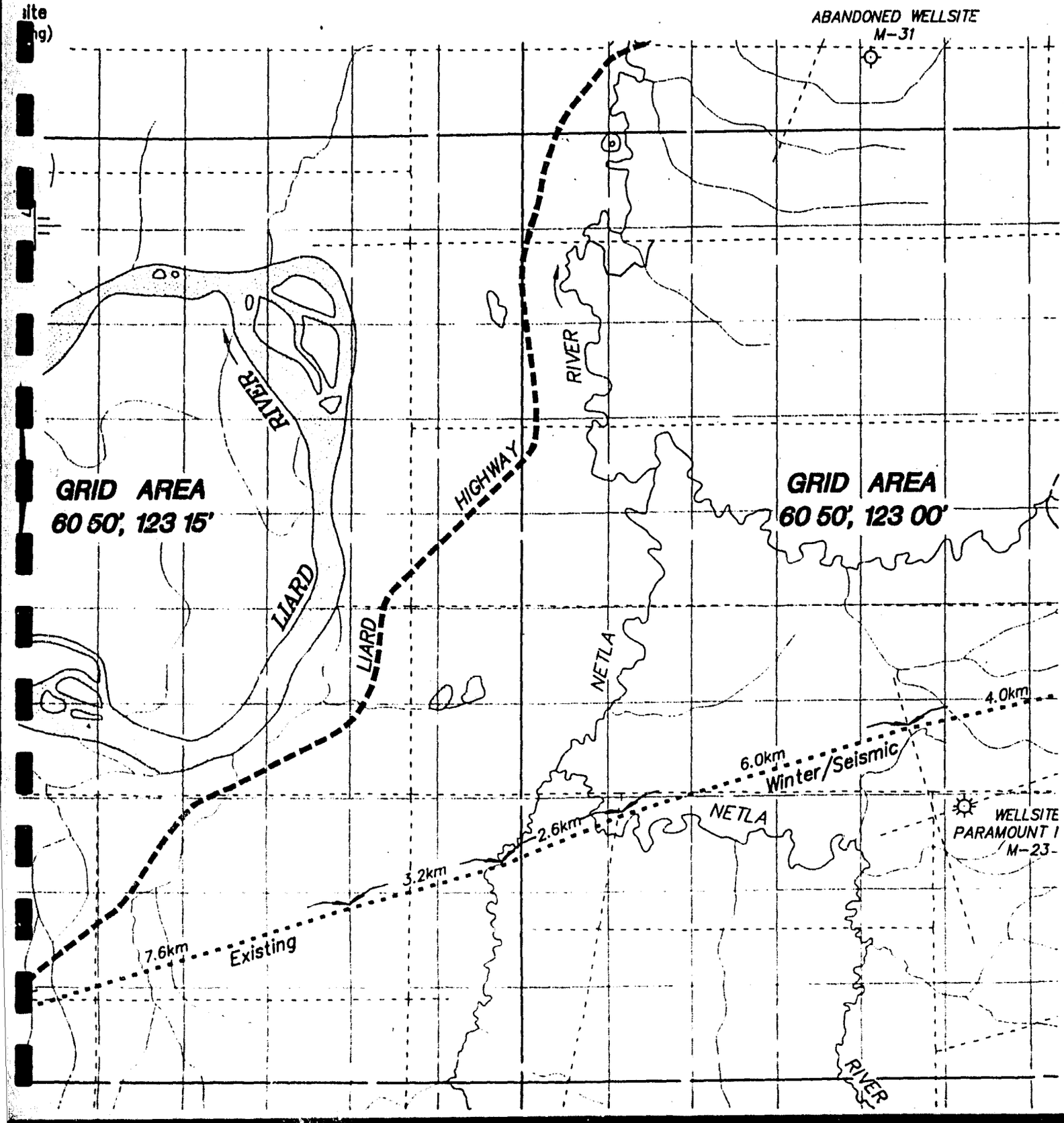
Survey was completed prior
not necessarily agree with

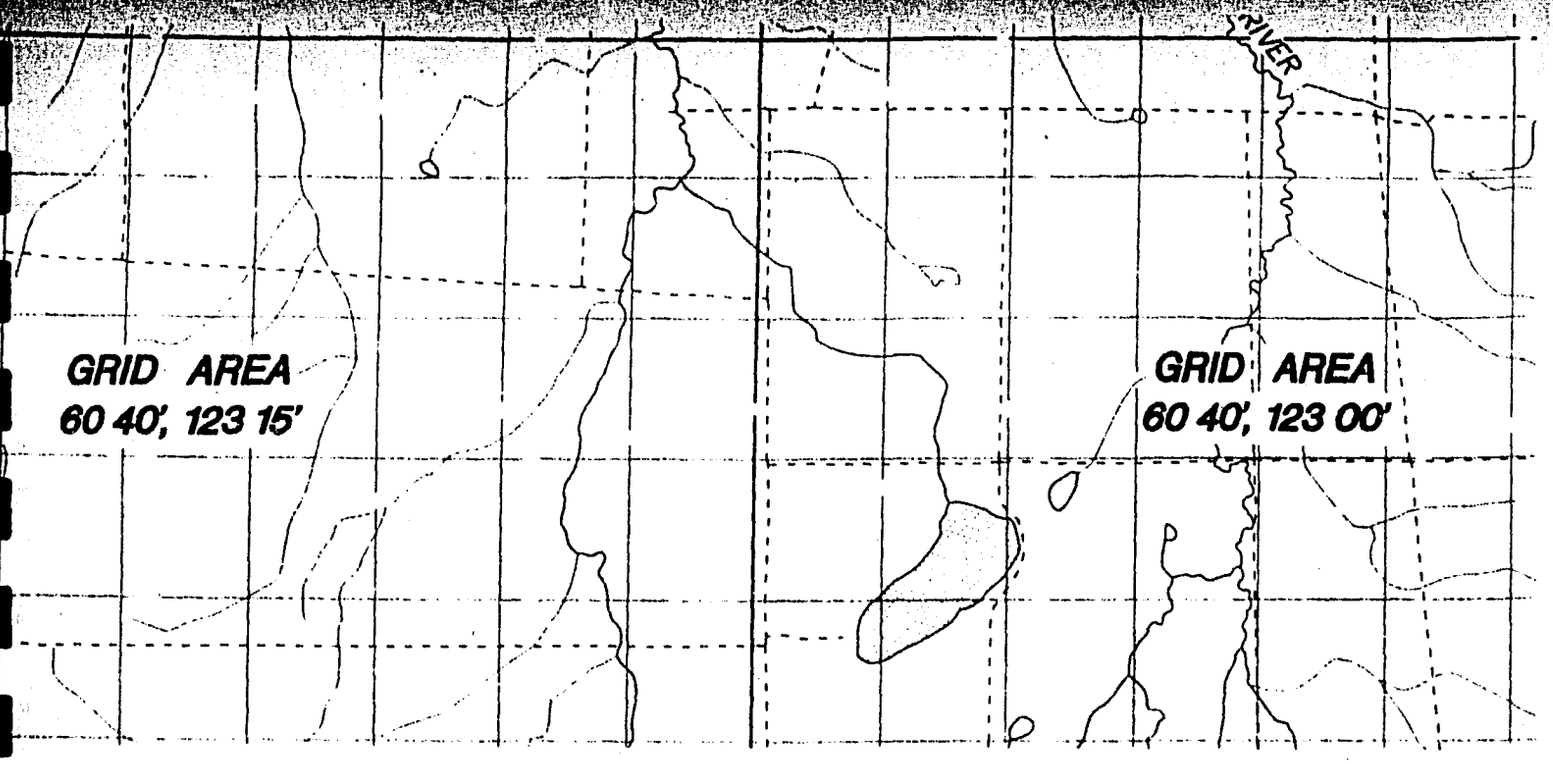
The survey was exceuted, A
by W.V. Johnson, CLS

wn are on 1927 North American Datum and were
ellsite Control Monuments Fd.CLS C-07-1 and Fd.CLS C-07-2

UTM COORDINATES, (1927 NAD)

Latitude	Longitude(W)	Northings	Eastings
60°46'13.995"	122°46'19.745"	6737047.818	512412.636
60°46'13.982"	122°46'08.081"	6737048.028	512589.146
60° 50' 00"	122° 45' 00"	6744044.752	513592.758
60° 50' 00"	123° 00' 00"	6744018.857	500000.000
60° 40' 00"	122° 45' 00"	6725481.053	513663.430
60° 40' 00"	123° 00' 00"	6725455.066	500000.000
60°46'00.093"	122°46'52.501"	6736616.029	511918.398
60°46'00.112"	122°47'20.625"	6736615.219	511492.741
60°45'45.093"	122°46'52.501"	6736151.936	511919.944
60°45'45.112"	122°47'20.625"	6736151.125	511494.232
60°45'49.080"	122°46'49.288"	6736275.431	511968.161
60°45'36.194"	122°47'06.992"	6735875.859	511701.492
60°46'10.498"	122°46'19.872"	6736939.624	512411.095
60°45'36.338"	122°47'06.935"	6735880.337	511702.346
60°46'10.542"	122°46'19.947"	6736940.980	512409.959
60°45'54.043"	122°47'07.130"	6736428.088	511697.600
60°45'49.034"	122°46'49.444"	6736274.004	511965.804
60°45'57.556"	122°47'07.157"	6736536.795	511696.834


ABANDONED WELLSITE
M-31
GRID AREA
60 50', 123 15'
GRID AREA
60 50', 123 00'
RIVER
LIARD
RIVER
LIARD
HIGHWAY
NETLA
NETLA
4.0km
6.0km
Winter/Seismic
2.6km
3.2km
7.6km
Existing
WELLSITE
PARAMOUNT I
M-23
RIVER

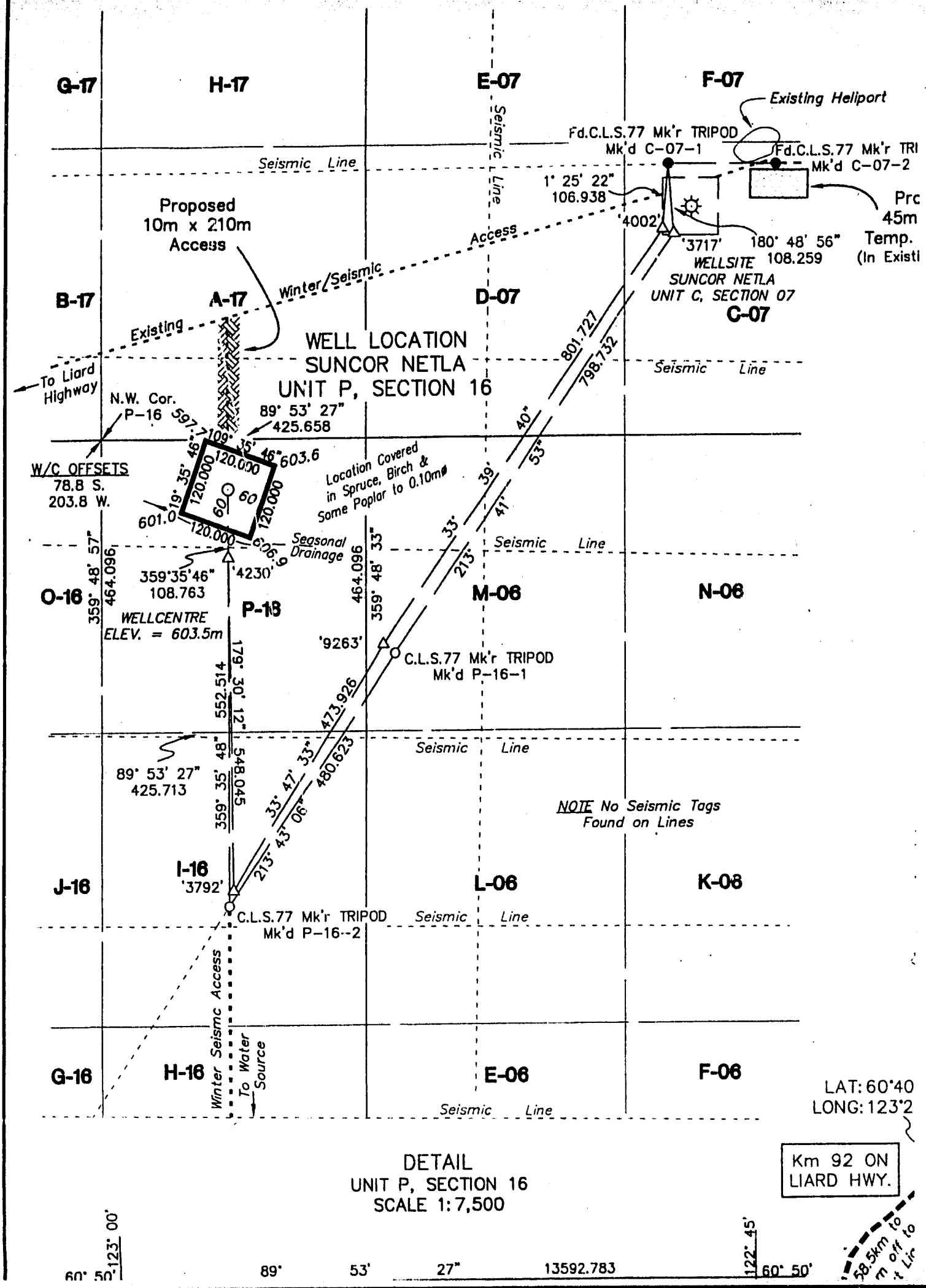


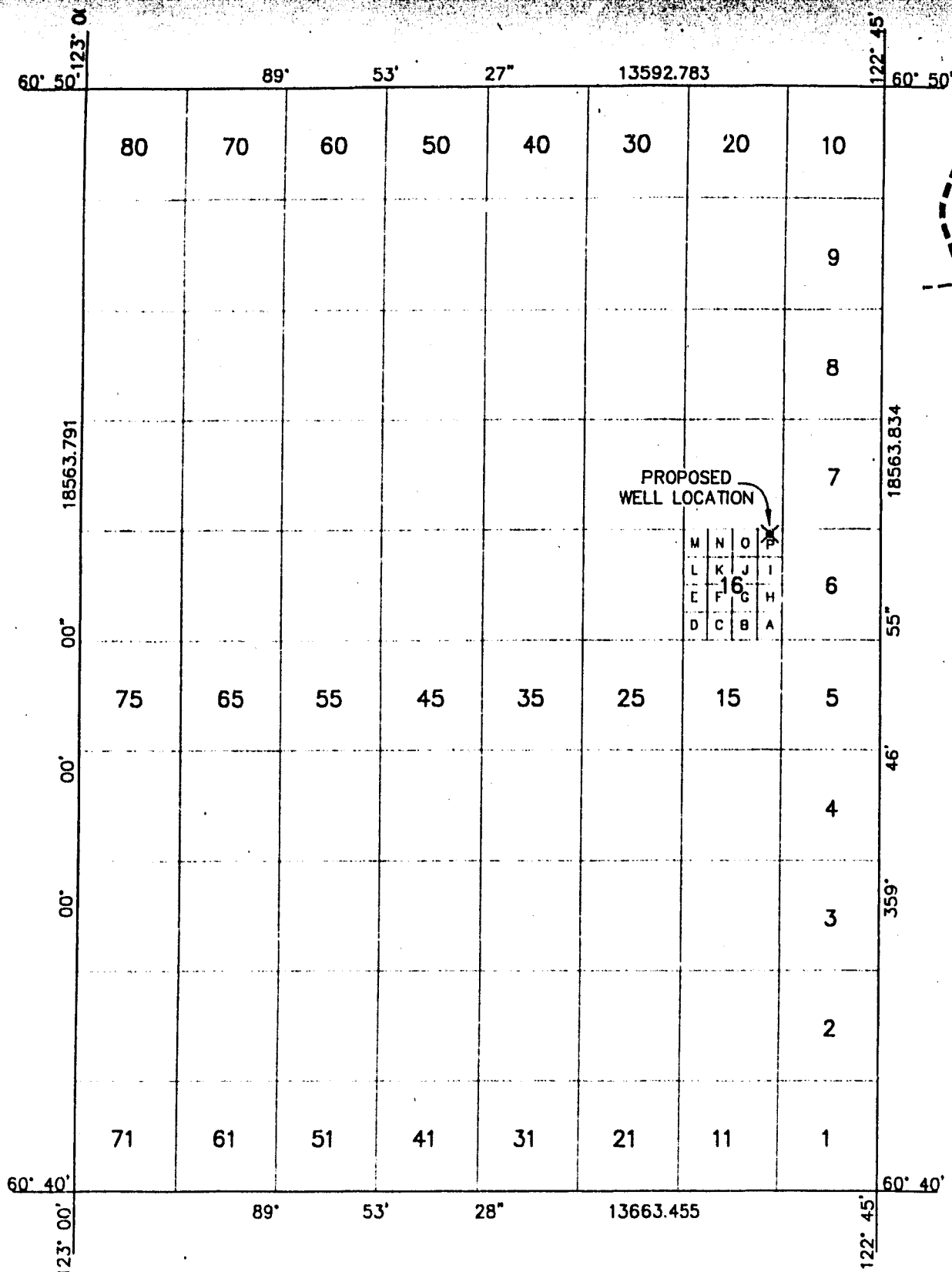
All coordinates obtained from

GEOGRAPHIC AI
Station
CONTROL MONUME
C-07-1
C-07-2
GRID AREA
NE
NW
SE
SW
P-16, NE
P-16, NW
P-16, SE
P-16, SW
TRAVERSE STATION
P-16-1
P-16-2
TH 3717
TH 3792
TH 4002
TH4230
TH 9263
PROPOSED WELL
P-16

AREAS REQUIRED:

Access to Water Source:	10m x 2.9km =	2.90 ha.
Access to Wellsite:	10m x 210m =	0.21 ha.
Temp. Campsite:	45m x 95m =	0.43 ha.
Wellsite:	120m x 120m =	1.44 ha.
TOTAL:		4.98 ha.


G-17
H-17
E-07
F-07
Existing Heliport
Fd.C.L.S.77 Mk'r TRIPOD
Mk'd C-07-1
Fd.C.L.S.77 Mk'r TRI
Mk'd C-07-2
Seismic Line
Seismic Line
1° 25' 22"
106.938
Proposed
10m x 210m
Access
Access
4002'
3717'
180° 48' 56"
WELLSITE 108.259
SUNCOR NETLA
UNIT C, SECTION 07
C-07
Prc
45m
Temp.
(In Existi
B-17
A-17
Winter/Seismic
Existing
D-07
WELL LOCATION
SUNCOR NETLA
UNIT P, SECTION 16
To Liard
Highway
N.W. Cor.
P-16
597.7
89° 53' 27"
425.658
109° 35' 46"
603.6
801.727
798.732
40°
53°
39°
41°
33°
213°
Seismic Line
W/C OFFSETS
78.8 S.
203.8 W.
120.000
120.000
120.000
120.000
60
60
19° 35' 46"
601.0
Location Covered
in Spruce, Birch &
Some Poplar to 0.10m
Seasonal
Drainage
359°35'46"
108.763
4230'
359° 48' 57"
464.096
359° 48' 33"
464.096
O-16
P-16
M-06
N-06
WELLCENTRE
ELEV. = 603.5m
9263'
C.L.S.77 Mk'r TRIPOD
Mk'd P-16-1
179° 30' 12"
552.514
473.926
Seismic Line
89° 53' 27"
425.713
359° 35' 48"
548.045
33° 47' 33"
480.623
213° 43' 06"
NOTE No Seismic Tags
Found on Lines
I-16
3792'
J-16
L-06
K-08
C.L.S.77 Mk'r TRIPOD
Mk'd P-16-2
Seismic Line
Winter Seismic Access
To Water
Source
G-16
H-16
E-06
F-06
Seismic Line
LAT: 60°40
LONG: 123°2
DETAIL
UNIT P, SECTION 16
SCALE 1:7,500
Km 92 ON
LIARD HWY.
60° 50' 123° 00'
89° 53' 27" 13592.783
122° 45' 60° 50'
58.5km to
m off to
t Lia



GRID AREA 60° 50', 122° 45'

SCALE 1:100,000

REV.No.	DESCRIPTION	DATE

McElhanney

McELHANNEY ASSOCIATES
PROFESSIONAL LAND SURVEYORS
10014 – 97th Ave., Suite 202
Fort St. John, British Columbia
Phone: (250)787-0356, Fax: (250)787-0310

DATE : 99/08/17 JOB No.: 3111-07349WS RT BRC

OVERSIZED

DOCUMENT

FILMED

ON

35mm

Attachment
#3

DFW BIT RECORD SUMMARY REPORT

Province: NWT

Name: Suncor Nella P16-60-50-122-45

Location: 300/P- 16 Lat: 60° 50' Long: 122° 45'

Elev: 607.00

Contractor: AKITA DRILLING LTD.

Rig No.: 37

Spud Date: 21/12/1999

Rig Release: 13/01/2000

Pump #	TYPE	Liner Size
1	TRIPLEX	216/152
2	DUPLEX	357/0

K2SO4 Visplex	2099 m	m
	m	m
	m	m
	m	m

Bit No	Run No	Size	Type	Serial No	IADC Code	Depth In	Depth Out	Metres Run	ROP	Hours Run	Hours Accum	T B O R	Cond O D L	Nozzles	WOB (1000 lbf) Min/Max	RPM Min/Max	Vert Dev.	Pump Press	SPM	Pump Rate	Hole Condition	Bit Wt	Mud Wt	Vis	WL	Mud Type
1A	311.	FDSS	17.5/17.5/17.5	LN8137	116	521.00	542.00	13.30	40.75	40.75	5-7-FC-H	2-1 -FC-BC	159	/ 16,000	140 200						Good		0	9	16.8	
2A	311.	HP43A	15.9/15.9/15.9	87706	437	542.00	21.00	12.00	1.75	42.50	-- -	- - -	159	12,000/ 15,000	150 160						Good		28	11.5	0	
1	222.	DS110	7.9/7.9/7.9 7.9/7.9/8.7	H66882	M323	1,900.00	1,358.00	9.82	138.2	180.75	6-7-CT-N	D-I -NO-BHA	159	/ 6,000	175						Good		72	10	11.6	
2	222.	EHP51X	17.5/17.5/17.5	LU8223	517	2,058.00	156.00	2.85	55.50	236.25	5-7-BT-H	E-I -NO-TQ	159	/ 15,000	70 80						Good		61	11	9.2	
3	222.	AQ426	12.7/12.7/14.3	R25YD	447	2,099.00	41.00	2.69	15.25	251.50	1-1-NO-A	E-I -NO-TD	159	12,000/ 15,000	65 75						Good		67	11	10.2	

Attachment
#4

Attachment #4

End Well Report
Suncor Inc. Resources
Suncor Netla P16-60-50-122-45

Casing & Cement Record.

Casing Size (mm)	Weight (kg/m)	Grade	Make	No. Joints	Thread	Date Set	Depth Set (m)		Cement Volume (tonnes)	(m3)	Cement Blend.
244.5	53.57	J-55	Prudential	42	LT&C	99-12-22	542.0		45.00	43.10	Thixotrop RFC + 2%S1

Final Pipe Tally Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	1	Report Date:	1999/12/22
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Date Run: 1999/12/22
Buoyancy Factor: 0.8700

Proposed Setting TMD: 542.00 (m)
Block Weight: 7,000 (daN)

0 - 0		244.50	PRUDENTIAL		63.57	LT&C	J-55	3	0.00662

1		SURFACE CASIN	14.13	14.13	24		SURFACE CASIN	13.25	291.52	
2		SURFACE CASIN	13.18	27.31	25		SURFACE CASIN	13.24	304.76	
3		SURFACE CASIN	13.23	40.54	26		SURFACE CASIN	13.25	318.01	
4		SURFACE CASIN	13.23	53.77	27		SURFACE CASIN	13.24	331.25	
5		SURFACE CASIN	13.25	67.02	28		SURFACE CASIN	13.24	344.49	
6		SURFACE CASIN	13.23	80.25	29		SURFACE CASIN	13.24	357.73	
7		SURFACE CASIN	13.18	93.43	30		SURFACE CASIN	13.21	370.94	
8		SURFACE CASIN	13.23	106.66	31		SURFACE CASIN	13.11	384.05	
9		SURFACE CASIN	13.15	119.81	32		SURFACE CASIN	13.22	397.27	
10		SURFACE CASIN	13.22	133.03	33		SURFACE CASIN	13.22	410.49	
11		SURFACE CASIN	13.18	146.21	34		SURFACE CASIN	13.24	423.73	
12		SURFACE CASIN	13.22	159.43	35		SURFACE CASIN	13.19	436.92	
13		SURFACE CASIN	13.22	172.65	36		SURFACE CASIN	13.22	450.14	
14		SURFACE CASIN	13.22	185.87	37		SURFACE CASIN	13.24	463.38	
15		SURFACE CASIN	8.17	194.04	38		SURFACE CASIN	13.24	476.62	
16		SURFACE CASIN	8.66	202.70	39		SURFACE CASIN	13.22	489.84	
17		SURFACE CASIN	9.16	211.86	40		SURFACE CASIN	13.18	503.02	
18		SURFACE CASIN	9.78	221.64	41		SURFACE CASIN	13.22	516.24	
19		SURFACE CASIN	9.94	231.58	42		SURFACE CASIN	13.22	529.46	
20		SURFACE CASIN	9.53	241.11	43		SURFACE CASIN	13.24	542.70	
21		SURFACE CASIN	10.71	251.82	OUT		SURFACE CASIN	11.19		
22		SURFACE CASIN	13.24	265.06	OUT		SURFACE CASIN	11.29		
23		SURFACE CASIN	13.21	278.27						

Casing Report

Legal Well Name:	Suncor Netia P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netia P16-60-50-122-45	Report #:	1	Report Date:	1999/12/26
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

String Type: Surface Casing		Permanent Datum:	Kelly Bushing	Hole Size:	222.00 (mm)	Hole TMD:	542.00 (m)
Hole TVD:	542.00 (m)	KB-Datum:	0.00 (m)	Water TMD:	(m)	Str Wt on Slips:	(daN)
Ground Level:	602.30 (m)	CF Elevation:	602.30 (m)	Liner Overlap:	(m)	Max Hole Angle:	0.75 (°)
Circ Hours:	1.25 (hr)	Mud Lost:	0.5 (m³)	KB to Cutoff:	-0.70 (m)	Days From Spud:	5.00 (days)

Manufacturer:	Stream Flo	Model:	Top Hub/Flange: (mm) / (kPa)
Hanger Model:		Packoff Model:	BTM Hub/Flange: (mm) / (kPa)

Actual TMD Set: 541.960 (m)

SURFACE CASING	244.50	53.57	J-55		LT&C	42	528.550	-0.70	6,140		PRUDENTIAL		NEW		226.59
FLOAT COLLAR	244.50		J-55		LT&C	1	0.400	527.85	6,140		PRUDENTIAL		NEW		
SURFACE CASING	244.50	53.57	J-55		LT&C	1	13.270	528.25	6,140		PRUDENTIAL		NEW		226.59
FLOAT SHOE	244.50		J-55		LT&C	1	0.460	541.52	6,140		PRUDENTIAL		NEW		

Centralizer	WEATHERFORD	2	7.0	532.00	539.00	Stop Collar
Centralizer	WEATHERFORD	10	49.0		489.00	Floating

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	1	Report Date:	1999/12/26
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Casing Type Data

Hole Size: 311.000 (mm)	Hole Size:	Hole Size:	Hole Size:
TMD Set: 542.00 (m)	SQ TMD: (m)	TMD Set:	Top Set: (m)
Date Set: 1999/12/26	SQ Date:	Date Set:	BTM set: (m)
Csg Type: Surface Casing	SQ Type:	Csg Type:	Plug Date:
Csg Size: 244.50 (mm)		SQ TMD:	Plug Type:
		SQ Date:	Drilled Out:
Cmtd. Csg: Surface Casing	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:

Cement Co: Dowell Schlumberger Cementer: Sheldom Owen Pipe Movement: Reciprocating

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque:	(N-m)	Avg Torque: (N-m)	Max Torque: (N-m)	
Rec Time Start:02:30	Time End: 05:30	SPM: 4	Stroke Length:	4.0 (m)	Drag Up: 2,000 (daN)	Drag Down: 2,000 (daN)	

Stage Number

Type:	Surface Pipe	Start Mix Cmt:	05:03	Disp Avg Rate:	0.89 (m³/min)	Returns: 23m3 of good re	
Volume Excess %: 150.00		Start Slurry Displ:	06:00	Disp Max Rate:	0.90 (m³/min)	Total Mud Lost:	(m³)
Meas. From: KB		Start Displ:	06:00	Bump Plug:	Y	Cmt Vol to Surf:	23.00 (m³)
Time Circ Prior		End Pumping:	06:29	Press Prior:	5,300 (kPa)		
To Cementing: 1.00		End Pump Date:	1999/12/26	Press Bumped:	10,000 (kPa)	Ann Flow After:	N
Mud Circ Rate: 1.30 (m³/min)		Top Plug:	Y	Press Held:	10 (min)	Mixing Method:	Recirculat
Mud Circ Press: 3,000 (kPa)		Bottom Plug:	Y	Float Held:	Y	Density Meas By:	Densotomet

Mud Data

Type: K2SO4 Visplex Density: 11,750 (kg/m³) Visc: (s/L) PV/YP: 13.0 (mPa*s)/35.0 (Pa) Gels 10 sec: 26.0 (Pa) Gels 10 min: 27.0 (Pa)
Bottom Hole Circulating Temperature: (°C) Bottom Hole Static Temperature: (°C)
Displacement Fluid Type:Fresh Water Density: 1,000 (kg/m³) Volume: 21.30 (m³)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: LEAD	Description: RFC + 2%S1		Class: Thixotrop		Purpose: SHOE INTEG
Slurry Interval: 542.00 (m) To: (m)	Cmt Vol: 45.00 (tonne)	Density: 1,740.0 (kg/m³)	Yield: 0.92 (m³/t)		Mix Water: 0.59 (m³/t)
Water Source: lake	Slurry Vol: 43.1 (m³)	Water Vol: 26.5 (m³)	Other Vol: (tonne)		Foam Job: N

Test Data			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(kPa)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(kPa)
Fluid Loss: (mL)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	1	Report Date:	1999/12/26
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Stage No: 1 Sub No: 1 Additive

Type	Name	Concentration	Unit	Stage	Comment
Antifoam	D-48	2.00	%		
Accelerator	CACL2 (LIQUID)	2.00	%		
L.C.M.	D-29 CELLOPHANE	20.00	Bags		Sack(25Kg)

Stage 1 Sub 1

Test Press: (kPa)	Pressure: (kg/m³)	Liner Lap:
For: (min)	Tool: N	Pos Test: (kg/m³) Tool: N
Cement Found between	Open Hole: (m)	Neg Test: (kg/m³) Tool: N
Shoe and Collar: N	Hrs Before Test:	Hrs Before Test:
		Cement Found on Tool: N

Log Survey Evaluation / Intermediate Summary

CBL Run: N	Cement Top: (m)
Under Pressure: (kPa)	How Determined: Tag
Bond Quality:	TOC Sufficient: N
Cet Run: N	Job Rating:
Bond Quality:	If Unsuccessful Detection Indicator:
Temp Survey: N	Remedial Cementing Required: N
Hrs Prior to Log:	Number of Remedial Squeezes:

SUNCOR RESOURCES ONE
WELLBORE HISTORY

CASING

	Landed	Size	Weight	Date
Surface Casing	542.0 (m)	244.50 (mm)	53.57 (kg/m)	1999/12/26

CEMENTING

	Tonnes	Type of Cement	Cmt. Top	Date
Surface Casing	45.00 (tonne	LEAD, RFC + 2%S1, Thixotrop, SHOE INTEGRITY	(m)	1999/12/26

12/28/1999 11:45 403-346-7723 OK RATHOLE PAGE 01

CALGARY
Phone (403) 284-0841
GRANDE PRAIRIE
Phone (780) 538-0447
WHITECOURT
Phone (780) 778-6640

OK RATHOLE DRILLING

RED DEER
Phone (403) 343-3000
Fax (403) 346-7723
Toll Free 1-800-661-6234
BOX 700
RED DEER
ALBERTA
T4N 5G6

CUSTOMER Sumac

DRILLING RIG Akita #37 WELL LOCATION P16 NWT

DATE Dec 16,17,18 / 1999 CUSTOMER ORDER NO

QTY.	UNIT	TYPE	SIZE/DESCRIPTION	PRICE	UNIT	AMOUNT
15.2	METERS	CONDUCTOR HOLE		70.00	PER METER	1064.00
8.5	METERS	RAT HOLE		70.00	PER METER	595.00
5.4	METERS	MOUSE HOLE		70.00	PER METER	378.00
1		CELLAR HOLE		325.00	PER	325.00
15.2	METERS	CONDUCTOR PIPE		120.00	PER METER	1824.00
	METERS	LINER PIPE			PER METER	
	METERS	RAT & MOUSE LINER PIPE			PER METER	
		DRIVE SHOE			PER	
1	2x6	CELLAR CRIBBING		325.00	PER	325.00
	METERS	CELLAR GRAVEL			PER METER	
55	Days	DERRICK		25.00	PER Day	1375.00
3		HOLE OPENER			PER	n/c
		ROCK TEETH			PER	
		PILOT POINT			PER	
		ROCK BITS			PER	
1808		TRAVEL - RIG		2.50	PER km	4520.00
1808		TRAVEL - SERVICE TRUCK		2.50	PER km	4520.00
		TRAVEL - PULLING UNIT			PER	
8	HOURS	RIG HOURS			PER HOUR	
	HOURS	PULLING UNIT			PER HOUR	
		WELDER			PER	
		HOT SHOT			PER	
		OTHER THIRD PARTY			PER	
3	Days	SUPERVISOR		435.00	PER Day	n/c
2	Days	SUBSISTENCE	3 meals	120.00	PER man-day	720.00
		PERMITS/LICENSES			PER	
		MATERIAL SURCHARGE			PER	
		OTHER			PER	

TERMS

1. Terms are net 30 days. Visa and other card accepted. Overdue accounts subject to interest at a rate of 18% per annum (1.5% per month).
2. Prices are subject to change without notice.
3. The company will not be liable for consequential damages arising out of the performance or non-performance of this contract.

SUB TOTAL	15,646.00
G.S.T	1095.22
TOTAL	16,741.22

REMARKS: Initial Water @ 2 m / Water Source

A-15.2m Clay & Shale Boulders

CUSTOMER SIGNATURE

Herb, Lauren, Daryl

OK RATHOLE PERSONNEL ON SITE CUSTOMER SIGNATURE

TICKET NO 21677

Attachment
#5

SUNCOR INC. RESOURCES GROUP

Mud Summary Report

Legal Well Name: Suncor Netla P16-60-50-122-45
Common Well Name: Suncor Netla P16-60-50-122-45
Event Name: ORIG DRILLING
Contractor Name: AKITA DRILLING LTD.
Rig Name: National 370

Start: 12/17/1999
Rig Release: 1/13/2000
Rig Number: 37

Spud Date: 12/21/1999
End: 1/13/2000

Day	TMD (m)	Hole Sz. (mm)	Mud Type	MW (kg/m³)	Visc. (s/L)	PV (mPa*s)	YP (Pa)	Gels 10s/10m/30m (Pa)	API WL (mL)	HTHP WL (mL)	HTHP T (°C)	pH	Cl- (mg/L)	Sand (%)	TS (%)	LGS (kg/m³)	MBT (kg/m³)	Oil (%)	Tot. Hard. (mg/L)	Tot. Vol. (m³)
1	40.00	311.00	K2SO4 Visplex	1,060.0																0.0
2	295.00	311.00	K2SO4 Visplex	1,120.0		8.00	33.50	20.0/20.0/0	14.8			9.00	1,000		10.0		70.0			0.0
3	521.00	311.00	K2SO4 Visplex	1,120.0		8.00	33.50	20.0/20.0/0	14.8			9.00	1,000		10.0		70.0			0.0
4	542.00	222.00	K2SO4 Visplex	1,175.0	120	14.00	34.50	54.0/55.0/28.0	9.6			9.50	1,000		8.8		71.0			0.0
5	542.00	222.00	K2SO4 Visplex	1,130.0	214	13.00	35.00	28.0/27.0/28.0	9.8			9.50	1,000		10.0		78.0			0.0
6	542.00	222.00	K2SO4 Visplex	1,135.0	218	12.00	35.00	27.5/25.0/28.0	12.0			8.50	1,100		6.0		64.0			0.0
7	542.00	222.00	K2SO4 Visplex	1,000.0	28							11.50								0.0
8	800.00	222.00	K2SO4 Visplex	1,150.0		14.00	36.50	27.0/29.0/0	10.4			9.50	1,800		10.0		53.0			0.0
9	934.00	222.00	K2SO4 Visplex	1,155.0		13.00	26.00	20.0/21.5/0	10.0			8.00	1,500		6.0		43.0			0.0
10	998.00	222.00	K2SO4 Visplex	1,150.0	68	12.00	23.00	18.0/10.0/0	10.0			10.00	1,800		10.0		43.0			0.0
11	1,092.00	222.00	K2SO4 Visplex	1,140.0	57	12.00	19.50	19.0/19.0/0	12.5			10.00	1,550		8.7		30.0			0.0
12	1,299.00	222.00	K2SO4 Visplex	1,180.0	63	13.00	21.00	17.0/17.5/0	12.5			9.00	2,200		11.3		43.0			0.0
13	1,468.00	222.00	K2SO4 Visplex	1,210.0	87	16.00	27.50	20.0/20.0/0	12.2			10.00	2,800		13.1		35.0			0.0
14	1,670.00	222.00	K2SO4 Visplex	1,225.0	75	15.00	27.50	21.0/22.0/0	14.2			10.00	2,900		13.9		50.0			0.0
15	1,834.00	222.00	K2SO4 Visplex	1,225.0	75	19.00	24.00	20.0/21.0/0	12.0			10.00	2,800		14.1		47.0			0.0
16	1,900.00	222.00	K2SO4 Visplex	1,235.0	72	13.00	23.00	19.0/20.0/0	11.6			10.00	2,900		14.4		45.0			0.0
17	1,966.00	222.00	K2SO4 Visplex	1,230.0	72	13.00	22.50	19.0/19.0/0	9.6			11.00	2,900		14.4		43.0			0.0
18	2,028.00	222.00	K2SO4 Visplex	1,220.0	128	17.00	24.00	19.0/19.0/0	7.4			11.00	3,000		14.0		45.0			0.0
19	2,063.00	222.00	K2SO4 Visplex	1,215.0	61	15.00	18.50	16.0/16.0/0	9.2			11.00	3,100		13.4		45.0			0.0
20	2,099.00	222.00	K2SO4 Visplex	1,220.0	67	15.00	20.50	17.0/18.0/0	10.4			10.50	3,300		13.7		43.0			0.0
21	2,099.00	222.00	K2SO4 Visplex	1,220.0	67	15.00	20.50	17.0/18.0/0	10.2			11.00	3,000		13.7		43.0			0.0
22	2,099.00	222.00	K2SO4 Visplex	1,220.0	67	15.00	20.50	17.0/18.0/0	10.2			11.00	3,000		13.7		43.0			0.0
23	2,099.00	222.00	K2SO4 Visplex	1,220.0	67	15.00	20.50	17.0/18.0/0	10.2			11.00	3,000		13.7		43.0			0.0

Attachment
#6

SUNCOR INC, RESOURCES GROUP

Leak-Off Test Summary

Legal Name: Suncor Netla P16-60-50-122-45
Common Name: Suncor Netla P16-60-50-122-45

Test Date	Test Type	Test Depth (TMD)	Test Depth (TVD)	AMW	Surface Pressure	Leak Off Pressure (BHP)	EMW
12/28/1999	LOT	550.00 (m)	550.00 (m)	1,000.0 (kg/m³)	6,602 (kPa)	11,997.50 (kPa)	2,223.6 (kg/m³)

Attachment
#7

Attachment #7

End Well Report
Suncor Inc. Resources
Suncor Netla P16-60-50-122-45

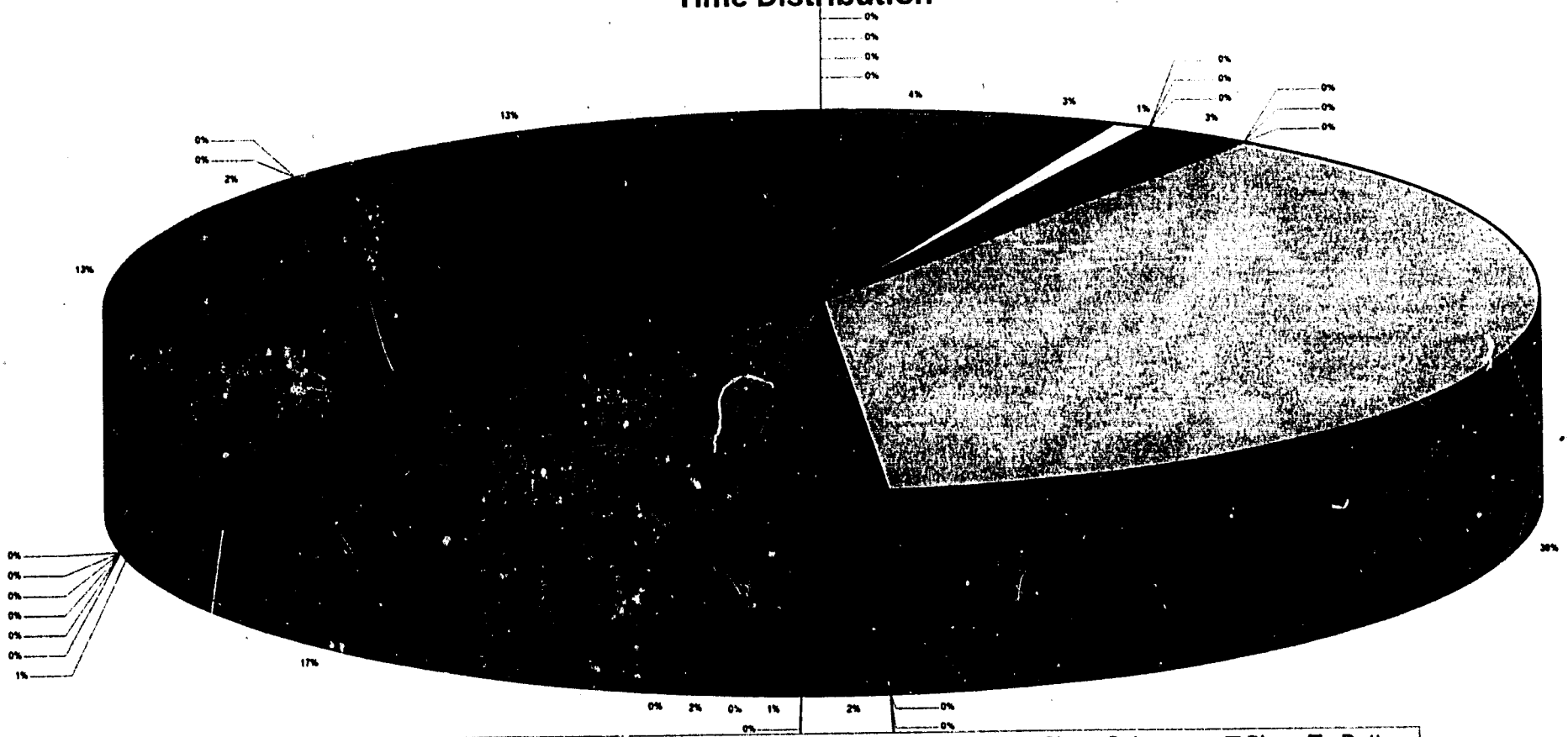
Time Distribution

Operation Type	Hours	Percentage
BOP Drill	25.00	3.82%
Cementing	19.25	2.94%
Circulate	4.00	0.61%
Clean Pumps		0.00%
Clean Sub		0.00%
Clean To Bottom		0.00%
Conduction Mud	17.75	2.71%
Casing Bowl		0.00%
Cut Casing		0.00%
DC Inspect		0.00%
Drilling	253.00	38.61%
Drilling Out		0.00%
Fishing		0.00%
Flare Tank		0.00%
Flow Check		0.00%
Handle Tools		0.00%
Logging	12.75	1.95%
Lost Circulation		0.00%
Manifold		0.00%
Orient		0.00%
POL Plug		0.00%
Pressure Test		0.00%
Pu/LD Pipe		0.00%
Reaming		0.00%
Repairs	7.75	1.18%
Rig Move		0.00%
Rig Service	12.25	1.87%
Rig Spud		0.00%
Rig Up/Down	110.50	16.86%
Run Casing	7.00	1.07%
S-In/well		0.00%
Safety Meetings		0.00%
Sand Trap		0.00%
Set Slips		0.00%
Shut In		0.00%
Slip & Cut	0.75	0.11%
Special	82.75	12.63%
Surveying	16.25	2.48%
Swivels		0.00%
Top Drive		0.00%
Tripping	86.25	13.16%
W.N.U. BOP		0.00%
Wait On Cement		0.00%
Wait On Orders		0.00%
Wait On Tools		0.00%
W/N.U. BOP		0.00%
Total Hours	**655.25**	**100.00%**

Attachment
#8

Attachment #8

Time Distribution



BOP Drill	Cementing	Circulate	Clean Pumps	Clean Sub	Clean To Bottom
Conduction Mud	Casing Bowl	Cut Casing	DC Inspect	Drilling	Drilling Out
Fishing	Flare Tank	Flow Check	Handle Tools	Logging	Lost Circulation
Manifold	Orient	POL Plug	Pressure Test	Pu/LD Pipe	Reaming
Repairs	Rig Move	Rig Service	Rig Spud	Rig Up/Down	Run Casing
S-In/well	Safety Meetings	Sand Trap	Set Slips	Shut In	Slip & Cut
Special	Surveying	Swivels	Top Drive	Tripping	W.N.U. BOP
Wait On Cement	Wait On Orders	Wait On Tools	W/N.U. BOP		

Attachment
#9

Deviation Summary

Legal Well Name:	Suncor Netla P16-60-50-122-45	Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Start:	1999/12/17
Event Name:	ORIG DRILLING	End:	2000/01/13
Contractor Name:	AKITA DRILLING LTD.	Rig Release:	2000/01/13
Rig Name:	National 370	Rig Number:	37
TMD: 2,040.00 (m)	TVD: 2,039.45 (m)	Calculation Method:	Minimum Curvature

OH	34.00	0.250	0.000	NYN	34.00	0.00	0.00	0.00	0.00	0.00	TC
OH	56.00	0.250	0.000	YNN	56.00	0.10	0.00	0.10	0.00	0.00	TC
OH	86.00	0.250	0.000	YNN	86.00	0.23	0.00	0.23	0.00	0.00	TC
OH	117.00	0.500	0.000	YNN	117.00	0.43	0.00	0.43	0.24	0.24	TC
OH	155.00	0.250	0.000	YNN	155.00	0.68	0.00	0.68	0.20	-0.20	TC
OH	174.00	0.750	0.000	YNN	174.00	0.84	0.00	0.84	0.79	0.79	TC
OH	221.00	0.500	0.000	YNN	220.99	1.36	0.00	1.36	0.16	-0.16	TC
OH	246.00	0.750	0.000	YNN	245.99	1.63	0.00	1.63	0.30	0.30	TC
OH	283.00	0.750	0.000	YNN	282.99	2.11	0.00	2.11	0.00	0.00	TC
OH	312.00	0.750	0.000	YNN	311.99	2.49	0.00	2.49	0.00	0.00	
OH	329.00	0.250	0.000	YNN	328.99	2.64	0.00	2.64	0.88	-0.88	
OH	368.00	0.500	0.000	YNN	367.99	2.90	0.00	2.90	0.19	0.19	
OH	406.00	0.500	0.000	YNN	405.98	3.23	0.00	3.23	0.00	0.00	
OH	434.00	0.250	0.000	YNN	433.98	3.41	0.00	3.41	0.27	-0.27	
OH	460.00	0.250	0.000	YNN	459.98	3.53	0.00	3.53	0.00	0.00	
OH	489.00	0.500	0.000	YNN	488.98	3.72	0.00	3.72	0.26	0.26	
OH	592.00	0.250	0.000	YNN	591.98	4.39	0.00	4.39	0.07	-0.07	
OH	691.00	0.750	0.000	YNN	690.98	5.25	0.00	5.25	0.15	0.15	
OH	810.00	1.500	0.000	YNN	809.95	7.59	0.00	7.59	0.19	0.19	
OH	870.00	1.000	0.000	YNN	869.94	8.90	0.00	8.90	0.25	-0.25	
OH	964.00	0.750	0.000	YNN	963.93	10.33	0.00	10.33	0.08	-0.08	
OH	983.00	1.250	0.000	YNN	982.92	10.67	0.00	10.67	0.79	0.79	
OH	1,095.00	1.750	0.000	YNN	1,094.89	13.60	0.00	13.60	0.13	0.13	
OH	1,189.00	2.000	0.000	YNN	1,188.83	16.67	0.00	16.67	0.08	0.08	
OH	1,236.00	1.750	0.000	YNN	1,235.81	18.21	0.00	18.21	0.16	-0.16	
OH	1,302.00	2.000	0.000	YNN	1,301.77	20.37	0.00	20.37	0.11	0.11	
OH	1,368.00	0.000	0.000	NNY	0.00	0.00	0.00	0.00	0.00	0.00	
OH	1,405.00	1.000	0.000	YNN	1,404.74	23.07	0.00	23.07	0.29	-0.29	

SUNCOR INC RESOURCES GROUP

DEVIATION SURVEY

Legal Well Name:	Suncor Netla P16-60-50-122-45	Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Start:	1999/12/17
Event Name:	ORIG DRILLING	End:	2000/01/13
Contractor Name:	AKITA DRILLING LTD.	Rig Release:	2000/01/13
Rig Name:	National 370	Rig Number:	37
TMD: 2,040.00 (m)	TVD: 2,039.45 (m)	Calculation Method:	Minimum Curvature

OH	1,509.00	2.000	0.000	YNN	1,508.70	25.79	0.00	25.79	0.29	0.29	
OH	1,578.00	0.000	0.000	NNY	0.00	0.00	0.00	0.00	0.00	0.00	
OH	1,584.00	2.000	0.000	YNN	1,583.65	28.41	0.00	28.41	0.00	0.00	
OH	1,694.00	1.500	0.000	YNN	1,693.60	31.77	0.00	31.77	0.14	-0.14	
OH	1,743.00	2.000	0.000	YNN	1,742.58	33.26	0.00	33.26	0.31	0.31	
OH	1,819.00	1.500	0.000	YNN	1,818.54	35.58	0.00	35.58	0.20	-0.20	
OH	1,929.00	2.000	0.000	YNN	1,928.49	38.94	0.00	38.94	0.14	0.14	
OH	2,040.00	1.250	0.000	YNN	2,039.45	42.09	0.00	42.09	0.20	-0.20	TC

OH	0.00

Attachment
#10

Attachment #10

Canadian Forest Oil Ltd.
Suncor Inc. Resources

Abandonment Plug Record

Type of Plug	Interval (mKB)	Felt	Cement Type	Cement (m^3)
Plug #1	2099 - 2039	Plug not felt	0:1:0 + 0.3% D13 + 0.5% D65	4t, $3m^3$
Plug #2	1950 - 1900	1891	0:1:0 + 0.3% D13 + 0.5% D65	3.4t, $2.5m^3$
Plug #3	1000 - 950	955	0:1:0 + 0.5% D65	3.4t, $2.5m^3$
Plug #4	572 - 512	478	0:1:0 + 0.5% D65	5.4t, $4m^3$

SUNCOR INC RESOURCES GROUP

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	2	Report Date:	2000/01/09
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 222.000 (mm)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 2,039.00 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 2,099.00 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 2000/01/11
Csg Size:		SQ TMD:	Plug Type: Abandon
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: Dowell Schlumberger Cementer: Patrick Pipe Movement: No movement

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (N-m)	Avg Torque: (N-m)	Max Torque: (N-m)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (m)	Drag Up: (daN)	Drag Down: (daN)	

Stage No: 1 of 1

Type: Abandonment Plug	Start Mix Cmt: :	Disp Avg Rate: 0.80 (m³/min)	Returns: Full
Volume Excess %: 25.00	Start Slurry Displ: :	Disp Max Rate: 1.00 (m³/min)	Total Mud Lost: (m³)
Meas. From: Caliper Log	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (m³)
Time Circ Prior	End Pumping: 23:45	Press Prior: (kPa)	
To Cementing: 14.00	End Pump Date: 2000/01/11	Press Bumped: (kPa)	Ann Flow After:
Mud Circ Rate: 1.00 (m³/min)	Top Plug: N	Press Held: (min)	Mixing Method: Recirculat
Mud Circ Press: 6,000 (kPa)	Bottom Plug: N	Float Held:	Density Meas By: Densometer

Mud Data

Type: ''2SO4 Visplex Density: 1,220 (kg/m³) Visc: 65 (s/ PV/YP: 15.0 (mPa*s)/20.0 (Pa) Gels 10 sec: 17.0 (Pa) Gels 10 min: 18.0 (Pa)
Bottom Hole Circulating Temperature:54 (°C) Bottom Hole Static Temperature: 75 (°C)
Displacement Fluid Type:Mud Density: 1,220 (kg/m³) Volume: 11.00 (m³)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: SLURRY 1 OF 1 Description: 0:1:0 Class: G NEAT Purpose: ZONAL ISOL
Slurry Interval: 2,039.00 (m)To: 2,099.00 (m)Cmt Vol: 4.00 (tonne) Density: 1,900.0 (kg/m³Yield: 0.76 (m³/t) Mix Water: 0.44 (m³/t)
Water Source: Lake Slurry Vol3.0 (m³) Water Vol: 1.6 (m³) Other Vol: (tonne) Foam Job: N

Test Data			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(kPa)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(kPa)
Fluid Loss: (mL)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

SUNCOR INC RESOURCES GROUP

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	2	Report Date:	2000/01/09
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Casing Test

Test Press: (kPa)
For: (min)
Cement Found between Shoe and Collar: N

Shoe Test

Pressure: (kg/m³)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (kg/m³) Tool: N
Neg Test: (kg/m³) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (kPa)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: 2,099 (m)
How Determined: Not Felt
TOC Sufficient: Y
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes:

SUNCOR INC. RESOURCES GROUP

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	3	Report Date:	2000/01/10
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 222.000 (mm)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 1,900.00 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 1,950.00 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 2000/01/12
Csg Size:		SQ TMD:	Plug Type: Abandon
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: Dowell Schlumberger Cementer: Patrick Pipe Movement: No movement

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (N-m)	Avg Torque: (N-m)	Max Torque: (N-m)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (m)	Drag Up: (daN)	Drag Down: (daN)	

Stage No: 1 of 1

Type: Abandonment Plug	Start Mix Cmt: :	Disp Avg Rate: 0.80 (m³/min)	Returns: Full
Volume Excess %: 25.00	Start Slurry Displ: :	Disp Max Rate: 1.00 (m³/min)	Total Mud Lost: (m³)
Meas. From: Caliper Log	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (m³)
Time Circ Prior	End Pumping: 00:15	Press Prior: (kPa)	
To Cementing:	End Pump Date: 2000/01/12	Press Bumped: (kPa)	Ann Flow After:
Mud Circ Rate: (m³/min)	Top Plug: N	Press Held: (min)	Mixing Method: Recirc.
Mud Circ Press: (kPa)	Bottom Plug: N	Float Held:	Density Meas By: Densometer

Mud Data

Type: K2SO4 Visplex Density: 1,220 (kg/m³) Visc: 65 (s/ PV/YP: 15.0 (mPa*s)/20.0 (Pa) Gels 10 sec: 17.0 (Pa) Gels 10 min: 18.0 (Pa)

Bottom Hole Circulating Temperature:54 (°C) Bottom Hole Static Temperature: 74 (°C)

Displacement Fluid Type:Mud Density: 1,220 (kg/m³) Volume: 10.60 (m³)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: SLURRY 1 OF 1 Description: 0:1:0 Class: G NEAT Purpose: ZONAL ISOL

Slurry Interval: 1,900.00 (m) To: 1,950.00 (m) Cmt Vol: 3.40 (tonne) Density: 1,900.0 (kg/m³) Yield: 0.76 (m³/t) Mix Water: 0.44 (m³/t)

Water Source: Lake Slurry Vol 2.5 (m³) Water Vol: 1.5 (m³) Other Vol: (tonne) Foam Job: N

Test Data			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(kPa)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(kPa)
Fluid Loss: (mL)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

SUNCOR NC RESOURCES GROUP

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	3	Report Date:	2000/01/10
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Casing Test

Test Press: (kPa)
For: (min)
Cement Found between Shoe and Collar: N

Shoe Test

Pressure: (kg/m³)
Tool: N
Open Hole: (m)
Hrs Before Test:

Liner Top Test

Liner Lap:
Pos Test: (kg/m³) Tool: N
Neg Test: (kg/m³) Tool: N
Hrs Before Test:
Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N
Under Pressure: (kPa)
Bond Quality:
Cet Run: N
Bond Quality:
Temp Survey: N
Hrs Prior to Log:

Interpretation Summary

Cement Top: 1,891 (m)
How Determined: Log
TOC Sufficient: Y
Job Rating:
If Unsuccessful Detection Indicator:
Remedial Cementing Required: N
Number of Remedial Squeezes: 1

Remarks

Plug logged with Computalog, found we had 1m3 of slurry still inside the drill pipe and the plug was 17m low, Ran the pipe in to 910m and displaced the 1m3 of cment from the drill pipe to put the top of the plug @ 1891m.

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	4	Report Date:	2000/01/11
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Cement Job Type: Plug

Primary	Squeeze Open Hole	Squeeze Casing	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 222.000 (mm)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 950.00 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 1,000.00 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 2000/01/12
Csg Size:		SQ TMD:	Plug Type: Abandon
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: Dowell Schlumberger Cementer: Patrick Pipe Movement: No movement

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (N-m)	Avg Torque: (N-m)	Max Torque: (N-m)
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (m)	Drag Up: (daN)	Drag Down: (daN)

Stage No: 1 of 1

Type: Abandonment Plug	Start Mix Cmt: :	Disp Avg Rate: 0.80 (m³/min)	Returns: Full
Volume Excess %: 25.00	Start Slurry Displ: :	Disp Max Rate: 1.00 (m³/min)	Total Mud Lost: (m³)
Meas. From: Caliper Log	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (m³)
Time Circ Prior	End Pumping: 08:48	Press Prior: (kPa)	
To Cementing:	End Pump Date: 2000/01/12	Press Bumped: (kPa)	Ann Flow After:
Mud Circ Rate: (m³/min)	Top Plug: N	Press Held: (min)	Mixing Method: Recirc.
Mud Circ Press: (kPa)	Bottom Plug: N	Float Held:	Density Meas By: Densometer

Mud Data

Type: K2SO4 Visplex Density: 1,220 (kg/m³) Visc: 65 (s/ PV/YP: 15.0 (mPa*s)/20.0 (Pa) Gels 10 sec: 17.0 (Pa) Gels 10 min: 18.0 (Pa)
Bottom Hole Circulating Temperature:54 (°C) Bottom Hole Static Temperature: 74 (°C)
Displacement Fluid Type:Mud Density: 1,220 (kg/m³) Volume: 6.00 (m³)

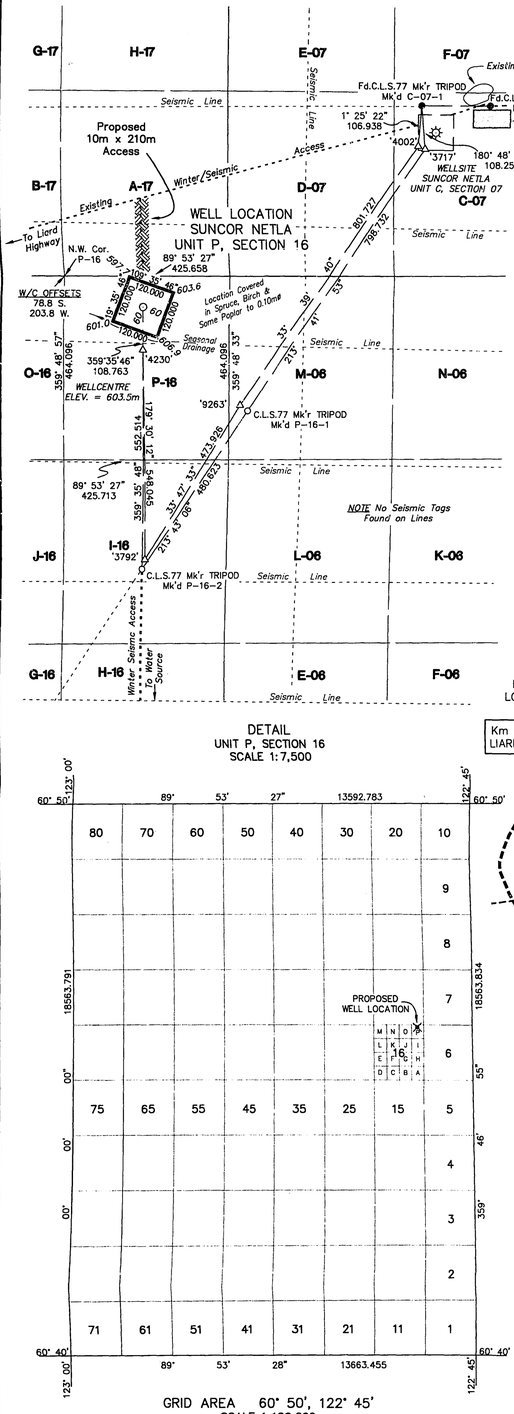
Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: SLURRY 1 OF 1	Description: 0:1:0			Class: G NEAT		Purpose: ZONAL ISOL
Slurry Interval: 950.00 (m)	To: 1,000.00 (m)	Cmt Vol: 3.40 (tonne)	Density: 1,900.0 (kg/m³)	Yield: 0.76 (m³/t)		Mix Water: 0.44 (m³/t)
Water Source: Lake		Slurry Vol 2.5 (m³)	Water Vol: 1.5 (m³)	Other Vol: (tonne)		Foam Job: N

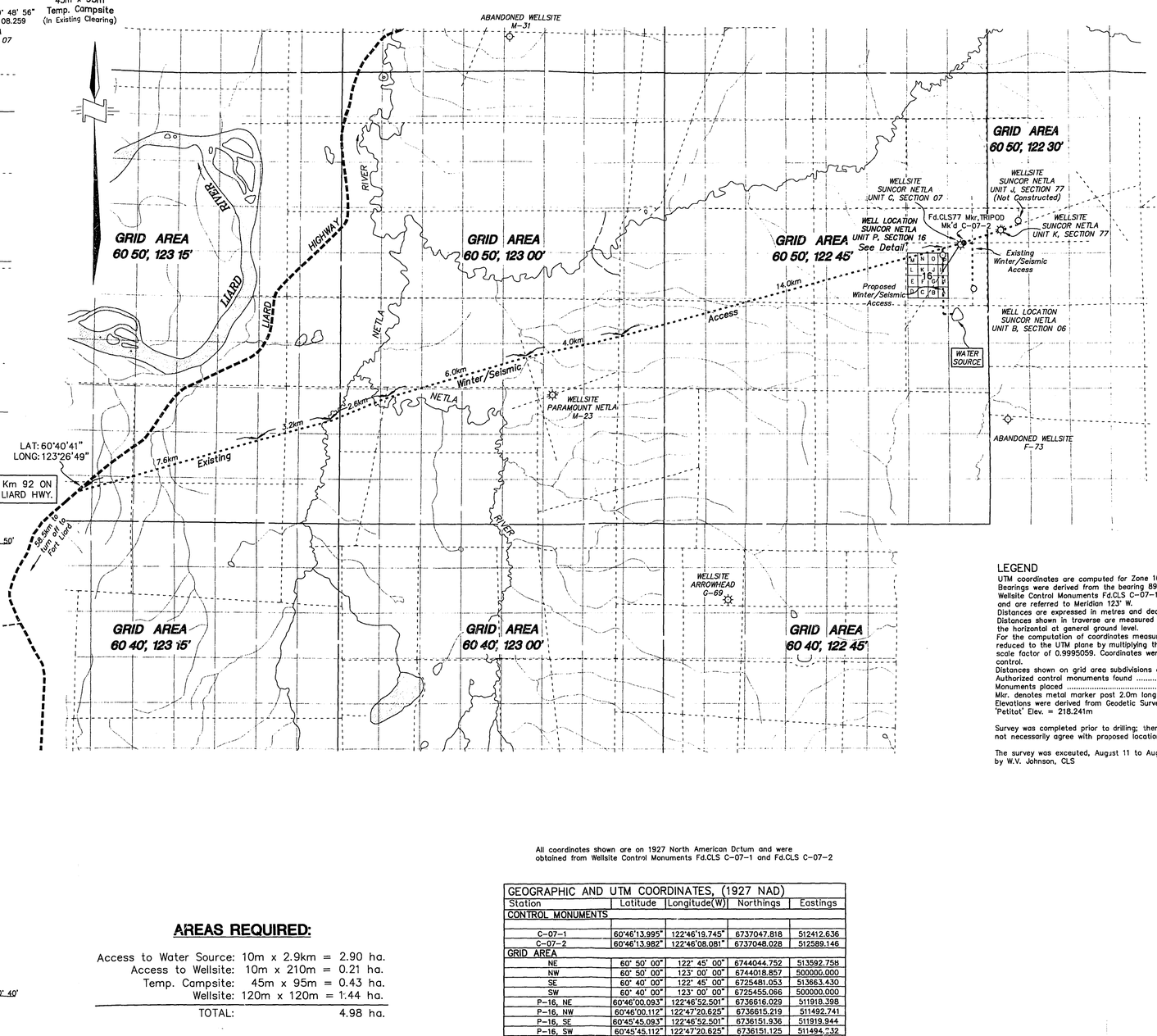
Test Data

			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(kPa)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(kPa)
Fluid Loss: (mL)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					



DETAIL
UNIT P, SECTION 16
SCALE 1:7,500

GRID AREA 60° 50', 122° 45'
SCALE 1:100,000



PLAN AND FIELD NOTES

OF SURVEY OF

PROPOSED EXPLORATORY WELL

SUNCOR NETLA

IN UNIT P, SECTION 16

GRID AREA 60° 50' , 122° 45'

NORTHWEST TERRITORIES

CANADA OIL AND GAS LAND REGULATIONS

SCALE 1:100,000

2km 1km 0m 2km 4km 6km 8km

SURVEYED FOR

SUNCOR ENERGY INC.

BY : W.V. JOHNSON, CLS
AUGUST, 1999.

AREAS REQUIRED:

Access to Water Source:	10m x 2.9km	= 2.90 ha.
Access to Wellsite:	10m x 210m	= 0.21 ha.
Temp. Campsite:	45m x 95m	= 0.43 ha.
Wellsite:	120m x 120m	= 1:44 ha.
TOTAL:		4.98 ha.

All coordinates shown are on 1927 North American Datum and were obtained from Wellsite Control Monuments Fd.CLS C-07-1 and Fd.CLS C-07-2

GEOGRAPHIC AND UTM COORDINATES, (1927 NAD)				
Station	Latitude	Longitude(W)	Northings	Eastings
CONTROL MONUMENTS				
C-07-1	60°46'13.995"	122°46'19.745"	6737047.818	512412.636
C-07-2	60°46'13.982"	122°46'08.081"	6737048.028	512589.146
GRID AREA				
NE	60° 50' 00"	122° 45' 00"	6744044.752	513592.758
NW	60° 50' 00"	123° 00' 00"	6744018.857	500000.000
SE	60° 40' 00"	122° 45' 00"	6725481.053	513663.430
SW	60° 40' 00"	123° 00' 00"	6725455.066	500000.000
P-16, NE	60°46'00.093"	122°46'52.501"	6736816.029	511918.398
P-16, NW	60°46'00.112"	122°47'20.625"	6736815.219	511492.741
P-16, SE	60°45'45.093"	122°46'52.501"	6736151.936	511919.944
P-16, SW	60°45'45.112"	122°47'20.625"	6736151.125	511494.232
TRAVERSE STATIONS				
P-16-1	60°45'49.080"	122°46'49.288"	6736275.431	511968.161
P-16-2	60°45'36.194"	122°47'06.992"	6735875.859	511701.492
TH 3717	60°46'10.498"	122°46'19.872"	6736939.624	512411.095
TH 3792	60°45'36.338"	122°47'06.935"	6735880.337	511702.346
TH 4002	60°46'10.542"	122°46'19.947"	6736940.980	512409.959
TH4230	60°45'54.043"	122°47'07.130"	6736428.088	511697.600
TH 9263	60°45'49.034"	122°46'49.444"	6736274.004	511965.804
PROPOSED WELL				
P-16	60°45'57.556"	122°47'07.157"	6736536.795	511696.834

LEGEND
UTM coordinates are computed for Zone 10, central meridian 123° W.
Bearings were derived from the bearing 89° 55' 55" computed between Wellsite Control Monuments Fd.CLS C-07-1 and Fd.CLS C-07-2 and are referred to Meridian 123° W.
Distances are expressed in metres and decimals thereof.
Distances shown in traverse are measured distances reduced to the horizontal at general ground level.
For the computation of coordinates measured distances have been reduced to the UTM plane by multiplying them by an average combined scale factor of 0.9995059. Coordinates were then adjusted to fit the control.
Distances shown on grid area subdivisions are UTM plane.
Authorized control monuments found ..... ●
Monuments placed ..... ○
Mkr. denotes metal marker post 2.0m long placed 0.30m N.
Elevations were derived from Geodetic Survey of Canada Monument 'Petitot' Elev. = 218.241m

Survey was completed prior to drilling; therefore well as drilled may not necessarily agree with proposed location.

The survey was exceuted, August 11 to August 13, 1999 by W.V. Johnson, CLS

Certified Correct and completed on the 18th day of August, 1999.

W.V. Johnson
Canada Land Surveyor

Date: Aug. 19, 1999

ASSOCIATION OF CANADA LAND SURVEYORS
ASSOCIATION DES ARPENTEURS DES TERRES DU CANADA
W.V. Johnson
Comm. No. 1393

SUNCOR ENERGY INC.

P. Eng.

WITNESS

1999.09.16
DATE

REV.No.	DESCRIPTION	DATE

McELHANNEY ASSOCIATES
PROFESSIONAL LAND SURVEYORS
10014 – 97th Ave., Suite 202
Fort St. John, British Columbia
Phone:(250)787-0356, Fax:(250)787-0310

DATE : 99/08/17 JOB No.: 3111-07349WS RT BRC

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	4	Report Date:	2000/01/11
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Casing Test

Test Press: (kPa)	Pressure: (kg/m³)	Liner Lap:
For: (min)	Tool: N	Pos Test: (kg/m³) Tool: N
Cement Found between	Open Hole: (m)	Neg Test: (kg/m³) Tool: N
Shoe and Collar: N	Hrs Before Test:	Hrs Before Test:
		Cement Found on Tool: N

Log/Survey Evaluation

CBL Run: N	Cement Top: 940 (m)
Under Pressure: (kPa)	How Determined: Log
Bond Quality:	TOC Sufficient: Y
Cet Run: N	Job Rating:
Bond Quality:	If Unsuccessful Detection Indicator:
Temp Survey: N	Remedial Cementing Required: N
Hrs Prior to Log:	Number of Remedial Squeezes:

SUNCOR ENERGY RESOURCES GROUP

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	5	Report Date:	2000/01/12
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Plug Back (Type) Plug

Pump	Retainer	Squeeze	Plug
Hole Size:	Hole Size:	Hole Size:	Hole Size: 222.000 (mm)
TMD Set: (m)	SQ TMD: (m)	TMD Set:	Top Set: 512.00 (m)
Date Set:	SQ Date:	Date Set:	BTM set: 572.00 (m)
Csg Type:	SQ Type:	Csg Type:	Plug Date: 2000/01/12
Csg Size:		SQ TMD:	Plug Type: Abandon
		SQ Date:	Drilled Out: N
Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg:	Cmtd. Csg: OPEN HOLE

Cement Co: Dowell Schlumberger | Cementer: Patrick | Pipe Movement: No movement

Pipe Movement

Rot Time Start: :	Time End: :	RPM:	Init Torque: (N-m)	Avg Torque: (N-m)	Max Torque: (N-m)	
Rec Time Start: :	Time End: :	SPM:	Stroke Length: (m)	Drag Up: (daN)	Drag Down: (daN)	

Stage No: 1

Type: Abandonment Plug	Start Mix Cmt: :	Disp Avg Rate: 0.80 (m³/min)	Returns: Full
Volume Excess %: 60.00	Start Slurry Displ: :	Disp Max Rate: 0.80 (m³/min)	Total Mud Lost: (m³)
Meas. From: Caliper Log	Start Displ: :	Bump Plug: N	Cmt Vol to Surf: (m³)
Time Circ Prior	End Pumping: 12:28	Press Prior: (kPa)	
To Cementing:	End Pump Date: 2000/01/12	Press Bumped: (kPa)	Ann Flow After:
Mud Circ Rate: (m³/min)	Top Plug: N	Press Held: (min)	Mixing Method: Recirc.
Mud Circ Press: (kPa)	Bottom Plug: N	Float Held:	Density Meas By: Densometer

Mud Data

Type: K2SO4 Visplex Density: 1,220 (kg/m³) Visc: 65 (s/ PV/YP: 15.0 (mPa*s)/20.0 (Pa) Gels 10 sec: 17.0 (Pa) Gels 10 min: 18.0 (Pa)
Bottom Hole Circulating Temperature:54 (°C) Bottom Hole Static Temperature: 74 (°C)
Displacement Fluid Type:Mud Density: 1,220 (kg/m³) Volume: 3.20 (m³)

Stage No: 1 Slurry No: 1 of 1

Slurry Data

Fluid Type: SLURRY 1 OF 1	Description: 0:1:0		Class: G NEAT		Purpose: ZONAL ISOL
Slurry Interval: 512.00 (m) To: 572.00 (m)	Cmt Vol: 5.40 (tonne)	Density: 1,900.0 (kg/m³)	Yield: 0.76 (m³/t)		Mix Water: 0.44 (m³/t)
Water Source: Lake	Slurry Vol: 4.0 (m³)	Water Vol: 2.4 (m³)	Other Vol: (tonne)		Foam Job: N

Test Data

			Time	Temp	Pressure
Thickening Time:	Temperature: (°C)	Compressive Strength 1:		(°C)	(kPa)
Free Water: (%)	Temperature: (°C)	Compressive Strength 2:		(°C)	(kPa)
Fluid Loss: (mL)	Temperature: (°C)				
Fluid Loss Pressure: (°C)					

Cementing Report

Legal Well Name:	Suncor Netla P16-60-50-122-45			Spud Date:	1999/12/21
Common Well Name:	Suncor Netla P16-60-50-122-45	Report #:	5	Report Date:	2000/01/12
Event Name:	ORIG DRILLING	Start:	1999/12/17	End:	2000/01/13

Casing Test

Test Press: (kPa)	
For: (min)	
Cement Found between Shoe and Collar: N	

Shoe Test

Pressure: (kg/m³)	
Tool: N	
Open Hole: (m)	
Hrs Before Test:	

Liner Top Test

Liner Lap:	
Pos Test: (kg/m³)	Tool: N
Neg Test: (kg/m³)	Tool: N
Hrs Before Test:	
Cement Found on Tool: N	

Temperature Evaluation

CBL Run: N	
Under Pressure: (kPa)	
Bond Quality:	
Cet Run: N	
Bond Quality:	
Temp Survey: N	
Hrs Prior to Log:	

Cementing Information

Cement Top: 476 (m)	
How Determined: Log	
TOC Sufficient: Y	
Job Rating:	
If Unsuccessful Detection Indicator:	
Remedial Cementing Required: N	
Number of Remedial Squeezes:	

Attachment
#11

SUNCOR ENERGY INC.

SUNCOR NETLA P-16

P16-60-50-122-45

Geologist: Craig Odagaki

Merlin Petroleum Services Ltd.
#207, 239 - 12th Ave. S.W.
Calgary, Alberta T2R 1H6
(403) 234-9555

Reported to: Mr. John McCrossan

SUNCOR NETLA P-16

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SUNCOR NETLA P-16

WELL DATA SUMMARY

Company:	Suncor Energy Inc.	
Well Name:	Suncor Netla P-16	
Well Location:	P16-60-50-122-45	
Province:	N.W.T.	
Elevations:	Ground:	602.3 m
	Kelly Bushing:	607.0 m
	K.B. to Ground:	4.7 m
Well Type:	Exploratory	
AFE Number:	A9911480P16	
License Number:	1874	
Contractor:	Akita Drilling	Rig Number: 37
Geologist:	Craig Odagaki	
Drilling Foreman:	Paul Erb / Pat Miller	
Spud Date:	21:00 hrs., December 21, 1999	
Total Depth:	2099 m, 13:45 hr., January 9, 2000	
Hole Size:	Surface:	311 mm
	Main:	200 mm
Casing:	Surface:	Size: 244.5 mm Type: 53.6 kg/m J-55
	Cemented with:	41 tonnes RFC with 2% $CaCl_2$
	Landed at:	542 m
	Plug down:	06:30 hr., December 26, 1999
Sample Interval:	Operator:	545 - 2099 m (5 metre intervals)
	NEB:	545 - 2099 m (5 metre intervals)

SUNCOR NETLA P-16

WELL DATA SUMMARY

Mud Program: Company: MI Drilling Fluids
Mud Type: K_2SO_4 Visplex
Mud Up: 542 m

Cores: Company: None

Drill Stem Tests: Company: None on penetration.

Open Hole Logs: Company: Schlumberger

Logs	Scales	Interval
AIT-SP-GR	1:240; 1:600	T.D. to Surface Casing
CNT-LDT-TLD	1:240; 1:600	T.D. to Surface Casing
DSI-MLT-GPIT-MDC	1:240; 1:600	T.D. to Surface Casing

Final Status: Plugged and abandoned.

SUNCOR NETLA P-16

GEOLOGICAL MARKERS

K.B. ELEVATION: 607.0 m

FORMATION	PROGNOSIS DEPTH	PROGNOSIS SUBSEA	SAMPLE DEPTH	SAMPLE SUBSEA	LOG DEPTH	LOG SUBSEA
Exshaw	612.0	- 5.0	610.0	- 3.0	610.0	- 3.0
Kotcho Shale	621.0	- 14.0	627.0	- 20.0	624.0	- 17.0
Kotcho Carbonate	708.0	- 101.0	709.0	- 102.0	707.5	- 100.5
Tetcho Carbonate	976.0	- 369.0	974.0	- 367.0	971.5	- 364.5
Trout River	1076.0	- 469.0	1077.0	- 470.0	1075.5	- 468.5
Kakisa	1148.0	- 541.0	1142.0	- 535.0	1141.0	- 534.0
Redknife	1177.0	- 570.0	1171.0	- 564.0	1169.0	- 562.0
Fort Simpson	1385.0	- 778.0	1379.0	- 772.0	1379.0	- 772.0
FS Mkr	1716.0	-1109.0	1745.0	-1138.0	1744.5	-1137.5
Muskwa	1895.0	-1288.0	1892.0	-1285.0	1896.0	-1289.0
Slave Point	1923.0	-1316.0	1923.0	-1316.0	1922.0	-1315.0
Elk Point	2054.0	-1447.0	2053.0	-1446.0	2054.0	-1447.0
Total Depth	2092.0	-1485.0	2099.0	-1492.0	2098.8	-1491.8

SUNCOR NETLA P-16

BIT RECORD

BIT NO.	SIZE	TYPE	.....JETS..... mm	DEPTH OUT	METERS	HRS	ROP m/h	WOB KdN	RPM	COND T-B-G
1	311	FDSS	17.5 17.5 17.5	521	521	40.75	12.8	15	200	5-2-I
2	311	HP43A	17.5 17.5 17.5	542	21	1.75	12.0	15	160	1-1-I
3	222	DS110NV	-- 6 X 11.9 --	1900	1358	138.25	9.8	6	140	6-N-I
4	222	EHP51X	17.5 17.5 17.5	2058	158	55.5	2.8	15	80	5-E-I
5	222	GT18	12.7 12.7 14.3	2099	41	13.25	3.1	15	65	1-E-I

SUNCOR NETLA P-16

DEVIATION RECORD

Surface Casing at: 542.0 m

DEPTH (m)	DEVIATION (degrees)	INTERVAL (m)
34	0.25	34
56	0.25	22
86	0.25	30
117	0.5	31
155	0.25	38
174	0.75	19
221	0.5	37
246	0.75	25
283	0.75	37
312	0.75	29
329	0.25	17
368	0.5	39
406	0.5	38
434	0.25	28
460	0.25	26
489	0.5	29
592	0.25	103
691	0.75	99
810	1.5	119
870	1.0	60
983	1.25	113
1095	1.75	112
1302	2.0	107
1405	1.0	103
1509	2.0	104
1584	2.0	75
1649	1.5	65
1743	2.0	94
1819	1.5	76
1929	2.0	110
2040	1.25	111

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

542-561 SHALE: medium to light grey, trace dark grey, blocky to platy, subfissile to fissile, micromicaceous, trace silty, local siltstone stringers.

