IOE ET AL ARROWHEAD

L-49-60-30-122-30

ICE ET AL ARROWHEAD L-49-60-30-122-30

D.A. 403 - Daily Tour Reports

Form 34402 (200 blks-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 10

WELL NAME Ice ET AL ARROWHEAD L Lsd. 49 Sec. 20 Twn. 30 Rge. 12.2 W. 3.6 Contractor S.T. DRLG. WESTERN Month Feb Day 5 1970

	1st Tour From: 12:00 Midnight To: 8:00 a.m.	2nd Tour From: 8:00 a.m. To: 4:00 p.m.	3rd Tour From: 4:00 p.m. To: 12:00 p.m.
DEPTH	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation
DRILLING STRING	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS
BIT RECORD	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T____ B____ G____	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T____ B____ G____	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T____ B____ G____
SURVEYS	Depth / Deviation	Depth / Deviation	Depth / Deviation
SLUSH PUMP RECORD No. 1 No. 2	HOURS On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size	HOURS On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size	HOURS On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size
MUD RECORD	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS Rig released @ 5 PM. FEB 5/70 CRR	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS CEMENT TOP OF CASING W/ 5 SKS CEMENT RAT HOLE W/ 4 SKS CEMENT MOUSE HOLE W/ 3 SKS. CUT CASING 3' BELOW GROUND LEVEL CRR	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS
CORING	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery
DETAIL OF OPERATIONS AND REMARKS	From / To / Hrs. Rig SERV 12:00 12:15 1/4 W. O. C. 12:15 5:00 4 3/4 TEAR OUT TO MOVE 5:00 8:00 3	From / To / Hrs. TEAR OUT RIG MOVE CAMP 8:00 8:00 12	From / To / Hrs.
	Driller Don Doyle	Driller D A Webber	Driller

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: / DRILLING: / REAMING: / TOTCO: / FISHING: / CIRCULATING: / CONDITIONING MUD: / TRIPPING: / CORING: / CASING: / W.O.C. / D.S. TESTING: / LOGGING: / W. O. ORDERS: / RIG REPAIRS: / RIG MAINTENANCE: / MISCELLANEOUS: / CONDITION HOLE: / REAMING CLEANING: / WORKING PIPE: / LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES____ NO____

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher [illegible] Approved by .....

Form 34402 (200 blks.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 9

WELL NAME Joe et al Arrowhead 1 – Lsd. 4 Sec. 10 Twn. 30 Rge. 12 W. 3 Meridian Contractor S.T. Drlg. Western Month Feb. Day 4 1970

	1st Tour From: 12:00 Midnight To: 8:00 a.m.	2nd Tour From 8:00 a.m. To: 4:00 p.m.	3rd Tour From: 4:00 p.m. To: 12:00 p.m.
DEPTH	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation
DRILLING STRING	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. 4½ / 177207 / / 33.45 / 306.48 / 540 4.00	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft.	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft.
	DRILL COLLAR DATA: Number 10 / OD 6¼ / ID 2¼ / Length 306.48 / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS
BIT RECORD	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed
	Bit Serial No. / Jet ☐ / Conventional ☐ Nozzle Size / Bit Wear: T. B. G.	Bit Serial No. / Jet ☐ / Conventional ☐ Nozzle Size / Bit Wear: T. B. G.	Bit Serial No. / Jet ☐ / Conventional ☐ Nozzle Size / Bit Wear: T. B. G.
SURVEYS	Depth / Deviation	Depth / Deviation	Depth / Deviation
SLUSH PUMP RECORD No. 1 No. 2	HOURS: On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size	HOURS: On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size	HOURS: On Line / Circulating / Pump Press / Length of Pump Stroke / Strokes Per Min. / Liner Size
MUD RECORD	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS RAN IES, BHC-SGR, F.D.L., & SNP Logs: Adams David Ft. - Ioe Wellsite Service	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS RAN Plug #1 - 2120 - 1790 - w/150 SKs Plug down @ 6.05 P.M. RAN Plug #2 - 525 - 425 - w/60 SKs + 2% CaCl. Plug down @ 7.10 P.M. Top @ 405
CORING	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery
DETAIL OF OPERATIONS AND REMARKS	From / To / Hrs. Rig Serv. 12:00 12:15 ¼ Pick up Test Tools & 12:15 3:00 2¾ make up same Run in w/ D.S.T. #2 3:00 5:00 2 Head up To Test 5:00 5:30 ½ Testing 5:30 8:00 2½	From / To / Hrs. Testing 8:00 9:15 1¼ Rig serv & B.O.P. 9:15 9:45 ½ Hoist D.S.T. 9:45 11:45 2 Break down serv & load 11:45 out Test Tool 2:00 2¼ Wait on orders 2:00 3:00 1 Run in w/ open end drill pipe 3:00 3:30 ½ Measure & Pick up singles 3:30 To Beach Bottom 4:00 ½	From / To / Hrs. Rig Serv 4:00 4:15 ¼ Finish Pick up Sols & Break Circ 4:15 5:00 ¾ Circ 5:00 5:15 ¼ R.U. T. & Run Plug No 1 5:15 6:00 ¾ Roll out & Run back in w/ 6:00 5 Stands & 2 Sols 7:00 1 Run Plug No 2 7:00 7:15 ¼ W O C 7:15 12:00 4¾ Lay down Drill Collars & Drill Pipe.
	Driller: Don Doyle	Driller: D. A. Webber	Driller: D. A. Webber D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: TOTCO: CONDITIONING MUD: CASING: LOGGING: RIG MAINTENANCE: REAMING CLEANING:
DRILLING: FISHING: TRIPPING: W.O.C. W.O. ORDERS: MISCELLANEOUS: WORKING PIPE:
REAMING: CIRCULATING: CORING: D.S. TESTING: RIG REPAIRS: CONDITION HOLE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ✓ NO

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher Geo. C. Winkler Approved by .....

Form 24402 (200 blks-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 8

WELL NAME Joe ET AL Arrowhead L.- Lsd. 49 Sec. 60 Twn. 90 Rge. 122 W. 2nd Contractor Int. Drlg/Western Month Feb. Day 3 19 70

1st Tour From: 12:00 Midnight To: 8:00 a.m.

DEPTH

From	To	Hole Made	Bit Size	Formation
	F. T. D. 2120			

DRILLING STRING

Size D.P.	Stands	Singles	Kelly	Drill Collar Ft.	Core Bbl. Ft.

	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL
	COLLAR					DRILLING STRING DRILL COLLARS
	DATA					

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed

Bit Serial No. Jet ☐ Conventional ☐

Nozzle Size Bit Wear: T. B. G.

SURVEYS

Depth	Deviation

SLUSH PUMP RECORD

No. 1 / No. 2	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS

CORING

Core No.	Depth In	Footage	Hours Run	Depth Cut	Recovery

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
Logging w/ SCHLUMBERGER	12:00	8:00	8

Driller Don Doyle

2nd Tour From: 8:00 a.m. To: 4:00 p.m.

DEPTH

From	To	Hole Made	Bit Size	Formation

DRILLING STRING

Size D.P.	Stands	Singles	Kelly	Drill Collar Ft.	Core Bbl. Ft.
4½	177.07		33.45	306.48	SUB 4.00

	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL
	COLLAR	10	6¼	2⅞	301.48	DRILLING STRING DRILL COLLARS
	DATA					

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
2 RR	XV		CIRC					

Bit Serial No. Jet ☑ Conventional ☐

Nozzle Size OPEN Bit Wear: T. B. G.

SURVEYS

Depth	Deviation

SLUSH PUMP RECORD

No. 1 / No. 2	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS

CORING

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
LOGGING w/ SCHLUMBERGER	8:00	11:45	3¾
RIG SERV & BOP TKELLY COCK	11:45	12:15	½
RUN IN w/ DRILL COLLARS	12:15	12:45	½
RIG TO T LAY DOWN 10 COLLARS	12:45	1:45	1
RUN IN DRILL PIPE	1:45	2:15	½
PICK UP 10 SINGLES	2:15	2:45	½
CIRC WAIT ON ORDERS	2:45	4:00	1¼

Driller D. A. Webber

3rd Tour From: 4:00 p.m. To: 12:00 p.m.

DEPTH

From	To	Hole Made	Bit Size	Formation

DRILLING STRING

Size D.P.	Stands	Singles	Kelly	Drill Collar Ft.	Core Bbl. Ft.
4½	177.07		33.45	306.48	SUB 4.00

	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL
	COLLAR	10	6¼	2⅞	306.48	DRILLING STRING DRILL COLLARS
	DATA					

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
2 RR	XV	CIRC.						

Bit Serial No. Jet ☑ Conventional ☐

Nozzle Size OPEN Bit Wear: T. B. G.

SURVEYS

Depth	Deviation

SLUSH PUMP RECORD

No. 1 / No. 2	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS

CORING

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
RIG SERV	4:00	4:15	¼
CIRC WAIT ON ORDERS	4:15	8:30	4¼
PULL OUT 18 STDS TO CSG.	8:30	9:15	¾
CIRC. WAIT ON ORDERS	9:15	11:15	2
FINISH OUT w/ BIT #2 RR	11:15	12:00	¾

Driller D. A. Webber D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: DRILLING: REAMING: TOTCO: FISHING: CIRCULATING: CONDITIONING MUD: TRIPPING: CORING: CASING: W.O.C. D.S. TESTING: LOGGING: W. O. ORDERS: RIG REPAIRS: RIG MAINTENANCE: MISCELLANEOUS: CONDITION HOLE: REAMING CLEANING: WORKING PIPE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ✓ NO

Total Contract Time ..... hrs. Total Company Time ..... hrs. Toolpusher [redacted] Approved by .....

Form 34402 (200 blks.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 7

WELL NAME Ioe ET AL ARKINHEAD L. Lsd. 49 Sec. 20 Twn. 30 Rge. 22 W 2O Contractor S+T DRLG. (WEST) Month. FEB Day 2 19 70

DEPTH

1st Tour From: 12:00 Midnight To: 8:00 a.m.				
From	To	Hole Made	Bit Size	Formation
1935	2028	93'	7 7/8	

2nd Tour From: 8:00 a.m. To: 4:00 p.m.				
From	To	Hole Made	Bit Size	Formation
2028	2066	32	7 7/8	

3rd Tour From: 4:00 p.m. To: 12:00 p.m.				
From	To	Hole Made	Bit Size	Formation
2066	2120	54'	7 7/8	

DRILLING STRING

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4½	1309.48	61.47	41.50	613.40	540. 4:00

DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING	DRILL COLLARS
DATA	20	6¼	2¼	613.40	84 M	58. M

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4½	1401.48	34.35	15.77	613.40	540 4.00

DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING	DRILL COLLARS
DATA	20	6¼	2¼	613.40	84 M	58 M

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4½	1401.48	62.47	39.50	613.40	540 4.00

DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING	DRILL COLLARS
DATA	20	6¼	2¼	613.40	84 M	58 M

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
3	XDV	9¼	136	35-40	60		136	

Bit Serial No. 17620 Jet ☑ Conventional ☐
Nozzle Size 3-11 Bit Wear: T.____ B.____ G.____

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
3	XDV	12¼	159	30-40	60	2051	159	
4	ODVJ	[illegible]	85	40	60			

Bit Serial No. 17620 – 18947 Jet ☑ Conventional ☐
Nozzle Size 3-11 Bit Wear: T.____ B.____ G.____

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
4	ODVJ	5	69	40	60	2120		

Bit Serial No. 18947 Jet ☑ Conventional ☐
Nozzle Size 3-11 Bit Wear: T.____ B.____ G.____

SURVEYS

Depth Deviation

Depth 2120 Deviation 3/4°

SLUSH PUMP RECORD No. 1 No. 2

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
		975	15"	60	5"

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
		1000			

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
		1000	15"	60	5"

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
1:00	58	9.4	5.8	10.0	GEL - 1100 *
3:00	64	9.5	5.9	10.5	PolyTex - 100 *
6:30	72	9.5	5.6	11.0	CAUSTIC - 100 *

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
8:30	44	9.3	6.0	10.5	GEL 700
4:30	90	9.4		10.5	CMC (REG) 50
3:30	74	9.4		10.5	

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS

CORING

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
Rig SERV.	12:00	12:15	¼
DRLg.	12:15	1:15	1
CHANGE SHAKER SCREEN	1:15	1:30	½
DRLg.	1:30	3:00	6½

	From	To	Hrs.
DRLG	8:00	11:00	3
HOIST FOR BIT	11:00	12:45	1¼
LAY DOWN CORE BBL	12:15	12:45	½
RIG SERV + BOP + KELLY COCK	12:45	1:15	½
RUN IN W/ BIT NO 4	1:15	2:30	1¼
DRLG	2:30	4:00	1½

	From	To	Hrs.
RIG SERV	4:00	4:15	¼
DRLG	4:15	7:45	3½
CIRC	7:45	8:45	1
DROP SURVEY	8:45	9:00	¼
HOIST BIT #4 TO LOG	9:00	10:15	1¼
RIG TO + LOG W/ SCHLUMBERGER	10:15	12:00	1¾

STRAP OUT -38 DIFF.

Driller Don Doyle

Driller D. A. Tasker

Driller D. A. Tasker D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: TOTCO: CONDITIONING MUD: CASING: LOGGING: RIG MAINTENANCE: REAMING CLEANING:
DRILLING: FISHING: TRIPPING: W.O.C. W.O. ORDERS: MISCELLANEOUS: WORKING PIPE:
REAMING: CIRCULATING: COR.NG: D.S. TESTING: RIG REPAIRS: CONDITION HOLE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ☑ NO ☐

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher Geo E Strathern Approved by .....

Form 34402 (200 blks-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 6

WELL NAME JOE ET AL ARROWHEAD - L Lsd. 49 Sec. 60 Twn. 30 Rge 12 W. 2 Contractor S.T. Drlg. WESTERN Month FEB Day 1 19 70

1st Tour From: 12:00 Midnight To: 8:00 a.m.