561-610 INTERBEDDED SHALE AND SILTSTONE
SHALE: medium to dark grey, trace light grey, blocky, subfissile to nonfissile, micromicaceous, silty in part.
SILTSTONE: medium to light grey, trace grey-brown quartzose, well indurated, argillaceous.

EXSHAW (610.0 m)

610-622 SHALE: medium to dark grey, blocky to platy, subfissile to trace fissile, micromicaceous, silty in part, rare siltstone stringers, rare pyrite, local glauconite.

622-627 SHALE: dark grey, dark brown-grey, blocky to platy, subfissile to fissile, micromicaceous, slightly bituminous.

KOTCHO SHALE (627.0 m)

627-643 SILTSTONE WITH TRACE INTERBEDDED LIMESTONE
SILTSTONE: light grey to buff, quartzose, trace argillaceous, calcareous.
LIMESTONE: buff to white, trace light brown, cryptocrystalline, mudstone, massive, dense, earthy, trace silty, no visible porosity, no visible shows.

643-650 INTERBEDDED SILTSTONE AND SHALE
SILTSTONE: buff to light grey, quartz, calcareous, trace argillaceous, trace limestone stringers, well indurated.
SHALE: light grey, blocky, subfissile, micromicaceous, calcareous, trace silty.

650-709 INTERBEDDED SHALE AND SILTSTONE
SHALE: light to medium grey, blocky to platy, subfissile, micromicaceous, calcareous, trace silty, local tight limestone stringers.
SILTSTONE: light grey, quartzose, calcareous, argillaceous in part, well indurated.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

KOTCHO CARBONATE (709.0 m)

709-743 INTERBEDDED LIMESTONE AND SHALE
LIMESTONE: buff to white, trace light grey, trace light brown, crypto to microcrystalline, mudstone, massive, dense, earthy to trace vitreous, trace silty, no visible porosity, no visible shows.
SHALE: light to medium grey, blocky to platy, subfissile, micromicaceous, trace silty, trace calcareous siltstone stringers.

743-801 INTERBEDDED SHALE, LIMESTONE, AND SILTSTONE
SHALE: medium grey, trace light grey, blocky, nonfissile to subfissile, micromicaceous, silty in part, calcareous in part.
LIMESTONE: buff, trace light brown, crypto to microcrystalline, mudstone, massive, dense, earthy, trace silty, rare fossiliferous (crinoids, brachiopods), rare pyrite, no visible porosity, no visible shows.
SILTSTONE: buff to white, quartzose, calcareous, trace argillaceous.

801-820 SHALE: light to medium grey, blocky to platy, subfissile, micromicaceous, calcareous, silty in part, local limestone stringers.

820-825 NO SAMPLE CAUGHT

825-838 SHALE: light to medium grey, blocky to platy, subfissile to trace fissile, micromicaceous, calcareous, trace disseminated pyrite, rare silty.

838-867 SHALE: light grey, trace medium grey, rare dark grey, blocky to platy, subfissile to trace fissile, micromicaceous, calcareous, trace disseminated pyrite, rare limestone stringers, rare siltstone stringers.

867-876 SHALE: medium to light grey, blocky, subfissile to nonfissile, micromicaceous, calcareous, trace disseminated pyrite.

876-939 SHALE: light to medium grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, local tight limestone stringers, trace disseminated pyrite.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

939-969 SHALE: medium to light grey, blocky to trace platy, subfissile to fissile, micromicaceous, calcareous, trace disseminated pyrite, local tight limestone stringers.

969-974 SHALE: dark to medium grey, dark grey-brown, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace bituminous, local tight limestone stringer.

TETCHO CARBONATE (974.0 m)

974-980 LIMESTONE: buff to light grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, calcilutite, trace argillaceous, no visible porosity, no visible shows.

980-1005 INTERBEDDED LIMESTONE AND SHALE
LIMESTONE: buff to light grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, calcilutite, microsucrosic, trace argillaceous, no visible porosity, no visible shows.
SHALE: medium to dark grey, trace light grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace disseminated pyrite.

1005-1052 LIMESTONE: buff to grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, microsucroic, calcilutite, trace argillaceous, trace shale laminations, no visible porosity, no visible shows.

1052-1077 INTERBEDDED SILTSTONE, SHALE, AND LIMESTONE
SILTSTONE: buff to white, medium to light grey, quartzose, calcareous, trace argillaceous, well indurated; SHALE- medium to light grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace silty.
LIMESTONE: buff to light grey, micro to cryptocrystalline, massive, vitreous to earthy, microsucrosic in part, trace silty, trace fossiliferous, no visible porosity, no visible shows.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

TROUT RIVER (1077.0 m)

1077-1142 INTERBEDDED SHALE, SILTSTONE, AND LOCAL LIMESTONE

SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, calcareous, trace silty.

SILTSTONE: light to medium grey, buff, quartzose, calcareous, trace argillaceous, well indurated.

LIMESTONE: buff to light brown, micro to cryptocrystalline, massive, dense, earthy to vitreous, trace fossiliferous, no visible porosity, no visible shows.

KAKISA (1142.0 m)

1142-1152 INTERBEDDED LIMESTONE AND SHALE

LIMESTONE: buff to light grey, trace light brown, crypto to microcrystalline, massive, dense, earthy to trace vitreous, slightly argillaceous, trace fossiliferous, no visible porosity, no visible shows.

SHALE: medium to light grey, trace dark grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace silty, trace disseminated pyrite.

1152-1171 INTERBEDDED SHALE, SANDSTONE, AND LOCAL LIMESTONE

SHALE: medium to dark grey, blocky to trace platy, subfissile, micromicaceous, calcareous, trace silty.

SANDSTONE: white to grey, very fine grained to silty, vitreous and frosted quartz, trace lithic grains, calcareous, argillaceous in part, subrounded, well sorted, well cemented, calcareous cement, no visible porosity, no visible shows.

LIMESTONE: buff to white, trace light grey, crypto to microcrystalline, massive, dense, earthy, trace fossiliferous, no visible porosity, no visible shows.

RED KNIFE (1171.0 m)

1171-1183 SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty, rare disseminated pyrite, local tight limestone stringers.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

1183-1216 SHALE: medium to light grey, grey-brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, local tight limestone stringers.

1216-1234 INTERBEDDED SHALE AND SILTSTONE
SHALE: medium grey, dark brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, trace tight limestone stringers.
SILTSTONE: light to dark grey, quartzose, calcareous, trace argillaceous, well indurated.

1234-1256 SHALE: medium to light grey, trace brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, trace siltstone stringers, trace tight limestone stringers.

1256-1281 SHALE: medium to dark grey, trace light grey, blocky to platy, subfissile to fissile, micromicaceous, trace disseminated pyrite, trace siltstone stringers.

1281-1315 INTERBEDDED SHALE AND SILTSTONE
SHALE: medium to dark grey, trace light grey, blocky to platy, subfissile to subfissile, micromicaceous, trace disseminated pyrite, trace siderite.
SILTSTONE: white to light grey, quartzose, calcareous, trace very fine grained sandy, trace argillaceous, well indurated.

1315-1354 SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace disseminated pyrite, local calcareous siltstone stringers.

1354-1375 SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micomicaceous.

1375-1379 SILTSTONE: light grey to buff, trace white, quartzose, calcareous, argillaceous in part, well indurated.

FT. SIMPSON (1379.0 m)

1379-1406 SHALE: medium to dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty to very fine grained sandy, local tight limestone stringers, local calcareous siltstone stringers.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

1406-1439	SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty, local trace calcareous siltstone stringers, local trace tight limestone stringers.
1439-1478	SHALE: medium to trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace calcareous siltstone stringers, trace tight limestone stringers.
1478-1497	SHALE: light to medium grey, trace dark grey, platy to blocky, fissile to subfissile, trace nonfissile, micromicaceous, trace silty.
1497-1553	SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, trace nonfissile, micromicaceous, trace silty, trace disseminated pyrite.
1553-1581	SHALE: light to medium grey, trace dark grey, blocky to platy, subfissile to fissile, micromicaceous, trace silty, rare siltstone stringers.
1581-1596	SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty to very fine grained sandy stringers.
1596-1628	SHALE: light to medium grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, local very fine grained sandstone stringers.
1628-1656	SHALE: dark to light grey, platy to trace blocky, fissile to trace subfissile, micromicaceous, trace disseminated pyrite.
1656-1741	SHALE: medium to dark grey, trace light grey, platy to trace blocky, fissile to subfissile, micromicaceous, trace disseminated pyrite.
1741-1745	SHALE: dark to medium grey, dark grey-brown, trace light grey, platy to blocky, fissile to subfissile, trace nonfissile, micromicaceous, calcareous in part, slightly bituminous in part.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

FS MKR (1745.0 m)

1745-1780 SHALE: medium to dark grey, trace light grey, platy to trace blocky, fissile to subfissile, micromicaceous, local tight limestone stringers, trace calcareous.

1780-1792 SHALE: medium to trace dark grey, blocky to platy, subfissile, micromicaceous, trace calcareous.

1792-1818 SHALE: medium to dark grey, platy to blocky, fissile to subfissile, micromicaceous.

1818-1837 SHALE: light to medium grey, trace dark grey, platy to trace blocky, fissile to subfissile, micromicaceous.

1837-1863 SHALE: medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty.

1863-1882 SHALE: medium to dark grey, trace light grey, blocky to platy, subfissile to fissile, micromicaceous, trace calcareous stringers.

1882-1892 SHALE: dark to medium grey, light grey, platy to blocky, fissile to subfissile, micromicaceous, rare pyrite.

MUSKWA (1892.0 m)

1892-1923 SHALE: dark grey to black, trace medium to light grey, blocky to platy, subfissile to fissile, micromicaceous, trace pyrite, carbonaceous in part.

SLAVE POINT (1923.0 m)

1923-1930 LIMESTONE: white to light grey, trace light brown, crypto to microcrystalline, massive, dense, earthy to trace vitreous, trace fossiliferous, no visible porosity, no visible shows.

1930-1941 LIMESTONE: buff to light brown, mottled dark grey-brown, trace medium to dark brown, minor slylolites, earthy to vitreous, trace fossiliferous, trace argillaceous, no visible porosity, no visible shows.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

1941-1950 LIMESTONE: white to buff, trace light to dark brown, crypto to microcrystalline, massive, dense, earthy to vitreous, trace fossiliferous, trace poor pinpoint and intercrystalline porosity, trace bitumen, no visible dry fluorescence, no visible cut fluorescence.

1950-1972 LIMESTONE: buff to white, trace light brown, micro to cryptocrystalline, massive, dense, earthy to chalky, trace vitreous, trace fossiliferous, rare sparite (fracture filling), local trace poor pinpoint and rare fracture porosity, rare bitumen, no visible dry fluorescence, no visible cut fluorescence.

1972-1988 LIMESTONE: white to buff, trace light brown and light grey, micro to cryptocrystalline, massive, dense, chalky to earthy, trace vitreous, fossiliferous in part, trace stylolites, rare sparite (fracture filling), tight to local trace poor intercrystalline and fracture porosity, no visible shows.

1988-2005 LIMESTONE: buff to white, trace light brown, micro to cryptocrystalline, massive, dense, earthy to trace vitreous, chalky, trace fossiliferous, rare sparite (fracture filling), tight to local poor intercrystalline and fracture porosity, no visible shows.

2005-2034 LIMESTONE: buff to white, light to medium brown, trace grey, micro to cryptocrystalline, massive, dense, earthy to chalky, trace vitreous, trace fossiliferous, rare sparite (fracture filling), minor stylolites, trace poor intercrystalline and rare fracture porosity, no visible shows.

2034-2053 LIMESTONE: buff to light brown, dark to medium brown, micro to cryptocrystalline, massive, dense, earthy to trace vitreous, chalky in part, fossiliferous, trace stylolites, argillaceous in part, rare disseminated pyrite, tight to trace poor intercrystalline porosity, no visible shows.

SUNCOR NETLA P-16

SAMPLE DESCRIPTIONS

ELK POINT (2053.0 m)

2053-2075 LIMESTONE: dark to medium brown, trace buff to light brown, crypto to microcrystalline, massive, dense, vitreous to earthy, argillaceous in part, fossiliferous, no visible porosity, no visible shows.

2075-2080 LIMESTONE: buff to light brown, trace dark to medium brown, micro to cryptocrystalline, massive, dense, earthy to trace vitreous, fossiliferous, argillaceous in part, no visible porosity, no visible shows.

2080-2099 LIMESTONE: dark brown, trace buff to light brown, crypto to microcrystalline, massive, dense, vitreous to earthy, fossiliferous in part, argillaceous in part, no visible porosity, no visible shows.

T.D.: 2099.0 m (driller)
2098.8 m (logger)

MERLIN PETROLEUM SERVICES LTD.
#207, 239 - 12th Ave. S.W.
CALGARY, Alberta
T2R 1H6 (403) 234-9555

COMPOSITE WELL HISTORY
DRILLING TIME
LITHOLOGY LOG

COMPANY: SUNCOR ENERGY INC.
WELL: SUNCOR NETLA P16
FIELD: NETLA
PROVINCE: N.W.T.
LOCATION: P16-60-50-122-45

COORDINATES:
ELEVATIONS: GD 602.3 m
KB 607.0 m
WELL TYPE: Exploratory
SPUD DATE: 20:00hr 12-21-1999
LICENCE No.: 1874

LOG MEASURED FROM KB
4.7 m ABOVE GROUND
TOTAL DEPTH: 2099
T.D. DATE: 13:45hr 01-09-2000
AFE No.: A9911480P16

CONTRACTOR: Akita #37
MUD TYPE: Gel-chem
MUD UP @: 542
SAMPLES: 545 m to 2099 m

DSTs: None on penetration.

CORES: None

OPEN HOLE LOGS: Schlumberger
AIT-TLD-LDT-CNT
DSI-MLT-GPIT-MCD

SUPERVISION
GEOLOGICAL: Craig Odagaki

DRILLING: P. Erb / P. Miller

CASING DEPTH
SURFACE: 542 m
INTERMEDIATE: m
MAIN: m

CASING SIZE
SURFACE: 244.5 mm
INTERMEDIATE: mm
MAIN: mm

HOLE SIZE
SURFACE: 311 mm
INTERMEDIATE: mm
MAIN: 222 mm

REMARKS: Sample formation tops not corrected to log tops.

CANSTRAT SYMBOLS USED FOR LITHOLOGY AND SHOWS

SCALE 1:240

DESCRIPTIONS

SHALE- medium to light grey, trace dark grey, blocky to platy, subfissile to fissile, micromicaceous, trace silty, local siltstone stringers.

INTERBEDDED SHALE AND SILTSTONE: SHALE- medium to dark grey, trace light grey, blocky, subfissile to nonfissile, micromicaceous, silty in part; SILTSTONE- medium to light grey, trace grey-brown quartzose, well indurated, argillaceous.

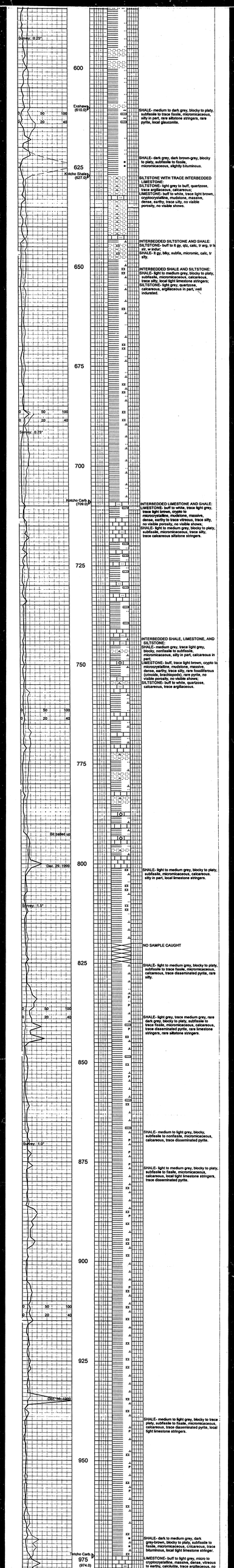
GRAIN OF CRYSTAL SIZE
LITHOLOGY
POROSITY TYPE
POROSITY
OIL SHOWS
DEPTH

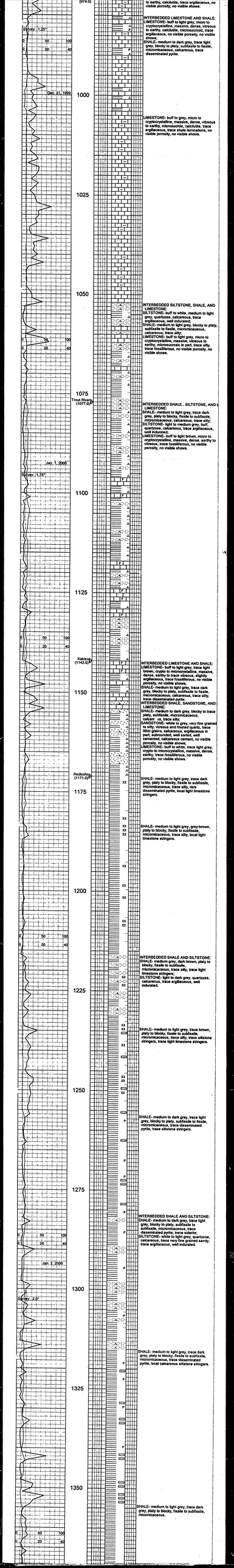
550
575

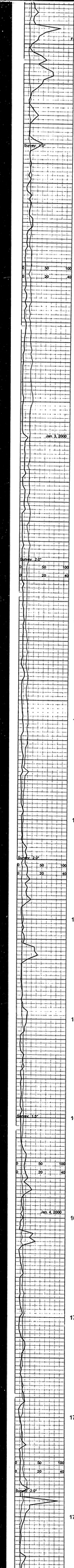
TOTAL GAS (units) 0 50 100
DRILLING TIMES (min/m) 0 20 40

Bit 1: DS110NV 222mm
In: 542m Out: 1900m
138.25hr 6-N-I
FOB 2-5 kdN
RPM 140

03:00hr, Dec. 28, 1999


Survey: 0.25°
600
Exshaw (610.0)
SHALE- medium to dark grey, blocky to platy, subfissile to trace fissile, micromicaceous, silty in part, rare siltstone stringers, rare pyrite, local glauconite.
625
SHALE- dark grey, dark brown-grey, blocky to platy, subfissile to fissile, micromicaceous, slightly bituminous.
Kotcho Shale (627.0)
SILTSTONE WITH TRACE INTERBEDDED LIMESTONE:
SILTSTONE- light grey to buff, quartzose, trace argillaceous, calcareous;
LIMESTONE- buff to white, trace light brown, cryptocrystalline, mudstone, massive, dense, earthy, trace silty, no visible porosity, no visible shows.
INTERBEDDED SILTSTONE AND SHALE:
SILTSTONE- buff to lt gy, stc, calc, tr arg, tr ls, st, w indur;
SHALE- lt gy, blky, subfis, micromic, calc, tr silty.
650
INTERBEDDED SHALE AND SILTSTONE:
SHALE- light to medium grey, blocky to platy, subfissile, micromicaceous, calcareous, trace silty, local light limestone stringers;
SILTSTONE- light grey, quartzose, calcareous, argillaceous in part, well indurated.
675
Survey: 0.75°
700
Kotcho Carb. (709.0)
INTERBEDDED LIMESTONE AND SHALE:
LIMESTONE- buff to white, trace light grey, trace light brown, crypto to microcrystalline, mudstone, massive, dense, earthy, trace siliceous, trace silty, no visible porosity, no visible shows;
SHALE- light to medium grey, blocky to platy, subfissile, micromicaceous, trace silty, trace calcareous siltstone stringers.
725
INTERBEDDED SHALE, LIMESTONE, AND SILTSTONE:
SHALE- medium grey, trace light grey, blocky, nonfissile to subfissile, micromicaceous, silty in part, calcareous in part;
LIMESTONE- buff, trace light brown, crypto to microcrystalline, mudstone, massive, dense, earthy, trace silty, rare fossiliferous (crinoids, brachiopods), rare pyrite, no visible porosity, no visible shows;
SILTSTONE- buff to white, quartzose, calcareous, trace argillaceous.
750
775
Bit balled up
800
Dec. 29, 1999
SHALE- light to medium grey, blocky to platy, subfissile, micromicaceous, calcareous, silty in part, local limestone stringers.
Survey: 1.5°
NO SAMPLE CAUGHT
825
SHALE- light to medium grey, blocky to platy, subfissile to trace fissile, micromicaceous, calcareous, trace disseminated pyrite, rare silty.
SHALE- light grey, trace medium grey, rare dark grey, blocky to platy, subfissile to trace fissile, micromicaceous, calcareous, trace disseminated pyrite, rare limestone stringers, rare siltstone stringers.
850
SHALE- medium to light grey, blocky, subfissile to nonfissile, micromicaceous, calcareous, trace disseminated pyrite.
Survey: 1.0°
875
SHALE- light to medium grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, local light limestone stringers, trace disseminated pyrite.
900
925
Dec. 30, 1999
SHALE- medium to light grey, blocky to trace platy, subfissile to fissile, micromicaceous, calcareous, trace disseminated pyrite, local light limestone stringers.
950
SHALE- dark to medium grey, dark grey-brown, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace bituminous, local light limestone stringer.
Kotcho Carb. (974.0)
975
LIMESTONE- buff to light grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, calcilutite, trace argillaceous, no


(974.0)
Survey: 1.25"
0
50
100
0
20
40
Dec. 31, 1999
1000
1025
1050
1075
Trout River
(1077.0)
Jan. 1, 2000
Survey: 1.75"
1100
1125
Kaskida
(1142.0)
1150
Redknife
(1171.0)
1175
1200
1225
1250
1275
Jan. 2, 2000
Survey: 2.0"
1300
1325
1350
to earthy, calciulite, trace argillaceous, no visible porosity, no visible shows.
INTERBEDDED LIMESTONE AND SHALE:
LIMESTONE- buff to light grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, calciulite, microsucrosic, trace argillaceous, no visible porosity, no visible shows.
SHALE- medium to dark grey, trace light grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace disseminated pyrite.
LIMESTONE- buff to grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, microsucrosic, calciulite, trace argillaceous, trace shale laminations, no visible porosity, no visible shows.
INTERBEDDED SILTSTONE, SHALE, AND LIMESTONE:
SILTSTONE- buff to white, medium to light grey, quartzose, calcareous, trace argillaceous, well indurated.
SHALE- medium to light grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace silty.
LIMESTONE- buff to light grey, micro to cryptocrystalline, massive, dense, vitreous to earthy, microsucrosic in part, trace silty, trace shaliness, no visible porosity, no visible shows.
INTERBEDDED SHALE , SILTSTONE, AND LIMESTONE:
SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, calcareous, trace silty;
SILTSTONE- light to medium grey, buff, quartzose, calcareous, trace argillaceous, well indurated;
LIMESTONE- buff to light brown, micro to cryptocrystalline, massive, dense, earthy to vitreous, trace fossiliferous, no visible porosity, no visible shows.
INTERBEDDED LIMESTONE AND SHALE:
LIMESTONE- buff to light grey, trace light brown, crypto to microcrystalline, massive, dense, earthy to trace vitreous, slightly argillaceous, trace fossiliferous, no visible porosity, no visible shows;
SHALE- medium to light grey, trace dark grey, blocky to platy, subfissile to fissile, micromicaceous, calcareous, trace silty, trace disseminated pyrite.
INTERBEDDED SHALE, SANDSTONE, AND LIMESTONE:
SHALE- medium to dark grey, blocky to trace platy, subfissile, micromicaceous, calcare ous, trace silty;
SANDSTONE- white to grey, very fine grained to silty, vitreous and frosted quartz, trace silicic grains, calcareous, argillaceous in part, subrounded, well sorted, well cemented, calcareous cement, no visible porosity, no visible shows;
LIMESTONE- buff to white, trace light grey, crypto to microcrystaline, massive, dense, earthy, trace fossiliferous, no visible porosity, no visible shows.
SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty, rare disseminated pyrite, local light limestone stringers.
SHALE- medium to light grey, grey-brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, local light limestone stringers.
INTERBEDDED SHALE AND SILTSTONE:
SHALE- medium grey, dark brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, trace light limestone stringers;
SILTSTONE- light to dark grey, quartzose, calcareous, trace argillaceous, well indurated.
SHALE- medium to light grey, trace brown, platy to blocky, fissile to subfissile, micromicaceous, trace silty, trace siltstone stringers, trace light limestone stringers.
SHALE- medium to dark grey, trace light grey, blocky to platy, subfissile to fissile, micromicaceous, trace disseminated pyrite, trace siltstone stringers.
INTERBEDDED SHALE AND SILTSTONE:
SHALE- medium to dark grey, trace light grey, blocky to platy, subfissile to subfissile, micromicaceous, trace disseminated pyrite, trace siderite;
SILTSTONE- white to light grey, quartzose, calcareous, trace very fine grained sandy, trace argillaceous, well indurated.
SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace disseminated pyrite, local calcareous siltstone stringers.
SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous.



SILTSTONE- light grey to buff, trace white, quartzose, calcareous, argillaceous in part, well indurated.

SHALE- medium to dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty to very fine grained sandy, local light limestone stringers, local calcareous siltstone stringers.

SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty, local trace calcareous siltstone stringers, local trace light limestone stringers.

SHALE- medium to trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace calcareous siltstone stringers, trace light limestone stringers.

SHALE- light to medium grey, trace dark grey, platy to blocky, fissile to subfissile, trace nonfissile, micromicaceous, trace silty.

SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, trace nonfissile, micromicaceous, trace silty, trace disseminated pyrite.

SHALE- light to medium grey, trace dark grey, platy to blocky, subfissile to fissile, micromicaceous, trace silty, rare siltstone stringers.

SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty to very fine grained sandy stringers.

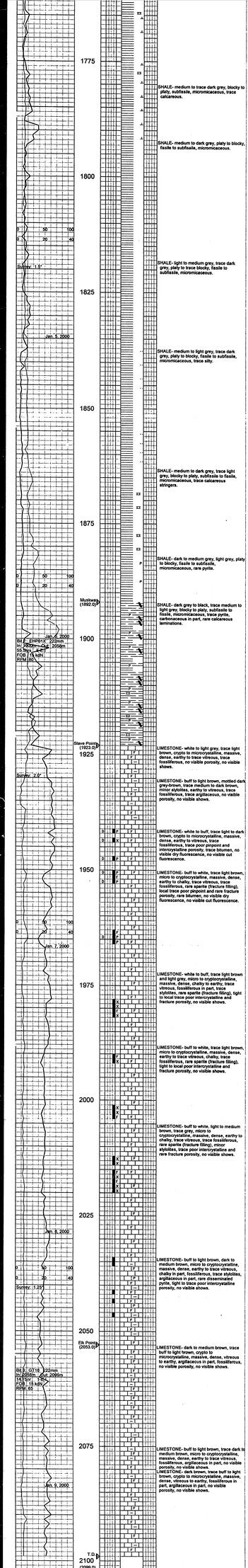
SHALE- light to medium grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, local very fine grained sandstone stringers.

SHALE- dark to light grey, platy to trace blocky, fissile to trace subfissile, micromicaceous, trace disseminated pyrite.

SHALE- medium to dark grey, trace light grey, platy to trace blocky, fissile to subfissile, micromicaceous, trace disseminated pyrite.

SHALE- dk to m gy, dk gy-brn, tr lt gy, pty to bky, fss to subfss, tr nonfss, micromic, calc in pt,sl bit in pt.

SHALE- medium to dark grey, trace light grey, platy to trace blocky, fissile to subfissile, micromicaceous, local light limestone stringers, trace calcareous.


1775
1800
1825
1850
1875
1900
1925
1950
1975
2000
2025
2050
2075
2100
(2099.0)
T.D.
SHALE- medium to trace dark grey, blocky to platy, subfissile, micromicaceous, trace calcareous.
SHALE- medium to dark grey, platy to blocky, fissile to subfissile, micromicaceous.
SHALE- light to medium grey, trace dark grey, platy to trace blocky, fissile to subfissile, micromicaceous.
SHALE- medium to light grey, trace dark grey, platy to blocky, fissile to subfissile, micromicaceous, trace silty.
SHALE- medium to dark grey, trace light grey, platy to blocky, subfissile to fissile, micromicaceous, trace calcareous stringers.
SHALE- dark to medium grey, light grey, platy to blocky, fissile to subfissile, micromicaceous, rare pyrite.
SHALE- dark grey to black, trace medium to light grey, blocky to platy, subfissile to fissile, micromicaceous, trace pyrite, carbonaceous in part, rare calcareous laminations.
LIMESTONE- white to light grey, trace light brown, crypto to microcrystalline, massive, dense, earthy to trace vitreous, trace fossiliferous, no visible porosity, no visible shows.
LIMESTONE- buff to light brown, mottled dark grey-brown, trace medium to dark brown, minor stylolites, earthy to vitreous, trace fossiliferous, trace argillaceous, no visible porosity, no visible shows.
LIMESTONE- white to buff, trace light to dark brown, crypto to microcrystalline, massive, dense, earthy to vitreous, trace fossiliferous, trace poor pinpoint and intercrystalline porosity, trace bitumen, no visible dry fluorescence, no visible cut fluorescence.
LIMESTONE- buff to white, trace light brown, micro to cryptocrystalline, massive, dense, earthy to chalky, trace vitreous, trace fossiliferous, rare sparite (fracture filling), local trace poor pinpoint and rare fracture porosity, rare bitumen, no visible dry fluorescence, no visible cut fluorescence.
LIMESTONE- white to buff, trace light brown and light grey, micro to cryptocrystalline, massive, dense, chalky to earthy, trace vitreous, fossiliferous in part, trace stylolites, rare sparite (fracture filling), light to local trace poor intercrystaline and fracture porosity, no visible shows.
LIMESTONE- buff to white, trace light brown, micro to cryptocrystalline, massive, dense, earthy to trace vitreous, chalky, trace fossiliferous, rare sparite (fracture filling), light to local poor intercrystaline and fracture porosity, no visible shows.
LIMESTONE- buff to white, light to medium brown, trace grey, micro to cryptocrystalline, massive, dense, earthy to chalky, trace vitreous, trace fossiliferous, rare sparite (fracture filling), minor stylolites, trace poor intercrystaline and rare fracture porosity, no visible shows.
LIMESTONE- buff to light brown, dark to medium brown, micro to cryptocrystaline, massive, dense, earthy to trace vitreous, chalky in part, fossiliferous, trace stylolites, argillaceous in part, rare disseminated pyrite, light to trace poor intercrystaline porosity, no visible shows.
LIMESTONE- dark to medium brown, trace buff to light brown, crypto to microcrystaline, massive, dense, vitreous to earthy, argillaceous in part, fossiliferous, no visible porosity, no visible shows.
LIMESTONE- buff to light brown, trace dark to medium brown, micro to cryptocrystaline, massive, dense, earthy to trace vitreous, fossiliferous, argillaceous in part, no visible porosity, no visible shows
LIMESTONE- buff to light brown, trace buff to light brown, crypto to microcrystaline, massive, dense, vitreous to earthy, fossiliferous in part, argillaceous in part, no visible porosity, no visible shows.
Jan. 5, 2000
Jan. 6, 2000
Jan. 7, 2000
Jan. 8, 2000
Jan. 9, 2000
Survey: 1.5°
Survey: 2.0°
Survey: 1.25°
Bit 2 - 8 7/8" - 222mm
In: 1903m - Out: 2058m
50 hrs - PDC
FOB: 15 kN
RPM: 80
Bit 3 - 6 7/8" - 222mm
In: 2058m - Out: 2099m
14 hrs - PDC
FOB: 15 kN
RPM: 65
Muskwa
(1892.0)
Slave Point
(1923.0)
Elk Point
(2053.0)
0
50
100
0
20
40

Attachment
#12

NO DOCUMENTS ON FILE AT TIME OF FILMING

Attachment
#13

CS400

COMPUTALOG

CEMENT QUALITY PLUG LOG

FILE NO.

LSD.

SEC.

TWP.

RGE.

M.

COMPANY SUNCOR ENERGY LTD.

WELL SUNCOR PLUG FOUR 16-06-49-12W5

FIELD NETLA

PROVINCE NORTHWEST TERRITORIES

WELL FILE

LOCATION LSD ___ Sec. ___ Twp. ___ Rge. ___

Other Services:

Perm. Datum Ground Level Elev. 672.3 ELEV.: K.B. 683.00

Log Meas. from 11.8 m above Perm.Datum D.F.

Drilling Measured from KELLY BUSHING G.L. 672.30

Date	JAN 11 00	JAN 12 00	JAN 12 00	JAN 12 00
Run #	ONE	TWO	THREE	FOUR
Plug #	ONE	TWO	THREE	FOUR
Plug Bottom - Driller	2039.0	1950.0	1000.0	672.0
Plug Top - Driller	2039.0	1950.0	959.0	512.0
Plug Bottom - Logger	NOT FELT	1954.0	NOT FELT	NOT FELT
Plug Top - Logger	NOT FELT	1922.0	969.2	478.5
Cement - ver.	4.0	3.2	3.2	5.4
- Dens.	1900	1900	1500	1900
Casing Size	Surface - 244.500		Set - 542.0	Hole Size 222.000
	Intermediate -		Set	

Unit # 405 District 1105 S.O. # 51104

Recorded By M. CHRISTENSEN

Witnessed By P. MILLER

Panel # CS400 Tool # GRTCYC F002 Source # CSNG

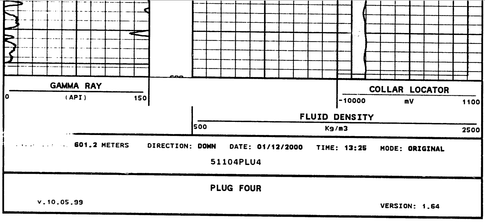
Equipment Type GR CCL FLUIDITY BHT °C Deg. C

Cementing Co. DOWELL SCHLUMBERGER

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS SET OUT IN OUR CURRENT PRICE SCHEDULE.

FIELD

Run #	ONE	TWO	THREE	FOUR
Plug #	ONE	TWO	THREE	FOUR
Plug Down - Time	JAN/11/00	JAN/12/00	JAN/12/00	JAN/12/00
Logging Time - Start	07:45	05:30	07:30	12:20
- Finish	N/A	06:30	11:30	14:00
Plug Bottom - Driller	2039.0	1950.0	1000.0	672.0
Plug Top - Driller	2039.0	1900.0	959.0	512.0
Plug Bottom - Logger	NOT FELT	1954.0	NOT FELT	NOT FELT
Plug Top - Logger	NOT FELT	1922.0	969.2	478.5
Cement - ver.	4.0	3.2	3.2	5.4
- Dens.	1900	1900	1500	1900
Casing Size	Surface - 244.500		Set - 542.0	Hole Size 222.000
	Intermediate -		Set	
Unit # 405	District 1105			S.O. # 51104
Recorded By	M. CHRISTENSEN			
Witnessed By	P. MILLER			
Panel #	CS400	Tool #	GRTCYC F002	Source # CSNG
Equipment Type	GR CCL FLUIDITY	BHT °C	Deg. C	
Cementing Co.	DOWELL SCHLUMBERGER			



601.2 METERS DIRECTION: DOWN DATE: 01/12/2000 TIME: 13:25 MODE: ORIGINAL

51104PLU4

PLUG FOUR

v.10.05.99 VERSION: 1.64

REMARKS

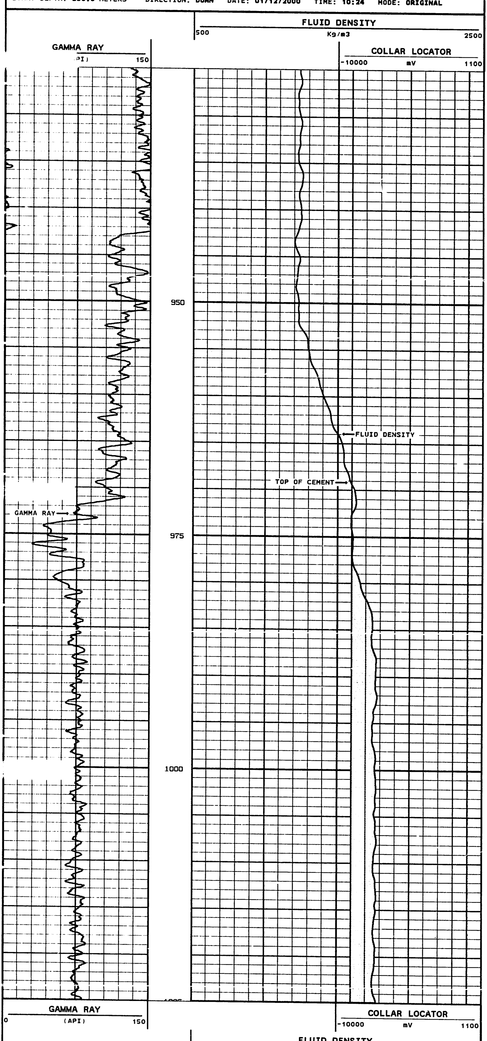
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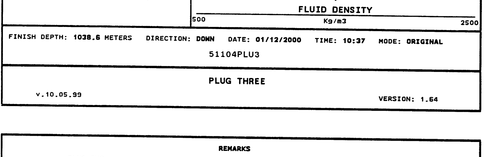
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PLUG THREE

51104PLU3

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FINISH DEPTH: 1038.6 METERS DIRECTION: DOWN DATE: 01/12/2000 TIME: 10:37 MODE: ORIGINAL

51104PLU3

PLUG THREE

v.10.05.99 VERSION: 1.64

REMARKS

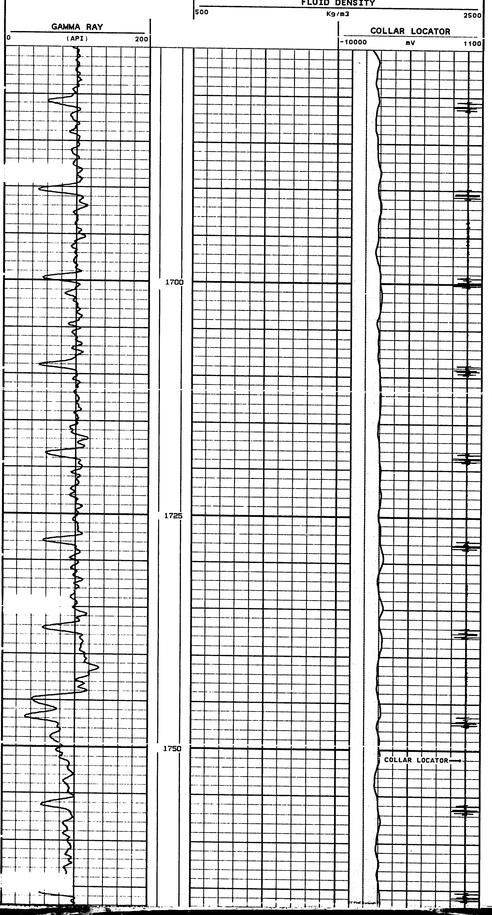
PLUG TWO
CEMENT TOP AT 1922.0mKB.
PLUG BOTTOM AT 1954.0mKB.

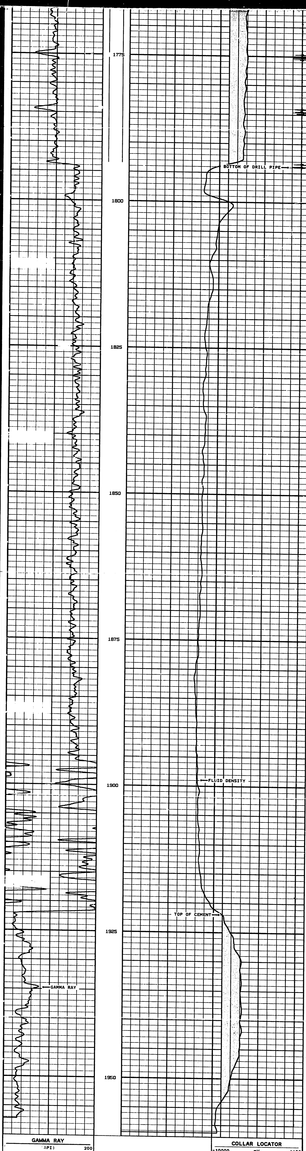
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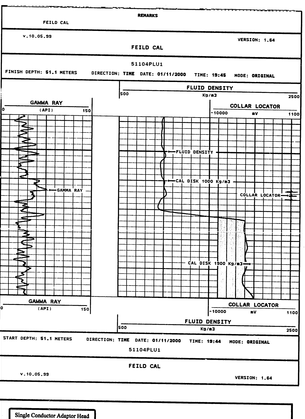
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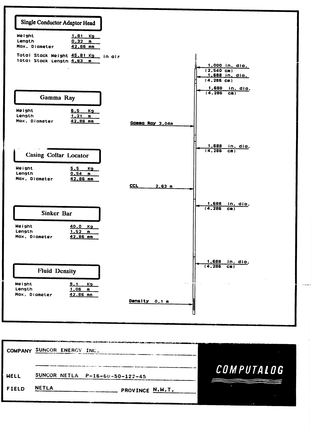
51104PLU2

START DEPTH: 1675.2 METERS DIRECTION: DOWN DATE: 01/12/2000 TIME: 01:09 MODE: ORIGINAL









COMPANY SUNCOR ENERGY Inc.

WELL SUNCOR NETLA P-16-44-50-122-45

FIELD NETLA PROVINCE N.W.T.

COMPUTALOG

Attachment
#14

Golder Associates Ltd.

10th Floor, 940 6th Avenue S.W.
Calgary, Alberta, Canada T2P 3T1
Telephone (403) 299-5600
Fax (403) 299-5606

Golder Associates

FINAL REPORT

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE 2000 NETLA EXPLORATORY DRILLING PROJECT

Submitted to:

Suncor Energy Inc.
P.O. Box 38
112 - 4th Avenue S.W.
Calgary, Alberta, Canada
T2P 2V5

DISTRIBUTION:

40 Copies	DIAND Yellowknife, NT
10 Copies	Pajak Engineering Ltd. / Suncor Energy Inc. Calgary, Alberta
3 Copies	Golder Associates Ltd. Calgary, Alberta

September 1999 **992-2243**

EXECUTIVE SUMMARY

Suncor Energy Incorporated (Suncor) proposes to drill four new gas exploration wells in the Fort Liard and Nahanni Butte area in the south-west corner of the Northwest Territories (NWT) during the winter of 2000. The proposed drilling program, referred to as the 2000 Netla Exploratory Drilling Project (the project), will enable Suncor to further evaluate potential prospects that were revealed during previous seismic and drilling programs in the region. Specifically, the project includes: preparing and drilling four new well locations, all of which are expected to be slightly sour (0.5 - 2.0% H_2S); utilization of a temporary winter access road routed on existing cutlines (total length of approximately 48 km, previously permitted and utilized in 1999); siting a temporary work camp; and excavation of two borrow pits, which will be used as remote sumps. Suncor will also require a water source for drilling and for road construction.

Preliminary screening of the project will occur under the Mackenzie Valley Resource Management Act (MVRMA) by agencies with a permitting authority for the project. The primary agencies with jurisdiction over the project are the Department of Indian Affairs and Northern Development (DIAND) for Land Use Permits, the NWT Water Board for water licenses and the NEB as the government authority that will authorize this project. This report has been produced for submission to government agencies to assist in screening this project.

Suncor has consulted with the communities of Fort Liard and Nahanni Butte about their drilling program in 1998 and 1999. A brief, directed traditional knowledge study was conducted by each community in order to document traditional use of the project area. Frank Betsaka from Nahanni Butte operates a trapline in the immediate vicinity of the proposed wellsites. When consulted in late 1998, Mr. Betsaka did not identify any concerns about the proposed wellsites.

This region supports five wildlife species that have been identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 1999) as being threatened or vulnerable: wood bison (threatened), grizzly bear (vulnerable), woodland caribou (vulnerable), peregrine falcon (endangered) and wolverine (vulnerable). The Liard River and its tributaries support substantial fish resources. No federally-listed (COSEWIC 1999) plant species occur in the proposed project area. No previously recorded archaeological sites occur in the proposed project area.

In general the regional economy is not well developed. Historically, the area supported mostly subsistence and commercial hunting and trapping. Commercial wildlife use has been declining

mean that no significant residual impacts will occur as a result of the project. As discussed in Section 7.9, all residual cumulative effects are predicted to be insignificant.

Summary of Potential Impacts, Mitigation Measures and Residual Impacts

POTENTIAL IMPACT	MITIGATION	RESIDUAL IMPACTS
Well Locations and associated support sites		
Wildlife habitat loss and disturbance with reduction in opportunities for hunting, fishing and trapping.	Workers will be educated in minimizing disturbance, harassment and attraction of wildlife.	Insignificant, as a very limited area of new disturbance is required.
Soil and vegetation disturbance.	Winter construction will minimize impacts; survey done to fine-tune plans; earth and compacted snow pads to protect the surface and permafrost; borrow pits will be reclaimed.	Insignificant, vegetation and soil disturbance limited to small construction footprint.
Waste and/or spills could affect fish or wildlife.	Waste disposal and spill contingency plans.	Insignificant.
Ice fog and emissions from generators.	Standard emissions equipment.	Insignificant, very limited in time and area.
Noise from generator engine.	Small engines with appropriate mufflers.	Insignificant, short-term.
Camps, historic sites or archaeological sites may be impacted.	Database review and consultation showed no requirement for additional surveys.	Insignificant.
Access		
Wildlife dens, nest sites, habitat could be impacted.	Surveys took place before construction; existing disturbance corridors used for access.	Insignificant.
Large mammal movements and hunting opportunities may be affected.	No barriers will be created; gaps placed in slash and snow windrows to facilitate movement.	Insignificant; some caribou and moose may alter their movements to use access roads. Use of existing cutlines will minimize the amount of new access created for hunting.
Soil and vegetation disturbances.	Existing cutlines mainly used for access; winter construction will mitigate impacts; DOT (GNWT 1993) and Land Use Permit conditions will be followed. Compacted snow and ice roads will protect underlying vegetation. Clearing requirements minimal and frozen ground conditions will permit clean shearing of any standing timber.	Insignificant.
Fish may be impacted, especially from sediment washing into creeks.	Clean snow fill to be used for temporary crossing and will be removed before spring melt; crossings are located at previously used sites.	Insignificant.

ACKNOWLEDGEMENTS

We would like to thank Deh Cho Helicopters, in particular, our pilot Ben Hawkins, for his assistance with the field work. We are grateful for the hospitality of the staff at the Beaver Enterprises base camp in Fort Liard. We also appreciate the assistance of Sally Timbre and Gord of the Acho Dene Koe who helped arrange for Antoine Bertrand to assist with the field survey. Pauline and Chief Peter Marcellais of the Nahanni Butte Dene Band were also very co-operative and enthusiastic in arranging for Archie Betsaka to assist with the field survey. We are very appreciative of the assistance of Antoine and Archie.

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1. INTRODUCTION

Suncor Energy Incorporated (Suncor) proposes to drill four new gas exploration wells in the Fort Liard and Nahanni Butte area in the south-west corner of the Northwest Territories (NWT) during the winter of 2000 (Figure 1). Suncor has contracted Golder Associates Ltd. (Golder) to undertake an Environmental Impact Assessment (EIA) of the proposed development to meet the requirements of the Mackenzie Valley Resource Management Act (MVRMA) as required by the Oil and Gas Directorate of the Department of Indian Affairs and Northern Development (DIAND) and the National Energy Board (NEB).

Suncor recognizes the environmental sensitivities in the project area and will employ appropriate measures to mitigate disturbances and minimize residual impacts. The scope of the EIA includes the site selection, construction, drilling, cleanup and reclamation of four exploration wells and associated access routes, camp and borrow pits. Startup of the drilling program is scheduled for January 2000, and all phases of the drilling program are expected to be completed before March 31, 2000. Consequently, mitigation of impacts and facilitation of access will be accomplished under frozen ground conditions.

It is important to note that the proposed project is strictly exploratory at this time. The proposed wells will enable Suncor to further evaluate prospects in the Slave Point gas target zone. Consequently, if any wells prove to be successful, they will be suspended and no production development will occur at this time. Nonetheless, following completion of the drilling program, all sites will be reclaimed and associated equipment transported out of the project area. Should one or more of the wells prove to be viable, subsequent development plans will be submitted to regulatory agencies and relevant third parties as a separate application.

1.1 Regulatory Approvals and Process

The 2000 Netla Exploratory Drilling Project falls under federal and territorial environmental regulatory jurisdiction. Furthermore, the project falls in a Deh Cho area and the Fort Liard Band (Acho Dene Koe) and Nahanni Butte Dene Band play a main role in reviewing all permit applications and providing advice to government.

Preliminary screening of the project will occur under the Mackenzie Valley Resource Management Act (MVRMA), by agencies with a permitting authority for the project. The primary agencies with jurisdiction over the project are:

DIAND for Land Use Permits:

- DIAND will determine if the potential adverse environmental effects can be mitigated with known technology and are not significant. Full details of conditions will be provided in the Land Use Permits.

NWT Water Board for Water Licenses:

- The Water Board and its Technical Advisory Committee (TAC) will determine if the potential adverse environmental effects can be mitigated with known technology and are not significant. Full details of license conditions will be provided in the Water License.

The NEB is the government authority that will authorize the project:

- The NEB is required to conduct a screening pursuant to the MVRMA, and to consider environmental impacts under its jurisdiction to approve facilities and development under the *Canada Oil and Gas Operations Act* (COGOA).

Other regulatory agencies involved in the approvals process include: the Department of Fisheries and Oceans (DFO) with reference to effects on fisheries; Government of the Northwest Territories (GNWT) for wildlife, including a research permit.

This report has been produced for submission by Suncor to the NEB, DIAND and the NWT Water Board to assist these agencies in assessing this project. The environmental information in this report builds on the existing information reported in the 1998 Environmental Impact Assessment for the 1999 Netla Exploratory Drilling Project (Golder Associates 1998).

2. PROJECT OVERVIEW

The proposed drilling program, referred to as the 2000 Netla Exploratory Drilling Project (the project), will enable Suncor to further evaluate potential prospects that were revealed during previous seismic and drilling programs in the region. The proposed project is located within the Deh Cho Region in land parcel EL 382, as defined by the Oil and Gas Directorate of DIAND.

Specifically, the project includes: preparing and drilling four new well locations, all of which are expected to be slightly sour (0.5 - 2.0% H_2S); utilization of a temporary winter access road routed on existing cutlines (total length of approximately 48 km, utilized and previously permitted in 1999); siting a temporary work camp; and excavation of two borrow pits, which will be used as remote sumps. Suncor will also require a water source for drilling and for road construction.

Project Location

The project is located approximately 74 km north-east of Fort Liard and 40 km south-east of Nahanni Butte (Figure 1). The specific geographic location and Universal Transverse Mercator (UTM) of the proposed four wellsites are provided in Table 1.

Table 1
Well Locations for the Proposed Netla Exploratory Drilling Project

WELLSITE	LATITUDE	LONGITUDE	UTM
Suncor Netla O-15	60° 44' 54.080"	122° 47' 38.309"	6734571.351 N 511231.515 E
Suncor Netla P-16	60° 45' 57.556"	122° 47' 07.157"	6736536.795 N 511696.834 E
Suncor Netla B-06	60° 45' 13.182"	122° 45' 39.893"	6735168.448 N 513022.558 E
Suncor Netla H-77	60° 46' 16.491"	122° 43' 25.303"	6737135.176 N 515052.085 E

The entire project is situated on Crown lands that do not currently have any special land use designation or classification.

Project Timetable

Construction of the winter road is proposed for late November / early December. Construction and drilling of the proposed wellsites is projected for early December and early January 2000 under winter conditions. Final clean-up and reclamation will commence as soon as possible after drilling has been completed. Monitoring of the sites during the summer of 2000 will be required to assess reclamation success.

3. PUBLIC CONSULTATION

Suncor has consulted with the communities of Fort Liard and Nahanni Butte about their drilling project in 1998 and in 1999. The access route was flown with Chief Peter Marcellais of Nahanni Butte and Francis Betsaka, a trapper from Nahanni Butte in 1998. Discussions are on-going with the Bands. For a listing of community consultation and dates and topics of meetings, refer to the attachments in the Suncor Land Use Permit and Water License applications.

In 1998, a small, directed traditional knowledge study was conducted by Judy Kotchea of the Acho Dene Koe and one family from Fort Liard who hunt and trap in the region near existing and proposed Suncor wellsites. A summary of the traditional knowledge study was provided in Appendix I of the 1998 Environmental Impact Study of the 1999 Netla Exploratory Drilling Project (Golder Associates 1998). Chief Peter Marcellais and Frank Betsaka from Nahanni Butte are planning to conduct a small, directed traditional knowledge study in 1999. Mr. Betsaka operates a trapline parallel to Suncor's proposed winter access road. Discussion of results will form part of the ongoing consultation between Suncor and the communities.

Jayne Konisenta from Nahanni Butte conducted a small Traditional Knowledge study, interviewing Margaret Konisenta, whose family traps in the proposed project area (please refer to Appendix IV for study questions and answers).

4. EXISTING ENVIRONMENT

Detailed information on the regional setting, climate, geology, vegetation, wildlife, birds, fish, land use, resource use and archaeology of the project area are provided elsewhere (Golder Associates and WOES 1997; Golder Associates 1998). In brief, the proposed project area is located within the Taiga Plains Ecozone, an area including the southwestern corner of the NWT, northeastern British Columbia and northern Alberta. This ecozone is dominated by the Mackenzie River and its tributaries. Permafrost is discontinuous with low ice content (Ecological Stratification Working Group 1995).

This region supports five wildlife species that have been identified by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 1999) as being threatened or vulnerable: wood bison (threatened), grizzly bear (vulnerable), woodland caribou (vulnerable), peregrine falcon (threatened) and wolverine (vulnerable).

A small number of wood bison exist in the region of Fort Liard and Nahanni Butte. Grizzly bears have been known to utilize the region on an infrequent basis. No critical grizzly bear habitat has been identified in the project area. Black bears are more common (Appendix IV). During the field survey, a black bear was observed along the existing winter access route approximately 7 km east of kilometer 92 of the Liard Highway No. 7 and black bear tracks were as observed on one of the proposed well leases and along the main access road. Wolverines occur in the area and tracks were observed during a 1998 field reconnaissance (Golder Associates 1998). Peregrine falcons are not likely to breed in the project area due to the lack of suitable habitat, but may nest west of the project area in the Franklin Mountains. Woodland caribou occur in selective areas throughout the region; in the mountains to the west and the bogs to the south and southeast (S. Parrish, pers. comm.; M. Labine, pers. comm.). Woodland caribou are year-round residents of the region and while not migratory like barren-ground caribou are, they can be seen at any time throughout their range (Appendix IV). Caribou tracks, including those of a cow and calf, were observed in the project area during the 1999 field visit.

No federally-listed plant species (COSEWIC 1999) occur in the project area.

Muskrat, beaver and marten are traditionally hunted/trapped in the area (F. Betsaka, pers. comm.). Beaver are reported to be abundant in the Netla River area (Fort Liard Traditional Knowledge Study, Golder Associates 1998). A coyote track was observed on the B-06 lease, but the track was partially obscured by the soft substrate. It is possible the track could have been produced by a red fox but Archie Betsaka, who has knowledge of the wildlife in the area, was confident that coyote inhabit the region.

The Liard River and its tributaries support substantial fish resources. The tributaries are likely important feeding habitats for fish during periods of high sediment content (high sediment loads) in the Liard River (Hatfield et al. 1972). They also provide spawning, nursery, and possibly over-wintering habitat for numerous fish species. Fish species known to inhabit the Liard River and its main tributaries include northern pike, walleye, goldeye, inconnu, Dolly Varden, Arctic grayling, Arctic cisco, lake cisco, suckers, burbot, and lake, mountain, and round whitefish (Hatfield et al. 1972; Irvine and Rowland 1979; Macleod et al. 1979; Ker, Priestman and Associates 1980). Elders from Fort Liard noted in a traditional knowledge study (see Golder Associates 1998) that grayling, jack, pickerel, and whitefish occur in the river and lakes in the area.

There are no endangered fish species in the Liard River drainage. However, a recent survey identified bull trout in the Liard River drainage. Bull trout are a "species of concern" in Alberta. It is suspected that in the past, bull trout in the Liard drainage may have been misidentified as Dolly Varden (Yukon, Renewable Resources, pers. comm.; de Graff 1999). Genetic analysis is currently underway to distinguish between Dolly Varden and bull trout.

Detailed information on traditional and industrial land use of the project area is provided in previous reports (Golder Associates and WOES 1997; Golder Associates 1998). Briefly, current land use includes: traditional activities (hunting, trapping, and gathering) by the communities of Fort Liard and Nahanni Butte; industrial activities that primarily include gas exploration and forestry; and tourism.

5. FIELD SURVEY METHODS

The field survey was conducted between August 25 and 27th, 1999. The survey entailed on-site visits and/or aerial inspections of each proposed wellsite, associated access route, camp location, the proposed water source lake and borrow pit sites. The Netla River and Denedothada Creek crossings were also inspected along the main access road (Figure 1). Results from this fieldwork are presented in the following sections and are considered in relation to impact mitigation in Section 7.

The field team consisted of four individuals: Hilary Machtans (Golder Associates) and Antoine Bertrand (a resident of Fort Liard) examined the aquatic (fish habitat and water source lake) components of the project; Carol Stefan (Golder Associates) and Archie Betsaka (a resident of Nahanni Butte) investigated the terrestrial wildlife habitat. Field personnel assessed environmental issues and evaluated potential mitigation techniques that would minimize disturbances to the local landscape and enhance future site regeneration (e.g., vegetation re-growth).

All locations and routes were also flown by helicopter to allow the team to examine the project area at a broader landscape perspective and to identify any concerns that may be located within close proximity to the wellsites or access routes. Where deemed necessary, select drainage or beaver pond crossings along the access routes were also inspected at ground level. Photographs were taken to document each aspect of the proposed project and select photographs have been included in this report for each site.

5.1 Terrestrial Survey

There were four objectives for the terrestrial field investigations. They were to:

- document mammal and bird species in the area of the proposed project during late summer;
- document any features such as nests or dens that would be disturbed by winter construction;
- document the vegetation community in the area of the proposed project;

- document the basic soil composition at each of the proposed wellsite locations; and,
- provide on-site advice to Suncor regarding mitigation measures as appropriate.

A typical site visit included walking the perimeter of a proposed well lease, as well as throughout the lease, mapping the vegetation communities and documenting any wildlife sign. Tree, shrub and ground cover species were recorded and each vegetation community was drawn on maps for each location. The canopy tree species were classified as dominant or subdominant and other tree species present were also documented. Tree heights were estimated and recorded, and average diameter at breast height (dbh's) for canopy tree species were recorded. Wildlife sign such as tracks, browse, fecal droppings, claw marks on trees, nests and potential den sites were noted. Changes in slope, particularly ridges and low lying areas, and stream drainages were also sketched on site-specific habitat maps.

5.2 Aquatic Survey

Wellsites and access routes were surveyed for possible waterbodies, including 1st and 2nd order streams and any possible seasonal drainages. Specifically the objectives for the fisheries survey were to:

- describe fish habitat in streams in the area of the proposed wellsites or streams crossed by proposed access routes to and from wellsites and to identify the sensitivity of the streams with respect to crossings based on the habitat observed;
- describe fish habitat at the Netla River and Denedothada Creek crossing along the main access route during the open water season;
- identify potential impacts of the proposed wellsites and crossings on the aquatic resources in streams;
- calculate the draw-down of lake water level of the proposed water source lake and assess the impacts of water use on fish and fish habitat; and,

- develop site-specific mitigation measures that could be implemented during construction and operation to minimize potential impacts.

5.2.1 Fish Habitat

Fish habitat was surveyed on the Netla River and Denedothada Creek. These crossings were previously surveyed in December 1998 (Golder Associates 1998), but were revisited in 1999 to confirm fish habitat observations during open-water conditions. Physical features of the streams were recorded and measured, including: channel width, water depth, bank slope, stability, erosion and scour potential, shoreline (riparian) and instream vegetation, and water quality (pH, temperature, conductivity). Photographs were taken of each stream crossing. A standardized Golder Associates *Stream Crossing Habitat Evaluation Program* (SCHEP) form was completed for each crossing. This form incorporates fisheries-related data, as well as data potentially useful for mitigation during road construction. Details on the technical procedures and definitions of this form are provided in previous environmental assessment reports of the area (Golder Associates 1998).

5.2.2 Water Source Assessment

A bathymetry profile of a lake identified as the potential water source (Figures 1 and 2) for the drilling project was conducted. Bathymetry data (water depths, widths) was recorded along the long and short axes of the lake. Widths and depths of the inlet stream and outlet stream were also recorded. Lake volume was calculated from the bathymetry data. An estimate of draw-down of the lake volume for drilling purposes was calculated by comparing lake volume before and after water use. The amount of draw-down (% lake volume loss and reduction in lake level (cm)) is used to assess the potential impact of water use on overwintering fish and fish habitat.

A conservative estimate of water draw-down was calculated based on a "worst-case scenario" where all wells were drilled simultaneously and there was no water flowing into the lake to recharge the lake level. The following assumptions were made to conservatively estimate the draw-down:

- All four proposed wells and Well J-77, a previously proposed well that was permitted in early 1999 but not yet drilled) will require water from one lake. Minimal amounts of water will be required from this lake for road construction. Camp water will come from Fort Liard.

- Low water stage in the lake. Specifically, winter conditions were mimicked because the drilling will be done during winter months when there is little inflow to the lake, and lake volume is likely at it lowest.

- The maximum, estimated amount of water would be required to drill all wells.

- All wells drilled would be drilled simultaneously (maximum one time draw on the lake). This implies that each well has a drilling or service rig working on it at the same time as the other wells.

As mentioned above, these assumptions are designed to mimic a worst-case scenario. Realistically, only one to two rigs would be working in the project area at one time. Moreover, water usage will likely be below the maximum projected use due to recycling of water; as feasible, water will be recycled by removing the water from the drilling mud ("de-watering the mud") and reusing the mud and water when drilling subsequent wells.

The lake identified as a potential water supply was sketched (see Figure 7), including annotations such as beaver lodges, inflow, outflow, and shoreline vegetation. Because Suncor proposes to drill its wells during the winter, the fisheries concern was the presence of overwintering fish and fish habitat in affected water bodies. One water sample was collected from the west shore of the lake for water quality analysis. The water sample was sent to Taiga Environmental Laboratory in Yellowknife for analysis of nutrients (e.g., phosphorus), metals (e.g., mercury) and routine parameters such as pH.

6. PROJECT DETAILS AND FIELD RESULTS

6.1 Wellsite and Access Route Selection

6.1.1 Location Alternatives

As discussed, aerial and ground reconnaissance programs were conducted to select the preferred wellsites, camps and access routes associated with the project. During the surveys, both environmental and construction concerns were incorporated in the selection process.

The exploratory well locations were determined largely on the interpretation of data derived from previous seismic surveys and exploration drilling programs in the region, and the subsequent selection of target areas that would enable Suncor to evaluate subsurface anomalies. Following identification of the target areas, wellsites were selected within these locations that would minimize potential impacts to the environment and be technically feasible to construct. To minimize clearing requirements and mitigate overall impacts, one temporary drilling camp is sited on a previously cleared area.

To gain primary access into the project area, Suncor is proposing to utilize the same temporary winter access route that was used in 1999. The access is routed on an existing seismic cutline and portions of the route have been used previously for temporary winter access to other exploratory wellsites in the area. Access to each individual wellsite will branch off this main route and will follow existing cut-lines.

6.1.2 Wellsite Selection

The criteria utilized for wellsite and camp selection include:

- maximizing exploratory requirements;
- maximizing use of existing clearings and high, dry ground;
- avoiding permafrost and wet muskeg or beaver pond areas where feasible;
- use of level areas that would require minimal disturbance (i.e., grading, cut and fill) to create a level drilling foundation for the rig and associated equipment;

- avoidance of sensitive soil and vegetation areas;
- avoidance of sensitive wildlife habitat features; and,
- maintaining a minimum buffer zone of 100 m between the wellsite and any flowing watercourse or fish bearing waterbody.

6.1.3 Access Route Right-of-way Selection

The criteria utilized for access route selection include:

- maximizing use of existing cutlines, trails or roads;
- preference for flat to gently sloping terrain that would require minimal grading to facilitate vehicle traffic;
- avoidance of sensitive soil and vegetation areas;
- avoidance of sensitive wildlife habitat;
- avoiding poorly drained areas and minimizing watercourse crossings to the extent practical; and,
- maximizing and maintaining a buffer zone of at least 100 m between the road and any flowing watercourse or fish bearing waterbody (except at crossings).

6.2 Wellsite and Associated Access Route Description

The following section will describe the wellsites, access routes to the wellsites, and common borrow pits at sump locations. For more detail on the main access route to the wells from the Liard Highway refer to Golder Associates (1998). One main camp is proposed for the project and is discussed below in Section 6.3.2. One main water source will be used for drilling operations as well as access construction and is discussed further in Section 6.6.

6.2.1 Netla O-15

The O-15 wellsite is located approximately 36 km north-east of Km 92 of the Liard Highway No. 7 between Fort Liard and Fort Simpson. Proposed activities associated with the well include: preparing and drilling the site, utilizing and maintaining a temporary winter access routed along existing cutlines, and using a borrow pit.

Field survey results for wellsite O-15 are shown in Figure 3. The dominant vegetation on the lease includes black spruce (95%) and white birch (5%) with an average height of 15 m and diameters that range between 2.5 and 14 cm. The black spruce trees were taller and more dense on the east side of the lease (Photograph 1). This area was drier and supported more reindeer lichen and less moss than the west side of the lease which had a more open canopy and denser understory of shrubs. The shrub species identified on and near the wellsite included willow, green alder, bog birch, Labrador tea, prickly rose, bog cranberry, huckleberry and cinquefoil. Ground cover species observed on the lease included bunchberry, feather moss, reindeer lichen, coltsfoot, bilberry and horsetail.

The proposed lease occurs on an area with two low ridges, one ridge near the middle of the lease sloping 27% from the south and another ridge sloping 14% from the north-east corner of the lease (Figure 3). Other topographic variations include a low-lying, wetter area that extends from and beyond the west side of the lease. Due to the variability in the topography, grading will be necessary to facilitate equipment set-up and safe drilling operations.

The proposed 20 m x 30 m (0.06 ha) drilling sump was initially positioned on the west edge of the lease. However, as this location is the lower, wetter area of the lease, it is recommended that the sump be moved to the east side, where drier conditions are indicated by the small ridge complex. Material excavated for the sump could be used to level the site. An assessment of gravel and or clay at this site is required prior to full sump excavation.

Moose tracks were the only animal sign identified near or on the lease during the brief field visit. A pair of gray jays were also observed on the lease. No stick nests or dens were noted, and the area immediately surrounding and encompassing the lease did not include suitable denning habitat for bears.

Two soil pits were dug on the lease to determine basic soil composition. Near well centre, the organic layer is 22 cm deep at which point a grey mineral layer is reached. The other pit was near the east edge where the organic layer is 6 cm and a dry mineral layer extends beyond a depth of 15 cm.

Access to Netla O-15 will originate at the previously used main winter access. From that main access, an existing seismic line extending 2.2 km south will provide access to the lease. Only minimal clearing (2 m additional width) will be required along the seismic line to facilitate access (Figure 2 and Figure 3).

The proposed water source for this well is a small (400 m x 600 m), shallow lake located 980 m south-east of the wellsite along existing seismic cutlines (Figure 2). A description of the water source assessment can be found in Section 6.5. The proposed water source will be used for all five wellsites (O-15, P-16, B-06, H-77 and previously permitted 1998/99 well J-77).

6.2.2 Netla P-16

The P-16 wellsite is located approximately 1.8 km north of the previously discussed O-15 well location. Proposed activities associated with the well include: preparing and drilling the site, utilizing and maintaining a temporary winter access routed along existing cutlines, and using a borrow pit.

Field survey results for wellsite P-16 are shown in Figure 4. The dominant vegetation on the northern half of the lease is black spruce (60%) and white birch (40%) with heights to 15 m and diameters between 5 and 14.5 cm (Photographs 2 and 3). On the drier ridges on the south-west portion of the lease, a few jack pine trees were scattered in the forest stand. In these drier areas, the understory is comprised of green alder, willow, bunchberry, bearberry, horsetail, feather moss, club moss and reindeer lichen. In the low lying areas on the north and north-east corners of the lease, the stand is more open and is comprised solely of shorter (to 8 m) black spruce trees. The understory in these areas is comprised of green alder, willow, bog birch, Labrador tea, prickly rose, bog moss, reindeer lichen, horsetail, bog cranberry and cloudberry.

The proposed lease location slopes down gently (5-7%) outward from a knoll/ridge on the south-west edge of the lease. A series of four low ridges run approximately east-west across the lease. The north and north-east corners overlap low-lying areas and another low-lying area occurs at the south-west boundary of the lease along the existing seismic line. During lease construction, efforts will be employed to minimize disturbances to the underlying organic layer. A well pad,

constructed of borrow material and/or compacted snow, will be required to level micro-relief variations.

The proposed 20 m x 30 m (0.06 ha) drilling sump is sited in the south-east corner of the lease. Material excavated for the sump could be used to level the site although, due to the variability in the topography, some grading may be necessary to facilitate equipment set-up and safe drilling operations. An assessment of gravel and or clay at this site is required prior to full excavation.

Animal sign identified near or on the lease consisted of tracks from moose, woodland caribou, bear and snowshoe hare, and a red squirrel nest and feeding log. A porcupine was also observed at the junction of two seismic lines just south-east of the proposed lease. No stick nests or dens were noted, and the area immediately surrounding and encompassing the lease did not include suitable denning habitat for bears.

Two soil pits were dug on the lease to determine basic soil composition. Near well centre, the organic layer is 19 cm and a grey mineral layer extends beyond a depth of 28 cm. The second pit was dug near the south edge of the lease and the soil was wet. The organic layer is 28 cm deep at which point a grey mineral layer is reached.

The temporary winter access and potential water source for drilling and camp operations will be the same as for the proposed O-15 well discussed in Section 6.2.1.

6.2.3 Netla B-06

The B-06 wellsite is located 140 m east of the existing C-07 wellsite (Golder Associates 1998) and 1.82 km south along existing seismic lines (Figure 2). Proposed activities associated with the well include: preparing and drilling the site, utilizing and maintaining a temporary winter access routed along existing cutlines, and using a borrow pit.

Field survey results for wellsite B-06 are shown in Figure 5. The dominant vegetation on the lease is black spruce (60%) and tamarack (40%) with tree heights to 15 m and diameters between 3.5 and 21 cm (Photographs 4 and 5). The understory is comprised of willow, bog birch,

Labrador tea and bog blueberry. The ground cover species include horsetail, two species of bearberry, sedge, bog moss, cloudberry, reindeer lichen, club moss and feather moss.

The proposed lease is relatively level and slopes gradually towards the north-north-west. During lease construction, efforts will be employed to minimize disturbances to the underlying organic layer. A well pad, constructed of borrow material and/or compacted snow, will be required to level micro-relief variations. Initially, a proposed 20 m x 30 m (0.06 ha) drilling sump was to be located in the north-west corner of the lease. However, as this site is located near the inlet drainage to the water source lake to the south, a proposed alternate 45 m x 100 m (0.45 ha) remote sump/borrow pit has been sited 0.54 km north along and adjacent to the proposed winter access (Figure 2). Prior to full excavation, an assessment of gravel and/or clay at both sites will be required.

Animal tracks identified near or on the wellsite included moose, woodland caribou and coyote. Other wildlife sign included wolf scat, red squirrel nests, and bog lemming tunnels and runways. The bog lemming tunnels (Photograph 6) appeared to be freshly dug and were abundant and extensive throughout much of the lease. No stick nests or dens were noted, and the area immediately surrounding and encompassing the lease did not include suitable denning habitat for bears.

One soil pit was dug near well centre. The organic layer is 30 cm deep and a mineral layer extends beyond a depth of 43 cm. The soil was wet and water slowly collected at the bottom of the pit.

Access to Netla B-06 will be achieved by following the temporary winter road that was constructed last year (Golder Associates 1998). From the existing C-07 wellsite, the access route will follow 140 m east and then turn south and continue 1.82 km down a second cutline to the north boundary of the B-06 lease (Figure 5). Only minimal clearing (2 m additional width) will be required along the seismic lines to facilitate access to the wellsite.

Wellsite B-06 is located more than 100 m from an inlet stream to the water source lake (Figure 2 and Figure 5). The inlet stream did not have a defined channel (at the crossing of the seismic line near well B-06) and was characterized by diffuse flow in a low, grassy area (Photograph 8 and 9).

A small unidentified fry was seen at the deeper, defined portion of the stream at the mouth. The deep water and grasses near the mouth may provide good spawning habitat for northern pike.

6.2.4 Netla H-77

The H-77 wellsite is located 2.4 km east of the existing C-07 wellsite (Figure 2). Proposed activities associated with the well include: preparing and drilling the site, utilizing and maintaining a temporary winter access routed along existing cutlines, and using a borrow pit.

Field survey results for wellsite H-77 are shown in Figure 6. The dominant vegetation on the lease is black spruce with tree heights to 10 m and diameters between 5 and 11 cm (Photograph 7). A few tamarack trees were scattered throughout the stand. Labrador tea was the only understory shrub observed. The ground cover species include horsetail, bearberry, bog moss, cloudberry, reindeer lichen and feather moss.

The proposed lease is relatively level and slopes gradually towards the west. During lease construction, efforts will be employed to minimize disturbances to the underlying organic layer. A well pad, constructed of borrow material and/or compacted snow, will be required to level micro-relief variations. A proposed 20 m x 30 m (0.06 ha) drilling sump was initially sited in the north-west corner of the lease. However, as this site is situated on very wet organic soils with permafrost starting at a depth of approximately 40 cm, a proposed 50 m x 100 m (0.5 ha) remote sump/borrow pit has been sited 1.2 km west along and adjacent to the proposed winter access (Figure 2). Prior to full excavation, an assessment of gravel and/or clay at the site will be required.

Animal sign identified near or on the lease included moose tracks and red squirrel nests. No stick nests or dens were noted, and the area immediately surrounding and encompassing the lease did not include suitable denning habitat for bears.

Two soil pits were dug on the lease to determine basic soil composition. The organic soil layers were 38 to 47 cm deep at which point the permafrost layer was reached. The soils were wet and water quickly collected at the bottom of the pits.

Access to Netla H-77 will be achieved by following the temporary winter access that was constructed last year (Golder Associates 1998). From the proposed campsite, the access route will extend 2.4 km east along an existing cutline to the west boundary of the H-77 lease. As the entire length of the route follows existing 8 m wide disturbance corridors, only minimal clearing (an extra 2 m in width) will be required to facilitate access.

6.2.5 Netla J-77

The description and assessment of the J-77 wellsite location was discussed in Golder Associates (1998). Wellsite J-77 is located 750 m north-west of the H-77 location (Figure 2). This wellsite was permitted in early 1999 but not drilled in the 1998/99 drilling season. The lease may be constructed this winter and the well may be drilled.

6.3 Construction and Drilling Operations

6.3.1 Wellsites

During the drilling program, all conditions listed in the Land Use Permit issued for the project sites will be followed. Standing timber and residual slash will be cleared and windrowed on the edges of the lease. Although each lease is 120 m x 120 m (1.44 ha) in size, Suncor will only clear the minimal area necessary to safely facilitate drilling operations.

Depending on the climatic conditions, some localized grading and levelling may be required to create a level drilling foundation for the rig and associated equipment. However, if snowfall is sufficient, a compacted snow pad will be used to level micro-relief variations to the maximum extent feasible, thereby avoiding disturbances to the organic mat and active layer. Due to the low-lying profile of the proposed B-06 and H-77 well locations, it is expected that a well pad, constructed of granular material and clay obtained from a local borrow pit, will be required to build a level and safe drilling foundation. A combination of compacted snow, matting and/or blocking will be used for levelling support facilities and tanks.

Due to the sloping profiles of the proposed O-15 and P-16 well locations, grading of these leases will likely be required to create a level and safe drilling foundation. If grading is required, the

organic material will be stripped over the area to be levelled and stored in windrows on the high side of the lease for eventual replacement during lease abandonment. Prior to grading activities, snow will be removed and windrowed on the edges of the lease, but will not be mixed with any salvaged soil lifts.

To contain any accidental spills on site, a berm will be installed on the low side of the lease sites. The berm may be constructed with sand bags, subsoil excavated from the sump (if one is used), graded subsoils, or compacted/frozen snow which would also incorporate an upslope liner into the design. An interceptor ditch may also be excavated on the upslope side of the berm to help contain any flows. If a ditch is used, material from the ditch can also be used to construct the berm.

Suncor plans to utilize an environmentally friendly Gel/Chem mud system. Excavated, on-lease sumps are being proposed for all wellsites identified in this report. To minimize disturbance, the sumps will be located in the same area as the borrow pits. For the B-06 and H-77 wellsites, the low lying profile of these locations may require that the drilling fluids be transferred to remote sumps located along the temporary accesses (Figure 2). Prior to using any site for a sump, subsurface material will be assessed for clay content to ensure fluids will be contained. If the subsoil is pervious (water can permeate the soil), the sump will be lined with an artificial liner. Further, drilling waste in the sump will be sampled to ensure that it does not contain mud contaminants that exceed regulatory parameters or guidelines.

If unexpected down-hole drilling conditions are encountered (i.e., sensitive shales or other formations that are prone to washouts), use of an invert mud may be required in conjunction with the Gel/Chem system discussed above. Should an invert mud be used, the liquid and cuttings associated with it will be captured and held in steel, above-ground tanks on the lease for eventual transfer and disposal at an approved location in Alberta.

If a well proves to be viable, it will be completed and tested, a wellhead installed and then suspended with no further production development at this time. In turn, the lease will be reclaimed and stabilized in compliance with the issued Land Use Permit.

6.3.2 Camp

The proposed campsite is located approximately 120 m north-east of the existing C-07 wellsite, adjacent to the existing seismic line that will be used for access to the proposed B-06, H-77 and J-77 wellsites. To mitigate disturbances, the 45 m x 95 m (0.43 ha) camp area was sited in an existing clearing that was previously used for the same purpose (Golder Associates 1998). The camp is positioned on level terrain and the surrounding forest community is comprised of white spruce, trembling aspen and white birch association. To compensate for surface micro-relief variations, the camp will be set on a compacted snow pad and an on-site sump will be used for sewage disposal.