DEPTH

From	To	Hole Made	Bit Size	Formation
1877	1892	15	7 7/8	

DRILLING STRING

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4 1/2	1122.96	60.03	25.00	613.40	62.40 SUB 4.00

DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL	
COLLAR	20	6 1/4	2 7/8	612.40	DRILLING STRING	DRILL COLLARS
DATA					84 M	58

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
1C	D	13 3/4	26	14	100	1892		

Bit Serial No. EC 9908 Jet ☐ Conventional ☐

Nozzle Size Bit Wear: T B G

SURVEYS

Depth	Deviation

SLUSH PUMP RECORD No. 1 No. 2

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
		1150	15"	58	5"

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
13:00	80	9.4	5.8	10.0	C.E.L. - 1000 #
2:00	74	9.4	5.6	10.5	Caustic - 50 #
6:00	68	9.4	5.2	10.5	

CORING

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery
2 RN.	1874	18	8 1/2	1892.	

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
CUT CORE #2	12:00	7:15	7 1/4
HOIST CORE #2	7:15	8:00	3/4

Driller Don Dagle

2nd Tour From: 8:00 a.m. To: 4:00 p.m.

From	To	Hole Made	Bit Size	Formation
1892				

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4 1/2	1122.96			629.92	TEST TOOL 5.10

DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL	
COLLAR	14	6 1/4	2 7/8	429.92	DRILLING STRING	DRILL COLLARS
DATA						

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed

Bit Serial No. Jet ☐ Conventional ☐

Nozzle Size Bit Wear: T B G

Depth	Deviation

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

	From	To	Hrs.
FINISH HOIST CORE	8:00	8:30	1/2
RECOVER CORE & HOL SAME	8:30	9:00	1/2
SERV & STAND CORE BBL IN DERRICK	9:00	9:30	1/2
RIG SERV	9:30	9:45	1/4
& BOP KELLY COCK & MOTOR SHUT GEES	9:45	10:00	1/4
MAKE UP TEST TOOL	10:00	10:45	3/4
RUN IN W/ DST PICK UP 7 SGLS	10:45	12:15	1 1/2
HEAD UP TO TEST & TESTING	12:15	4:00	3 3/4

Driller D.A. Wilkes

3rd Tour From: 4:00 p.m. To: 12:00 p.m.

From	To	Hole Made	Bit Size	Formation
1892	1935	43	7 7/8	

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4 1/2	1215.04	62.02	41.50	613.40	

DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL	
COLLAR	20	6 1/4	2 7/8	612.40	DRILLING STRING	DRILL COLLARS
DATA					92 M	58 M

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
3	XDV	1 7/8						

Bit Serial No. 17120 Jet ☑ Conventional ☐

Nozzle Size 3-11 Bit Wear: T B G

Depth	Deviation

HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
		950	15"	60	5"

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
11:30	60	9.4	5.5	10.0	

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

	From	To	Hrs.
HOIST DST	4:00	5:15	1 1/4
RIG SERV	5:15	5:30	1/4
BREAK DOWN TEST TOOL SERV & LOAD OUT SAME	5:30	7:15	1 3/4
RUN IN W/ BIT #3	7:15	8:45	1 1/2
PICK UP KELLY STEAM OUT &	8:45		
PUT ON KELLY HOSE		9:30	3/4
REAM 27' RAT HOLE TO BOTTOM	9:30	10:15	3/4
DRLG.	10:15	12:00	1 3/4

Driller D.A. Wilkes D. Dagle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: DRILLING: REAMING: TOTCO: FISHING: CIRCULATING: CONDITIONING MUD: TRIPPING: CORING: CASING: W.O.C. D.S. TESTING: LOGGING: W.O. ORDERS: RIG REPAIRS: RIG MAINTENANCE: MISCELLANEOUS: CONDITION HOLE: REAMING CLEANING: WORKING PIPE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ☑ NO ☐

Total Contract Time ..... hrs. Total Company Time ..... hrs. Toolpusher Geo. Edwardson Approved by .....

Form 34602 (200 blks.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 5

WELL NAME IOE ET AL ARROWHEAD-L Lsd. 49 Sec. 60 Twn. 20 Rge. 122 W. 20 Contractor S.T. DRLG. WESTERN Month JAN. Day 31 19 70

DEPTH

1st Tour From: 12:00 Midnight To: 8:00 a.m.						2nd Tour From: 8:00 a.m. To: 4:00 p.m.						3rd Tour From: 4:00 p.m. To: 12:00 p.m.					
From	To	Hole Made	Bit Size	Formation		From	To	Hole Made	Bit Size	Formation		From	To	Hole Made	Bit Size	Formation	
1721	1868	147	7 7/8	BIT 548 4.00		1815	1871	6	7 7/8			1871	1877	6'	7 7/8		

DRILLING STRING

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4 1/2	12/1204		33.56	613.40	
4 1/2	1122 PK	30.41	33.43	613.40	66.40
4 1/2	1122 PK	30.41	40.50	613.40	66.40

	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL
1st Tour	COLLAR	20	6 1/4	2 7/8	613.40	DRILLING STRING: DRILL COLLARS
	DATA				77 M.	58 M
2nd Tour	COLLAR	20	6 1/4	2 7/8	1134.8	DRILLING STRING: DRILL COLLARS
	DATA				82	55
3rd Tour	COLLAR	20	6 1/4	2 7/8	613.40	DRILLING STRING: DRILL COLLARS
	DATA				82 M	58

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
2	XV	10 3/4	393	35	65	1868	393	
1C	◇	3 1/4	6	14M	85			
1C	◇	6 1/2	6	14	85	1874		

	1st Tour	2nd Tour	3rd Tour
Bit Serial No.	6595	EC 9908	EC 9928
Jet / Conventional	Jet ☑ Conventional ☐	Jet ☐ Conventional ☐	Jet ☐ Conventional ☐
Nozzle Size	2-10 1-11		
Bit Wear: T. B. G.	T. 3 B. 4 G. 1	T. B. G.	T. B. G.

SURVEYS

	1st Tour	2nd Tour	3rd Tour
Depth	1860		
Deviation	¼ °		

SLUSH PUMP RECORD No. 1 No. 2

	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
1st Tour			1100	15"	58	5"
2nd Tour			1150	15"	58	5"
3rd Tour			1150	15"	58	5"

MUD RECORD

	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
1st Tour	12:00	58	9.3	5.6	10.5	GEL - 2200
	2:00	56	9.3	5.7	10.5	C.M.C - 50
	4:00	52	9.2		10.5	
2nd Tour	1:30	55	9.4	5.8		GEL 500
	3:30	76	9.4	5.4		CMC (HI VIS) 50
3rd Tour	11:00	58	9.4	5.8	10.0	

CORING

	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery
2nd Tour	1	1865	6	3 1/4		
3rd Tour	2	1874	3	1 1/4		

DETAIL OF OPERATIONS AND REMARKS

1st Tour	From	To	Hrs.
Rig SERV.	12:00	12:15	1/4
DRLG.	12:15	4:30	4 1/4
CIRC.	4:30	5:30	1
SURVEY	5:30	5:45	1/4
HOIST BIT #2	5:45	8:00	2 1/4
STRAP OUT 2.60 SHORT ADJUSTMENT MADE			

Driller Don Doyle

2nd Tour	From	To	Hrs.
PICK UP & MAKE UP CORE BBL	8:00	9:15	1 1/4
SLIP & CUT DRLG LINE	9:15	9:45	1/2
RIG SERV & B.O.P & KELLY CHCK	9:45	10:15	1/2
RUN IN W/ CORE BBL	10:15	11:45	1 1/2
PICK UP KELLY & BREAK CIRC	11:45	12:00	1/4
CLEAN 5' TO BOTTOM	12:00	12:15	1/4
CIRC CORE BBL DROP BALL	12:15	12:45	1/2
CUT CORE NO 1	12:45	4:00	3 1/4

Driller L.A. Wilder

3rd Tour	From	To	Hrs.
CUT CORE NO 1	4:00	6:00	2
HOIST CORE	6:00	7:15	1 1/4
RECOVER CORE	7:15	7:30	1/4
SERV CORE BBL & BIT	7:30	8:45	1 1/2
TRIP IN FOR CORE #2	8:45	9:45	1
PICK UP KELLY BREAK CIRC.	9:45	10:00	1/4
CIRC.	10:00	10:30	1/2
DROP BALL & CIRC. TO BOTTOM	10:30	10:45	1/4
CUTTING CORE #2	10:45	12:00	1 1/4

Driller L.A. Wilder D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: TOT CO: CONDITIONING MUD: CASING: LOGGING: RIG MAINTENANCE: REAMING CLEANING:
DRILLING: FISHING: TRIPPING: W.O.C. W.O. ORDERS: MISCELLANEOUS: WORKING PIPE:
REAMING: CIRCULATING: CORING: D.S. TESTING: RIG REPAIRS: CONDITION HOLE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ✓ NO

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher [illegible] Approved by .....

Form 34402 (200 Dec.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 4

WELL NAME ICE ET AL ARROWHEAD L: Lsd. 12 Sec. 20 Twn. 55 Rge. 12W2 W. 3.0 Contractor S.T. Wells Drlg. (1967) Ltd. Month JAN Day 30 1970

	1st Tour From: 12:00 Midnight To: 8:00 a.m.													
DEPTH	From	To	Hole Made	Bit Size	Formation									
	1140	1375	235	7⅞										
DRILLING STRING	Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.								
	4½	65.90	6.12	35.58	613.40									
	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL								
	COLLAR	20	6¼	2¾	613.40	DRILLING STRING	DRILL COLLARS							
	DATA					70 M								
BIT RECORD	No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed					
	1	X16	20	895	28	65								
	Bit Serial No. 18816				Jet ☑	Conventional ☐								
	Nozzle Size 2-10 1-11				Bit Wear: T.	B.	G.							
SURVEYS	Depth 1286				Deviation ¼°									
SLUSH PUMP RECORD	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size								
No. 1			975	15"	58	5"								
No. 2														
MUD RECORD	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS								
	12:30	38	9.8		11.5	GEL - 1500 lbs								
	3:30	40	8.9		11.5	CAUSTIC - 50 lbs								
	6:00	36	9.0		11.5									
CORING	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery								
DETAIL OF OPERATIONS AND REMARKS					From	To	Hrs.							
	Rig Serv + BOP				12:00	12:30	½							
	DRLg.				12:30	5:00	4½							
	Survey @ 1286				5:00	5:15	¼							
	DRLg.				5:15	8:00	2¾							
	Driller Don Doyle													

	2nd Tour From: 8:00 a.m. To: 4:00 p.m.													
DEPTH	From	To	Hole Made	Bit Size	Formation									
	1375	1475	100'	7⅞										
DRILLING STRING	Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.								
	4½	7.63.45	12.38	41.17	613.40	SUB 4.00								
	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL								
	COLLAR	20	6¼	2¾	1846	DRILLING STRING	DRILL COLLARS							
	DATA					72	591							
BIT RECORD	No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed					
	1	X16	26	995	35a	65	1475	995						
	Bit Serial No. 18816				Jet ☑	Conventional ☐								
	Nozzle Size 2-10 1-11				Bit Wear: T. 2	B. 1	G. 1							
	Depth 1475				Deviation ¾°									
SLUSH PUMP RECORD	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size								
No. 1			1225	15"	58	5"								
No. 2														
MUD RECORD	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS								
	8:30	34	9.0	17.0	11.0	GEL 1100								
	10:00	60	9.1	6.2	10.5	CMC (REG) 300								
	1:30	60	9.1		10.5									
CORING	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery								
DETAIL OF OPERATIONS AND REMARKS					From	To	Hrs.							
	Rig Serv + BOP + Kelly cock				8:00	8:30	½							
	DRLg				8:30	10:30	2							
	Change saver sub				10:30	10:45	¼							
	DRLg				10:45	2:00	3¼							
	Drop survey				2:00	2:15	¼							
	Hoist for bit				2:15	3:30	1¼							
	Change bits + blind rams				3:30	3:45	¼							
	Run in w/ bit no 2				3:45	4:00	¼							
	Driller D.A. Webber													

	3rd Tour From: 4:00 p.m. To: 12:00 p.m.													
DEPTH	From	To	Hole Made	Bit Size	Formation									
	1475	1721	246	7⅞										
DRILLING STRING	Size-D.P.	Stands	Singles	Kelly	Drl. Collar Ft.	Core Bbl. Ft.								
	4½	1032.92	30.25	41.45	1134	SUB 4.00								
	DRILL	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL								
	COLLAR	20	6¼	2¾	1134	DRILLING STRING	DRILL COLLARS							
	DATA					74 M	58							
BIT RECORD	No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed					
	2	XV	6½	246	35	65		246						
	Bit Serial No. 6595				Jet ☑	Conventional ☐								
	Nozzle Size 2-10 1-11				Bit Wear: T.	B.	G.							
	Depth				Deviation									
SLUSH PUMP RECORD	HOURS On Line	HOURS Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size								
No. 1			1100	15"	58	5"								
No. 2														
MUD RECORD	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS								
	6:00	58	9.2	5.6	10.5	GEL - 500 lbs								
	8:30	78	9.3	5.0	10.5	Ca. M.C. - 100 lbs Reg.								
	10:30	58	9.3	5.3	10.5									
CORING	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery								
DETAIL OF OPERATIONS AND REMARKS					From	To	Hrs.							
	Rig Serv				4:00	4:15	¼							
	Finish in w/ Bit No 2				4:15	5:15	1							
	Pick up Kelly + break circ				5:15	5:30	¼							
	DRLg				5:30	12:00	6½							
	Driller D.A. Webber E. Doyle													

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT:	TOTCO:	CONDITIONING MUD:	CASING:	LOGGING:	RIG MAINTENANCE:	REAMING CLEANING:	
DRILLING:	FISHING:	TRIPPING:	W.O.C.	W.O. ORDERS:	MISCELLANEOUS:	WORKING PIPE:	
REAMING:	CIRCULATING	CORING:	D.S. TESTING:	RIG REPAIRS:	CONDITION HOLE:	LOST CIRC.:	

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES. ✓ NO.

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher Alex Edmondson Approved by .....

Form 34402 (200 bks-3-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 3

WELL NAME JOE, ET AL ARROWHEAD ... Lsd. 49 ... Sec. 6.0 ... Twn. 24 ... Rge. 13.2 ... W. 5.0 ... Contractor S.T. DRLG. (WESTERN) Month Jan. ... Day 29 ... 19 70

DEPTH

1st Tour From: 12:00 Midnight To: 8:00 a.m.					2nd Tour From: 8:00 a.m. To: 4:00 p.m.					3rd Tour From: 4:00 p.m. To: 12:00 p.m.				
From	To	Hole Made	Bit Size	Formation	From	To	Hole Made	Bit Size	Formation	From	To	Hole Made	Bit Size	Formation
			7 7/8		480	864	384	7 7/8		864	1140	276	7 7/8	

DRILLING STRING

Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
4½	19.35	3.31	25.45	613.40	5 1/8
4½	47.00	31.60	19.92	613.40	5 1/8

DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING	INDICATOR WEIGHT OF TOTAL DRILL COLLARS
	20	6½	2 7/8	613.40		
	20	6½	2 7/8	613.40		

DATA: 65 ... 58 ... 58

BIT RECORD

No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
1	X16	5½	384	25a	65			
1	X16	12¾	660	28	65			

	Jet	Conventional	Nozzle Size	Bit Wear: T	B	G
Bit Serial No. 18816	☑	☐	2-10 1-11			
Bit Serial No. 18816	☑	☐	2-10 1-11			
Bit Serial No. 19916	☑	☐	2-10 1-11			

SURVEYS

Depth	Deviation
Depth [illegible]	
Depth 990	Deviation ¼°

SLUSH PUMP RECORD

	On Line	Circulating	Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
No. 1						
No. 2						
No. 1			575	15	60	5"
No. 1			950	15"	60	5"

MUD RECORD

Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
5:15					PRESSURE UP PIPE RAMS, KILL & KELLY COCK TO 1000 PSI O.K.
6:00					DRLG OUT CEMENT + PLUG
6:00					PRESSURE TEST CSG + BLIND RAMS TO 1000 PSI OK
5:00	28	8.9			CAUSTIC - 150 #
7:00	28	8.8			GEL - 5300 #
11:00	31	8.8			

CORING

Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery

DETAIL OF OPERATIONS AND REMARKS

	From	To	Hrs.
FINISH PRESSURE UP BLIND RAMS CASG. BOWL & MANIFOLD VALVES TO 1000 P.S.I. HELD O.K.	12:00	12:15	¼
DRILL MOUSE HOLE	12:15	1:15	1
REMOVE CATHEAD DRILLERS SIDE	1:15		
REPLACE BROKEN STUD		2:30	1 ¼
REPAIR VALVE ON STANPIPE	2:30	3:00	½
FINISH DRLG. MOUSEHOLE	3:00	4:30	1½
RUN TO PRESSURE UP	4:30	5:15	¾
RIG SERV + BOP & KELLY COCK	8:00	8:15	¼
FINISH DRILL OUT	8:15	10:30	2 ¼
PRESS FORMATION 100 PSI	10:30	10:45	¼
DRLG	10:45	4:00	5 ¼
DRLG	4:00	4:15	¼
SURVEY @ 990	4:15	4:30	¼
DRLG	4:30	8:15	3 ¾
WORK ON DRAWORKS	8:15	8:30	¼
DRLG.	8:30	12:00	3½

Driller: Don Doyle

Driller: D. A. Webber

Driller: D. A. Webber D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: ... DRILLING: ... REAMING: ... TOTCO: ... FISHING: ... CIRCULATING: ... CONDITIONING MUD: ... TRIPPING: ... CORING: ... CASING: ... W.O.C. ... D.S. TESTING: ... LOGGING: ... W.O. ORDERS: ... RIG REPAIRS: ... RIG MAINTENANCE: ... MISCELLANEOUS: ... CONDITION HOLE: ... REAMING CLEANING: ... WORKING PIPE: ... LOST CIRC:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ✓ NO ...

Total Contract Time ..... hrs. Total Company Time ..... hrs. Toolpusher Gene Winkham Approved by .....

Form 24402 (200 blks-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 2

WELL NAME I.O.E. ET AT ARROW HEAD L Lsd. 4 Sec. 6 Twn 30 Rge. 22 W. 3 Contractor S.H.I. DRLG. WESTERN Month. JAN. Day. 28 19 70

	1st Tour From: 12:00 Midnight To: 8:00 a.m.	2nd Tour From: 8:00 a.m. To: 4:00 p.m.	3rd Tour From: 4:00 p.m. To: 12:00 p.m.
DEPTH	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation
DRILLING STRING	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	Size-D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft. DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS
BIT RECORD	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T. B. G.	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T. B. G.	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed Bit Serial No. / Jet ☐ Conventional ☐ Nozzle Size / Bit Wear: T. B. G.
SURVEYS	Depth / Deviation	Depth / Deviation	Depth / Deviation
SLUSH PUMP RECORD No. 1 No. 2	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size
MUD RECORD	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS Cemented 8 5/8 Csg. w 275 sax + 2% Ca Cl2 Plug down @ 1230 hrs 27 Jan 70 81.5%	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS
CORING	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery
DETAIL OF OPERATIONS AND REMARKS	From / To / Hrs. CEMENT CASG. 12:00 1:00 1 W. O. C. 1:00 8:00 7	From / To / Hrs. W O C 8 4 5 REMOVE CSG COLLAR INSTALL CSG BOWL PICK UP BOP & NIPPLE UP SAME	From / To / Hrs. FINISH NIPPLE UP 4:00 11:30 7½ PRESSURE UP BLIND RAMS 11:30 CASG. BOWL & MANIFOLD VALVES TO 1000 PSI HELD O.K. 12:00 ½
	Driller: Don Doyle	Driller: D. A. Walker	Driller: D. A. Walker D. Doyle

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: / DRILLING: / REAMING: / TOTCO: / FISHING: / CIRCULATING: / CONDITIONING MUD: / TRIPPING: / CORING: / CASING: / W.O.C. / D.S. TESTING: / LOGGING: / W. O. ORDERS: / RIG REPAIRS: / RIG MAINTENANCE: / MISCELLANEOUS: / CONDITION HOLE: / REAMING CLEANING: / WORKING PIPE: / LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ✓ NO

Total Contract Time .....hrs. Total Company Time :.....hrs. Toolpusher Geo. E. Beckham Approved by .....

Form 34402 (200 blks.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No. 1

WELL NAME I.O.E. ET AL ARROWHEAD Lsd. L Sec. 42 Twn. 30 Rge. 22 W. 3.0 Contractor S.T. DRILLING Month. JAN. Day. 27 19 70

	1st Tour From: 12:00 Midnight To: 8:00 a.m.						2nd Tour From: 8:00 a.m. To: 4:00 p.m.						3rd Tour From: 4:00 p.m. To: 12:00 p.m.					
DEPTH	From	To	Hole Made	Bit Size	Formation		From	To	Hole Made	Bit Size	Formation		From	To	Hole Made	Bit Size	Formation	
	79	310		12¼"			310	470	160	12¼								
DRILLING STRING	Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.	Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.	Size-D.P.	Stands	Singles	Kelly	Drill. Collar Ft.	Core Bbl. Ft.
				24.84			4½	[illegible]	64.00	29.02	369.78	508's 2.22						
	DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR	Number	OD	ID	Length	INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS
		9	6¼	2⅜	262.70			12	6¼	2⅜	369.78							
	DATA				37M		DATA				43		DATA					
BIT RECORD	No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed	No.	Type	Time On Bit	Footage	WOB	RPM	Depth Pulled	Total Footage Drilled	Total Footage Reamed
	2A RR	OSC-3	8½	310	12	80				2A	OSC-3	13½	470	15	70			
	Bit Serial No. 10292			Jet ☐	Conventional ☑		Bit Serial No. 10292			Jet ☐	Conventional ☑		Bit Serial No.			Jet ☐	Conventional ☐	
	Nozzle Size			Bit Wear: T	B	G	Nozzle Size			Bit Wear: T	B	G	Nozzle Size			Bit Wear: T	B	G
SURVEYS	Depth 70' 180' 264			Deviation ¼° ¾° ¼°			Depth 355' 418'			Deviation ½° ¼°			Depth 480'			Deviation ½°		
MUD PUMP RECORD No. 1 No. 2	HOURS On Line	Circulating		Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size	HOURS On Line	Circulating		Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size	HOURS On Line	Circulating		Pump Press	Length of Pump Stroke	Strokes Per Min.	Liner Size
				900	15	60	7¾				475	15	60	7¾							
MUD RECORD	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS	Time	Visc.	Wt.	W L	pH	ADDITIVES — POUNDS
	7:00	48	9.0			GEL - 200 lbs LIME - 15 lbs SAWDUST - 2 SKS.	9:00	34	9.0			GEL 1200 LIME 15						Ran 15 jts 2570 x 24" KS Age #2 Tke MM Csg total 418.58 landed @ 417' Cement c/w Howco w 335 + 2% Ca Cl2 & Flo down @ E.T.K removed
							1:00	50	9.2									
							3:00	32	9.2									
CORING	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery	Core No.	Depth In	Footage	Hours Run	Depth Out	Recovery
							BREAK DRLG	CIRC CLEAN 15' FILL			9:30-3:00-½ 3:00-4:00-1							
DETAIL OF OPERATIONS AND REMARKS					From	To	Hrs.				From	To	Hrs.				From	To	Hrs.
	SURVEY				12:00	12:15	¼	RIG SERV			9:00	8:15	¼	DRLG			11:00	11:45	¾
	Rig SERV.				12:15	12:30	¼	DRLG			8:15	9:15	1	CIRC			4:45	5:15	½
	DRLG. 12¼" HOLE				12:30	2:45	2¼	SURVEY @ 355			9:15	9:30	¼	TRIP			5:15	6:15	1
	PUMP FUEL				2:45	3:15	½	DRLG			9:30	11:30	2	CIRC COND HOLE			6:15	6:45	½
	DRLG. 12¼ HOLE				3:15	3:45	½	SURVEY @ 418			11:30	1:45	¼	DROP SURVEY			6:45	7:00	¼
	SURVEY				3:45	4:00	¼	DRLG			11:45	12:45	1	HOIST TO RUN CSG			7:00	7:45	¾
	DRLG. 12¼" HOLE				4:00	6:30	2½	CIRC			12:45	1:00	¼	RIG TO RUN CSG			7:45	11	4¼
	SURVEY				6:30	6:45	¼	HOIST STRAP PIPE			1:00	1:30	½	CIRC Csg			11	11:30	½
	DRLG. 12¼" HOLE				6:45	8:00	1¼	RUN IN REAM BRIDGE @ 38'			1:30	2:30	1	PREPARE TO CEMENT			11:30	12	½
	Driller Don Doyle							Driller D.A. Webber						Driller D.A. Webber / D. Doyle					

CLASSES OF TIME BREAKDOWN

HEADING UP & DRLG. OUT: | TOTCO: | CONDITIONING MUD: | CASING: | LOGGING: | RIG MAINTENANCE: | REAMING CLEANING:
DRILLING: | FISHING: | TRIPPING: | W.O.C. | W.O. ORDERS: | MISCELLANEOUS: | WORKING PIPE:
REAMING: | CIRCULATING: | CORING: | D.S. TESTING: | RIG REPAIRS: | CONDITION HOLE: | LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES ____ NO ☑

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher Geo. Elizuthan Approved by E.T.K. Kennedy

Form 3440Z (200 blks.-5-68)

IMPERIAL OIL LIMITED

DAILY DRILLING REPORT No.....

WELL NAME ..... Lsd..... Sec..... Twn..... Rge..... W..... Contractor S.T. Month 1 Day 26 1970

	1st Tour From: 12:00 Midnight To: 8:00 a.m.	2nd Tour From: 8:00 a.m. To: 4:00 p.m.	3rd Tour From: 4:00 p.m. To: 12:00 p.m.
DEPTH	From / To / Hole Made / Bit Size / Formation	From / To / Hole Made / Bit Size / Formation	From: 0 / To / Hole Made / Bit Size: 7 3/4 = 12 1/4 / Formation
	Size D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft.	Size D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft.	Size D.P. / Stands / Singles / Kelly / Drill. Collar Ft. / Core Bbl. Ft.
DRILLING STRING	DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS	DRILL COLLAR DATA: Number / OD / ID / Length / INDICATOR WEIGHT OF TOTAL DRILLING STRING / DRILL COLLARS
BIT RECORD	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed	No. / Type / Time On Bit / Footage / WOB / RPM / Depth Pulled / Total Footage Drilled / Reamed
			1A RR X-16 — 76
			RR OSC-3 — 79
	Bit Serial No. ☐ Jet ☐ Conventional ☐	Bit Serial No. ☐ Jet ☐ Conventional ☐	Bit Serial No. 19712 ☑ Jet ☐ Conventional
	Nozzle Size Bit Wear: T B G	Nozzle Size Bit Wear: T B G	Nozzle Size 2-16 1-22 Bit Wear: T B G
SURVEYS	Depth / Deviation	Depth / Deviation	Depth / Deviation
MUD PUMP RECORD No. 1 No. 2	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size	HOURS: On Line / Circulating; Pump Press; Length of Pump Stroke; Strokes Per Min.; Liner Size
MUD RECORD	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS	Time / Visc. / Wt. / W L / pH / ADDITIVES — POUNDS
			40 / 8.9
CORING	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery	Core No. / Depth In / Footage / Hours Run / Depth Out / Recovery

DETAIL OF OPERATIONS AND REMARKS

From	To	Hrs.	Description
12:00	8:00	8	Pick up Kelly + Swivel. Rig up To Spud in. Mix mud

From	To	Hrs.	Description
8:00	11:00	3	MIX MUD + HOOK UP CELLAR JET
11:00	4:00	5	DRILL RAT HOLE

From	To	Hrs.	Description
4:00	9:00	5	SPUD IN + DRILL 7 3/4 HOLE
9:00			PULL OUT LAY DOWN D.C. MAKE
	10:00	1	UP 12 1/4" BIT
10:00	12:00	2	DRLG. 12 1/4" HOLE

Driller Duane D. Ford

Driller C. A. Webber

Driller C. A. Webber Don Doyle

HEADING UP & DRLG. OUT. DRILLING: REAMING:

CLASSES OF TIME BREAKDOWN
TOTCO: FISHING: CIRCULATING: CONDITIONING MUD: TRIPPING: CORING: CASING: W.O.C. D.S. TESTING: LOGGING: W. O. ORDERS: RIG REPAIRS: RIG MAINTENANCE: MISCELLANEOUS: CONDITION HOLE: REAMING CLEANING: WORKING PIPE: LOST CIRC.:

DID YOU CHECK BLOWOUT PREVENTER EQUIPMENT TODAY YES..... NO.....