All combustible garbage will be burned in a diesel-fired incinerator on site, while metal, plastics and other wastes will be contained in bins for removal to appropriate disposal locations. Secured storage containers for fuels, filters, used motor oil and special handling wastes will be placed away from low-lying areas and appropriate containment measures such as catch trays and berms will be used as necessary. Oily wastes will be transported to an approved recycling or disposal facility. During camp occupation, good housekeeping practices will be enforced. Following camp closure, all equipment, garbage, wastes and structures will be removed and the sump backfilled and compacted.

6.4 Fish Habitat at Two Crossings along the Main Access Route

Netla River

The Netla River is an irregularly winding stream that varies in habitat composition along its reaches. At the proposed crossing, the river is surrounded by conifers and overhanging willows and is characterized by clear, shallow, slow-moving water. The substrate is dominated by small gravel (Photograph 11). The banks are moderately vegetated and were stable at the winter road crossing location. Along most of the upper reach of the river, the left downstream bank of the river at the water's edge is soft and may be subject to undercutting during periods of higher water velocity or if disturbed (Photograph 12). The right downstream (northeast) bank is stabilized at the crossing by a fallen log parallel to the water's edge that has prevented undercutting of the bank (Photograph 13).

Fish habitat potential is high for spring and summer seasons. McKinnon and Hnytka (1979) captured grayling, brook stickleback, longnose sucker and a small minnow species in the lower reaches of the river at the crossing of the Liard Highway. Potentially these species could travel to the upper reaches of the river to the Suncor winter road crossing for spawning and feeding. Overwintering habitat potential at the crossing is low; depths sufficient for overwintering were not recorded (maximum depth: 0.42 m; average depth: 0.32 m). Site-specific data is tabled in Appendix II.

Denedothada Creek

Denedothada Creek is surrounded by conifers and willows and is dominated by deep, slow-moving water (Photograph 14). The substrate is silt and there are submerged and emergent grasses and macrophytes (e.g., water plants like cattails). The banks of the creek up and downstream of the crossing are well vegetated but there is some slight erosion and root exposure (Photograph 15). The banks at the current crossing location are moderately well vegetated and moderately stable. The reach of stream surveyed was run (flat or unbroken flowing water) and pool habitat. A deep pool was observed approximately 20 m downstream of the crossing where a fallen log created an area of low flow; the pool was approximately 1.2 m deep.

It is likely that fish utilize Denedothada Creek on a year-round basis given that it is a medium sized tributary (> 7 m wet width) to the Netla River, a river known to contain fish. Lack of defined substrates such as cobble and gravel may preclude the presence of larger fish such as trout. Grassy shoreline areas (Photograph 14 and 15) may provide suitable spawning habitat for small fish such as dace. Overwintering potential near the crossing is high given the deep pool downstream of the crossing. Site specific data is presented in Appendix II.

6.5 Water Source Assessment

The proposed water source lake is near the headwaters of the Arrowhead River, a tributary to the Muskeg River. Based on the lake depth and fish resources in the region, overwintering fish may be present in this lake. One unidentified fry was observed at the mouth of the inlet stream. Beaver dams on the outlet stream may prevent the migration of species from the Arrowhead River to the lake or from the lake to the river at existing moderate to low flow rates. The beaver

dam height is 1.2 m and is likely a barrier to upstream and downstream travel for fish (Photograph 10).

Suncor proposes to use a maximum of 3100 m^3 to drill four new proposed wells and one well previously proposed in 1998 (J-77) and to construct winter access. The estimated water usage and subsequent water draw-down is provided in Table 2. The impact of the draw-down on lake level is discussed in Section 7.

Table 2
Estimated Water Usage and Subsequent Water Draw-down on the Proposed Water Source Lake

Water use	Quantity (m^3)	Draw-down of lake water level
Drilling	600 m^3 x 5 wells	
Access road construction	100 m^3 total	
MAXIMUM ESTIMATED WATER WITHDRAWAL ON LAKE	3100	**3 cm or 2.2% of the lake volume**

The results from the analysis of one water sample from the proposed water source lake are presented in Table 3. These results are to provide baseline data should any future monitoring be desired. The results are not considered further in this report

Table 3
Water Quality Result from Proposed Water Source Lake

Category	Parameter	Lake	WQ Guide*	Detection Limit
Physical	pH	7.31	6.5-9.0	0.05
	alkalinity (mg/L	42.1		0.3
	turbidity (NTU)	0.8	5[1]	0.1
	Conductivity (uS/cm)	87.2		0.3
	TSS (mg/L)	< 3	10	3
	TDS (mg/L)	96	500[1]	10.0
Major Ions	sodium (mg/L)	.56	<200 mg/L[1]	0.02
	chloride (mg/L)	1.0	250 mg/L[1]	0.2
	calcium (mg/L)	14.7	0.00006 mg/L	0.05
	sulphate (mg/L)	10		3
	potassium (mg/L)	.07		0.02
	magnesium (mg/L)	3.21		0.01
Nutrients	ammonia-nitrogen (mg/L)	<0.005	1.37-2.2 mg/L	0.005
	nitrate-nitrite (mg/L)	0.008		0.008
	total phosphorous (mg/L)	Data forthcoming		
	Mercury	< 0.01	0.1 µg/L	0.01
	Silver	< 0.3	0.1 µg/L	0.3
	Aluminum	< 30	5 µg/L	30
	Barium	24	500 µg/L	1.0
	Beryllium	< 2		2
	Bismuth	< 0.4		0.4
	Cadmium	< 0.3	0.02-1.8 µg/L	0.3
	Chromium	< 3	2.0 µg/L	3
	iron (mg/L)	0.16	300 µg/L	0.03
	Cobalt	< 1		1.0
	Cesium	< 0.4		0.4
	Copper	< 2	2-4 µg/L	2.0
	Lithium	< 3		3.0
	Manganese	4.0	<50 µg/L[1]	1.0
	Molybdenum	< 1		1.0
	Nickel	< 1	25-150 µg/L	1.0
	Lead	< 1	1-7 µg/L	1.0
	Selenium	< 10	1.0 µg/L	10
	Antimony	0.6		0.5
	Strontium	34.0		1.0
	Titanium	< 3		3
	Thallium	< 0.4		0.4
	Uranium	< 0.3	100 µg/L[1]	0.3
	Vanadium	< 1		1.0
	Zinc	< 10	30 µg/L	10

*Canadian Council of Ministers of the Environment- Canadian Water Quality Guidelines. Reported here are Guidelines for Freshwater and Aquatic Life unless otherwise noted as Guidelines for Drinking Water Quality[1] (1995).

** Parameters that are reported as ranges vary with pH, temperature or water hardness. Other guidelines were not reported because either there is scientific disagreement about the guideline or there is insufficient data to recommend a guideline.

7. IMPACT ASSESSMENT AND MITIGATION

7.1 Potential Environmental Implications

This section addresses potential impacts, proposed mitigation measures and residual negative impacts. Residual effects are those likely to remain after mitigation. The significance of any residual effects is determined based on:

- direction (+ve or -ve);
- geographic extent;
- duration and frequency;
- magnitude;
- confidence;
- reversibility; and,
- significance.

A description of each criterion is provided in Appendix III. As described below, it is predicted that the use of the proposed mitigation measures will mean that no significant residual environmental impacts will occur as a result of the project. In addition, all work connected with the project will comply with the recommendations and conditions identified in the Land Use Permit and other relevant permits and licenses.

7.2 Air and Noise

Stationary and mobile equipment used during the project will temporarily influence air and noise quality. Ice fog around the drilling and service rig may occur from water vapour in the exhaust of the power generator during periods of extreme cold. Generator emissions would produce CO_2, NO_x, and water vapour. Federal air quality standards will not be exceeded, as small generators will be used with approved emissions equipment. The stack height will be consistent with regulatory requirements. Emissions from vehicles and heavy equipment will not significantly increase normal background levels. As there are no permanent inhabitants in the immediate area, noise pollution is not anticipated to be a concern. Nevertheless, some wildlife species may be temporarily displaced during startup operations.

Residual effects will be negative, but short-term and very local. Air and noise impacts will be of low magnitude and of short duration. Residual effects on air and noise can be predicted with high confidence and will not be significant.

7.3 Soils and Vegetation

There is potential for surface disturbance during the drilling of the wells. However, effects on permafrost, soils and vegetation will be prevented, or at least minimized, through winter construction and use of methods as described in Section 6. Those methods emphasize use of snow, matting and/or blocking to level micro-relief variations, thereby avoiding disturbances to the organic mat and active layer.

Any timber that has been deemed to be salvageable or merchantable will be handcut and decked on the edge of the leases. The remaining standing timber and shrubs on the wellsites will be cleared with a cutter blade held at least 20 cm above the surface or it will be outfitted with mushroom shoes to avoid unnecessary gouging and admixing to the underlying organic/soil layer. A brush rake will then be used to push slash into windrows for eventual rollback at the end of the project. Frozen ground conditions will promote the top growth to break-off or be sheared-off at or above ground level. This will minimize the potential for soil attached to the roots to become dislodged and help maintain the integrity of the underlying organic and root mat. Clearing will be limited to the extent necessary to safely conduct drilling operations. Slash windrows will be located along the edges of the lease with a break maintained between it and the standing forest. Trampling slash may also be conducted to reduce volume and space occupation. No slash material will be pushed into or against standing timber adjacent to surveyed boundaries, or into natural drainages or wetland features. To protect the natural root mat, stumps and roots will only be grubbed where absolutely necessary and grubbing will be limited to within 2 m of the edge of the wellsite to prevent damage to adjacent, standing timber.

Prior to sump construction or use of a borrow pit, snow will be cleared over the area to be excavated and stored in windrows or incorporated into the compacted snow drilling foundation. Following the snow removal, the underlying organic/topsoil layer will be stripped and salvaged adjacent to the sump/pit or on the high side of the lease. This procedure will also be employed if any additional grading is required on the lease to accommodate drilling operations. Upon

abandonment, graded or excavated areas will be recontoured to a stable profile (backsloped) and the salvaged topsoil/organic material replaced. This may also include slash rollback. The sites will be visited during early summer when the snow has gone, to ensure that cleanup was complete. If necessary, a seed-mix appropriate for the area will be used to assist in re-vegetation efforts.

As previously mentioned, the drilling camp will be sited on a previously cleared area. Nonetheless, clearing of regenerating aspen and alder (generally <2m in height) on the site will be completed by walking down or shearing-off the small trees. Clearing methods will be consistent with those described previously for the wellsites. The camp was sited on relatively level terrain and compacted snow can be used to assist in site levelling.

Potential disturbance (e.g., tree removal) resulting from winter access construction will be minimized through the exclusive use of existing cutlines for access routing. Construction of the temporary access will, where required, consist of "walking down" and/or shearing off standing timber and regenerating flora within the right-of-way and windrowing the generated slash along each edge, but not into adjacent standing timber. This operation will be followed by the construction of a compacted snow and/or ice road that is consistent with the methodology and guidelines identified in the DOT Handbook (GNWT 1993), and incorporation of any other requirements contained in the Land Use Permits. Conducting the drilling program during frozen ground conditions, combined with the protective cushion or buffer created by a packed snow cover over the right-of-way, will help mitigate soil compaction from equipment and vehicles, and minimize the potential for surface rutting.

Residual effects on soils and vegetation will be negative, but very local, short-term and of low magnitude. They can be predicted with high confidence and are reversible in the medium term at the end of the project.

7.4 Wildlife

The project area provides year-round habitat for numerous wildlife species and seasonal habitat for many other species, especially bird species, during the summer months. Wildlife can potentially be impacted directly through habitat loss and indirectly through disturbance. The very

small footprint of the project means that little direct habitat loss will occur. Likewise, the short duration of the project means that disturbance effects will be short term. The drilling program will be completed outside of sensitive breeding, nesting and rearing periods for wildlife. However, depending on the severity of the winter (i.e., temperature, wind and snowfall accumulation), the project may overlap with sensitive late winter periods for ungulates.

As discussed in previous sections, disturbance to natural landscapes (e.g., habitat) was minimized during the planning phases of the project by avoiding sensitive terrain features (waterbodies, steep topography, *etc.*) and maximizing the use of previously disturbed areas and corridors. This, in turn, will avoid further disturbance of the various habitat types presently encountered in the project area. In addition, the terrain and vegetation protection measures outlined in previous sections (e.g., limited grading and tree clearing) are directly related to protecting habitat integrity (e.g., vegetation cover) and enhancing long-term regeneration capability. Nonetheless, the short- to medium-term modification of approximately 8.6 ha of natural habitat (clearing of four new wellsites, two borrow pits and widening of the proposed access routes) will occur as a result of the project.

Moose and woodland caribou find seasonally important habitat throughout the project area. During the proposed drilling program, many of the moose will have likely migrated to favoured winter habitats, namely the islands and floodplains associated with the Liard River, and therefore will be clear of the project. Black spruce forest with a lichen ground cover provides important habitat for caribou in winter. Such habitat occurs in widely scattered patches in the project area. Current habitat loss associated with the proposed exploration activity will be insufficient to affect the regional population. No hunting will be allowed by company employees in the project area. Moreover, completion of the project will not result in increased hunting pressure through new access to remote areas as only existing access routes will be used.

No raptor nests were identified on or near any sites or access corridors associated with the project. Further, tree clearing will be minimized to limit potential habitat loss such as nesting and perch sites. Suncor's project schedule will ensure activities are completed prior to the arrival of most nesting birds in the spring.

Bear dens are difficult to locate, but none were identified in the vicinity of the project. In the unlikely event that a bear den is encountered during the drilling program, the local GNWT Renewable Resources officer will be notified, and the appropriate mitigation adopted.

Upland furbearers will generally use areas supporting mature forest cover during the winter months. To limit disturbances and habitat loss, project components were sited and routed to maximize the use of existing disturbance corridors and patches. Every effort will be made to avoid destroying traps or snares during construction of the access route. The GNWT Renewable Resources Officer will be kept informed of project scheduling so that they can contact trappers that have lines set in the project area.

Beaver activity was noted throughout the project area. Impacts to potential beaver habitat will be mitigated by minimizing ground disturbances, minimizing drawdown at the water source lake, avoiding wetland complexes to the extent practical and maximizing the buffer zone between wetlands and the wellsites or access routes.

Vehicles and equipment used during the drilling program pose some potential for wildlife harassment in winter, particularly to caribou and moose. Affected species would, to some degree, become accustomed to activities and the accompanying source of noise and light. Increased traffic in the project area may enhance the potential for wildlife collisions, as animals will likely use the compacted winter road surface for travel, especially if there is a deep snow cover. Consequently, drivers will be instructed to maintain safe and appropriate speeds, and to be aware of potential encounters with wildlife. Caribou, moose and other wildlife, startled by vehicle headlights at night, may continue to proceed down the road corridor. Drivers will not herd or chase animals down the road and, as an avoidance measure, will be advised to stop and turn headlights off for a moment, to allow animals to disperse off the road. Further, snow windrows or embankments created adjacent to the winter access roads by snow clearing operations will have gaps (i.e., 8 m width) at regular intervals (i.e., 250 m to 500 m) and at identified trails to facilitate wildlife movement across the access route and to provide escape routes off the road.

Construction and drilling crews will be instructed to not harass wildlife in any manner, and no dogs or firearms will be allowed on the project. Further, to discourage the attraction of scavenger species, all sites associated with the project will be kept free of litter and garbage, and food waste

will be placed in secured containers, which in turn, will be either transported to an approved disposal location or incinerated on-site. It is recommended that kitchen sumps be treated with lye or lime to render them unattractive to scavenging wildlife species such as wolverines and wolves. Safety in Bear Country practices will be followed in the spring as a contingency in the unlikely event that bears are encountered. GNWT literature in this regard will be distributed to staff.

Residual effects to wildlife will be negative, but short-term and local in extent. Impacts will be of low magnitude and can be reversed in the short term at the end of the project. Residual effects can be predicted with high confidence and will not be significant.

7.5 Fish

The access route traverses several small intermittent drainages, unnamed creeks, as well as the Netla River and Denedothada Creek. The construction of temporary ice bridges and snow ramps may increase the potential for short-term impacts at the crossing points and immediate downstream areas. However, these impacts are not expected to be significant and are not expected to have long-term, detrimental impacts on the fishery or fish habitat within watercourses crossed by the winter access.

Potential Winter Road - Stream Crossing Impacts

Overwintering habitat has the highest potential to be affected by winter road construction and operation. Denedothada Creek appears to have suitable overwintering habitat for fish. Sediment that is accidentally introduced into the drainage during ice or snow bridge construction could be released in the spring and, consequently, pose a potential impact on spawning habitats downstream of the crossing. As described below, appropriate construction techniques and measures will be employed to mitigate the potential for such releases to occur.

To mitigate impacts, special attention will be made to avoid introducing foreign material (i.e., slash, debris, rocks, soil, *etc.*) into the stream. Only clean snow and ice will be placed in the channels to facilitate winter road crossings. Should any soil or other materials be inadvertently introduced into the watercourse, they will be removed as soon as possible. In addition, the crossing itself will either be removed completely, or a "V" notch placed in the middle of the snow fill or ice bridge to allow flow, before the rest of the fill is removed during spring breakup.

During fill removal, equipment operators will be careful to avoid gouging or otherwise disturbing stream banks or stream bottoms.

Currently the stream banks of the two main crossings along the access road (Netla River and Denedothada Creek) are stable. Construction staff will monitor snowfall and construction activities to ensure bank stability is preserved. However, the stream banks of these crossings are soft at the water's edge. Frozen conditions and snow cover should allow crossing without disturbance or erosion of these banks, nonetheless, if there is inadequate snow cover to install snowfill bridges to the Department of Transportation standards (GNWT 1993) and to avoid impact on the stream banks, alternate crossing structures will be utilized (e.g., timber bridge). If a temporary bridge is installed, bridge abutments would be set back from stream banks. Should alternate crossing structures be required, site-specific crossing structures would be installed based on consultation with the DFO staff in Yellowknife.

As mentioned earlier, there are potential impacts of stream crossings on hydrology that include increased stream sediment loading and increased erosion rates (i.e., stream-bed scour). In addition to complying with the methodology and guidelines identified in the DOT Handbook (GNWT 1993), the following mitigation measures would be implemented during stream crossing construction to minimize impacts and sediment entrainment to the receiving streams:

- Adherence to the construction schedule to minimize activity in or at the stream, and any potential impacts on water quality and fish habitat.

- Hand clearing (to ground level) will be conducted within 5 m of the top of the drainage banks and, to reduce the loss of overhanging canopy; only the minimal width necessary for safe operation of equipment and crossing installation will be cleared. This will also apply to any extra work space cleared near the steam crossing (however, extra space and extra clearing is most likely not required).

- Cleared trees/shrub material will be stored in slash piles away from the drainage banks and no debris or sawdust will be placed in the channel.

- Grading adjacent to the channel will be limited to that required to create a safe work space.

- If there is running water in any streams during construction, particularly at the Denedothada Creek crossing, silt screens will used down gradient of the crossing to prevent possible travel of silt downstream; alternate crossing structures like temporary bridges would be considered if open water was observed at the crossing (Note: no open water was observed during 1997 or 1998/99 winter access construction).

- If banks of a drainage are disturbed during construction, a pre-disturbance bank profile will be re-established which may include using rock rip-rap, organic cribbing, bundled logs, or other stabilization measures.

- Instream work with heavy machinery will be done in winter, when less alteration to stream substrate can occur due to frozen ground conditions.

- Streambed material (boulders and cobble) will not be removed at any stream crossings.

- Crossings will be monitored during the spring runoff period and high rainfall events to ensure integrity.

Potential Water Quality Impacts

Fuel spills or leaks

Fuel spills or leaks constitute a potential hazard to surface waters and aquatic organisms. Stationary storage tanks will be bermed and the dike and floor area will be lined with an impermeable liner or medium (e.g., clay) to capture any accidentally released product. All fuel storage tanks will be located on a well-drained and stable area, away from wetlands, channels or other hydrological features. During construction and operations, it is important that vehicles and heavy machinery are not refuelled within 100 m of the watercourse crossing sites, and vehicles

are routinely checked for oil and fuel leaks. Absorbent pads and/or socks will be available to pick up any spilled fuel or lubricant.

Only one wellsite is located in the vicinity of a water course. Wellsite B-06 is located more than 100 m from an inlet stream to the water source lake (Figure 2 and Figure 5, Photograph 8). It is possible that runoff or spills from the lease could enter the watercourse and consequently enter the lake. However, a ridge on the southwest of the proposed B-06 lease would likely prevent spring runoff from flowing to the watercourse (Photograph 8). To prevent spills or leaks that may enter the inlet stream near B-06, the following precautions will be taken:

(1) The lease boundaries will be bermed to prevent runoff from the lease from draining towards the watercourse. Should the construction supervisor deem that the berm is insufficient, the south east corner, (bottom right corner of Figure 5, Photograph 8) of the lease will be "cutoff" and not constructed. This would move the lease boundary farther away from the watercourse.

(2) The fuel and mud storage area will be located on the north-west corner of the lease, the corner furthest from the watercourse.

(3) A sump will not be constructed on the lease. A remote sump, north-west of the watercourse would be utilized in place of an on-site sump.

Silt deposition or pollutants

The introduction of silt or pollutants into a waterbody or drainage from runoff may have deleterious effects on fish habitat, fish eggs and the fish themselves. The Fisheries Habitat Protection Guidelines (1985), which were published by the Forestry, Lands and Wildlife, Fish and Wildlife Division, Edmonton, Alberta, are to help mitigate deleterious effects on aquatic life. These guidelines are based on the Federal Fisheries Act and the recommendations below are from the Guidelines No. 2 - Wellsites for Oil and Gas Industry.

1. Any drilling fluids or fluids generated as a result of drilling be controlled in such a manner that it is not allowed to enter a watercourse. Typically, this is controlled with a berm around the perimeter of the lease site.

2. If access is on the low side of the lease, the access shall go over and not through the berm.

3. The sump should be placed as far as possible away from any watercourse, waterbody or runoff channel.

4. It is prohibited to deposit any deleterious materials on the ice or in the water of a watercourse or waterbody.

5. At no time should any sump fluid, treated or otherwise, be discharged to surface waters.

Potential Impact on Water Source Lake

One potential concern with draw-down of the water level is that the lake becomes so shallow that it freezes to the bottom and fish cannot overwinter. Similarly, beaver habitat could be affected by lowering of the water level. The problem for fish can be magnified if fish cannot travel out of the lake to other appropriate overwintering habitat. In the proposed water source lake, fish likely cannot travel downstream to overwinter due to the barrier created by the beaver dams (>1 m in height on the downstream and 15 cm on the upstream side) and low flow (trickling over the dam) at the lake outlet (Photograph 10; Figure 7).

A second concern is loss of littoral zone habitat (lake shallows) at low water levels in spring. Shallow, weedy areas at lake edges are critical areas for spawning by small fish in the vegetation, feeding habitat for young fish, cover for small fish from predators, or as habitat for ambush predators like northern pike.

Based on lake volume calculations (Section 6), the effects of drawing a maximum of approximately 3100 m^3 of water on the lake level will be insignificant. Total draw-down of lake level was conservatively estimated to be 3 cm of the lake depth (2% of the lake volume). The lake is 2 m deep on average and the littoral zone of the lake is 90 cm deep on average. A maximum, worst-case scenario draw-down of 3 cm (under the ice) would have no effect on fish habitat or overwintering fish given the depth of the littoral zone and the overall depth of the lake.

The loss of 2% of lake volume will not have a significant effect on lake hydrology; the lake will recharge in the spring.

The inlet stream of the lake was approximately 1-2 m deep; draw-down of the lake level is not expected to impact this stream. The outlet stream did not have a measurable flow due to the presence of beaver dams; draw-down of the lake level should not impact beaver habitat. It is likely that the outlet stream freezes at the mouth and along the stream in locations less than 1 m deep.

Actual water use is expected to be below the maximum expected volumes required because water use will be staggered through the drilling season (fall and winter) as wells are drilled, and water will not be drawn all at once. The potential for impact would therefore be further reduced. Suncor will de-water their drilling muds between wells and reuse the extracted water and muds. Recycling of water will reduce the overall amount of water required from the lake. Suncor will use water pumps with intake screens of 5 mm that will prevent potential entrainment of overwintering fish.

Residual effects will be neutral, short-term and of local extent. The residual effects on fisheries can be predicted with high confidence and are not significant.

7.6 Heritage Resources

A search for registered archaeological sites in the project area was conducted by the Prince of Wales Northern Heritage Center in 1998, and none were identified. The effects of the project on known heritage resources are not significant and can be predicted with high confidence; residual effects are neutral. In the event that previously unknown heritage resources are discovered during lease preparation, the Prince of Wales Northern Heritage Center will be notified and consulted for advice on appropriate mitigation.

In addition to the archaeological search, on-going consultation has occurred with the Fort Liard and Nahanni Butte Bands with regard to the access route and wellsite locations. The aim of this consultation was to divert project elements from areas of significance to the Bands.

Mr. F. Betsaka of Nahanni Butte who uses traplines in the project area indicated that he did not have any concerns about the locations of the wellsites (F. Betsaka, pers. comm, Dec. 1998).

7.7 Socio-Economic Impacts

Hunting and trapping are the primary economical and cultural activities in the project area. With implementation of the mitigation measures discussed above, impacts to wildlife habitat are expected to be minimal and consequently residual impacts to socio-economic factors will be short-term and of local extent.

A number of positive socio-economic impacts are predicted to be associated with this short-term project. Suncor is committed to developing a mutually beneficial relationship with residents in the vicinity of the 2000 winter drilling program.

7.8 Important Species Involvement

Endangered or threatened species in the project area are listed in Section 6. Based on the above discussion of potential impacts and the proposed mitigation, there will be no significant residual impacts on any of the five COSEWIC-listed wildlife species that may utilize habitat types in the project area on a seasonal or year-round basis.

7.9 Cumulative Effects Assessment

As part of the assessment of environmental effects, MVRMA requires the consideration of any cumulative effects likely to result from the project in combination with other projects or activities that have been or will be carried out. The MVRMA and subsequent guidelines do not prescribe Cumulative Effects Assessment (CEA) methodology in any detail. Although the Canadian Environmental Assessment Act (CEAA) does not define cumulative environmental effect, a definition is presented in a CEAA reference guide (Federal Environmental Assessment Review Office 1994) and is adopted for the purposes of this assessment:

> *The effect on the environment which results from effects of a project when combined with those of other past, existing and imminent projects and activities. These may occur over a certain period of time and distance.*

The concept of triggering of threshold effects is important to CEA and is based on the notion that systems are resilient to certain amounts of perturbation, but beyond that, large changes to the system can occur. Environmental thresholds are often proposed as the basis for defining impact acceptability, which is attractive for environmental impact assessments. It is, however, problematic, in that determining what the threshold limits are for most environmental components remains largely theoretical.

Related to thresholds, and of direct relevance to cumulative effects assessment at the project level, is the concept of incremental effects. This addresses the potential for several small effects on a particular valued ecosystem component, which when combined, can result in a significant effect. These incremental effects can arise from a variety of sources including multiple activities from the same project.

Potential cumulative effects that could result from the proposed Suncor 2000 drilling project include:

- wildlife habitat loss;
- wildlife disturbance during construction and drilling operations;
- increase of access into a remote area; and,
- emissions to the atmosphere.

As discussed above and summarized further in Section 7; no significant residual impacts will remain after mitigation, when impacts are assessed individually. When all impacts from this project are compared for multiple effects on each environmental feature, there is little potential for significant additive or synergistic effects. However, it is possible that a cumulative effect may arise in relation to this project. Forestry activities (i.e., logging) have occurred on the periphery of the project area. A cut-block at the edge of the Liard Highway (Km 90) has been planted by the Fort Liard Band and the GNWT (M. Labine, pers. comm.). The construction and use of the winter access into the wellsites was routed north of this cut-block and thus new seedlings will not be disturbed. The only other existing developments in the region are seismic cutlines, the Liard Highway, and existing Paramount Resources wellsites M-23 and P-57. It is unknown if Paramount Resources is re-entering these wellsites. However, to mitigate impacts, and to

concentrate activities to one disturbance corridor, Suncor and Paramount would share a common access route to their respective wellsites.

The above four potential cumulative effects are considered in turn:

- Wildlife habitat loss is confined to the small footprint of each wellsite (~1.5 ha), campsite (0.24 ha), one or two borrow pits (0.40 or 0.64 ha) and the widening of existing seismic lines for access to wellsites (1.5 ha). No additional projects or activities exist to compound these losses, aside from the existing Paramount P-57 and M-23 wells, both of which use or will use the same access route. No significant residual cumulative effects will occur.

- Wildlife may be disturbed by noise, sound and emissions combined. However, all are of low impact, local extent and short duration. No significant residual cumulative effects will occur.

- Temporary winter access will be exclusively routed on existing disturbance corridors (cutlines). Thus, no cumulative effects will occur with respect to access. Proper winter crossing construction techniques will ensure that there is not effect on fish habitat at the crossings.

7.10 Residual Impacts

Table 4 summarizes potential impacts, mitigation measures and predicted residual impacts as discussed above. It is predicted that the use of proposed mitigation measures will mean that no significant residual environmental impacts will occur as a result of the project.

Table 4
Summary of Potential Impacts, Mitigation Measures and Residual Impacts

POTENTIAL IMPACT	MITIGATION	RESIDUAL IMPACTS
Well Locations and associated support sites		
Wildlife habitat loss and disturbance with reduction in opportunities for hunting, fishing and trapping.	Workers will be educated in minimizing disturbance, harassment and attraction of wildlife.	Insignificant, as a very limited area of new disturbance is required.
Soil and vegetation disturbance.	Winter construction will minimize impacts; survey done to fine-tune plans; earth and compacted snow pads to protect the surface and permafrost; borrow pits will be reclaimed.	Insignificant, vegetation and soil disturbance limited to small construction footprint.
Waste and/or spills could affect fish or wildlife.	Waste disposal and spill contingency plans.	Insignificant.
Ice fog and emissions from generators.	Standard emissions equipment.	Insignificant, very limited in time and area.
Noise from generator engine.	Small engines with appropriate mufflers.	Insignificant, short-term.
Camps, historic sites or archaeological sites may be impacted.	Database review and consultation showed no requirement for additional surveys.	Insignificant.
Access		
Wildlife dens, nest sites, habitat could be impacted.	Surveys took place before construction; existing disturbance corridors used for access.	Insignificant.
Large mammal movements and hunting opportunities may be affected.	No barriers will be created; gaps placed in slash and snow windrows to facilitate movement.	Insignificant; some caribou and moose may alter their movements to use access roads. Use of existing cutlines will minimize the amount of new access created for hunting.
Soil and vegetation disturbances.	Existing cutlines used for access; winter construction will mitigate impacts; DOT (GNWT 1993) and Land Use Permit conditions will be followed. Compacted snow and ice roads will protect underlying vegetation. Clearing requirements minimal and frozen ground conditions will permit clean shearing of any standing timber.	Insignificant.
Fish may be impacted, especially from sediment washing into creeks.	Clean snow fill to be used for temporary crossing and will be removed before spring melt; crossings are located at previously used sites	Insignificant.

8. EMERGENCY RESPONSE PLAN

To respond in a safe and timely manner to emergency situations that may affect the health and safety of the public, employees. facilities and the environment, Suncor has prepared a site-specific Emergency Response Plan (ERP) for their activities in the project region. The ERP is further supported by Suncor's Health, Safety and Environment Manual.

The ERPs describe the procedures and methods that will be implemented in the event of an emergency such as a well blow out, fire or liquid spill.

In conjunction with the ERPs, the proponent will ensure staff and associated contractors are adequately trained to deal with emergency situations. Further, any other relevant industry standards pertaining to safety and environmental protection will be incorporated into the operation of the project.

9. CLEAN-UP, RECLAMATION, DISPOSAL AND ABANDONMENT

Following completion of drilling operations, all equipment, materials and other debris from the project will be removed before spring breakup and transported to Fort Liard. To maintain the environmental integrity of the project area, all sites associated with the drilling program will be stabilized and reclaimed to a condition that will mitigate residual impacts, promote re-vegetation and not impair pre-disturbance land use activities.

By scheduling drilling activities during the winter months and employing minimal disturbance drilling techniques, it is anticipated that several of the potential negative impacts commonly associated with programs of this nature will be mitigated. Consequently, reclamation requirements at the wellsites will be minimal.

In general, if compacted snow pads are used to support drilling equipment and structures, they will be scoured and scraped as necessary to ensure no impact occurs to the ground surface following thawing of the pad.

Drilling and camp sump locations will be restored in a manner suitable to DIAND. Once issued, DIAND Land Use Permit conditions will already have been reviewed by Fort Liard, Nahanni Butte, GNWT departments and other relevant federal departments (i.e., Environment Canada and DFO). The proponent is proposing to use the standard mix, bury and cover method, whereby the excavated spoil from the sump pit will be mixed with drilling fluids, followed by replacement or capping of the previously stripped organic/topsoil cover.

The sump edges will be overlapped during backfill operations to mitigate the possibility of post-abandonment subsidence of the fill material. Before backfilling, any snow cover on the sump surface and salvaged material piles will be removed to the extent feasible, as snow sandwiched between fill lifts or entrained in fill material may promote subsidence during thaw periods. To further mitigate post-abandonment subsidence, backfill material will be compacted during each lift replacement and a cap will be created over the sump (i.e., 1 m to 1.5 m in height) to compensate for any settling and to divert surface water away from the site. Following backfill operations, the sump location will be recontoured as necessary to promote site stability, which will include rollback of any salvaged slash or other organic debris. The rollback, combined with

cleat imprints from heavy equipment, will provide a rough micro-topography that helps plant re-establishment by creating micro-habitats and increases plant biodiversity by producing a variety of microclimate habitats. Seeding will take place at the end of the project, however site visits will occur in the summer to evaluate reclamation work and undertake remedial seeding as necessary.

If the borrow pit is used at the wellsites, it will be recontoured and/or terraced as necessary to promote site stability and all cuts and fills will be backsloped to a slope ratio of not less than 3:1, or as required in Land Use or Quarry Permits. Slash rollback and seeding for the borrow pit would be as described above for sumps.

Should any wells prove to be viable, the well will be completed and tested during the drilling program and subsequently shut-in with no additional site development during the exploration phase. Conversely, if any of the wells prove unsuccessful, downhole abandonment will be conducted according to National Energy Board (NEB) requirements immediately following drilling operations.

10. CLOSURE

We trust this report presents the information you require. Should any portion of the report require clarification, please do not hesitate to contact the undersigned.

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Environmental Assessment Biologist

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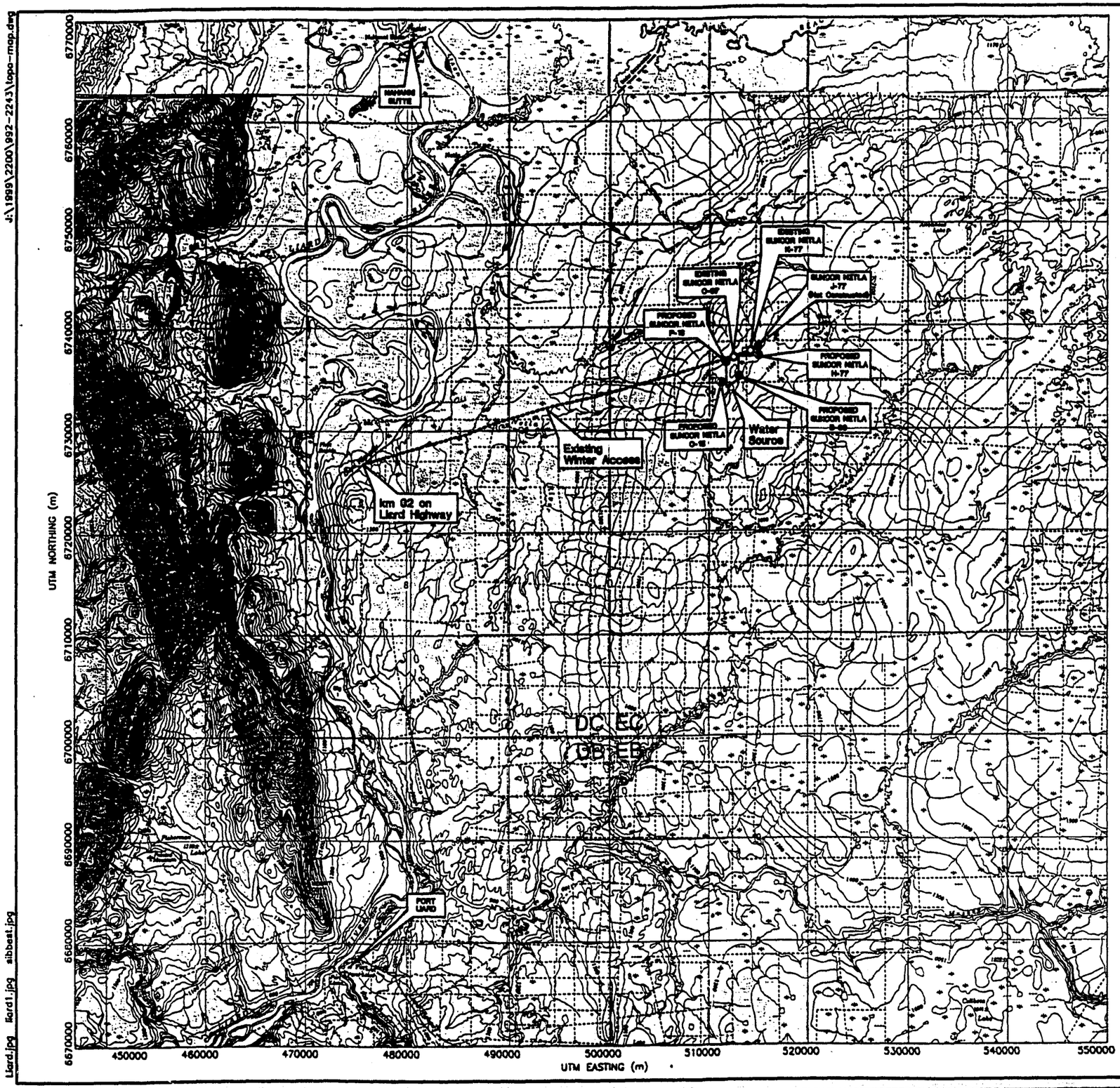
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liard.jpg liard1.jpg sibbest.jpg

LEGEND

- PROPOSED WELLSITE LOCATION
- EXISTING WELLSITE LOCATION
- LOCATION OF WELLSITE NOT CONSTRUCTED
- EXISTING WINTER/SEISMIC ACCESS
- PROPOSED SEISMIC ACCESS

REFERENCE

BASE MAP PROVIDED BY THE CANADA CENTRE FOR MAPPING (OTTAWA) DEPARTMENT OF ENERGY, MINES AND RESOURCES. 95B (FORT LIARD) AND 95G (SIBBESTON LAKE) NAD 27 UTM ZONE 10.

0 5 10 15 20km

SCALE 1:400,000

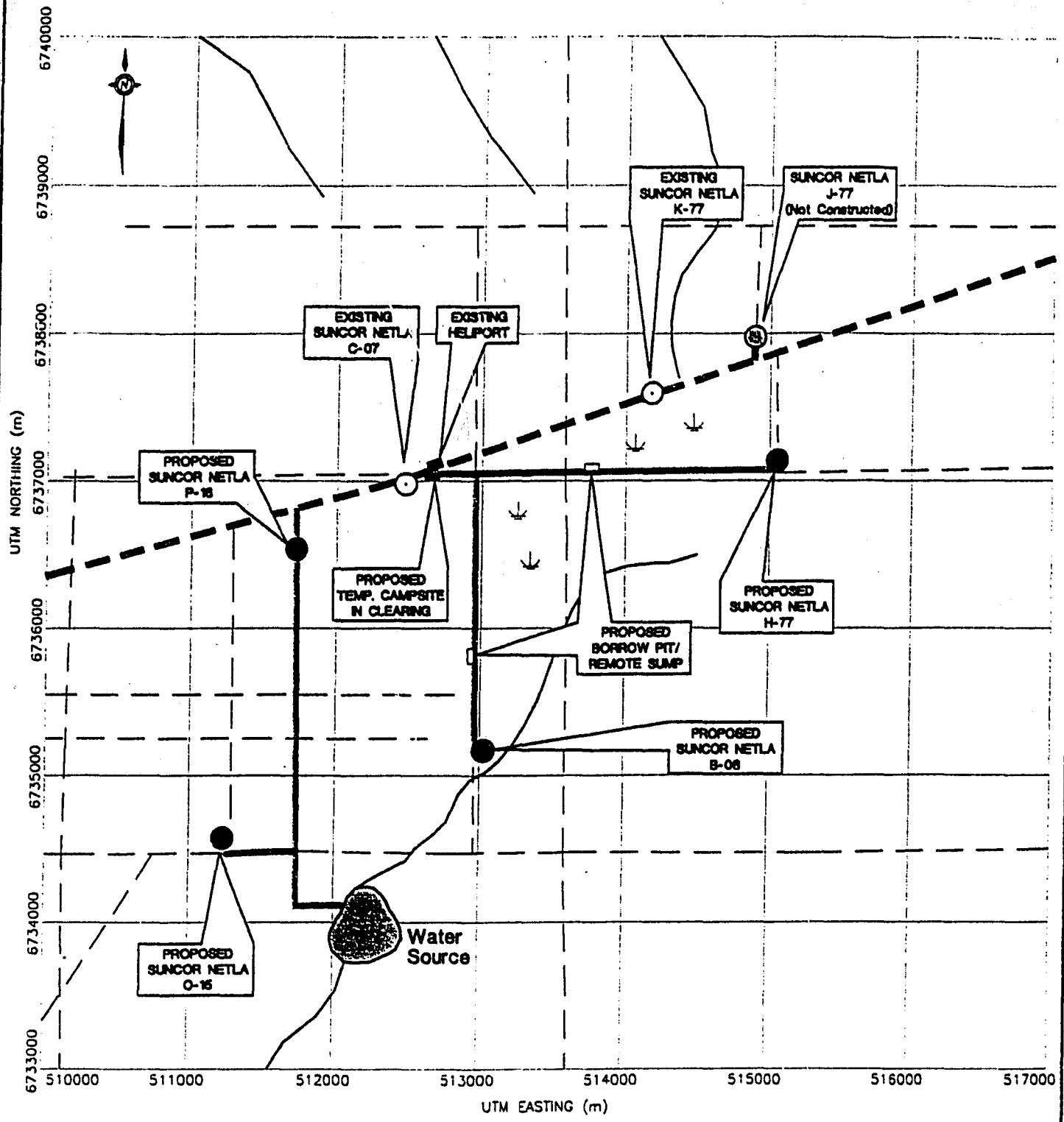
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SUNCOR ENERGY

REGIONAL STUDY AREA

DRAWN: RFM	APPROVED: CS	DATE: 3 SEPT. 1999
PROJECT: 992-2243		FIGURE: 1

J:\1999\2200\992-2243\topo-sites.dwg



0 500 1000 1500 2000(metres)

SCALE 1:40,000

LEGEND

- PROPOSED WELLSITE LOCATION
- EXISTING WELLSITE LOCATION
- LOCATION OF WELLSITE NOT CONSTRUCTED
- EXISTING WINTER/SEISMIC ACCESS
- PROPOSED SEISMIC ACCESS
- EXISTING SEISMIC LINE
- MARSH
- CREEK

REFERENCE

BASE MAP PROVIDED BY THE CANADA CENTRE FOR MAPPING (OTTAWA) DEPARTMENT OF ENERGY, MINES AND RESOURCES. 95B (FORT LIARD) NAD 27 UTM ZONE 10.

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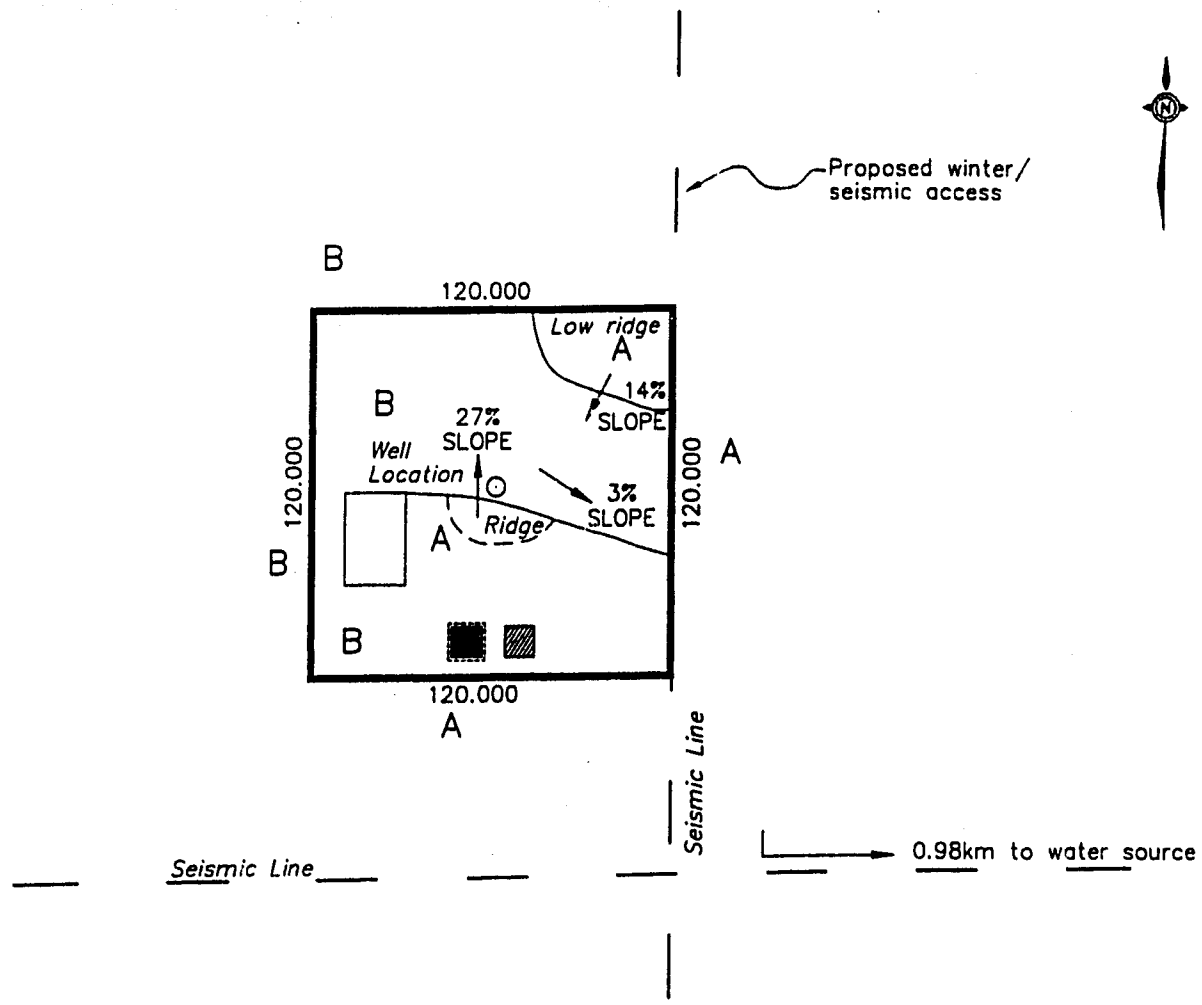
SUNCOR ENERGY

SUNCOR NETLA DRILLING LOCATIONS

DRAWN: RFM	APPROVED:	DATE: 3 SEPT. 1999
PROJECT: 992-2243		FIGURE: 2

Liard2.jpg

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Proposed drilling sump
(20m X 30m X 3m deep)

Proposed temporary fuel storage
(10m X 10m with 1m berm)

Proposed drilling mud storage
(10m X 10m)

A. Vegetation

Trees: Black spruce
(dominant to 15m)
White birch
Shrubs: Bog birch
Willow spp.
Green alder
Prickly rose
Bog cranberry
Labrador tea
Forbs: Bunchberry
Feather moss
Reindeer lichen

Wildlife

Moose (tracks)

B. Vegetation

Trees: Similar to A but more open
Shrubs: Similar to A but denser
Huckleberry
Cinquefoil
Forbs: Similar to A
Coltsfoot
Bilberry
Horsetail

0 25 50 75 100 125m

SCALE 1:2500

REFERENCE

DRAWING BASED ON FILES SUPPLIED
BY McELHANNEY ASSOCIATES
JOB # 3111-07350WS DATED 99-08-18

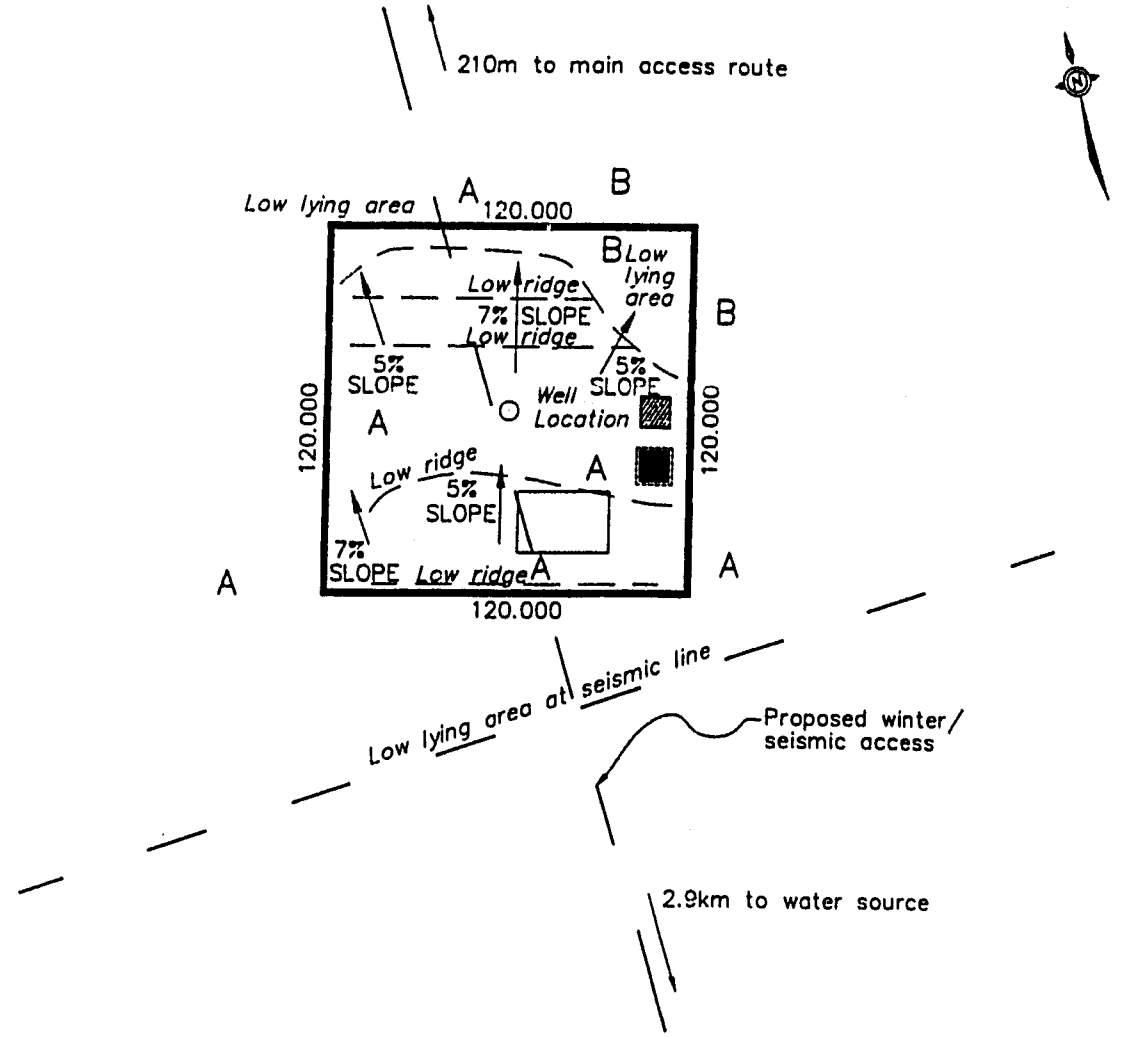
Golder Associates

SUNCOR ENERGY

SUNCOR NETLA
WELL LOCATION UNIT O SECTION 15

DRAWN: GP	APPROVED: CS	DATE: 3 SEPT. 1999
PROJECT: 992-2243		FIGURE: 3

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Proposed drilling sump (20m X 30m X 3m deep)

Proposed temporary fuel storage (10m X 10m with 1m berm)

Proposed drilling mud storage (10m X 10m)

A. Vegetation

Trees: Black spruce (dominant to 15m)
White birch (codominant to 15m)
Jack pine
Shrubs: Green alder
Willow spp.
Forbs: Bunchberry
Bearberry
Horsetail
Feather moss
Club moss
Reindeer lichen

Wildlife

Caribou (tracks), bear (tracks) and red squirrel (nest and feeding log)

B. Vegetation

Trees: Black spruce (more open, trees to 8m)
Shrubs: Green alder
Willow spp.
Bog birch
Labrador tea
Prickly rose
Forbs: Bog moss
Reindeer lichen
Horsetail
Bog cranberry
Cloudberry

Wildlife

Moose (tracks)

0 25 50 75 100 125m

SCALE 1:2500

REFERENCE

DRAWING BASED ON FILES SUPPLIED BY McELHANNEY ASSOCIATES
JOB # 3111-07349WS DATED 99-08-17

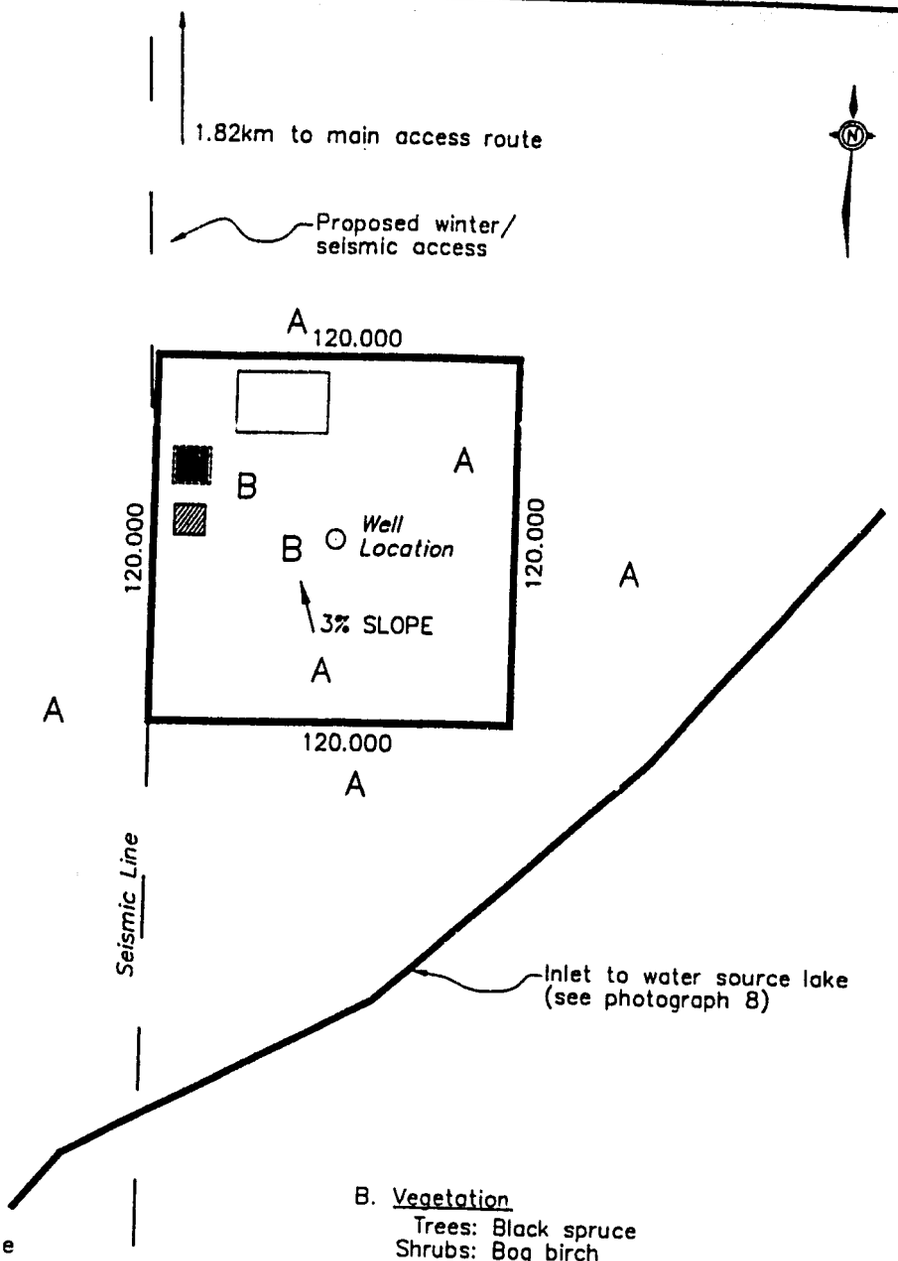
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SUNCOR NETLA
WELL LOCATION UNIT P SECTION 16

DRAWN: GP	APPROVED: CS	DATE: 3 SEPT. 1999
PROJECT: 3,2-2243		FIGURE: 4

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Proposed drilling sump (20m X 30m X 3m deep)

Proposed temporary fuel storage (10m X 10m with 1m berm)

Proposed drilling mud storage (10m X 10m)

A. Vegetation

Trees: Black spruce (dominant to 15m)
Tamarack (codominant to 15m)
Shrubs: Willow spp.
Bog birch
Labrador tea
Bog blueberry
Forbs: Horsetail
Bearberry (2 species)
Sedge
Bog moss

Wildlife

Bog lemming (tunnels), red squirrel (nests), wolf (scat), moose (pellets), coyote (tracks) and caribou (tracks)

B. Vegetation

Trees: Black spruce
Shrubs: Bog birch
Labrador tea
Bog blueberry
Forbs: Cloudberry
Horsetail
Reindeer lichen
Feather moss

Wildlife

Moose (tracks) and caribou (tracks)

0 25 50 75 100 125m

SCALE 1:2500

REFERENCE

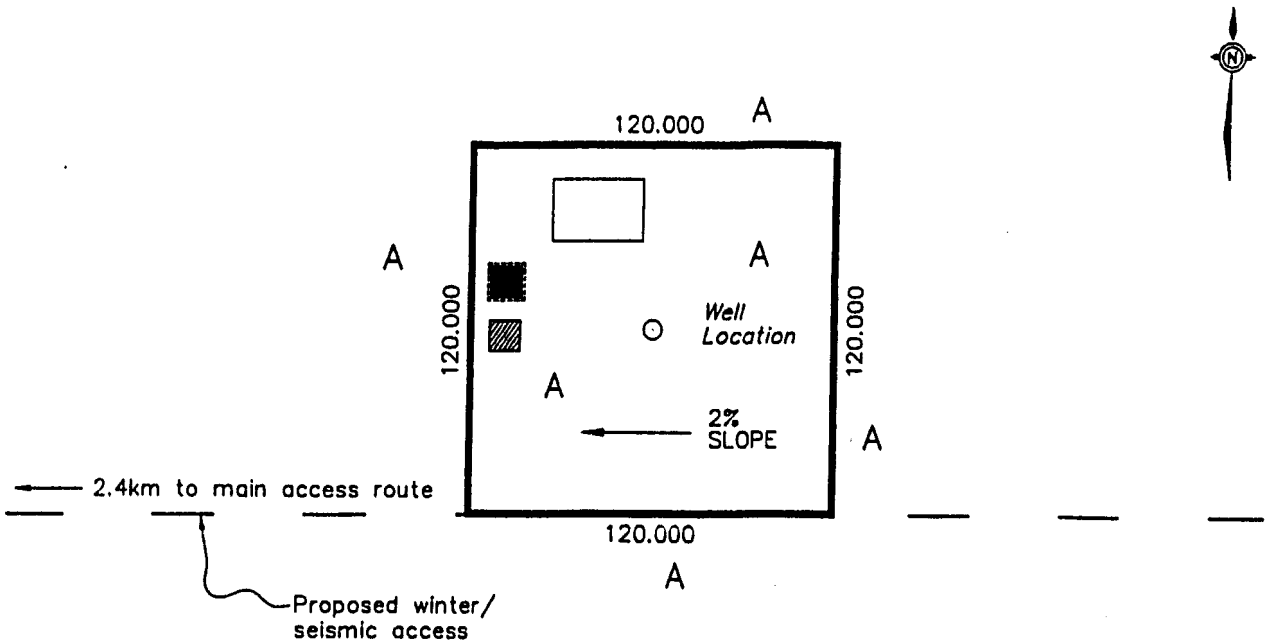
DRAWING BASED ON FILES SUPPLIED BY McELHANNEY ASSOCIATES
JOB # 3111-07305WS DATED 99-07-21

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SUNCOR NETLA
WELL LOCATION UNIT B SECTION 06

DRAWN: GP	APPROVED: CS	DATE: 3 SEPT 1999
PROJECT: 992-2243		FIGURE: 5

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Proposed drilling sump
(20m X 30m X 3m deep)

Proposed temporary fuel storage
(10m X 10m with 1m berm)

Proposed drilling mud storage
(10m X 10m)

A. Vegetation

Trees: Black spruce
(dominant to 10m)
Tamarack
Shrubs: Labrador tea
Forbs: Horsetail
Bearberrry
Cloudberry
Bog moss
Feather moss
Reindeer lichen

Wildlife

Moose (tracks) and
red squirrel (nests)

0 25 50 75 100 125m

SCALE 1:2500

REFERENCE

DRAWING BASED ON FILES SUPPLIED
BY McELHANNEY ASSOCIATES
JOB # 3111-07306WS DATED 99-07-22

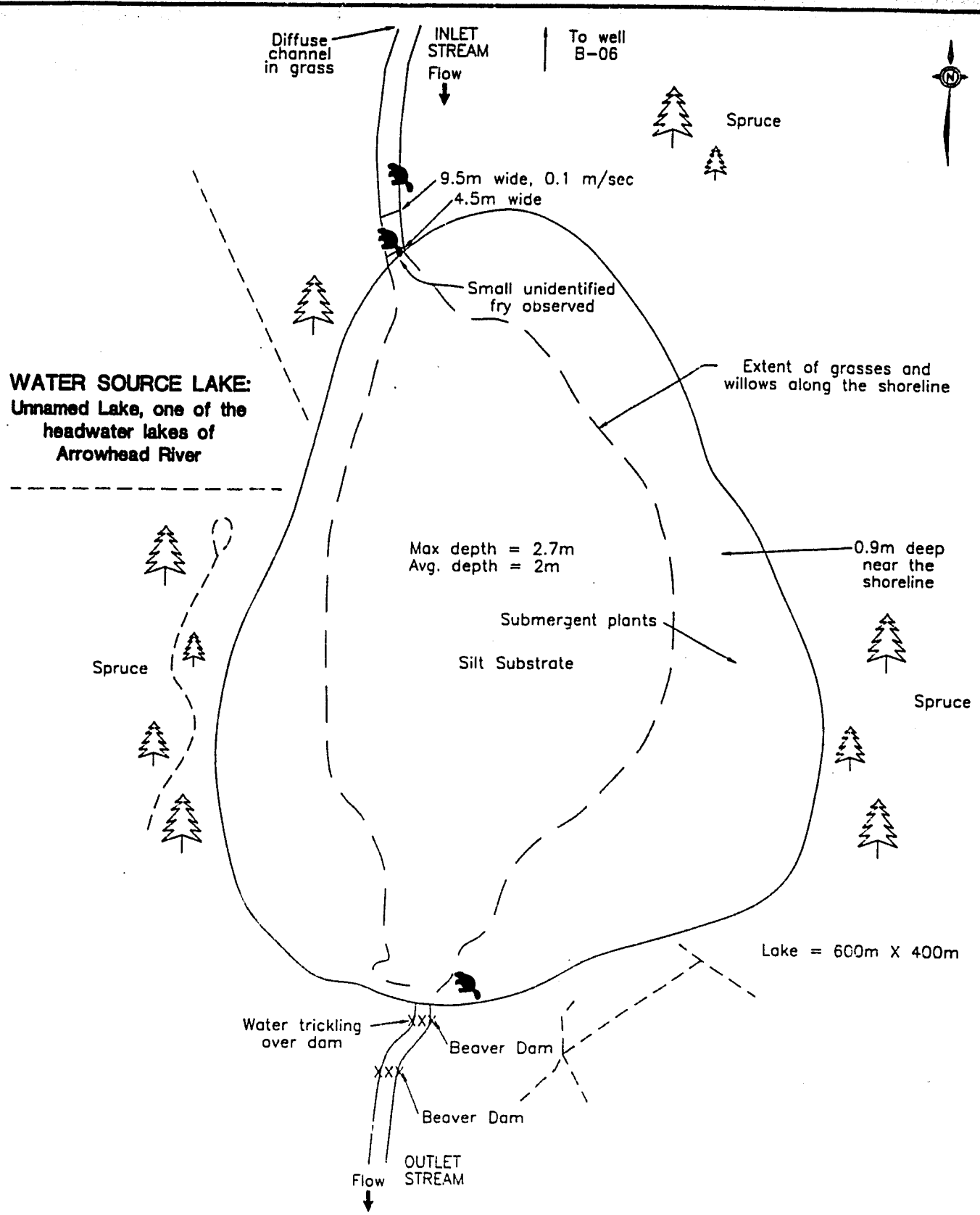
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SUNCOR NETLA
WELL LOCATION UNIT H SECTION 77

DRAWN: GP	APPROVED: CS	DATE: 3 SEPT. 1999
PROJECT: 992-2243		FIGURE: 8

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Notes:

Schematic only – not to scale

LEGEND

– – – – Seismic Lines

Beaver Lodge

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PROPOSED WATER SOURCE

DRAWN: GP	APPROVED:	DATE: 8 SEPT. 1999
PROJECT: 992-2243		FIGURE: 7

J:1999/2200/992-2243/photos.dwg

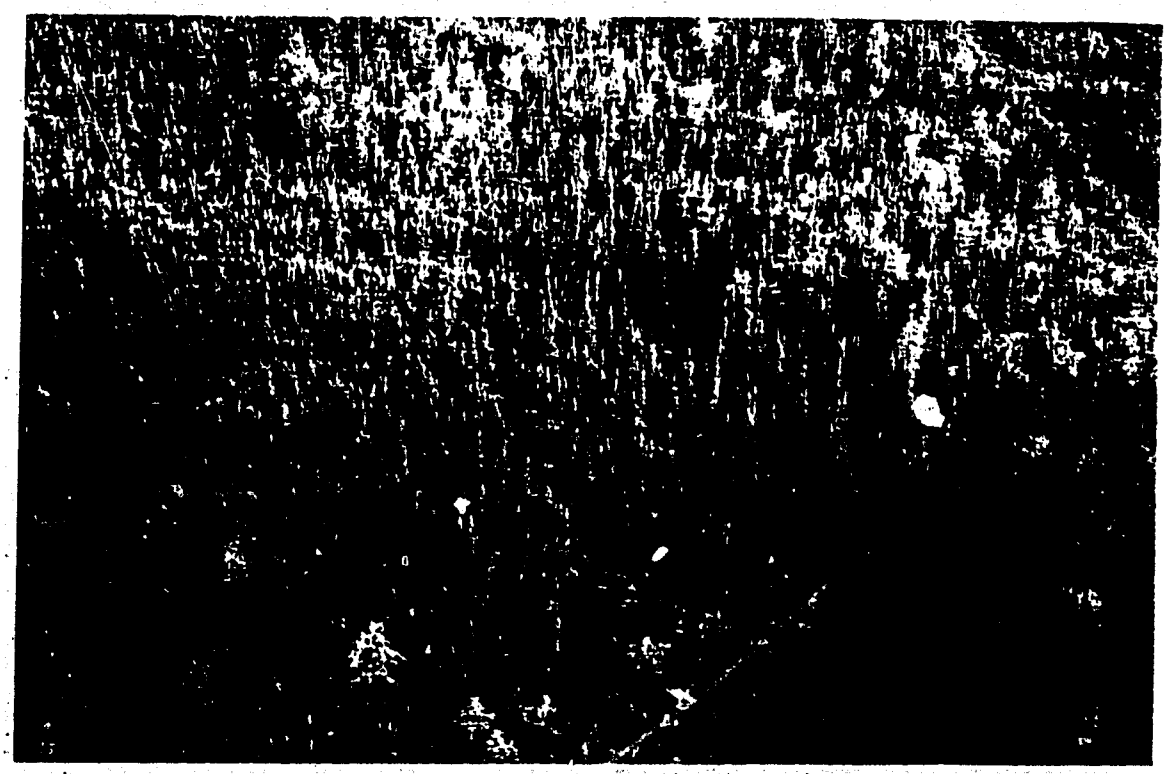


Photo 1. Aerial view of the proposed O-15 well location (looking west).

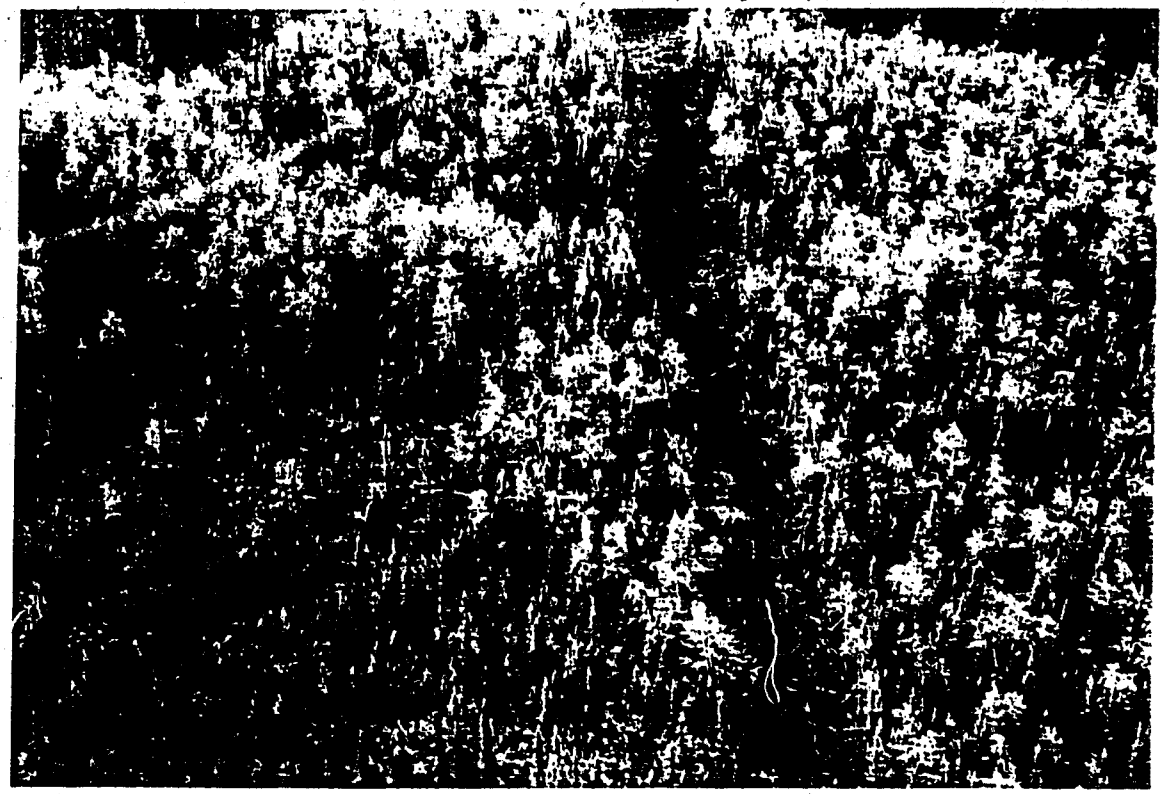


Photo 2. Aerial view of the proposed P-16 well location (looking south).

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SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED:	DATE: 01 SEPT. 1999
PROJECT: 992-2243.7070	PLATES: 1 & 2

J:1999/2200/992-2243/photos.dwg



Photo 3. Ground view of the proposed P-16 well location (looking north).

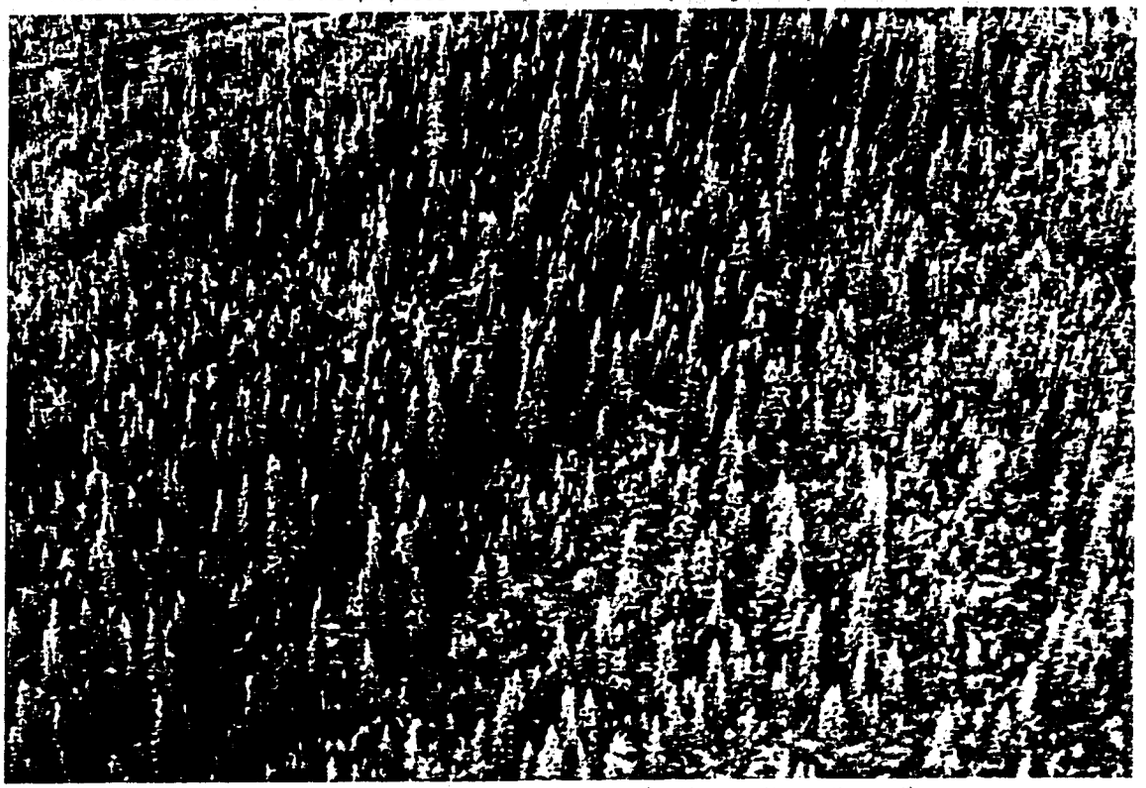


Photo 4. Aerial view of the proposed B-06 well location (looking north-north-west).

Golder Associates	SUNCOR ENERGY
SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED: CS	DATE: 01 SEPT. 1999
PROJECT: 992-2243.7070	PLATES: 3 & 4

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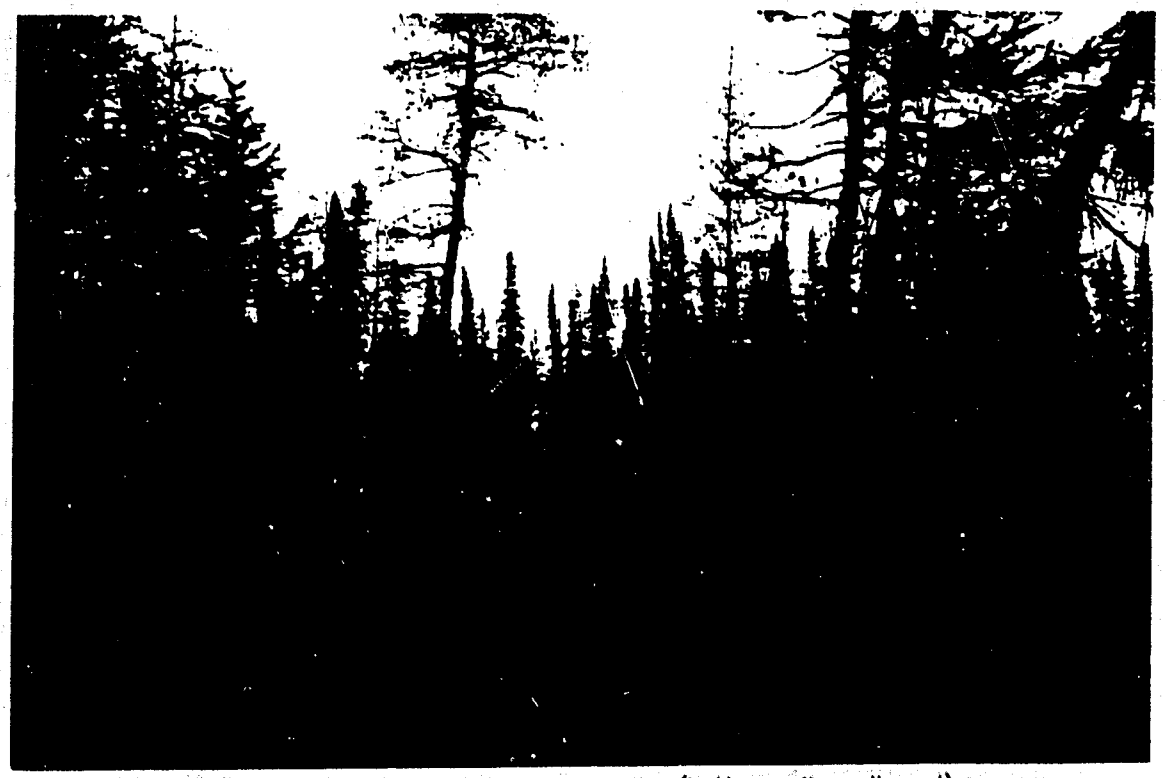


Photo 5. Ground view of the proposed B-06 well location (looking north-north-east).



Photo 6. Bog lemming tunnel entrance at the proposed B-06 well location. Runways and tunnels were abundant throughout much of the lease.

Golder Associates	SUNCOR ENERGY
SITE PHOTOGRAPHS	
DRAWN RFM | APPROVED CS	DATE 01 SEPT. 1999
PROJECT 992-2243.7070	PLATES 5 & 6

J:1999/2200/992-2243/photos.dwg



Photo 7. Ground view of the proposed H-77 well location (looking north).