Total Contract Time .....hrs. Total Company Time .....hrs. Toolpusher Ken E. Mackay Approved by .....

TOE ET AL ARROWHEAD

L-49

Drilling Authority No. 403

Date Issued 19 January 1970

WELL NAME IOE et al Arrowhead L-49

FIELD Area:

LOCATION: Unit L Section 49 Grid 60-30-122-30

Latitude 60-28-35.1 Longitude 122-39-13.4

U.W.L.R. 60.47642 --- 122.65372

U.W.I. 300L49603012230O

Rig Release Date: 5/2/70

Status

Information Release Date

CHANGE OF NAME:

DATE RECEIVED	INDEX
19-1-70	Application for a Drilling Authority.
	Well Completion Data.
	Well History Report.
	Application to Amend a Drilling Authority.
	Application to change a Well Name.
18/2/70	Application to Abandon a Well ~~or Suspend Drilling~~.
	Application to Alter Condition of a Well.
Rec 3/70	Well History Supplement.
	Well Completion Data.
	Work-over Report No.
	Application to Commingle Production before Measurement.
	Data for Back Pressure Test on Natural Gas Wells – Monograph 7 Method.
	Data for Back Pressure Test on Natural Gas Wells – Vitter's Method
	M.P.R. – Oil – Calculations.
	New Oil Well Report.
	New Gas Well Report.
	Well Inspection Report.
	Rig Inspection Report.
	Battery Inspection Report.
	Equipment Report.
	Well Card.
	New Service Well Report.
	Monthly Water Flood Operations Report
	Monthly Water Receipts and Disposal of Fluids Report
	Logs. Large scale..... Small scale.....

LAND 5290 (3-69)

Unique well Identifier
300A960301222500

Drilling Authority No. 403
Date Issued January 19, 1970

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
OIL AND MINERAL DIVISION

WELL COMPLETION DATA

To be submitted in duplicate within thirty days after the completion, rework, abandonment, recompletion or suspension of every well.

Well name and number IOE et al Arrowhead L-49 60-30-122-30

Permit No. 4612
Gen Grigoli, Freeport, Canso,
Gen Crude, Roberault
(Permittee, Licensee, Lessee)

Lease No.
Exploratory Licence No. 1354, 1371, 1232, 1246, 1276

Imperial Oil Enterprises Limited
(Operator)
Exploratory Licence No. 1266

Location: Unit L Section 49 Grid 60° 30' 122° 30'
Latitude 60°28'35.1"N Longitude 122°39'13".4 W
From Established Reference Marker Seismic Control from Autotape Fix
Universal Well Location Reference 60°.47642 N Lat 122°.65372 E Long

	DATE	DEPTH
Spudded	Jan 26/70	
Suspended		
Resumed Operations		
Finished Drilling	Feb 2/70	2120
Deepened		
Completed (gas/oil)		
Abandoned	Feb 5/70	2120
Rig released	Feb 5/70	2120

Pool(s)
Interval(s) open to production

Elevation: Gr. 1710 K.B. 1723
Rig No. 5
Drilling Contractor S & T
Contractor's Business Licence No. 564

CASING RECORD

Casing Size (inches)	Grade	Weight	Amount	Set at —	Sacks of Cement and Additives
1. 8 5/8	KS	24#	458.58	472.28	275 + 2% $CaCl_2$
2.					
3.					
4.					
5.					
6.					

GEOLOGICAL TOPS	ELEVATION	
	Depths	Sub-Sea
Scatter	1368	+ 355
Bsl Cretaceous Ss	1843	- 120
Fundle	1970	- 247

CORE RECORD

From	To	Rec.	From	To	Rec.
1865	1874	8.2			
1874	1892	18			

LOG RECORD

Run No.	Type of Log	From	To
1	FDC	471	2115
1	SNP	471	2115
1	BHCSGRC	135	2114
1	IES	471	2115

DEPT. OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT
OIL & MINERAL DIVISION
MAR 9 1970
CALGARY 31, ALBERTA
OIL CONSERVATION ENGINEER
Northwest Territories & Yukon Section

IAND 52-90 (2) (2-69)

CEMENTING RECORD (Plug, Squeeze, etc.)

Date	From	To	Remarks
Feb 4	2120	1790	150 sax
Feb 4	525	425	60 sax + 2% $CaCl_2$ felt at 405
Feb 5	Surface		5 sax rathole 4 sax mousehole 3 sax cut casing off 3' below ground level and welded on steel plate

PERFORATING RECORD (Bullet, Jet)

Date	From	To	Remarks

SERVICING RECORD (Acidizing, Fracturing, etc.)

Date	From	To	Remarks

DRILL STEM TESTS

No.	Date	Formation	From	To	V.O. Mins.	I.S.I. Mins.	F.S.I. Mins.	I.S.I.B.H.P.	F.S.I.B.H.P.	I.F.B.H.P.	F.F.B.H.P.	I.H.P.	F.H.P.	REMARKS
1	Feb 1	Bsl Cret SS	1849	1892	60	60	90	637	624	25	98	918	907	Rec 110' mud
2	Feb 4	Bsl Cret SS	1845	1980	60	60	90	631	631	601	631	909	901	Rec 1335' water (10,000 PPM NaCl) Field Pressures

ANALYSIS

Lab. No.	Sample	From	To	Source	Remarks
Cal-2-1667	Water	1845	1980	DST # 2	
CNP-1-9820	Core	1865	1892	Core # 1 & 2	

PRESENT STATUS OF WELL

Oil		(Interval)
Gas		(Interval)
Dry	X	
Susp.		

Company Imperial Oil Limited

Signed by [signature]

Title Well Records Supervisor

Date March 4, 1970

Forms to be prepared in duplicate and forwarded to the Oil Conservation Engineer, Calgary, Alberta.

File No.
Drilling Authority No. 403

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

Oil and Mineral Division

Application to Abandon a Well ~~or Suspend Drilling~~

In compliance with the "Canada Oil and Gas Land Regulations", application is hereby made for approval to abandon, to suspend drilling—

Name and number of well IOE et al Arrowhead L-49 60-30-122-30

Location: Unit L Section 49 Field 60° 30' 122° 30'

Latitude 60° 28' 35"18 Longitude 122° 39' 13" 44

From Established Reference Marker Seismic Control from entrance fix

Universal Well Location Reference 60°47642 N Lat: 122° 65372 E Long

Permit No. 6612 Lease No.

Canadian Gridoil et al
(Permittee, Licensee, Lessee)

Date of commencement of proposed program February 4, 1970

OIL, GAS, AND WATER ENCOUNTERED
(Depths)

Oil at None encountered
Gas at None encountered
Water at 1845' - 1980'
Total Depth 2120' Date of last operations
Present condition of well

Stands - Ready to abandon

CASING RECORD

Casing Size O.D. Inches		Amount	Set At—	Kinds of Cement and Additives	Amount Pulled
1. 8-5/8"	24	458.58	472.28'	275 sacks + 2% $CaCl_2$	None
2.					
3.					
4.					
5.					

PROPOSED ABANDONMENT PROGRAM

No.	Plug Positions	Geological Formations	Number of Sacks of Cement	Remarks
1	2120'- 1790'	Upper Cretaceous - Mississippian	150 sacks	Do not feel
2	525'- 425'	Surface Shales	60 sacks + 2% $CaCl_2$	Feel in 8 hours
3	Surface	5 sack plug, cut off 3' below grade. Weld on plate and install 4" riser with well name		

The following logs have been run IES, Sonic, SNP, Density
Other operations proposed None

Operations to be carried out by Imperial Oil Enterprises Contractor Licence No. 56
Address 10025 - Jasper Avenue, Edmonton Address
Responsible Agent in field K. Kennedy

Dated at Edmonton this 10 Day of February 19 70
Signed by [signature] Company Imperial Oil Enterprises Ltd.
Title Development Manager Operator's Exploratory Licence No. 1266

Note:—The Oil Conservation Engineer's office must be notified before work is commenced.

(For RESOURCE MANAGEMENT DIVISION use only)

APPROVAL

This application has been examined and proposed programme approved, subject to the following conditions:

1. Confirming oral approval given by Mr. G. E. Hine on the 4th February 1970.

Dated 18th February, 19 70

[signature]
Oil Conservation Engineer

Forms to be submitted in triplicate to Oil Conservation Engineer, Department of Indian Affairs and Northern Development, Calgary, Alberta.

IAND 52-90 (5) (3-67)

Drilling Authority No. 403

Project No.

File No.

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT

[redacted]

Application for a Drilling Authority

This notice of intention to begin drilling operations, in triplicate, and where required a plan of survey approved by the Surveyor General showing the target area or the site of the well must be submitted and approved before commencing operations.

In compliance with the "Canada Oil and Gas Land Regulations", application is hereby made for approval to drill:—

Name and number of well: IOE et al Arrowhead L-49-60-20-122-30

Location: Unit L Section 49 Grid 60° 30° 122° 30°

Latitude 60° 25° 17".1 N Longitude 133° 39° 19".4 W

From Established Reference Marker: Seismic Control from autotape file.

Universal Well Location Reference: 60°. 47642 N Lat: 121°. 63372 W Long.

Elevation: Ground 1705' K.B. feet above sea-level.

Well is expected to produce from Lower Cretaceous formation at a depth of about 2,000' feet. Expected total final depth 2,230'

Area assigned to well

(for Oil Conservation Engineer's use only)

Permit No. 4,512 Lease No. Acreage 31656

Permittee, licensee, or lessee: Canadian Gridoil Limited et al

Exploratory Licence No. 1356 Fraser Oil Company Alberta Ltd. - 1232 / United Canso - 1232 / General Crude - 1246 J.Ray McDermott - 1276

Surface owned by Crown or Crown

Petroleum and natural-gas rights owned by Crown

(If allocated, indicate name and address of owner and occupant.)

We propose to use the following strings of casing, either cementing or landing them as indicated below:—

Casing Size O.D. (inches)	Weight (lb./ft.)	Grade	New or Used	Estimated Depth	Sacks of Cement
1. 8-5/8"	24.0	J-55	New	230	To Surface
2.					
3.					
4.					
5.					

Expected water, gas, and oil horizons and type of control equipment: Hydril-double gate Shaffer.

Well will be drilled with Rotary Rig No. 5 by 567 Drilling Co. Ltd.

(Drilling Contractor or company)

Responsible agent of applicant:— D. J. Kennedy

At well Address 11630 - 142 St., Edmonton

Contractor's Business Licence No. 564

At registered office C. M. McPherson

Address 10025 - Jasper Ave., Edmonton

It is understood that if changes become necessary, notice of the change of plan will be submitted.

Dated at Edmonton, this 15 day of January 19 70

Signed by [signature] Development Manager

Company Imperial Oil Enterprises Ltd.

Title Operator's Licence No. 126

(For Resource Management Division use only)

APPROVED

This application has been examined and approved subject to the following conditions:—

1. The Company will submit to this office, on Tuesday of each week, the latest reports received by radio on the progress of the well.
2. During well drilling and testing operations, every effort shall be made to observe low

Dated 19th January 19 70

[signature] Oil Conservation Engineer

Forms to be submitted to Oil Conservation Engineer, Department of Indian Affairs and Northern Development, Calgary, Alberta.

IAND 52-90-1 (3-67)

UNIQUE WELL IDENTIFIER - 300LA603012300

that drilling fluids, chemicals and wastes shall be disposed of or contained in a manner that will prevent the contamination of adjacent vegetation and surface or sub-surface waters.

3. We draw your attention to Sections 95 and 96 of the Canada Oil and Gas Land Regulations.

4. Intermediate and production strings of casing shall receive the approval of the Oil Conservation Engineer.

5. This Drilling Authority is being issued subject to the receipt of an Oil and Gas Exploratory Licence by Fremont Oil Company Alberta Ltd., after incorporation and subsequent registration with the Registrar of Companies in the Northwest Territories.

B.H.J. Thomas, Oil Conservation Engineer

ZONE 10 W

1 010 000

122° 37' 30"

60° 30'

11-70-20

11-70-22

11-70-23

22 010 000

11-70-30

60° 29'

11-70-40

L

LOCATION

SEC. 49

22 000 000

11-70-50

60° 28'

60

IMPERIAL OIL ENTERPRISES LTD.
LOCATION SKETCH
IOE et al Arrowhead L-49-60-30-122-30 SCALE - 1/25000
SHOT POINTS PLOTTED FROM GEOPHYSICAL SURVEY. LOCATION STAKED ON SHOT POINT 11-70-42 LATITUDE - 60° 28' 35.1" N. SCALED FROM MAP. LONGITUDE-122° 39' 13.4" W. JANUARY 15, 1970 W.G.W.

DEPT. OF INDIAN AFFAIRS & NORTHERN DEVELOPMENT
OIL & MINERAL DIVISION
JAN 1970

J. RAY MCDERMOTT CANADA, LTD.

Department of Indian Affairs and Northern Development
112 - 11th Avenue S.E.
Calgary 21, Alberta

Attention: Mr. A. E. J. Thorn

Gentlemen:

J. Ray McDermott Canada, Ltd. and General Crude Oil Company (Alberta) Ltd. (hereinafter called "McDermott" and "General Crude", respectively) hereby appoint Imperial Oil Enterprises Ltd. (hereinafter called "Imperial") to act as Operator to transact business with the Department of Indian Affairs and Northern Development and all other governmental agencies with respect to their respective interests in N.W.T. Permits Nos. [illegible] and [illegible], (1) to sign all documents, (2) submit all statements of expenditure, (3) file reports of operations conducted, (4) allocate all credits, (5) receive all refunds, (6) make application for granting of permits and (7) to see that the permits are maintained in good standing or to surrender all interest thereto pursuant to the Regulations, except with the joint decision of McDermott and General Crude.

The authority hereby granted shall remain in force and effect until revoked in writing by McDermott and General Crude. In the case of such a revocation, McDermott and General Crude will furnish the proper governmental authorities with a copy of the revocation concurrent with service of same on Imperial.

Very truly yours,

J. RAY MCDERMOTT CANADA, LTD.

By _____
Vice President

By _____
Assistant Secretary

GENERAL CRUDE OIL COMPANY, ALBERTA, LTD.

By _____
J. W. CUTHBERTSON, President

By _____
Assistant Secretary

JUN 12 1970

December 3, 1969

Department of Indian Affairs
& Northern Development,
112 - 11 Avenue S.E.,
Calgary 21, Alberta.

Attention: Mr. B. H. J. Thomas

Dear Sirs:

Re: N.W.T. Permit Nos. 4611 and 4612
Mackenzie River Area

Please be advised that we are negotiating agreements whereby Imperial Oil Enterprises Ltd. will be doing certain work on the above mentioned Permits.

Although documentation is not complete, we are prepared to carry out the following work in connection with these Permits.

Yours very truly,

[illegible] Oil Co. Ltd.,

B. D. C. Patterson,
Land Manager.

BDCP/nh

bcc: Canadian Gridoil Limited,
330 - 9th Avenue S.W.,
Calgary 2, Alberta.
Attention: Mr. J. M. Barclay

DEC 22 1969
CALGARY, ALBERTA

POOR COPY

December 3, 1969

Department of Indian Affairs
& Northern Development,
112 - 11 Avenue S.E.,
Calgary 21, Alberta.

Attention: Mr. B. E. J. Thomas

Dear Sirs:

Re: N.I.T. Permit Nos. 4611 and 4612
[illegible] River Area

Please be advised that we are negotiating agreements with [illegible] will be doing certain work on the above mentioned permits.

Although documentation is not complete, we are prepared to [illegible] out operation on these Permits.

Yours very truly,

[illegible] Oil & Gas Ltd.,

B. D. C. Patterson,
Land Manager.

BDCP/nh

bcc: Canadian GriMoil Limited,
330 - 9th Avenue S.W.,
Calgary 2, Alberta.
Attention: Mr. J. M. Barclay

DEC 22 1969
[illegible] CALGARY 21, ALBERTA

POOR COPY

CANADIAN GRIDOIL LIMITED

November 4, 1969

Department of Indian Affairs & Northern Development,
Oil Conservation Engineer,
[illegible] - 12th Ave. S.E.,
CALGARY 22, Alta.

Attention: Mr. E.H.J. Thoss

Dear Sirs:

Re: N.W.T. Permit Nos. 4611 and 4612
Our Files G-1540 and G-1541

The holders of the subject Permits are in the process of entering into an Agreement with Imperial Oil Enterprises Ltd., pursuant to which that company will be conducting for our account certain work on the above captioned Permits. In this connection we would request you to accept this letter as our authorization appointing Imperial Oil Enterprises Ltd. as Operator.

Yours very truly,

CANADIAN GRIDOIL LIMITED

J. M. Barclay.

JMB:jz

cc: Imperial Oil Enterprises Ltd.,
142nd St. & 118th Ave., Edmonton.
Attention: Mr. Ray Anthony

NOV 5 1969

7-11-4-82

IOZ et al Arrowhead L-49

60° 30' 122° 30'

INDEX 7-11-4-83

Page 1	Section I	Summary
Page 3	Geological Summary	Tops and Cores
Page 4		Sample Description
Page 7	Engineering Summary	D.S.T.'s
Page 8		Casing
Page 9		Bit Record
Page 10		Mud Report
Page 11		Deviation Record
Page 12		Abandonment Plugs
Page 13	Section IV	Logs
Page 14	Analysis	Core and Water
Page 15	Completion Summary	Cementation Record

COMPANY: IMPERIAL OIL LIMITED

SIGNED BY: [signature]

TITLE: WELL RECORDS SUPERVISOR

DATE: MARCH 4, 1970

OIL & GAS OPERATIONS UNIT
Oil and Mineral Division
MAR 31 1970
OTTAWA, CANADA
Dept. of Indian Affairs & Northern Development

OIL & GAS OPERATIONS UNIT
Oil and Mineral Division
Dept. of Indian Affairs & Northern Development

SECTION I SUMMARY OF WELL DATA

(a) Name - IOE et al Arrowhead L-49-60-30-122-30

(b) Permittee - Cdn Cridoil Ltd.
Freeport Oil Co. Alberta Ltd.
United Canso
General Crude
J. Ray McDermott

(c) Operator - Imperial Oil Enterprises Ltd.
10025 Jasper Avenue, Edmonton, Alberta

(d) Location - L-49-60-30-122-30
Latitude: 60°28'35.1"North, Longitude: 122°39'13.4"West
Universal Well Location Reference 60.47642° N. Lat.
122.65372° E. Long.
Unique Well Identifier 300L496030122300

(e) Co-ordinates

(f) Permit - #4612

(g) Drilling Contractor - S&T #5 Rotary

(h) Drilling Authority - #403 issued January 19, 1970

(i) Classification - NFW

(j) Elevations - Gr 1710 KB 1723

(k) Spud - January 26, 1970

(l) Completed Drilling - February 2, 1970

(m) PTD - 2120

(n) Status - Dry & Abandoned

(o) Rig Release - February 5, 1970

(p) Hole Size - 0-480 12-1/4
480-2120 7-7/8

(q) Casing - 8-5/8 x 422 x C275 + 2% $CaCl_2$

SECTION II GEOLOGICAL SUMMARY

(a) Formation Tops K.B. 1723

Formation	Log	Sample
Lower Cretaceous	-	85
Scatter	1368	1370
Bsl. Cretaceous Ss.	1843	1848
Rundle	1970	1971
FTD	2120	

(b) Cored Intervals

No.	Interval	Recovery	Formation
1	1865-1874	8.2	Bsl. Cretaceous Ss.
2	1874-1892	18	Bsl. Cretaceous Ss.

(c) Core Description

Core No. 1 1865-1874' Rec. 9'/9'

1865 - 1874 - Sandstone - yellow brown - very fine grained, subangular. Silica cemented. Interbedded and churned. Coalified wood fragments common, 20% to 30% carbonaceous shale beds interbedded with sandstone. Coarser sandstone from 1873.5' to 1874.5'
22, 37, 21, 40, 39, 36, 27, 24, 73 mins./ft.

Core No. 2 1874' - 1892' Rec. 12'/18'

1874 - 1887 Sandstone - yellow brown, very fine grained, subangular, Silica cemented. Interbedded with dark grey shale. Sandstone and shale contain coalified wood fragments. Interval contains 30% shale interbedded at top and 40% at bottom.

1887 - 1888.5 Interbedded carbonaceous - dark grey shale and very fine grained sandstone moderately sorted, coalified wood fragments. Interval contains ± 25% sandstone as described.

1888.5 - 1892 Interbedded very fine sandstone and carbonaceous dark grey shale as above (40% shale - 60% sandstone). Sandstone silica cemented and moderately sorted.
24, 32, 30, 29, 30, 29, 49, 48, 33, 26, 26, 23, 21, 14, 24, 23, 26, 25 mins./ft.

(d) Sample Description

0 - 85'	-	Glacial drift - unconsolidated sand, gravel and clay
85 - 170'	-	Siltstone, buff and medium grey shale, very arenaceous and slightly calcareous.
170 - 210	-	Shale, medium grey interbedded with light grey and buff siltstone (trace glauconite)
210 - 220	-	Siltstone light grey
220 - 235	-	50% siltstone, light grey, 50% silty medium grey shale.
235 - 435	-	Shale, medium grey, silty with minor siltstone interbeds
435 - 450	-	Shale, medium grey, interbedded with light orange and red quartzite.
450 - 480	-	Shale, medium grey, trace silty.
480 - 500	-	No Samples
500 - 565	-	Shale, medium dark grey, micro micaceous, some plant fragments, ironstone concretions.
565 - 620	-	Shale, medium grey, silty (30%) interbedded with light grey glauconitic siltstone. Sample missing 610-620
620- 710	-	Sandstone, light grey, very fine grained glauconitic and argillaceous, some calcite cement - estimate 6% porosity, no staining, interbedded with medium grey siltstone and dark grey shale.
710 - 730	-	Shale, medium grey, silty, interbedded with glauconitic siltstone which is light grey, calcareous and arenaceous in part.
730 - 870	-	Samples very poor. Mostly cement which has caved in hole.
870 - 1370	-	Shale, medium grey, micromicaceous, silty in part (20% silt below 1300')
1370 - 1380	-	Siltstone, yellow brown, arenaceous, glauconitic, argillaceous, good oil staining.

1350 - 1390	-	50% sandstone, very fine grained, glauconitic, quartzite, argillaceous and some calcite cement, light oil stained - 50% siltstone as above.
1390 - 1400	-	Sandstone - as above
1400 - 1420	-	50% Sandstone - as above 50% Siltstone - as above
1420 - 1540	-	Siltstone, yellow brown, arenaceous, glauconitic argillaceous, oil stained.
1540 - 1700	-	Shale, dark grey, micromicaceous with minor interbeds of glauconitic oil stained siltstone.
1700 - 1780	-	Shale as above, with more siltstone which is oil stained.
1780 - 1848	-	Shale, dark grey. Fish scales and plant fragments at 1780'. Light grey dolomitic shale interbeds from 1820 -
1848 - 1890	-	Sandstone, yellow brown, very fine to medium grained, quartzite (20% chert), fair sorting, subangular.. Fair to poor porosity, silica cemented. Very faint oil stain. Abundant coal and plant fragments. Interbeds of dark grey shale.
1890 - 1971	-	Sandstone as above with white and grey chert.
1971 - 2100	-	Limestone - light grey to medium grey, argillaceous slightly skeletal, interbedded with grey to dark grey calcareous shale.
2100 - 2120	-	Shale - calcareous - greenish grey to grey.

FTD 2120

(e) Palaeontological Determinations

SECTION III ENGINEERING SUMMARY

(a) Drill Stem Tests

D.S.T. #1 - 1845 - 1892 VO 60" SI 60/90"
Bal. Cretaceous Ss Rec. 110' mud
HP 918-907 FP 25-98 SIP 637-624

D.S.T. #2 - 1845 - 1980 VO 60" SI 60/90"
Bal. Cretaceous Ss Rec. 1335' water (10,000 ppm NaCl)
HP 909-901 FP 601-631 SIP 631-631

All pressure are field.

(b) Casing Record

IMPERIAL OIL LIMITED

EDMONTON PRODUCING DIVISION

FORM No. 558

PAGE No. _____

REFERENCE TALLY NO _____

CASING—CEMENTING REPORT

DATE Jan 23/60

NAME OF WELL ICE ETAL ARDREW No 2 LSD 6 SEC 30 - 53 - 20 W4

CONTRACT RIG Eastern #5 PREPARED BY [illegible]

CASING	SIZE O.D. (in.)	WEIGHT LB./FT.	GRADE	MANUFACTURER	COLLARS SHORT/LONG	NO. OF JOINTS	AMOUNT FT.	DEPTH FT K.B. (o)
STAGING COLLAR								
	8 5/8	24	KS	MM	S	14	423.71	
BACKOFF COLLAR OR PACKER								
FLOAT COLLAR	8 5/8			Howco			1.62	
CASING	8 5/8	24	KS	MM	S		32.15	
SHOE	8 5/8			Howco			1.10	
TOTAL							458.58	
CALC AMT UP ON LAST JT							13.70	
ACTUAL AMT UP ON LAST JT								
MAKE UP ALLOWANCE								
CASING SET							472.28	
TOTAL DEPTH OF HOLE								480

HOLE SIZE 11" IN. FROM 2 TO 480 FT.
HOLE SIZE ____ IN. FROM ____ TO ____ FT.
HOLE SIZE ____ IN. FROM ____ TO ____ FT.
K.B. TO TOP OF SURFACE CASING FLANGE 13.10 FT.
CASING CUTOFF ____ IN. ABOVE TOP OF CASING FLGE.
TYPE OF CASING - A.P.I. [X] EXTREME LINE [ ]
POWER TONGS USED — YES [ ] NO [X]
POWER TONGS SUPPLIED BY _____
TYPE OF FLOAT EQUIPMENT Guide Shoe, Float Collar MANUFACTURER Howco

ITEM	TYPE	MANUFACTURER	NO	SPACING FT.	INTERVAL COVERED FT. K.B. (o)
SCRATCHERS					
CENTRALIZERS		Howco	2	Centre of 1st & 3rd Jts	

TYPE OF MUD Gel
INITIAL MUD WT. 9.2 LB./GAL. VISCOSITY 52 SEC.
FINAL MUD WT. _____ LB./GAL. VISCOSITY ____ SEC.
CEMENTED BY Howco
CEMENT USED 225 SKS. GEL ____ % ____ SKS.
ADDITIVES _____ AMT. _____ SKS.
CaCl2 AMT. 2% SKS.
TIME CASING STARTED IN HOLE 2:15 AM/PM.
DROPPING RATE AT 2000' WAS ___ SEC. FOR ___ FT. JT.
4000' WAS ___ SEC. FOR ___ FT. JT.
6000' WAS ___ SEC. FOR ___ FT. JT.
8000' WAS ___ SEC. FOR ___ FT. JT.
WAS THERE LOSS OF FLUID WHILE RUNNING PIPE? _____
IF SO AT WHAT DEPTH? _____ FT.
TIME CASING ON BOTTOM _____ A.M. 11 P.M.
CIRCULATION BROKEN AT _____ A.M. 11:10 P.M.
PRESSURE REQUIRED TO BREAK CIRCULATION _____ P.S.I.