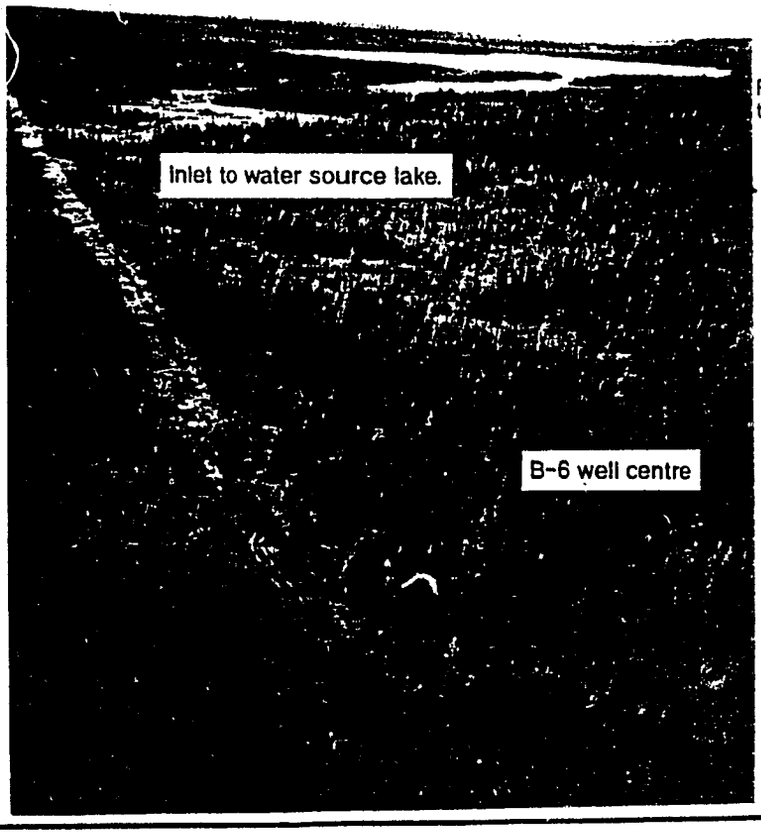


Photo 8. Aerial view looking south from B-06 well to water source lake.

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SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED:	DATE: 8 SEPT. 1999
PROJECT: 992-2243.7070	PLATES 7 & 8

J:1999/2200/992-2243/photos.dwg



Photo 9. Inlet tributary to proposed water source lake. Note diffuse flow at bottom of photo (north tip of lake).

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SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED: CS	DATE: 01 SEPT 1999
PROJECT: 992-2243.7070	PLATES: 8

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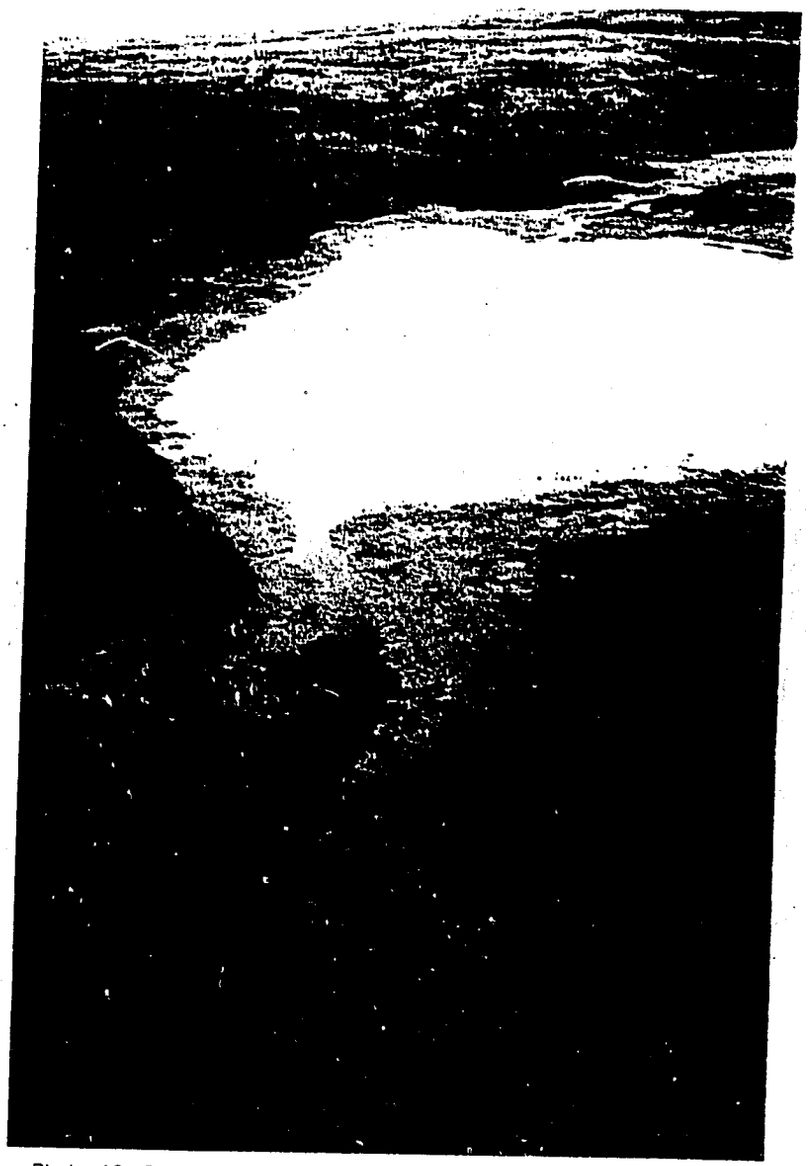


Photo 10. Outlet tributary to proposed water source lake.
Note beaver dams along outlet.

Golder Associates	SUNCOR ENERGY
SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED: CS	DATE: 01 SEPT. 1999
PROJECT: 992-2243.7070	PLATES: 10

J:1999/2200/992-2243/photos.dwg



Photo 11. Upstream view of Netla River crossing. Gravel/silt substrate with low flow and shallow depth.



Photo 12. Left downstream bank of the Netla River. Bank is well vegetated and stable but soft near water edge.

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SITE PHOTOGRAPHS	
DRAWN: RFM | APPROVED: CS	DATE: 01 SEPT. 1999
PROJECT: 992-2243.7070	PLATES: 11 & 12

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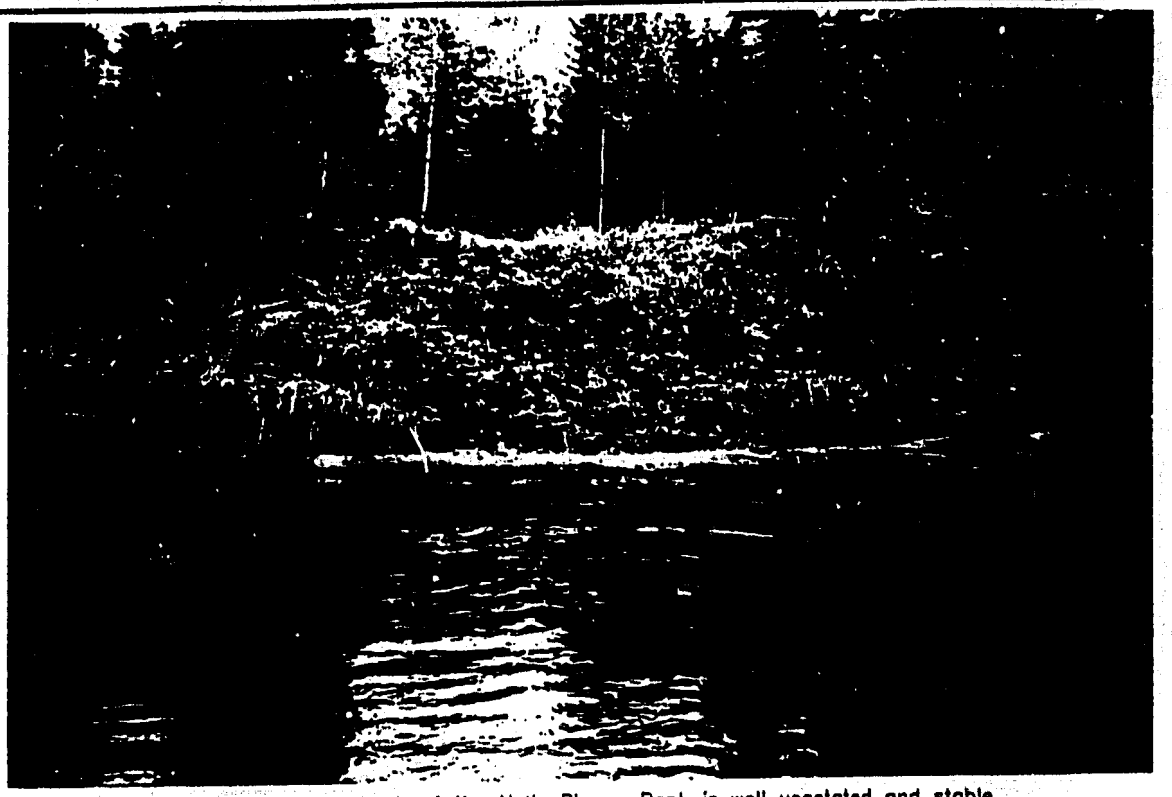


Photo 13. Right downstream bank of the Netla River. Bank is well vegetated and stable. Fallen log creates bank undercut and stability at the water's edge.



Photo 14. East view of Denedothada Creek crossing. Well vegetated banks. Old winter road crossing visible in upper right corner across from Antoine Bertrand (Fort Liard).

Golder Associates	SUNCOR ENERGY
SITE PHOTOGRAPHS	
DRAWN: RFM | APPROVED: CS	DATE: 01 SEPT. 1999
PROJECT: 992-2243.7070	PLATES 13 & 14

J:1999/2200/992-2243/photos.dwg

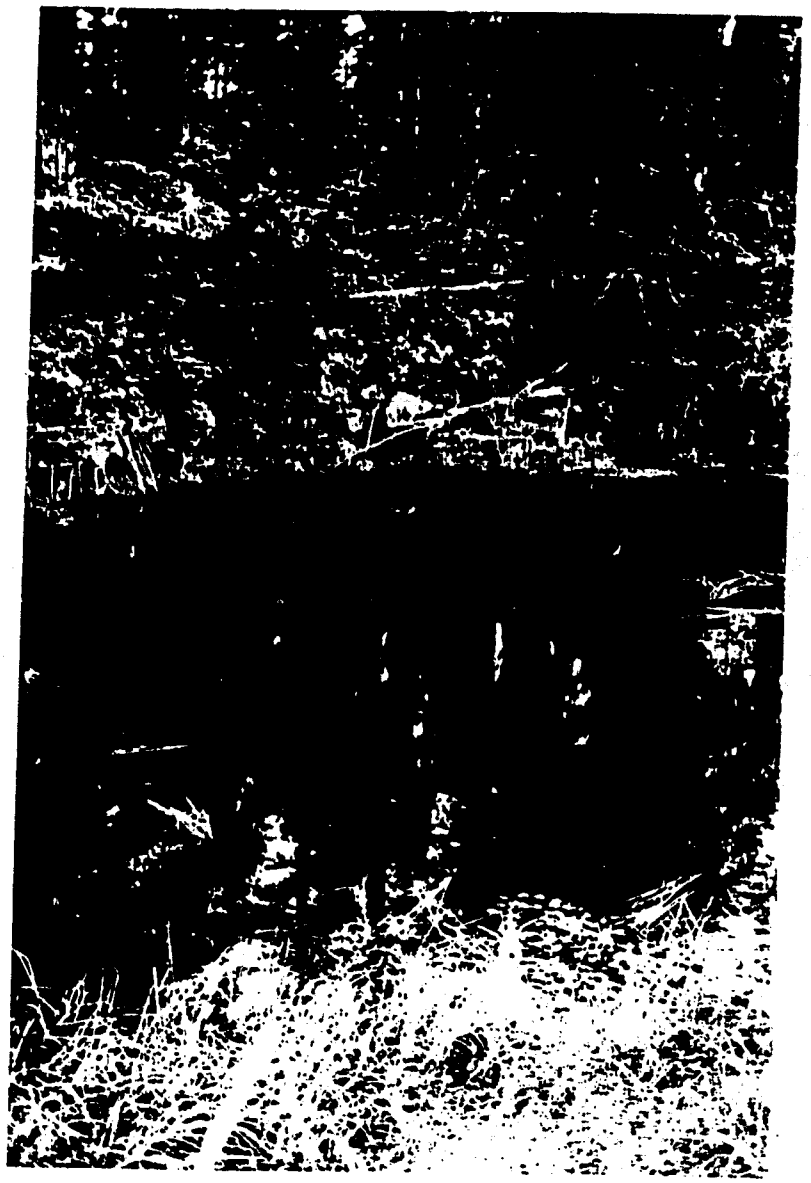


Photo 15. Upstream of winter road crossing on Denedothada Creek. Note vegetated banks with slight slumping.

Golder Associates	SUNCOR ENERGY
SITE PHOTOGRAPHS	
DRAWN: RFM / APPROVED: CS	DATE: 03 SEPT. 1999
PROJECT: 992-2243.7070	PLATES: 15

APPENDIX I

LIST OF COMMON AND SCIENTIFIC NAMES OF SPECIES LIKELY FOUND IN THE PROJECT AREA

LIST OF COMMON AND SCIENTIFIC NAMES OF SPECIES LIKELY FOUND IN THE PROJECT AREA

Birds	
Ruffed Grouse	*Bonasa umbellus*
Spruce Grouse	*Dendragapus canadensis*
Sharp-tailed Grouse	*Tympanuchus phasianellus*
Ptarmigan	*Lagopus* spp.
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Pileated Woodpecker	*Dryocopus pileatus*
Gray Jay	*Perisoreus canadensis*
Common Raven	*Corvus corax*
Boreal Chickadee	*Parus hudsonicus*
Pine Siskin	*Carduelis pinus*
Sandhill Crane	*Grus canadensis*
Common Raven	*Corvus corax*
Northern Shrike	*Lanius excubitor*
Bald Eagle	*Haliaeetus leucocephalus*
Common Redpoll	*Carduelis flammea*

*A more detailed list of songbirds present in the Liard Valley but not observed during this field survey may be available from the Canadian Wildlife Service.

Mammals	
Snowshoe Hare	*Lepus americanus*
Northern Bog Lemming	*Synaptomys borealis*
Coyote	*Canis latrans*
Red Squirrel	*Tamiasciurus hudsonicus*
Beaver	*Castor canadensis*
Vole	Cricetidae sp.
Muskrat	*Ondatra zibethicus*
Gray Wolf	*Canis lupus*
Red Fox	*Vulpes vulpes*
Black Bear	*Ursus americanus*
Grizzly Bear	*Ursus arctos horribilis*
Marten	*Martes americana*
Weasel	*Mustela* spp.
Mink	*Mustela vison*
Wolverine	*Gulo gulo*
Canada Lynx	*Lynx canadensis*
Moose	*Alces alces*
Woodland Caribou	*Rangifer tarandus caribou*
Wood Bison	*Bison bison athabascae*

Fish	
Lake Trout	*Salvelinus namaycush*
Arctic Cisco	*Coregonus autumnalis*
Least Cisco	*Coregonus sardinella*
Lake Whitefish (Humpback Whitefish)	*Coregonus clupeaformis*
Inconnu	*Stendodus leucichthys*
Arctic Grayling	*Thymallus arcticus*
Northern Pike (jack or jackfish)	*Esox lucius*
Finescale Dace	*Chrosomus neogaeus*
Lake Chub	*Couesius plumbeus*
Emerald Shiner	*Notropis atherinoides*
Spottail Shiner	*Notropis hudsonius*
Longnose Dace	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus catostomus*
White Sucker	*Catostomus commersoni*
Burbot	*Lota lota*
Ninespine Stickleback	*Pungitius pungitius*
Trout Perch	*Percopsis omiscomaycus*
Walleye (Yellow Pickerel)	*Stizostedion vitreum*
Slimy Sculpin	*Cottus cognatus*
Spoonhead Sculpin	*Cottus ricei*
Dolly Varden	*Salvelinus malma malma*
Bull Trout	*Salvelinus confluentus*
Goldeye	*Hiodon alosoides*
Trees	
Lodgepole Pine	*Pinus contorta*
Tamarack (Larch)	*Larix laricina*
White Spruce	*Picea glauca*
Black Spruce	*Picea mariana*
Trembling Aspen	*Populus tremuloides*
Balsam Poplar	*Populus balsamifera*
White Birch	*Betula papyrifera*
Jack Pine	*Pinus banksiana*
Shrubs	
Green Alder	*Alnus crispa*
Willow	*Salix* spp.
Bog Birch	*Betula glandulosa*
Cinquefoil	*Potentilla fruticosa*
Labrador Tea	*Ledum groenlandicum*
Leather Leaf	*Chamaedaphne calyculata*
Prickly Rose	*Rosa acicularis*
High-bush Cranberry	*Viburnum trilobum*
Current	*Ribes* spp.
Red-osier Dogwood	*Cornus stolonifera*
Bearberry	*Arctostaphylos uva-ursi, Arctostaphylos rubra*
Bog Cranberry	*Oxycoccus microcarpus*
Blueberry/Huckleberry	*Vaccinium* spp.

Ground Plants	
Bunch Berry	*Cornus canadensis*
Raspberry	*Rubus strigosus*
Solomon's Seal	*Smilacina* spp.
Wild Strawberry	*Fragaria glauca*
Marsh Aster	*Aster borealis*
Sedges	*Carex* spp.
Dwarf Scouring Rush	*Equisetum scirpoides*
Feather Moss	*Pleurozium* spp.
Lichen	*Cladonia* spp.
Club moss	*Lycopodium annotinum*
Bilberry	*Vaccinium caespitosum*
Coltsfoot	*Petasites palmatus*
Cloudberry	*Rubus chamaemorus*
Horsetail	*Equisetum* spp.

APPENDIX II

FISH HABITAT DATA SHEETS

STREAM CROSSING HABITAT EVALUATION PARAMETERS FORM

Project No.	992-2243
Date:	August 26/99
Time:	1700-1800
Crew:	HM/AB

NETLA RIVER

GENERAL INFORMATION

Name of Watercourse		Netla River
Tributary to...		Liard River
Kilometre Post		n/a
Topographic Map No.		95B
GPS Data	**File**	Netla
	Waypoint	E
		N
Lat./Long. Coordinates		60°42'40.4"N
		123°13'13.6"W
Watercourse Length Inspected Upstream (m)		150
Watercourse Length Inspected Downstream (m)		150
General Terrain Setting		Liard Valley
Watercourse Navigable?		Yes No

LAND USE / ACCESS

Land Use	Oil and Gas / Traditional
Access	Winter seismic line
Recommended Working Side	LDB RDB either side

GENERAL WATERCOURSE CHARACTERISTICS

Stream Pattern	Irregular meander
Stream Confinement	Confined
Channel Form	Open
Side Channel (%)	-
Stream Bed Gradient (%)	2
Natural Drop Offs	No
Evidence of Bedrock	No

CHANNEL MEASUREMENTS

Mean Wetted Width (m)	-	
Mean Channel Width (m)	-	
Depth (m):	**Mean**	**Max.**
Pool		
Run	0.32	0.42
Riffle		

WATER FLOW

Turbulence Category	Low
Discharge (m^3/s)	0.5
Stage	dry pooled low mod high flood

WATER QUALITY

Air Temperature (°C)	14
Water Temperature (°C)	14.9
pH	8.45
Conductivity (µS/cm)	242
Dissolved Oxygen (mg/L)	7.65
Turbidity (NTU)	Stained
Secchi Depth (m)	To bottom

CROSSING CHARACTERISTICS

Wetted Channel Width (m)	15.8
Channel Width (m)	15.8
Bankfull Width (m)	15.8

Depth/Velocity Profile

Station (m)	Depth (m)	Mean Col. Velocity (m/s)
See last page of data sheet		

SUBSTRATE CHARACTERIZATION

Clay/Silt (<0.06 mm)	20
Sand (0.06-2 mm)	
Gravel (2-64 mm)	20
Cobble (64-256 mm)	40
Boulder (> 256 mm)	20
Bedrock	
Muck present	Yes No
Detritus present	Yes No

BANK CHARACTERIZATION

	LDB	RDB
Bank Stability	Moderate	Moderate
Bank Height (m)	3.2	3.6
Bank Slope (%)	70	80
Approach Slope (%)	5	5
% of Bank Covered by Riparian Vegetation	90	90
% of Bank That Has Overhanging Vegetation	20	20
% of Bank That is Undercut	20	20
Dominant Riparian Vegetation	Alder and grass	Alder and grass

BANK MATERIAL CHARACTERIZATION (%)

	LDB	RDB
Clay/Silt (<0.06 mm)	100	100
Sand (0.06- 2 mm)		
Gravel (2-64 mm)		
Cobble (64-256 mm)		
Boulder (> 256 mm)		
Bedrock		

EROSION

	LDB	RDB
Bank Erosion Potential	Moderate	Moderate
Evidence of Slumping on Banks	Yes No	Yes No
Evidence of Slumping on Approach Slopes	Yes No	Yes No
Evidence of Gullying	Yes No	Yes No
Other Erosion Features		
Evidence of Groundwater Seepage	Yes No	Yes No
Bank Scour Potential	Moderate	Low
Bed Erosion Potential	Very high High **Moderate** Low Very low	
Relative Sediment Transport Potential	Very high High **Moderate** Low Very low	
Relative Suspend. Solids Load	Very high High **Moderate** Low Very low	
Evidence of Flood Events Above Bankfull Width	No	

HABITAT FEATURES

Fish Habitat Potential	Low Overwintering habitat potential Moderate summer potential, all stages Low instream cover
Aquatic Macrophytes (by %)	Total Area: 5
	Emergents:
	Floating-Leaved:
	Submergents: 95
	Free Floating:
Algae (by %)	Total Area: 0
	Filamentous:
	Planktonic:
	Macrophytic:
Barriers to Fish Movement	None in reach

Available Instream Cover %	30
Percentage of Total Instream Cover	
Large Organic Debris	40
Substrate (Boulders)	30
Instream Vegetation	20
Turbidity	5
Depth/Surface Turbulence	5

SAMPLING RESULTS SUMMARY

Fish Sampling Methods	**Effort**
Backpack Electrof.	**sec**
Boat Electrofishing	**sec**
Gill Netting	**Hours**
Seining	**# hauls**
Minnow Trap	**Hours**
Set Line	**Hours**

Fish Captured			
Species	**No.**	**F. Length Range (mm)**	**Life Stages**
None sampled			

Available Overhead Cover %	5
Percentage of Total Overhead Cover	
Large Organic Debris	20
Undercut Bank	60
Overhanging Trees	
Overhanging Shrubs	
Overhanging Grass	20

General Description of Reach

Neutral, gravel/cobble bottom channel in moderate-steep banks, silt laden bottom and banks.

Description of Crossing Site

Neutral, gravel/cobble bottom channel in moderate-steep banks, silt laden bottom and banks

Sensitivity to Construction Activities

Steep banks

Netla River: Depth/velocity profile		
Station (m)	Depth (m)	Mean Water Column Velocity (m/s)
0.00	0.01	0.00
0.50	0.10	0.05
1.00	0.11	0.00
1.50	0.11	0.00
2.00	0.14	0.00
2.50	0.10	0.00
3.00	0.20	0.10
3.50	0.23	0.00
4.00	0.24	0.10
4.50	0.25	0.00
5.00	0.28	0.00
5.50	0.28	0.00
6.00	0.30	0.10
6.50	0.32	0.00
7.00	0.33	0.05
7.50	0.36	0.10
8.00	0.37	0.10
8.50	0.39	0.15
9.00	0.40	0.15
9.50	0.40	0.15
10.00	0.43	0.15
10.50	0.42	0.15
11.00	0.38	0.15
11.50	0.38	0.15
12.00	0.36	0.15
12.50	0.40	0.15
13.00	0.37	0.20
13.50	0.36	0.20
14.00	0.35	0.10
14.50	0.34	0.10
15.00	0.32	0.10
15.50	0.25	0.05
15.80	0.20	0.00

STREAM CROSSING HABITAT EVALUATION PARAMETERS FORM

DENEDOTHADA CREEK

Project No.	992-2243
Date:	August 26/99
Time:	1814
Crew:	HM/AB

GENERAL INFORMATION

Name of Watercourse		Denedothada Creek
Tributary to...		Netla
Kilometre Post		n/a
Topographic Map No.		95B
GPS Data	**File**	Den
	Waypoint	E
		N
Lat./Long. Coordinates		60°42'16.8"N
		123°15'16.3"W
Watercourse Length Inspected Upstream (m)		150
Watercourse Length Inspected Downstream (m)		150
General Terrain Setting		Liard Valley
Watercourse Navigable?		Yes No

LAND USE / ACCESS

Land Use	Oil and Gas / Traditional
Access	Seismic line
Recommended Working Side	LDB RDB **either side**

GENERAL WATERCOURSE CHARACTERISTICS

Stream Pattern	Irregular meander
Stream Confinement	Confined
Channel Form	Neutral
Side Channel (%)	-
Stream Bed Gradient (%)	2
Natural Drop Offs	Debris Jam
Evidence of Bedrock	No

CHANNEL MEASUREMENTS

Mean Wetted Width (m)	-	
Mean Channel Width (m)	-	
Depth (m):	**Mean**	**Max.**
Pool	1.0	1.2
Run	1.0	
Riffle		

WATER FLOW

Turbulence Category	None
Discharge (m^3/s)	-
Stage	dry pooled low mod high flood

WATER QUALITY

Air Temperature (°C)	14.0
Water Temperature (°C)	14.5
pH	8.14
Conductivity (µS/cm)	192
Dissolved Oxygen (mg/L)	7.46
Turbidity (NTU)	Stained
Secchi Depth (m)	-

CROSSING CHARACTERISTICS

Wetted Channel Width (m)	12.6
Channel Width (m)	12.6
Bankfull Width (m)	15

Depth/Velocity Profile

Station (m)	Depth (m)	Mean Col. Velocity (m/s)
To deep/soft to walk to collect data		

SUBSTRATE CHARACTERIZATION

Clay/Silt (<0.06 mm)	100
Sand (0.06-2 mm)	
Gravel (2-64 mm)	
Cobble (64-256 mm)	
Boulder (> 256 mm)	
Bedrock	
Muck present	Yes No
Detritus present	Yes No

BANK CHARACTERIZATION

	LDB	RDB
Bank Stability	Moderate	Moderate
Bank Height (m)	1.8	1.7
Bank Slope (%)	50	45
Approach Slope (%)	5	5
% of Bank Covered by Riparian Vegetation	50	50
% of Bank That Has Overhanging Vegetation	20	20
% of Bank That is Undercut	5	5
Dominant Riparian Vegetation	Alder and grass	Alder and grass

BANK MATERIAL CHARACTERIZATION (%)

	LDB	RDB
Clay/Silt (<0.06 mm)	100	100
Sand (0.06-2 mm)		
Gravel (2-64 mm)		
Cobble (64-256 mm)		
Boulder (> 256 mm)		
Bedrock		

EROSION

	LDB	RDB
Bank Erosion Potential	Moderate	Moderate
Evidence of Slumping on Banks	**Yes** No	**Yes** No
Evidence of Slumping on Approach Slopes	Yes **No**	Yes **No**
Evidence of Gullying	Yes **No**	Yes **No**
Other Erosion Features		
Evidence of Groundwater Seepage	Yes **No**	Yes **No**
Bank Scour Potential	Moderate	Low
Bed Erosion Potential	Very high High Moderate **Low** Very low	
Relative Sediment Transport Potential	Very high High Moderate **Low** Very low	
Relative Suspend. Solids Load	Very high High Moderate **Low** Very low	
Evidence of Flood Events Above Bankfull Width	No	

HABITAT FEATURES

Fish Habitat Potential	Moderate Potential for over wintering habitat due to depth. But lack of useable substrate for larger fish. Presence of frogs suggests some open/moist areas remain for overwintering?
Aquatic Macrophytes (by %)	Total Area: 35
	Emergents:
	Floating-Leaved: 80
	Submergents: 20
	Free Floating:
Algae (by %)	Total Area: 10
	Filamentous:
	Planktonic:
	Macrophytic: 100
Barriers to Fish Movement	None is reach surveyed.

Available Instream Cover %	60
Percentage of Total Instream Cover	
Large Organic Debris	20
Substrate (Boulders)	
Instream Vegetation	65
Turbidity	5
Depth/Surface Turbulence	10

SAMPLING RESULTS SUMMARY

Fish Sampling Methods	**Effort**
Backpack Electrof.	sec
Boat Electrofishing	sec
Gill Netting	Hours
Seining	# hauls
Minnow Trap	Hours
Set Line	Hours

Fish Captured			
Species	**No.**	**F. Length Range (mm)**	**Life Stages**
None sampled			

Available Overhead Cover %	25
Percentage of Total Overhead Cover	
Large Organic Debris	15
Undercut Bank	15
Overhanging Trees	20
Overhanging Shrubs	20
Overhanging Grass	30

General Description of Reach

Winding, deep, incised channel.
Heavy instream vegetation.
Soft bottom and banks.

Description of Crossing Site

Winding, deep, incised channel
Heavy instream vegetation and submerged debris. Soft bottom and banks.

Sensitivity to Construction Activities

Potential overwintering habitat for fish. Areas downstream of crossing may not freeze to bottom.

APPENDIX III

ASSESSMENT CRITERIA FOR DETERMINATION OF SIGNIFICANCE OF RESIDUAL EFFECTS

Appendix III

Assessment Criteria for Determination of Significance of Residual Effects

ATTRIBUTE	CLASSIFICATION	EFFECT CRITERIA
Direction	Positive	net benefit
	Neutral	no net benefit or loss
	Negative	net loss or adverse effect
Geographic Extent	Local	confined to the area of direct disturbance by the project (e.g., ROW and wellsite footprint)
	Subregional	disturbance confined to assessment area boundaries as specified for each discipline
	Regional	extending beyond subregional boundaries but confined to the province or territory being considered
Duration/Freq	Immediate	on the order of days
	Short term	three years or less
	Medium term	may last as long as the operating life of the project.
	Long term	remaining after decommissioning
Magnitude	Nil	no change
	Low	above background conditions, but within established criteria or known scientific threshold and within range of natural variability
Magnitude (cont)	Medium	substantially above typical background conditions and concentrations, but within established criteria or known scientific threshold and within range of natural variability
	High	predicted to exceed established criteria and known threshold to cause adverse effects and will likely cause detectable change beyond the range of natural variability
Confidence	Low	based on a good understanding of cause and effect relationships and/or incomplete data
	Moderate	based on a good understanding of cause and effect relationship using data from similar cases or incompletely understood cause and effect relationships and good site-specific information
	High	based on a good understanding of cause and effect relationships and good site-specific information
Reversibility	Reversible in short term	effects can be reversed in months
	Reversible in medium term	effects can be reversed in years, but less than 10 years

ATTRIBUTE	CLASSIFICATION	EFFECT CRITERIA
Reversibility (cont)	Reversible in long term	effects can be reversed, but will take longer than 10 years
	Irreversible	effects are permanent
Significance	Significant Adverse Effect	high probability of permanent or long-term residual effect of high magnitude despite successful standard and site-specific mitigation efforts
	Significant Positive Effect	high probability of permanent or long-term benefit of high magnitude
	Unknown	significance cannot be confidently assessed with existing information
	No Significant Adverse Effect	all adverse effects that do not fit the significant effect criterion
	No Significant Positive Effect	all positive effects that do not fit the significant effect criterion

APPENDIX IV

NAHANNI BUTTE – SUNCOR ENERGY
POTENTIAL QUESTIONS / ANSWERS FOR TRADITIONAL KNOWLEDGE STUDY

NAHANNI BUTTE – SUNCOR ENERGY

POTENTIAL QUESTIONS / ANSWERS FOR TRADITIONAL KNOWLEDGE

Questions may be best answered on by making notes on a map of the project area

Interview – Margaret Konisenta
By Jayne Konisenta

Are there any of the following in the project area:

1. Wildlife and Fish

Yes there is fish in the area Netla Creek. As for wildlife such as moose, beaver, etc., people do a lot of hunting in all areas. There's also caribous in that area.

A. Harvest sites, including traplines. Location and season of trapping done?

Around the Netla River and towards Arrowhead Joseph Konisenta did alot of trapping that was years ago. Probably in the late 60s. The location Leon Konisenta would know more as he is the one who's done trapping in the area. The season of trapping is in November to at times March. But now mostly everyone is working as the fur price isn't very good.

B. Birthing Areas (eagle nests, dens, etc.). Location?

I don't really know, maybe bears dens around the area.

C. Summer / Winter wildlife Areas, plus any main wildlife movement routes?

I don't know, I guess there is wildlife movement routes as wildlife just go anywhere.

D. Location of animals seen, but not hunted (i.e. grizzly Bear, bison)?

Seen bears mostly around the area.

E. Fishing; Harvest site locations, season, method, spawning location?

2. Vegetation: Location of berry sites, medicinal plants, other important plants such as woods?

There is berries around that area such as blueberries, cranberries. We hardly pick any medicinal plants around that area.

3. **Water:**

A. Flood conditions of rivers, lakes. Where? When?

The water rises when it rains alot, but never flooded as the water drops quite fast after a day or two.

B. Very low water levels; rivers, lakes. Where? When?

The water really drops in the fall. Just in the fall sometimes it's so low you can't boat up the river. This is up the Netla River.

C. Usual start/finish of spring run-off?

Usually in May.

D. Usual freeze-up / thaw of small lakes on the trapline/Suncor winter road?

As for small lakes it usually thaws out around early part of June.

4. **Cultural and Historic Sites**

A. Tent frames and cabin location?

B. Fire sites and camp sites?

C. Historical sites ?

D. Cultural sites?

E. Other sites of importance?

6. **Are there any other important sightings or special places in this area?**

We did a lot of travelling in the early years just about all areas in around Netla so we can't just point out one area as special.

RESISTIVITY/

CONDUCTIVITY

1824 N.E.B. COPY

COMPANY SUNCOR ENERGY INC.

WELL SUNCOR NETLA P-16

FIELD NETLA

PROVINCE NORTHWEST TERRITORIES

PROVINCE: NORTHWEST TERRITORIES | Field: NETLA | Location: P-16-60-50-122-45 (LSD) | Well: SUNCOR NETLA P-16 (LSD) | Company: SUNCOR ENERGY INC.

LOCATION

Schlumberger

PLATFORM EXPRESS
ARRAY INDUCTION
Rxo-LOG

P-16-60-50-122-45 (LSD)
300P160050122450 (UWID)

Elev.: K.B. 607 m
G.L. 602.3 m
D.F. 606.7 m

Permanent Datum: GROUND LEVEL — Elev.: 602.3 m
Log Measured From: KELLY BUSHING — 4.7 m above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE
1674			

	Run 1	Run 2	Run 3	Run 4
Logging Date	10-JAN-2000			
Run Number	ONE			
Depth Driller	2099 m			
Schlumberger Depth	2098.8 m			
Bottom Log Interval	1093.3 m			
Top Log Interval	542 m			
Casing Driller Size @ Depth	244.000 mm @ 542 m	@	@	
Casing Schlumberger	542 m			
Bit Size	222.000 mm			
Type Fluid In Hole	POTASSIUM SULPHATE			
Density Viscosity	1200 kg/m3 65 s			
Fluid Loss PH	11.5 cm3 11			
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.510 ohm.m @ 14 degC	@	@	
RMF @ Measured Temperature	0.310 ohm.m @ 15 degC	@	@	
RMC @ Measured Temperature	0.380 ohm.m @ 15 degC	@	@	
Source RMF RMC	MEASURED MEASURED			
RM @ MRT RMF @ MRT	0.193 @ 74 0.119 @ 74	@ @	@ @	@ @
Maximum Recorded Temperatures	74 degC			
Circulation Stopped Time	10-JAN-2000 1:45			
Logger On Bottom Time	10-JAN-2000 10:15			
Unit Number Location	2034 GRANDE PRAIRIE			
Recorded By	ROBERT HARRIES			
Witnessed By	CRAIG ODAGAKI			

	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@			@
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
Density Viscosity				
Fluid Loss PH				
Source Of Sample				
RM @ Measured Temperature	@			@
RMF @ Measured Temperature	@			@
RMC @ Measured Temperature	@			@
Source RMF RMC				
RM @ MRT RMF @ MRT	@ @	@ @	@ @	@ @
Maximum Recorded Temperatures				
Circulation Stopped Time				
Logger On Bottom Time				
Unit Number Location				
Recorded By				
Witnessed By				

All interpretations (Opinions) expressed in this report are subject to our General Terms and Conditions as set out in our current Price Schedule. We do not guarantee the accuracy, correctness or completeness of any interpretation, and we shall not, except in the case of gross or wilful negligence on our part, be liable or responsible for any loss, cost, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our General Terms and Conditions as set out in our current Price Schedule.

OTHER SERVICES
OS1:
OS2:
OS3:
OS4:
OS5:

REMARKS: RUN 1 WITH 4.5" COMPLETE STANDOFF MADE
FOUR PASS LOGS PRESENTED ON THE LOG FOR A TEMPERATURE
LOG WAS RUN AFTER THE 4TH PASS WAS CHANGED TO OPEN HOLE
LOG WHERE THE STATUS WAS CHANGED TO OPEN HOLE
DUE TO RECORDED A WORK REPAIR SECTION
DEPTH CORRELATED TO SCHLUMBERGER OPEN HOLE LOG RUN
DOWN HOLE CALCULATED USING BOTH DENSITY CALIPERS VERTICAL=177.8MM

PRIME 3 FIELD STRAT
ENGINEER
OPERATING RIG TIME
DEVIATION

RUN 1
RECORDED ORDER #
LOGGING ENGINEER
LOCATION

RUN 2
RECORDED ORDER #
LOGGING ENGINEER
LOCATION

START STOP

RUN 1 EQUIPMENT DESCRIPTION RUN 2

SURFACE EQUIPMENT
NGS-AB

DOWNHOLE EQUIPMENT

LEH-QT			29.07
LEH-QT 1284			
DTC-A			27.91
DTC-A 1366	CTEM		27.27
HLTB-PTB	TotalMate		28.19
HRDD-TTRD	HRDD MEM		
HRDD-TTRD	Gamma Ray		26.65
HNDS-F			26.44
HNDS-F 2014	Neutron-F		24.66
HNDS-N	HDNS MEM		24.45
HNDS-N 1944	HDNS sens		23.79
HRDD-TTRT	HRDD-DPL		22.27
HRDD-TTRT 1777	HRDD-DPL		22.07
HRDD-TTRD	HRDD-DPL		20.67
HRDD-TTRD 1999	HRDD-DSB		20.47
AH-90			20.06
AH-107			19.45
DTA-A			18.84
DTA-A 1630			17.62
GR-3			
GR-3 3000			
HRDD-2709			
HRDD-2709			
HRDD-2999			12.34
HRDD-2999			
AIT-B			38 MM
AIT-B 97			Standoff
AIT-AA			
AIT-AA 97			
SRE-A			38 MM
SRE-A			Standoff
			5.30
			0.16 2.09
			0.00

Centralizer
SB

Inclination
Inclination
Power Supp

SP RANGE
HTEN HMAS
Tension

TOOL ZERO

MAXIMUM STRING DIAMETER 178 MM
MEASUREMENTS TAKEN FROM TOOL ZERO
ALL DEPTHS IN METERS

Input DLIS Files

DEFAULT	RPSA .009	FN:5	PRODUCER 10-Jan-2000 16:11

Output DLIS Files

DEFAULT	RPSA .010	FN:5	PRODUCER 10-Jan-2000 13:08
CSRT	RPSA .019	FN:22	CUSTOMER 10-Jan-2000 13:08

OP System Version: 9C1-583
MCM

DFT-A	9C1-583	AIT-A 9C1-583
LDP-J	9C1-583	AIT-B 9C1-583
LEH-QT	9C1-583	DTC-H
HLTB-PTB	9C1-583	

PIP SUMMARY

Time Mark Every 60 S

AIT Computed Standoff (Inches) AIT-B 0 AIT-A 0

AIT 90 inch Investigation Conductivity (ATC90) (mS/m) 0 2000

SP (SPD) (mV) -160 40

Tension (TENS) (lbf) 0 10000

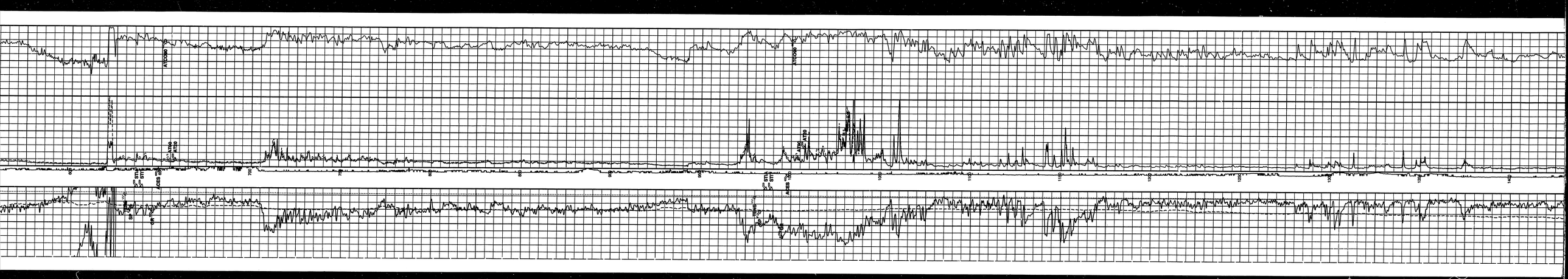
AIT 60 inch Investigation (ATC60) (mS/m) 0 100

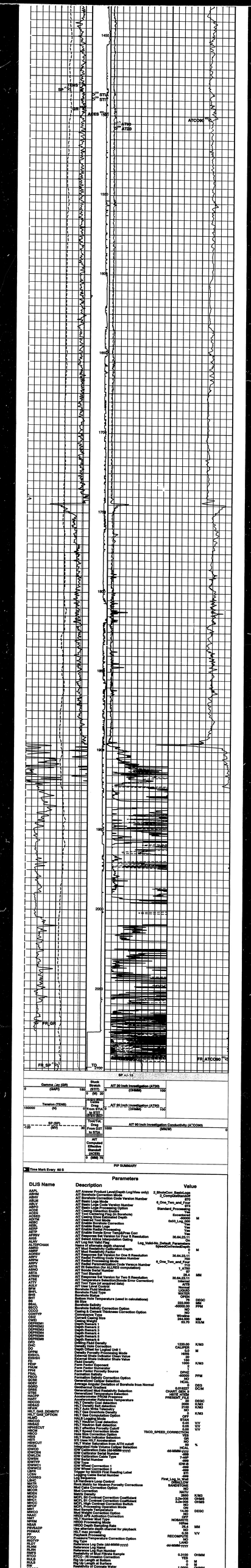
AIT 20 inch Investigation (ATC20) (mS/m) 0 100

Gamma Ray (GR) (GAPI) 150 0

Borehole Size (BS) (in) 6 16

BP AY-15


ATC500
ATC600
ATC700
ATC800
ATC900
ATC1000
ATC1100
ATC1200
ATC1300
ATC1400
ATC1500
ATC1600
ATC1700
ATC1800
ATC1900
ATC2000
ATC2100
ATC2200
ATC2300
ATC2400
ATC2500
ATC2600
ATC2700
ATC2800
ATC2900
ATC3000
ATC3100
ATC3200
ATC3300
ATC3400
ATC3500
ATC3600
ATC3700
ATC3800
ATC3900
ATC4000
ATC4100
ATC4200
ATC4300
ATC4400
ATC4500
ATC4600
ATC4700
ATC4800
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ATC5000
ATC5100
ATC5200
ATC5300
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ATC6100
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ATC7900
ATC8000
ATC8100
ATC8200
ATC8300
ATC8400
ATC8500
ATC8600
ATC8700
ATC8800
ATC8900
ATC9000
ATC9100
ATC9200
ATC9300
ATC9400
ATC9500
ATC9600
ATC9700
ATC9800
ATC9900
ATC10000



PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_WholeCorr_BaseLogs
ABHV	AIT Borehole Correction Mode	2_CompBeHandOff
ABVR	AIT Borehole Correction Code Version Number	ETO
ABLM	AIT Basic Logs Mode	6_One_Two_and_Four
ABLV	AIT Basic Logs Code Version Number	ETO
ABPO	AIT Basic Logs Processing Option	Standard_Processing
ACEN	AIT Caliper Detection Enable	Yes
ACESD	AIT Caliper Short Eccentered Depth	Eccentered
ADTM	AIT Destroy Tool Mode	-32000 M
AHCV	AIT Hole Correction Version	0x00_Log_000
AIEL	AIT Enable Basic Logs	Yes
AERP	AIT Enable Radial Processing	Yes
AEPC	AIT Enable Eccentered Tornado/Pres Corr	Yes
AFRRV	AIT Response Set Version for Four ft Resolution	30,64,23,11
AIGV	AIT Invasion Interpretation Setting	Standard
ALVL	AIT Log Not Valid Flag	Log_Valid=No_Default_Parameters
ALTDCHAN	Name of alternate depth channel	SpeedCorrectedDepth
AMBZ	AIT Real Receiver Minimum Depth	0 M
AORRV	AIT Response Set Version for One ft Resolution	30,64,23,11
ARPM	AIT Radial Processing Mode	TWO
ARPV	AIT Radial Processing Code Version Number	6_One_Two_and_Four
AVVS	AIT Fit Selection for ALLRES computation)	1_ATO
ASTA	AIT Sonde Serial Number	37
ATRRV	AIT Response Set Version for Two ft Resolution	30,64,23,11
ATTE	AIT Temperature Selection(Sonde Error Correction)	Internal
ATTS	AIT Temperature Measured data)	ATTE
AULV	AIT Tool Unit Voltage	0 V
BHIL	Borehole Fluid Sodium	120000
BHS	Borehole Salinity	WATER
BHT	Borehole Mud Type	OPEN
BS	Bit Size	8 IN
BSAL	Borehole Salinity	223,000 MM
BSCO	Borehole Salinity Correction Option	-50000.00 PPM
CDCO	Casing & Cement Thickness Correction Option	NO
CDMTYP	Convergence Type	NO
CDS	Current Casing Size	Wireline
CNAV	Count Average	244.000 MM
DEPREM1	Depth Remark 1	63.70 KG/M
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFD	Drilling Fluid Density	1220.00 K/M3
DFL	Drilling Fluid Loss	CALIPER
DO	Depth Offset for Logical Unit 1	0 M
DPPM	Density Porosity Processing Mode	HDIS
EXSH	External Shale Indicator Chain Value	20
FD	Fluid Density Indicator Shale Value	2.65
FDM	Fluid Density	1500 K/M3
FEXP	Form Factor Exponent	2
FFAC	Form Factor Coefficient	1
FPS	Formation Porosity Source	DENS
FSAL	Formation Salinity	-50000 PPM
FSCO	Formation Salinity Correction Option	NO
GCSV	Gamma Ray Calibrator Selection	HCAL
GDEV	Geological Deviation of Borehole from Normal	0 DEG
GREE	Geological Mud Resistivity Selection	0.018277 OHM
HAMC	Generalized Mud Resistivity Selection	CHART_2826_9
HAOP	Accelerometer Orientation	HSTB_FTUB
HAOT	Accelerometer Reference Temperature	PRESENT_FILE
HCCD	HALS Casing Coil Detection	DEGC
HFAU	HALS Focus Current Units	2000 K3M2
HFAV	HALS Auto Value Telemetry	2100 K3M3
HLT_GAS_DENSITY	HALS Gas Density Correction	0 K/M3
HLT_GAS_OPTION	HALS Gas Computation Option	OFF
HMPO	HALS Mud Porosity	17.6 V/V
HNCO	HALS Neutron Coal detection	0.05 V/V
HNMC	HALS Neutron Salt detection	0.05 V/V
HNSCUT	HALS Neutron Porosity Cutoff	0.05 V/V
HSCC	HALS Mud Correction Coefficient	0.00
HSCO	Halite Size Correction Option	NO
HSIZ	HALS Mud Cake Thickness	0 IN
HSVCUT	HALS Shale Volume from ATH cutoff	80 %
HVCE	Integrated Hole Volume Caliper Selection	HCAL
IDWCDN	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWCSN	IDW Calibration Source Number	7777
IDWTYP	IDW Calibration Data Type	-999
IDWSN	IDW Serial Number	999
IDWVC1	IDW Voltage Channel 1	8250 V
IDWWC1	IDW Wheel Correction 1	-999
IDWWC2	IDW Wheel Correction 2	-999
LABEL	Trigger for MAXIS Field Reading Label	21
LOGSEQ	Logging Cable Serial Number	4040
LUN	Logical Unit	First_Log_In_Hole
LUNC	LB Hardware Loop Control	DEALLOC
MATS	Rock Matrix for Neutron Porosity Corrections	SANDSTONE
MCO	Mud Cake Correction Option	NO
MCOH	Mud Cake Chart	NATL
MDEN	Matrix Density	2650 K/M3
MFCC	MCFL R1 Contrast Correction Coefficient	2.2e-006 OHM/S
MFCC	MCFL R1 Contrast Correction Coefficient	3.2e-005 OHM/S
MFCO	MCFL Processing Correction Option	NO
MFT	Mud Sample Temperature	0M
MSTCO	Mud Sample Temperature Option	14.00 DEGC
NAC	HNGS Activation Correction	NO
NHT	HALS Number Mud Type	NOBARITE
NSAM	HNGS Processing Mode	1
PBAUD	HNGS Logging Baud Rate	38.4 MM
PBMAP	Use channel specified channel for playback	0
PDMAX	KELT max pressure	0 V/V
PPC	Playback Processing	RECOMPUTE
PTCO	Pressure Temperature Correction Option	NO
RGTYP	Rig Type	LAND
RLDD	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy
RLDM	Reference Log Depth	0
RMFD	Reference Log Number	
RMFS	Resistivity of Mud Filtrate Sample	0.2100 OHMM
RTCO	RTCO - RI Interaction	YES
RULS	Rig Up Length at Bottom	0 M
RUP	Rig Up Length at Top	0 M
SW	Salinity of Drilling Water	0

RW	Resistivity of Connate Water	0	OHMM
ECORR	Sonde Eccentralizer	1.0000	IN
SDAT	Standoff Data Source	40000	M
SDATTYP	Standoff Data Attachment	SOCH	
SHT	Surface Hole Temperature	0	
SOCN	Standoff Distance	5.172	DEGC
SPHC	Spherical Correction Option	NO	MM
SPNO	Standoff Count	0	
SSHC	SS Hardware Loop Control	DISALLOW	MV
STDC	Subsequent Trip Down Log Correction	40000	M
STI	STI Stuck Threshold	1.624	M
TD1	Total Depth	40000	M
TD2	Total Depth - Driller	39996	M
TDL	Total Depth - Logger	39998.00	M
TNDCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
TNDCN	Tension Device Calibrator Serial Number	1008	
TNDGN	Tension Device GAIN	1	
TNDOF	Tension Device Offset	0	
TNDSN	Tension Device Serial Number	1	
TNDTYP	Tension Device Type	2816	
TSCU	TSCU Enable	CMTD	
TWE	Corrected Depth Computation	YES	
TWSD	Temperature of Connate Water Sample	27.78	DEGC
ZDCU	Zero Datum	904.685	ILND
ZPCU	Tool Zero Reference Check at Surface	40000	

Format: AITH_2LIN Vertical Scale: 1:600 Graphics File Created: 10-Jan-2000 13:10

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTC-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA	.009	FNIS PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA	.012	FNI:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA	.010	FNI:32 CUSTOMER	10-Jan-2000 13:09

Input DLIS Files

DEFAULT	SPEA	.009	FNIS PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA	.010	FNI:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA	.010	FNI:32 CUSTOMER	10-Jan-2000 13:09

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTC-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

PIP SUMMARY

Time Mark Every 60 S

SP (SP)
-120 (MV) 30

Tension (TENS)
1500000 (N) 0

Gamma Ray (GR)
0 (GAPI) 150

LDT Caliper (CALI)
12in (MM) 375in

Mud Cake Drag From DTT To STIA
0 (IN) 30

Bit Size (BS)
125 (MM) 375 From STIA

Mud Cake Drag From STIA
0 (IN) 30

AIT Uncut Shale Diameter (AIRD)
125 (MM) 375

Stuck Sonde (STIT)
0 (M) 30

Shk Res. Uncted Zone Resistivity (RXOZ)
0.2 (OHMM) 2000

AIT 90 Inch Investigation (AF90)
0.2 (OHMM) 2000

AIT 60 Inch Investigation (AF60)
0.2 (OHMM) 2000

AIT 30 Inch Investigation (AF30)
0.2 (OHMM) 2000

AIT 20 Inch Investigation (AF20)
0.2 (OHMM) 2000

AIT 10 Inch Investigation (AF10)
0.2 (OHMM) 2000

MAIN PASS SP +/- 15

CALIPER CASING CHECK

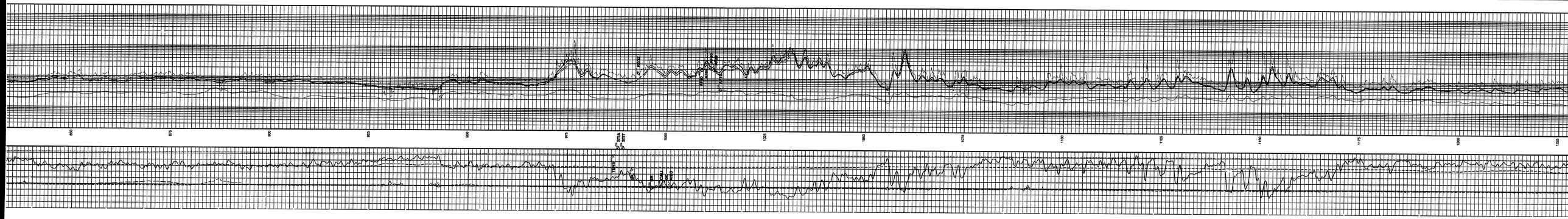
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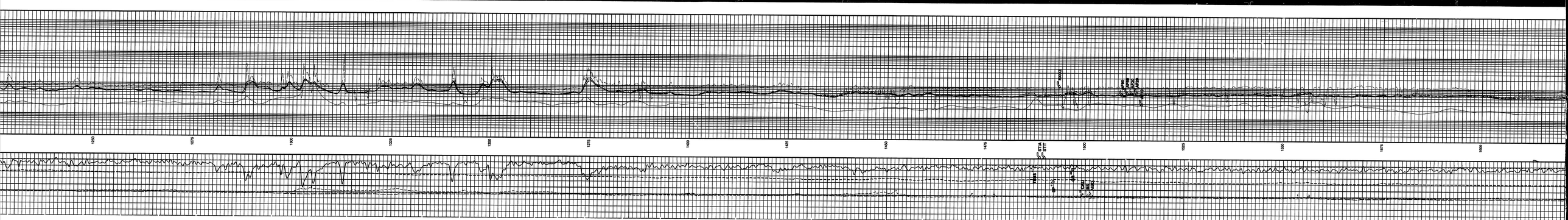
STIA
STIT

SHOC

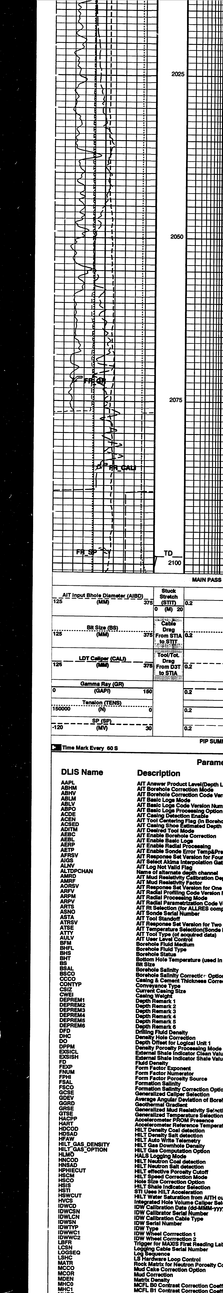
AF90
AF60
AF30
AF20
AF10

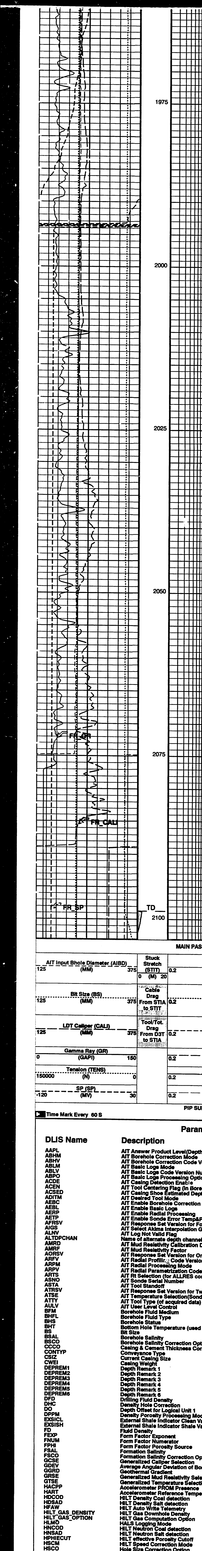
525
550
575
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625
650
675
700
725
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775
800
825


850
875
900
925
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975
1000
1025
1050
1075
1100
1125
1150
1175
1200
ETIA
BTIT
TBNB
BIT
DIEL
MED


1950
1975
1000
1025
1050
1075
1100
1125
1150
1175
1200
1225
1250
1275
1300
1325
1350
1375
1400
1425
1450
1475
1500
1525
1550
1575
1600

1650
1675
1700
1725
1750
1775
1800
1825
1850
1875
1900
1925
1950
1975
2000


2025
2050
2075
2100
FR_SP
FR_CALI
FR_GR
FR_TENS
FR_HVOL
FR_HTEN
FR_MRES
FR_MTEM
FR_SPD
TD
MAIN PASS SP +/- 15
AIT Input Bhole Diameter (AIBD)
(MM)
Stuck Sheath (STIT)
(IN)
AIT 10 Inch Investigation (AF10)
(OHMM)
Bit Size (BS)
(MM)
Caliper Drag From STIA to STIT
AIT 20 Inch Investigation (AF20)
(OHMM)
LDT Caliper (CALI)
(MM)
Tool/Tot. Drag From TDT to STIA
AIT 30 Inch Investigation (AF30)
(OHMM)
Gamma Ray (GR)
(GAPI)
AIT 60 Inch Investigation (AF60)
(OHMM)
Tension (TENS)
(N)
AIT 90 Inch Investigation (AF90)
(OHMM)
SP (SP)
(MV)
Std. Res. Invaded Zone Resistivity (RXOZ)
(OHMM)
Time Mark Every 60 S
PIP SUMMARY
Parameters
DLIS Name
Description
Value
AAPL
AIT Antenna Product Level(Depth Log/View only)
2_ShotsCorr_BasicLogs
ABHM
AIT Borehole Correction Mode
Computed_Processing
ABNV
AIT Borehole Correction Code Version Number
1
ABLM
AIT Basic Logs Mode
6_One_Two_and_Four
ABVC
AIT Basic Logs Version Number
1
ABVO
AIT Basic Logs Processing Option
Standard_Processing
ACBE
AIT Casing Detection Enable
Yes
ACDM
AIT Casing Detection Mode (Log or Borehole)
Borehole
ACEE
AIT Casing Eccentered Depth
-9999
M
ADHM
AIT Dielectric Tool Mode
0x00_Low_Res_Only
AEBC
AIT Enable Basic Corr
Yes
AEBP
AIT Enable Basic Processing
Yes
AETP
AIT Enable Borehole Temp&Pres Corr
Yes
AFRSV
AIT Responses Set Version for Four ft Resolution
20.64.23.11
AIAV
AIT Log Not Valid Flag Value
-9999
Log_Valid=No_Default_Parameters
ALTDPCHAN
Name of alternate depth channel
Spectrecchannels
AMRF
AIT Most Restrictive Calibration Depth
-9999
M
AORSV
AIT Responses Set Version
1
ARFM
AIT Radial Processing Mode for One ft Resolution
20.64.23.11
ARFV
AIT Radial Processing Data Version Number
700
ARPM
AIT Radial Processing Mode
6_One_Two_and_Four
ARVS
AIT Radial Processing Mode Version Number
1
ASID
AIT Sonde Serial Number
1_ATSP
ASTD
AIT Tool Standoff
2.54
MM
ATRSV
AIT Responses Set Version for Two ft Resolution
30.64.23.11
ATSE
AIT Tool Type (or acquired Error Correction)
ATSE
ATTV
AIT Tool Type (or acquired Data)
AITH
AVFV
AIT User Level Control
1003.02
BFH
Borehole Fluid Type
WATER
BHS
Borehole Status
OPEN
BI
Bit Size
215.9
DEGC
BSAL
Borehole Salinity
-9999.00
PPM
CDCC
Caliper Data Correction - Option
NO
CDHTP
Casing & Cement Thickness Correction Option
NO
CDL
Current Casing Label
Wireline
CDS
Current Casing Size
244.000
MM
CHTM
Cable Weight
63.70
KG/M
DBHREM1
Depth Remark 1
DBHREM2
Depth Remark 2
DBHREM3
Depth Remark 3
DBHREM4
Depth Remark 4
DBHREM5
Depth Remark 5
DBHREM6
Depth Remark 6
DFD
Drilling Fluid Density
1220.00
K/M3
DO
Density Hole Correction
CALIPER
M
DPFM
Density Processing Mode
STD
M
EXBECL
External Shale Indicator Clean Value
1600
EXBSH
External Shale Indicator Shale Value
150
FD
Fluid Density
1000
K/M3
FEXP
Form Factor Exponent
2
FFHV
Form Factor Porosity Value
0.45
FFSC
Formation Porosity Source
DPOZ
PPM
FSOC
Formation Salinity Correction Option
NO
GCEV
Generalized Caliper Selection
HCALI
GDRS
Generalized Depth Resolution of Borehole from Normal
0.500
DEG
GRSE
Generalized Mud Resistivity Selection
CHART_DATA
DCIM
GTEM
Generalized Temperature Selection
HTTE_HYTH
HAOT
Accelerometer Pitch Processing Selection
PRESENT_FILE
HBCO
Borehole Compensation Mode Version Number
1
DEGC
HDCO
HDIL Density Coil Selection
2000
K/M3
HFSC
HDIL Density Salt detection
2100
K/M3
HGSC
HDIL Gain Compensation
NO
K/M3
HLDT
HDIL Gain Computation Option
OFF
HMCO
HDIL Mudcake Correction
STAN
HNSAD
HILT Neutron Salt detection
0.45
V/V
HPOSCUT
HILT effective Porosity Cutoff
0.45
V/V
HSCO
HILT Speed Correction Mode
TSCD_SPEED_CORRECTION
HSIS
HILT Shale Indicator Selection
YES
HSIV
HILT Shale Indicator Value
0.45
HVCC
Integrated Mud Volume Caliper Selection
HCALI
%
IDWCD
IDW Calibration Date (dd-MMM-YYYY)
dd-MMM-YYYY
IDWCN
IDW Calibration Serial Number
7-449
IDWEN
IDW Serial Number
7-449
IDWTYP
IDW Type
IDW-B
IDWWC1
IDW Wheel Correction 1
-999
IDWWC2
IDW Wheel Correction 2
-999
LDFL
Trigger for MAXED First Reading Label
Logging Cable Serial Number
-999
LDSEQ
Log Sequence
First_Log_In_Well
LSHC
LS Hardware Loop Control
CALLOW
MATD
Mask Matrix for Neutron Porosity Corrections
SANDSTONE
MCSN
Mud Cake Correction Option
NO
MDEN
Mud Correction
NATU
MHCC
MCFL Pi Contrast Correction Coefficient
2.500
K/M3
MHC1
MCFL R1 Contrast Correction Coefficient
3.2e-005
OHMS
MHCO
MCFL Pi Contrast Correction Switch
NO
MPCF
MCFL Polarization Correction Mode
NO
MST
Mud Sample Temperature
14.00
DEGC
NAAC
HNGT Accelerator Correction
NO
NMT
HILT Norther Mud Type
NOBLANK
NPMM
HNGD Processing Mode
NRM
NPSM
HNGD Depth Sampling Rate
25.4
MM
OPHAY
HILT mud resistivity for playback
0.00
V/V
PTCO
Playback Processing
RECOMPUTE
PTCP
Playback Temperature Correction Option
NO
RGTYP
Reference Log Type
LAND
RLDT
Reference Log Date (dd-MMM-yyyy)
dd-MMM-yyyy
RLRN
Reference Log Run Number
RMFS
Reference Log Mud Filtrate Sample
0.2100
OHMM
RTCO
RTOC - Pit Inclination Correction
YES
RULS
Rig Up Length at Bottom
0
M
RUS
Rig Up Length at Surface
0
M
RW
Resistivity of Borehole Water
1.0000
OHMM
SCWR
Stretch Correction
NO
SDFV
Sonde Frequency
MV
SEHC
SS Hardware Loop Control
DISALLOW
SHT
Subsequent Trip Down Log Correction
-9999
M
SOCH
Sonde Threshold
1.524
M
TDD
Total Depth - Driller
2000
M
TDL
Total Depth - Logger
2000.00
M
TNDCN
Tension Device Calibration Date (dd-MMM-yyyy)
dd-MMM-yyyy
TNDCS
Tension Device Calibration Serial Number
-999
TNDON
Tension Device GUID
-999
TNDOF
Tension Device Offset
0
TNDSN
Tension Device Serial Number
-999
TNDTY
Tension Device Type
CMTC-SLS
TSEC
TSCD Enable Corrected Depth Computation
YES
TWT
Temperature of Borehole Water Sample
27.78
DEGC
WMUD
Weight of Mud Sample
964.000
K/M3
ZSCC
Mud Level Reference Check at Surface
-99999
M
Format: AITH_ELOG
Vertical Sc.fac: 1/240
Graphics File Created: 10-Jan-2000 13:10
OP System Version: 9C1-303
MCM
SPE-A 9C1-303
LDT-D 9C1-303
HILTB-FTB 9C1-303
AIT-B 9C1-303
DTA-A 9C1-303
DTC-H 9C1-303
Speed Corrected - Depth Matched LOG
Input DLIS Files
DEFAULT SPEA .009 FN:8 PRODUCER 10-Jan-2000 12:11
Output DLIS Files
DEFAULT SPEA .010 FN:31 PRODUCER 10-Jan-2000 13:09
CUST SPEA .010 FN:32 CUSTOMER 10-Jan-2000 13:09
Input DLIS Files
DEFAULT SPEA .006 FN:7 PRODUCER 10-Jan-2000 11:11 2103.1 M 1864.6 M
Output DLIS Files
DEFAULT SPEA .016 FN:25 PRODUCER 10-Jan-2000 13:00 2103.1 M 1864.6 M
CUST SPEA .016 FN:26 CUSTOMER 10-Jan-2000 13:00 2103.1 M 1864.6 M
OP System Version: 9C1-303
MCM
SPE-A 9C1-303
LDT-D 9C1-303
HILTB-FTB 9C1-303
AIT-B 9C1-303
DTA-A 9C1-303
DTC-H 9C1-303
Time Mark Every 60 S
PIP SUMMARY
SP (SP)
(MV)
Std. Res. Invaded Zone Resistivity (RXOZ)
(OHMM)
Tension (TENS)
(N)
AIT 90 Inch Investigation (AF90)
(OHMM)
Gamma Ray (GR)
(GAPI)
AIT 60 Inch Investigation (AF60)
(OHMM)
LDT Caliper (CALI)
(MM)
Tool/Tot. Drag From TDT to STIA
AIT 30 Inch Investigation (AF30)
(OHMM)
Bit Size (BS)
(MM)
Caliper Drag From STIA to STIT
AIT 20 Inch Investigation (AF20)
(OHMM)
AIT Input Bhole Diameter (AIBD)
(MM)
Stuck Sheath (STIT)
(IN)
AIT 10 Inch Investigation (AF10)
(OHMM)
REPEAT SECTION +/- 15
LAST READING
1875
1900
1925
1950



MAIN PASS SP +/- 15

AIT Input Shoe Diameter (AISD) (MM)	125	375	Shuck Stretch (STIT) (M)	0.2 / 2000 — AIT 10 Inch Investigation (AF10) (OHMM)
Bit Size (BS) (MM)	125	375	Cable Drag From STA to STIT (M) 20	0.2 / 2000 — AIT 20 Inch Investigation (AF20) (OHMM)
LDT Caliper (CALI) (MM)	125	375	Total Fric. Drag From EOT to STA (M) 20	0.2 / 2000 — AIT 30 Inch Investigation (AF30) (OHMM)
Gamma Ray (GR) (GAPI)	0	150		0.2 / 2000 — AIT 60 Inch Investigation (AF60) (OHMM)
Tension (TENS) (N)	1500000	0		0.2 / 2000 — AIT 90 Inch Investigation (AF90) (OHMM)
SP (SP) (MV)	-120	30		0.2 / 2000 — Std. Res. Invaded Zone Resistivity (RXOZ) (OHMM)

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_ShuloCorr_BasicLogs
ABHV	AIT Borehole Correction Mode	1_ComputeAnalyze
ABLM	AIT Basic Logs Code Version Number	610
ABLW	AIT Basic Logs Mode	6_One_Two_and_Three
ACCV	AIT Basic Logs Code Version Number	872
ACDE	AIT Basic Logs Processing Option	Standard_Processing
ACDS	AIT Data Sampling Rate	2
ACEC	AIT Test Centering Flag (0=Unstable)	Eccentered
ACSD	AIT Casing Shoe Estimated Depth	6000 M
ADBC	AIT Default Borehole Code	0x80_1,4x5_0x0
AEBL	AIT Enable Basic Logs	Yes
AERL	AIT Enable Radial Processing	Yes
AFSV	AIT Enable Sonde Error Temp/Drive Corr	Yes
ALRP	AIT Array Logging Rate Per Foot Resolution	30.64,23,11
ALWS	AIT Select Arrays Interpolation Gating	On
ANEP/CHAN	AIT Log Not Valid Flag	Log_Valid=No_Default_Parameters
AMID	AIT Mud Resistivity Calibration Depth	SpeedCorrectedDepth
AMRF	AIT Mud Resistivity Factor	6000 M
AMRV	AIT Mud Resistivity Version for One ft Resolution	700
ARPM	AIT Radial Processing Code Version Number	700
ARTD	AIT Radial Presentation Code Version Number	710
ARTS	AIT Rt Selection (for ALLRES computation)	1_ATR0
ASEL	AIT Select Logging	ALL
ATMM	AIT Tool Standoff	0.5 MM
ATRSV	AIT Response Set Version for Two ft Resolution	30.64,23,11
ATTC	AIT Temperature Selection(Borehole Error Correction)	Internal
ATTF	AIT Temperature (required data)	AITB
AULV	AIT User Logical Curves	None
BFIN	Borehole Fluid Medium	LIQUID
BHFL	Borehole Fluid Type	WATER
BHS	Bit Size	222.003
BHT	Bottom Hole Temperature (used in calculations)	0 DEGC
BS	Bit Size	222.003 MM
BSAL	Borehole Salinity	-0000.00 PPM
BSCL	Borehole Salinity Correction Option	NO
CCDT	Casing & Cement Thickness Correction Option	NO
CMOD	Conveyance Type	Wireline
CWS	Current Casing Size	244.000 MM
DEPHEM1	Depth Remark 1	6000 M
DEPHEM2	Depth Remark 2	0
DEPHEM3	Depth Remark 3	0
DEPHEM4	Depth Remark 4	0
DEPHEM5	Depth Remark 5	0
DEPHEM6	Depth Remark 6	0
DFD	Drilling Fluid Density	1220.00 K/M3
DHC	Density Hole Correction	CENTRALIZED
DI	Depth Offset for Logging Unit 1	0.0 M
DPHM	Density Porosity Processing Mode	HSRS
EXBSL	External Shale Indicator Source	GR
EXSSH	External Shale Indicator Shale Value	100
FD	Fluid Density	1000 K/M3
FEXP	Formation Exponent	2
FMOM	Form Factor Mixmodel	0
FPHI	Form Factor Porosity Source	0
FSAL	Formation Salinity	20000 PPM
GCSC	Formation Salinity Correction Option	NO
GDEV	Geothermal Deviation	0.0 DEG
GRAD	Average Angular Deviation of Borehole from Normal	0.018227 DEGM
GRSC	Geothermal Gradient	CHART_SEN_S
HBSP	Geometrical Temperature Selection	HSTE_HTEE
HLDZP	Accelerometer PROM Presence	PRESENT_OK
HLTC	Accelerometer Reference Temperature	25 DEGC
HOCD	HILT Density Coal detection	2000 K/M3
HSAD	HILT Density Salt detection	2200 K/M3
HSAV	HILT Acq Vars Write Telemetry	NO
HSDW	HILT Gas Downhole Density	1000 K/M3
HSGC	HILT Gas Correction Option	OFF
HSLD	HALS Logging Mode	STAN
HSOD	HILT Neutron Coal detection	0.45 V/V
HSOS	HILT Neutron Salt detection	0.45 V/V
HSPED/OUT	HILT Effective Porosity Count	0.00 V/V
HSCM	HILT Speed Correction Mode	TSCD_SPEED_CORRECTION
HSCO	Hole Size Correction Option	YES
HSTI	HILT Stable Indicator Selection	GR
HSTP/OUT	HILT Stable Porosity Count	0.00
HVCC	Integrated Hole Volume Caliper Selection	HCAL
IDWCSN	IDW Calibration Serial Number	dd-MMM-YYYY
IDWLCN	IDW Calibration Cable Type	7-46F
IDWTP	IDW Serial Number	2009
IDWWC1	IDW WOMM Correction 1	IDW-E
IDWWC2	IDW WOMM Correction 2	0.0
LBEN	Trigger for MAXIS First Reading Label	STI
LDSN	LDT Sensor Serial Number	2009
LOGSEQ	Log Sequence	First_Log_In_Hole
LSHC	LS Hardware Loop Control	DISALLOW
MCDP	Mud Cake Dielectric Porosity Correction	SANDSTONE
MCOC	Mud Cake Correction Option	NO
MDSN	Mandrel Serial Number	3000
MHC1	MCFL Bit Contrast Correction Coefficient	3.2e-005 OHMS
MHC2	MCFL Low Contrast Correction Coefficient	3.2e-005 OHMS
MHC3	MCFL High Contrast Correction Coefficient	0
MHCP	MCFL Processing Operation Mode	ON
MHT	Mud Hydrogen Index	14.00 DEGC
MHVCO	Mud Weight Correction Option	NO
NAAC	HRDD APS Activation Curve	NO
NAMC	HILT Neutron Mud Type	NOBARITE
NBAR	HRDD Processing Mode	HiRes
NRGD	HRDD Data Sampling Rate	0.125 MM
PAVGADP	Use alternate depth channel for playback	NO
PHMAX	HILT max porosity	0.30 V/V
PTCO	Pressure/Temperature Correction Option	RECOMMENDED
RGTYP	Rig Type	LAND
RLAS	Reference Log Data (dd-MMM-yyyy)	dd-MMM-YYYY
RLRN	Reference Log Run Number	1
RMFR	Reference Log Run Number	1
RMFT	Resistivity of Mud Filtrate Sample	0.3100 OHMM
RTCO	RTCO - Rt Inversion Correction	YES
RUCS	Rig Up Logging Unit Side	S
RUSN	Rig Up Location at Surface	N
RW	Resistivity of Connate Water	1.0000 OHMM
SBHT	Static Bottom Hole Temp	-0000.00
SDAT	Standoff Data Source	SOCH
SEXP_HILT	HILT Saturation Exponent	2
SFCT	Surface Hole Temperature	20 DEGC
SOCO	Standoff Distance	3.175 MM
SOCS	Standoff Correction Option	NO
SSVC	SP Nest Value	NOMINAL MV
SSWC	SS Hardware Loop Control	DISALLOW
STCO	Stretch Correction Report Log Correction	20000 M
STD	STI Stuck Things Do	0.0 M
TD	Total Depth	6000 M
TDD	Total Depth - Driller	6000.00 M
TDL	Total Depth - Logger	6000.00 M
TNDCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-YYYY
TNDCSN	Tension Device Calibrator Serial Number	0
TNDGFF	Tension Device GUFF	0
TNDSN	Tension Device Serial Number	0
TNDTYP	Tension Device	0
TWCC	Tool Weight Corrected Depth Computation	CMTD-B/A
TWS	Tool Weight w/ Consists Water Sample	YES
WMUD	Mud Weight	1220 DEGC
ZSCS	Tool Zero Reference Check at Surface	6000.00 M

Format: AIT_REPSEC Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 13:00

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	STA-A	9C1-303
HILT* YTB	9C1-303	DTC-H	9C1-303

Speed Corrected - Depth Matched LOG

Input DLIS Files

DEFAULT	SPEA .008	FN:7	PRODUCER	10-Jan-2000 11:11	2103.1 M	1884.6 M

Output DLIS Files

DEFAULT	SPEA .016	FN:25	PRODUCER	10-Jan-2000 13:00	
CUST	SPEA .016	FN:26	CUSTOMER	10-Jan-2000 13:00	

Input DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 12:11	

Output DLIS Files

DEFAULT	SPEA .010	FN:31	PRODUCER	10-Jan-2000 13:00	
CUST	SPEA .010	FN:32	CUSTOMER	10-Jan-2000 13:00	

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	STA-A	9C1-303
HILT/B-J* B	9C1-303	DTC-H	9C1-303

PIP SUMMARY

Time Mark Every 60 S

SP (SP) (MV)	-120 / 30		
Tension (TENS) (N)	1500000 / 0		
Gamma Ray (EHGR) (GAPI)	0 / 150		
LDT Caliper (CALI) (MM)	125 / 375	Total Fric. Drag From EOT to STA (M) 20	
Bit Size (BS) (MM)	125 / 375	Cable Drag From STA to STIT (M) 20	
AIT Input Shoe Diameter (AISD) (MM)	125 / 375	Shuck Stretch (STIT) (M) 20	

H. Res. Invaded Zone Resistivity (RXOR) (OHMM) 0.2 / 2000

AIT 90 Inch Investigation (AO90) (OHMM) 0.2 / 2000

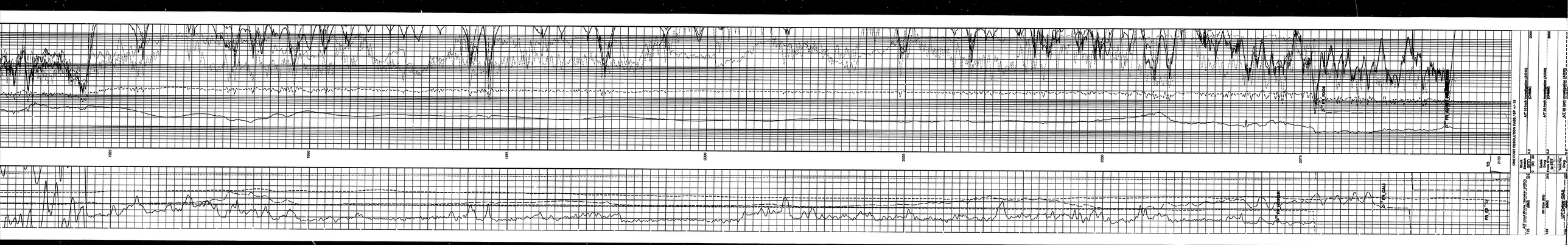
AIT 60 Inch Investigation (AO60) (OHMM) 0.2 / 2000

AIT 30 Inch Investigation (AO30) (OHMM) 0.2 / 2000

AIT 20 Inch Investigation (AO20) (OHMM) 0.2 / 2000

AIT 10 Inch Investigation (AO10) (OHMM) 0.2 / 2000

ONE FOOT RESOLUTION PASS / SP +/- 15


1955
1960
1970
2000
2020
2050
2075
TD
2100
ONE-FOOT RESOLUTION FAULT SP +/- 15
FR_RXO
FR_RT
FR_SP
FR_CALI
FR_GR
FR_RESMUD
FR_RESMUD
FR_SP
FR_CALI
AIT Induction Shallow Resistivity (HILD)
AIT Induction Medium Resistivity (HIMD)
AIT Deep Induction Resistivity (HILD)
Bit Size (BS)
Caliper (CALI)
Density Correction (DRHO)
Gamma Ray (GR)
Neutron Porosity (TNPH)
Photoelectric Factor (PEF)
Bulk Density (RHOB)

Gamma Ray (SHGR) 0 (GAPI) 150

Tension (TENS) 1500000 (N) 0

SP (SP) +120 (MV) -30

Time Mark Every 60 S

Bit Size 6 (IN)