CIRCULATING PRESSURE AFTER CLEANUP _____ P.S.I.
STROKE LENGTH WHILE RECIPROCATING 30 FT. INITIALLY
____ FT. FINALLY
TIME STARTED MIX CEMENT _____ A.M. 11:45 P.M.
WAS BOTTOM PLUG USED? Yes
RELEASED TOP PLUG AT 12:20 A.M. _____ P.M.
PRESSURE JUST BEFORE PLUG HITS _____ P.S.I.
MAXIMUM PRESSURE 1000 P.S.I.
PLUG CHASED WITH water AND BUMPED AT 12:30 A.M. ____ P.M.
STROKE LENGTH WHILE CEMENTING 30 - 5 FT.
WAS THERE ANY DIFFERENCE IN PUMP PRESSURE ON UPSTROKE AND DOWNSTROKE? None P.S.I.
MUD RETURNS WHILE CEMENTING [X] FULL [ ] PARTIAL
[ ] NONE EXPLAIN IN REMARKS
RECIPROCATION STOPPED AT _____ A.M. _____ P.M.
REMARKS Good cement returns

(c) Bit Record

#	Type	Size	Depth In	Depth Out	Footage Drilled	Hours	Remarks
1A	XIG	7-7/8	0	76	76	5	
2A	OSC3	12-1/4	76	480	404	13-1/2	
1	XIG	7-7/8	480	1475	995	26	
2	XV	7-7/8	1475	1868	393	10-3/4	
1C	Diamond	7-13/16	1865	1892	27	13-3/4	Coring
3	XDV	7-7/8	1892	2051	159	12-1/4	
4	ODVJ	7-7/8	2051	2120	69	5	FTD

(d) Mud Reports - Water Bentonite

Date	Gel	Lime	Caustic	Soda	CMC	Peltex
Jan 27/70	1400	30				
Jan 29/70	5500		150	200		
Jan 30/70	3100		50		400	
Jan 31/70	2700				100	
Feb 1/70	1000		50			
Feb 2/70	1800		100		50	100
	15500#	30#	350#	200#	550#	100#

(e) Deviation Record

Depth	Degrees Off
70	1/2
100	3/4
264	1/4
355	1/2
418	1/4
480	1/2
880	1/4
1286	1/2
1473	3/4
1860	1/4
2120	3/4

(f) Abandonment Plugs

#	Interval	Cement	Felt
1	2120 - 1790	150 sacks	No
2	525 - 425	60 sacks + 2% $CaCl_2$	405
3	Surface	5 sacks	
	Rachole	4 sacks	
	Mousehole	3 sacks	

Cut off casing 3' below ground level and welded on steel plate.

(g) Lost Circulation Zones - Nil

(h) Blowouts - Nil

SECTION IV LOGS

Date	Type	Interval
Feb.2/70	MCS-GRC	135 - 2114
Feb.2/70	FDC	471 - 2115
Feb.2/70	SNP	471 - 2115
Feb.2/70	IES	471 - 2115

SECTION V ANALYSIS

(a)	Core Analysis	-	CNP - 1 - 9620
(b)	Water Analysis	-	CAL - 2 - 1667
(c)	Gas Analysis	-	Nil
(d)	Oil Analysis	-	Nil

CORE LABORATORIES – CANADA LTD.

PETROLEUM RESERVOIR ENGINEERING

WATER ANALYSIS

File CAL-2-1662 Page 1 of 1

Company Imperial Oil Limited

Well IOE et al Arrowhead I-49 K.B. ____ Grd. 1705'

Location 60 28'35.10 N.L. 122 39'13.40 W.L. Field Arrowhead River Area Province N.W.T.

Formation ____ Interval 1845' - 1980'

Sampled from DST #2 (Sample #2) by ____

Date sampled ____ Date analysed Feb. 17/70 Analyst DS

Recovery 1335' Water

____ Mud type ____ Water cushion ____

Resistivity 0.673 Ohm-meters @ 68 °F

Specific gravity 1.0078 @ 60°F

pH 7.7 H_2S Absent

Refractive Index 1.334 @ 70°F

Total Solids:

Calculated 12,007 mg/liter

By evaporation @ 110°C - mg/liter

By evaporation @ 180°C - mg/liter

At ignition - mg/liter

MILLIGRAMS PER LITER

Na + K	Ca	Mg	Fe	Ba	Br	I	Cl	HCO_3	SO_4	CO_3	OH
3,586	75	25	Trace	Abs.	-	-	2,114	6,134	73	Nil	Nil

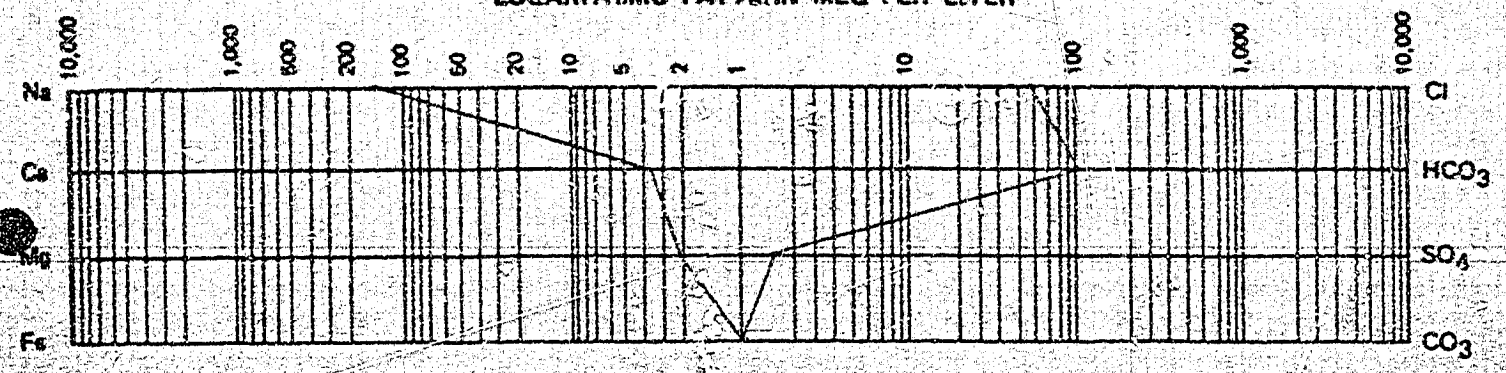
PER CENT CALCULATED SOLIDS

29.9	3.7	2.1	Trace	Abs.	-	-	17.6	51.1	0.6	Nil	Nil

MEQ PER LITER

155.9	3.7	2.1	Trace	Abs.	-	-	59.6	100.6	1.5	Nil	Nil

LOGARITHMIC PATTERN MEQ PER LITER



IOE "D"

CORE LABORATORIES CANADA LTD. (8-2)

Company IMPERIAL OIL ENTERPRISES LTD.
Well LOC ET AL BOOK HEAD L-49
Field 22-30-122-30
Province
ss - small sample

Date Report FEBRUARY 2/70
Location L-49 66-30-122-30
Formation BSL CRETACEOUS SS
D. Fluid WATER BASE

Page 1
File CNP-1-9870
Analysts CK HY SH DD
Remarks Cemented / Coring Fluid used

Plug No. (Cord Field)	Interval Represented Top A	Base C	Thick D	Permeability (md) Maximum F	90° G	Vertical M	Porosity Per Cent I	Density Bulk J	Grain K	Pore Vol. Sat. Oil L	Water M	Plug Quality N Condition (1)	Texture (2)	Interpretation (3)	Plug Type O	Description
	CORED INTERVAL		00.0													
	CORE No. 1	1565	00.0 - 09.0	13/14	(REC. 8.2') (3 BOXES)											
1	1565 00.0	1565 00.6	0.6	19.93			17.9			20.1	33.5				3	1, 2, 9, 17
2	1565 00.6	1566 01.1	0.5	33.89			12.1			3.2	30.6				3	1, 2, 9, 17
3	1566 01.1	1566 01.8	0.7	43.93			13.5			3.0	43.7				3	1, 2, 9, 17
4	1566 01.8	1567 02.4	0.6	2.66			15.1			6.0	41.0				3	1, 2, 9, 17
5	1567 02.4	1567 03.1	0.7	3.32			14.4			6.3	45.0				3	1, 2, 9, 17
6	1567 03.1	1568 03.7	0.6	21.34			13.6			6.6	42.0				3	1, 2, 9, 17
ss 7	1568 03.7	1568 04.4	0.7	8.78			12.8	--	--	7.0	33.6				3	1, 2, 9, 17
8	1569 04.4	1569 05.1	0.7	10.12			12.4			3.2	34.5				3	1, 2, 9, 17
9	1569 05.1	1571 06.2	1.1	2.16			13.4			8.2	32.2				3	1, 2, 9, 17
--	1571 06.2	1571 06.8	0.6	--	--	--	--	--	--	--	--	5	1		--	SHALY
ss 10	1571 06.8	1572 07.1	0.3	<0.01			8.5	--	--	20.0	30.7				3	1, 2, 9, 17
11	1573 07.1	1573 07.5	0.4	6.65			13.5			8.9	43.0				3	1, 2, 9, 17
12	1573 07.5	1573 08.2	0.7	26.37			10.1			19.8	51.5				3	1, 2, 9, 17
--	1573 08.2 -	1574 09.0	0.8	--	--	--	--	--	--	--	--	2			--	LOST CORE
	CORE No. 2	1574	09.0-27.0	42	(REC. 18.0') (5 BOXES)											
ss 13	1574 09.0	1575 09.3	0.3	<0.01			16.1	--	--	1.9	23.4				3	1, 2, 9, 17
ss 14	1575 09.3	1575 09.6	0.3	16.93			15.7	--	--	21.7	30.0				3	1, 2, 9, 17
--	1575 09.6	1575 09.7	0.1	--	--	--	--	--	--	--	--	5	1			

CORE LABORATORIES CANADA LTD. (R-2)

"IOE "D"

Company
Well
Field
Province

Date Report
Location
Formation
D. Fluid

Page 2
File CORE-1-9820
Analysts
Remarks

Plug No. (Card Field)	Interval Represented: Top B	Base C	Thick D	Permeability (md): Maximum F	90° G	Vertical H	Porosity: Per Cent I	Density: Bulk J	Grain K	Pore Vol. Sat.: Oil L	Water M	Plug Quality N: Condition (1)	Texture (2)	Interpretation (3)	Plug Type O	Description
15	15 09.7	15 10.6	0.9	4.98			17.4			18.4	32.8				3	1, 2, 9 18.5
--	15 10.6	15 10.9	0.3	--	--	--	--	--	--	--	--	3	1		--	SHALY
16	15 10.9	15 11.7	0.8	1.66			13.1			5.4	35.2				3	1, 7, 9 19.5
17	15 11.7	15 12.9	1.2	0.20			15.0			8.0	56.0				3	1, 7, 9 19.5
--	15 12.9	15 13.3	0.4	--	--	--	--	--	--	--	--	5	1		--	SHALE & COAL
ss 18	15 13.3	15 13.9	0.6	0.48			18.0	--	--	26.1	49.0				3	1, 7, 9 19.5
--	15 13.9	15 14.8	0.9	--	--	--	--	--	--	--	--	5	1		--	SHALY
19	15 14.8	15 15.5	0.7	0.14			15.2			9.9	47.5				3	1, 7, 9 19.5
--	15 15.5	15 15.6	0.1	--	--	--	--	--	--	--	--	5	1		--	SHALY
ss 20	15 15.6	15 16.3	0.7	0.76			12.2	--	--	6.6	42.0				3	1, 7, 9 19.5
--	15 16.3	15 16.5	0.2	--	--	--	--	--	--	--	--	5	1		--	SHALY
ss 21	15 16.5	15 17.4	0.9	1.40			11.8	--	--	8.5	54.2				3	1, 7, 9 19.5
--	15 17.4	15 21.0	9.6	--	--	--	--	--	--	--	--	5	1		--	SHALE

SECTION VI COMPLETION SUMMARY

(a) Tubing Record - Nil

(b) Perforation Record - Nil

(c) Cementation Record

No.	Date	Interval	Cement	Felt	Zone
1	Feb.4/70	2120-1790	150	No	Bsl.Cretaceous-Rundle
2	Feb.4/70	525-425	60+2%CaCl2	405	Lower Cretaceous

(d) Acidization and Fracturing Record - Nil

(e) Back Pressure and Production Tests - Nil

CORE ANALYSIS REPORT

FOR

IMPERIAL OIL ENTERPRISES LTD.