AIT 90 Inch Investigation (AO90) 0.2 (OHMM) 2000

AIT 30 Inch Investigation (AO30) 0.2 (OHMM) 2000

Hi Res. Invaded Zone Resistivity (RXOZ) 0.2 (OHMM) 2000

PIP SUMMARY

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_RholsCorr_BasicLogs
ABHV	AIT Borehole Correction Mode	2_CorrectedAndUncorr
ABHV	AIT Borehole Correction Code Version Number	670
AIBV	AIT Basic Logs Mode	4_One_Two_and_Four
AIBV	AIT Basic Logs Code Version Number	972
ATSD	AIT Tool Standoff Selection Mode	Standard_Processing
ACSC	AIT Casing Detection Enable	Yes
ACEN	AIT Tool Centering Flag (in Borehole)	Eccentered
ACDD	AIT Casing Thickness Computed Depth	-60000 M
AEBC	AIT Enable Borehole Correction	0x00_Log_000
AESL	AIT Enable Skin Logs	Off
AERP	AIT Enable Radial Processing	Yes
AEPV	AIT Enable Vertical Resolution/Pres Corr	Yes
AUSV	AIT Response Variation for Four 5 Resolution	30,64,23,111
AUWI	AIT Select Alldas Interpolation Gating	On
AUXV	AIT Auxiliary Logs Mode	Log_Valid+No_Default_Parameters
ALTCHCHAN	Name of Alternate Depth channel	SpeedCorrectedDepth
AMRD	AIT Mud Resistivity Calibration Depth	0 M
AMRV	AIT Mud Resistivity Value	222.000
ARFV	AIT Response Std Variation for One ft Resolution	30,64,23,111
ARPV	AIT Radial Processing Mode	Standard
ARPM	AIT Radial Processing Mode	4_One_Two_and_Four
ARPV	AIT Radial Parameterization Code Version Number	715
ARPV	AIT Radial Processing (AE83 computation)	1_AT90
CWS	AIT Surface Serial Number	63.70
ASTA	AIT Tool Standoff	28.4 MM
ATRV	AIT Response Std Variation for Two ft Resolution	30,64,23,111
ATES	AIT Tool Eccentralization(Include Error Correction)	Internal
ATTY	AIT Tool Type (id assigned data)	HALS
AWEL	Borehole Fluid	Hydrocarbon
BFPL	Borehole Fluid Medium	LIQUID
BHTP	Borehole Mud Type	WATER
BHS	Borehole Salinity	0 PPM
BMT	Bottom Hole Temperature (used in calculations)	76 DEGC
BS	Bit Size	222.000 MM
BSAL	Borehole Salinity	-60000 PPM
BSCO	Borehole Salinity Correction Option	Off
CASCO	Casing & Cement Thickness Correction Option	No
CDRTYP	Conveyance Type	Wireline
CNTH	Casing Thickness	0.000 MM
CWS	Casing Weight	63.70 KG/M
DEPREM1	Depth Remark 1	
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFD	Drilling Fluid Density	1220.00 K/M3
DFC	Dwell/Flole Correction	CALIPER
DFPH	Depth Offset for Logged Unit 1	0.0 M
DIGMOD	Digitizer Sampling Mode	Hi_Res
EXBSEL	External Shake Indicator Clean Value	20
EXBSH	External Shake Indicator Shake Value	150
FD	Fluid Density	1000 K/M3
FDFP	Form Factor Numerator	1
FNUM	Form Factor Numerator	2
FSRS	Form Factor Porosity Source	DENC
FW	Formation Salinity	-60000 PPM
GCSC	Generalized Caliper Correction Option	Off
GDSV	Generalized Caliper Selection	HCAL
GDSY	Average Angular Deviation of Borehole from Normal	2 DEG
GMED	Generalized Medium	0.01524 DCIN
GMES	Generalized Mud Resistivity Selection	CHART_DATA
GTSE	Generalized Temperature Selection	HITE_HTEN
HAEP	Accelerometer FROM Firmware	PRESENT_FILE
HAMT	Accelerometer Reference Temperature	30 DEGC
HDCOD	HALS Density Correction Mode	2100 K/M3
HDDD	HILT Density Bed Selection	2100 K/M3
HFSF	HALS Volts Telemetry	NO
HILT_GAS_DENSITY	HILT Gas Density Value	0 K/M3
HILT_GAS_OPTION	HILT Gas Correction Option	OFF
HLMD	HALS Logging Mode	STAN
HMSD	HILT Mud Salinity Selection	0 V/V
HNUG	HILT Nugget Selection	0 V/V
HPHSCUT	HILT effective Porosity Cutoff	0.05
HSCR	HILT Speed Correction Mode	TS;CD_SPEED_CORRECTION
HSCO	Hole Size Correction Option	YES
HSIZ	HILT Hole Size Selection	222
ISTI	ISTI Uses HILT Accelerometer	NO
HSVCUT	HILT Water Saturation from ATRI cutoff	92 %
IDWC	IDW Calibration Coefficients Table	HCAL
IDWCD	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWCSN	IDW Calibration Serial Number	????
IDWCTC	IDW Calibration Cable Type	T-400
IDWSN	IDW Serial Number	-999
IDWTYP	IDW Type	IDW2
IDWVC1	IDW Wheel Correction 1	-999
IDWVC2	IDW Wheel Correction 2	-999
LCAB	Logging Cable Depth Reading Label	CBL
LCSN	Logging Cable Serial Number	0
LOGSEQ	Log Sequence	First_Log_In_Well
LTC	LB Hardware Loop Control	DEVALLOW
MATR	Matrix Selection for Neutron Porosity Corrections	SANDSTONE
MCCO	Mud Cake Correction Option	Off
MCM	Mud Connection	MATU
MDEN	Matrix Density	2650 K/M3
MFCC	MCFL Filtrate Constant Correction Coefficient	2.2e+000 OHMS
MHCC	MCFL IH Constant Correction Coefficient	3.2e+000 OHMS
MHCC	MCFL High Contrast Correction Switch	NO
MHCO	MCFL High Contrast Correction Mode	Off
MST	Mud Sonic Transit Time	142 DEGC
MWCO	Mud Weight Correction Option	Off
NAAC	HRDD API Activation Correction	3.5 MM
NHS	HILT Nuclear Mud Type	NOBASITE
NPRF	HRDD Depth Reference	Bit
NRDS	HRDD Depth Sampling Rate	152.4 MM
PBVRADP	Use alternate depth channel for playback	NO
PSMAX	Playback Speed	2 M/S
PTCO	Playback Processing	RECOMPUTE
PTTP	Pressure/Temperature Correction Option	NO
RIGTP	Rig Type	LAND
RLDT	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy
RLHM	Reference Log Hour	
RLRN	Reference Log Run Number	
RMFS	Resistivity of Mud Filtrate Sample	0.3100 OHMM
RMSC	RM Sensor Correction Option	YES
RUGS	Rig Up Length at Surface	0 M
RULS	Rig Up Length at Surface	0 M
RWA	Resistivity of Formation Water	1.0000 OHMM
SCHOR	Stretch Correction	Off
SDAT	Standoff Data Source	SOCH
SFSF_HILT	HILT Saturation Exponent	2
SGC	Surface Hole Temperature	20 DEGC
SHOW	Standoff Distance	3.5 MM
SSCO	Standoff Correction Option	NO
SPHV	SP Heel Value	MV
SPLC	SP Hardware Loop Control	DISALLOW
STCO	Subsurface Trip Zone Log Correction	NO M
STKT	DIT Blocks Threshold	1.624 M
TDD	Total Depth	-999 M
TDL	Total Depth - Driller	2000.00 M
TDLG	Total Depth - Logger	2000.00 M
TMDCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
TMDSN	Tension Device Calibrator Serial Number	????
TMDTP	Tension Device Type	1
TMDVF	Tension Device Offset	0
TMDSN	Tension Device Serial Number	-999
TMDTY	Tension Device Type	CMTD-MA
TNCO	TENS Distance Corrected Depth Computation	72.39
WMUD	Mud Weight	1220.00 DEGC
ZERO3	Test Zero Reference Check at Surface	0.0000 M

Format: AITH_1LOG Vertical Scale: 1:120 Graphics File Created: 10-Jan-2000 13:10

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Speed Corrected - Depth Matched LOG

Input DLIS Files

DEFAULT	SPEA .009	FN:6 PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .010	FN:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA .010	FN:32 CUSTOMER	10-Jan-2000 13:09

Input DLIS Files

DEFAULT	SPEA .009	FN:6 PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .010	FN:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA .010	FN:32 CUSTOMER	10-Jan-2000 13:09

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

AIT Boosted Borehole Corrected Average Conductivities

Average performed from depth 6794.00 ft/ 2070.81 m with 21048 samples

A1: 1415.882 A2: 564.460 A3: 255.882 A4: 176.271

A5: 142.399 A6: 129.501 A7: 131.008 A8: 127.831

Casing shoe depth estimated from AIT Induction measurements: 1775.25 +/-5 ft

PIP SUMMARY

Time Mark Every 60 S

Tension (TENS) 500000 (N) 5000

AIT OC Fully Calibrated A2 Signal (AQA2IN2T2) 2 (MMHO) 2000

AIT OC Fully Calibrated A7 Signal (AQA2IN3S) 2 (MMHO) 2000

AIT OC Fully Calibrated A6 Signal (AQA2IN3D) 2 (MMHO) 2000

AIT OC Fully Calibrated A5 Signal (AQA2IN1D) 2 (MMHO) 2000

AIT OC Fully Calibrated A4 Signal (AQA2IN2D) 2 (MMHO) 2000

AIT Shols/Form Signal Ratio (ABFR) 2 (V/V) 0

Tool/YXL Drag From DIT 2 to STIA

Caliper Drag From STIA 2 to STIT

AIT OC Fully Calibrated A3 Signal (AQA2IN2D) 2 (MMHO) 2000

Tool Electronics Monitor (from ADES Channel): White=Normal, Blue=Warning, Red=Failure (AQTI) 2 1

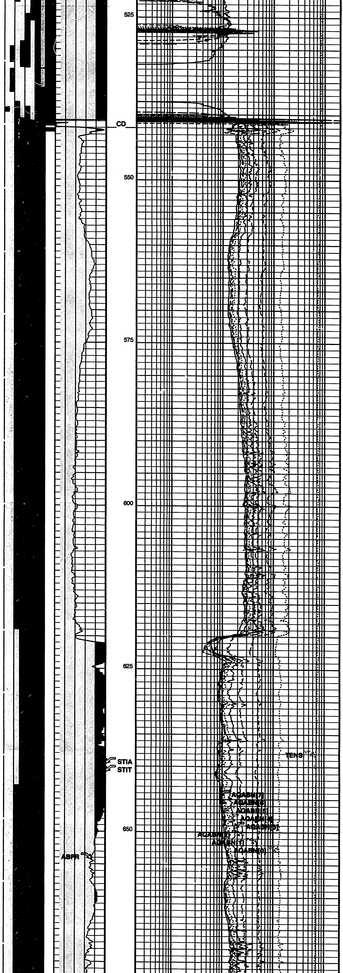
AIT OC Fully Calibrated A2 Signal (AQA2IN1T2) 2 (MMHO) 2000

AIT Array Ratio Modifier: Green=Normal (AQRA) 0 (N) 30

Stuck Stretch (STIT) 0 (IN) 30

AIT OC Fully Calibrated A1 Signal (AQA2IN1D) 2 (MMHO) 2000

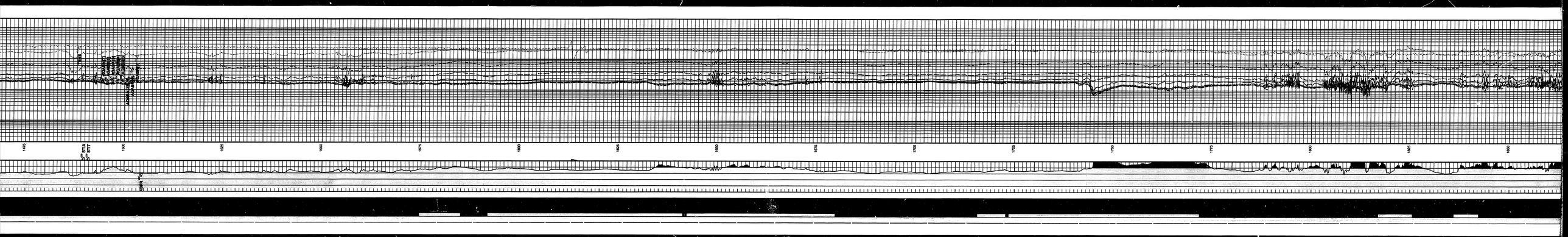
LOG QUALITY IMAGE

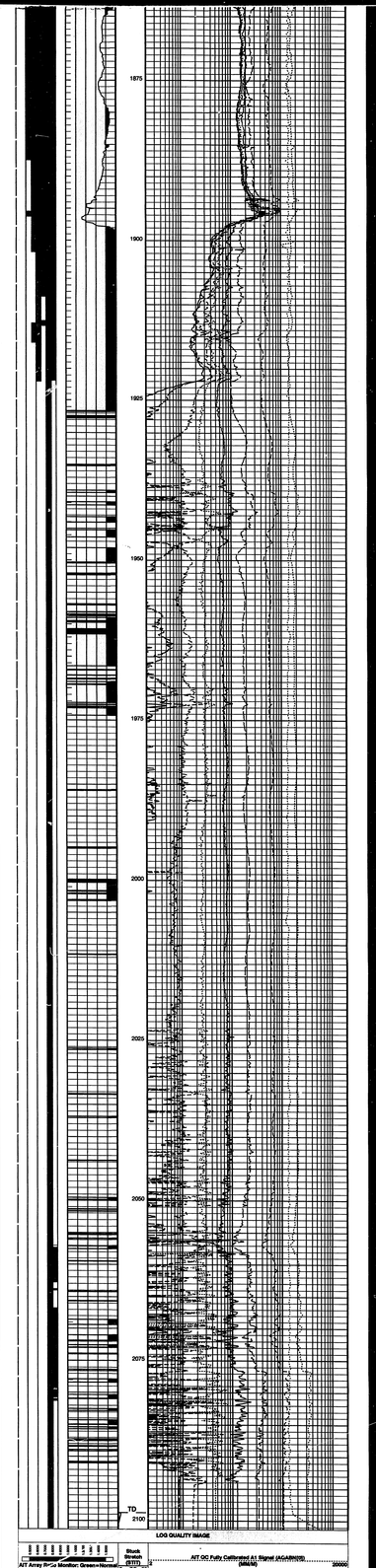


TEN:S

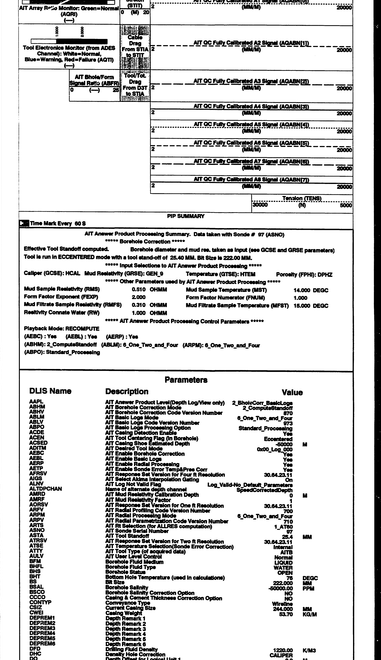
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1050

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1475
STA
5777
1500
1525
1550
1575
1600
1625
1650
1675
1700
1725
1750
1775
1800
1825
1850
SHOT



LOG QUALITY IMAGE



PIP SUMMARY

Time Mark Every 60 S

AIT Answer Product Processing Summary. Data taken with Sonde # 97 (ASNO)

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)
Tool is run in ECCENTERED mode with a tool stand-off of 25.40 MM. BS Size is 222.00 MM.

***** Input Selections to AIT Answer Product Processing *****

Caliper (GCSE): HCAL	Mud Resistivity (GRSE): 0RM_9		Temperature (GTSE): HTEM		Porosity (FPHZ): DPHZ

***** Other Parameters used by AIT Answer Product Processing *****

Mud Sample Resistivity (RMS)	0.010	OHMM	Mud Sample Temperature (MST)	14.000	DEGC
Form Factor Exponent (FEXP)	2.000		Form Factor Numerator (FNUM)	1.000	
Mud Filtrate Sample Resistivity (RMFS)	0.310	OHMM	Mud Filtrate Sample Temperature (MFST)	18.000	DEGC
Resistivity Connate Water (RW)	0.000	OHMM			

***** AIT Answer Product Processing Control Parameters *****

Playback Mode: RECOMPUTE
(AESC) : Yes (AESL) : Yes (AERP) : Yes
(ARHS): 2_ComputedBandcnt (ARLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four
(ARPO): Standard_Processing

Parameters

DLIS Name	Description	Value
AAPL	AIT Sensor Product Level(Depth Log/View only)	2_RiteOne_BaseLogs
ABHN	AIT Borehole Correction Mode	1_CompleteBoreholeCorr
ABHV	AIT Borehole Correction Code Version Number	810
ABLM	AIT Basic Logs Mode	6_One_Two_and_Four
ABLV	AIT Basic Logs Code Version Number	2.4
ABPO	AIT Basic Logs Processing Option	Standard_Processing
ACDN	AIT Casing Detection Enable	Yes
ACDO	AIT Casing Detection Option	Exceptional
ADBSD	AIT Casing Hunting Max Depth	2100 M
ADTM	AIT Deadtime Tool Mode	0x00_Log_Data
AEBC	AIT Enable Borehole Correction	Yes
AEBS	AIT Enable Basic Logs	Yes
AEFW	AIT Enable Speed Processing	Yes
AFRV	AIT Enable Time/Array Corr	Yes
AFSV	AIT Sensors Set Version for Four ft Resolution	30,64,23,11
ALDO	AIT Logging Direction Setting	Down
ALNV	AIT Log Not Valid Flag	0
ALTDCHAN	Alarm of alternate depth channel	SpeedCorrectedDepth
AMRF	AIT Mud Resistivity Correction Depth	M
AMRV	AIT Mud Resistivity Value	0
AORV	AIT Response Set Version for One ft Resolution	30,64,23,11
APHV	AIT Radial Processing Code Version Number	810
APPM	AIT Radial Processing Mode	6_One_Two_and_Four
ARTV	AIT Real Time Code Version Number	1.2
ARTX	AIT Rt Selection (for ALLRES computation)	1_ATR0
ASNO	AIT Sonde Serial Number	97
ATCC	AIT Tool Combination	364 MM
ATRSV	AIT Response Set Version for Two ft Resolution	30,64,23,11
ATSE	AIT Temperature Selection(Sonde Error Correction)	Internal
ATTC	AIT Tool Type (if acquired data)	AITB
ATUV	AIT Tool Version	1.2
BFM	Borehole Fluid Condition	1500.00
BHS	Borehole Fluid Salinity	1500.00
BHT	Borehole Fluid Type	WATER
BHV	Borehole Status	OPEN
BIT	Bit Size Borehole Mode Temperature (used in calculations)	222.000 DEGC
BS	Bit Size	222.000 MM
BSAL	Borehole Salinity	-90000.00 PPM
CCCO	Compute Caliper Correction Option	NO
CCCV	Compute Caliper Thickness Correction Option	NO
CONTYP	Connection Type	Wireline
CSG	Current Casing Size	244.000 MM
CWGT	Casing Weight	53.70 KG/M
DEPREM1	Depth Remark 1	
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFC	Drilling Fluid Density	1230.00 K/M3
DFL	Depth Offset for Logfoot Unit 1	CALIPER
DO	Depth Offset for Logfoot Unit 1	0 M
DPFM	Primary Porosity Processing Mode	HRM
EXBOL	External Shale Indicator Clean Value	20
EXSHA	External Shale Indicator Shale Value	120
FD	Fluid Density	1000 K/M3
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
FWA	Formation Water Salinity	0 PPM
FWAL	Formation Salinity	-90000 PPM
GCEC	Generalized Caliper Correction Option	NO
GCEV	Generalized Caliper Selection	HCAL
GDEV	Generalized Deviation Selection of Borehole from Normal	0 DEG
GHAV	Geothermal Gradient	0.015227 DC/M
GRSE	Generalized Mud Resistivity Selection	CHART_GEN_9
GTSE	Generalized Temperature Selection	MEAS_TEMP
HACPP	Arabiscreener Processing Mode	PRESENT_PASS
HART	Arabiscreener Reference Temperature	20 DEGC
HDAD	HELT Density Dual Detection	2000 K/M3
HDAV	HELT Density Sail detection	2100 K/M3
HFAW	HELT Gas Correction Density	0 K/M3
HGCD	HELT Gas Correction Option	OFF
HGCV	HELT Gas Computation Option	0.45 V/V
HHCO	HELT Hole Size Correction	0.45
HHSD	HELT Neutron Dual detection	0.06 V/V
HHSV	HELT Neutron Sail detection	0.06 V/V
HHVO	HELT Wheel Correction Option	TSCD_SPEED_CORRECTION
HSCO	Hole Size Correction Option	YES
HSS	HELT Mode Indication	0
HTT	Time HELT Acceleration	40
HWCUT	HELT Wheel Correction (ATH cutoff	0 %
HVOL	Interpolated Hole Volume Calculation	HCAL
IDWCD	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWCN	IDW Calibration Coefficient	0.000
IDWLCN	IDW Calibration Coefficient Type	T-wall
IDWSN	IDW Serial Number	-999
IDWTT	IDW Tool Type	IDW-A
SWFC	IDW Wheel Correction	-999
SWWC2	IDW Wheel Correction	-999
LBVR	Trigger for MAXIS First Reading Label	211
LOGSEQ	Logging Cable Serial Number	1
LOGTRG	Log Trigger	First_Log_In_Well
LSVC	LS Hardware Logic Control	DUALFLOW
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE
MCOD	Mud Correction Code	1
MCOO	Mud Correction	HNO
MDEN	Metric Density	2650 K/M3
MHCC	MCFL Bit Correction Coefficient	2.2e-005 OHMS
MHCO	MCFL Borehole Correction Coefficient	3.2e-005 OHMS
MPDC	MCFL Processing Operation Mode	0
MPOF	MCFL Processing Operation Mode	0
MRT	Mud Sample Temperature	14.00 DEGC
MSCO	Mud Standoff Correction Option	NO
NHAC	HRDD APS Activation Correction	ON
NMT	HELT Nuclear Mud Type	NOBARITE
NPRM	HRDD Processing Mode	HRM
NRAM	Time Variable Sampling Rate	25.0 MIN
PBVRADOP	Playback Operation Scheme for playback	1
PCAL	HELT Pad Contact	VV
PTCO	Pressure Correction	RECOMPUTE
RDTYP	Reference Datum Type	PTC
RLDT	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy
RLOT	Reference Log Time	
RMC	Reference Temperature Correction	0
RMF	Mud Type	LAND
RMFS	Mud Filtrate Sample Resistivity	0.310 OHMM
RMFT	Mud Filtrate Temperature	18.00 DEGC
RMS	Mud Sample Resistivity	0.010 OHMM
RMT	Mud Sample Temperature	14.00 DEGC
RW	Resistivity Connate Water	0.000 OHMM
SBHT	Static Borehole Temperature	0 DEGC
SCAL	Scale Information for playback	1
SCHI	Schlumberger Hole Size	222.000 MM
SCHV	Schlumberger Hole Volume	0
SDEV	Standoff Deviation	0
SDFC	Standoff Correction	25.400 MM
SDFV	Standoff Value	25.400
SDMD	Standoff Mode	1_Eccentered
SDMV	Standoff Mode Value	1
SDPC	Standoff Processing Control	1_Standoff_Processing
SDPV	Standoff Processing Value	1
SDSV	Standoff Source Value	1
SDTC	Standoff Tool Combination	1
SDTV	Standoff Tool Value	1
SDVC	Standoff Value Correction	0
SDVV	Standoff Value	25.400
SFCO	Surface Correction	NO
SFLU	Flushed Zone Resistivity	0 OHMM
SGRC	Gamma Ray Correction	NO
SHOC	Shoulder Correction	NO
SHOV	Shoulder Value	0
SMRT	Mud Resistivity Temperature	18.00 DEGC
SMTC	Mud Temperature Correction	0
SPHV	Spherical Processing Code Version Number	810
SPPM	Spherical Processing Mode	6_One_Two_and_Four
SPRV	Spherical Response Set Version	30,64,23,11
SSCO	Standoff Correction Option	NO
SSCV	Standoff Correction Value	0
SSVC	Standoff Value Correction	0
SSVV	Standoff Value	25.400
STEM	Surface Temperature	0 DEGC
TCAV	Tool Calibration Version	1
TCC	Tool Combination	364
TCDO	Tool Combination Option	NO
TCMD	Tool Combination Mode	1_Eccentered
TCMV	Tool Combination Mode Value	1
TCOV	Tool Combination Value	1
TDEP	Tool Depth	0 M
TDEPO	Tool Depth Offset	0 M
TDEPV	Tool Depth Value	0 M
TDFC	Tool Depth Correction	0 M
TDFV	Tool Depth Value	0 M
TDMD	Tool Depth Mode	1_Eccentered
TDMV	Tool Depth Mode Value	1
TDPC	Tool Depth Processing Control	1_Standoff_Processing
TDPV	Tool Depth Processing Value	1
TDSV	Tool Depth Source Value	1
TDTC	Tool Depth Tool Combination	1
TDTV	Tool Depth Tool Value	1
TDVC	Tool Depth Value Correction	0
TDVV	Tool Depth Value	0 M
TEMP	Temperature	0 DEGC
TEMPO	Temperature Offset	0 DEGC
TEMPV	Temperature Value	0 DEGC
TENS	Tension	0 LB
TENSO	Tension Offset	0 LB
TENSV	Tension Value	0 LB
TMD	Time Mode	1_Eccentered
TMDV	Time Mode Value	1
TMPC	Temperature Correction	0
TOOL	Tool Type	AITB
TPRM	Tool Primary	1
TSEC	Tool Secondary	0
TSEL	Tool Selection	1
TSEV	Tool Selection Value	1
TSPC	Tool Speed Correction	0
TSPV	Tool Speed Value	0
TTEN	Tool Tension	0 LB
TTMD	Tool Time Mode	1_Eccentered
TTMV	Tool Time Mode Value	1
TVDC	True Vertical Depth Correction	0 M
TVDV	True Vertical Depth Value	0 M
TWOP	Two Point Calibration	1
UWI	Unique Well Identifier	
VDL	Vertical Drilling Line	0
VDLC	Vertical Drilling Line Correction	0
VDLV	Vertical Drilling Line Value	0
WDFC	Wheel Correction	0
WDFV	Wheel Value	0
WDMD	Wheel Mode	1_Eccentered
WDMV	Wheel Mode Value	1
WDPC	Wheel Processing Control	1_Standoff_Processing
WDPV	Wheel Processing Value	1
WDSV	Wheel Source Value	1
WDTC	Wheel Tool Combination	1
WDTV	Wheel Tool Value	1
WDVC	Wheel Value Correction	0
WDVV	Wheel Value	0
WELL	Well Name	
WITN	Witness	
WMD	Wheel Mode	1_Eccentered
WMDV	Wheel Mode Value	1
WPC	Wheel Processing Control	1_Standoff_Processing
WPV	Wheel Processing Value	1
WSV	Wheel Source Value	1
WTC	Wheel Tool Combination	1
WTV	Wheel Tool Value	1
WVC	Wheel Value Correction	0
WVV	Wheel Value	0

RUN	Reference Log Name		
RNUM	Reference Log Run Number		
RMFS	Resistivity of Mud Filtrate Sample	0.3100	OHMM
RTCO	RTCO - RI Invasion Correction	YES	
RUL	Rig Up Length at Bottom	0	M
RULS	Rig Up Length at Surface	0	M
RW	Resistivity of Connate Water	1.0000	OHMM
SCORR	Stretch Correction	0.0000	M
SDAT	Standoff Data Source	SOCN	
SDAT_HILT	Standoff Data Source Comment		
SHT	Surface Hole Temperature	80	DEGC
SOCN	Standoff Distance	3.175	MM
SPAV	Spherical Correction Option	NO	
SPHV	SP Hold Value	0	MV
SSIC	SS Hardware Loop Control	DISALLOW	
STOC	Software Trip Down Log Correction	-50000	M
STT	SP Shale Threshold	1.024	M
TC	TD Circ	2000.00	M
TDD	Total Depth - Driller	2000.00	M
TDL	Total Depth - Logger	2000.80	M
TDOCO	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
TNDCSN	Tension Device Calibrator Serial Number	1007	
TNDGN	Tension Device GAIN	1	
TNDOFF	Tension Device Offset	0	
TNDSN	Tension Device Serial Number	1007	
TNDTYP	Tension Device	CMTD-BA	
TRC	TRCO Enable Corrected Depth Computation	YES	
TWT	Temperature of Connate Water Sample	27.78	DEGC
VMUD	Viscosity of Mud	60.000	S
ZROC	Tool Zero Reference Check at Surface	-50000	M

Format: AIT_QualityControlImage Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 13:10

OP System Version: 9C1-303 MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .019	FN:31	PRODUCER	10-Jan-2000 13:09
CUST	SPEA .019	FN:32	CUSTOMER	10-Jan-2000 13:09

Input DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .019	FN:31	PRODUCER	10-Jan-2000 13:09
CUST	SPEA .019	FN:32	CUSTOMER	10-Jan-2000 13:09

OP System Version: 9C1-303 MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

PIP SUMMARY

Time Mark Every 60 S

AIT Volume of Mud Filtrate (ATV) (V) (MUM) T 0

AIT Fil (ATIRT) (OHMM) 0.2 2000

AIT 90 Inch Investigation (AT90) (OHMM) 0.2 2000

AIT Rxo (ATRO) (OHMM) 0.2 2000

AIT Curve out of Order Flag (---) 0 1 2 3 4

AIT 60 Inch Investigation (AT60) (OHMM) 0.2 2000

AIT Resistivity (ATIR) (---)

AIT Input Shale Radius (AIRD) 2000 (MM)

AIT Input Shale Radius (AIRD) 250 (MM)

Tool/Cal. Dog From CDT to STIA 0 1 2 3 4

AIT 20 Inch Investigation (AT20) (OHMM) 0.2 2000

AIT Outer Invasion Radius (ATVD) 250 (CM)

AIT Outer Invasion Radius (ATVD) 250 (CM)

Cable Drag From STIT to STIT 0 1 2 3 4

AIT 10 Inch Investigation (AT10) (OHMM) 0.2 2000

AIT Inner Invasion Radius (ATIT) 250 (CM)

AIT Inner Invasion Radius (ATIT) 250 (CM)

Stuck Sketch (STIT) 0 90 30

DEPTH OF INVESTIGATION

CD

STIA

STIT

ATOC

ATRW

AT10

AT20

AT30

AT60

AT90

AT10

AT20

AT30

AT60

AT90

550

575

600

625

650

675

700

725

750

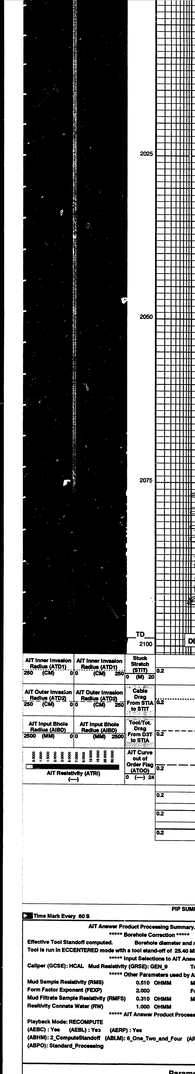
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1950
1975
2000



AIT Inner Invasion Radius (ATIR1)	AIT Inner Invasion Radius (ATIR)	Shock Stretch (STIT)	A/T 10 Inch Investigation (AT10) (OHMM)
250 (CM)	250 (CM)	250 0 (M)	0.2 2000

AIT Outer Invasion Radius (ATOI)	AIT Outer Invasion Radius (ATOI)	Cable Drag From STA to STT	A/T 20 Inch Investigation (AT20) (OHMM)
250 (CM)	0.0 (M)	250 From STA to STT	0.2 2000

AIT Input Bhole Radius (AIBD)	AIT Input Bhole Radius (AIBD)	Tool/Tot. Drag from STT to STA	A/T 30 Inch Investigation (AT30) (OHMM)
2500 (MM)	0.0 (MM)	2500 (MM)	0.2 2000

AIT Curve out of Order Flag (ATOO)	A/T 60 Inch Investigation (AT60) (OHMM)
0 0=+s 2=	0.2 2000

AIT Resistivity (ATIR) (---)

A/T Rxo (ATRO) (OHMM)
0.2 2000

A/T 90 Inch Investigation (AT90) (OHMM)
0.2 2000

A/T IR (ATRT) (OHMM)
0.2 2000

A/T Volume of Mud Filtrate (AFV) (M3)
1 0

PIP SUMMARY

Time Mark Every 60 S

AIT Answer Product Processing Summary, Data taken with Sonde # 97 (AISNO)

***** Borehole Correction *****

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with 4.5" stand-off at 25.40 MM, BB Size is 222.00 MM.

***** Input Selections to AIT Answer Product Processing *****

Caliper (GCSE); HCAL	Mud Resistivity (GRSI): GDN_9	Temperature (GTSE): HTEM	Porosity (FPHI): DPHZ

***** Other Parameters used by AIT Answer Product Processing *****

Mud Sample Resistivity (RMS)	0.010	OHMM	Mud Sample Temperature (MST)	14.000 DEGC
Form Factor Exponent (FEXP)	2.000		Form Factor Numerator (FNUM)	1.000
Mud Filtrate Sample Resistivity (RMFS)	0.310	OHMM	Mud Filtrate Sample Temperature (MFST)	15.000 DEGC
Resistivity Connate Water (RW)	0.100	OHMM		

***** AIT Answer Product Processing Control Parameters *****

Playback Mode: RECOMPUTE

(AESC) : Yes (AESL) : Yes (AERP) : Yes

(ABHM): 0_ComputedStandoff (ABLM): 6_One_Two_and_Four (ARPM): 6_One_Two_and_Four

(ABPO): Standard_Processing

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_ShiloCorr_BasicLogs
ABHM	AIT Borehole Correction Mode	2_CompGeometry
ABNW	AIT Basic Logs Normalization Code Version Number	870
ABLM	AIT Basic Logs Mode	6_One_Two_and_Four
ABPO	AIT Basic Logs Processing Version	870
ABPO	AIT Basic Logs Processing Option	Standard_Processing
ACAL	AIT Calibration Version	0
ACQS1	AIT Test Configuration Flag (Schlumberger)	Eccentered
ACSED	AIT Casing Shoe Estimated Depth	-60000
ACSD	AIT Casing Shoe Depth	0x00_Long_000
AEBC	AIT Enable Borehole Correction	Yes
AEEL	AIT Enable Eadis Logs	Yes
AEFP	AIT Enable Focusing	Yes
AERSV	AIT Enable Sonde Error Term&Res Cor	Yes
AERV	AIT Resistivity Answer Product Version Number	30.64,23,11
AESD	AIT Enable Shifting Interpolation	Yes
ALNO	AIT Log Not Valid Flag	Log_Valid-No_Default_Parameters
AMCH	AIT Mud Resistivity Main channel	SpeedCorrectedDepth
AMRD	AIT Mud Resistivity Correction Depth	0 M
AMRF	AIT Mud Resistivity Factor	1
ARSV	AIT Resistivity Version for One R-Resolution	30.64,23,11
ARPM	AIT Radial Profiling Code Version Number	700
ARPV	AIT Radial Profiling Version	6_One_Two_and_Four
ARTC	AIT Radial Thermalization Code Version Number	710
ARTS	AIT RI Selection (for ALLRES computation)	1_ATRT
ASCN	AIT Sonde Configuration	1
ASTA	AIT Test Standoff	25.4 MM
ATRSV	AIT Response Set Version for Two R-Resolution	30.64,23,11
ATTC	AIT Attenuation Correction(Sonde Error Correction)	Internal
AULV	AIT Use Level (of acquired data)	AITB
AVLV	AIT Use Level (of data)	Standard
BFSK	Borehole Fluid Medium	LIQUID
BHFL	Borehole Fluid Type	WATER
BHT	Bottom Hole Temp	0 DEGC
BHT	Bottom hole temperature (used in calculations)	0 DEGC
BS	Bit Size	222.000 MM
BSAL	Borehole Salinity	-60000.00 PPM
BSCO	Borehole Correction Option	NO
CCCO	Casing & Cement Thickness Correction Option	NO
COMTYP	Correlation Type	Wireline
CWS	Current Casing Size	244.000 MM
CWT	Casing Weight	53.70 KG/M
DEPRBM1	Depth Remark 1	
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DHC	Drilling Fluid Density	1220.00 K/M3
DI	Depth Increment Selection	CUSTOM
DO	Depth Offset for Logical Unit 1	0 M
DPPM	Density Porosity Processing Mode	HIRES
DSCO	Drilling Fluid Salinity Correction Option	NO
EXSH	External Shale Resistivity Shale Value	0
FD	Fluid Density	1000 K/M3
FDEN	Fluid Density Type	
FNUM	Form Factor Numerator	1
FPHI	Form Factor Porosity Source	DPHZ
FSAL	Formation Salinity	-60000 PPM
FSCO	Formation Salinity Correction Option	NO
GDEN	Geothermal Gradient	0
GGRD	Geothermal Gradient	0.018227
GSEL	Geothermal Gradient Selection	CHART_HEM_1
GTSE	Generic Temperature Selection	HSTT_HTEM
HAEPP	Accelerometer PROM Presence	PRESENT_PRESENT
HAMT	Accelerometer Temperature	0 DEGC
HDAD	HELT Density Cust detection	2000 K/M3
HDAO	HELT Density Cust detection	2000 K/M3
HFAV	HELT Density Variable	2000 K/M3
HLSC	HELT Gas Borehole Density	0 K/M3
HMCO	HELT Mud Correction Option	OFF
HNAD	HALS Neutron Cust detection	0
HNCOD	HELT Neutron Cust detection	0.45 V/V
HNCOO	HELT Neutron Cust detection	0.45 V/V
HNPO-HT	HELT Neutron Porosity Code	0.03 V/V
HSCM	HELT Speed Correction Mode	TSCD_SPEED_CORRECTION
HSCO	Hole Size Correction Option	YES
HSIS	HELT Shale Indicator Selection	GR
HSTT	HELT Shock Stretch Time	250 MS
HSWCUT	HELT Water Saturation from ATR cutoff	0 %
HVCC	Integrated Hole Volume Caliper Selection	HCAL
IDWCD	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWCN	IDW Calibration Number	2
IDWLCN	IDW Calibration Cable Type	7-46P
IDWSN	IDW Serial No	-999
IDWTYP	IDW Type	IDW-B
IDWVC1	IDW Wheel Correction 1	0
IDWWC2	IDW Wheel Correction 2	0
LBPN	Trigger for MAXIS Flint Reading Label	STI
LDWDIR	Logging Direction	DOWN
LOGSEQ	Log Sequence Number	First_Log_Run
LSHC	LS Hardware Loop Control	DISALLOW
MACO	Mech Matrix for Neutron Porosity Corrections	SANDSTONE
MCCN	Mud Cake Correction Option	NATO
MCOR	Mud Correction	NATO
MDEN	Matrix Density	2650 K/M3
MHCS	MCFL Pad Contrast Correction Coefficient	3.2e-005 OHMS
MHCT	MCFL Pad Contrast Correction Threshold	3.3e-005 OHMS
MHCW	MCFL RGD Contrast Correction Switch	ON
MPOP	MCFL Processing Operation Mode	ON
MST	Mud Sample Temperature	14.000 DEGC
MSTCO	Mud Sample Temperature Correction	NO
NAAC	HNDD ASPI Activation Correction	NO
NEUTTYP	HELT Neutron Type	NOBIASTYP
NPWM	HNDD Processing Mode	NPHI
OBSD	Open Borehole Diameter	222 MM
PBVGADP	Vbe adjustment constant for playback	0
PKMAX	HELT max porosity	0.33 V/V
PPC	Playback Processing	RECOMPUTE
PRCO	Playback Processing Correction Option	NO
RGTYP	Rig Type	LAND
RLDT	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy
RLRH	Reference Log Run Number	
RLSH	Reference Log Shot Number	
RMFS	Resistivity of Mud Filtrate Sample	0.3100 OHMM
RTCO	RTCO - RI Intrusion Correction	YES
RTOL	Rig Tolerance for Depth	2
RUL	Rig Up Length at Surface	0 M
RW	Resistivity of Connate Water	1.0000 OHMM
SBHC	Borehole Correction	0
SCUT	Shock Cutoff Threshold	SOCH
SEDP_HILT	HELT Sediment Component	0
SHT	Surface Hole Temperature	20 DEGC
SOCN	Standoff Distance	3.175 MM
SPHC	Spherical Correction	NO
SPHT	SP Heat Value	0
SSHC	SS Hardware Loop Control	DISALLOW
SSWC	SS Wheel Correction Log Correction	0
STRT	STT Reading	1.524 M
TD	Total Depth	2100 M
TDD	Total Depth - Driller	2000.00 M
TDDD	Total Depth - Logger	2098.80 M
TDDCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
TDDCN	Tension Device Calibration Serial Number	1
TDDGN	Tension Device GAIN	1
TDDOF	Tension Device OFFSET	0
TDDSH	Tension Device Shunt	1
TDDTYP	Tension Device	CMTD-B/A
TIED	TSCD Depth Corrected Depth Computation	YES
TSPC	Temperature of Connate Water Sample	27.78 DEGC
TVD	Total Vertical Depth	2098.80 M
ZRCO	Zero Reference Check at Surface	-60000

Format: AITB_DOI Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 13:10

OP System Version: 9C1-303

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	CSU-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .009	FILE PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .019	FN:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA .019	FN:32 CUSTOMER	10-Jan-2000 13:09

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Array Induction Tool - B Walsate Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00							
Thru Cal Magnitude - 0	0	0.6204	0.6220	N/A	N/A	N/A	V
Thru Cal Magnitude - 1	0	1.227	1.241	N/A	N/A	N/A	V
Thru Cal Magnitude - 2	0	1.514	1.518	N/A	N/A	N/A	V
Thru Cal Magnitude - 3	0	0.2903	0.2937	N/A	N/A	N/A	V
Thru Cal Magnitude - 4	0	0.1263	0.1268	N/A	N/A	N/A	V
Thru Cal Magnitude - 5	0	0.0787	0.0811	N/A	N/A	N/A	V
Thru Cal Magnitude - 6	0	1.332	1.343	N/A	N/A	N/A	V
Thru Cal Magnitude - 7	0	0.6439	0.6439	N/A	N/A	N/A	V
Thru Cal Magnitude - 8	0	0.309	2.015	N/A	N/A	N/A	V
Thru Cal Magnitude - 9	0	0.6661	0.6683	N/A	N/A	N/A	V
Thru Cal Magnitude - 10	0	2.315	2.302	N/A	N/A	N/A	V
Thru Cal Magnitude - 11	0	0.6737	0.6758	N/A	N/A	N/A	V
Thru Cal Magnitude - 12	0	0.1943	0.1943	N/A	N/A	N/A	V
Thru Cal Magnitude - 13	0	0.5843	0.5883	N/A	N/A	N/A	V
Phase - 0	0	-93.18	-93.06	N/A	N/A	N/A	DEG
Phase - 1	0	-89.41	-89.52	N/A	N/A	N/A	DEG
Phase - 2	0	90.81	90.82	N/A	N/A	N/A	DEG
Phase - 3	0	-130.9	-130.6	N/A	N/A	N/A	DEG
Phase - 4	0	60.17	60.74	N/A	N/A	N/A	DEG
Phase - 5	0	-131.5	-131.2	N/A	N/A	N/A	DEG
Phase - 6	0	48.41	48.52	N/A	N/A	N/A	DEG
Phase - 7	0	72.54	72.36	N/A	N/A	N/A	DEG
Phase - 8	0	-19.70	-19.21	N/A	N/A	N/A	DEG
Phase - 9	0	72.84	72.69	N/A	N/A	N/A	DEG
Phase - 10	0	-5.337	-4.901	N/A	N/A	N/A	DEG
Phase - 11	0	72.71	72.56	N/A	N/A	N/A	DEG
Phase - 12	0	-5.468	-5.468	N/A	N/A	N/A	DEG
Phase - 13	0	74.93	75.49	N/A	N/A	N/A	DEG
Array Induction Tool - B Walsate Calibration - Electronics Calibration Check - Ref Gain Mag. & Phase							
Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00							
ADC Ref Gain Magnitude - 0	25.00	25.06	25.07	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 1	25.00	25.09	25.09	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 2	25.00	25.13	25.13	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 3	25.00	25.03	25.03	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 4	25.00	25.04	25.04	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 5	25.00	25.07	25.07	N/A	N/A	N/A	V
ADC Ref Gain Magnitude - 6	25.00	25.07	25.08	N/A	N/A	N/A	V
Phase - 0	0	-130.9	-130.6	N/A	N/A	N/A	DEG
Phase - 1	0	60.17	60.74	N/A	N/A	N/A	DEG
Phase - 2	0	-131.5	-131.2	N/A	N/A	N/A	DEG
Phase - 3	0	48.41	48.52	N/A	N/A	N/A	DEG
Phase - 4	0	72.54	72.36	N/A	N/A	N/A	DEG
Phase - 5	0	-19.70	-19.21	N/A	N/A	N/A	DEG
Phase - 6	0	72.84	72.69	N/A	N/A	N/A	DEG
Phase - 7	0	-5.337	-4.901	N/A	N/A	N/A	DEG
Phase - 8	0	72.71	72.56	N/A	N/A	N/A	DEG
Phase - 9	0	-5.468	-5.468	N/A	N/A	N/A	DEG
Phase - 10	0	74.93	75.49	N/A	N/A	N/A	DEG
Array Induction Tool - B Walsate Calibration - Electronics Calibration Check - Auxiliary							
Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00							
AIT SPA Plus	3950	3965	3964	N/A	N/A	N/A	MV
AIT SPA Zero	-50.00	-52.09	-53.08	N/A	N/A	N/A	MV
AIT Temperature Plus	4.500	4.511	4.510	N/A	N/A	N/A	V
AIT Temperature Zero	-0.050000	-0.050000	-0.050000	N/A	N/A	N/A	V
Array Induction Tool - B Walsate Calibration - Test Loop Gain Correction							
Master: 20-NOV-1999 11:57							
Test Loop Gain Magnitude - 0	0	1.001	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 1	0	1.010	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 2	0	1.015	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 3	0	1.013	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 4	0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 5	0	1.022	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 6	0	1.013	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 7	0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 8	0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 9	0	1.005	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 10	0	1.019	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 11	0	1.022	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 12	0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 13	0	1.020	N/A	N/A	N/A	N/A	
Phase - 0	0	0.4408	N/A	N/A	N/A	N/A	DEG
Phase - 1	0	0.4420	N/A	N/A	N/A	N/A	DEG
Phase - 2	0	0.1351	N/A	N/A	N/A	N/A	DEG
Phase - 3	0	0.2660	N/A	N/A	N/A	N/A	DEG
Phase - 4	0	0.1799	N/A	N/A	N/A	N/A	DEG
Phase - 5	0	0.2475	N/A	N/A	N/A	N/A	DEG
Phase - 6	0	0.2023	N/A	N/A	N/A	N/A	DEG
Phase - 7	0	-0.0022	N/A	N/A	N/A	N/A	DEG
Phase - 8	0	0.2679	N/A	N/A	N/A	N/A	DEG
Phase - 9	0	0.0428	N/A	N/A	N/A	N/A	DEG
Phase - 10	0	0.0787	N/A	N/A	N/A	N/A	DEG
Phase - 11	0	0.1679	N/A	N/A	N/A	N/A	DEG
Phase - 12	0	-0.1379	N/A	N/A	N/A	N/A	DEG
Phase - 13	0	-0.1319	N/A	N/A	N/A	N/A	DEG
Array Induction Tool - B Walsate Calibration - Sonde Error Correction							
Master: 20-NOV-1999 11:57							
R Sonde Error Correction - 0	0	1.915	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 1	0	32.29	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 2	0	48.74	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 3	0	26.50	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 4	0	48.74	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 5	0	26.94	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 6	0	26.86	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 7	0	7.181	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 8	0	7.181	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 9	0	10.12	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 10	0	6.582	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 11	0	6.580	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 12	0	6.582	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 13	0	6.582	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 0	0	69.14	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 1	0	3.783	N/A	N/A	N/A	N/A	MMM
R Sonde Error Correction - 2	0	3.783	N/A	N/A	N/A	N/A	MMM

X Sonde Error Correction - 4	0	66.84	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	-104.5	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	-20.66	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	-22.98	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 8	0	-14.30	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 9	0	-30.85	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 10	0	4.666	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 11	0	-9.456	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 12	0	1.000	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 13	0	-19.20	N/A	N/A	N/A	N/A	MM/M

Litho Density - D Wellsite Calibration - Background Measurement
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47

LL Background	20.00	19.21	19.14	N/A	N/A	1.000	CPS
LU Background	76.00	72.94	73.43	N/A	N/A	1.000	CPS
UL Background	57.00	55.68	55.85	N/A	N/A	1.000	CPS
UTH Background	5.500	5.480	5.510	N/A	N/A	0.5000	CPS
SS1 Background	18.00	17.49	17.59	N/A	N/A	0.5000	CPS
SS2 Background	11.00	11.43	11.43	N/A	N/A	0.5000	CPS

Litho Density - D Wellsite Calibration - Tool Quality Control Information HV
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47

LSHV Background	1500	1349	1349	N/A	N/A	N/A	V
SSHV Background	1500	1493	1495	N/A	N/A	N/A	V

Litho Density - D Wellsite Calibration - Detectory Resolution From BKG Measurements
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47

LS Resolution Background	9.000	8.733	8.787	N/A	N/A	N/A	
SS Resolution Background	8.000	8.676	8.813	N/A	N/A	N/A	

Litho Density - D Wellsite Calibration - Caliper Calibration
Before: 9-JAN-2000 12:50

Caliper Small Ring	203.2	N/A	225.3	N/A	N/A	N/A	MM
Caliper Large Ring	304.8	N/A	327.1	N/A	N/A	N/A	MM

Litho Density - D Master Calibration - Aluminum Measurement
Master: 4-JAN-2000 14:23

LL Aluminum	90.00	88.48	--	--	--	--	CPS
LU Aluminum	135.0	131.8	--	--	--	--	CPS
UL Aluminum	155.0	154.4	--	--	--	--	CPS
UTH Aluminum	60.00	55.56	--	--	--	--	CPS
SS1 Aluminum	175.0	179.0	--	--	--	--	CPS
SS2 Aluminum	250.0	248.4	--	--	--	--	CPS

Litho Density - D Master Calibration - Lithology Measurement
Master: 4-JAN-2000 14:38

LL Iron	80.00	79.97	--	--	--	--	CPS
LU Iron	120.0	117.3	--	--	--	--	CPS
UL Iron	135.0	137.6	--	--	--	--	CPS
UTH Iron	30.00	34.07	--	--	--	--	CPS
SS1 Iron	155.0	157.6	--	--	--	--	CPS
SS2 Iron	245.0	224.4	--	--	--	--	CPS

Litho Density - D Master Calibration - Spectrum Quality Ratios
Master: 4-JAN-2000 14:38

QRLS Calculated	0.5000	0.6715	--	--	--	--	
QRUS Calculated	0.7200	0.7177	--	--	--	--	
QRLU Calculated	0.3900	0.3426	--	--	--	--	
QRUU Calculated	1.000	0.9971	--	--	--	--	
QR Calculated	1.000	0.9971	--	--	--	--	

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Stab Measurement Summary
Before: 9-JAN-2000 12:50

SS Window Ratio	1.010	N/A	1.012	N/A	N/A	N/A	
SS Window Sum	18410	N/A	18370	N/A	N/A	N/A	CPS
SS Window Mean	0.4600	N/A	0.4590	N/A	N/A	N/A	
LS Window Ratio	10170	N/A	10170	N/A	N/A	N/A	CPS
LS Window Sum	254200	N/A	254200	N/A	N/A	N/A	
LS Window Mean	1010	N/A	1010	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Photo-multiplier High Voltages Calibrations
Before: 9-JAN-2000 12:50

SS PM High Voltage (Command)	1700	N/A	1693	N/A	N/A	N/A	V
SS PM High Voltage (Command)	2051	N/A	2108	N/A	N/A	N/A	V
LS PM High Voltage (Command)	2000	N/A	2031	N/A	N/A	N/A	V

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Crystal Quality Resolutions Calibration
Before: 9-JAN-2000 12:50

SS Crystal Resolution	12.66	N/A	12.59	N/A	N/A	N/A	%
SS Crystal Resolution	10.02	N/A	10.56	N/A	N/A	N/A	%
LS Crystal Resolution	10.53	N/A	10.51	N/A	N/A	N/A	%

High resolution Integrated Logging Tool-DTS Wellsite Calibration - MCFL Calibration
Before: 9-JAN-2000 12:55

Raw S0 Resistivity	3875	N/A	3940	N/A	N/A	N/A	OHMM
Raw S1 Resistivity	3830	N/A	3818	N/A	N/A	N/A	OHMM
Raw S2 Resistivity	3830	N/A	3812	N/A	N/A	N/A	OHMM

High resolution Integrated Logging Tool-DTS Wellsite Calibration - HILT Caliper Calibration
Before: 9-JAN-2000 12:48

HILT Caliper Zero Measurement	203.2	N/A	221.5	N/A	N/A	N/A	MM
HILT Caliper Plus Measurement	304.8	N/A	324.1	N/A	N/A	N/A	MM

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Detector Calibration
Before: 9-JAN-2000 12:44

Gamma Ray Background	30.00	N/A	55.53	N/A	N/A	N/A	GAPI
Gamma Ray (Ug - Sig)	178.9	N/A	178.9	N/A	N/A	16.26	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Zero Measurement
Master: 29-OCT-1998 12:43 Before: 9-JAN-2000 12:48

CNTC Background	25.00	25.60	27.26	N/A	N/A	3.870	CPS
CFTC Background	29.07	29.07	30.26	N/A	N/A	4.361	CPS

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Accelerometer Calibration
Before: 10-JAN-2000 8:57

Z-Axis Acceleration	0.810	N/A	0.818	N/A	N/A	N/A	M/S2

High resolution Integrated Logging Tool-DTS Master Calibration - Inversion results
Master: 9-JAN-2000 14:14

Rho Aluminum	2696	2698	--	--	--	--	K/M3
Rho Magnesium	1686	1686	--	--	--	--	K/M3
Pe Aluminum	2.570	2.577	--	--	--	--	
Pe Magnesium	2.650	2.627	--	--	--	--	

High resolution Integrated Logging Tool-DTS Master Calibration - Deviation Summary
Master: 9-JAN-2000 14:14

SS Average Deviation	0	0.2215	--	--	--	--	
SS Max Deviation	0	0.8435	--	--	--	--	
SS Average Deviation	0	0.3942	--	--	--	--	
SS Max Deviation	0	1.358	--	--	--	--	
LS Average Deviation	0	0.6699	--	--	--	--	
LS Max Deviation	0	1.592	--	--	--	--	

High resolution Integrated Logging Tool-DTS Master Calibration - Tank Measurement
Master: 29-OCT-1998 12:49

Thermal Near Corr. (Tare)	6031	5466	--	--	--	--	CPS
Thermal Far Corr. (Tare)	2703	2703	--	--	--	--	CPS
CNTC/CFTC (Tare)	2.159	2.266	--	--	--	--	

The GLS-VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT-B Water Temperature 18.4 DEGC.
Thermal Housing Size 66.977 MM.

Array Induction Tool - B / Equipment Identification

Primary Equipment:
Array Induction Sonde AIS - BA 97
Adaptive Response Cartridge AIC - BA 97

Auxiliary Equipment:
Mass Isolated Housing AIH - AA 97

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Thru Cal Mes. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6004	0.5602	-63.18		-63.18	-66.00
	Before	0.6220		-63.06			
1	Master	1.237	1.166	-64.41		-64.41	-69.00
	Before	1.241		-64.27			
2	Master	1.014	1.369	69.49		69.49	72.00
	Before	1.018		70.05			
3	Master	0.3923	0.3680	-130.9		-130.9	-138.0
	Before	0.3937		-130.8			
4	Master	2.224	2.057	69.17		69.17	71.00
	Before	2.231		69.74			
5	Master	0.6787	0.5600	-131.0		-131.0	-138.0
	Before	0.6811		-130.8			
6	Master	1.209	1.423	-19.82		-19.82	-3.000
	Before	1.343		-19.04			
7	Master	0.4552	0.4000	72.64		72.64	86.00
	Before	0.4568		72.96			
8	Master	2.009	2.111	-19.75		-19.75	-3.000
	Before	2.015		-19.21			
9	Master	0.6661	0.5600	73.24		73.24	86.00
	Before	0.6683		72.69			
10	Master	2.313	2.111	-4.337		-4.337	0
	Before	2.322		-4.801			
11	Master	0.6737	0.5600	76.12		76.12	75.00
	Before	0.6758		76.65			
12	Master	2.035	1.853	-6.027		-6.027	-1.000
	Before	2.040		-6.499			
13	Master	0.5643	0.5000	74.83		74.83	74.00
	Before	0.5663		75.49			
		70.00 % (Minimum)	130.0 % (Nominal)	Nom +45.00 (Maximum)		Nom +45.00 (Maximum)	

Master: 20-NOV-1998 11:57 Before: 10-JAN-2000 9:00

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Rel Gain Mag. & Phase

Idx	Phase	Value	ADC Rel Gain Magnitude	Value	Phase DEG
0	Master	25.06	0.4000	0.4000	
	Before	25.07	0.4005	0.4005	
1	Master	25.09	0.2175	0.2180	
	Before	25.09	0.2180	0.2180	
2	Master	25.10	0.3979	0.3979	
	Before	25.10	0.4063	0.4063	
3	Master	25.03	0.1046	0.1014	
	Before	25.03	0.1014	0.1014	
4	Master	25.04	0.2291	0.2270	
	Before	25.04	0.2270	0.2270	
5	Master	25.07	0.1089	0.1151	
	Before	25.07	0.1151	0.1151	
6	Master	25.07	0.2124	0.2145	
	Before	25.08	0.2145	0.2145	
		23.75 (Minimum)	25.00 (Nominal)	26.25 (Maximum)	-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)

Master: 20-NOV-1998 11:57 Before: 10-JAN-2000 9:00

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Auxiliary

Phase	AT SPA Phs MV	Value	Phase	AT SPA Zero MV	Value
Master		3965	Master		-53.29
Before		3964	Before		-53.29
3740 (Minimum)	3965 (Nominal)	4190 (Maximum)	-90.00 (Minimum)	0 (Nominal)	90.00 (Maximum)

Phase	AT Temperature Plus V	Value	AT Temperature Zero V	Value
Master		4.511	Master	-0.00378
Before		4.510	Before	-0.00389
4.250 (Minimum)	4.500 (Nominal)	4.750 (Maximum)	-0.1000 (Minimum)	-0.00000 (Nominal)	0 (Maximum)

Master: 20-NOV-1998 11:57 Before: 10-JAN-2000 9:00

Array Induction Tool - B Wellsite Calibration
Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	1.001	1.000	0.4508	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
1	1.010	1.000	0.4492	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
2	1.015	1.000	0.1351	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
3	1.013	1.000	0.2558	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
4	1.019	1.000	0.1739	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
5	1.020	1.000	0.2470	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
6	1.019	1.000	-0.3209	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
7	1.018	1.000	-0.6023	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
8	1.022	1.000	-0.004478	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
9	1.025	1.000	0.09438	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
10	1.019	1.000	0.07897	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
11	1.022	1.000	0.1998	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
12	1.022	1.000	-0.1279	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)
13	1.026	1.000	-0.1316	0.000
		0.9500 (Minimum) 1.000 (Nominal) 1.050 (Maximum)		-3.000 (Minimum) 0 (Nominal) 3.000 (Maximum)

Master: 20-NOV-1998 11:57

Array Induction Tool - B Wellsite Calibration
Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M
0	1.010	66.84	-646.0	646.0
		27.00 (Minimum) 34.00 (Nominal) 41.00 (Maximum)		-10.25 (Minimum) 646.0 (Nominal) 666.3 (Maximum)
1	30.29	-104.5	-606.0	606.0
		23.00 (Minimum) 37.00 (Nominal) 48.00 (Maximum)		-10.25 (Minimum) 606.0 (Nominal) 616.3 (Maximum)
2	49.74	-20.66	3.793	-191.0
		-43.00 (Minimum) 64.00 (Nominal) 64.00 (Maximum)		-191.0 (Minimum) -191.0 (Nominal) -181.0 (Maximum)
3	32.50	-22.98	-75.61	-101.0
		28.00 (Minimum) 37.00 (Nominal) 46.00 (Maximum)		-101.0 (Minimum) 0 (Nominal) 101.0 (Maximum)
4	45.44	-14.30	85.34	-206.0
		23.00 (Minimum) 53.00 (Nominal) 74.00 (Maximum)		-206.0 (Minimum) 0 (Nominal) 206.0 (Maximum)
5	38.74	-30.85	-104.5	-186.0
		13.00 (Minimum) 47.00 (Nominal) 80.00 (Maximum)		-186.0 (Minimum) 0 (Nominal) 186.0 (Maximum)
6	26.88	4.666	-29.68	87.00
		18.00 (Minimum) 27.00 (Nominal) 37.00 (Maximum)		-87.00 (Minimum) 0 (Nominal) 87.00 (Maximum)
7	14.00	-9.456	-22.98	-34.00
		4.000 (Minimum) 15.00 (Nominal) 26.00 (Maximum)		-34.00 (Minimum) 0 (Nominal) 34.00 (Maximum)
8	7.581	1.000	-14.30	-43.00
		-2.000 (Minimum) 8.000 (Nominal) 18.00 (Maximum)		-43.00 (Minimum) 0 (Nominal) 43.00 (Maximum)
9	10.17	-19.20	-30.85	-32.00
		2.000 (Minimum) 11.00 (Nominal) 18.00 (Maximum)		-32.00 (Minimum) 0 (Nominal) 32.00 (Maximum)
10	7.901	4.666	4.666	-98.00
		2.000 (Minimum) 8.000 (Nominal) 13.00 (Maximum)		-98.00 (Minimum) 0 (Nominal) 98.00 (Maximum)
11	6.360	-9.456	9.636	-138.0
		1.000 (Minimum) 7.000 (Nominal) 12.00 (Maximum)		-138.0 (Minimum) 0 (Nominal) 30.00 (Maximum)
12	-1.361	1.000	-4.112	-32.00
		-6.000 (Minimum) -2.000 (Nominal) 4.000 (Maximum)		-32.00 (Minimum) 0 (Nominal) 32.00 (Maximum)
13	0.3952	-19.20	-19.20	-98.00
		-6.000 (Minimum) 8.000 (Nominal) 22.00 (Maximum)		-98.00 (Minimum) 0 (Nominal) 98.00 (Maximum)

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Electronics Calibration Check - Thru Cal Mes. & Phase

Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6254	0.5602	-63.18		-63.18	-66.00
1	Master	1.237	1.166	-64.41		-64.41	-69.00
2	Master	1.014	1.369	69.49		69.49	72.00
3	Master	0.3923	0.3680	-130.9		-130.9	-138.0
4	Master	2.224	2.057	69.17		69.17	71.00
5	Master	0.6787	0.5600	-131.0		-131.0	-138.0
6	Master	1.339	1.423	-19.82		-19.82	-3.000
7	Master	0.4552	0.4000	72.64		72.64	86.00
8	Master	2.009	2.111	-19.75		-19.75	-3.000
9	Master	0.6661	0.5600	73.24		73.24	86.00
10	Master	2.315	2.111	-4.337		-4.337	0
11	Master	0.6737	0.5600	76.12		76.12	75.00
12	Master	2.035	1.853	-6.027		-6.027	-1.000
13	Master	0.5643	0.5000	74.83		74.83	74.00
		70.00 % (Minimum)	130.0 % (Nominal)	Nom +45.00 (Maximum)		Nom +45.00 (Maximum)	

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Electronics Calibration Check - Rel Gain Mag. & Phase

Idx	Phase	Value	ADC Rel Gain Magnitude	Value	Phase DEG
0	Master	25.06	0.4000	0.4000	
1	Master	25.09	0.2175	0.2180	
2	Master	25.10	0.3979	0.3979	
3	Master	25.03	0.1046	0.1014	
4	Master	25.04	0.2291	0.2270	
5	Master	25.07	0.1089	0.1151	
6	Master	25.07	0.2124	0.2145	
		23.75 (Minimum)	25.00 (Nominal)	26.25 (Maximum)	-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Electronics Calibration Check - Auxiliary

Phase	AT SPA Phs MV	Value	Phase	AT SPA Zero MV	Value
Master		3965	Master		-53.29
3740 (Minimum)	3965 (Nominal)	4190 (Maximum)	-90.00 (Minimum)	0 (Nominal)	90.00 (Maximum)

Phase	AT Temperature Plus V	Value	AT Temperature Zero V	Value
Master		4.511	Master	-0.00378
4.250 (Minimum)	4.500 (Nominal)	4.750 (Maximum)	-0.1000 (Minimum)	-0.00000 (Nominal)	0 (Maximum)

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Test Loop Gain Correction

Idx	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	1.001	1.000	0.4508	0.000
1	1.010	1.000	0.4492	0.000
2	1.015	1.000	0.1351	0.000
3	1.013	1.000	0.2558	0.000
4	1.019	1.000	0.1739	0.000
5	1.020	1.000	0.2470	0.000
6	1.019	1.000	-0.3209	0.000
7	1.018	1.000	-0.6023	0.000
8	1.022	1.000	-0.004478	0.000
9	1.025	1.000	0.09438	0.000
10	1.019	1.000	0.07897	0.000
11	1.022	1.000	0.1998	0.000
12	1.022	1.000	-0.1279	0.000
13	1.026	1.000	-0.1316	0.000

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Sonde Error Correction

Idx	Value	R Sonde Error Correction MM/M	Value	X Sonde Error Correction MM/M
0	1.010	66.84	-646.0	646.0
1	30.29	-104.5	-606.0	606.0
2	49.74	-20.66	3.793	-191.0
3	32.50	-22.98	-75.61	-101.0
4	45.44	-14.30	85.34	-206.0
5	38.74	-30.85	-104.5	-186.0
6	26.88	4.666	-29.68	87.00
7	14.00	-9.456	-22.98	-34.00
8	7.581	1.000	-14.30	-43.00
9	10.17	-19.20	-30.85	-32.00
10	7.901	4.666	4.666	-98.00
11	6.360	-9.456	9.636	-138.0
12	-1.361	1.000	-4.112	-32.00
13	0.3952	-19.20	-19.20	-98.00

Master: 20-NOV-1998 11:57

Array Induction Tool - B Master Calibration
Electronics Calibration Check - Re Gain Mag. & Phase

IDs	Phase	Value	ADC Re Gain Magnitude	Value	Phase DDG
0	Master	25.06		0.4069	
1	Master	25.09		0.2175	
2	Master	25.10		0.3815	
3	Master	25.03		0.1048	
4	Master	25.04		0.2261	
5	Master	25.07		0.1069	
6	Master	25.07		0.2102	
		25.75 (Nominal)	25.00 (Nominal)	38.25 (Maximum)	-1.000 0 1.000 (Nominal) (Maximum)

Master: 20-NOV-1999 11:57

Array Induction Tool - B Master Calibration
Electronics Calibration Check - Auxiliary

Phase	ATSPA Plus MV	Value	Phase	ATSPA Zero MV	Value
Master		3965	Master		-63.26
	3750 3992 4193 (Minimum) (Nominal) (Maximum)			-100.0 -60.00 0 (Minimum) (Nominal) (Maximum)	

Phase	ATTemperature Plus V	Value	Phase	ATTemperature Zero V	Value
Master		4511	Master		-0.00278
	4.250 4.500 4.750 (Minimum) (Nominal) (Maximum)			-0.1000 -0.00500 0 (Minimum) (Nominal) (Maximum)	

Master: 20-NOV-1999 11:57

Array Induction Tool - B Master Calibration
Test Loop Gain Correction

IDs	Value	Test Loop Gain Magnitude	Value	Phase DDG
0	1.001		0.4506	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
1	1.010		0.4420	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
2	1.013		0.1351	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
3	1.013		0.2556	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
4	1.018		0.1738	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
5	1.020		0.2475	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
6	1.018		-0.3229	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
7	1.018		-0.0223	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
8	1.022		-0.004078	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
9	1.025		0.04436	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
10	1.018		0.07987	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
11	1.002		0.1998	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
12	1.002		-0.1279	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	
13	1.026		-0.1318	
	0.9500 1.000 1.050 (Minimum) (Nominal) (Maximum)		-3.000 0 3.000 (Minimum) (Nominal) (Maximum)	

Master: 20-NOV-1999 11:57

Array Induction Tool - B Master Calibration
Sonde Error Correction

IDs	Value	R Sonde Error Correction M&M	Value	X Sonde Error Correction M&M
0	1.810		89.14	
	27.00 (Minimum)	0 34.00 (Nominal) (Maximum)	-648.0 (Minimum)	0 648.0 (Nominal) (Maximum)
1	32.29		-10.25	
	22.00 (Minimum)	37.00 48.00 (Nominal) (Maximum)	-208.0 (Minimum)	0 208.0 (Nominal) (Maximum)
2	48.74		3.783	
	43.00 (Minimum)	84.00 84.00 (Nominal) (Maximum)	-181.0 (Minimum)	0 181.0 (Nominal) (Maximum)
3	32.50		-72.61	
	29.00 (Minimum)	37.50 46.00 (Nominal) (Maximum)	-101.0 (Minimum)	0 101.0 (Nominal) (Maximum)
4	45.44		95.34	
	33.00 (Minimum)	60.00 74.00 (Nominal) (Maximum)	-206.0 (Minimum)	0 206.0 (Nominal) (Maximum)
5	38.74		-104.5	
	12.00 (Minimum)	47.00 66.00 (Nominal) (Maximum)	-196.0 (Minimum)	0 196.0 (Nominal) (Maximum)
6	26.86		-28.86	
	16.00 (Minimum)	27.00 37.00 (Nominal) (Maximum)	-67.00 (Minimum)	0 67.00 (Nominal) (Maximum)
7	14.00		-22.98	
	4.000 (Minimum)	15.00 25.00 (Nominal) (Maximum)	-24.00 (Minimum)	0 24.00 (Nominal) (Maximum)
8	7.551		-14.30	
	2.000 (Minimum)	8.000 18.00 (Nominal) (Maximum)	-43.00 (Minimum)	0 43.00 (Nominal) (Maximum)
9	10.12		-30.85	
	2.000 (Minimum)	11.00 18.00 (Nominal) (Maximum)	-32.00 (Minimum)	0 32.00 (Nominal) (Maximum)
10	7.801		4.666	
	2.000 (Minimum)	8.000 13.00 (Nominal) (Maximum)	-38.00 (Minimum)	0 38.00 (Nominal) (Maximum)
11	8.350		-8.606	
	1.000 (Minimum)	7.000 12.00 (Nominal) (Maximum)	-30.00 (Minimum)	0 30.00 (Nominal) (Maximum)
12	-1.361		-4.112	
	-4.000 (Minimum)	-0.000 4.000 (Nominal) (Maximum)	-32.00 (Minimum)	0 32.00 (Nominal) (Maximum)
13	0.3952		-19.20	
	-5.000 (Minimum)	1.000 6.000 (Nominal) (Maximum)	-38.00 (Minimum)	0 38.00 (Nominal) (Maximum)

Master: 20-NOV-1999 11:57

Litho Density - D / Equipment Identification

Primary Equipment:

Nuclear Sevices Cartridge	NSC - E	2707
Powered Gamma Detector	PGD - G	2959
Gamma Source Reflective	GSR - J	2550
Auxiliary Equipment:		
Density Reliably Sonde	DRS - C	1803
Electronics Cartridge Housing	ECH - MKA	
Powered Detector Housing	PDH - L	2959

Litho Density - D Wafaite Calibration
Background Measurement

Phase	LL Background CPS	Value	Phase	LU Background CPS	Value	Phase	LS Background CPS	Value
Master		19.21	Master		72.84	Master		55.68
Before		18.14	Before		73.43	Before		58.85
	15.00 20.00 25.00 (Minimum) (Nominal) (Maximum)		58.00 78.00 84.00 (Minimum) (Nominal) (Maximum)			40.00 67.00 72.00 (Minimum) (Nominal) (Maximum)		

Phase	LTH Background CPS	Value	Phase	SS1 Background CPS	Value	Phase	SS2 Background CPS	Value
Master		5.480	Master		17.16	Master		11.48
Before		5.810	Before		17.09	Before		11.43
	4.000 5.500 7.000 (Minimum) (Nominal) (Maximum)		12.00 16.00 18.00 (Minimum) (Nominal) (Maximum)			8.000 11.00 13.00 (Minimum) (Nominal) (Maximum)		

Master: 4-JUN-2000 14:08
Before: 8-JUN-2000 12:47

Litho Density - D Wafaite Calibration
Detector Resolution From SIG Measurments

Phase	LS Resolution Background	Value	Phase	SS Resolution Background	Value
Master		8.733	Master		8.816
Before		8.767	Before		8.813
	5.000 8.000 11.00 (Minimum) (Nominal) (Maximum)		5.000 8.000 11.00 (Minimum) (Nominal) (Maximum)		

Master: 4-JUN-2000 14:08
Before: 8-JUN-2000 12:47

Litho Density - D Master Calibration
Aluminum Measurment

Phase	LL Aluminum CPS	Value	Phase	LU Aluminum CPS	Value	Phase	LS Aluminum CPS	Value
Master		88.48	Master		131.8	Master		154.1
	70.00 90.00 125.0 (Minimum) (Nominal) (Maximum)		100.0 135.0 194.0 (Minimum) (Nominal) (Maximum)			120.0 155.0 217.0 (Minimum) (Nominal) (Maximum)		

Phase	LTH Aluminum CPS	Value	Phase	SS1 Aluminum CPS	Value	Phase	SS2 Aluminum CPS	Value
Master		82.68	Master		179.0	Master		248.4
	36.00 50.00 74.00 (Minimum) (Nominal) (Maximum)		120.0 175.0 256.0 (Minimum) (Nominal) (Maximum)			210.0 280.0 353.0 (Minimum) (Nominal) (Maximum)		

Master: 4-JUN-2000 14:23

Litho Density - D Master Calibration
Uranium Measurment

Phase	LL Ion CPS	Value	Phase	LU Ion CPS	Value	Phase	LS Ion CPS	Value
Master		79.07	Master		117.3	Master		137.6
	60.00 80.00 114.0 (Minimum) (Nominal) (Maximum)		85.00 120.0 172.0 (Minimum) (Nominal) (Maximum)			100.0 135.0 193.0 (Minimum) (Nominal) (Maximum)		

Phase	LTH Ion CPS	Value	Phase	SS1 Ion CPS	Value	Phase	SS2 Ion CPS	Value
Master		34.07	Master		157.6	Master		224.4
	19.00 26.00 51.00 (Minimum) (Nominal) (Maximum)		105.0 155.0 234.0 (Minimum) (Nominal) (Maximum)			190.0 245.0 305.0 (Minimum) (Nominal) (Maximum)		

Master: 4-JUN-2000 14:36

Litho Density - D Master Calibration
Spectrum Quality Ratios

Phase	GRS Calculated	Value	Phase	GSS Calculated	Value	Phase	GRJ Calculated	Value
Master		0.6715	Master		0.7177	Master		0.3428
	0.6600 0.6800 0.7000 (Minimum) (Nominal) (Maximum)		0.6800 0.7000 0.7200 (Minimum) (Nominal) (Maximum)			0.2000 0.3600 0.4800 (Minimum) (Nominal) (Maximum)		

Phase	QLR Calculated	Value	Phase	QR Calculated	Value
Master		1.364	Master		0.9871
	1.200 1.360 1.400 (Minimum) (Nominal) (Maximum)		0.9600 1.000 1.020 (Minimum) (Nominal) (Maximum)		

Master: 4-JUN-2000 14:36

High resolution Integrated Logging Tool-DTS / Equipment Identification

Primary Equipment:

HILT High-Resolution Mechanical Sonde	HRMB - B	1717
HILT Rmi Gamma-ray Device	HRGD -	726
HILT Hardware Back-Scatter Detector	HILT -	
HILT Hardware Long-Spacing Detector	HILT -	
HILT Nuclear Long-Spacing Detector	HILT -	
Micro Cylindrically Focused Log Device	MCFL -	
GR Logging Source	SLS - VJ	1985
HILT High Res. Control Cartridge	HRCC - B	772

Auxiliary Equipment:

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Rwb Measurement Summary

Phase	BB Window Ratio	Value	Phase	BS Window Ratio	Value	Phase	LB Window Ratio	Value	Phase	LS Window Ratio	Value
Before		1.012	Before		0.4080	Before		0.2812	Before		0.2924
	0.8680 1.010 1.090 (Minimum) (Nominal) (Maximum)		0.4078 0.4600 0.4636 (Minimum) (Nominal) (Maximum)			0.2600 0.2800 0.3000 (Minimum) (Nominal) (Maximum)					

Phase	SB Window Sum CPS	Value	Phase	SS Window Sum CPS	Value	Phase	LB Window Sum CPS	Value	Phase	LS Window Sum CPS	Value
Before		18370	Before		10170	Before		1192	Before		1200
	17460 18410 19360 (Minimum) (Nominal) (Maximum)		9991 10170 10860 (Minimum) (Nominal) (Maximum)			1100 1192 1212 (Minimum) (Nominal) (Maximum)			1071 1200 1221 (Minimum) (Nominal) (Maximum)		

Before: 8-JUN-2000 12:00

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Photo-multiplier High Voltages Calibrations

Phase	30 PM High Voltage (Command) V	Value	Phase	35 PM High Voltage (Command) V	Value	Phase	25 PM High Voltage (Command) V	Value
Before		1893	Before	2108		Before		2051
	1800 1700 1900 (Minimum) (Nominal) (Maximum)		1961 2051 2151 (Minimum) (Nominal) (Maximum)			1900 2000 2100 (Minimum) (Nominal) (Maximum)		

Before: 8-JUN-2000 12:00

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Count Quality Functions Calibrations

Phase	SB Crystal Resolution %	Value	Phase	SS Crystal Resolution %	Value	Phase	LB Crystal Resolution %	Value	Phase	LS Crystal Resolution %	Value
Before		12.59	Before		8.003	Before		10.66	Before		10.51
	11.66 12.66 13.66 (Minimum) (Nominal) (Maximum)		7.003 10.00 11.00 (Minimum) (Nominal) (Maximum)			9.500 10.50 11.50 (Minimum) (Nominal) (Maximum)					

Before: 8-JUN-2000 12:00

High resolution Integrated Logging Tool-DTS Wafaite Calibration
MCFL Calibration

Phase	Rxo 50 Resistivity OHMM	Value	Phase	Rxo 31 Resistivity OHMM	Value	Phase	Rxo 82 Resistivity OHMM	Value
Before		3946	Before	3618		Before		3812
	3500 3573 4180 (Minimum) (Nominal) (Maximum)		3624 3630 4138 (Minimum) (Nominal) (Maximum)			3624 3630 4138 (Minimum) (Nominal) (Maximum)		

Before: 8-JUN-2000 12:00

High resolution Integrated Logging Tool-DTS Wafaite Calibration
HILT Caliper Corrections

Phase	RILT Caliper Zero Measurement MM	Value	Phase	RILT Caliper Plus Measurement MM	Value
Before		201.5	Before		384.1
	152.4 203.2 254.0 (Minimum) (Nominal) (Maximum)		228.6 304.8 381.0 (Minimum) (Nominal) (Maximum)		

Before: 8-JUN-2000 12:48

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Detector Ratios

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Arg - Big) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		55.53	Before		179.9	Before		185.0
	0 30.00 120.0 (Minimum) (Nominal) (Maximum)		152.4 170.0 196.2 (Minimum) (Nominal) (Maximum)			160.0 180.0 200.0 (Minimum) (Nominal) (Maximum)		

Before: 8-JUN-2000 12:48

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Zero Measurement

Phase	CNTC Background CPS	Value	Phase	CFTC Background CPS	Value	Phase	CNTC/CFTC (Tank)	Value
Master		25.80	Master		28.27			
Before		27.26	Before		30.28			
	0.000 23.00 40.00 (Minimum) (Nominal) (Maximum)		0.000 29.07 40.00 (Minimum) (Nominal) (Maximum)					

Before: 29-OCT-1999 12:43

High resolution Integrated Logging Tool-DTS Wafaite Calibration
Accelerometer Calibrations

Phase	Z-Axis Accelerometer ???	Value
Before		8.819
	8.810 8.910 10.01 (Minimum) (Nominal) (Maximum)	

Before: 10-JUN-2000 8:07

High resolution Integrated Logging Tool-DTS Master Calibration
Detector Ratios

Phase	Rho Aluminum KIM3	Value	Phase	Rho Magnesium KIM3	Value
Master		2598	Master		1898
	2590 2598 2606 (Minimum) (Nominal) (Maximum)		1878 1898 1908 (Minimum) (Nominal) (Maximum)		

Phase	Pe Aluminum	Value	Phase	Pe Magnesium	Value
Master		5.577	Master		2.427
	5.470 5.570 5.670 (Minimum) (Nominal) (Maximum)		2.360 2.400 2.750 (Minimum) (Nominal) (Maximum)		

Master: 5-JUN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration
Deviation Summary

Phase	SS Average Deviation %	Value	Phase	SB Average Deviation %	Value	Phase	LS Average Deviation %	Value
Master		0.2215	Master		0.3842	Master		0.5650
	0.4000 0.8000 1.600 (Minimum) (Nominal) (Maximum)		0.4000 0.8000 1.600 (Minimum) (Nominal) (Maximum)			0.4000 0.8000 1.600 (Minimum) (Nominal) (Maximum)		

Phase	SS Max Deviation %	Value	Phase	SB Max Deviation %	Value	Phase	LS Max Deviation %	Value
Master		0.9435	Master		1.335	Master		1.582
	-1.600 0 1.600 (Minimum) (Nominal) (Maximum)		-2.500 0 2.500 (Minimum) (Nominal) (Maximum)			-3.500 0 3.500 (Minimum) (Nominal) (Maximum)		

Master: 5-JUN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration
Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS	Value	Phase	Thermal Far Corr. (Tank) CPS	Value	Phase	CNTC/CFTC (Tank)	Value
Master		5469	Master		2412	Master		2.266
	5000 8001 7000 (Minimum) (Nominal) (Maximum)		2000 2763 3100 (Minimum) (Nominal) (Maximum)			2.100 2.158 2.540 (Minimum) (Nominal) (Maximum)		

Master: 29-OCT-1999 12:43

COMPANY	SUNCOR ENERGY INC.
WELL	SUNCOR NETLA P-16
FIELD	NETLA
PROVINCE	NORTHWEST TERRITORIES

BOTTOM LOG INTERVAL	1093.3 m
SCHLUMBERGER DEPTH	2036.8 m
DEPTH DRILLER	2209 m
KELLY BUSHING	607 m
DRILL FLOOR	606.7 m
GROUND LEVEL	602.3 m

Schlumberger

PLATFORM EXPRESS
ARRAY INDUCTION
Arko-LOG

LEGIBILITY
OF LOG
COULD VARY
DUE TO
COLOR
CONTENT

SONIC

1874 N.E.B. COPY

COMPANY SUNCOR ENERGY INC.

WELL SUNCOR NETLA P-16

FIELD NETLA

PROVINCE NORTHWEST TERRITORIES

PROVINCE/TERRITORY: NORTHWEST TERRITORIES
Field: NETLA
Location: P-16-60-50-122-45 (LSD)
Well: SUNCOR NETLA P-16
Company: SUNCOR ENERGY INC.

LOCATION

Schlumberger

DIPOLE SHEAR SONIC IMAGER LOG

P-16-60-50-122-45 (LSD)
300P160505122450 (UWID)

Elev.: K.B. 607 m
G.L. 602.3 m
D.F. 606.7 m

Permanent Datum: GROUND LEVEL Elev.: 602.3 m
Log Measured From: KELLY BUSHING 4.7 m above Perm. Datum
Drilling Measured From: KELLY BUSHING

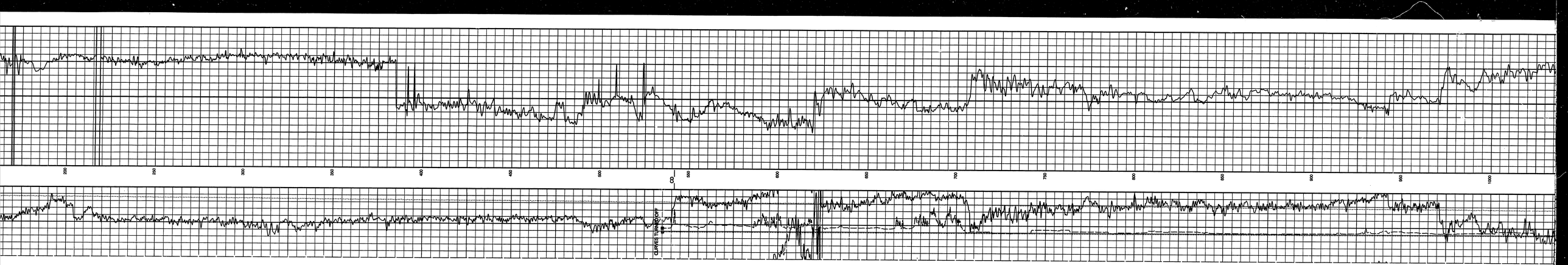
API Serial No.	SECTION	TOWNSHIP	RANGE
1874			

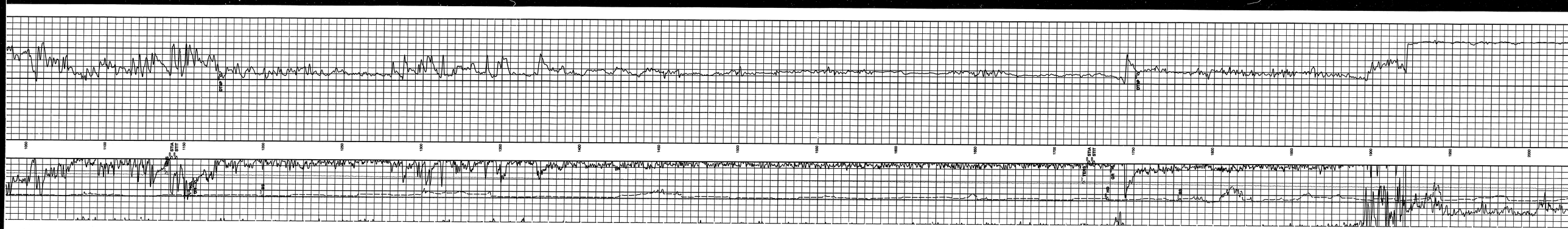
	Run 1	Run 2	Run 3	Run 4
Logging Date	10-JAN-2000			
Run Number	ONE			
Depth Driller	2099 m			
Schlumberger Depth	2098.8 m			
Bottom Log Interval	2093.6 m			
Top Log Interval	542 m			
Casing Driller Size @ Depth	244.000 mm @ 542 m	@	@	
Casing Schlumberger	542 m			
Bit Size	200.000 mm			
Type Fluid In Hole	POTASSIUM SULPHATE			
MUD Density / Viscosity	1020 kg/m3 69 s			
Fluid Loss / PH	11.6 cm3 11			
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.510 ohm.m @ 14 degC	@	@	@
RMF @ Measured Temperature	0.310 ohm.m @ 15 degC	@	@	@
RMC @ Measured Temperature	0.360 ohm.m @ 14 degC	@	@	@
Source RMF / RMC	MEASURED / MEASURED			
RM @ MRT / RMF @ MRT	0.190 @ 74 / 0.119 @ 74	@ @	@ @	@ @
Maximum Recorded Temperatures	74 degC			
Circulation Stopped / Time	10-JAN-2000 1:45			
Logger On Bottom / Time	10-JAN-2000 10:15			
Unit Number / Location	2034 GRANDE PRAIRIE			
Recorded By	ROBERT HARRIES			
Witnessed By	CRAIG OSKAWA			

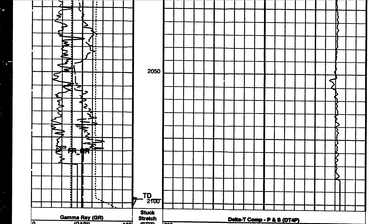
	Run 1	Run 2	Run 3	Run 4
Logging Date				
Run Number				
Depth Driller				
Schlumberger Depth				
Bottom Log Interval				
Top Log Interval				
Casing Driller Size @ Depth	@	@	@	
Casing Schlumberger				
Bit Size				
Type Fluid In Hole				
MUD Density / Viscosity				
Fluid Loss / PH				
Source Of Sample				
RM @ Measured Temperature	@	@	@	
RMF @ Measured Temperature	@	@	@	
RMC @ Measured Temperature	@	@	@	
Source RMF / RMC				
RM @ MRT / RMF @ MRT	@ @	@ @	@ @	@ @
Maximum Recorded Temperatures				
Circulation Stopped / Time				
Logger On Bottom / Time				
Unit Number / Location				
Recorded By				
Witnessed By				

ALL INTERPRETATIONS (IF ANY) EXPRESSED IN THIS ELECTRICAL OR OTHER LOG ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT, GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES
OBI1 OBI1
OBI2 OBI2
OBI3 OBI3
OBI4 OBI4
OBI5 OBI5
REMARKS: RUN 1 MARKS 1
POLARIZATION DIPOLE SHEAR SONIC IMAGER (PSI) TOOL RUN IN COMBINATION WITH THE DIGITAL SONIC IMAGER (DSI) TOOL.
FOLLOWING DATA PRESENTED ON THE FIELD PRINT WERE RECORDED:
DSI4 RAW, RECEIVER WAVEFORMS, STC PROCESSED SLOWNESS TIME COHERENCE (STC) AT 0.15 INCH SAMPLE RATE.
DSI4 RAW, RECEIVER WAVEFORMS, STC PROCESSED SLOWNESS TIME COHERENCE (STC) AT 0.5 INCH SAMPLE RATE.
CLIENT REQUESTED 5 SECONDS OF RECEIVER WAVEFORMS WITH 1/2


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CB
CLIFFS TUBE ROOF


DTHP
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1950
2000



Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
SIZ	Bit Size	222.000	MM
DEPO	Depth Offset for Logical Unit 1	0.0	M
LUPR	Trigger for MAIN Pass Reading Label	STI	
PP	Phase Processing	NORMAL	
RX1G	Receiver 1 Geometry	7452	MM
RX2G	Receiver 2 Geometry	7522	MM
RX3G	Receiver 3 Geometry	7772	MM
RX4G	Receiver 4 Geometry	7972	MM
RX5G	Receiver 5 Geometry	8222	MM
RX6G	Receiver 6 Geometry	8292	MM
RX7G	Receiver 7 Geometry	8362	MM
RX8G	Receiver 8 Geometry	8432	MM
SPVO	TVD of Rearing Point	0.0	M
TDD	DT Stuck Threshold	1.524	M
TDL	Total Depth - Driller	2106.60	M
TDWI	Total Depth - Logger	2106.60	M
TVDE	Along-hole depth of Tie-In Point	886	M
	TVD of Tie-In Point	886	M

Format: DSI_2 Vertical Scale: 1:600 Graphics File Created: 11-Jan-2000 00:24

OP System Version: 9C1-303

MCM

DSST-B	9C1-303	SGT-N	9C1-303
MCD-G	9C1-303	GPIT-A/B	9C1-303
MLT-AA	9C1-303	DTA-A	9C1-303
DTC-H	9C1-303		

Input DLIS Files

DEFAULT	DSSTB .032	FN:1	PRODUCER	11-Jan-2000 00:17	2102.1 M	28.8 M

Output DLIS Files

DEFAULT	DSSTB .033	FN:45	PRODUCER	11-Jan-2000 00:24		
CUST	DSSTB .033	FN:46	CUSTOMER	11-Jan-2000 00:24		

Input DLIS Files

DEFAULT	DSSTB .032	FN:1	PRODUCER	11-Jan-2000 00:17	2102.1 M	28.8 M

Output DLIS Files

DEFAULT	DSSTB .033	FN:45	PRODUCER	11-Jan-2000 00:24		
CUST	DSSTB .033	FN:46	CUSTOMER	11-Jan-2000 00:24		

OP System Version: 9C1-303

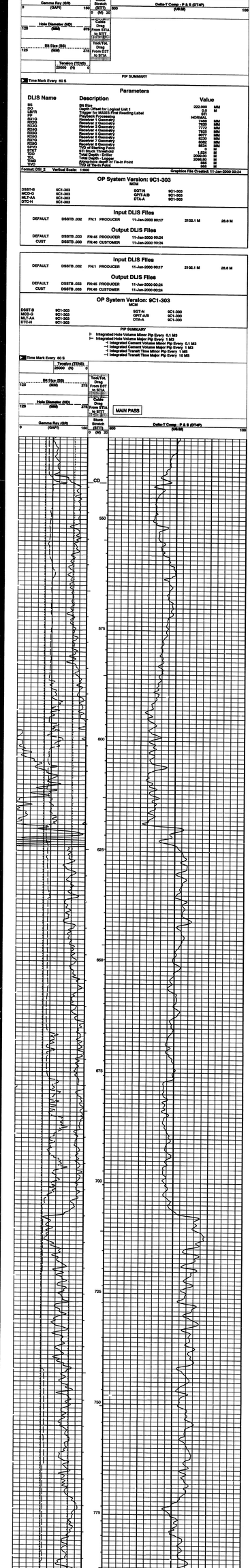
MCM

DSST-B	9C1-303	SGT-N	9C1-303
MCD-G	9C1-303	GPIT-A/B	9C1-303
MLT-AA	9C1-303	DTA-A	9C1-303
DTC-H	9C1-303		

PIP SUMMARY

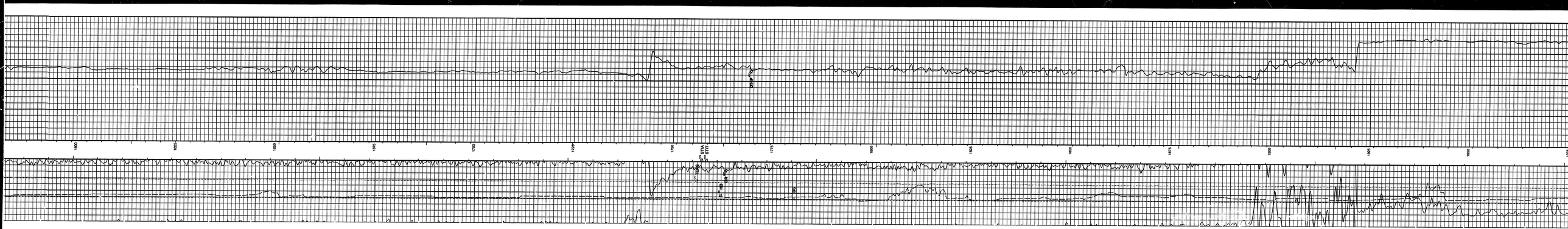
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3
- Integrated Transit Time Minor Pip Every 1 MS
- Integrated Transit Time Major Pip Every 10 MS

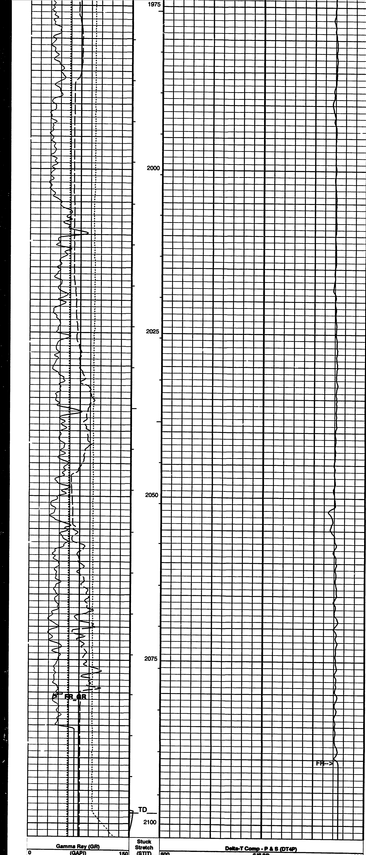
Time Mark Every 60 S

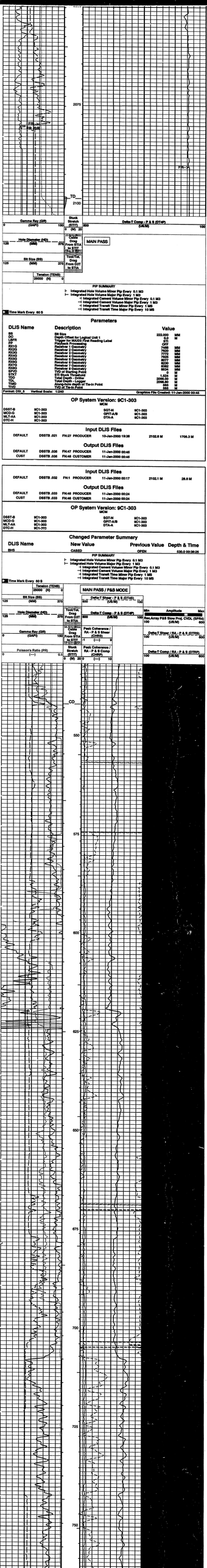


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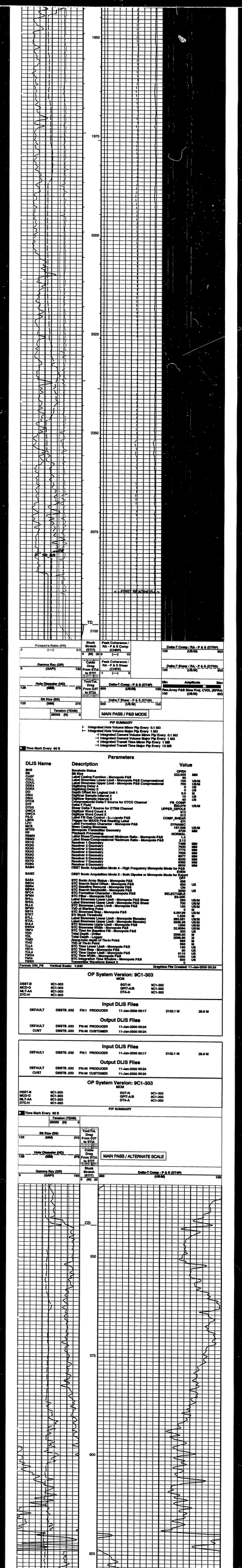

Gamma Ray (GR) (GAPI)
0
150
Shock Shock (STIT)
0 (M) 20
500
Delta-T Comp - P & S (DTdP) (US/M)
100
Hole Diameter (HD) (MM)
125
375
Cable Drag From STIA to STIT
MAIN PASS
Bit Size (BS) (MM)
125
375
Tool/Tdk. Drag From DST to STIA
Tension (TENS) 20000 (N)
0
PIP SUMMARY
Integrated Hole Volume Minor Pip Every 0.1 M3
Integrated Hole Volume Major Pip Every 1 M3
Integrated Cement Volume Minor Pip Every 0.1 M3
Integrated Cement Volume Major Pip Every 1 M3
Integrated Transit Time Minor Pip Every 1 MS
Integrated Transit Time Major Pip Every 10 MS
Time Mark Every 60 S
Parameters
DLIS Name
Description
Value
BS
Bit Size
222.003 MM
CSG
Depth Offset for Logical Unit 1
0.0 M
DEPTH
TYPE=MAXIS Final Reading Label
STI
Depth Shift
NORMAL
RX1G
Receiver 1 Geometry
6350 MM
RX2G
Receiver 2 Geometry
7620 MM
RX4G
Receiver 4 Geometry
7772 MM
RX5G
Receiver 5 Geometry
8077 MM
RX6G
Receiver 6 Geometry
8230 MM
RX7G
Receiver 7 Geometry
8382 MM
SPVD
TVD of Starting Point
8534. MM
STI
STI Borehole Indicator
1.000
TDD
Total Depth - Driller
2099.00 M
TDL
Total Depth - Logger
2099.00 M
TIVD
Along-Hole Depth of Tie-In Point
565 M
TVD of Tie-In Point
565 M
Format: DSI_6
Vertical Scale: 1/240
Graphics File Created: 11-Jan-2000 00:24
OP System Version: 9C1-303
MCM
D..ST-B 9C1-303
MCD-G 9C1-303
MLT-AA 9C1-303
DTC-H 9C1-303
SGT-N 9C1-303
GPIT-A/B 9C1-303
DTA-A 9C1-303
Input DLIS Files
DEFAULT DSSTB .032 FN:1 PRODUCER 11-Jan-2000 00:17 2102.1 M 28.8 M
Output DLIS Files
DEFAULT DSSTB .033 FN:45 PRODUCER 11-Jan-2000 00:24
CUST DSSTB .033 FN:46 CUSTOMER 11-Jan-2000 00:24
Input DLIS Files
DEFAULT DSSTB .021 FN:27 PRODUCER 10-Jan-2000 19:28 2102.8 M 1706.3 M
Output DLIS Files
DEFAULT DSSTB .035 FN:47 PRODUCER 11-Jan-2000 00:45 2102.8 M 1689.9 M
CUST DSSTB .035 FN:48 CUSTOMER 11-Jan-2000 00:45 2102.8 M 1689.9 M
OP System Version: 9C1-303
MCM
DSST-B 9C1-303
MCD-G 9C1-303
MLT-AA 9C1-303
DTC-H 9C1-303
SGT-N 9C1-303
GPIT-A/B 9C1-303
DTA-A 9C1-303
PIP SUMMARY
Integrated Hole Volume Minor Pip Every 0.1 M3
Integrated Hole Volume Major Pip Every 1 M3
Integrated Cement Volume Minor Pip Every 0.1 M3
Integrated Cement Volume Major Pip Every 1 M3
Integrated Transit Time Minor Pip Every 1 MS
Integrated Transit Time Major Pip Every 10 MS
Time Mark Every 60 S
Tension (TENS) 20000 (N)
0
Bit Size (BS) (MM)
125
375
Tool/Tdk. Drag From DST to STIA
Hole Diameter (HD) (MM)
125
375
Cable Drag From STIA to STIT
REPEAT SECTION
Gamma Ray (GR) (GAPI)
0
150
Shock Shock (STIT)
0 (M) 20
500
Delta-T Comp - P & S (DTdP) (US/M)
100
LAST READINGS
1900
1925
1950
1975
2000
2025
1975
2000
2025
2050
2075
2100
TD
FIN-2

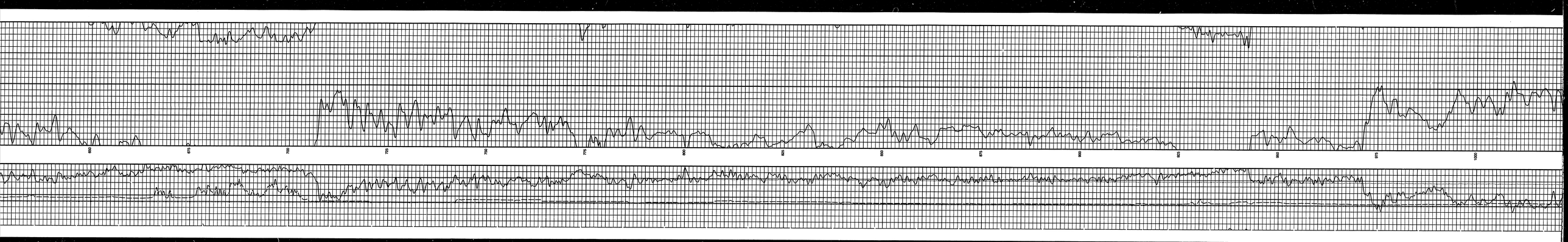

2079
FFS
2108
TD
2120
FFS_2
Gamma Ray (GR) (GAPI)
Stuck Stretch (STIT) (S)
Delta-T Comp - P & S (DTCP) (US/M)
Hole Diameter (HD) (MM)
Cable Drag From STIA to STIT (Pull)
MAIN PASS
Bit Size (BS) (MM)
Tool/Tot. Drag From STIT to STIA
Tension (TENS) (N)
PIP SUMMARY
Integrated Hole Volume Minor Pip Every 0.1 M3
Integrated Hole Volume Major Pip Every 1 M3
Integrated Cement Volume Minor Pip Every 0.1 M3
Integrated Cement Volume Major Pip Every 1 M3
Integrated Transit Time Minor Pip Every 1 MS
Integrated Transit Time Major Pip Every 10 MS
Time Mark Every 60 S
Parameters
DLIS Name
Description
Value
BS
Bit Size
222.000 MM
LDPR
Depth Offset for Logical Unit 1
0.0 M
PP
Playback Processing
ST
RG1Q
Receiver 1 Geometry
7456 MM
RG2Q
Receiver 2 Geometry
7930 MM
RG3Q
Receiver 3 Geometry
8404 MM
RG4Q
Receiver 4 Geometry
7930 MM
RG5Q
Receiver 5 Geometry
8877 MM
RG6Q
Receiver 6 Geometry
8230 MM
RG7Q
Receiver 7 Geometry
8704 MM
RG8Q
Receiver 8 Geometry
8834 MM
TVD
TVD of Starting Point
0 M
TDD
Total Depth - Driller
1.026 M
TDL
Total Depth - Logger
2108.10 M
TVDL
Along-hole depth of Tie-In Point
586 M
TVD
TVD at Tie-In Point
586 M
Format: DSI_5
Vertical Scale: 1:240
Graphics File Created: 11-Jan-2000 00:48
OP System Version: 9C1-303 MCM
DSST-B 9C1-303
MCD-G 9C1-303
MLT-AA 9C1-303
DTC-H 9C1-303
DSST-H 9C1-303
GPIT-A/B 9C1-303
DTA-A 9C1-303
Input DLIS Files
DEFAULT DSSTB.021 FN:27 PRODUCER 10-Jan-2000 19:38 2102.8 M 1706.3 M
Output DLIS Files
DEFAULT DSSTB.035 FN:47 PRODUCER 11-Jan-2000 00:48
CUST DSSTB.035 FN:48 CUSTOMER 11-Jan-2000 00:48
Input DLIS Files
DEFAULT DSSTB.032 FN:1 PRODUCER 11-Jan-2000 00:17 2102.1 M 28.8 M
Output DLIS Files
DEFAULT DSSTB.033 FN:46 PRODUCER 11-Jan-2000 00:24
CUST DSSTB.033 FN:45 CUSTOMER 11-Jan-2000 00:24
OP System Version: 9C1-303 MCM
DSST-B 9C1-303
MCD-G 9C1-303
MLT-AA 9C1-303
DTC-H 9C1-302
DSST-H 9C1-303
GPIT-A/B 9C1-303
DTA-A 9C1-303
Changed Parameter Summary
DLIS Name
New Value
Previous Value
Depth & Time
BHS
CASED
OPEN
630.0 00:38:28
PIP SUMMARY
Integrated Hole Volume Minor Pip Every 0.1 M3
Integrated Hole Volume Major Pip Every 1 M3
Integrated Cement Volume Minor Pip Every 0.1 M3
Integrated Cement Volume Major Pip Every 1 M3
Integrated Transit Time Minor Pip Every 1 MS
Integrated Transit Time Major Pip Every 10 MS
Time Mark Every 60 S
Tension (TENS) (N)
MAIN PASS / PAS MODE
Bit Size (BS) (MM)
Tool/Tot. Drag From CUT to STIA
Delta-T Shear - P & S (DTSP) (US/M)
Hole Diameter (HD) (MM)
Cable Drag From STIA to STIT (Pull)
Peak Coherence / RA - P & S Shear (CHSP)
Amplitude
Rec.Array P&S Slow Prog. CVDL (SPSN) (US/M)
Gamma Ray (GR) (GAPI)
Stuck Stretch (STIT) (S)
Peak Coherence / RA - P & S Comp (CHCP)
Delta-T Shear / RA - P & S (DTRP) (US/M)
Poisson's Ratio (PR)
Delta-T Comp / RA - P & S (DTCP) (US/M)
CD
550
575
600
625
650
675
700
725
750

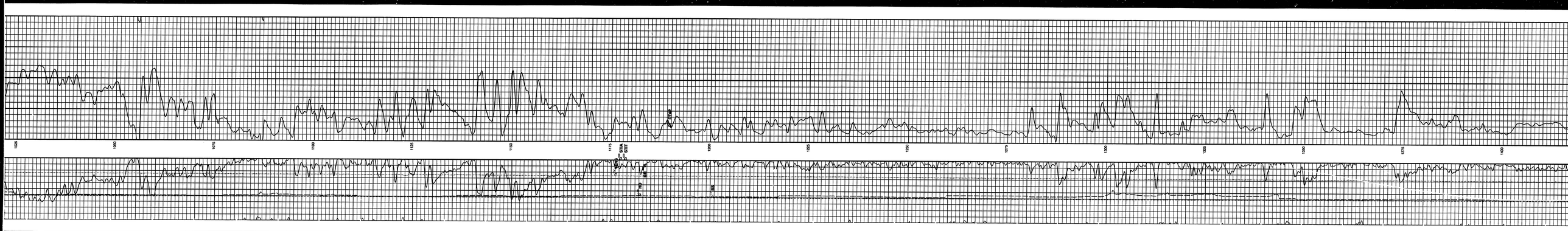
775
800
825
850
875
900
925
950
975
1000
1025
1050
1075
1100
1125
1150

1000
1025
1050
1075
1100
1125
1150
1175
1200
1225
1250
1275
1300
1325
1350
1375
1400
1425
1450
1475
1500
1525

1650
1675
1700
1725
1750
1775
1800
1825
1850
1875
1900
1925


1950
1975
2000
2025
2050
2075
2100
TD
CD
550
575
600
625
<-- FIRST READING -->
Poisson's Ratio (PR)
Stuck Sonde
Peak Coherence / RA - P & S Comp (CHRP)
Delta-T Comp / RA - P & S (DTRP)
Caliper
Peak Coherence / RA - P & S Sheer (CHRS)
Delta-T Sheer / RA - P & S (DTRS)
Gamma Ray (GR)
Hole Diameter (HD)
Delta-T Comp - P & S (DTCP)
Amplitude
Max
Min
Rec.Array P&S Slow Freq. CVDL (SPHV)
Bit Size (BS)
Delta-T Sheer - P & S (DTCP)
Tension (TENS)
MAIN PASS / P&S MODE
PIP SUMMARY
Integrated Hole Volume Minor Pip Every 0.1 bl3
Integrated Hole Volume Major Pip Every 1 bl3
Integrated Cement Volume Minor Pip Every 0.1 bl3
Integrated Cement Volume Major Pip Every 1 bl3
Integrated Transit Time Minor Pip Every 1 bl3
Integrated Transit Time Major Pip Every 10 bl3
Time Mark Every 60 S
Parameters
DLIS Name
Description
Value
BHS
Borehole Status
OPEN
BS
Bit Size
222.000
MM
CCAT
Label Casing Function - Monopole P&S
80
CDEC
Label Compressional Slowness - Monopole P&S Compressional
100
US/M
CDEU
Label Slowness Upper Limit - Monopole P&S Compressional
40
US/M
DDE2
Digitizing Delay 4
0
US
DDE3
Digitizing Delay 5
0
US
DDO
Digitizer Sample Logical Unit 1
0.5
US
DSI4
Digitizer Sample Interval 2
1
US
DSI5
Digitizer Sample Interval 3
2
US
DTC
Compressional Delta-T Source for DTCO Channel
PR_COMP
DTCO
DTCO Channel
100
US/M
DTSS
Shear Delta-T Source for DTSM Channel
UPPER_DIPOLE
DWCI
Digitizer Word Count 4
812
DWCS
Digitizer Word Count 5
812
FLC
Label Fil Gap Control - Monopole P&S
COMP_SHEER
LBFR
Trigger for MAXIS First Reading Label
FIRST
LFC
Label Formation Character - Monopole P&S
DYNAMIC
MTRG
Mnemonic Casing Slowness
187.008
US/M
PIR
Pipe Reference Geometry
NOMINAL
PP
Playback Processing
NORMAL
RSMN
Label Sheer/Compressional Minimum Ratio - Monopole P&S
1.4
RSMX
Label Sheer/Compressional Maximum Ratio - Monopole P&S
3.12
RX1G
Receiver 1 Geometry
7692
MM
RX2G
Receiver 2 Geometry
7692
MM
RX3G
Receiver 3 Geometry
7772
MM
RX4G
Receiver 4 Geometry
7772
MM
RX5G
Receiver 5 Geometry
8052
MM
RX6G
Receiver 6 Geometry
8052
MM
RX7G
Receiver 7 Geometry
8262
MM
RX8G
Receiver 8 Geometry
8262
MM
SAMX
DSST Sonic Acquisition Mode X - High Frequency Monopole Mode for P&S
EVEN
SAMX
DSST Sonic Acquisition Mode X - Both Dipoles or Monopole Mode for Sheer
EVEN
SASH
STC Sonic Array Status - Monopole P&S
OFF
SBOH
STC Search Band Offset - Monopole P&S
200
US
SBSH
STC Baseline Subscript - Monopole P&S
CH
SBW4
STC Search Band Width - Monopole P&S
400
US
SFCH
STC Formation Character - Monopole P&S
SELECTABLE
SFM4
STC Filter - Monopole P&S
80-2KC
SHEC
Label Sheer Compressional Limit - Monopole P&S Sheer
200
US/M
SHEL
Label Slowness Lower Limit - Monopole P&S Sheer
100
US/M
SLLG
STC Slowness Lower Limit - Monopole P&S
100
US/M
SPF4
STC st Starting Point
0
SPF5
STC Filter Type - Monopole P&S
6.80184
US/M
STH7
STC Stack Threshold - Monopole P&S
0.0625
STUL
Label Slowness Lower Limit - Monopole Monopole
590.551
US/M
STUL
Label Slowness Upper Limit - Monopole Monopole
2598.03
US/M
SWD4
STC Slowness Window Width - Monopole P&S
200
US
SWD4
STC Slowness Width - Monopole P&S
33.8583
US/M
TDF4
STC Time for Baseline Fill - Monopole P&S
300
US
TDL
Total Depth - Logger
2098.69
M
TDL
Total Depth - Logger
2098.82
M
TIMD
Along-hole depth of Tie-In Point
0
M
TIVD
TVD of Tie-In Point
0
M
TST1
STC Time Lower Limit - Monopole P&S
150
US
TST4
STC Time Upper Limit - Monopole P&S
512
US
TWD4
STC Time Width - Monopole P&S
512
US
TWD4
STC Time Window Width - Monopole P&S
1000
US
TWF4
Time Window Type - Monopole P&S
BOX
US
TWS4
Time Window Window Select 4
1
Format: DSI_PB
Vertical Scale: 1:240
Graphics File Created: 11-Jan-2000 00:24
OP System Version: 9C1-303
MCM
DSST-B
9C1-303
9GT-N
9C1-303
MCD-G
9C1-303
GPIT-AB
9C1-303
MLT-AA
9C1-303
DTA-A
9C1-303
DTC-H
9C1-303
Input DLIS Files
DEFAULT
DSSTB .032
FN:1 PRODUCER
11-Jan-2000 00:17
2102.1 M
28.8 M
Output DLIS Files
DEFAULT
DSSTB .033
FN:46 PRODUCER
11-Jan-2000 00:24
CUST
DSSTB .033
FN:46 CUSTOMER
11-Jan-2000 00:24
Input DLIS Files
DEFAULT
DSSTB .032
FN:1 PRODUCER
11-Jan-2000 00:17
2102.1 M
28.8 M
Output DLIS Files
DEFAULT
DSSTB .033
FN:46 PRODUCER
11-Jan-2000 00:24
CUST
DSSTB .033
FN:46 CUSTOMER
11-Jan-2000 00:24
OP System Version: 9C1-303
MCM
DSST-B
9C1-303
9GT-N
9C1-303
MCD-G
9C1-303
GPIT-AB
9C1-303
MLT-AA
9C1-303
DTA-A
9C1-303
DTC-H
9C1-303
PIP SUMMARY
Time Mark Every 60 S
Tension (TENS)
Bit Size (BS)
Tool/Tol. Drag
Hole Diameter (HD)
Caliper
Gamma Ray (GR)
Stuck Sonde
Delta-T Comp - P & S (DTCP)
MAIN PASS / ALTERNATE SCALE


650
675
700
725
750
775
800
825
850
875
900
925
950
975
1000


1025
1050
1075
1100
1125
1150
1175
1200
1225
1250
1275
1300
1325
1350
1375
1400
ETA
ETA
ETA

1445 1450 1475 1500 1525 1550 1575 1600 1625 1650 1675 1700 1725 1750 1775 1800

P STAP

P STAB

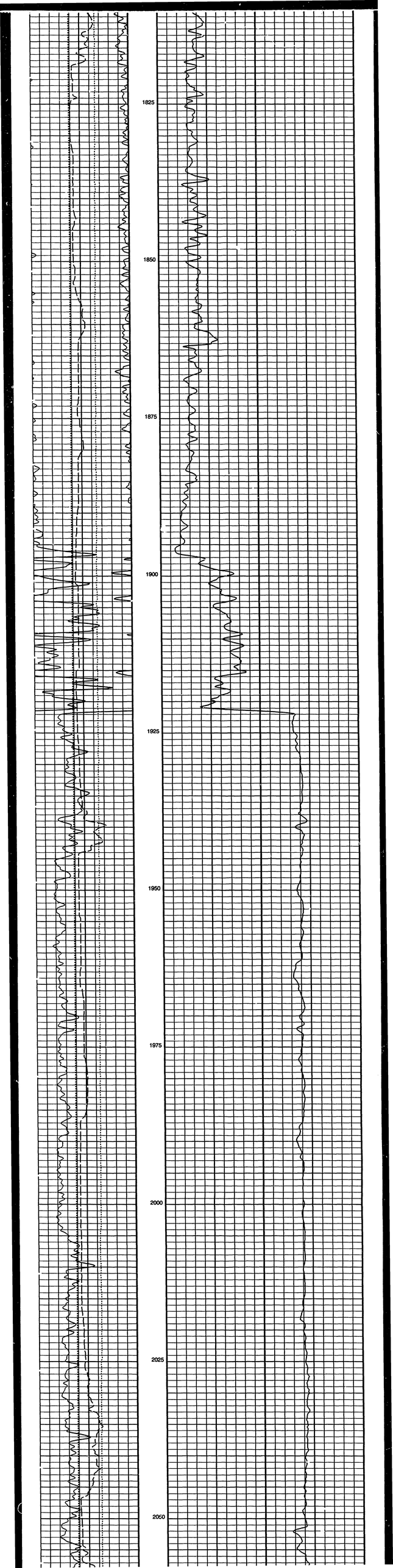
S STA

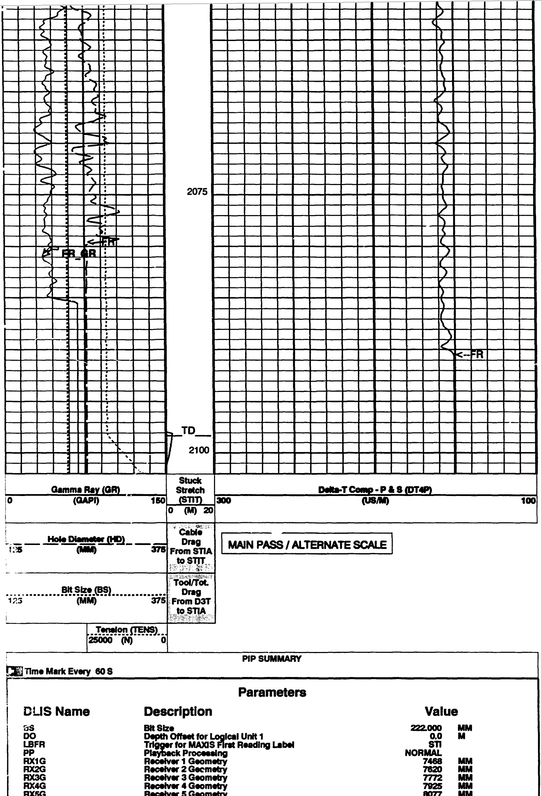
S TTT

P PUP

S SUP

S SB


1825
1850
1875
1900
1925
1950
1975
2000
2025
2050



Gamma Ray (GR)	Stuck Stretch (STIT)	Delta-T Comp - P & S (DT4P)
0 (GAPI) 150	0 (M) 20	300 (US/M) 100

Hole Diameter (HD)	Cable Drag From STIA to STIT
1.35 (MM) 375	

MAIN PASS / ALTERNATE SCALE

Bit Size (BS)	Tool/Tot. Drag From D3T to STIA
1.23 (MM) 375	

Tension (TENS) 25000 (N) 0

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DO	Depth Offset for Logical Unit 1	0.0	M
LBFR	Trigger for MAXIS First Reading Label	STI	
PP	Playback Processing	NORMAL	
RX1G	Receiver 1 Geometry	7468	MM
RX2G	Receiver 2 Geometry	7520	MM
RX3G	Receiver 3 Geometry	7772	MM
RX4G	Receiver 4 Geometry	7925	MM
RX5G	Receiver 5 Geometry	8077	MM
RX6G	Receiver 6 Geometry	8230	MM
RX7G	Receiver 7 Geometry	8382	MM
RX8G	Receiver 8 Geometry	8534	MM
SPVD	TVD of Starting Point	0	M
STKT	STI Stuck Threshold	1.524	M
TDD	Total Depth - Driller	2099.00	M
TDL	Total Depth - Logger	2098.80	M
TLMD	Along-hole depth of Tie-in Point	565	M
TVD	TVD of Tie-in Point	565	M

Format: DSI_300 Vertical Scale: 1:240 Graphics File Created: 11-Jan-2000 00:24

OP System Version: 9C1-303

MCM

DSST-B	9C1-303	SGT-N	9C1-303
MCD-G	9C1-303	GPIT-A/B	9C1-303
MLT-AA	9C1-303	DTA-A	9C1-303
DTC-H	9C1-303		

Input DLIS Files

DEFAULT	DSSTB .032	FN:1	PRODUCER	11-Jan-2000 00:17	2102.1 M	28.8 M

Output DLIS Files

DEFAULT	DSSTB .033	FN:45	PRODUCER	11-Jan-2000 00:24
CUST	DSSTB .033	FN:46	CUSTOMER	11-Jan-2000 00:24

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Scintillation Gamma-Ray - N Wellsite Calibration - Detector Calibration							
Before: 10-JAN-2000 18:09							
Gamma Ray (Jig - Bkg)	136.8	N/A	136.8	N/A	N/A	12.44	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI
Mechanical Caliper - G Wellsite Calibration - Electronics Calibration							
Before: 10-JAN-2000 17:57							
MCDG Counts Plus	377.0	N/A	378.5	N/A	N/A	N/A	
MCDG Counts Zero	103.0	N/A	103.8	N/A	N/A	N/A	
Mechanical Caliper - G Wellsite Calibration - Caliper Calibration							
Before: 10-JAN-2000 18:06							
Diameter Large Ring	304.8	N/A	323.8	N/A	N/A	N/A	MM
Diameter Small Ring	203.2	N/A	233.8	N/A	N/A	N/A	MM
General Purpose Inclinometer Wellsite Calibration - CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY							
Before: 10-JAN-2000 17:54							
TEMPERATURE REFERENCE :	N/A	N/A	20	N/A	N/A	N/A	DEGC
YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	6	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	614	N/A	N/A	N/A	
General Purpose Inclinometer Wellsite Calibration - CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY							
Before: 10-JAN-2000 17:55							
TEMPERATURE REFERENCE :	N/A	N/A	23	N/A	N/A	N/A	DEGC
YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A	N/A	
MONTH OF CALIBRATION :	N/A	N/A	5	N/A	N/A	N/A	
SERIAL NUMBER :	N/A	N/A	306	N/A	N/A	N/A	
MicroLog - AA Wellsite Calibration - MLTA Caliper Calibration							
Before: 9-JAN-2000 13:51							
MLT Caliper Small Ring	203.2	N/A	225.3	N/A	N/A	N/A	MM
MLT Caliper Large Ring	304.8	N/A	324.7	N/A	N/A	N/A	MM
MicroLog - AA Wellsite Calibration - MLTA Micro Inverse Calibration							
Before: 9-JAN-2000 13:49							
Micro Inverse Zero	0	N/A	0.1442	N/A	N/A	0.1000	OHMM
Micro Inverse Plus	5.000	N/A	4.937	N/A	N/A	0.1000	OHMM
MicroLog - AA Wellsite Calibration - MLTA Micro Normal Calibration							
Before: 9-JAN-2000 13:49							
Micro Normal Zero	0	N/A	0.2332	N/A	N/A	0.1000	OHMM
Micro Normal Plus	6.720	N/A	6.663	N/A	N/A	0.1000	OHMM

Scintillation Gamma-Ray - N / Equipment Identification

Primary Equipment:		
Scintillation Gamma Cartridge	SGC - SA	9588
Scintillation Gamma Detector	SGD - TAA	21097
Auxiliary Equipment:		
Scintillation Gamma Housing	SGH - K	2439
Gamma Source Radioactive	GSR - U/Y	

Scintillation Gamma-Ray - N Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI	Value	Phase	Gamma Ray (Jig - Bkg) GAPI	Value	Phase	Gamma Ray (Calibrated) GAPI	Value
Before		42.15	Before		136.8	Before		165.0
0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)	124.4 (Minimum)	136.8 (Nominal)	149.3 (Maximum)	150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)

Before: 10-JAN-2000 18:09

Mechanical Caliper - G / Equipment Identification

Primary Equipment:		
Mechanical Caliper Device - G	MCD - G	63
Auxiliary Equipment:		

Mechanical Caliper - G Wellsite Calibration

Electronics Calibration

Phase	MCDG Counts Plus	Value	Phase	MCDG Counts Zero	Value
Before		378.5	Before		103.8
320.5 (Minimum)	377.0 (Nominal)	433.5 (Maximum)	87.55 (Minimum)	103.0 (Nominal)	118.4 (Maximum)

Before: 10-JAN-2000 17:57

Mechanical Caliper - G Wellsite Calibration

Caliper Calibration

Phase	Diameter Large Ring MM	Value	Phase	Diameter Small Ring MM	Value
Before		323.8	Before	EXCEEDS LIMIT	233.8
259.1 (Minimum)	304.8 (Nominal)	350.5 (Maximum)	172.7 (Minimum)	203.2 (Nominal)	233.7 (Maximum)

Before: 10-JAN-2000 18:06

General Purpose Inclinometer / Equipment Identification

Primary Equipment:		
GPIT Cartridge - AC	GPIC - AC	
Auxiliary Equipment:		
GPIT Housing	GPIH - A	1777

MicroLog - AA / Equipment Identification

Primary Equipment:		
MicroLog - AA (sonde)	MLT - AA	109
Auxiliary Equipment:		

MicroLog - AA Wellsite Calibration

MLTA Micro Inverse Calibration

Phase	Micro Inverse Zero OHMM	Value	Phase	Micro Inverse Plus OHMM	Value
Before		0.1442	Before		4.937
-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)	3.000 (Minimum)	5.000 (Nominal)	7.000 (Maximum)

Before: 9-JAN-2000 13:49

MicroLog - AA Wellsite Calibration

MLTA Micro Normal Calibration

Phase	Micro Normal Zero OHMM	Value	Phase	Micro Normal Plus OHMM	Value
Before		0.2332	Before		6.663
-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)	4.720 (Minimum)	6.720 (Nominal)	8.720 (Maximum)

Before: 9-JAN-2000 13:49

COMPANY: SUNCOR ENERGY INC.

WELL: SUNCOR NETLA P-16

FIELD: NETLA

PROVINCE: NORTHWEST TERRITORIES

BOTTOM LOG INTERVAL	2098 m
SCHLUMBERGER DEPTH	2098.8 m
DEPTH DRILLER	2099 m
KELLY BUSHING	607 m
DRILL FLOOR	606.7 m
GROUND LEVEL	602.3 m

Schlumberger

DIPOLE SHEAR SONIC IMAGER LOG

LEGIBILITY
OF LOG
COULD VARY
DUE TO
COLOR
CONTENT

DENSITY

1874 N.E.B. COPY

COMPANY: SUNCOR ENERGY INC.

WELL: SUNCOR NETLA P-16

FIELD: NETLA

PROVINCE: NORTHWEST TERRITORIES

Field: NETLA
Location: P-16-60-50-122-45 (LSD)
Well: SUNCOR NETLA P-16
Company: SUNCOR ENERGY INC.

Schlumberger

PLATFORM EXPRESS COMPENSATED NEUTRON LITHODENSITY LOG

LOCATION

P-16-60-50-122-45 (LSD)
300P166050122450 (UWID)

Elev.: K.B. 607 m
G.L. 602.3 m
D.F. 606.7 m

Permanent Datum: GROUND LEVEL — Elev.: 602.3 m
Log Measured From: KELLY BUSHING — 4.7 m above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE
1874			

	Run 1	Run 2	Run 3	Run 4
Logging Date	10-JAN-2000			
Run Number	ONE			
Depth Driller	2099 m			
Schlumberger Depth	2098.8 m			
Bottom Log Interval	2085.8 m			
Top Log Interval	28 m			
Casing Driller Size @ Depth	244.000 mm @ 542 m	@	@	
Casing Schlumberger	542 m			
Bit Size	222.000 mm			
Type Fluid In Hole	POTASSIUM SULPHATE			
MUD Density / Viscosity	1220 kg/m3 / 65 s			
MUD Fluid Loss / PH	11.5 cm3 / 11			
MUD Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.510 ohm.m @ 14 degC	@	@	
RMF @ Measured Temperature	0.310 ohm.m @ 15 degC	@	@	
RMC @ Measured Temperature	0.380 ohm.m @ 16 degC	@	@	
Source RMF / RMC	MEASURED / MEASURED			
RM @ MRT / RMF @ MRT	0.190 @ 74 / 0.119 @ 74	@ / @	@ / @	
Maximum Recorded Temperatures	74 degC			
Circulation Stopped / Time	10-JAN-2000 / 1:45			
Logger On Bottom / Time	10-JAN-2000 / 10:15			
Unit Number / Location	2034 / GRANDE PRAIRIE			
Recorded By	ROBERT HARRIES			
Witnessed By	CRAIG ODAGAKI			

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFUL NEGLIGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO CLAUSE 4 OF OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES1
OS1: RUN1:AIT-TLD-LDT-CNT
OS2: RUN2: DSI-MLT-GPIT
OS3:
OS4:
OS5:

OTHER SERVICES2
OS1:
OS2:
OS3:
OS4:
OS5:

REMARKS: RUN NUMBER 1
ARRAY INDUCTION TOOL RUN IN COMPUTE STANDOFF MODE
FOUR FOOT CURVES PRESENTED ON THE 1:240 SCALE MAIN PASS
COMPENSATED NEUTRON PUN ECCENTRALIZED AND IN CASED HOLE STATUS UNTIL
542M WHERE THE STATUS WAS CHANGED TO OPEN HOLE
MUD RESISTIVITIES .0 51OHMS @ 1DEGC, 0.430HMS @ 18 DEGC
CLIENT REQUESTED A 200M REPEAT SECTION
HALS / FMI / VSP / MSCT WERE CANCELLED ON LOCATION
CEMENT VOLUME CALCULATED USING BOTH DENSITY CALIPERS WITH FCD=177.8MM
PULLED TIGHT AT 1612 M

REMARKS: RUN NUMBER 2

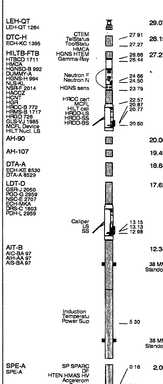
PRINTS : 2 FIELD, 9 FINAL
CREW : GORD WHALEN, DARRELL BASISTY
DEVIATION : 2 DEGREES

RUN 1			RUN 2		
SERVICE ORDER #:		6139233	SERVICE ORDER #:		
PROGRAM VERSION:		9C1-303	PROGRAM VERSION:		
FLUID LEVEL:			FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

EQUIPMENT DESCRIPTION

RUN 1	RUN 2
SURFACE EQUIPMENT	
WITM (DTS)-A HDSVS DIGITAL DNS-AB	

DOWNHOLE EQUIPMENT



MAXIMUM STRING DIAMETER 175 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

Input DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .019	FN:31	PRODUCER	10-Jan-2000 13:09
CUST	SPEA .019	FN:32	CUSTOMER	10-Jan-2000 13:09

OP System Version: 9C1-303

MCM

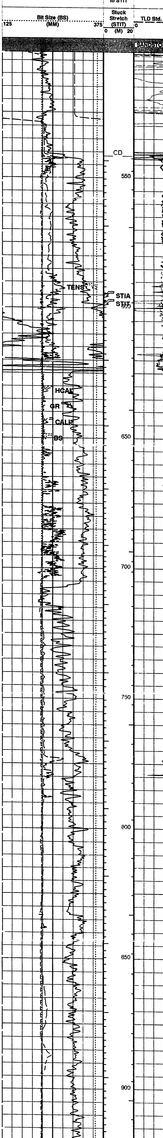
SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HLTB-FTB	9C1-303	DTC-H	9C1-303

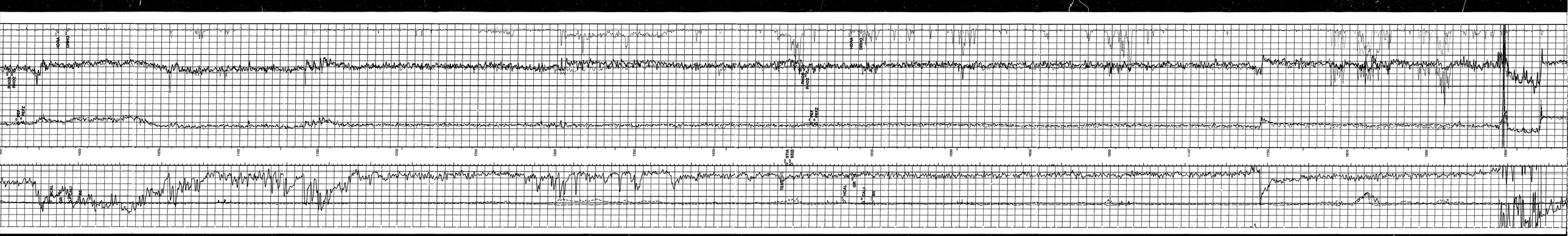
PIP SUMMARY

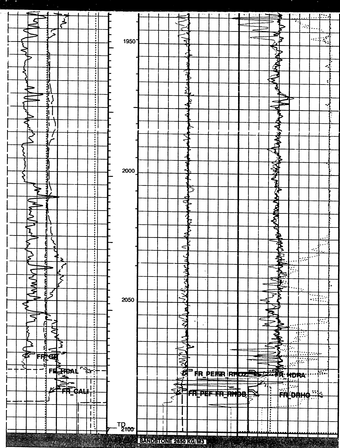
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

Tension (TENS) (N)			LDT Bulk Density (RHOB) (K/M3)		
150000	0		2000		3000
HRMR Caliper (HCAL) (MM)					
125	375				
Gamma Ray (GR) (GAPI)		Head Tens Drag Factor To STIA	TLD Bld. Res. Formation Density (RHOZ) (K/M3)		
0	150	150	2000		3000
LDT Caliber (CALI) (MM)		Cable Drag From STIA To STIT	LDT Photo-Electric Factor (PEF) (---)	TLD Density Correction (HDRA) (K/M3)	
125	375	0	10	450	-50
Bit Size (BS) (MM)		Shock Strain (STIT) (N)	TLD Bld. Res. Formation Pe (DEF) (---)	LDT Bulk Density Correction (DRHO) (K/M3)	
125	375	0 20	0	10	450 -50




HDN
DRMO
RUOA
RUO2
1 SEC
1 MV
1000
1050
1100
1150
1200
1250
1300
1350
1400
STIA
QRS
1500
1550
1600
1650
1700
1750
1800
1850
1900
HCAL
GR
1 CALI
SEC



Bit Size (BS) (MM) 125 375

Stuck Stretch (STIT) (M) 0 0

LDT Std. Res. Formation Pe (PEFZ) (---) 10.460

LDT Bulk Density Correction (DRHZ) (K/M3) -50 50

LDT Caliper (CALI) (MM) 125 375

Cable Grng From BTIA To BTIT 0

LDT PhotoElectric Factor (PEF) (---) 10.460

TLD Density Correction (HDRA) (K/M3) -50 50

Gamma Ray (GR) (GAPI) 0 150

Tool/Tol. Drag From DJT To BTIA 2000 2000

TLD Std. Res. Formation Density (RHOZ) (K/M3) 3000 3000

HRMS Caliper (HCAL) (MM) 125 375

LDT Bulk Density (RHOB) (K/M3) 2000 3000

Tension (TENS) (N) 15000000 0

PIP SUMMARY
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_StaleCorr_BasicLogs
ABHS	AIT Borehole Correction Mode	2_ComplexBasicSP
ABVV	AIT Borehole Correction Code Version Number	870
ACQT	AIT Basic Log Type	6_One_Two_and_Four
ADVV	AIT Basic Logs Code Version Number	0400_Log_Comp
ADVX	AIT Basic Logs Processing Option	Standard_Processing
ADZN	AIT Default Operation Enable	Yes
ACEN	AIT Centralization Flag (In Borehole)	Eccentered
ACSED	AIT Casing Effect Editing Depth	0 M
ADTM	AIT Desired Tool Mode	0400_Log_Comp
AEBC	AIT Enable Borehole Correction	Yes
AEBD	AIT Enable Dielectric	Yes
AERP	AIT Enable Radial Processing	Yes
AETP	AIT Enable Sonde Error Table/Pass Corr	Yes
AGRV	AIT Gamma Ray Code Version Number R Resolution	30.84,23,11
AIAV	AIT Select Address Translation Gating	On
AIHC	AIT Log Net Valid Flag	Log_Valid-No_Default_Parameters
AMPCHAN	Name of alternate sigma channel	SpecCorrectedSigma
AMRP	AIT Mud Resistivity Correction Depth	0 M
AMRP	AIT Mud Resistivity Factor	1
ARSV	AIT Response Set Version for One R Resolution	30.84,23,11
ARPV	AIT Radial Profiling Code Version Number	700
ARSV	AIT Response Set Version for Two R Resolution	6_One_Two_and_Four
ARTS	AIT Radial Parameterization Code Version Number	1750
ARTS	AIT Rt Selection (for ALLRES computation)	t_Array
ASFV	AIT Sonde Code Version	2400
ASTA	AIT Test Flag	25.4 MM
ATBSV	AIT Response Set Version for Two R Resolution	30.84,23,11
ATEF	AIT Temperature Selection(Sonde Error Correction)	Internal
AULV	AIT Tool Type (of acquired data)	AITB
AVAV	AIT Vertical Resolution	10CM
BFM	Borehole Fluid Medium	SOLID
BHFL	Borehole Fluid Type	WATER
BHT	Bottom Hole Temp	OPEN
BHT	Bottom Hole Temperature (used in calculations)	76 DEGC
BS	Bit Size	222.25 MM
BSCO	Borehole Salinity	40000.00 PPM
BSCO	Borehole Salinity Correction Option	NO
CAKT	Casing & Cement Thickness Correction Option	NO
CDFTYP	Conveyance Type	Wireline
CSID	Current Casing Size	244.000 MM
DENS1	Density Matrix	53.70 KG/M
DEPREM1	Depth Remark 1	
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFD	Drilling Fluid Density	1220.00 K/M3
DHC	Drilling Fluid Salinity Correction	CALCULATED
DQI	Depth Offset for Logical Unit 1	0.0 M
DXBCL	Density Porosity Processing Mode	HIRES
DXBCL	Density Porosity Processing Mode	2D
EDFD	External Bias Indicator Bias State Value	0
FLD	Fluid Density	1000 K/M3
FNOM	Form Factor Exponent	2
FNOM	Form Factor Exponent	2
FPHI	Form Factor Porosity Source	DPHZ
FSCO	Formation Salinity	40000 PPM
GCBC	Gravel Correction Salinity Correction Option	NO
GRAV	Gravel Pack Porosity	HCAL
GRID	Average Angular Orientation of Borehole from Normal	0 DEG
GRID	Geometrical Gradient	0.015257 DC/M
GTSE	Generalized Tornado Sensitivity Selection	CHANT_HTEN_2
GTSE	Generalized Tool Response Selection	HRTS_HTEN
HACTP	Accelerometer FROM Presence	PRESENT_FROM
HDCO	Accelerometer Operating Temperature	OPER DEGC
HDEAD	HLDT Density Dead detection	2600 K/M3
HDEAD	HLDT Density Dead detection	2600 K/M3
HFAV	HLDT Auto Window Integrity	YES
HFLC_GAS_DENSITY	HLDT Gas Downhole Density	0 K/M3
HFLC_GAS_OPTION	HLDT Gas Downhole Option	ON
HLMD	HDLX Logging Mode	STAN
HNDGD	HLDT Neutron Gain detection	0.40 V/V
HNDGD	HLDT Neutron Gain detection	0.40 V/V
HPSEOUT	HLDT effective Pulse Count	0.00 V/V
HSCB	HLDT Speed Correction Mode	HCAL
HSCB	HLDT Speed Correction Mode	TSCD_SPEED_CORRECTION
HSO	Hole Size Correction Source	TCS
HSTI	HLDT Stick Indicator Selection	GR
HSTI	HLDT Stick Indicator Selection	GR
HWOUT	HLT Water Saturation Bulk AITH cutoff	0 %
HWCO	Integrated Hole Volume Caliper Selection	HCAL
IDWV	IDW Code Version Number (YYYY)	4d-MMM-yyyy
IDWLCN	IDW Calibration Cable Type	7-46P
IDWLCN	IDW Calibration Cable Type	7-46P
IDWTY	IDW Tool	IDW-B
IDWWC1	IDW Wheel Correction 1	999
IDWWC2	IDW Wheel Correction 2	999
INFS	Trigger for MAXIS First Reading Label	STI
LCSN	Logging Company Name	SLB
LDHC	Log Integration	First_Log_to_Run
LDHC	LS Hardware Loop Control	DISALLOW
MCCO	Mud Cake Correction Option	SANDSTONE
MCCO	Mud Cake Correction Option	NO
MCDR	Mud Connection	NAD
MHCO	MCFL Correction	2650 K/M3
MHCO	MCFL Dry Component Correction Coefficient	3.2e-005 OHMS
MHC1	MCFL Wt Contrast Correction Coefficient	3.2e-005 OHMS
MHC2	MCFL High Contrast Correction Option	NO
MHC	MCFL Processing Operation Mode	ON
MMT	Mud Maximum Temp	143.33 DEGC
MWCO	Mud Weight Correction Option	NO
NAAC	HRDD APS Activation Correction	ON
NFAV	HRDD Near Far Average	NOMINAL
NPIM	HRDD Processing Mode	HiRes
NSAR	HRDD Depth Sampling Rate	0.1524 MM
PHMAX	Max Porosity Limit Used for playback	60 V/V
PP	Pe Processing	0.25 V/V
PPCO	Pressure Compensation Correction Option	RECOMPUTE
PPCO	Pressure Temperature Correction Option	NO
RGT	Rig Type	LAND
RLHM	Reference Log Date (dd-MMM-yyyy)	6d-MMM-yyyy
RLRH	Reference Log Run Number	1
RLRH	Reference Log Run Number	1
RTCO	RTCO - Rt Correction	0.3100 OHMM
RULB	Rig Up Length at Bottom	YES
RULB	Rig Up Length at Surface	0 M
RW	Resistivity of Connate Water	0 M
SCCORR	Sonde Correction	1.0000 OHMM
SDAT	Standoff Data Source	-50000 M
SEXP_HILT	HILT Saturation Exponent	2
SGCO	Sigma Correction	20 DEGC
SOCO	Standoff Distance	3.175 MM
SOCO	Standoff Correction Option	NO
SRHC	SP Near Value	999 MV
STDLC	SS Hardware Loop Control	DISALLOW
STIT	Stuck Stretch Log Correction	0 M
TDAT	Total Depth	2100 M
TDD	Total Depth - Driller	2099.00 M
TDL	Total Depth - Logger	2099.00 M
TNDCD	Tension Device Calibration Date (dd-MMM-yyyy)	6d-MMM-yyyy
TNDSN	Tension Device Calibration Serial Number	1
TNDOS	Tension Device Gain	1
TNDOF	Tension Device Offset	0
TNDSN	Tension Device Serial Number	1
TNSO	Tension Source	-999
TSEC	Tension Source Corrected Depth Computation	CMTD-BIA
TWS	Temperature of Drilling Mud Surface	21 DEGC
WMUD	Mud Weight	1064.936 K/M3
WSID	Tool Zero Reference Check at Surface	-50000 M

Format: PORO_2 Vertical Scale: 1:600 Graphics File Created: 10-Jan-2000 12:10

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FITB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SEPA .009	FN:8	PRODUCER	10-Jan-2000 12:11	

Output DLIS Files

DEFAULT	SEPA .010	FN:31	PRODUCER	10-Jan-2000 13:09	
CUST	SEPA .019	FN:32	CUSTOMER	10-Jan-2000 13:09	

Input DLIS Files

DEFAULT	SEPA .009	FN:8	PRODUCER	10-Jan-2000 12:11	2101.3 M	28.0 M

Output DLIS Files

DEFAULT	SEPA .020	FN:33	PRODUCER	10-Jan-2000 13:56	2101.3 M	28.0 M
CUST	SEPA .020	FN:34	CUSTOMER	10-Jan-2000 13:56	2101.3 M	28.0 M

Integrated Hole/Cement Volume Summary

Hole Volume = 80.07 M3

Cement Volume = 21.42 M3 (assuming 177.80 MM casing O.D.)

Computed from 2098.9 M to 542.1 M using data channel(s) HCAL

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FITB	9C1-303	DTC-H	9C1-303

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
BHS	CASED	OPEN	541.9 15:33:44

PIP SUMMARY
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

Tension (TENS) (N) 15000000 0

LDT PhotoElectric Factor (PEF) (---) 10.460

TLD Density Correction (HDRA) (K/M3) -50 50

HRMS Caliper (HCAL) (MM) 125 375

TLD Std. Res. Formation Pe (PEFZ) (---) 10.460

LDT Bulk Density Correction (DRHO) (K/M3) -50 50

Gamma Ray (GR) (GAPI) 0 150

Tool/Tol. Drag From DJT To BTIA 0.45

Alpha Processed Neutron Porosity (NPOR) (V/V) -0.15

LDT Caliper (CALI) (MM) 125 375

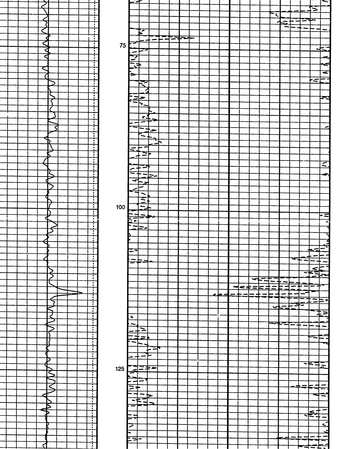
Cable Grng From BTIA To BTIT 0.45

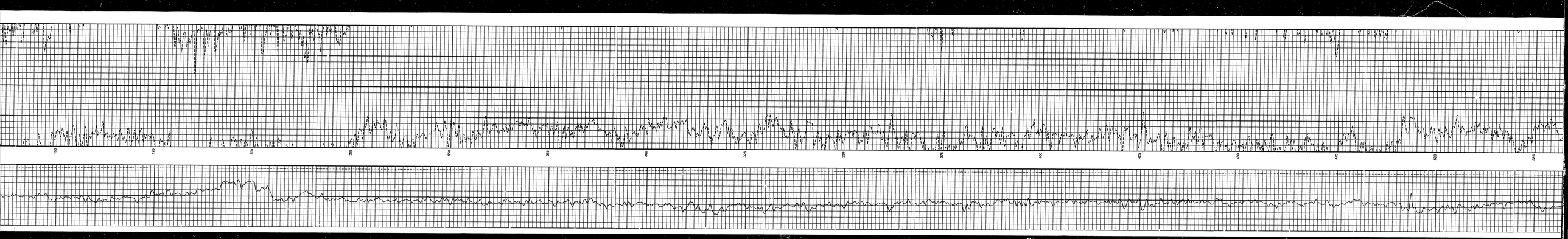
LDT Density Porosity (DPHI) (V/V) -0.15

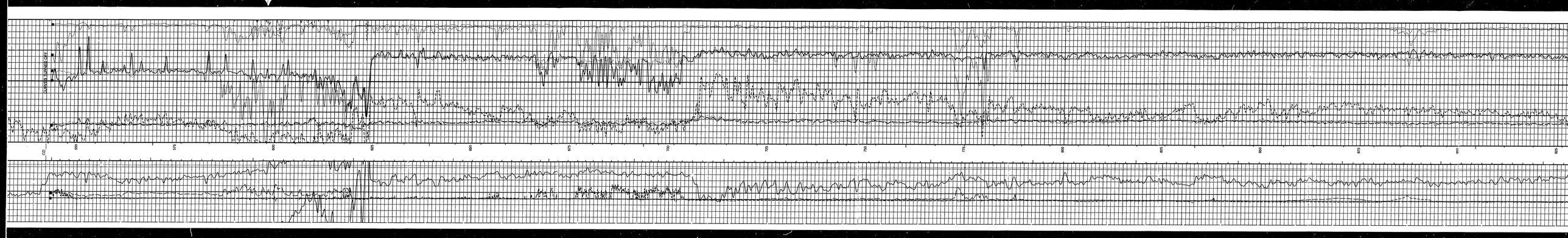
Bit Size (BS) (MM) 125 375

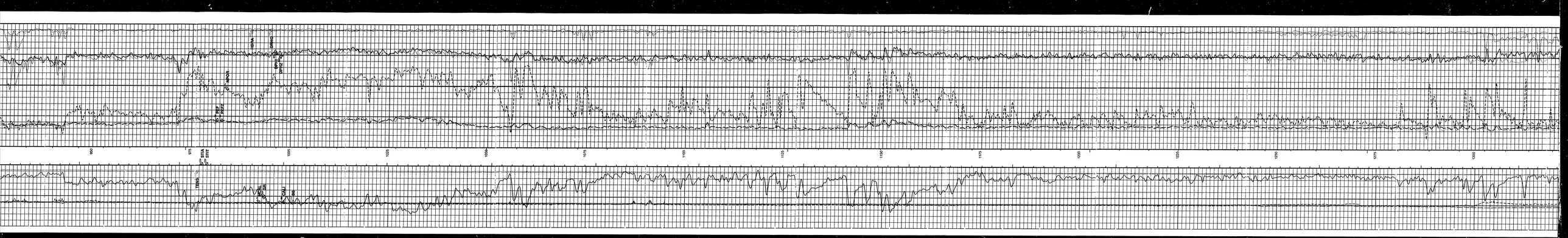
Stuck Stretch (STIT) (M) 0 (M) 20

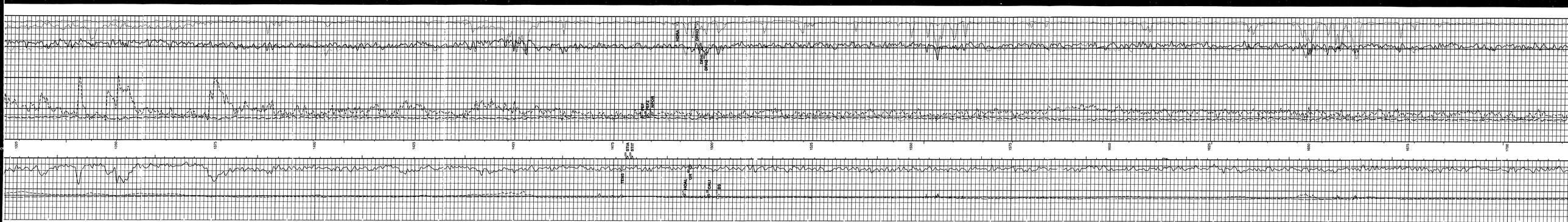
TLD Std. Res. Density Porosity (DPHZ) (V/V) 0.45 -0.15




150
175
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525


CARDIAC SURGERY OFF
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PEF
PEF2
HPOA
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2100

FR UPPR
FR LWR
FR FREQ
FR PWR
FR UPPR TRANSVRS
FR LWR TRANSVRS
FR PWR TRANSVRS
FR TOTAL
FR PWR UNIT

LDT Caliper (CALI)		Cable Drag		LDT Density Porosity (DPHI)	
125 (MM)	375	From STA 0.45 to STT		(V/V)	-0.15

Gamma Ray (GR)		Tool/Tel. Drag		Alpha Processed Neutron Porosity (NPOR)	
0 (GAPI)	150	From DST 0.45 to STA		(V/V)	-0.15

HRMS Caliper (HCAL)		Tension (TENS)	
125 (MM)	375	1500000 (N)	0

TLD Std. Res. Formation Pe (PEFZ)		TLD Bulk Density Correction (DRHO)	
0 (---)	10	.450 (K/M3)	.450

LDT PhotoElectric Factor (PEF)		TLD Density Correction (HDRA)	
0 (---)	10	.450 (K/M3)	.450

PIP SUMMARY
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AAPL	AIT Answer Product Level(Depth Log/View only)	2_RholdCorr_BasicLogs	
ABHM	AIT Borehole Correction Mode	2_ComputeSetEquals	
ABVM	AIT Borehole Correction Code Version Number	870	
ACLV	AIT Basic Logs Level	4_One_Two_and_Four	
ADLV	AIT Basic Logs Code Version Number	973	
ADPG	AIT Basic Logs Processing Option	Stac _r4_ Processing	
ADPM	AIT Depth Processing Enable	Yes	
ADPV	AIT Depth Processing Flag (In Borehole)	Eccentered	
ADTM	AIT Desired Tool Mnemonic	1_AIT-M	M
AEBC	AIT Enable Borehole Correction	Yes	
AEDP	AIT Enable Dip Log	Yes	
AEIP	AIT Enable Invasion Processing	Yes	
AETP	AIT Enable Sonde Error Temp&Pres Corr	Yes	
AEVP	AIT Enable Vertical Resolution Processing	Yes	
AIGS	AIT Natural Gamma Interpolation Gating	On	
ALMV	AIT Log Mnemonic	Log_Valid-No_Default_BasicLogs	
ALTDPCH:N	Name of alternate depth channel	SpeedCorrDepth	
AMPF	AIT Mud Resistivity Calibration Depth	0	M
ANPV	AIT Neutral Porosity	0.3	
APDV	AIT Replacement Set version for One R Resolution	30,64,23,11	
APFV	AIT Radial Profiling Code Version Number	720	
APLV	AIT Radial Processing Mode	6_One_Two_and_Four	
APPV	AIT Radial Processing Code Version Number	710	
ARTS	AIT Rt Selection (for ACRS computation)	1_AIT-M	
ARVS	AIT Simple Recal Number	0	
ASDT	AIT Tool Standoff	25.4	MM
ATBV	AIT Tool Set Version for Two R Resolution	30,64,23,11	
ATSC	AIT Temperature Selection(Sonde Error Correction)	Main	
ATTY	AIT Tool Type (of acquired data)	AITB	
AVRV	AIT Vertical Resolution	Normal	
BFSI	Borehole Fluid Sodium	130000	
BHFL	Borehole Fluid Type	SALTMUD	
BHSI	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	56	DEGC
BS	Bit Size	222.25	MM
BSCG	Borehole Salinity Correction Option	-50000.00	PPM
CBCO	Casing Bulk Density Thickness Correction Option	NO	
CDNTYP	Conveyance Type	Wireline	
CSIZ	Current Casing Size	244.475	MM
CWEI	Casing Weight	53.70	KG/M
DEPMEM1	Depth Remark 1		
DEPMEM2	Depth Remark 2		
DEPMEM3	Depth Remark 3		
DEPMEM4	Depth Remark 4		
DEPMEM5	Depth Remark 5		
DEPMEM6	Depth Remark 6		
DFD	Drilling Fluid Density	1235.00	K/M3
DFL	Drilling Fluid Production	CALIPER	
DO	Depth Offset for Logical Unit 1	0.0	M
DPPM	Density Porosity Processing Mode	1_Limestone	
EXBSIG	External Shale Indicator Gate Value	20	
EXSH	External Shale Indicator Shale Value	100	
FD	Fluid Density	1000	K/M3
FEXF	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
FSRC	Formation Salinity Source	DPHZ	
FSXL	Formation Salinity Value	-50000	PPM
FSCO	Formation Salinity Correction Option	NO	
GDEC	Generalized Called Selection	HCAL	
GSRO	Average Angular Deviation of Borehole from Normal	0	DEG
GSSO	Generalized Standoff	0.018287	DGCM
GWBS	Generalized Mud Resistivity Selection	CHART GEN 4	
GTSE	Generalized Temperature Selection	HSTE HTEM	
HBHP	HALS Bad Hole Processing	PRESENT_IT_1	
HART	Accelerometer Reference Temp	20	DEGC
HDCOD	HILT Density Coal detection	2000	K/M3
HDSD	HILT Density Sand detection	2650	K/M3
HFAM	HILT Auto Write Telemetry	7100	K/M3
HFAW	HILT Auto Write Telemetry	NO	
HILT_GAS_DENSITY	HILT Gas Correction Option		
HILT_VAC_OPTION	HILT Vac Correction Option	OFF	
HMCO	HALS Logging Mode	STAN	
HMSD	HILT Mud Salinity Detection	NO	Y/V
HNAO	HILT Neutron Salt detection	0.01	V/V
HPHSCUT	HILT effective Porosity Cutoff	0.01	V/V
HSCO	HILT Salinity Correction Mode	TSCD_SPEED_CORRECTION	
HSOD	HILT Shale Detection Option	YES	
HSRS	HILT Shale Indicator Source	GRCH	
HSTI	STI Uses HILT Accelerometer	NO	
HWCUT	HILT Water Saturation from ATR cutoff	50	%
HYCS	Hydrocarbon Correction Source	HCAL	
IDWCN	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
IDWCSN	IDW Calibrator Serial Number	7777	
IDWDT	IDW Density Offset	2.467	
IDWSN	IDW Serial Number	999	
IDWTYP	IDW Type	999	
IDWWC1	IDW Wheel Correction 1	999	
IDWWC2	IDW Wheel Correction 2	999	
LBFR	LDT Bulk Density Reading Label	999	
LSN	Logging Case Serial Number	7100	K/M3
LOGSEQ	Log Sequence	NO	
LPLC	LDT Pulser Loop Control	First_Log_In_Well	
MATR	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
MCCO	Mud Cake Correction Option	OFF	
MCSN	Mud Conductivity	NATU	
MDEN	Mud Density	2600	K/M3
MHCE	MCFL Bit Constraint Correction Coefficient	2.2e-005	OHMS
MHCI	MCFL Bit Constraint Correction Constant	3.2e-005	OHMS
MHCC	MCFL High Contrast Correction Switch	NO	
MHCO	MCFL High Contrast Correction Mode	OFF	
MST	Mud Sample Temperature	24.00	DEGC
MWCO	Mud Weight Correction Option	NO	
NCOR	HRDD Neutron Porosity Correction	OFF	
NMT	HRDD Processing Type	NOBARITE	
NPRM	HRDD Processed Matrix	SANDSTD	
NSAM	HRDD Depth Sampling Rate	0.1	MM
PBVSADP	Use alternate depth channel for playback	NO	
PDMAX	Pad Max Deviation	5.25	V/V
PP	Playback Processing	RECOMPUTE	
PTCO	Pressure/Temperature Correction Option	OFF	
PTYP	Pad Type	LARGE	
RLDT	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy	
RLNM	Reference Log Name		
RLRN	Reference Log Run Number		
RMFS	Resistivity of Mud Filtrate Sample	0.3100	OHMM
RTCO	RT Correction Option Switch	YES	
RULS	Rig Up Length at Bottom	0	M
RULT	Rig Up Length at Surface	0	M
SCWR	Stretch Correction Water	1.0000	OHMM
SDAT	Standoff Data Source	-50000	M
SDST_HI_T	Standoff Set Point	-50000	M
SHT	Surface Hole Temperature	0.00	DEGC
SOCH	Sonde Offset Channel	3.175	MM
SOCO	Standoff Correction Option	NO	
SPNV	SP Neut Value	0	MV
SPLC	SP Pulser Loop Control	DISALLOW	
SSKC	Subsequent Trip Or * Log Correction	-50000	M
STKT	STI Block Threshold	0.05	M
TDD	Total Depth	2099	M
TDL	Total Depth - Driller	2099	M
TDLL	Total Depth - Logger	2098.00	M
TENCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	M
TENDSN	Tension Device Calibrator Serial Number	7777	
TENOFF	Tension Device Offset	1	
TENSF	Tension Device	1	
TENSN	Tension Device Serial Number	999	
TSEC	TNSD Section	CMTD-D-5	
TWS	TNSD Weight Corrected Depth Computation	YES	
WMUD	Temperature of Circulate Water Sample	24.00	DEGC
WWGT	Mud Weight	994.036	K/M3
	Tool Zero Reference Check at Surface	-50000	