IOE ET AL ARROWHEAD L-49
ARROWHEAD RI[illegible]EA
NORTHWEST[illegible]RIES

CORE LABORATORIES - CANADA LTD.
Petroleum Reservoir Engineering
CALGARY - EDMONTON - REGINA

CORE LABORATORIES CANADA LTD.
EDMONTON ALBERTA

Company IMPERIAL OIL ENTERPRISES LTD.
Well IOE ET AL ARROWHEAD L-49
Field ARROWHEAD RIVER AREA,
Province NORTHWEST TERRITORIES

Date Report MARCH 10/70
Location 60° 28'N,122° 39'W
Formation CRETACEOUS
D. Fluid WATER BASE MUD

File CRP-1-9820
Analysts ON MY SH DD
Remarks

SS - SMALL SAMPLE

Plug No. (Card Field)	Interval Represented, Feet			Permeability to Air, Millidarcys			Porosity	Density, gm./cc.		Saturations, Per Cent Pore Space		Plug Quality N			Plug Type	Description
	Top	Base	Thick	Maximum	90°	Vertical	Per Cent	Bulk	Grain	Oil	Water	Condition (1)	Texture (2)	Interpretation (3)		
	B	C	D	F	G	H	I	J	K	L	M					
CORED INTERVAL		1865.0' - 1892.0'														
CORE NO.1		1865.0' - 1874.0'		(REC. 8.2')			(3 BOXES)									
1	1865.0	65.6	0.6	*	121.00	1.72	14.1	2.21	2.57					11		1 6 9 17 FS
2	1865.6	66.1	0.5	23.57	20.19	4.85	11.9	2.31	2.63					11		1 6 9 19 S
3	1866.1	66.8	0.7	27.26	23.69	1.24	12.4	2.32	2.65					11		1 6 9 10 S
4	1866.8	67.4	0.6	4.37	3.66	-0.01	12.5	2.33	2.66					11		1 6 9 18 FS
5	1867.4	68.1	0.7	6.14	7.41	-0.01	14.3	2.27	2.64					11		1 6 9 18 FS
6	1868.1	68.7	0.6	6.88	5.90	0.23	12.7	2.32	2.66					11		1 6 9 18 FS
SS7	1868.7	69.4	0.7	8.78	-	-	12.8	-	-					3		1 7 9 17 S
8	1869.4	70.1	0.7	12.20	9.27	0.17	12.3	2.31	2.64					11		1 6 9 18 FS
9	1870.1	71.2	1.1	3.02	2.89	-0.01	12.9	2.30	2.64					11		1 6 9 18 FS
-	1871.2	71.8	0.6	-	-	-	-	-	-	5	1			-		SHY
SS10	1871.8	72.1	0.3	-0.01	-	-	8.5	-	-					3		1 7 9 17 S
11	1872.1	72.5	0.4	*	24.27	13.46	14.6	2.31	2.70					11		1 6 10 19 DS
12	1872.5	73.2	0.7	19.80	11.82	4.57	8.5	2.43	2.65					11		1 6 9 19 BDS
-	1873.2	74.0	0.8	-	-	-	-	-	-	2				-		LOST CORE
CORE NO. 2		1874.0' - 1892.0'		(REC. 18.0')			(5 BOXES)									
SS13	1874.0	74.3	0.3	-0.01	-	-	11.1	-	-					3		1 7 9 19 FS
SS14	1874.3	74.6	0.3	16.93	-	-	15.7	-	-					3		1 7 9 18 S
-	1874.6	74.7	0.1	-	-	-	-	-	-	5	1			-		SHY
15	1874.7	75.6	0.9	*	16.47	3.29	14.5	2.17	2.53					11		1 6 9 10 DPS
-	1875.6	75.9	0.3	-	-	-	-	-	-	5	1			-		SH
16	1875.9	76.7	0.8	2.00	1.57	0.05	12.3	2.32	2.64					11		1 6 9 18 FS
17	1876.7	77.9	1.2	136.00	3.99	-0.01	10.7	2.31	2.59					11		1 6 9 17 FS
-	1877.9	78.3	0.4	-	-	-	-	-	-	5	1			-		SH & COAL

KODAK SAFETY FILM

CORE LABORATORIES CANADA LTD.
EDMONTON ALBERTA

File CHF-1-9820

Company IMPERIAL OIL ENTERPRISES LTD.
Well IOE ET AL ARROWHEAD L-49

SS - SMALL SAMPLE

Plug No. (Card Field)	Interval Represented, Feet			Permeability to Air, Millidarcys			Porosity	Density gm./cc		Saturations, Per Cent Pore Space		Plug Quality %			Fluid Type	Description
	Top	Base	Thick	Maximum	90°	Vertical	Per Cent	Bulk	Grain	Oil	Water	Consolidation (1)	Texture (2)	Alteration (3)		
	B	C	D	F	G	H	I	J	K	L	M	(1)	(2)	(3)	S	

CORE NO. 2 (CONT'D)

SS18	1878.3	78.9	0.6	0.48	-	-	18.0	-	-					3	1 7 9 17 SP
-	1878.9	79.8	0.9	-	-	-	-	-	-			5	1	-	SHY
19	1879.8	80.5	0.7	2.55	2.48	0.63	13.2	2.31	2.66					11	1 6 9 19 FS
-	1880.5	80.6	0.1	-	-	-	-	-	-			5	1	-	SHY
SS20	1880.6	81.3	0.7	0.76	-	-	12.2	-	-					3	1 7 9 17 FS
-	1881.3	81.5	0.2	-	-	-	-	-	-			5	1	-	SH
SS21	1881.5	82.4	0.9	1.80	-	-	11.8	-	-					3	1 7 9 18 FS
-	1882.4	92.0	9.6	-	-	-	-	-	-			5	1	-	SH

FORM NO. 61A

CORE LABORATORIES - CANADA LTD.
EDMONTON ALBERTA

Company IMPERIAL OIL ENTERPRISES LTD.,
Well IOE ET AL ARROWHEAD L-49
Field ARROWHEAD RIVER AREA,
Province NORTHWEST TERRITORIES

Date Report MARCH 10/70
Location 60° 28'N 122° 39'W
Formation CRETACEOUS
D. Fluid WATER BASE MUD

File CDF-1-9620
Analysts OK NY SH DD
Remarks CONVENTIONAL ANALYSIS ON END PIECES OF FULL DIAMETER SAMPLES.

SS - SMALL SAMPLE

Plug No. (Card Field)	Interval Represented, Feet			Permeability to Air, Millidarcys			Porosity	Density, gm./cc.		Saturations, Per Cent Pore Space		Plug Quality %			Plug Type	Description
	Top	Base	Thick.	Maximum	90°	Vertical	Per Cent	Bulk	Grain	Oil	Water	Condition (1)	Texture (2)	Interpretation (3)		
	B	C	D	F	G	H	I	J	K	L	M				O	
CORED INTERVAL		1865.0' - 1892.0'														
CORE NO.1		1865.0' - 1874.0'		(REC. 8.2')				(3 BOXES)								
1	1865.0	65.6	0.6	19.93			17.9			20.1	33.5				3	1 7 9 17 S
2	1865.6	66.1	0.5	33.89			12.1			3.2	30.6				3	1 7 9 18 S
3	1866.1	66.8	0.7	43.93			13.5			3.0	43.7				3	1 7 9 19 S
4	1866.8	67.4	0.6	2.66			15.1			6.0	41.0				3	1 7 9 17 S
5	1867.4	68.1	0.7	3.32			14.4			6.3	45.0				3	1 7 9 18 S
6	1868.1	68.7	0.6	21.34			13.6			6.6	42.0				3	1 7 9 19 S
SS 7	1868.7	69.4	0.7	8.78			12.8			7.0	33.6				3	1 7 9 17 S
8	1869.4	70.1	0.7	10.12			12.4			3.2	34.5				3	1 7 9 18 S
9	1870.1	71.2	1.1	2.16			13.4			8.2	37.2				3	1 7 9 18 S
-	1871.2	71.8	0.6	-			-			-	-	5	1		-	SHY
SS10	1871.8	72.1	0.3	-0.01			8.5			20.0	50.7				3	1 7 9 17 S
11	1872.1	72.5	0.4	6.65			13.5			8.9	43.0				3	1 7 9 18 S
12	1872.5	73.2	0.7	26.37			10.1			19.8	51.5				3	1 7 9 18 S
-	1873.2	74.0	0.8	-			-			-	-	2			-	LOST CORE
CORE NO. 2		1874.0' - 1892.0'		(REC. 18.0')				(5 BOXES)								
SS13	1874.0	74.3	0.3	-0.01			11.1			1.8	23.4				3	1 7 9 19 FS
SS14	1874.3	74.6	0.3	16.93			15.7			21.7	30.0				3	1 7 9 18 S
-	1874.6	74.7	0.1	-			-			-	-	5	1		-	SHY
15	1874.7	75.6	0.9	4.98			17.4			18.4	32.8				3	1 7 9 18 S
-	1875.6	75.9	0.3	-			-			-	-	5	1		-	SH
16	1875.9	76.7	0.8	1.66			13.1			5.4	35.2				3	1 7 9 19 SF
17	1876.7	77.9	1.2	0.20			15.0			8.0	56.0				3	1 7 9 17 S
-	1877.9	78.3	0.4	-			-			-	-	5	1		-	SH & COAL

CORE LABORATORIES-CANADA LTD.
EDMONTON ALBERTA

Company IMPERIAL OIL ENTERPRISES LTD.,
Well IOE ET AL ARROWHEAD L-49

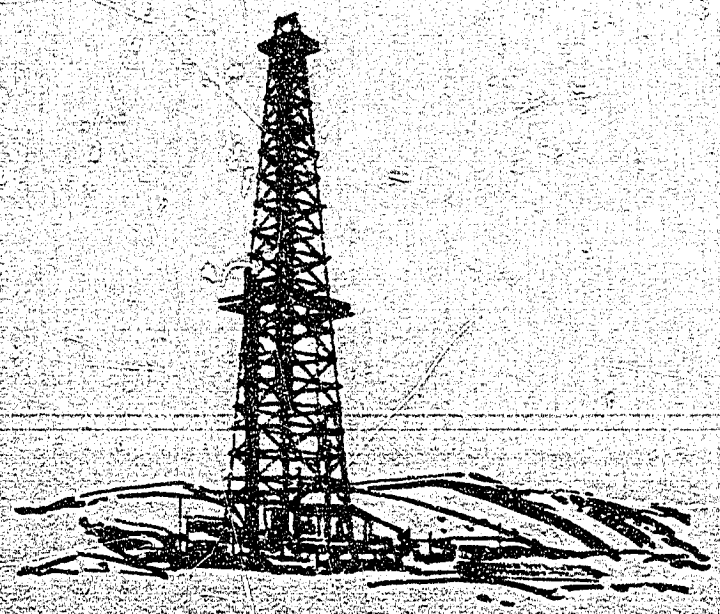
SS - SMALL SAMPLE

Plug No. (Card Field)	Interval Represented, Feet			Permeability to Air, Millidarcys			Porosity	Density, gm./cc.		Saturations, Per Cent Pore Space		Plug Quality			Plug Type	Description
	Top	Base	Thick	Maximum	90°	Vertical	Per Cent	Bulk	Grain	Oil	Water	Condition	Texture	Intersection		
	B	C	D	F	G	H	I	J	K	L	M	(1)	(2)	31	S	
CORE NO. 2 (CONT'D)																
SS18	1878.3	78.9	0.6	0.48			18.0			26.1	40.0				3	1 7 9 17 SF
-	1878.9	79.8	0.9	-			-			-	-	5	1		-	SHY
19	1879.8	80.5	0.7	0.69			15.2			9.9	47.6				1	1 7 9 18 FS
-	1880.5	80.6	0.1	-			-			-	-	5	1		-	SHY
SS20	1880.6	81.3	0.7	0.76			12.2			6.6	47.0				3	1 7 9 17 FS
-	1881.3	81.5	0.2	-			-			-	-	5	1		-	SH
SS21	1881.5	82.4	0.9	1.80			11.8			8.5	54.7				3	7 9 17 FS
-	1882.4	92.0	9.6				-			-	-	5	1		-	SH