Format: PORO_5 Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 13:56

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .020	FN:33	PRODUCER	10-Jan-2000 13:56
CUST	SPEA .020	FN:34	CUSTOMER	10-Jan-2000 13:56

Input DLIS Files

DEFAULT	SPEA .008	FN:7	PRODUCER	10-Jan-2000 11:11

2103.1 M 1884.6 M

Output DLIS Files

DEFAULT	SPEA .004	FN:3	PRODUCER	10-Jan-2000 10:38

2103.1 M 1884.6 M

Integrated Hole/Cement Volume Summary

Hole Volume =	8.32 M3
Cement Volume =	2.50 M3 (assuming 177.80 MM casing O.D.)
Computed from	2098.9 M to 1884.9 M using data channel(s) HCAL

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

PIP SUMMARY
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

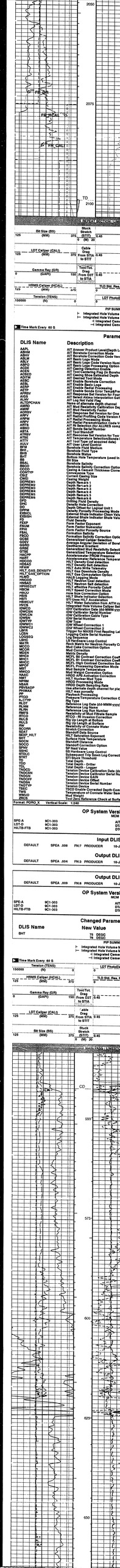
Tension (TENS)		LDT PhotoElectric Factor (PEF)		TLD Density Correction (HDRA)	
1500000 (N)	0	0 (---)	10	.450 (K/M3)	.450

HRMS Caliper (HCAL)		TLD Std. Res. Formation Pe (PEFZ)		TLD Bulk Density Correction (DRHO)	
125 (MM)	375	0 (---)	10	.450 (K/M3)	.450

Gamma Ray (GR)		Tool/Tel. Drag		Alpha Processed Neutron Porosity (NPOR)	
0 (GAPI)	150	From DST 0.45 to STA		(V/V)	-0.15

LDT Caliper (CALI)		Cable Drag		LDT Density Porosity (DPHI)	
125 (MM)	375	From STA 0.45 to STT		(V/V)	-0.15

Bit Size (BS)		Stuck Sticker		TLD Std. Res. Density Porosity (DPHZ)	
125 (MM)	375	0 (M)	20	(V/V)	-0.15



PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Parameters

DLIS Name	Description	Value
AAPL	ATF Answer Product Limit/Depth Log/View only)	0_SholeCorr_BasicLogs
ABHM	ATF Borehole Correction Mode	0_CompensatedResistivity
ABVV	ATF Borehole Correction Code Version Number	1
ABLM	ATF Basic Logs Mode	6_One_Two_and_Four
ABNO	ATF Basic Logs Processing Number	2
ABSO	ATF Basic Logs Processing Option	Standard_Processing
ACDE	ATF Casing Detection Enable	Yes
ACDO	ATF Tool Centering Flag (in Borehole)	Eccentered
ACEO	ATF Casing Thickness Calculated Depth	-32000 M
ADTM	ATF Detector Mode	0x06_Long_One
AEBC	ATF Enable Borehole Correction	Yes
AELS	ATF Enable Basic Logs	Yes
AEPS	ATF Enable Basic Processing	Yes
AERV	ATF Enable Error Term&Prec Corr	Yes
APRV	ATF Reposition Set Version for Four ft Resolution	30.64.23.11
ARPV	ATF Reposition Set Version for One ft Resolution	30.64.23.11
ALSV	ATF Last Valid Log Pass	Log_Valid-No_Default_Parameters
ALTDPCHAN	Name of alternate depth channel	SpeedCorrectedDepth
AMRD	ATF Mod Resistivity Calibration Depth	-32000 M
AMRV	ATF Mod Resistivity Factor	1
AORV	ATF Radial Profiling Set for One ft Resolution	30.64.23.11
ARFV	ATF Radial Profiling Data Version Number	1
ARPM	ATF Radial Processing Mode	6_One_Two_and_Four
ARVV	ATF Radial Profiling Correction Code Version Number	1
ARTS	ATF Re-Selection for ALLRES computation)	1_ATSO
ASNO	ATF Sonde Serial Number	2
ASTV	ATF Tool Standoff	24.4 MM
ATSV	ATF Resonse Set Version for Two ft Resolution	30.64.23.11
ATEE	ATF Temperature Correction Mode Error Correction)	1
ATTV	ATF Tool Type (of acquired data)	HRMR
AULV	ATF User Level Control	Normal
AWTY	ATF Wellbore Type	LIQUID
BHF	Borehole Fluid Type	WATER
BHS	Borehole Status	OPEN
BIT	Bottom Hole Temperature (used in calculations)	74 DEGC
BSAL	Bit Size	222.000 MM
BSCO	Borehole Salinity	-50000.000 PPM
CDCO	Borehole Shape Correction Option	NO
CDDTYP	Casing & Cement Thickness Correction Option	NO
CMC	Cement Class	Wilwhite
CWC	Current Casing Size	244.000 MM
DEPREM1	Current Casing Weight	53.70 KG/M
DEPREM2	Depth Remark 1	
DEPREM3	Depth Remark 2	
DEPREM4	Depth Remark 3	
DEPREM5	Depth Remark 4	
DEPREM6	Depth Remark 5	
DFD	Depth Remark 6	
DFV	Drilling Fluid Density	1220.00 K/M3
DHC	Density Hole Correction	CALIPER
DPHM	Density Porosity Display Unit 1	0.0 M
DPMM	Density Processing Averaging Mode	HIRES
EXBICL	External Shale Indicator Clean Value	0.05
EXBISH	External Shale Indicator Shale Value	1.00
FD	Fluid Density	1000 K/M3
FEXP	Form Factor Exponent	2
FINUM	Form Factor Numerator	1
FPHI	Form Factor Porosity Source	DPHZ
FRCO	Formation Resistivity Correction	-50000 OHMM
GCSE	Formation Salinity Correction Option	NO
GDEV	Generalized Caliper Selection	CALI
GSRO	Average Angular Deviation of Borehole from Normal	5 DEG
GRBE	Geothermal Gradient	0.018287 DC/M
GTSE	Generalized Interpolation Selection	CHAN_SPACING
HACP	Generalized Temperature Selection	HIRES_MEAS
HADP	Accelerometer PROM Presence	PRESENT_FILE
HBHT	Borehole Bottom Hole Temperature	82 DEGC
HDACO	HILT Density Coal selection	2000 K/M3
HDAC	HILT Density Salt selection	2200 K/M3
HDAS	HILT Density Tele selection	NO
HILT_GAS_DENSITY	HILT Gas Downhole Density	0 K/M3
HILT_GAS_OPTION	HILT Gas Downhole Option	OFF
HLMD	HALS Logging Mode	STAN
HNCO	HILT Neutron Coal selection	0.45 V/V
HNSA	HILT Neutron Salt selection	0.03 V/V
HPWEOUT	HILT effective Porosity Cutoff	0.05 V/V
HSCM	HILT Speed Correction Mode	SOV
HSD	HILT Sonde Diameter	TSCD_SPEED_CORRECTION 178 MM
HSIO	Hole Size Indicator Selection	YES
HSTI	HILT Logging Mode	7-HSP
HWHCUT	HILT Water Saturation from ATR cutoff	50 %
HWPD	Integrated Hole Volume Caliber Selection	HCAL
IDWCD	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWLCN	IDW Calibration Cable Type	7-46P
IDWLSN	IDW Logger Number	496
IDWTYP	IDW Tool Type	IDW-B
IDWWC1	IDW Wheel Correction 1	0.000
IDWWC2	IDW Wheel Correction 2	-999
LDSN	Trigger for MAXIS Final Reading Label	STI
LOGBIO	LIS Hardware Loop Control	DISALLOW
LSPD	Log Sequence	First_Log_In_Hole
LWIL	LIS Hardware Loop Control	DISALLOW
MCCO	Mud Cake Correction Coefficient	LIMESTONE
MCOR	Mud Cake Correction Option	NO
MDEN	Mud Density	NATIVE
MHCN	Matrix Density	2710 K/M3
MHC1	MCFL Oil Contrast Correction Coefficient	2.2e-005 OHMS
MHC2	MCFL Oil Contrast Correction Coefficient	3.3e-005 OHMS
MHCS	MCFL High Contrast Correction Switch	ON
MPC	MCFL Processing Operation Mode	ON
MSAL	Mud Salinity	14.00 DEGC
MWCO	Mud Weight Correction Option	NO
NAAC	HRDD APS Activation Correction	NO
NDIS	HILT Neutron Distance	0.381 M
NPIM	HILT Processing Mode	NOMINITE
NSAR	HRDD Logging Mode	HiRes
PBVSADP	HRDD Sample Rate	152 MM
PHMAX	Use alternate depth channel for playback	
PIP	HILT max porosity	0.35 V/V
PTCO	HILT Processing	RECOMPUTE
PuCTYP	Pressure Correction Option	NO
RIG	Rig Type	LAND
RLAH	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy
RLRH	Reference Log Run Number	1
RLRN	Reference Log Run Number	1
RMFF	Resistivity of Mud Filtrate Sample	0.3100 OHMM
RTCO	RTCO - RI Invasion Correction	YES
RUCO	RUCO - RI Undisturbed	0 M
RUL5	Rig Up Length at Surface	0 M
RW	Resistivity of Connate Water	0.1000 OHMM
SDAT	Standoff Data Source	-50000
SEXP_HILT	HILT Saturation Exponent	SOCH
SHT	Surface Hole Temperature	20 DEGC
SOCO	Standoff Distance	3.1731 MM
SPAV	Standoff Correction Option	NO
SPMV	SP Heel Value	0 MV
SSNC	SS Hardware Loop Control	DISALLOW
STIC	STI Hardware Trip Down Log Correction	-50000 M
STTC	STI Stuck Threshold	0.000 M
TD	Total Depth	1.524 M
TDC	Total Depth - Driller	2100.00 M
TDCL	Total Depth - Logger	2098.80 M
TNDCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
TNDCN	Tension Device Calibration Serial Number	6021
TNDGN	Tension Device GAIN	1
TNDOF	Tension Device OFFSET	0
TNDSN	Tension Device Serial Number	1
TNDTYP	Tension Device	CMTD-B-A
TWCO	TWCO Enable Recorded Depth Computation	YES
TWS	Temperature of Connate Water Sample	27.78 DEGC
WMUD	Weight of Mud	9620.00 K/M3
ZRCS	Tool Zero Reference Check at Surface	0 M

Format: PORO_X Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 10:38

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .008	FN:7	PRODUCER	10-Jan-2000 11:11	2103.1 M	1864.6 M

Output DLIS Files

DEFAULT	SPEA .009	FN:8	PRODUCER	10-Jan-2000 11:11		2072.2 1120.08 1993.3 11:37:26

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

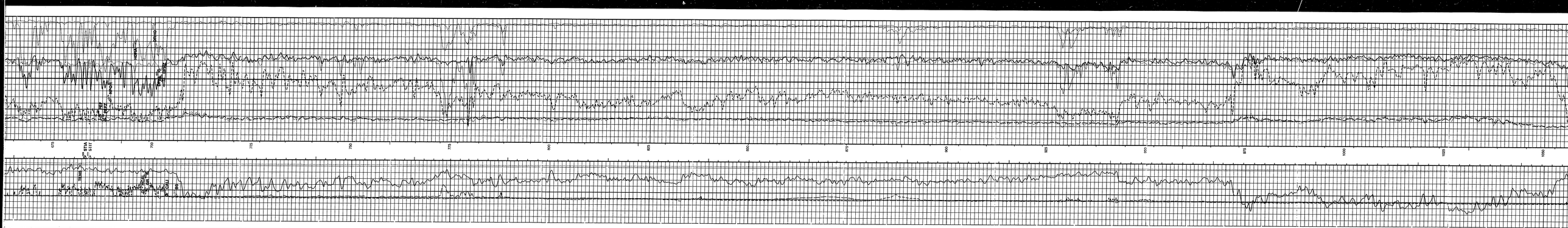
Changed Parameter Summary

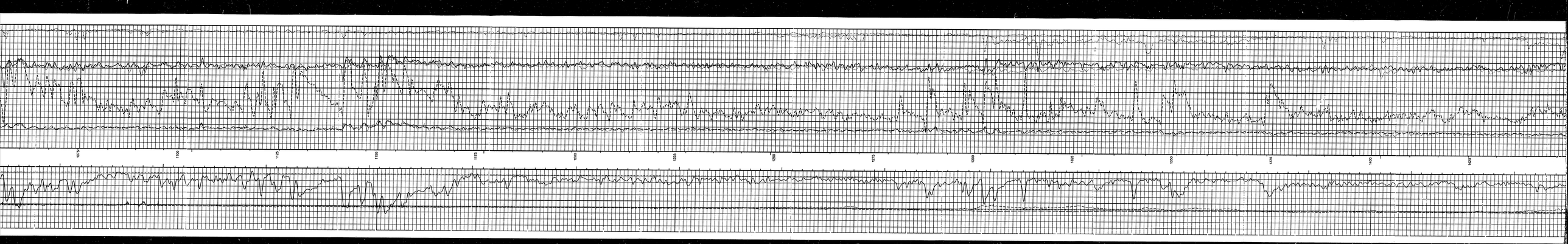
DLIS Name	New Value	Previous Value	Depth & Time
BHT	75 DEGC 76 DEGC	74 DEGC 75 DEGC	2072.2 1120.08 1993.3 11:37:26

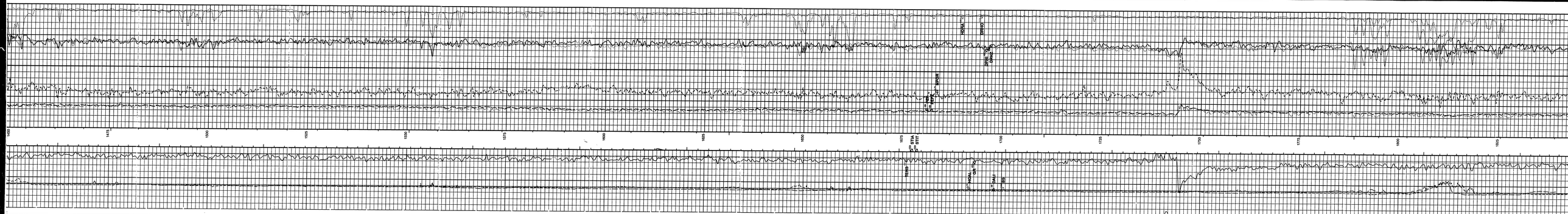
PIP SUMMARY

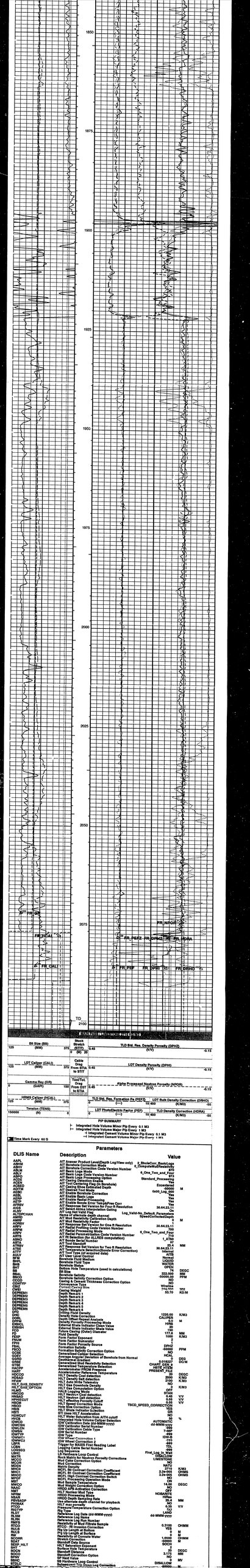
- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S


700
725
750
775
800
825
850
875
900
925
950
975
1000
1025
1050


1095
1100
1105
1110
1115
1120
1125
1130
1135
1140
1145
1150
1155
1160
1165


1450
1475
1500
1525
1550
1575
1600
1625
1650
1675
1700
1725
1750
1775
1800
1825
ETH
SITT
FEIB
HOMA
DIR
SHU
IRR
HOMA
DIRIO
DPIR
DPIO
DPIR
DPIO
HOMA



Bit Size (BS)	Mud Weight (MWT)	TLD Bnd. Res. Density Porosity (DPHZ)			
125 (MM)	375 (KG/M3)	0.45 (V/V)			-0.15
LDT Caliber (CALI)	Cable Drag	LDT Density Porosity (DPHI)			
125 (MM)	From STIA to STIT	0.45 (V/V)			-0.15
Gamma Ray (GR)	ToolTot. Drag	Alpha Processed Neutron Porosity (NPOR)			
0 (GAPI)	150 From CHT to STIA	0.45 (V/V)			-0.15
HRMS Caliper (HCAL)		TLD Bnd. Res. Formation Pe (PEFZ)		LDT Bulk Density Correction (DRHO)	
125 (MM)	375	0 (--)	10 (B/E)	(KG/M3)	-50
Tension (TENS)		LDT Photoelectric Factor (PEF)		TLD Density Correction (HDRA)	
150000 (N)	0	0 (--)	10 (B/E)	(KG/M3)	-50

PIP SUMMARY

- Integrated Hole Volume Minor Pip Every 0.1 M3
- Integrated Hole Volume Major Pip Every 1 M3
- Integrated Cement Volume Minor Pip Every 0.1 M3
- Integrated Cement Volume Major Pip Every 1 M3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_BholeCorr_RawLogs
ABNV	AIT Borehole Correction Mode	6_ComputedMud/Invasity
ABUM	AIT Borehole Correction Code Version Number	470
ABLM	AIT Basic Logs Mode	6_One_Two_and_Four
ABLV	AIT Basic Logs Code Version Number	470
ABPO	AIT Basic Logs Processing Option	Standard_Processing
ACQN	AIT Tool Combination Name	Yes
ACSED	AIT Tool Centering Flag (In Borehole)	Eccentered
AEBZ	AIT Casing Shoe Estimated Depth	2100 M
AEBC	AIT Deviated Tool Mode	0x00_Und_0x00
AEBL	AIT Enable Backup	Yes
AEDP	AIT Enable Dynamic	Yes
AFBV	AIT Enable Bandw Error Tem24Pres Corr	Yes
AIDS	AIT Select Alpha Version for Curve Resolution	30.64,23,1
ALOG	AIT Select Alpha Version for Curve Timing	On
ALTDPCHAN	AIT Log Hot Valid Flag	Log_Valid-No_Default_Parameters
AMSF	AIT Mud Resistivity Correction Depth	SpeedCorrection-Depth
AMTF	AIT Mud Resistivity Factor	0 M
APPV	AIT Acquisition Set Version for One ft Resolution	30.64,23,1
ARPM	AIT Radial Profiling Code Version Number	100
ARPO	AIT Radial Profiling Mode	6_One_Two_and_Four
ARTS	AIT Resistivity Processing Code Version Number	470
ASTD	AIT Bh Selection (for ALLRES computation)	1_AT60
ASTV	AIT Tool Version	11
ATRSV	AIT Response Set Version for Two ft Resolution	30.64,23,1
ATSV	AIT Temperature Selection(Sonde Error Correction)	Internal
AULV	AIT User Type (of acquired data)	AITB
BFM	AIT Curve Filter Mode	Filtered
BHF	Borehole Fluid Status	LIQUID
BHS	Borehole Fluid Type	WATER
BHT	Bottom Hole Temperature	OPEN
BS	Bit Size	374 DEGC
BSAL	Borehole Salinity	222.000000 PPM
BSCO	Borehole Salinity Correction Option	-50000.00 PPM
CCCO	Casing & Cement Thickness Correction Option	NO
CEMTYP	Cementation Type	OPEN
CSIZ	Casing Hole Size	Wireless 374.000 MM
CWEI	Casing Weight	33.70 KG/M
DEPREM1	Depth Remark 1	
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFD	Drilling Fluid Density	1220.00 KM3
DOFL	Depth Offset Applied	CALIPER1
DOFL	Depth Offset Reset Analysis	0 M
EXBCL	Density Processing Mode	HRS
EXBOH	External Bit Size Indicator Value	22
FCD	External Stabilizer Blade Value	22
FD	Future Casing (Outer) Diameter	177.8 MM
FDAP	Form Factor	1000 KM3
FNUM	Form Factor Numerator	2
FPU	Form Factor Porosity Source	1
FSCO	Formation Salinity	DPHZ
GCCC	Generalized Cc Correction Option	-50000 PPM
GDEV	Generalized Deviation	NO
GDRV	Average Angular Deviation of Borehole from Normal	HCAL 1 DEG
GMW	Generalized Mud Weight	0.018227 DC/M
GTSE	Generalized Mud Resistivity Selection	CHART_DEN_9
HART	Generalized Temperature Selection	CHART_DEN_9
HCOD	Accelerometer Configuration Presence	PRESENT_FILT
HDCOD	Hole Diameter Reference Temperature	20 DEGC
HDIAM	HILT Hole Diameter Value	2000 KM3
HDIAO	HILT Density Salt detection	2100 KM3
HILT_GAS_DENSITY	HILT Auto Write Telemetry	0
HILT_QUAL_OPTION	HILT Gas Density Value	2 KM3
HLMO	HILT Gas Compensation Option	OFF
HLOGMO	HILDA Logging Mode	DRHO
HNSAO	HILT Electrical Cond detection	0.45 V/V
HPHSECUT	HILT Neutron Salt detection	0.05 V/V
HSCO	HILT Salinity Correction Mode	0.05 V/V
HSPD	HILT Speed Correction Mode	TSCD_SPEED_CORRECTION
HSS	Hole Size Correction Option	YES
HSTT	HILT Stress Tool Orientation	225
HSTT	STT Uses HILT Acceleration	225
HUSEOUT	HILT Water Saturation from AITH cutoff	NO
IDWCO	IDW Formation Volume Caliper Selection	0 %
IDWCSD	IDW Calibration Serial Number(yyyy)	AUTOMATIC
IDWCSN	IDW Calibration Serial Number	dd-MMM-yyyy
IDWSP	IDW Calibration Cable Type	YMV
IDWSW	IDW Serial Number	1-MEC
IDWTYP	IDW Type	-999
IDWWC1	IDW Wheel Correction 1	IDW-S
IDWWC2	IDW Wheel Correction 2	-999
IHLT	IDW Hole Size Reading Label	-999
LCAL	STT Uses HILT Acceleration	225
LOGSEQ	HILT Water Saturation from AITH cutoff	NO
MAT	Log Sequence	YES
MATS	LD Hardware Loop Control	First_Log_In_Time
MCCO	Rock Matrix for Neutron Porosity Corrections	DISALLOW
MCOH	HILT Mud Correction Option	LIMESTONE
MDEN	Mud Correction	Hilton
MHCN	Matrix Density	NATU
MHCO	MCFL Contrast Correction Coefficient	3710 KM3
MHCI	MCFL RT Contrast Correction Coefficient	3.24-005 OHMS
MHCC	MCFL High Contrast Correction Switch	3.24-003 OHMS
MHCS	MCFL Contrast Correction Mode	ON
MMCO	Mud Sampling Option	14.00 DEGC
MMD	Mud Weight Correction Option	2.65
MMT	HRDD APB Activation Correction	OFF
MPIM	HILT Nuclear Mud Type	NOBARITE
MSAR	HILT Mud Resistivity	Hilton
PBVADP	Mud Sampling Rate	30_S MM
PDAT	Use alternate depth channel for playback	NO
PTCO	Pressure/Temperature Correction Option	0.35 V/V
RGTYP	Rig Type	NO
RLAB	Reference Log Date (dd-MMM-yyyy)	LAND
RLNM	Reference Log Name	dd-MMM-yyyy
RLRN	Reference Log Run Number	1
RMF	Resistivity of Mud Filtrate Sample	0.2100 OHMM
RTCO	RTCO - RI Invasion Correction	YES
RTSC	RTSC Correction Mode	0
RUN	Pip Up Length at Surface	1 M
RWCORR	Resistivity of Connate Water	1.0000 OHMM
SCAT	Standoff Correction	-50000 M
SEQU_HILT	HILT Sensitive Equipment	SOCH
SHOT	Surface Hole Temperature	20 DEGC
SOCO	Standoff Distance	3.175 MM
SPHC	Spherical Correction Option	NO
SWHC	Bit Hardware Loop Control	0 MV
TCCO	Subsequent Tie Point Log Correction	DISALLOW
TDEP	Tie Point Depth	-9999

TD	Total Depth - Driller	1,624	M
TDD	Total Depth - Driller	3200	M
TDDB	Total Depth - Driller	2099.00	M
TNDCDM	Tension Device Calibration Date (dd-MMM-yyyy)	2000.00	M
TNDCSN	Tension Device Calibrator Serial Number	dd-MMM-YYYY	
TNDMAX	Tension Device Gain	1000	kg
TNDSW	Tension Device Type	1	
TNDSN	Tension Device Serial Number	2	
TNOFFW	Tension Offset	-290	
TNSTU	Tension Device	CMTD-B-A	
TWS	TSCD Enable Corrected Depth Computation	YES	
WMUD	Mud Weight at Formation Water Sample	1.04	DEGC
ZRCR	Tool Zero Reference Check at Surface	262.128	KMS
		50000	lbf

Format: PORO_5 Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 11:12

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HLTB-FTB	9C1-303	DTC-H	9C1-303

Output DLIS Files

DEFAULT	SPEA .009	FN:5 PRODUCER	10-Jan-2000 11:11	

Input DLIS Files

DEFAULT	SPEA .009	FN:5 PRODUCER	10-Jan-2000 12:11	

Output DLIS Files

DEFAULT	SPEA .005	FN:4 PRODUCER	10-Jan-2000 11:02	2101.3 M 1884.4 M

Integrated Hole/Cement Volume Summary

Hole Volume = 7.63 M3
Cement Volume = 2.31 M3 (assuming 177.80 MM casing O.D.)
Computed from 2098.9 M to 1884.8 M using data channel(s) HCAL

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HLTB-FTB	9C1-303	DTC-H	9C1-303

PIP SUMMARY

- Integrated Hole Volume Minor Plp Every 0.1 M3
- Integrated Hole Volume Major Plp Every 1 M3
  - Integrated Cement Volume Minor Plp Every 0.1 M3
  - Integrated Cement Volume Major Plp Every 1 M3

Time Mark Every 60 S

Tension (TENS) 0 / 150000 (lbf)

HRMS Caliber (HCAL) 125 / 375 (MM)

Gamma Ray (GR) 0 / 150 (GAPI)

LDT Caliber (CALI) 125 / 375 (MM)

BS Size (BS) 125 / 375 (MM)

LDT Photo/Electric Factor (PEF) 0 / 10 (---)

TLD Density Correction (HDRA) -0.5 / 0.5 (K/M3)

TLD Std. Res. Formation Pe (PEFZ) 0 / 10 (---)

TLD Soft Density Correction (DRHO) -0.5 / 0.5 (K/M3)

Tool/Tot. Drag From CUT to STIA 0.45 / 0 (lbf) 20

Alpha Processed Neutron Porosity (NPOR) 0.45 / -0.15 (V/V)

Cable Drag From STIA to STIT 0.45 / 0 (lbf) 20

LDT Density Porosity (DPHI) 0.45 / -0.15 (V/V)

Stuck Stretch (STIT) 0.45 / 0 (lbf) 20

TLD Std. Res. Density Porosity (DPHZ) 0.45 / -0.15 (V/V)

BS Size (BS) 125 / 375 (MM)
Stuck Stretch (STIT) 0.45 / 0 (lbf) 20
TLD Std. Res. Density Porosity (DPHZ) 0.45 / -0.15 (V/V)
Cable Drag From STIA to STIT 0.45 / 0 (lbf) 20
LDT Density Porosity (DPHI) 0.45 / -0.15 (V/V)
Gamma Ray (GR) 0 / 150 (GAPI)
Tool/Tot. Drag From CUT to STIA 0.45 / 0 (lbf) 20
Alpha Processed Neutron Porosity (NPOR) 0.45 / -0.15 (V/V)
HRMS Caliber (HCAL) 125 / 375 (MM)
TLD Std. Res. Formation Pe (PEFZ) 0 / 10 (---)
TLD Soft Density Correction (DRHO) -0.5 / 0.5 (K/M3)
Tension (TENS) 0 / 150000 (lbf)
LDT Photo/Electric Factor (PEF) 0 / 10 (---)
TLD Density Correction (HDRA) -0.5 / 0.5 (K/M3)

PIP SUMMARY

- Integrated Hole Volume Minor Plp Every 0.1 M3
- Integrated Hole Volume Major Plp Every 1 M3
  - Integrated Cement Volume Minor Plp Every 0.1 M3
  - Integrated Cement Volume Major Plp Every 1 M3

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value	
AAPL	AIT Answer Product Level(Depth Log/View only)	C_SholeCorr_BaseLogs	
ABHV	AIT Borehole Correction Table	C_ComputedMudResistivity	
ABLM	AIT Borehole Correction Code Version Number	1	
ABLV	AIT Basic Logs Mode	6_One_Two_and_Four	
ABMO	AIT Basic Logs Processing Option	Standard_Processing	
ACEN	AIT Centering Enable	Yes	
ACMO	AIT Tool Centering Flag (In Borehole)	Eccentered	
ADTM	AIT Casing Shoe Estimated Depth	-50000	M
AEMC	AIT Enable Mud Cake	0x00_0x0_0x0	
AERC	AIT Enable Borehole Correction	Yes	
AERL	AIT Enable Basic Logs	Yes	
AETF	AIT Enable Sonde Error Terms	Yes	
AFRSV	AIT Enable Sonde Error Terms&Pres Corr	Yes	
AFSV	AIT Response Set Version for Four R Resolution	30.64.23.11	
ALAM	AIT Enable Alarm Interpolation Gating	Yes	
ALTDPCHAN	AIT Raw Log_Valid-No_Default_Parameters	9)setCorrectionsOn	
AMID	Name of alternate depth channel AIT Mud Resistivity Calibration Depth	-50000	M
AQREV	AIT Mud Resistivity Factor	1	
ARFV	AIT Relfar Profiling Code Version for One R Resolution	30.64.23.11	
ARPM	AIT Relfar Profiling Code Version Number	4	
ARPV	AIT Relfar Processing Mode	6_One_Two_and_Four	
ASBV	AIT Sonde Error Correction Code Version Number	4	
ASNO	AIT Sonde Serial Number	1_ATSO	
ATBV	AIT Tool Bridle Version	2	
ATMV	AIT Tool Measure Set Version for Two R Resolution	30.64.23.11	MM
ATSE	AIT Tool Software Version(Sonde Error Correction)	2.0.1	
ATTY	AIT Tool Type (of acquired data)	ATSI	
AVLV	AIT User Level Control	Normal	
BAT	Battery Voltage	10.37	
BHFL	Borehole Fluid Type	LIQUID	
BHS	Borehole Status	WATER	
BHT	Bottom Hole Temperature (used in calculations)	OPEN	
BI	Bit Size	178	DEGC
BMAL	Borehole Salinity	222.000	MM
BRCO	Borehole Salinity Correction Option	-50000.00	PPM
CAKE	Casing & Cement Thickness Correction Option	0.00	V/V
CDNTYP	Conductor Type	NO	
CRSC	Current Casing Size	Water	
CWGT	Casing Weight	244.000	MM
DEPEM1	Depth Remark 1	53.70	KG.M
DEPEM2	Depth Remark 2		
DEPEM3	Depth Remark 3		
DEPEM4	Depth Remark 4		
DEPEM5	Depth Remark 5		
DEPEM6	Depth Remark 6		
DFD	Drilling Fluid Density	1220.00	K/M3
DIC	Density Hole Computed	CALIPER	
DIH	Density Hole Computed (Init 1	0.0	M
DPHI	Density Porosity Porosity Mode	HIRES	
EXBICL	External Stale Indicator Clean Value	1	
EXBIDL	External Stale Indicator Stale Value	100	
FEXP	Form Factor Exponent	1000	K/M3
FMUM	Form Factor Exponent	2	
FPAL	Form Factor Porosity Source	1	
FSAL	Formation Salinity	DPHZ	
FSCO	Formation Salinity Correction Option	-50000	PPM
GCBD	Generalized Caliper Selection	NO	
GDEV	Generalized Deviation of Borehole from Normal	HCAL	
GUNO	Gunbarrel Azimuth	0	DEG
GRSE	Generalized Mud Resistivity Selection	0.018207	DC/M
GTSE	Generalized Temperature Selection	CHART_DRIVEN	
HADP	Accelerometer PROM Presence	HSTI_DRIVEN	
HART	HLTA Accelerometer Temperature	PRESENT_FILE	
HDCOD	HDRA Density Coal detection	20	DEGC
HDRAD	HDRA Density Salt detection	2100	K/M3
HFN	HLT Serial Number	2100	K/M3
HGAT	HLT Gain Switch Polarity	NO	
HGCO	HLT Gas Computation Option	0	K/M3
HMUD	HMUD Logging Mode	OFF	
HNDCO	HLT Neutron Coal detection	STAH	
HNSAD	HLT Neutron Salt detection	0.45	V/V
HNSHOUT	HLT Neutron Shale detection	0.45	V/V
HSCO	HLT Speed Correction Mode	0.65	V/V
HSPD	HLT Speed Correction Mode	TSCD_SPEED_CORRECTION	
HSS	HLT Stuck Sensor Option	YES	
HSTI	HLT Stuck Indicator	GR	
HSTIHOUT	STI Uses HSLT Acceleration	GR	
HVCR	HSLT Water Saturation from AITH cutoff	62	%
IDWCD	HLT Water Hole Volume Caliber Selection	HCAL	
IDWCM	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-YYYY	
IDWCSN	IDW Calibrator Serial Number	7488	
IDWSN	IDW Calibration Cable Type	7-467	
IDWTYP	IDW Type	ONE	
IUWWCL	IUW Wheel Correction 1	IDW-H	
IUWWCT	IUW Wheel Correction 2	1.000	
LDTI	Trigger for MAXED First Reading Label	256	
LOBN	Logging Cable Serial Number	STI	
LOGED	Log Sequence	7-467	
LSN	LD Hardware Loop Control	First_Log_In_Well	
MATR	Matrix Density Porosity Density Corrections	DOMALOW	
MCOD	Mud Cake Correction Option	DOLOMITE	
MCOR	Mud Correction	NATU	
MDEN	Mud Density	1220.00	K/M3
MDFC	Mud Density Correction Coefficient		

MHCO	MCFL Gain	2870	K/M3
MHC1	MCFL 0th Contrast Correction Coefficient	2.2e-005	OHMS
MHC2	MCFL 1th Contrast Correction Coefficient	3.7e-005	OHMS
MHCC	MCFL High Contrast Correction Switch	YES	
MHOC	MCFL Contrast Processing Operation Mode	ON	
MHT	Mud Sample Temperature	140	DEGC
MWCO	Mud Weight Correction Option	ON	
MWF	HRDD APS Activation Correction	ON	
NAC	HILT Nuclear Mud Type	NOBARITE	
NRIM	HRDD Density Processing	HiRes	
NSAN	HRDD Depth Sampling Rate	152	MM
PRVSADP	Use alternate depth channel for playback	ZSC	
PSIMV	Pass Separation	0.15	V/V
PTCO	Playback Processing	RECOMPUTE	
PTEMP	Pressure/Temperature Correction Option	ON	
RLSTY	Rig Type	LAND	
RLNM	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy	
RLRN	Reference Log Run Number	1	
RLSN	Reference Log Well Number	1	
RTCO	Resistivity of Mud Filtrate Sample	0.3100	OHMM
RULE	Rig Up Length at Bottomhole	YES	
RULS	Rig Up Length at Surface	0	M
RUP	Resistivity of Concrete Water	0	M
SCOHM	Standoff Correction Option	1.0000	OHMM
SDAT	Standoff Data Source	-50000	M
SDSP_HILT	HILT Saturation Exponent	SONIC	
SHT	Surface Hole Temperature	20	DEGC
SOCN	Standoff Constant	3.1750	MM
SOCO	Standoff Correction Option	ON	
SPNV	SP Hard Value	0	MV
SPSC	SP Short Loop Control	DISALLOW	
STCGC	Schlumberger Tide Down Log Correction	-50000	M
STKT	STI Stuck Threshold	0.0000	M/M
TD	Total Depth	2099	M
TDD	Total Depth - Driller	2099.00	M
TDL	Total Depth - Logger	2098.80	M
TDOCD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
TNDCN	Tension Device Calibrator Serial Number	yyy	
TNDOF	Tension Device Offset	0	
TNDSC	Tension Device Offset	1	
TNDSN	Tension Device Serial Number	0	
TNDTP	Tension Device	CMTD-SGA	
TNT	Tension Centile Corrected Depth Computation	1778	
TWB	Temperature of Cement Water Sample	37.78	DEGC
WMCO	Mud Weight	WA.500	K/M3
ZSC	Tool Zero Reference Check at Surface	-50000	M

Format: PORO_S Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 11:02

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .009	FN:8 PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .005	FN:4 PRODUCER	10-Jan-2000 11:02

Output DLIS Files

DEFAULT	SPEA .009	FN:8 PRODUCER	10-Jan-2000 11:11

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Changed Parameter Summary

DLIS Name	New Value	Previous Value	Depth & Time
BHT	76 DEGC 76 DEGC	74 DEGC 76 DEGC	2075.3 11:00:08 1955.3 11:37:28

PIP SUMMARY

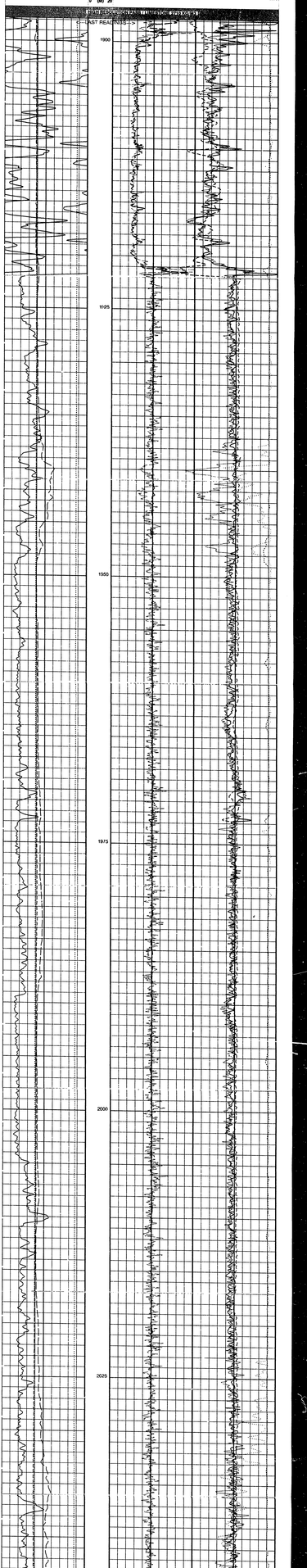
Time Mark Every 60 S

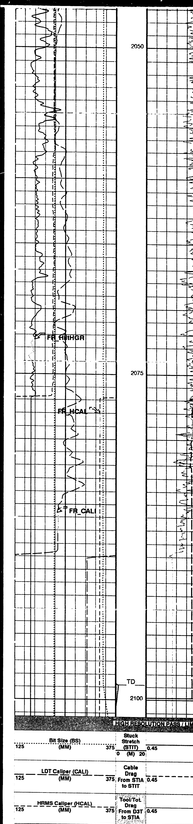
Tension (TENS)		Hiltes TLD Res. Formation Pe (PEFB)		Hiltes LDT Density Correction (HDRH)	
1500000	0	0	72.464	(K/M3)	-50
Hiltes Gamma Ray (HGLD)		**Hiltes LDT Photo/Electric Factor (HPEF)**		**TLD Density Correction (HDRA)**	
(GAPI)				(K/M3)	
0	150	0	10.460		-50

HSMB Caliper (HCAL)		Tool/Tnt. Drag	Hiltes LDT Density Porosity (HDPH)	
120	(MM)	From DZT	(V/V)	0.45
	370	to STIA		-0.15

LDT Caliper (CALI)		Cable Drag	Hiltes NRDR (DNPO)	
120	(MM)	From STIA	(V/V)	0.45
	370	to STIT		-0.15

Bit Size (BS)		Stuck Stretch	Hiltes TLD Density Porosity (DPHI)	
120	(MM)	(STIT)	(V/V)	0.45
	370	0	20	-0.15





Bit Size (BS) (MM) 125 375

Block Weight (BTT) (N) 30 0.45

HRes TLD Density Porosity (DPHB) (V/V) 0.15 -0.15

LDT Caliber (CALI) (MM) 125 375

Cable Drag (CS) from Surface to BTT 0.45

HRes NPOR (HNPO) (V/V) 0.45 -0.15

HSMS Caliber (HCAL) (MM) 125 375

Tool Tot. Drag (TTEN) from BTT to STA 0.45

HRes LDT Density Porosity (HDPH) (V/V) 0.45 -0.15

HRes Gamma Ray (EHGR) 0 150

HRes LDT PhotoElectric Factor (HPEF) 0 10

TLD Density Correction (HDRA) 450 -50

Tension (TENS) (N) 150000 0

HRes TLD Res. Formation Px (FEFS) 0 (Ωm²) 10

HRes LDT Density Correction (HDRH) 450 (K/M3) -50

PIP SUMMARY

Time Mark Every 60 S

Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	0_SholeCo:_BasicLogs
ABHV	AIT Borehole Conductivity Enable	1_CompositeMultiResolution
ABVV	AIT Borehole Corrections Version Number	4
ABWV	AIT Geology Version Number	6_One_Two_and_Four
ADPO	AIT Depth Logs Processing Option	0_Standard
ADTP	AIT Depth Logs Processing Mode	Standard_Processing
AECD	AIT Casing Detection Enable	Yes
AGRO	AIT Geology Corrections Borehole)	Yes
AOBD	AIT Default Borehole Depth	Eccentered
AOTM	AIT Default Tool Mode	-60000 M
ARBC	AIT Enable Borehole Correction	0x90_Log_Data
ARBV	AIT Enable Radial Processing	Yes
ARPP	AIT Enable Radial Processing	Yes
ARRV	AIT Enable Two-Term Shale&Pres Corr	Yes
ARWV	AIT Response Set Version for Four R Resolution	30.64.23.11
ASCV	AIT Enable Standoff Correction	Yes
ATMT	AIT Logging Mode	Log_Valid-No_OpenHole_Parameters
ATOPCHAN	Name of alternate depth channel	ECGT_Caliper_Processed
AWBF	AIT Default Borehole Correction Depth	-60000 M
AWRF	AIT Default Resistivity Fluid	Mud
AORVV	AIT Radial Profiling Code Version Number for One R Resolution	30.64.23.11
ARPV	AIT Radial Profiling Code Version Number	6_One_Two_and_Four
ARPM	AIT Radial Processing Mode	6_One_Two_and_Four
ARTS	AIT Radial Processing Code Version Number	1_ARTS
ASWC	AIT Bonds Serial Number	0
ATRV	AIT Response Set Version for Two R Resolution	30.64.23.11
ATSE	AIT Temperature Selection(Sonde Error Correction)	Yes
ATSV	AIT Temperature Source (Log Data)	ATB
BFM	BHC Enable Control	Normal
BHFL	Borehole Fluid Type	MIXED
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	0 DEGC
BMAL	Borehole Salinity	222.000 MW
BSCN	Borehole Salinity Correction Option	-60000 MW
CCD	Casing & Cement Thickness Correction Option	NO
CDRTYP	Caliper Type	Wheel
CMC	Current Casing Size	244.000 MM
DEPREM1	Depth Remark 1	53.70 KG/M
DEPREM2	Depth Remark 2	
DEPREM3	Depth Remark 3	
DEPREM4	Depth Remark 4	
DEPREM5	Depth Remark 5	
DEPREM6	Depth Remark 6	
DFD	Drilling Fluid Density	1220.00 K/M3
DFT	Drilling Fluid Type	CALIPER
DORL	Density Log Channel Analysis	0 M
DPHI	Density Processing Mode	HIRES
EKBO	External Shale Indicator Count Value	20
EKBW	External Shale Indicator Shale Value	150 MM
FCD	Future Casing (Outer) Diameter	177.8 MM
FDDP	Fluid Density	1000 K/M3
FHUM	Form Factor Humectant	0
FPHI	Form Factor Porosity Source	DPHZ
FRAL	Formation Salinity	-60000 PPM
FSOD	Formation Salinity Correction Option	NO
GDEV	Geology Deviation Source	HDEV
GGRD	Average Angular Deviation from Vertical	0 DEG
GGRD	Geothermal Gradient	3.61837 DEGM
GTSE	Gain+Offset Test Sensitivity Selection	CHART_SENS
GTSE	Gain+Offset Test Sensitivity Selection	HSTE_HTEM
HACPP	Acc._+pressMar PRIMM Presence	PRESENT_FALSE
HACT	Accelerometer Reference Temperature	0 DEGC
HDEAS	HLT Density Cool detection	2000 K/M3
HDEAT	HLT Density Cool detection	2000 K/M3
HFAW	HLT Auto Write Telemetry	0
HFDD	HLT Gas Downhole Density	0 K/M3
HFLA	HLT Logging Activation	OFF
HMLD	HALS Logging Mode	STAN
HNCDD	HLT Neutron Cool detection	0 V/V
HNSECUT	HLT Neutron Cool detection	0 V/V
HSCH	HLT Shallow Porosity Cutoff	0.55 V/V
HSCO	HLT Shallow Porosity Cutoff	TSCJ_SPEED_CORRECTION
HSIS	Hole Size Correction Option	YES
HSIS	HLT Shale Indicator Selection	GR
HSIT	HLT Shale Indicator Type	GR
HSWOUT	HLT Water Saturation with ARTV cutoff	NO
HVCB	Integrated Hole Volume Caliper Selection	AUTOMATIC
IDWCEN	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
IDWLCN	IDW Calibration Number	466
IDWSN	IDW Serial Number	466
IDWTYP	IDW Type	IDW-B
IDWWC1	IDW Wheel Correction 1	1.0000
IDWWC2	IDW Wheel Correction 2	1.0000
LBFR	Trigger for MAXIS Pixel Reading Label	YES
LDCS	Logging Cable Serial Number	7DC
LDSEQ	Tool Sequence	1
LSHC	LS Hardware Loop Control	First_Log_In_Well
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
MCOD	Mud Cake Correction Option	NO
MDEN	Mud Density	NA
MHCS	MCFL Bit Contact Correction Coefficient	3.24-003 OHMS
MHCT	MCFL Bit Contact Correction Coefficient	3.24-003 OHMS
MHSC	MCFL High Contrast Correction Switch	NO
MPCF	MCFL Processing Operation Mode	NO
MRC	Mud Resistivity Correction	NO
MRDQ	Mud Weight Correction Option	14.00 DEGC
NAAC	Neutron Algorithm Correction	NO
NHC	HLT Nuclear Head Type	NOGAMMA
NRMM	HSGD Processing Mode	HIRes
PHMAP	Porosity Matrix Density	2.65 MM
PHMAXP	Use alternate depth channel for playback	0
PHMX	HLT max porosity	0.53 V/V
PLTOP	Plot Type Interactive Correction Option	Plot Type
RLDT	Reference Log Date (dd-MMM-yyyy)	LAND
RLMM	Reference Log Name	dd-MMM-yyyy
RLRN	Reference Log Run Number	1
RLWN	Reference Log Well Name	1
RMFS	Reference Log Resistivity Sample	0.2100 OHMM
RUL8	Rig Up Length at Bottom	YES M
RUL8	Rig Up Length at Bottom	0 M
RW	Resistivity of Connate Water	1.0000 OHMM
SCORR	Stretch Correction	NO
SDSEQ	Standoff Data Source	SDCN
SEQF_HLT	HLT Selection Exponent	2 DEGC
SHT	Sonde Shoe Temperature	0
SOCO	Standoff Options	3.170 MM
SOCO	Standoff Correction Option	NO
SOFF	Standoff Offset	0 MV
SRHC	SS Hardware Loop Control	DISALLOW
STOLC	Subsequent Trip Down Log Correction	LAND
TCUT	BTI Stretch Threshold	1.500 M
TDD	Total Depth	2000.0 M
TDD	Total Depth - Driller	2000.0 M
TDLOG	Total Depth - Logger	2000.0 M
TNDCEN	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy
TNDCN	Tension Device Serial Number	0
TNDGF	Tension Device GAIN	1
TNDOF	Tension Device Offset	0
TNDSN	Tension Device Serial Number	-999
TSEC	TSCD Enable Corrected Depth Computation	CMTD-B/A
TSEC	TSCD Enable Corrected Depth Computation	NO
TWT	Tool Weight	3170 DEGC
ZDCE	Mud Weight	994.558 K/M3
ZDCE	Zero Offset Reference Check at Surface	-30000 M

Format: PORO_HIRES Vertical Scale: 1:100 Graphics File Created: 10-Jan-2000 11:12

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-C	9C1-303	ATR-A	9C1-303
HLTB-RTB	9C1-303	DTC-H	9C1-303

Output DLIS Files

DEFAULT SPE4 .009 FN:6 PRODUCER 10-Jan-2000 11:11

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00	9.00						
Thru Cal Magnitude - 1		0.8204	0.8200	N/A	N/A	N/A	V
Thru Cal Magnitude - 2		1.014	1.013	N/A	N/A	N/A	V
Thru Cal Magnitude - 3		1.014	1.013	N/A	N/A	N/A	V
Thru Cal Magnitude - 4		0.3923	0.3937	N/A	N/A	N/A	V
Thru Cal Magnitude - 5		0.1570	0.1581	N/A	N/A	N/A	V
Thru Cal Magnitude - 6		0.1570	0.1581	N/A	N/A	N/A	V
Thru Cal Magnitude - 7		1.339	1.343	N/A	N/A	N/A	V
Thru Cal Magnitude - 8		0.4052	0.4068	N/A	N/A	N/A	V
Thru Cal Magnitude - 9		2.009	2.013	N/A	N/A	N/A	V
Thru Cal Magnitude - 10		0.8204	0.8200	N/A	N/A	N/A	V
Thru Cal Magnitude - 11		2.315	2.302	N/A	N/A	N/A	V
Thru Cal Magnitude - 12		0.8737	0.8755	N/A	N/A	N/A	V
Thru Cal Magnitude - 13		2.055	2.049	N/A	N/A	N/A	V
Thru Cal Magnitude - 13		0.5943	0.5963	N/A	N/A	N/A	V
Phase - 1		0.000	0.000	N/A	N/A	N/A	DEG
Phase - 2		44.41	44.07	N/A	N/A	N/A	DEG
Phase - 3		69.48	70.05	N/A	N/A	N/A	DEG
Phase - 4		0.000	0.000	N/A	N/A	N/A	DEG
Phase - 5		-89.17	-89.14	N/A	N/A	N/A	DEG
Phase - 6		-131.5	-131.2	N/A	N/A	N/A	DEG
Phase - 7		-19.50	-19.04	N/A	N/A	N/A	DEG
Phase - 8		-72.54	-72.98	N/A	N/A	N/A	DEG
Phase - 9		0.000	0.000	N/A	N/A	N/A	DEG
Phase - 10		-72.24	-72.69	N/A	N/A	N/A	DEG
Phase - 11		-5.337	-4.801	N/A	N/A	N/A	DEG
Phase - 12		-78.12	-78.65	N/A	N/A	N/A	DEG
Phase - 13		-6.027	-5.469	N/A	N/A	N/A	DEG
Phase - 13		-75.48	-75.49	N/A	N/A	N/A	DEG
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Rel Gain Mag. & Phase							
Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00	9.00						
AOC Rel Gain Magnitude - 1		25.00	25.07	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 2		25.00	25.09	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 3		25.00	25.10	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 4		25.00	25.03	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 5		25.00	25.03	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 6		25.00	25.07	N/A	N/A	N/A	
AOC Rel Gain Magnitude - 6		25.00	25.07	N/A	N/A	N/A	
Phase - 1		0.000	0.000	N/A	N/A	N/A	DEG
Phase - 2		0.2173	0.2189	N/A	N/A	N/A	DEG
Phase - 3		0.3398	0.3421	N/A	N/A	N/A	DEG
Phase - 4		0.0196	0.1040	N/A	N/A	N/A	DEG
Phase - 5		0.0391	0.2270	N/A	N/A	N/A	DEG
Phase - 6		0.0196	0.1040	N/A	N/A	N/A	DEG
Phase - 6		0.0196	0.2140	N/A	N/A	N/A	DEG
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Auxiliary							
AIT SPA Plus		3965	3964	N/A	N/A	N/A	MV
AIT SPA Plus	-50.00	-53.09	-53.09	N/A	N/A	N/A	MV
AIT Temperature Plus	4.500	4.511	4.510	N/A	N/A	N/A	V
AIT Temperature Zero	-0.00000	-0.00378	-0.00369	N/A	N/A	N/A	V
Array Induction Tool - B Wellsite Calibration - Test Loop Gain Correction							
Master: 20-NOV-1999 11:57							
Test Loop Gain Magnitude - 0	0.0	1.001	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 1	0.0	1.013	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 2	0.0	1.013	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 3	0.0	1.013	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 4	0.0	1.019	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 5	0.0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 6	0.0	1.020	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 7	0.0	1.018	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 8	0.0	1.022	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 9	0.0	1.019	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 10	0.0	1.019	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 11	0.0	1.022	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 12	0.0	1.022	N/A	N/A	N/A	N/A	
Test Loop Gain Magnitude - 13	0.0	1.026	N/A	N/A	N/A	N/A	
Phase - 1		0.0000	N/A	N/A	N/A	N/A	DEG
Phase - 2		0.4402	N/A	N/A	N/A	N/A	DEG
Phase - 3		0.1351	N/A	N/A	N/A	N/A	DEG
Phase - 4		0.2358	N/A	N/A	N/A	N/A	DEG
Phase - 5		0.1728	N/A	N/A	N/A	N/A	DEG
Phase - 6		0.2358	N/A	N/A	N/A	N/A	DEG
Phase - 7		-0.3228	N/A	N/A	N/A	N/A	DEG
Phase - 8		-0.6023	N/A	N/A	N/A	N/A	DEG
Phase - 9		-0.0000	N/A	N/A	N/A	N/A	DEG
Phase - 10		-0.06420	N/A	N/A	N/A	N/A	DEG
Phase - 11		0.07997	N/A	N/A	N/A	N/A	DEG
Phase - 12		-0.1968	N/A	N/A	N/A	N/A	DEG
Phase - 13		-0.1279	N/A	N/A	N/A	N/A	DEG
Phase - 14		-0.1019	N/A	N/A	N/A	N/A	DEG
Array Induction Tool - B Wellsite Calibration - Sonde Error Correction							
R Sonde Error Correction - 0			N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 1	0	1.915	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 2	0	32.29	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 3	0	42.74	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 4	0	32.50	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 5	0	42.74	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 6	0	28.54	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 7	0	28.66	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 8	0	14.00	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 9	0	7.001	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 10	0	7.001	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 11	0	7.801	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 12	0	6.360	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 13	0	1.915	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 0		0.3902	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 1	0	-1.963	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 2	0	-12.20	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 3	0	3.780	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 4	0	-12.20	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	-55.34	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	-104.5	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	-28.66	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 8	0	-22.96	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 9	0	-10.00	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 10	0	-9.00	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 11	0	-4.668	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 12	0	-8.636	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 13	0	-4.112	N/A	N/A	N/A	N/A	MM/M
		-19.80	N/A	N/A	N/A	N/A	MM/M
Ultra Density - D Wellsite Calibration - Background Measurement							
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47							
LU Background		19.21	19.14	N/A	N/A	1.000	CPS
LU Background		78.00	79.84	73.43	N/A	1.000	CPS
LSU Background		57.00	57.85	55.66	N/A	1.000	CPS
LTH Background		5.500	5.460	5.510	N/A	0.3000	CPS
SSU Background		5.500	5.460	5.510	N/A	0.3000	CPS
SSU Background		11.00	11.48	11.40	N/A	0.5000	CPS
Ultra Density - D Wellsite Calibration - Tool Quality Control Information HV							
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47							
LSHV Background		1500	1349	1349	N/A	N/A	V
SSHV Background		1500	1493	1490	N/A	N/A	V
Ultra Density - D Wellsite Calibration - Detectors Resolution From BKG Measurments							
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47							
LS Resolution Background		8.000	8.733	8.787	N/A	N/A	%
SS Resolution Background		8.000	8.878	8.813	N/A	N/A	%
Ultra Density - D Wellsite Calibration - Caliper Calibration							
Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:50							
Caliper-Smart Ring		203.2	N/A	225.3	N/A	N/A	MM
Caliper Large Ring		304.8	N/A	327.1	N/A	N/A	MM
Ultra Density - D Master Calibration - Aluminum Measurement							
Master: 4-JAN-2000 14:23							
LU Aluminum	90.00	90.48	--	--	--	--	CPS
SU Aluminum	90.00	90.48	--	--	--	--	CPS
LTH Aluminum	100.0	104.4	--	--	--	--	CPS
LTH Aluminum	50.00	52.85	--	--	--	--	CPS
SSU Aluminum	50.00	52.85	--	--	--	--	CPS
SSU Aluminum	100.0	104.4	--	--	--	--	CPS

5	2852 Aluminum	1732.2	CPS
		2852.4	CPS

Ultra Density - D Master Calibration - Lithology Measurement
Master - 8-JAN-2003 14:39

Limestone	60.00	76.97	CPS
LIU Iron	122.0	117.3	CPS
LIU Iron	135.0	137.6	CPS
LIU Iron	30.00	34.07	CPS
SS2 Iron	1700	1674	CPS
SS2 Iron	2450.0	2454.4	CPS

Ultra Density - D Master Calibration - Spectrum Quality Ratios
Master - 8-JAN-2003 14:39

QFLS Calculated	0.6500	0.6715	
QRSS Calculated	0.7000	0.7177	
QKU Calculated	0.3000	0.3428	
QTH Calculated	0.1000	0.1021	
QPU Calculated	1.000	0.9871	

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Stab Measurement Summary
Before - 9-JAN-2002 12:50

SS Window Ratio	1.010	N/A	1.012	N/A	N/A
SS Window Sum	18410	N/A	18370	N/A	N/A
LS Window Ratio	0.4605	N/A	0.4560	N/A	N/A
LS Window Sum	10170	N/A	10170	N/A	N/A
SS Window Sum	0.2060	N/A	0.2004	N/A	N/A
LS Window Sum	1010	N/A	1010	N/A	N/A

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Photo-multiplier High Voltages Calibrations
Before - 9-JAN-2002 12:50

SS PM High Voltage (Command)	1700	N/A	1699	N/A	V
SS PM High Voltage (Command)	2051	N/A	2048	N/A	V
LS PM High Voltage (Command)	2000	N/A	2000	N/A	V

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Crystal Quality Resolutions Calibration
Before - 9-JAN-2002 12:50

SS Crystal Resolution	12.68	N/A	12.59	N/A	%
LS Crystal Resolution	10.52	N/A	10.55	N/A	%
LS Crystal Resolution	10.57	N/A	10.51	N/A	%

High resolution Integrated Logging Tool-DTS Wellsite Calibration - HGL Calibration
Before - 9-JAN-2002 12:55

Rex B1 Resistivity	3675	N/A	3645	N/A	OHMM
Rex B2 Resistivity	3650	N/A	3618	N/A	OHMM
Rex B3 Resistivity	3630	N/A	3612	N/A	OHMM

High resolution Integrated Logging Tool-DTS Wellsite Calibration - HILT Caliper Calibration
Before - 9-JAN-2002 12:44

HILT Caliper Zero Measurement	221.1	N/A	221.1	N/A	MM
HILT Caliper Pu Measurement	304.6	N/A	324.1	N/A	MM

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Detector Calibration
Before - 9-JAN-2002 12:44

Gamma Ray Background	30.00	N/A	55.53	N/A	GAPI
Gamma Ray Lig - Sig)	178.9	N/A	178.9	N/A	GAPI
Gamma Ray Calibrated	165.0	N/A	165.0	N/A	GAPI

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Zero Measurement
Master - 9-JAN-2002 14:14 Before - 9-JAN-2002 12:49

CNTC Background	25.50	25.50	27.28	N/A	CPS
CTC Background	29.50	29.27	30.28	N/A	CPS

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Accelerometer Calibration
Before - 9-JAN-2002 12:44

Z-Axis Acceleration	9.810	N/A	9.818	N/A	M/S2

High resolution Integrated Logging Tool-DTS Master Calibration - Inversion results
Master - 9-JAN-2002 14:14

Pbu Magnesium	1698	1698	1693		KMB
Pe Aluminum	2.570	2.577			KMB
Pe Magnesium	2.030	2.027			

High resolution Integrated Logging Tool-DTS Master Calibration - Zero Measurement
Master - 9-JAN-2002 14:14

SS Average Deviation	0	0.0015			
SS Mar Deviation	0	0.5435			
LS Average Deviation	0	0.0000			
LS Mar Deviation	0	0.386			
LS Average Deviation	0	0.0000			
LS Mar Deviation	0	0.582			

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Tank Measurement
Master - 29-OCT-1858 12:42

Thermal Neutron (Tank)	6031	5466			CPS
Thermal Far Count (Tank)	2776	2412			CPS
CNTC/FCTC (Tank)	2.169	2.266			

The GLS-IU source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT-B Water Temperature	16.4	DEGC
Thermal Housing Side	69.677	MM

Array Induction Tool - B / Equipment Identification

Primary Equipment:		
Array Induction Sonde	AIS - BA	97
Adaptive Response Cartridge	AIC - BA	97
Auxiliary Equipment:		
Mass Isolated Housing	AIH - AA	97

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Thru-Cal Mag & Phase

Ub	Phase	Value	Thru-Cal Magnitude V	Normal	Value	Phase	OEG	Normal
1	Master	0.6634			-93.118			-88.00
	Before	-0.6265			93.117			
2	Master	1.237			-89.41			-89.50
	Before	1.241		1.195	-89.27			
3	Master	1.914			89.49			70.00
	Before	1.919		1.389	89.28			
4	Master	0.3663			-90.8			-90.3
	Before	0.3657		0.3960	-90.4			
5	Master	2.204			89.17			71.00
	Before	2.231		2.087	89.74			
6	Master	0.5767			-91.5			-91.2
	Before	0.5811		0.5920	-91.0			
7	Master	1.339			-14.52			-9.000
	Before	1.343		1.423	-14.04			
8	Master	0.4052			72.54			69.00
	Before	0.4048		0.4000	72.45			
9	Master	2.309			-16.70			-3.000
	Before	2.315		2.311	-16.21			
10	Master	0.5880			72.24			66.00
	Before	0.5883		0.5930	72.24			
11	Master	2.315			-6.307			0
	Before	2.322		2.311	-6.801			
12	Master	0.5737			79.12			75.00
	Before	0.5758		0.5760	79.66			
13	Master	2.026			-6.027			-1.000
	Before	2.043		1.983	-5.440			
14	Master	0.5943			78.48			74.00
	Before	0.5963		0.5200	78.49			

	TOOL %	130	Non +4.00	Non + -4.00
	Minimum	Nominal	Minimal	Maximum

Master: 22-NOV-1999 11:57

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Ref Gain Mag & Phase

Ub	Phase	Value	ADC Ref Gain Magnitude	Value	Phase	OEG
1	Master	25.06		0.4089		
	Before	25.08		0.4116		
2	Master	25.13		0.3979		
	Before	25.03		0.3979		
3	Master	25.03		0.1046		
	Before	25.04		0.1044		
4	Master	25.07		0.1068		
	Before	25.07		0.1068		
5	Master	25.07		0.2124		
	Before	25.08		0.2145		

23.75	24.50	25.25	26.00	1.000
Minimum	Nominal	Maximum	Minimal	Maximum

Master: 22-NOV-1999 11:57 Before: 15-JAN-2000 8:06

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Aux Freq

Phase	ATF-STA Plus -3V	Value	Phase	ATF-STA Zero -3V	Value
Master		3988	Master		-53.09
Before		3990	Before		-53.09
3750	3990	4125	4500	-54.00	
Minimum	Nominal	Maximum	Minimum	Nominal	Maximum

Phase	ATF Temperature Plus -3V	Value	Phase	ATF Temperature Zero -3V	Value
Master		4.781	Master		-0.00078
Before		4.912	Before		-0.00388
4.500	5.000	5.500	-0.1700	-0.00000	0.1700
Minimum	Nominal	Maximum	Minimum	Nominal	Maximum

Master: 22-NOV-1999 11:57 Before: 15-JAN-2000 8:06

Array Induction Tool - B Wellsite Calibration
Test Loop Gain Correction

Ub	Value	Test Loop Gain Magnitude	Value	Phase	OEG
0	1.001		0.4508		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
1	1.010		0.4422		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
2	1.013		0.2058		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
3	1.013		0.2058		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
4	1.018		0.1729		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
5	1.020		0.0428		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
6	1.019		-0.0023		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
7	1.019		-0.0428		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
8	1.022		-0.04478		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
10	1.018		0.07687		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
11	1.022		0.1868		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
12	1.022		-0.1279		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
13	1.026		-0.1318		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	

Master: 22-NOV-1999 11:57

Array Induction Tool - B Wellsite Calibration
Sonde Error Correction

Ub	Value	R Sonde Error Correction MM M	Value	R Sonde Error Correction MM M
0	1.913		89.11	
	27.50	34.50	-546.0	546.0
	Minimum	Maximum	Minimal	Maximal
1	38.28		-12.28	
	33.00	37.00	-546.0	204.0
	Minimum	Maximum	Minimal	Maximal
2	48.74		3.783	
	42.00	54.00	-546.0	181.0
	Minimum	Maximum	Minimal	Maximal
3	34.50		-75.67	
	28.00	37.00	-546.0	120.0
	Minimum	Maximum	Minimal	Maximal
4	45.44		95.34	
	20.00	70.00	-546.0	204.0
	Minimum	Maximum	Minimal	Maximal
5	39.74		-104.5	
	13.00	47.00	-546.0	196.0
	Minimum	Maximum	Minimal	Maximal
6	26.98		-22.98	
	14.00	37.00	-546.0	87.00
	Minimum	Maximum	Minimal	Maximal
7	14.00		-22.98	
	4.500	19.00	-546.0	34.00
	Minimum	Maximum	Minimal	Maximal
8	7.881		-14.90	
	0.000	13.00	-43.00	43.00
	Minimum	Maximum	Minimal	Maximal
9	11.12		-30.88	
	0.000	11.00	-50.00	50.00
	Minimum	Maximum	Minimal	Maximal
10	7.881		-1.888	
	0.000	8.500	-38.00	38.00
	Minimum	Maximum	Minimal	Maximal
11	8.360		-9.606	
	1.500	7.000	-50.00	30.00
	Minimum	Maximum	Minimal	Maximal
12	-0.381		-4.112	
	-8.000	2.000	-50.00	50.00
	Minimum	Maximum	Minimal	Maximal
13	0.2952		-9.20	
	-8.000	4.000	-38.00	38.00
	Minimum	Maximum	Minimal	Maximal

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Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Thru-Cal Mag & Phase

Ub	Phase	Value	Thru-Cal Magnitude V	Normal	Value	Phase	OEG	Normal
0	Master	0.6634			0.5920	-93.118		-88.00
	Master	1.237			1.195	-89.41		-89.50
1	Master	1.914			1.389	-89.49		70.00
	Master	0.3663			0.3960	-130.8		-90.3
2	Master	2.204			2.087	-130.4		71.00
	Master	0.5767			0.5920	-131.5		-91.2
3	Master	1.339			1.423	-13.52		-9.000
	Master	0.4052			0.4000	72.54		69.00
4	Master	2.309			2.311	-16.70		-3.000
	Master	0.5880			0.5930	72.24		66.00
5	Master	2.315			2.311	-6.327		0
	Master	0.5737			0.5760	-6.801		75.00
6	Master	2.026			1.983	-6.027		-1.000
	Master	0.5943			0.5200	-5.440		74.00

	TOOL %	130	Non +4.00	Non + -4.00
	Minimum	Nominal	Minimal	Maximum

Master: 22-NOV-1999 11:57

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Ref Gain Mag & Phase

Ub	Phase	Value	ADC Ref Gain Magnitude	Value	Phase	OEG
0	Master	25.06		0.4089		
	Before	25.08		0.4116		
1	Master	25.13		0.3979		
	Before	25.03		0.3979		
2	Master	25.03		0.1046		
	Before	25.04		0.1044		
3	Master	25.07		0.1068		
	Before	25.07		0.1068		
4	Master	25.07		0.2124		
	Before	25.08		0.2145		

23.75	24.50	25.25	26.00	1.000
Minimum	Nominal	Maximum	Minimal	Maximum

Master: 22-NOV-1999 11:57

Array Induction Tool - B Master Calibration
Aux Freq

Phase	ATF-STA Plus -3V	Value	Phase	ATF-STA Zero -3V	Value
Master		3988	Master		-53.09
Before		3990	Before		-53.09
3750	3990	4125	4500	-54.00	
Minimum	Nominal	Maximum	Minimum	Nominal	Maximum

Phase	ATF Temperature Plus -3V	Value	Phase	ATF Temperature Zero -3V	Value
Master		4.781	Master		-0.00078
Before		4.912	Before		-0.00388
4.500	5.000	5.500	-0.1700	-0.00000	0.1700
Minimum	Nominal	Maximum	Minimum	Nominal	Maximum

Master: 22-NOV-1999 11:57

Array Induction Tool - B Master Calibration
Test Loop Gain Correction

Ub	Value	Test Loop Gain Magnitude	Value	Phase	OEG
0	1.001		0.4508		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
1	1.010		0.4422		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
2	1.013		0.2058		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
3	1.013		0.2058		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
4	1.018		0.1729		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
5	1.020		0.0428		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
6	1.019		-0.0023		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
7	1.019		-0.0428		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
8	1.022		-0.04478		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
10	1.018		0.07687		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
11	1.022		0.1868		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
12	1.022		-0.1279		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	
13	1.026		-0.1318		
		0.9500 1.000 1.050 Minimum Nominal Maximum	-0.500 0 3.500 Minimal Nominal Maximal	0.500 3.000 Minimum Maximum	

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Array Induction Tool - B Master Calibration
Sonde Error Correction

Ub	Value	R Sonde Error Correction MM M	Value	R Sonde Error Correction MM M
0	1.913		89.11	
	27.50	34.50	-546.0	546.0
	Minimum	Maximum	Minimal	Maximal
1	38.28		-12.28	
	33.00	37.00	-546.0	204.0
	Minimum	Maximum	Minimal	Maximal
2	48.74		3.783	
	42.00	54.00	-546.0	181.0
	Minimum	Maximum	Minimal	Maximal
3	34.50		-75.67	
	28.00	37.00	-546.0	120.0
	Minimum	Maximum	Minimal	Maximal
4	45.44		95.34	
	20.00	70.00	-546.0	204.0
	Minimum	Maximum	Minimal	Maximal
5	39.74		-104.5	
	13.00	47.00	-546.0	196.0
	Minimum	Maximum	Minimal	Maximal
6	26.98		-22.98	
	14.00	37.00	-546.0	87.00
	Minimum	Maximum	Minimal	Maximal
7	14.00		-22.98	
	4.500	19.00	-546.0	34.00
	Minimum	Maximum	Minimal	Maximal
8	7.881		-14.90	
	0.000	13.00	-43.00	43.00
	Minimum	Maximum	Minimal	Maximal
9	11.12		-30.88	
	0.000	11.00	-50.00	50.00
	Minimum	Maximum	Minimal	Maximal
10	7.881		-1.888	
	0.000	8.500	-38.00	38.00
	Minimum	Maximum	Minimal	Maximal
11	8.360		-9.606	
	1.500	7.000	-50.00	30.00
	Minimum	Maximum	Minimal	Maximal
12	-0.381		-4.112	
	-8.000	2.000	-50.00	50.00
	Minimum	Maximum	Minimal	Maximal
13	0.2952		-9.20	
	-8.000	4.000	-38.00	38.00
	Minimum	Maximum	Minimal	Maximal

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	(Minimum)	(Nominal)	(Maximum)	(Minimum)	(Nominal)	(Maximum)			
2	48.74			3.793					
	43.00 (Minimum)	54.00 (Nominal)	64.00 (Maximum)	-181.0 (Minimum)	0 (Nominal)	181.0 (Maximum)			
3	32.50			-75.61					
	25.00 (Minimum)	37.00 (Nominal)	48.00 (Maximum)	-101.0 (Minimum)	0 (Nominal)	101.0 (Maximum)			
4	45.44			95.34					
	23.00 (Minimum)	53.00 (Nominal)	74.00 (Maximum)	-208.0 (Minimum)	0 (Nominal)	208.0 (Maximum)			
5	38.74			-104.5					
	13.00 (Minimum)	47.00 (Nominal)	69.00 (Maximum)	-196.0 (Minimum)	0 (Nominal)	196.0 (Maximum)			
6	26.86			-26.68					
	16.00 (Minimum)	27.00 (Nominal)	37.00 (Maximum)	-67.00 (Minimum)	0 (Nominal)	67.00 (Maximum)			
7	14.00			-22.98					
	4.000 (Minimum)	15.00 (Nominal)	25.00 (Maximum)	-34.00 (Minimum)	0 (Nominal)	34.00 (Maximum)			
8	7.581			-14.30					
	-2.000 (Minimum)	8.000 (Nominal)	18.00 (Maximum)	-43.00 (Minimum)	0 (Nominal)	43.00 (Maximum)			
9	10.12			-30.85					
	2.000 (Minimum)	11.00 (Nominal)	18.00 (Maximum)	-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)			
10	7.801			4.856					
	2.000 (Minimum)	8.000 (Nominal)	13.00 (Maximum)	-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)			
11	6.360			-9.636					
	1.000 (Minimum)	7.000 (Nominal)	12.00 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)			
12	-1.361			-4.112					
	-6.000 (Minimum)	-2.000 (Nominal)	4.000 (Maximum)	-32.00 (Minimum)	0 (Nominal)	32.00 (Maximum)			
13	0.3952			-19.20					
	-5.000 (Minimum)	1.000 (Nominal)	8.000 (Maximum)	-38.00 (Minimum)	0 (Nominal)	38.00 (Maximum)			

Master: 22-NOV-1999 11:57

Litho Density - D / Equipment Identification

Primary Equipment:		
Nuclear Services Cartridge	NSC - E	2707
Powered Gamma Detector	PGD - G	2959
Gamma Source Radioactive	GSR - J	2050
Auxiliary Equipment:		
Density Resistivity Sonde	DRS - C	1803
Electronics Cartridge Housing	ECH - MKA	
Powered Detector Housing	PDH - L	2959

Litho Density - D Wellsite Calibration
Background Measurement

Phase	LL Background CPS			Value
Master				19.21
Before				19.14
	15.00 (Minimum)	20.00 (Nominal)	25.00 (Maximum)	

Phase	LU Background CPS			Value
Master				72.94
Before				73.43
	58.00 (Minimum)	76.00 (Nominal)	94.00 (Maximum)	

Phase	LS Background CPS			Value
Master				55.68
Before				55.85
	43.00 (Minimum)	57.00 (Nominal)	72.00 (Maximum)	

Phase	LITH Background CPS			Value
Master				5.480
Before				5.510
	4.000 (Minimum)	5.500 (Nominal)	7.000 (Maximum)	

Phase	SS1 Background CPS			Value
Master				17.16
Before				17.09
	12.00 (Minimum)	16.00 (Nominal)	19.50 (Maximum)	

Phase	SS2 Background CPS			Value
Master				11.46
Before				11.43
	8.000 (Minimum)	11.00 (Nominal)	13.50 (Maximum)	

Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47

Litho Density - D Wellsite Calibration
Detectors Resolution From BKG Measurements

Phase	LS Resolution Background			Value
Master				8.733
Before				8.767
	5.000 (Minimum)	8.000 (Nominal)	11.50 (Maximum)	

Phase	SS Resolution Background			Value
Master				8.876
Before				8.813
	5.000 (Minimum)	8.000 (Nominal)	11.50 (Maximum)	

Master: 4-JAN-2000 14:08 Before: 9-JAN-2000 12:47

Litho Den - Y - D Master Calibration
Aluminum Measurement

Phase	LL Aluminum CPS			Value
Master				68.48
	70.00 (Minimum)	90.00 (Nominal)	125.0 (Maximum)	

Phase	LU Aluminum CPS			Value
Master				131.8
	100.0 (Minimum)	138.0 (Nominal)	194.0 (Maximum)	

Phase	LS Aluminum CPS			Value
Master				154.4
	120.0 (Minimum)	158.0 (Nominal)	217.0 (Maximum)	

Phase	LITH Aluminum CPS			Value
Master				52.85
	36.00 (Minimum)	50.00 (Nominal)	74.00 (Maximum)	

Phase	SS1 Aluminum CPS			Value
Master				179.0
	125.0 (Minimum)	178.0 (Nominal)	256.0 (Maximum)	

Phase	SS2 Aluminum CPS			Value
Master				249.4
	210.0 (Minimum)	260.0 (Nominal)	353.0 (Maximum)	

Master: 4-JAN-2000 14:23

Litho Density - D Master Calibration
Lithology Measurement

Phase	LL Iron CPS			Value
Master				78.97
	60.00 (Minimum)	80.00 (Nominal)	114.0 (Maximum)	

Phase	LU Iron CPS			Value
Master				117.3
	85.00 (Minimum)	120.0 (Nominal)	177.0 (Maximum)	

Phase	LS Iron CPS			Value
Master				137.6
	100.0 (Minimum)	136.0 (Nominal)	193.0 (Maximum)	

Phase	LITH Iron CPS			Value
Master				34.07
	15.00 (Minimum)	30.00 (Nominal)	51.00 (Maximum)	

Phase	SS1 Iron CPS			Value
Master				157.6
	105.0 (Minimum)	155.0 (Nominal)	234.0 (Maximum)	

Phase	SS2 Iron CPS			Value
Master				224.4
	160.0 (Minimum)	245.0 (Nominal)	325.0 (Maximum)	

Master: 4-JAN-2000 14:36

Litho Density - D Master Calibration
Spectrum Quality Ratios

Phase	QRLS Calculated			Value
Master				0.6715
	0.6000 (Minimum)	0.6500 (Nominal)	0.7000 (Maximum)	

Phase	QRSS Calculated			Value
Master				0.7177
	0.6200 (Minimum)	0.7200 (Nominal)	0.8200 (Maximum)	

Phase	QRLI Calculated			Value
Master				0.3426
	0.2600 (Minimum)	0.3900 (Nominal)	0.4600 (Maximum)	

Phase	QUR Calculated			Value
Master				1.384
	1.290 (Minimum)	1.390 (Nominal)	1.450 (Maximum)	

Phase	QR Calculated			Value
Master				0.9671
	0.9600 (Minimum)	1.000 (Nominal)	1.020 (Maximum)	

Master: 4-JAN-2000 14:36

High resolution Integrated Logging Tool-DTS / Equipment Identification

Primary Equipment:		
HILT high-Resolution Mechanical Sonde	HRMS - B	1717
HILT Rxo Gamma-ray Device	HRGD -	726
HILT Nuclear Back-Scatter Detector	HILT -	
HILT Nuclear Short-Spacing Detector	HILT -	
HILT Nuclear Long-Spacing Detector	HILT -	
Micro Cylindrically Focused Log Device	MCFL -	
GR Logging Source	GLS - VJ	1955
HILT High Res Control Cartridge	HRCC - B	772
Auxiliary Equipment:		

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Stab Measurement Summary

Phase	SS Window Ratio			Value
Before				1.012
	0.9592 (Minimum)	1.010 (Nominal)	1.060 (Maximum)	

Phase	SS Window Ratio			Value
Before				0.4580
	0.4375 (Minimum)	0.4808 (Nominal)	0.4836 (Maximum)	

Phase	LS Window Ratio			Value
Before				0.2924
	0.2812 (Minimum)	0.2960 (Nominal)	0.3106 (Maximum)	

Phase	SS Window Sum CPS			Value
Before				16370
	17480 (Minimum)	18410 (Nominal)	19340 (Maximum)	

Phase	SS Window Sum CPS			Value
Before				10170
	9661 (Minimum)	10170 (Nominal)	10680 (Maximum)	

Phase	LS Window Sum CPS			Value
Before				1200
	1150 (Minimum)	1210 (Nominal)	1270 (Maximum)	

Before: 9-JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Photo-multiplier High Voltages Calibrations

Phase	SS PM High Voltage (Command) V			Value
Before				1693
	1600 (Minimum)	1700 (Nominal)	1800 (Maximum)	

Phase	SS PM High Voltage (Command) V			Value
Before				2108
	1991 (Minimum)	2081 (Nominal)	2181 (Maximum)	

Phase	LS PM High Voltage (Command) V			Value
Before				2031
	1900 (Minimum)	2000 (Nominal)	2100 (Maximum)	

Before: 9-JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Crystal Quality Resolutions Calibration

Phase	SS Crystal Resolution %			Value
Before				12.59
	11.66 (Minimum)	12.66 (Nominal)	13.66 (Maximum)	

Phase	SS Crystal Resolution %			Value
Before				10.56
	9.023 (Minimum)	10.02 (Nominal)	11.02 (Maximum)	

Phase	LS Crystal Resolution %			Value
Before				10.51
	9.532 (Minimum)	10.53 (Nominal)	11.53 (Maximum)	

Before: 9-JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Wellsite Calibration
MCFL Calibration

Phase	Raw B0 Resistivity OHMM			Value
Before				3845
	3566 (Minimum)	3875 (Nominal)	4185 (Maximum)	

Phase	Raw B1 Resistivity OHMM			Value
Before				3818
	3524 (Minimum)	3830 (Nominal)	4136 (Maximum)	

Phase	Raw B2 Resistivity OHMM			Value
Before				3812
	3524 (Minimum)	3830 (Nominal)	4136 (Maximum)	

Before: 9-JAN-2000 12:56

High resolution Integrated Logging Tool-DTS Wellsite Calibration
HILT Caliper Calibration

Phase	HILT Caliper Zero Measurement MM			Value
Before				221.5
	152.4 (Minimum)	203.2 (Nominal)	254.0 (Maximum)	

Phase	HILT Caliper Plus Measurement MM			Value
Before				324.1
	228.6 (Minimum)	304.8 (Nominal)	381.0 (Maximum)	

Before: 9-JAN-2000 12:48

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Detector Calibration

Phase	Gamma Ray Background GAPI			Value
Before				55.53
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)	

Phase	Gamma Ray (Lig - Bkg) GAPI			Value
Before				178.9
	162.6 (Minimum)	178.9 (Nominal)	196.2 (Maximum)	

Phase	Gamma Ray (Calibrated) GAPI			Value
Before				165.0
	150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)	

Before: 9-JAN-2000 12:44

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Zero Measurement

Phase	CNTC Background CPS			Value
Master				25.80
Before				27.26
	5.000 (Minimum)	25.80 (Nominal)	40.00 (Maximum)	

Phase	CFTC Background CPS			Value
Master				29.07
Before				30.29
	5.000 (Minimum)	29.07 (Nominal)	40.00 (Maximum)	

Master: 29-OCT-1999 12:43 Before: 9 JAN-2000 12:46

High resolution Integrated Logging Tool-DTS Wellsite Calibration
Accelerometer Calibration

Phase	Z-Axis Acceleration M/S2			Value
Before				9.818
	9.810 (Minimum)	9.810 (Nominal)	10.01 (Maximum)	

Before: 10-JAN-2000 8:57

High resolution Integrated Logging Tool-DTS Master Calibration
Inversion results

Phase	Rho Aluminum K/M3			Value
Master				2596
	2586 (Minimum)	2596 (Nominal)	2606 (Maximum)	

Phase	Rho Magnesium K/M3			Value
Master				1686
	1676 (Minimum)	1686 (Nominal)	1696 (Maximum)	

Phase	Pe Aluminum			Value
Master				2.577
	2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)	

Phase	Pe Magnesium			Value
Master				2.627
	2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)	

Master: 5-JAN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration
Deviation Summary

Phase	BS Average Deviation %			Value
Master				0.2215
	-0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)	

Phase	SS Average Deviation %			Value
Master				0.3842
	-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)	

Phase	LS Average Deviation %			Value
Master				0.6659
	-1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)	

Phase	BS Max Deviation %			Value
Master				0.8435
	-1.600 (Minimum)	0 (Nominal)	1.600 (Maximum)	

Phase	SS Max Deviation %			Value
Master				1.335
	-2.500 (Minimum)	0 (Nominal)	2.500 (Maximum)	

Phase	LS Max Deviation %			Value
Master				1.562
	-3.500 (Minimum)	0 (Nominal)	3.500 (Maximum)	

Master: 5-JAN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration
Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS			Value
Master				5466
	6005 (Minimum)	6031 (Nominal)	7200 (Maximum)	

Phase	Thermal Far Corr. (Tank) CPS			Value
Master				2412
	2075 (Minimum)	2799 (Nominal)	3125 (Maximum)	

Phase	CNTC/CFTC (Tank)			Value
Master				2.266
	2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)	

Master: 29-OCT-1999 12:43

COMPANY: SUNCOR ENERGY INC.	BOTTOM LOG INTERVAL: 2065.8 m
WELL: SUNCOR NETLA P-16	SCHLUMBERGER DEPTH: 2066.8 m
FIELD: NETLA	DEPTH DRILLER: 2069 m
PROVINCE: NORTHWEST TERRITORIES	KELLY BUSHING: 607 m
	DRILL FLOOR: 606.7 m
Schlumberger	GROUND LEVEL: 602.3 m

PLATFORM EXPRESS
COMPENSATED NEUTRON
LITHODENSITY LOG

MICRO

1874 N.E.B. COPY

COMPANY: SUNCOR ENERGY INC.

WELL: SUNCOR NETLA P-16

FIELD: NETLA

PROVINCE: NORTHWEST TERRITORIES

Schlumberger

PLATFORM EXPRESS
MICROLOG

P-16-60-50-122-40 (LSD)
300P160N0122H00 (UWI)

Elev.: K.B. 607 m
G.L. 602.0 m
D.F. 604.7 m

Permanent Datum: GROUND LEVEL — Elev.: 602.0 m
Log Measured From: KELLY BUSHING — 4.7 m above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No. 9874 — SECTION 40 — TOWNSHIP 60 — RANGE 50

	Run 1	Run 2	Run 3	Run 4
Logging Date	10-JAN-2000			
Run Number	ONE			
Depth Driller	2098 m			
Schlumberger Depth	2096.8 m			
Bottom Log Interval	2078.2 m			
Top Log Interval	243 m			
Casing Driller Size @ Depth	244.000 mm @ 242 m	@	@	@
Casing Schlumberger	242 m			
Bit Size	222.000 mm			
Type Fluid In Hole	POTASSIUM SULPHATE			
Density / Viscosity	1090 kg/m3 / 60 s			
Fluid Loss / PH	11.5 cm3 / 11			
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.510 ohm.m @ 14 degC	@	@	@
RMF @ Measured Temperature	0.380 ohm.m @ 16 degC	@	@	@
RMC @ Measured Temperature	0.380 ohm.m @ 16 degC	@	@	@
Source: RMF / RMC	MEASURED / MEASURED			
RM @ MIT / RMF @ MIT	0.180 @ 74 / 0.110 @ 74	@ / @	@ / @	@ / @
Maximum Recorded Temperatures	74 degC			
Circulation Stopped / Time	10-JAN-2000 / 1:45			
Logger On Bottom / Time	10-JAN-2000 / 10:15			
Unit Number / Location	5229 / LAKANGE PRAIRIE			
Recorded By	ROBERT HARRIES			
Witnessed By	CRAIG COUGAS			

RUN NUMBER(S), DEPTH DRILLER'S AND LOGGER'S DEPTH, BOTTOM AND TOP LOGGED INTERVALS, CASING DRILLER'S AND SCHLUMBERGER'S DEPTH, BIT SIZE AND TYPE OF FLUID IN THE HOLE, DENSITY AND VISCOSITY, PH AND FLUID LOSS, SOURCE OF SAMPLE, RM AND RMF AND RMC AND THEIR RESPECTIVE TEMPERATURES, MAXIMUM RECORDED TEMPERATURE, TIME CIRCULATION STOPPED AND TIME LOGGER ON BOTTOM, LOGGING UNIT NUMBER AND LOCATION, AND RECORDED AND WITNESSED BY.

DEPTH REFERENCE
GL
DFE
DRE
RMB

RUN 1 — RUN 2

EQUIPMENT DESCRIPTION

SURFACE EQUIPMENT
MOD 20TC-A
AUXILIARY
CHOKE

DOWNHOLE EQUIPMENT

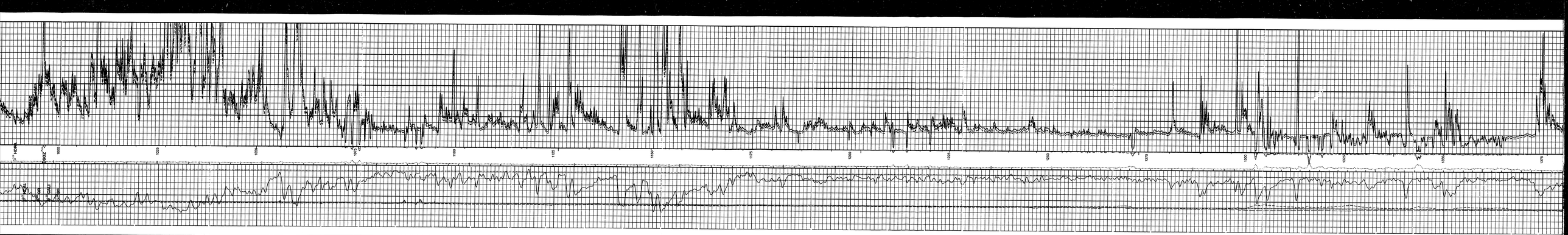
LEH-QT 2484
HILTS-TTB
DTC-H 1306
HILTS-TTB
HNGS-HNGD-A 1842
HILTS-TTB
HNGS-HNGD-A 1842
HILTS-TTB
HGNS-HNGD-A 1772
HILTS-TTB
HGNS-HNGD-A 1772
HILTS-TTB
AH-H72
HILTS-TTB
ATF-A
DTC-A 4309
GPIT-D 3366
GPIT-D 3366
GPIT-D 3366
ACT-B
ASTA-D 97
ASTA-D 97

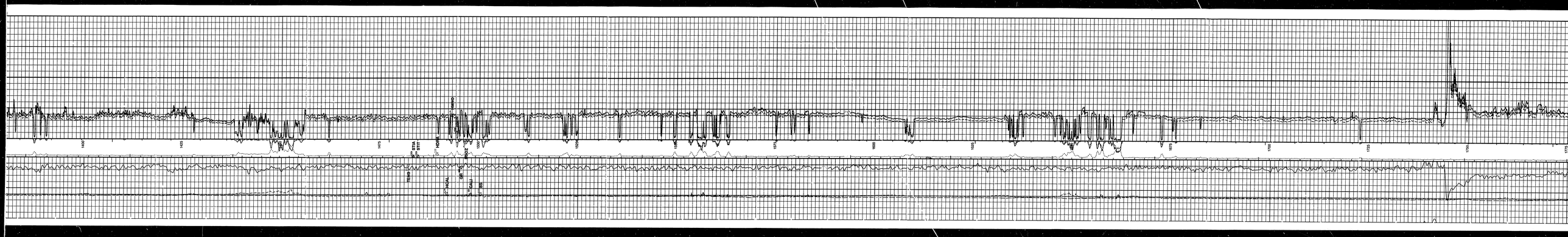
RUN 1 — RUN 2

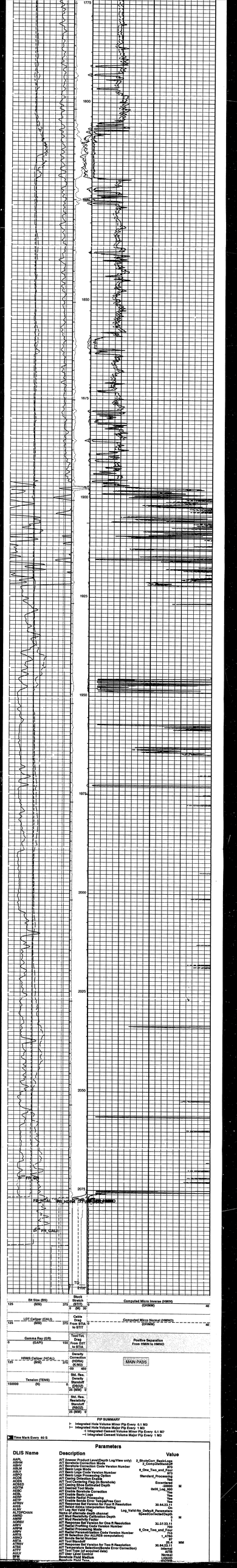
	RUN 1	RUN 2
BRINE DENSITY	1090	
MUD TYPE	POTASSIUM SULPHATE	
MUD VISCOSITY	60	
MUD PH	11	
FLUID LOSS	11.5	
MAXIMUM RECORDED TEMPERATURE	74	
LOGGING SPEED	1800	1800
TOOL STRING (TOP TO BOTTOM)	ECLIPSE	ECLIPSE

39.07
21.91
20.19
26.66
27.27
26.66
23.16
23.16
23.16

STA 5111
STA 5112
STA 5113
STA 5114
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STA 5116
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STA


HOME
1000
1025
1050
1075
1100
1125
1150
1175
1200
1225
1250
1275
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1375


1400
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1500
1525
1550
1575
1600
1625
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1675
1700
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1775
TRIP
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HOPE
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ROO2
CALI
BS



Parameters

DLIS Name	Description	Value
AAPL	AIT Answer Product Level(Depth Log/View only)	2_ShoteCorr_BaskLogs
ABHW	AIT Borehole Corrective Mode	2_ComputeBasedOff
ABLM	AIT Borehole Correction Code Version Number	870
ABLV	AIT Basic Calibration	6_One_Two_and_Four
ADLV	AIT Basic Log Code Version Number	872
ADPO	AIT Basic Logs Processing Option	Standard_Processing
AEDX	AIT Enable Depth Index	Yes
AEEN	AIT Tool Centering Flag (In Borehole)	Eccentered
ASED	AIT Casing Shoe Estimated Depth	20000 M
AEMM	AIT Enable Tool Mode	6mSt_Log_400
AENC	AIT Enable Borehole Correction	Yes
AERL	AIT Enable Rectify	Yes
AERP	AIT Enable Radial Processing	Yes
APRV	AIT Enable Borate Error Term&Press Corr	Yes
ARES	AIT Final Array Resistivity Output Resolution	30.64,23,11
AXIS	AIT Select Alpha Interpolation Gating	On
ALOG	AIT Log Not Valid Flag	Log_Valid=No_Default_Parameters
ATDPCHAN	AIT Tool Depth channel	SpeedCorrectedDepth
ARMC	AIT Mud Resistivity Calibration Depth	0 M
ARMF	AIT Mud Resistivity Factor	1
ARMV	AIT Response Set Version for One ft Resolution	30.67.33.11
ARPC	AIT Radial Profiling Code Version Number	100
ARPH	AIT Radial Processing Option	Standard_Processing
ARPV	AIT Radial Parameterization Code Version Number	6_One_Two_and_Four
ARTG	AIT Tilt Selection (for ALLRES computation)	1_ATR0
ARTN	AIT Tool Serial Number	47
ASTA	AIT Tool Standoff	0 MM
ATRV	AIT Response Set Version for Two ft Resolution	30.64,23,11
ATSV	AIT Temperature Correction(Sonde Error Correction)	internal
ATTY	AIT Tool Type (selected data)	AITB
AULV	AIT User Level Control	Default
BFM	Borehole Fluid Medium	LIQUID
BFR	Borehole Fluid Type	WATER

BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	176	DEGC
BS	Bit Size	8.5	MM
BVAL	Borehole Salinity	222,000	PPM
CCCO	Cement Channel Correction Option	-50000.00	PPM
CCCO	Casing & Contact Thickness Correction Option	0.00	
CONTYP	Connexpress Type	1	
CSG	Casing Shoe Size	Wireline	
CSGW	Casing Weight	248.000	MM
DEPREM1	Depth Remark 1	53.79	KG/M
DEPREM2	Depth Remark 2		
DEPREM3	Depth Remark 3		
DEPREM4	Depth Remark 4		
DEPREM5	Depth Remark 5		
DEPREM6	Depth Remark 6		
DFD	Drilling Fluid Density	1220.00	KM3
DFV	Density Hole Convention	CALIPER	
DO	Depth Offset for Logical Unit 3	0.0	M
DSPM	Dispersed Particle Concentration	3000	
EXBCL	External Bulk Chlorine Value	31000	
EXBSH	External Shale Indicator Shale Value	0.00	
FD	Fluid Density	1050	KM3
FEXP	Form Factor Exponent	2	
FNUM	Form Factor Numerator	1	
FSAL	Formation Salinity Source	DPHI	
FSAL	Formation Salinity	-50000	PPM
GCCO	Gamma Ray Correction Option	NO	
GDEV	Generalized Caliper Deviation	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GTSE	Generalized Tool Sensitivity Selection	0.018227	DCM
GTSE	Generalized Tool Sensitivity Selection	CHART_SIZE	
HCOR	Generalized Caliper Correction	0.0000	M
HDCP	Accelerometer PHDW Presence	PRESENT_FILE	
HDCR	Accelerometer Reference Temperature	20	DEGC
HDCSD	Hole Deviation Correction	2000	KM3
HDSAD	Hole Deviation Self-detection	2000	KM3
HFAT	HALS Auto Write Telemetry	31000	KM3
HLT_GAS_DENSITY	HILT Gas Density Option	0	
HLT_GAS_OPTION	HILT Gas Composition Option	2	KM3
HLMO	HALS Logging Mode	OFF	
HNDO	HILT Neutron Self-detection	0.45	V/V
HNSD	HILT Neutron Salt detection	0.05	V/V
HPHECUT	HILT Photoelectric Cutoff	0.00	V/V
HSCH	HILT Speed Correction Option	TSCD_SPEED_CORRECTION	
HSCO	Hole Size Correction Option	YES	
HSCO	HILT Hole Size Correction	0.00	M
HSTI	STI Uses HILT Accelerometer	NO	
HSWOUT	HILT Water Saturation from ATR cutoff	50	%
IDWCO	IDW Calibration Coefficient Correction	0.0	
IDWCD	IDW Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
IDWCON	IDW Calibration Constant	-7497	
IDWLOW	IDW Calibration Cable Type	7-460	
IDWPD	IDW Serial Number	-999	
IDWSN	IDW Serial	-999	
IDWWC1	IDW Wheel Correction 1	-999	
IDWWC2	IDW Wheel Correction 2	-999	
LDP	Logging Depth Offset for Reading Label	0.00	M
LOGH	Logging Head Serial Number	2000	
LOGSEQ	Log Sequence	First_Log_In_Well	
LWU	LIS Hardware Logs Configuration	ORBIT7.rtw	
MCCO	Rock Matrix for Neutron Porosity Corrections	SANDSTONE	
MDCO	Mud Density Correction	NATC	
MDEN	Mud Constants	NATC	
MHCO	Matrix Density	2650	KM3
MHCT	MCFL Thin Contrast Correction Coefficient	2.34-003	OHMS
MHCT	MCFL Bit Contrast Correction Coefficient	3.39-003	OHMS
MHCC	MCFL High Contrast Correction Switch	ON	
MHCP	MCFL Flowcake Pad Mode	ON	
MMCO	Mud Sample Temperature	14.00	DEGC
MMD	MDT Mud Density Acquisition	1.172	MM
NMF	HRDD APB Activation Combination	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
PBMAX	HRDD Playback Maximum	Infinite	
PBSADP	HRDD Depth Sampling Rate	30.4	MM
PBWADP	Use alternate depth channel for playback	NO	
PMF	Pressure Measurement	0.33	V/V
PTCO	Playback Processing	RECOMPUTE	
PTEMP	Pressure/Temperature Correction Option	NO	
RGTYP	Rig Type	LAND	
RLAM	Reference Log Date (dd-MMM-yyyy)	dd-MMM-yyyy	
RLRH	Reference Log Header		
RLRM	Reference Log Run Number		
RMFS	Resistivity of Mud Filtrate Sample	0.2100	OHMM
RMFT	Mud Filtrate Sample Temperature	14.00	M
RUN	Rig Up Length at Bottom	0	M
RUN	Rig Up Length at Surface	0	
SCWR	Resistivity of Connate Water	1.0000	OHMM
SDAT	Stretch Correction	-50000	M
SEAFLT_HILT	Seafloor Datum Source	Offset	
SHT	HILT Resistivity Exponent	2	
SOTC	Surface Hole Temperature	20	DEGC
SPACEN	Standard Spacing	0.1524	MM
SPHV	Standard Conversion Option	NO	
SPWC	SP Head Value	0	MV
STRCO	Stretch Correction Option	DISALLOW	
STRT	Logging Tool Drop Down Log Correction	-50000	M
STRT	STI Stuck Tool Threshold	0.0000	M
TD	Total Depth	2099	M
TDC	Total Depth - Driller	2099.00	M
TDL	Total Depth - Logger	2099.00	M
TDRDD	Tension Device Calibration Date (dd-MMM-yyyy)	dd-MMM-yyyy	
TNDSN	Tension Device Calibration Serial Number	7719	
TNDOF	Tension Device Offset	0	
TNDSF	Tension Device Offset	0	
TNDIH	Tension Device Serial Number	0	
TNDO	Tension Device Type	CMTD-DUAL	
TNPI	TSCD Enable Corrected Depth Computation	YES	
TNSD	Tension Device of Common Sensor	7719	DFSC
WMUD	Mud Weight	9/6.556	KM3
ZNCO	Test Zero Reference Check at Surface	-50000	

Format: MCFL_40 Vertical Scale: 1:200 Graphics File Created: 10-Jan-2000 13:19

OP System Version: 9C1-303

MCM

SPE-A	9C1-303	AIT-B	9C1-303
LDT-D	9C1-303	DTA-A	9C1-303
HILTB-FTB	9C1-303	DTC-H	9C1-303

Input DLIS Files

DEFAULT	SPEA .009	FN:5 PRODUCER	10-Jan-2000 12:11

Output DLIS Files

DEFAULT	SPEA .019	FN:31 PRODUCER	10-Jan-2000 13:09
CUST	SPEA .019	FN:32 CUSTOMER	10-Jan-2000 13:09

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: ALAN-2000 1999 11:57 Before: 10-JAN-2000 9:00							
Thru Cal Magnitude - 0	0	0.0204	0.0220	N/A	N/A	V	
Thru Cal Magnitude - 1	0	0.0511	0.0527	N/A	N/A	V	
Thru Cal Magnitude - 2	0	1.514	1.519	N/A	N/A	V	
Thru Cal Magnitude - 3	0	0.3933	0.3897	N/A	N/A	V	
Thru Cal Magnitude - 4	0	0.224	0.221	N/A	N/A	V	
Thru Cal Magnitude - 5	0	0.5707	0.5811	N/A	N/A	V	
Thru Cal Magnitude - 6	0	1.132	1.134	N/A	N/A	V	
Thru Cal Magnitude - 7	0	0.4552	0.4564	N/A	N/A	V	
Thru Cal Magnitude - 8	0	2.009	2.015	N/A	N/A	V	
Thru Cal Magnitude - 9	0	0.8965	0.8993	N/A	N/A	V	
Thru Cal Magnitude - 10	0	3.565	3.583	N/A	N/A	V	
Thru Cal Magnitude - 11	0	unused	unused	N/A	N/A	V	
Thru Cal Magnitude - 12	0	2.040	2.040	N/A	N/A	V	
Thru Cal Magnitude - 13	0	0.5943	0.5963	N/A	N/A	V	
Phase - 0	0	0.0	0.0	N/A	N/A	DEG	
Phase - 1	0	44.4	44.27	N/A	N/A	DEG	
Phase - 2	0	69.49	70.05	N/A	N/A	DEG	
Phase - 3	0	-180.0	-180.6	N/A	N/A	DEG	
Phase - 4	0	68.13	69.74	N/A	N/A	DEG	
Phase - 5	0	-166.5	-167.1	N/A	N/A	DEG	
Phase - 6	0	18.52	18.04	N/A	N/A	DEG	
Phase - 7	0	72.54	72.98	N/A	N/A	DEG	
Phase - 8	0	72.24	72.61	N/A	N/A	DEG	
Phase - 9	0	72.04	72.89	N/A	N/A	DEG	
Phase - 10	0	-5.237	-4.801	N/A	N/A	DEG	
Phase - 11	0	76.12	76.65	N/A	N/A	DEG	
Phase - 12	0	-6.027	-5.469	N/A	N/A	DEG	
Phase - 13	0	74.01	73.49	N/A	N/A	DEG	
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Rel Gain Mag. & Phase							
Master: ALAN-2000 1999 11:57 Before: 10-JAN-2000 9:00							
AOC Rel Gain Magnitude - 1	25.00	25.06	25.07	N/A	N/A	V	
AOC Rel Gain Magnitude - 2	25.00	25.08	25.07	N/A	N/A	V	
AOC Rel Gain Magnitude - 3	25.00	25.10	25.10	N/A	N/A	V	
AOC Rel Gain Magnitude - 4	25.00	25.03	25.02	N/A	N/A	V	
AOC Rel Gain Magnitude - 5	25.00	25.07	25.07	N/A	N/A	V	
AOC Rel Gain Magnitude - 6	25.00	25.07	25.07	N/A	N/A	V	
AOC Rel Gain Magnitude - 7	25.00	28.07	28.08	N/A	N/A	V	
Phase - 1	0	0.4069	0.4065	N/A	N/A	DEG	
Phase - 2	0	0.0175	0.0199	N/A	N/A	DEG	
Phase - 3	0	0.0246	0.0249	N/A	N/A	DEG	
Phase - 4	0	0.1046	0.1014	N/A	N/A	DEG	
Phase - 5	0	0.0281	0.0270	N/A	N/A	DEG	
Phase - 6	0	0.0160	0.0153	N/A	N/A	DEG	
Phase - 7	0	0.0240	0.0245	N/A	N/A	DEG	
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Auxiliary							
Master: ALAN-2000 1999 11:57 Before: 10-JAN-2000 9:00							
AIT SPA Pwr		3993	3994	N/A	N/A	MV	
AIT SPA Zero		-59.09	-59.09	N/A	N/A	MV	
AIT Temperature Flux	4.500	4.511	4.510	N/A	N/A	V	
AIT Temperature Zero	-0.00000	-0.00359	-0.00359	N/A	N/A	V	
Array Induction Tool - B Wellsite Calibration - Test Loop Gain Correction							
Master: 20-NOV-1999 11:57							
Test Loop Gain Magnitude - 0	0	1.001	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 1	0	1.000	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 2	0	1.012	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 3	0	1.013	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 4	0	1.019	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 5	0	1.000	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 6	0	1.000	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 7	0	1.018	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 8	0	1.022	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 9	0	1.025	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 10	0	1.033	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 11	0	1.033	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 12	0	1.032	N/A	N/A	N/A	V	
Test Loop Gain Magnitude - 13	0	1.028	N/A	N/A	N/A	V	
Phase - 0	0	0.0000	N/A	N/A	N/A	DEG	
Phase - 1	0	0.1402	N/A	N/A	N/A	DEG	
Phase - 2	0	0.1351	N/A	N/A	N/A	DEG	
Phase - 3	0	0.2058	N/A	N/A	N/A	DEG	
Phase - 4	0	0.1739	N/A	N/A	N/A	DEG	
Phase - 5	0	0.1739	N/A	N/A	N/A	DEG	
Phase - 6	0	0.3020	N/A	N/A	N/A	DEG	
Phase - 7	0	-0.0023	N/A	N/A	N/A	DEG	
Phase - 8	0	0.0000	N/A	N/A	N/A	DEG	
Phase - 9	0	-0.0405	N/A	N/A	N/A	DEG	
Phase - 10	0	0.0787	N/A	N/A	N/A	DEG	
Phase - 11	0	0.1866	N/A	N/A	N/A	DEG	
Phase - 12	0	-0.1279	N/A	N/A	N/A	DEG	
Phase - 13	0	-0.0126	N/A	N/A	N/A	DEG	
Array Induction Tool - B Wellsite Calibration - Sonde Error Correction							
Master: ALAN-2000 14:08							
R Sonde Error Correction - 0	0	1.915	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 1	0	22.29	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 2	0	45.74	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 3	0	32.50	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 4	0	19.14	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 5	0	34.74	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 6	0	26.56	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 7	0	14.00	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 8	0	7.561	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 9	0	7.561	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 10	0	7.801	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 11	0	8.360	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 12	0	8.983	N/A	N/A	N/A	MMM	
R Sonde Error Correction - 13	0	9.193	N/A	N/A	N/A	MMM	
S81 Background	0	6.914	N/A	N/A	N/A	MMM	
S82 Background	0	10.21	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 0	0	3.793	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 1	C	-1.34	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 2	C	-104.5	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 3	C	-25.92	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 4	C	-22.56	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 5	C	-104.5	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 6	C	-22.56	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 7	C	-4.955	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 8	C	-4.955	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 12	C	-4.132	N/A	N/A	N/A	MMM	
X Sonde Error Correction - 13	C	-19.22	N/A	N/A	N/A	MMM	
Linear Delay - D Wellsite Calibration - Background Measurement							
Master: ALAN-2000 14:08 Before: 9-JAN-2000 12:45							
LL Background	60.00	19.21	19.14	N/A	N/A	1.000	CPS
LU Background	76.00	72.94	73.43	N/A	N/A	1.000	CPS
LS Background	57.00	53.58	53.85	N/A	N/A	1.000	CPS
SS1 Background	5.000	5.460	5.910	N/A	N/A	0.3000	CPS
SS2 Background	9.000	11.40	11.42	N/A	N/A	0.3000	CPS
Linear Delay - D Wellsite Calibration - Tool Quality Control Information HV							
Master: ALAN-2000 14:08 Before: 9-JAN-2000 12:45							
LSHV Background	1500	1349	1349	N/A	N/A	V	
SSHV Background	1500	1495	N/A	N/A	N/A	V	
Linear Delay - D Wellsite Calibration - Detectors Resolution from BHG Measurements							
Master: ALAN-2000 14:08 Before: 9-JAN-2000 12:45							
LS Resolution Background	8.000	6.733	6.787	N/A	N/A	NA	
SS Resolution Background	8.000	6.876	6.813	N/A	N/A	NA	
Litho Density - S Wellsite Calibration - Caliper Calibration							
Before: ALAN-2000 12:50							
Caliper Small Ring	223.2	N/A	225.3	N/A	N/A	MM	
Caliper Large Ring	304.8	N/A	307.1	N/A	N/A	MM	
Litho Density - D Master Calibration - Aluminum Measurement							
Master: ALAN-2000 14:23							
LU Aluminum	60.00	19.48	--	--	--	CPS	
LU Aluminum	76.00	72.94	--	--	--	CPS	
LU Aluminum	193.0	154.4	--	--	--	CPS	
LITH Aluminum	50.00	52.88	--	--	--	CPS	
LITH Aluminum	175.0	179.0	--	--	--	CPS	
SS2 Aluminum	260.0	249.4	--	--	--	CPS	
Litho Density - D Master Calibration - Lithology Measurement							
Master: ALAN-2000 14:56							
LL Iron	80.00	78.97	--	--	--	CPS	
LU Iron	120.0	117.3	--	--	--	CPS	
LS Iron	135.0	137.6	--	--	--	CPS	
SS1 Iron	80.00	34.07	--	--	--	CPS	
SS2 Iron	195.0	157.6	--	--	--	CPS	
SS2 Iron	245.0	224.1	--	--	--	CPS	
Litho Density - D Master Calibration - Spectrum Quality Ratios							
Master: ALAN-2000 14:56							
GRSI Calculated	0.6500	0.5715	--	--	--		
GRBS Calculated	0.7200	0.7177	--	--	--		
GRU Calculated	0.2900	0.3408	--	--	--		
GLR Calculated	1.390	1.394	--	--	--		
GH Calculated	1.000	0.9851	--	--	--		
Litho Density - D Wellsite Calibration - Stab Measurement Summary							
Master: ALAN-2000 12:45							
SS Window Sum	1.513	N/A	1.512	N/A	N/A		
SS Window Sum	19410	N/A	19410	N/A	N/A	CPS	
SS Window Sum	0.4600	N/A	0.4600	N/A	N/A		
SS Window Sum	10170	N/A	10170	N/A	N/A	CPS	
SS Window Sum	0.2800	N/A	0.2804	N/A	N/A		
SS Window Sum	1200	N/A	1200	N/A	N/A	CPS	
Litho Density - D Master Calibration - Photo-multiplier High Voltages Calculations							
Master: ALAN-2000 12:50							
SS PM High Voltage (Command)	1700	N/A	1693	N/A	N/A	V	
SS PM High Voltage (Command)	2081	N/A	2081	N/A	N/A	V	
LS PM High Voltage (Command)	2000	N/A	2001	N/A	N/A	V	
Litho Density - D Wellsite Calibration - Crystal Quality Resolutions Calibration							
Master: ALAN-2000 12:50							
SS Crystal Resolution	12.66	N/A	10.39	N/A	N/A	%	
SS Crystal Resolution	10.02	N/A	10.55	N/A	N/A	%	
SS Crystal Resolution	10.53	N/A	10.51	N/A	N/A	%	
Litho Density - D Wellsite Calibration - MCFL Calibration							
Master: ALAN-2000 12:45							
Rwa SS Detector	3670	N/A	3645	N/A	N/A	OHMM	
Rwa LS Detector	3670	N/A	3645	N/A	N/A	OHMM	
Rwa SS Detector	3500	N/A	3612	N/A	N/A	OHMM	
Litho Density - D Wellsite Calibration - HILT Caliper Calibration							
HILT Caliper Zero Measurement	203.2	N/A	221.5	N/A	N/A	MM	
HILT Caliper Flu Measurement	314.1	N/A	314.1	N/A	N/A	MM	
Litho Density - D Wellsite Calibration - Detector Calibration							
Gamma Ray Background	30.00	N/A	55.53	N/A	N/A	GAPI	
Gamma Ray Background	178.8	N/A	178.8	N/A	N/A	%.2B	GAPI
Gamma Ray Calibration	165.0	N/A	165.0	N/A	N/A	GAPI	
Litho Density - D Wellsite Calibration - Zero Measurement							
Master: 29-OCT-1999 12:43 Before: 9-JAN-2000 15:45							
DTC Background	25.00	27.26	27.26	N/A	N/A	3.870	CPS
DTC Background	28.57	30.22	30.22	N/A	N/A	4.561	CPS
Litho Density - D Wellsite Calibration - Accelerometer Calibration							
Before: 10-JAN-2000 8:57							
ZAxis Acceleration	9.810	N/A	9.818	N/A	N/A	MS2	
Litho Density - D Master Calibration - Inversion results							
Master: ALAN-2000 14:14							
Rho Aluminum	2699	2698	--	--	--	KM3	
Rho Aluminum	2699	1999	--	--	--	KM3	
Pe Aluminum	2.570	2.577	--	--	--		
Pe Magnesium	2.650	2.627	--	--	--		
Array Induction Tool - B Wellsite Calibration - Deviation Summary							
Master: 9-JAN-2000 16:14							
SS Max Deviation	0	0.2015	--	--	--	%	
SS Average Deviation	0	0.5425	--	--	--	%	
LS Max Deviation	0	0.2015	--	--	--	%	
LS Average Deviation	0	0.6689	--	--	--	%	
LS Max Deviation	0	1.002	--	--	--	%	
Array Induction Tool - B Wellsite Calibration - Electronics Calibration Check - Thru Cal Mag. & Phase							
Master: 29-OCT-1999 12:43							
Thru Cal Magnitude - 0	0	0.0202	0.0220	N/A	N/A	V	
Thru Cal Magnitude - 1	0	0.0509	0.0527	N/A	N/A	V	
Thru Cal Magnitude - 2	0	1.514	1.519	N/A	N/A	V	
Thru Cal Magnitude - 3	0	0.3933	0.3897	N/A	N/A	V	
Thru Cal Magnitude - 4	0	0.224	0.221	N/A	N/A	V	
Thru Cal Magnitude - 5	0	0.5707	0.5811	N/A	N/A	V	
Thru Cal Magnitude - 6	0	1.132	1.134	N/A	N/A	V	
Thru Cal Magnitude - 7	0	0.4552	0.4564	N/A	N/A	V	
Thru Cal Magnitude - 8	0	2.009	2.015	N/A	N/A	V	
Thru Cal Magnitude - 9	0	0.8965	0.8993	N/A	N/A	V	
Thru Cal Magnitude - 10	0	3.565	3.583	N/A	N/A	V	
Thru Cal Magnitude - 11	0	unused	unused	N/A	N/A	V	
Thru Cal Magnitude - 12	0	2.040	2.040	N/A	N/A	V	
Thru Cal Magnitude - 13	0	0.5943	0.5963	N/A	N/A	V	
Phase - 0	0	0.0	0.0	N/A	N/A	DEG	
Phase - 1	0	44.4	44.27	N/A	N/A	DEG	
Phase - 2	0	69.49	70.05	N/A	N/A	DEG	
Phase - 3	0	-180.0	-180.6	N/A	N/A	DEG	
Phase - 4	0	68.13	69.74	N/A	N/A	DEG	
Phase - 5	0	-166.5	-167.1	N/A	N/A	DEG	
Phase - 6	0	18.52	18.04	N/A	N/A	DEG	
Phase - 7	0	72.54	72.98	N/A	N/A	DEG	
Phase - 8	0	72.24	72.61	N/A	N/A	DEG	
Phase - 9	0	72.04	72.89	N/A	N/A	DEG	
Phase - 10	0	-5.237	-4.801	N/A	N/A	DEG	
Phase - 11	0	76.12	76.65	N/A	N/A	DEG	
Phase - 12	0	-6.027	-5.469	N/A	N/A	DEG	
Phase - 13	0	74.01	73.49	N/A	N/A	DEG	

Master: 20-NOV-1999 11:57 Before: 10-JAN-2000 9:00

Array Induction Tool - B Wellsite Calibration
Electronics Calibration Check - Thru Cal Mag. & Phase

Ch	Phase	Value	ADC Rel Gain Magnitude	Value	Phase DEG
1	Master	25.06		0.4058	
	Master	25.07		0.4056	
2	Master	25.08		0.0175	
	Master	25.10		0.0194	
3	Master	25.03		0.0246	
	Master	25.02		0.0279	
4	Master	25.07		0.1046	
	Master	25.07		0.1043	
5	Master	25.07		0.0281	
	Master	25.07		0.0268	
6	Master	28.07		0.0160	
	Master	28.08		0.0153	
7	Master	25.07		0.0240	
	Master	25.07		0.0245	

Up	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	1.025	0.4938		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
1	1.013	0.4438		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
2	1.019	0.2553		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
3	1.013	0.2958		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
4	1.019	0.1739		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
5	1.025	0.2478		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
6	1.019	-0.5078		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
7	1.019	-0.5022		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
8	1.032	-0.004476		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
9	1.025	0.06408		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
10	1.019	0.07797		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
11	1.032	0.1965		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
12	1.032	-0.1278		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
13	1.006	-0.1318		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	

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Array Induction Tool - 0 Waterie Calibration
Sonde Error Correction

Up	Value	R Sonde Error Correction MM M	Value	X Sonde Error Correction MM M
0	1.915	69.14		
	-27.00	0 34.00	-648.0 0 648.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
1	32.29	4.740	-13.28	
	23.00	27.00 48.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
2	48.74	3.783	0.1	
	43.00	54.00 64.00	181.2 0 181.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
3	32.50	-70.61	-138.2	
	25.00	37.00 48.00	120.3 0 120.3	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
4	45.44	95.34	-208.0	
	22.00	33.00 74.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
5	38.74	-134.9	-186.2	
	13.00	47.00 63.00	-186.2 0 186.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
6	26.98	-29.66	-67.20	
	18.00	27.00 37.00	-67.20 0 67.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
7	14.00	-22.76	-34.00	
	4.000	15.00 25.00	-34.00 0 34.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
8	7.561	-14.30	-43.20	
	-2.000	8.000 18.00	-43.20 0 43.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
9	13.12	-30.85	-32.00	
	2.000	11.00 19.00	-32.00 0 32.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
10	7.801	4.568	-38.00	
	2.000	9.000 13.00	-38.00 0 38.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
11	6.361	-9.636	-90.00	
	1.000	7.000 12.00	-90.00 0 90.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
12	-1.381	-4.112	-32.50	
	-4.000	4.000 4.000	-32.50 0 32.50	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
13	0.3662	-19.20	-36.00	
	-4.000	1.000 8.000	-36.00 0 36.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	

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Array Induction Tool - 0 Waterie Calibration
Sonde Error Correction

Up	Value	Z Sonde Error Correction MM M
0	1.915	69.14
	-27.00	0 34.00
	Minimum	Nominal Maximum
1	32.29	-13.28
	23.00	27.00 48.00
	Minimum	Nominal Maximum
2	48.74	3.783
	43.00	54.00 64.00
	Minimum	Nominal Maximum
3	32.50	-70.61
	25.00	37.00 48.00
	Minimum	Nominal Maximum
4	45.44	95.34
	22.00	33.00 74.00
	Minimum	Nominal Maximum
5	38.74	-134.9
	13.00	47.00 63.00
	Minimum	Nominal Maximum
6	26.98	-29.66
	18.00	27.00 37.00
	Minimum	Nominal Maximum
7	14.00	-22.76
	4.000	15.00 25.00
	Minimum	Nominal Maximum
8	7.561	-14.30
	-2.000	8.000 18.00
	Minimum	Nominal Maximum
9	13.12	-30.85
	2.000	11.00 19.00
	Minimum	Nominal Maximum
10	7.801	4.568
	2.000	9.000 13.00
	Minimum	Nominal Maximum
11	6.361	-9.636
	1.000	7.000 12.00
	Minimum	Nominal Maximum
12	-1.381	-4.112
	-4.000	4.000 4.000
	Minimum	Nominal Maximum
13	0.3662	-19.20
	-4.000	1.000 8.000
	Minimum	Nominal Maximum

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Array Induction Tool - 0 Waterie Calibration
Electronics Calibration Check - Thru Cal Ring & Phase

Up	Phase	Value	Nominal	Phase DEG	Nominal
0	Master	0.4954	1.500	-89.00	-89.00
1	Master	1.237	1.185	-64.00	-69.00
2	Master	1.514	1.395	69.49	72.00
3	Master	0.3503	0.3960	-1.961	-1.961
4	Master	2.224	2.277	69.17	71.32
5	Master	0.5767	0.5625	-1.961	-1.961
6	Master	1.338	1.420	-19.52	-9.000
7	Master	0.4552	0.4035	72.54	89.00
8	Master	2.328	2.111	-19.70	-9.000
9	Master	0.4997	0.5830	72.24	89.00
10	Master	2.225	2.111	0.307	0
11	Master	0.6737	0.7930	76.12	79.45
12	Master	2.226	1.953	-0.527	-1.000
13	Master	0.5942	0.7420	-15.50	-14.00
		70.00 Minimum	100.0 % Nominal	Nom +40.00 Maximum	Nom -40.00 Minimum

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Array Induction Tool - 0 Waterie Calibration
Electronics Calibration Check - Auxiliary

Up	Phase	Value	ADC Per Gain Magnitude	Value	Phase DEG
0	Master	25.08	0.2000	0.1763	0
1	Master	25.09		0.2179	
2	Master	25.10		0.2879	
3	Master	25.03		0.1348	
4	Master	25.04		0.2280	
5	Master	25.07		0.1389	
6	Master	25.07		0.2154	
		23.75 Minimum	±0.50 Nominal	25.25 Maximum	±1.000 Nominal

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Array Induction Tool - 0 Waterie Calibration
Electronics Calibration Check - Auxiliary

Phase	Value	Master	Value	Phase	Value
Master	25.07	3986	3984	Master	43.09
3780 Minimum	3950 Nominal	4190 Maximum	-100.0 ±50.00	-50.00 Nominal	0 Maximum

Phase	ATT Reference Plus 'V'	Value	Phase	ATT Temperature Zero 'V'	Value
Master		4.551	Master		-0.3379
Before		4.552	Master		-0.3380
4.250 Minimum	4.500 Nominal	4.750 Maximum	-0.1000 Nominal	-0.08000 Maximum	0 Bottom

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Array Induction Tool - 0 Waterie Calibration
Test Loop Gain Correction

Up	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	1.500	0.4938		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
1	1.013	0.4420		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
2	1.013	0.2291		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
3	1.013	0.2656		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
4	1.019	0.1739		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
5	1.025	0.2478		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
6	1.019	-0.5029		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
7	1.019	-0.4923		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
8	1.026	0.004476		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
9	1.025	0.06428		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
10	1.019	0.07997		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
11	1.032	0.1965		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
12	1.032	-0.1278		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
13	1.006	-0.1318		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Sonde Error Correction

Up	Value	R Sonde Error Correction MM M	Value	X Sonde Error Correction MM M
0	1.915	69.14		
	-27.00	0 34.00	-648.0 0 648.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
1	32.29	4.740	-13.28	
	23.00	27.00 48.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
2	48.74	3.783	0.1	
	43.00	54.00 64.00	181.2 0 181.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
3	32.50	-70.61	-138.2	
	25.00	37.00 48.00	120.3 0 120.3	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
4	45.44	95.34	-208.0	
	22.00	33.00 74.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
5	38.74	-134.9	-186.2	
	13.00	47.00 63.00	-186.2 0 186.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
6	26.98	-29.66	-67.20	
	18.00	27.00 37.00	-67.20 0 67.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
7	14.00	-22.76	-34.00	
	4.000	15.00 25.00	-34.00 0 34.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
8	7.561	-14.30	-43.20	
	-2.000	8.000 18.00	-43.20 0 43.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
9	13.12	-30.85	-32.00	
	2.000	11.00 19.00	-32.00 0 32.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
10	7.801	4.568	-38.00	
	2.000	9.000 13.00	-38.00 0 38.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
11	6.361	-9.636	-90.00	
	1.000	7.000 12.00	-90.00 0 90.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
12	-1.381	-4.112	-32.50	
	-4.000	4.000 4.000	-32.50 0 32.50	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
13	0.3662	-19.20	-36.00	
	-4.000	1.000 8.000	-36.00 0 36.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Electronics Calibration Check - Thru Cal Ring & Phase

Up	Phase	Value	Nominal	Phase DEG	Nominal
0	Master	0.4954	1.500	-89.00	-89.00
1	Master	1.237	1.185	-64.00	-69.00
2	Master	1.514	1.395	69.49	72.00
3	Master	0.3503	0.3960	-1.961	-1.961
4	Master	2.224	2.277	69.17	71.32
5	Master	0.5767	0.5625	-1.961	-1.961
6	Master	1.338	1.420	-19.52	-9.000
7	Master	0.4552	0.4035	72.54	89.00
8	Master	2.328	2.111	-19.70	-9.000
9	Master	0.4997	0.5830	72.24	89.00
10	Master	2.225	2.111	0.307	0
11	Master	0.6737	0.7930	76.12	79.45
12	Master	2.226	1.953	-0.527	-1.000
13	Master	0.5942	0.7420	-15.50	-14.00
		70.00 Minimum	100.0 % Nominal	Nom +40.00 Maximum	Nom -40.00 Minimum

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Electronics Calibration Check - Auxiliary

Up	Phase	Value	ADC Per Gain Magnitude	Value	Phase DEG
0	Master	25.08	0.2000	0.1763	0
1	Master	25.09		0.2179	
2	Master	25.10		0.2879	
3	Master	25.03		0.1348	
4	Master	25.04		0.2280	
5	Master	25.07		0.1389	
6	Master	25.07		0.2154	
		23.75 Minimum	±0.50 Nominal	25.25 Maximum	±1.000 Nominal

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Electronics Calibration Check - Auxiliary

Phase	Value	Master	Value	Phase	Value
Master	25.07	3986	3984	Master	43.09
3780 Minimum	3950 Nominal	4190 Maximum	-100.0 ±50.00	-50.00 Nominal	0 Maximum

Phase	ATT Reference Plus 'V'	Value	Phase	ATT Temperature Zero 'V'	Value
Master		4.551	Master		-0.3379
Before		4.552	Master		-0.3380
4.250 Minimum	4.500 Nominal	4.750 Maximum	-0.1000 Nominal	-0.08000 Maximum	0 Bottom

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Test Loop Gain Correction

Up	Value	Test Loop Gain Magnitude	Value	Phase DEG
0	1.500	0.4938		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
1	1.013	0.4420		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
2	1.013	0.2291		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
3	1.013	0.2656		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
4	1.019	0.1739		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
5	1.025	0.2478		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
6	1.019	-0.5029		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
7	1.019	-0.4923		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
8	1.026	0.004476		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
9	1.025	0.06428		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
10	1.019	0.07997		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
11	1.032	0.1965		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
12	1.032	-0.1278		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	
13	1.006	-0.1318		
		0.9000 1.000 1.050	-3.000 0 3.000	
		Minimum Nominal Maximum	Minimum Nominal Maximum	

Master: 20-NOV-1998 11:57

Array Induction Tool - B Waterie Calibration
Sonde Error Correction

Up	Value	R Sonde Error Correction MM M	Value	X Sonde Error Correction MM M
0	1.915	69.14		
	-27.00	0 34.00	-648.0 0 648.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
1	32.29	4.740	-13.28	
	23.00	27.00 48.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
2	48.74	3.783	0.1	
	43.00	54.00 64.00	181.2 0 181.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
3	32.50	-70.61	-138.2	
	25.00	37.00 48.00	120.3 0 120.3	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
4	45.44	95.34	-208.0	
	22.00	33.00 74.00	-208.0 0 208.0	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
5	38.74	-134.9	-186.2	
	13.00	47.00 63.00	-186.2 0 186.2	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
6	26.98	-29.66	-67.20	
	18.00	27.00 37.00	-67.20 0 67.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
7	14.00	-22.76	-34.00	
	4.000	15.00 25.00	-34.00 0 34.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
8	7.561	-14.30	-43.20	
	-2.000	8.000 18.00	-43.20 0 43.20	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
9	13.12	-30.85	-32.00	
	2.000	11.00 19.00	-32.00 0 32.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
10	7.801	4.568	-38.00	
	2.000	9.000 13.00	-38.00 0 38.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
11	6.361	-9.636	-90.00	
	1.000	7.000 12.00	-90.00 0 90.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
12	-1.381	-4.112	-32.50	
	-4.000	4.000 4.000	-32.50 0 32.50	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	
13	0.3662	-19.20	-36.00	
	-4.000	1.000 8.000	-36.00 0 36.00	
	Minimum	Nominal Maximum	Minimum Nominal Maximum	

Master: 20-NOV-1998 11:57

Litho Density - D / Equipment Identification

Primary Equipment:		
Nuclear Services Cartridge	NSC - E	2707
Pad Contact Detector	PDD - D	2959
Gamma Source Radioactive	GSR - J	2050
Auxiliary Equipment:		
Density Reading Sonde	DRS - D	1803
Electronics Cartridge Housing	ECH - HNA	
Pressed Detector Housing	PDH - L	2959

Litho Density - D Waterie Calibration
Background Measurement

Phase	LL Background CPS	Value	LU Background CPS	Value	Phase	LS Background CPS	Value
Master		19.21		72.94	Master		58.66
Before		19.14		73.43	Before		59.68
	18.00 Minimum	19.00 Nominal	70.00 Maximum	84.00 Minimum	90.00 Nominal	70.00 Maximum	

Phase	LTH Background CPS	Value	SIU Background CPS	Value	Phase	SSD Background CPS	Value
Master		6.480		17.16	Master		11.48
Before		6.513		17.09	Before		11.43
4.000 Minimum	6.000 Nominal	8.000 Maximum	14.00 Minimum	18.00 Nominal	22.00 Maximum	11.00 Minimum	13.00 Maximum

Master: 4JAN-2000 14:08 Before: 9JAN-2000 12:47

Litho Density - D Waterie Calibration
Detector Resolution Factor Measurements

Phase	LS Resolution Background	Value	SS Resolution Background	Value
Master		9.730		8.876
Before		9.787		8.913
8.000 Minimum	9.000 Nominal	11.50 Maximum	8.000 Minimum	11.50 Nominal

Master: 4JAN-2000 14:08 Before: 9JAN-2000 12:47

Litho Density - D Waterie Calibration
Background Measurement

Phase	LL Aluminum CPS	Value	LU Aluminum CPS	Value	Phase	LS Aluminum CPS	Value
Master		88.48		139.8	Master		184.4
80.00 Minimum	90.00 Nominal	110.0 Maximum	130.0 Minimum	150.0 Nominal	180.0 Maximum	160.0 Minimum	217.0 Maximum

Phase	LTH Aluminum CPS	Value	SIU Aluminum CPS	Value	Phase	SSD Aluminum CPS	Value
Master		52.98		179.1	Master		248.9
40.00 Minimum	50.00 Nominal	70.00 Maximum	160.0 Minimum	210.0 Nominal	260.0 Maximum	210.0 Minimum	263.0 Maximum

Master: 4JAN-2000 14:23

Litho Density - D Waterie Calibration
Limiting Measurement

Phase	LL Ion CPS	Value	LU Ion CPS	Value	Phase	LS Ion CPS	Value
Master		78.57	Master	117.3	Master		137.6
60.00 Minimum	80.00 Nominal	90.00 Maximum	90.00 Minimum	120.0 Nominal	150.0 Maximum	120.0 Minimum	150.0 Maximum

Phase	LTH Ion CPS	Value	SIU Ion CPS	Value	Phase	SSD Ion CPS	Value
Master		34.07	Master	187.6	Master		324.4
30.00 Minimum	35.00 Nominal	50.00 Maximum	150.0 Minimum	200.0 Nominal	250.0 Maximum	300.0 Minimum	350.0 Maximum

Master: 4JAN-2000 14:38

Litho Density - D Waterie Calibration
Density Sensitivity Ratios

Phase	LHOU LithDENS	Value	Phase	LHOU LithDENS	Value
Master	1.4715		Master		0.3436
0.6000 Minimum	0.8000 Nominal	0.7000 Maximum	0.2000 Minimum	0.4000 Nominal	0.6000 Maximum

Phase	QLR Calculated	Value	Phase	QR Calculated	Value
Master		1.364	Master		0.9871
1.000 Minimum	1.280 Nominal	1.400 Maximum	0.8000 Minimum	1.000 Nominal	1.200 Maximum

Master: 4JAN-2000 14:38

High resolution Integrated Logging Tool-DTS / Equipment Identification

Primary Equipment:		
HILT High-Resolution Mechanical Sonde	HRMS - S	1717
HILT Pro Gamma-ray Device	HGD - A	728
HILT Nuclear Back-Scatter Dev.for	HILT -	
HILT Nuclear Short Spacing Detector	HILT -	
HILT Nuclear Long Spacing Detector	HILT -	
Micro Cylindrically Focused Log Device	HILT -	
GR Logging Source	GUL - V	1665
HILT High Res Control Cartridge	HRCC - B	772
Auxiliary Equipment		

High resolution Integrated Logging Tool-DTS Waterie Calibration
Shift Measurement Summary

Phase	SS Window Ratio	Value	Phase	SS Window Ratio	Value	Phase	LS Window Ratio	Value
Before		1.012	Before	0.4580		Before		0.2924
0.7500 Minimum	0.8000 Nominal	1.250 Maximum	0.4075 Minimum	0.5000 Nominal	0.5925 Maximum	0.2000 Minimum	0.2500 Nominal	0.3000 Maximum

Phase	SS Window Sum CPS	Value	Phase	SS Window Sum CPS	Value	Phase	LS Window Sum CPS	Value
Before		19370	Before	1070		Before		1200
17500 Minimum	20000 Nominal	22500 Maximum	1000 Minimum	1100 Nominal	1200 Maximum	1000 Minimum	1100 Nominal	1200 Maximum

Before : 9JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Waterie Calibration
MCFL Calibration

Phase	SS FM High Voltage (Command) 'V'	Value	Phase	SS FM High Voltage (Monitor) 'V'	Value	Phase	LS FM High Voltage (Command) 'V'	Value
Before		1555	Before	2126		Before		2031
1400 Minimum	1500 Nominal	1600 Maximum	2000 Minimum	2100 Nominal	2200 Maximum	1900 Minimum	2000 Nominal	2100 Maximum

Before : 9JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Waterie Calibration
MCFL Quality Receivers Calibration

Phase	SS Crystal Resolution %	Value	Phase	SS Crystal Resolution %	Value	Phase	LS Crystal Resolution %	Value
Before		12.66	Before	10.55		Before		10.91
11.50 Minimum	12.00 Nominal	13.00 Maximum	9.500 Minimum	10.00 Nominal	10.50 Maximum	10.50 Minimum	11.00 Nominal	11.50 Maximum

Before : 9JAN-2000 12:50

High resolution Integrated Logging Tool-DTS Waterie Calibration
MCFL Calibration

Phase	Res SS Resistivity OHMM	Value	Phase	Res SS Resistivity OHMM	Value	Phase	Res SS Resistivity OHMM	Value

Before			3845	Before			3818	Before			3812
3565 (Minimum)	3875 (Nominal)	4185 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)	

Before: 9-JAN-2000 12:55

High resolution Integrated Logging Tool-DTS Wellsite Calibration

HILT Caliper Calibration

Phase	HILT Caliper Zero Measurement MM			Value	Phase	HILT Caliper Plus Measurement MM			Value
Before				221.5	Before				324.1
152.4 (Minimum)	203.2 (Nominal)	254.0 (Maximum)			228.6 (Minimum)	304.8 (Nominal)	381.0 (Maximum)		

Before: 9-JAN-2000 12:48

High resolution Integrated Logging Tool-DTS Wellsite Calibration

Detector Calibration

Phase	Gamma Ray Background GAPI			Value	Phase	Gamma Ray (Jig - Bkg) GAPI			Value	Phase	Gamma Ray (Calibrated) GAPI			Value
Before				55.53	Before				178.9	Before				165.0
0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)			162.6 (Minimum)	178.9 (Nominal)	195.2 (Maximum)			150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)		

Before: 9-JAN-2000 12:48

High resolution Integrated Logging Tool-DTS Wellsite Calibration

Zero Measurement

Phase	CNTC Background CPS			Value	Phase	CFTC Background CPS			Value
Master				25.80	Master				29.07
Before				27.26	Before				30.28
5.000 (Minimum)	25.80 (Nominal)	40.00 (Maximum)			5.000 (Minimum)	29.07 (Nominal)	40.00 (Maximum)		

Master: 29-OCT-1999 12:43 Before: 9-JAN-2000 12:45

High resolution Integrated Logging Tool-DTS Wellsite Calibration

Accelerometer Calibration

Phase	Z-Axis Acceleration M/S2			Value
Before				9.818
9.610 (Minimum)	9.810 (Nominal)	10.01 (Maximum)		

Before: 10-JAN-2000 8:57

High resolution Integrated Logging Tool-DTS Master Calibration

Inversion results

Phase	Rho Aluminum K/M3			Value	Phase	Rho Magnesium K/M3			Value
Master				2598	Master				1686
2586 (Minimum)	2596 (Nominal)	2606 (Maximum)			1676 (Minimum)	1686 (Nominal)	1696 (Maximum)		
Phase	Pe Aluminum			Value	Phase	Pe Magnesium			Value
Master				2.577	Master				2.627
2.470 (Minimum)	2.570 (Nominal)	2.670 (Maximum)			2.550 (Minimum)	2.650 (Nominal)	2.750 (Maximum)		

Master: 5-JAN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration

Deviation Summary

Phase	BS Average Deviation %			Value	Phase	SS Average Deviation %			Value	Phase	LS Average Deviation %			Value
Master				0.2215	Master				0.3942	Master				0.6689
-0.6000 (Minimum)	0 (Nominal)	0.6000 (Maximum)			-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)			-1.500 (Minimum)	0 (Nominal)	1.500 (Maximum)		
Phase	BS Max Deviation %			Value	Phase	SS Max Deviation %			Value	Phase	LS Max Deviation %			Value
Master				0.8435	Master				1.335	Master				1.562
-1.600 (Minimum)	0 (Nominal)	1.600 (Maximum)			-2.500 (Minimum)	0 (Nominal)	2.500 (Maximum)			-3.500 (Minimum)	0 (Nominal)	3.500 (Maximum)		

Master: 5-JAN-2000 14:14

High resolution Integrated Logging Tool-DTS Master Calibration

Tank Measurement

Phase	Thermal Near Corr. (Tank) CPS			Value	Phase	Thermal Far Corr. (Tank) CPS			Value	Phase	CNTC/CFTC (Tank)			Value
Master				5466	Master				2412	Master				2.266
5000 (Minimum)	6031 (Nominal)	7200 (Maximum)			2075 (Minimum)	2793 (Nominal)	3125 (Maximum)			2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)		

Master: 29-OCT-1999 12:43

COMPANY:	SUNCOR ENERGY INC.
WELL:	SUNCOR NETLA P-16
FIELD:	NETLA
PROVINCE:	NORTHWEST TERRITORIES

BOTTOM LOG INTERVAL	2078.2 m
SCHLUMBERGER DEPTH	2098.8 m
DEPTH DRILLER	2099 m
KELLY BUSHING	607 m
DRILL FLOOR	606.7 m
GROUND LEVEL	602.3 m

Schlumberger

PLATFORM EXPRESS
MICROLOG

1824 N.E.B. COPY

COMPANY: SUNCOR ENERGY INC.

WELL: SUNCOR NETLA P-16

FIELD: NETLA

PROVINCE: NORTHWEST TERRITORIES

Schlumberger **MICROLOG**

P-16-60-50-122-45 (LSD) — Elev.: K.B. 607 m
300P160050122450 (UWID) — G.L. 602.3 m
D.F. 606.7 m

LOCATION

Permanent Datum: GROUND LEVEL — Elev.: 602.3 m
Log Measured From: KELLY BUSHING 4.7 m above Perm. Datum
Drilling Measured From: KELLY BUSHING

API Serial No.	SECTION	TOWNSHIP	RANGE
1824			

	Run 1	Run 2	Run 3	Run 4
Logging Date	10-JAN-2000			
Run Number	ONE			
Depth Driller	2099 m			
Schlumberger Depth	2098.8 m			
Bottom Log Interval	2073.1 m			
Top Log Interval	1850 m			
Casing Driller Size @ Depth	244.000 mm @ 542 m		@	@
Casing Schlumberger	542 m			
Bit Size	222.000 mm			
Type Fluid In Hole	POTASSIUM SULPHATE			
MUD Density / Viscosity	1220 kg/m3 65 s			
Fluid Loss / PH	11.5 cm3 11			
Source Of Sample	FLOWLINE			
RM @ Measured Temperature	0.510 ohm.m @ 14 degC		@	@
RMF @ Measured Temperature	0.310 ohm.m @ 15 degC		@	@
RMC @ Measured Temperature	0.360 ohm.m @ 16 degC		@	@
Source RMF / RMC	MEASURED / MEASURED			
RM @ MRT / RMF @ MRT	0.160 @ 74 / 0.119 @ 74	@ @	@ @	@ @
Maximum Recorded Temperatures	74 degC			
Circulation Stopped / Time	10-JAN-2000 1:45			
Logger On Bottom / Time	10-JAN-2000 10:15			
Unit Number / Location	2034 / GRANDE PRAIRIE			
Recorded By	ROBERT HARRIES			
Witnessed By	CRAIG OGAGAKI			

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT, AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATIONS, AND WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS AS SET OUT IN OUR CURRENT PRICE SCHEDULE.

OTHER SERVICES
OS1
OS2
OS3
OS4

REMARKS: RUN NUMBER 1
PASS 1 DOWN LOGGED FROM 2099 M TO 1850 M
PASS 2 UP LOGGED FROM 1850 M TO SURFACE
PASS 3 REPEAT PASS FROM 1850 M TO 1800 M
PASS 4 REPEAT PASS FROM 1850 M TO 1800 M
PASS 5 REPEAT PASS FROM 1850 M TO 1800 M
PASS 6 REPEAT PASS FROM 1850 M TO 1800 M
PASS 7 REPEAT PASS FROM 1850 M TO 1800 M
PASS 8 REPEAT PASS FROM 1850 M TO 1800 M
PASS 9 REPEAT PASS FROM 1850 M TO 1800 M
PASS 10 REPEAT PASS FROM 1850 M TO 1800 M
PASS 11 REPEAT PASS FROM 1850 M TO 1800 M
PASS 12 REPEAT PASS FROM 1850 M TO 1800 M
PASS 13 REPEAT PASS FROM 1850 M TO 1800 M
PASS 14 REPEAT PASS FROM 1850 M TO 1800 M
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PASS 57 REPEAT PASS FROM 1850 M TO 1800 M
PASS 58 REPEAT PASS FROM 1850 M TO 1800 M
PASS 59 REPEAT PASS FROM 1850 M TO 1800 M
PASS 60 REPEAT PASS FROM 1850 M TO 1800 M
PASS 61 REPEAT PASS FROM 1850 M TO 1800 M
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PASS 69 REPEAT PASS FROM 1850 M TO 1800 M
PASS 70 REPEAT PASS FROM 1850 M TO 1800 M
PASS 71 REPEAT PASS FROM 1850 M TO 1800 M
PASS 72 REPEAT PASS FROM 1850 M TO 1800 M
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PASS 85 REPEAT PASS FROM 1850 M TO 1800 M
PASS 86 REPEAT PASS FROM 1850 M TO 1800 M
PASS 87 REPEAT PASS FROM 1850 M TO 1800 M
PASS 88 REPEAT PASS FROM 1850 M TO 1800 M
PASS 89 REPEAT PASS FROM 1850 M TO 1800 M
PASS 90 REPEAT PASS FROM 1850 M TO 1800 M
PASS 91 REPEAT PASS FROM 1850 M TO 1800 M
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PASS 93 REPEAT PASS FROM 1850 M TO 1800 M
PASS 94 REPEAT PASS FROM 1850 M TO 1800 M
PASS 95 REPEAT PASS FROM 1850 M TO 1800 M
PASS 96 REPEAT PASS FROM 1850 M TO 1800 M
PASS 97 REPEAT PASS FROM 1850 M TO 1800 M
PASS 98 REPEAT PASS FROM 1850 M TO 1800 M
PASS 99 REPEAT PASS FROM 1850 M TO 1800 M
PASS 100 REPEAT PASS FROM 1850 M TO 1800 M

EQUIPMENT DESCRIPTION

	RUN 1	RUN 2
SURFACE EQUIPMENT		
DOWNHOLE EQUIPMENT		
SERVICE ORDER	8472033	
FIELD STATION	KLUANE	
LOGGING INTERVAL	START / STOP	START / STOP

RUN 1 RUN 2

GRT-A-TA
GRT-A-TB

GRT-A-TC
TOOL ZERO
MAXIMUM STRING DIAMETER 114 MM
MEASUREMENTS RELATIVE TO TOOL ZERO
ALL LENGTHS IN METERS

LEH-QT			29.72
LEH-QT 1.594			
DTCH	DTEM Tension		29.55
DTCH-C 1395	Tool(lbs)		28.83
DPC-A			27.91
DPC-E 6500			
DPC-B 6500	MWD MODEL		26.70
MLT-AA			25.65
MLT-AA-99	MLT-A Start		24.38
AH-107			24.38
AH-107			23.77
AH-SFT 270			23.16
GPIT-A/B			21.95
GPIT-A 1777			
AH-SFT 207			20.73
UCD-C			18.14
WDG-D 63	HO		12.21
SGT-N	Gamma Ray		16.94 17.22
SGC-SA 2399			
SGC-SA 2397			15.54
SGC-TA 1			
SGC-B 33			
SGC-B 33			
SNDE-A 33			

Output DLIS Files

DEFAULT	DSBTB.001	FILE PRODUCER	10-JAN-2000 19:28
CUST	DSBTB.001	FILE CUSTOMER	10-JAN-2000 19:28

OP System Version: 9C1-303

	9C1-303	SDT-A	9C1-303
DSBTB	9C1-303	SDT-B	9C1-303
GRT-A	9C1-303	DPIT-A	9C1-303
MLT-AA	9C1-303	DPIT-B	
DTCH	9C1-303		

PP SUMMARY

Integrated Hole Volume Minor Pip Every 0.1 MD
Integrated Hole Volume Major Pip Every 0.1 MD
Integrated Cement Volume Minor Pip Every 0.1 MD
Integrated Cement Volume Major Pip Every 1 MD

MAIN PASS

Time Mark Every 60 S — Tension (TENS) (LBF) 2000 to 3000 — Tool Flex Dwg to ST90 — Positive Separation From SMIN to SMAX

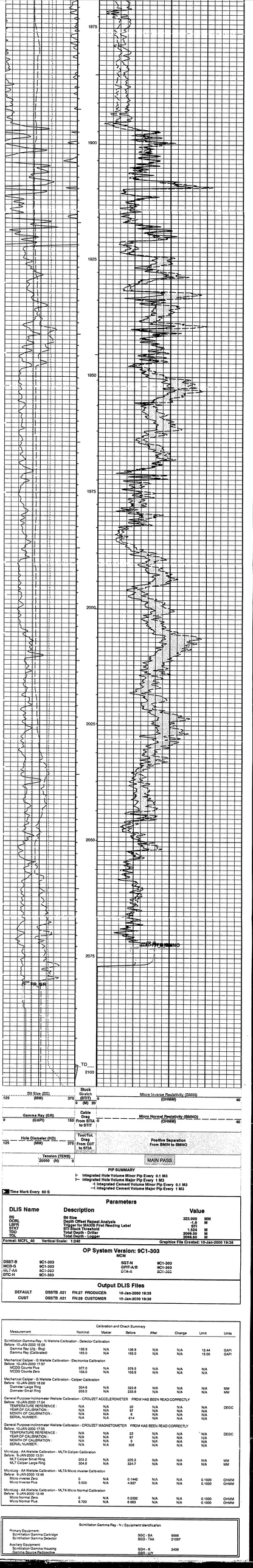
Hole Diameter (HDI) (MM) 125 — Gamma Ray (GR) (GAPI) 0 — Caliper From SMIN to ST90 150 — Micro Inverse Resistivity (SMIN) (OHMM) 0.2 — 40 — Micro Normal Resistivity (SMAX) (OHMM) 0.2 — 40

Res Shal (RS) (OHMM) 0.2 — 40 — Res Med (RM) (OHMM) 0.2 — 40 — Res Deep (RD) (OHMM) 0.2 — 40

Bit Size (MM) 125 — Bad Hole Flag 0 1 — Caliper From SMIN to ST90 375 — Caliper From SMIN to SMAX 375 — Caliper From SMIN to SMAX 375

1850

LAST READING



Parameters

DLIS Name	Description	Value	
BS	Bit Size	222.000	MM
DORL	Depth Offset Repeat Analysis	0.0	M
LBFR	Trigger for MAXIS First Reading Label	STI	
STKT	STI Stuck Threshold	1.524	M
TDD	Total Depth - Driller	2096.00	M
TDL	Total Depth - Logger	2098.80	M

Format: MCFL_40 Vertical Scale: 1:240 Graphics File Created: 10-Jan-2000 19:38

OP System Version: 9C1-303

MCM

DSST-B	9C1-303	SGT-N	9C1-303
MCD-G	9C1-303	GPIT-A/B	9C1-303
MLT-AA	9C1-303	DTA-A	9C1-303
DTC-H	9C1-303		

Output DLIS Files

DEFAULT	DSSTB .021	FN:27	PRODUCER	10-Jan-2000 19:38
CUST	DSSTB .021	FN:28	CUSTOMER	10-Jan-2030 19:38

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
Scintillation Gamma-Ray - N Wellsite Calibration - Detector Calibration							
Before: 10-JAN-2000 16:09							
Gamma Ray (Up - Bkg)	136.8	N/A	136.8	N/A	N/A	12.44	GAPI
Gamma Ray (Calibrated)	165.0	N/A	165.0	N/A	N/A	15.00	GAPI
Mechanical Caliper - G Wellsite Calibration - Electronics Calibration							
Before: 10-JAN-2000 17:57							
MCDG Counts Rise	377.0	N/A	378.5	N/A	N/A	N/A	
MCDG Counts Zero	103.0	N/A	103.8	N/A	N/A	N/A	
Mechanical Caliper - G Wellsite Calibration - Caliper Calibration							
Before: 10-JAN-2000 18:08							
Diameter Large Ring	304.8	N/A	303.8	N/A	N/A	N/A	MM
Diameter Small Ring	203.2	N/A	233.8	N/A	N/A	N/A	MM
General Purpose Inclinometer Wellsite Calibration - CROUZET ACCELEROMETER FROM HAS BEEN READ CORRECTLY							
Before: 9-JAN-2000 13:51							
TEMPERATURE REFERENCE :	N/A	N/A	20	N/A	N/A		DEGC
YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A		
MONTH OF CALIBRATION :	N/A	N/A	6	N/A	N/A		
SERIAL NUMBER :	N/A	N/A	614	N/A	N/A		
General Purpose Inclinometer Wellsite Calibration - CROUZET MAGNETOMETER FROM HAS BEEN READ CORRECTLY							
Before: 10-JAN-2000 17:55							
TEMPERATURE REFERENCE :	N/A	N/A	23	N/A	N/A		DEGC
YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A		
MONTH OF CALIBRATION :	N/A	N/A	5	N/A	N/A		
SERIAL NUMBER :	N/A	N/A	305	N/A	N/A		
Microlog - AA Wellsite Calibration - MLTA Caliper Calibration							
Before: 9-JAN-2000 13:51							
MLT Caliper Small Ring	203.2	N/A	225.3	N/A	N/A	N/A	MM
MLT Caliper Large Ring	304.8	N/A	324.7	N/A	N/A	N/A	MM
Microlog - AA Wellsite Calibration - MLTA Micro-inverse Calibration							
Before: 9-JAN-2000 13:49							
Micro-inverse Zero	0	N/A	0.1442	N/A	N/A	0.1000	OHMM
Micro-inverse Plus	5.000	N/A	4.937	N/A	N/A	0.1000	OHMM
Microlog - AA Wellsite Calibration - MLTA Micro Normal Calibration							
Before: 9-JAN-2000 13:49							
Micro Normal Zero	0	N/A	0.2332	N/A	N/A	0.1000	OHMM
Micro Normal Plus	6.720	N/A	6.663	N/A	N/A	0.1000	OHMM

Scintillation Gamma-Ray - N / Equipment Identification

Primary Equipment:		
Scintillation Gamma Cartridge	SGC - SA	9588
Scintillation Gamma Detector	SGD - TG	21097
Auxiliary Equipment:		
Scintillation Gamma Housing	SGH - K	2439
Gamma Source Radioactive	GSR - UY	

Scintillation Gamma-Ray - N Wellsite Calibration											
Detector Calibration											
Phase	Gamma Ray Background GAPI			Value	Phase	Gamma Ray (Jig - Bkg) GAPI			Value	Phase	Gamma Ray (Calibrated) GAPI			Value
Before				42.15	Before				136.8	Before				165.0
0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)			124.4 (Minimum)	136.8 (Nominal)	149.3 (Maximum)			150.0 (Minimum)	165.0 (Nominal)	180.0 (Maximum)		
Before 10-JAN-2000 18:09														

Mechanical Caliper - G / Equipment Identification

Primary Equipment:
Mechanical Caliper Device - G — MCD - G — 63

Auxiliary Equipment:

Mechanical Caliper - G Wellsite Calibration									
Electronics Calibration									
Phase	MCDG Counts Plus			Value	Phase	MCDG Counts Zero			Value
Before				378.5	Before				103.8
320.5 (Minimum)	377.0 (Nominal)	433.5 (Maximum)			87.55 (Minimum)	103.0 (Nominal)	118.4 (Maximum)		
Before: 10-JAN-2000 17:57									

Mechanical Caliper - G Wellsite Calibration									
Caliper Calibration									
Phase	Diameter Large Ring MM			Value	Phase	Diameter Small Ring MM			Value
Before				323.8	Before		EXCEEDS LIMIT		233.8
259.1 (Minimum)	304.8 (Nominal)	350.5 (Maximum)			172.7 (Minimum)	203.2 (Nominal)	233.7 (Maximum)		
Before: 10-JAN-2000 18:06									

General Purpose Inclinometer / Equipment Identification

Primary Equipment:
GPIT Cartridge - AC — GPIC - AC

Auxiliary Equipment:
GPIT Housing — GPIH - A — 1777

MicroLog - AA / Equipment Identification

Primary Equipment:
MicroLog - AA (sonde) — MLT - AA — 109

Auxiliary Equipment:

MicroLog - AA Wellsite Calibration									
MLTA Micro Inverse Calibration									
Phase	Micro Inverse Zero OHMM			Value	Phase	Micro Inverse Plus OHMM			Value
Before				0.1442	Before				4.937
-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)			3.000 (Minimum)	5.000 (Nominal)	7.000 (Maximum)		
Before: 9-JAN-2000 13:49									

MicroLog - AA Wellsite Calibration									
MLTA Micro Normal Calibration									
Phase	Micro Normal Zero OHMM			Value	Phase	Micro Normal Plus OHMM			Value
Before				0.2332	Before				6.663
-1.000 (Minimum)	0 (Nominal)	1.000 (Maximum)			4.720 (Minimum)	6.720 (Nominal)	8.720 (Maximum)		
Before: 9-JAN-2000 13:49									

COMPANY:	SUNCOR ENERGY INC.	BOTTOM LOG INTERVAL	2073.1 m
		SCHLUMBERGER DEPTH	2098.8 m
WELL:	SUNCOR NETLA P-16	DEPTH DRILLER	2099 m
FIELD:	NETLA	KELLY BUSHING	607 m
PROVINCE:	NORTHWEST TERRITORIES	DRILL FLOOR	606.7 m
		GROUND LEVEL	602.3 m

MICROLOG

Schlumberger