FORM NO. 61A

LYNES

BRIGHT NAME IN THE OIL PATCH

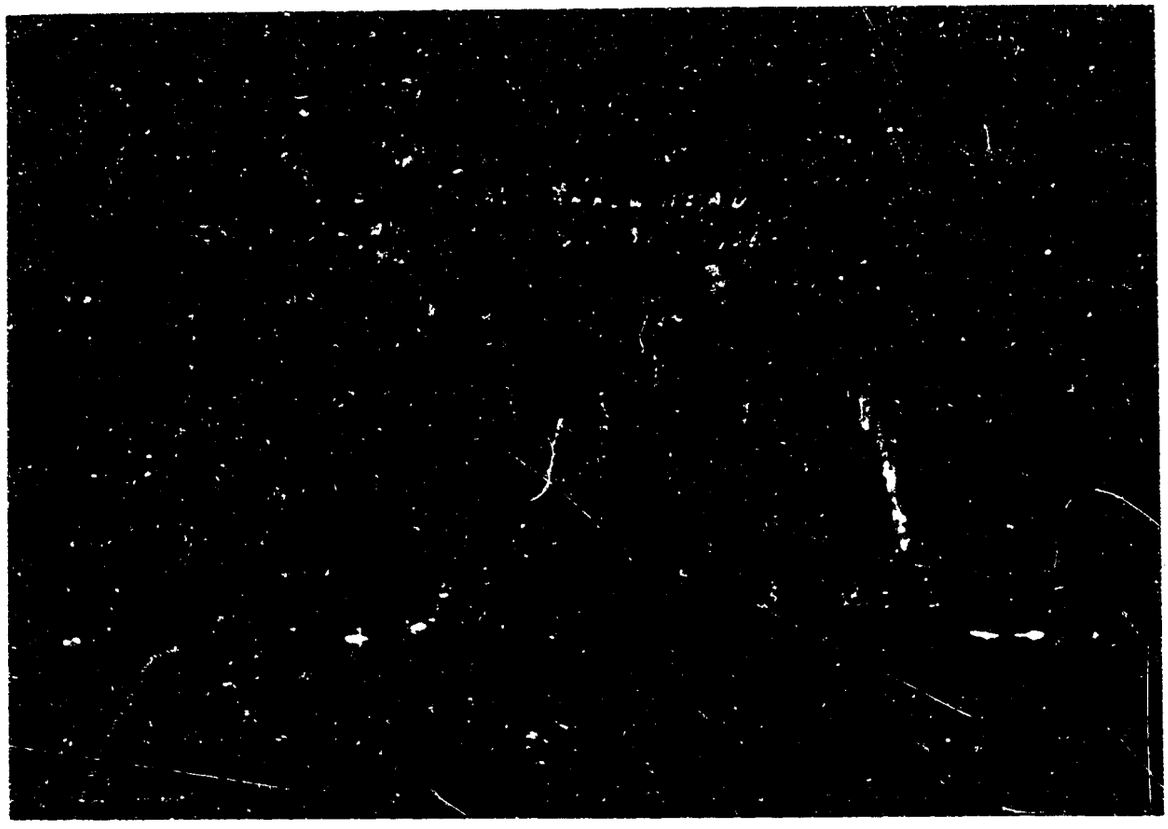


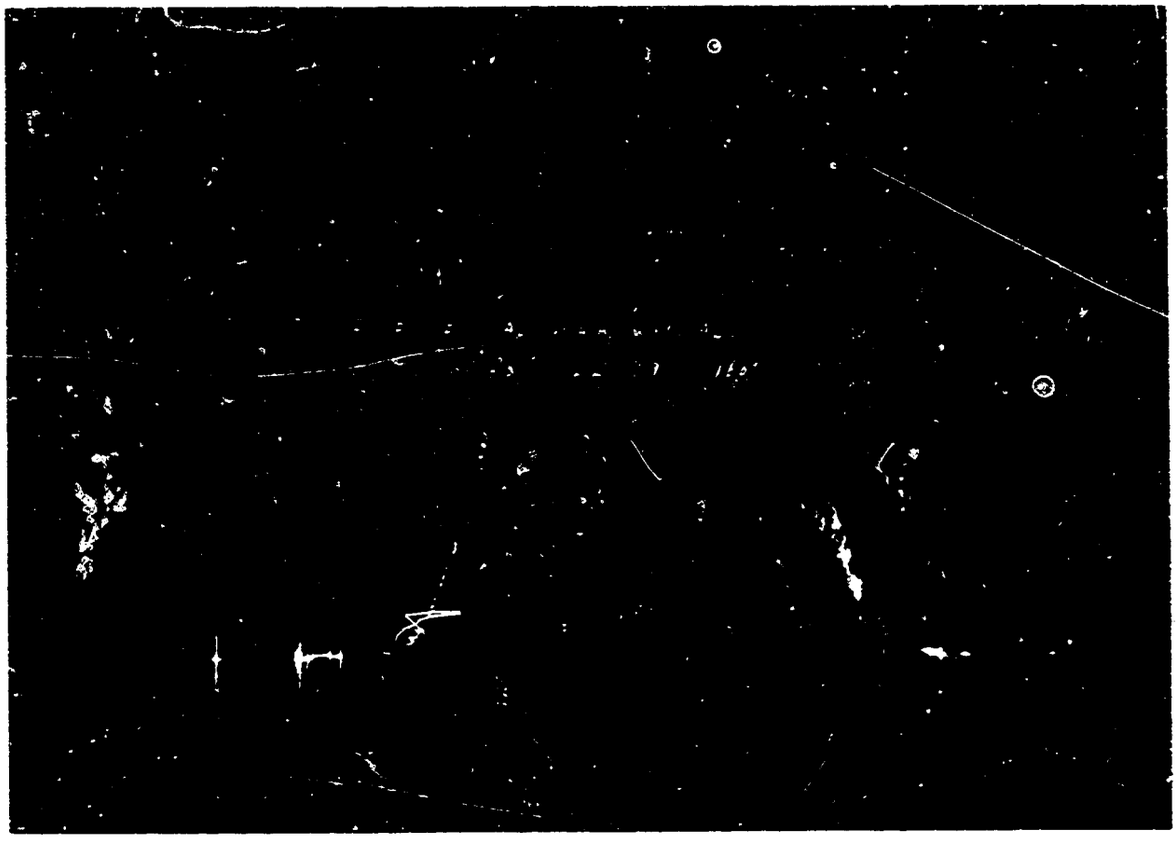
DRILL STEM TEST

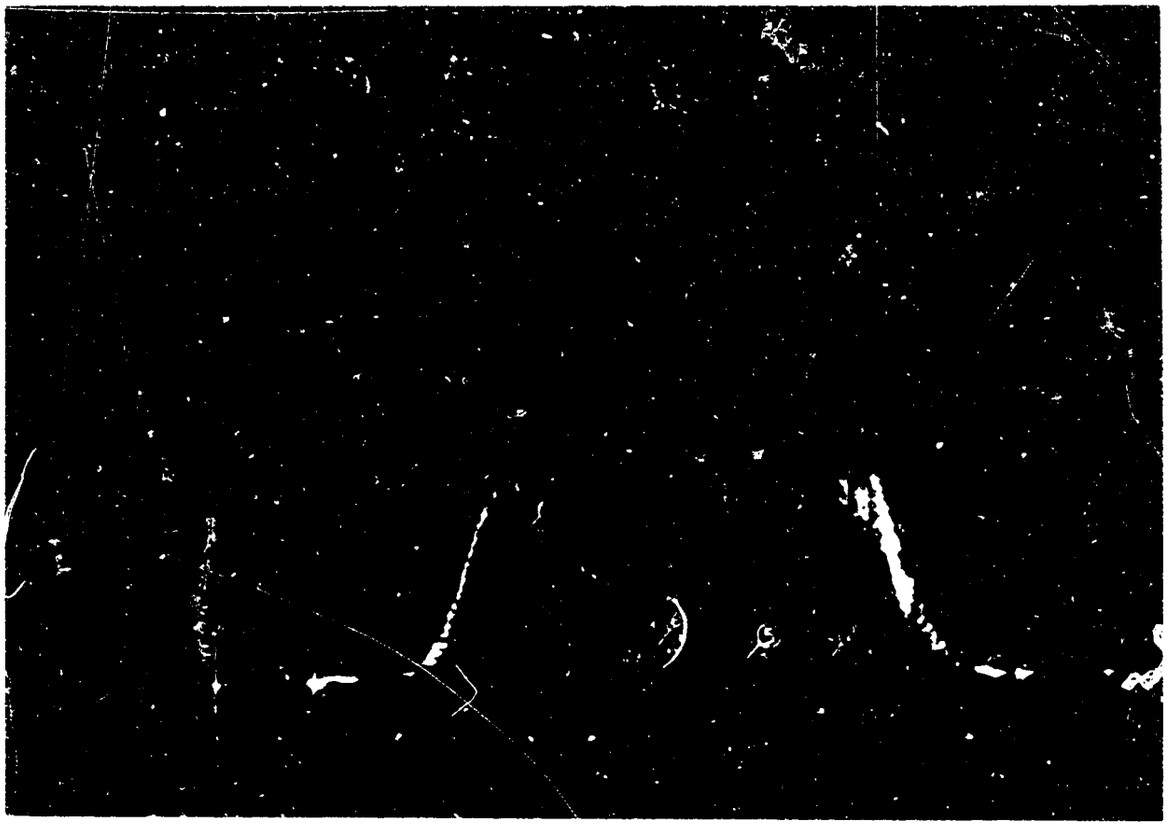
TECHNICAL SERVICE REPORT

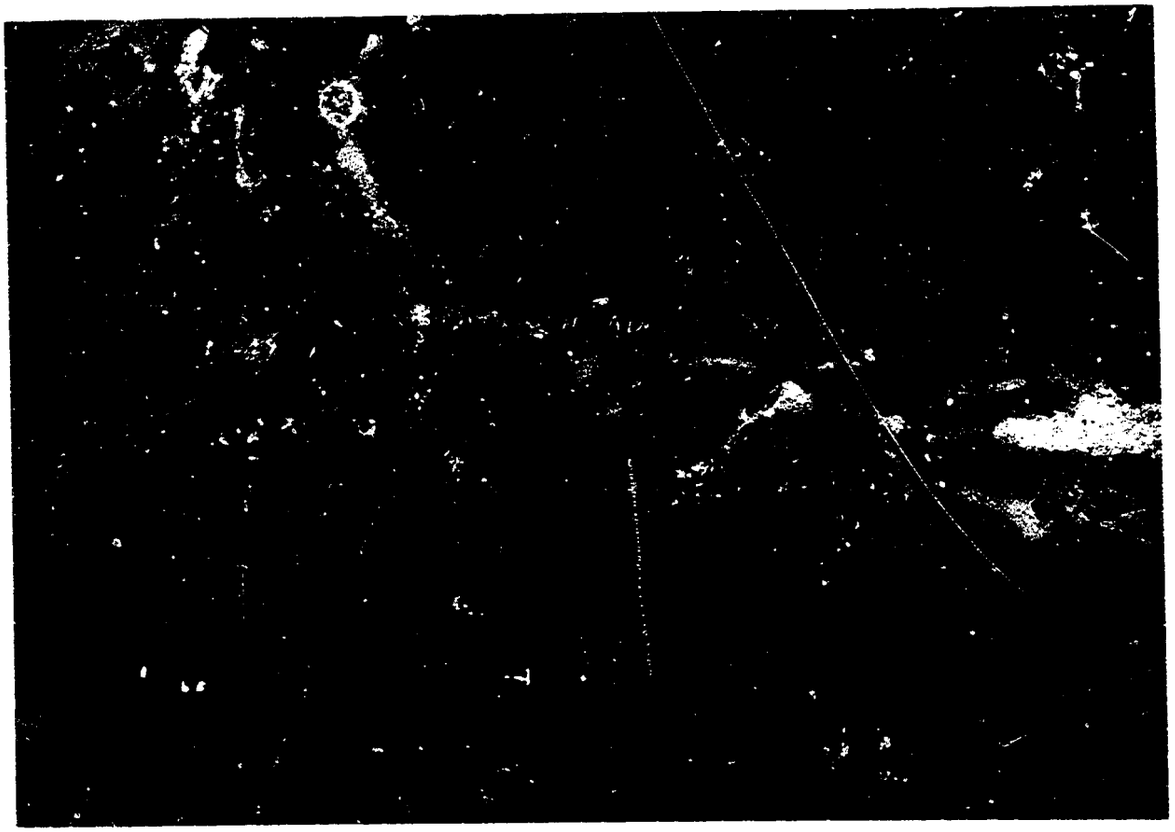


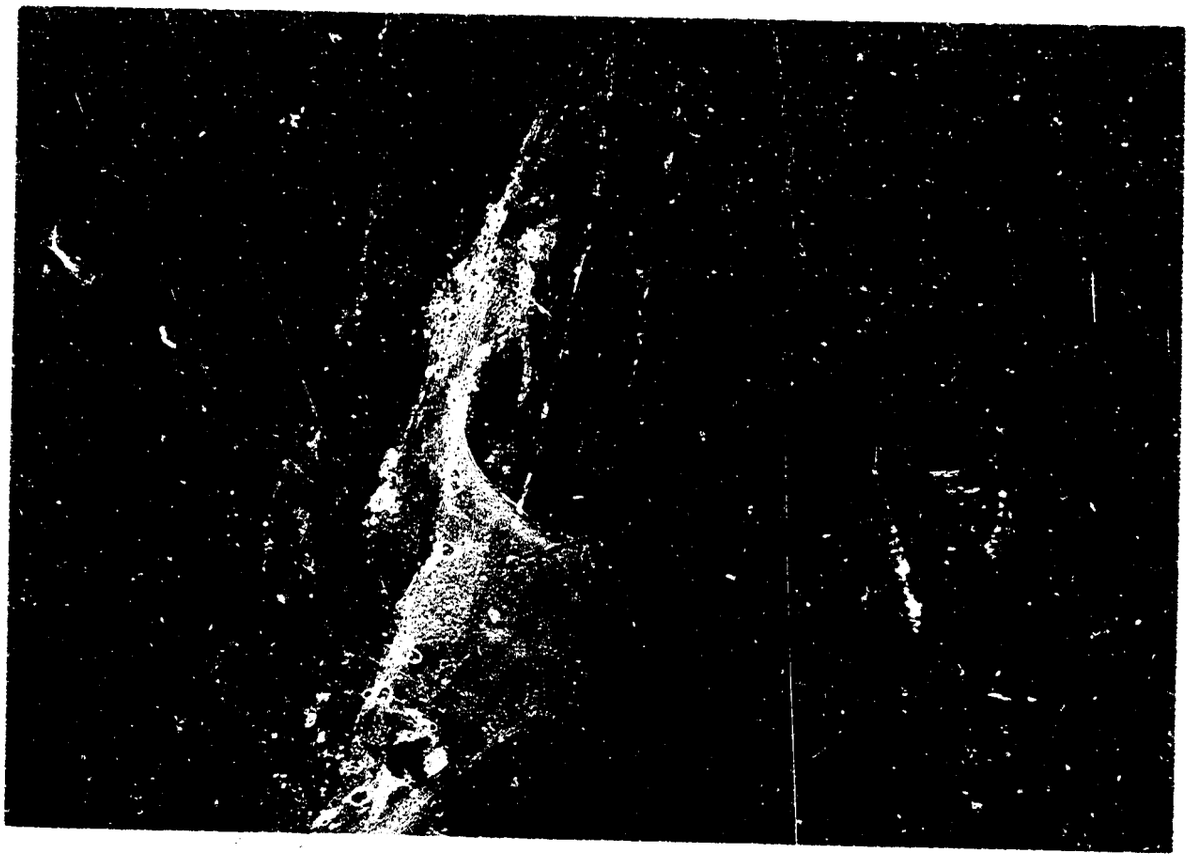


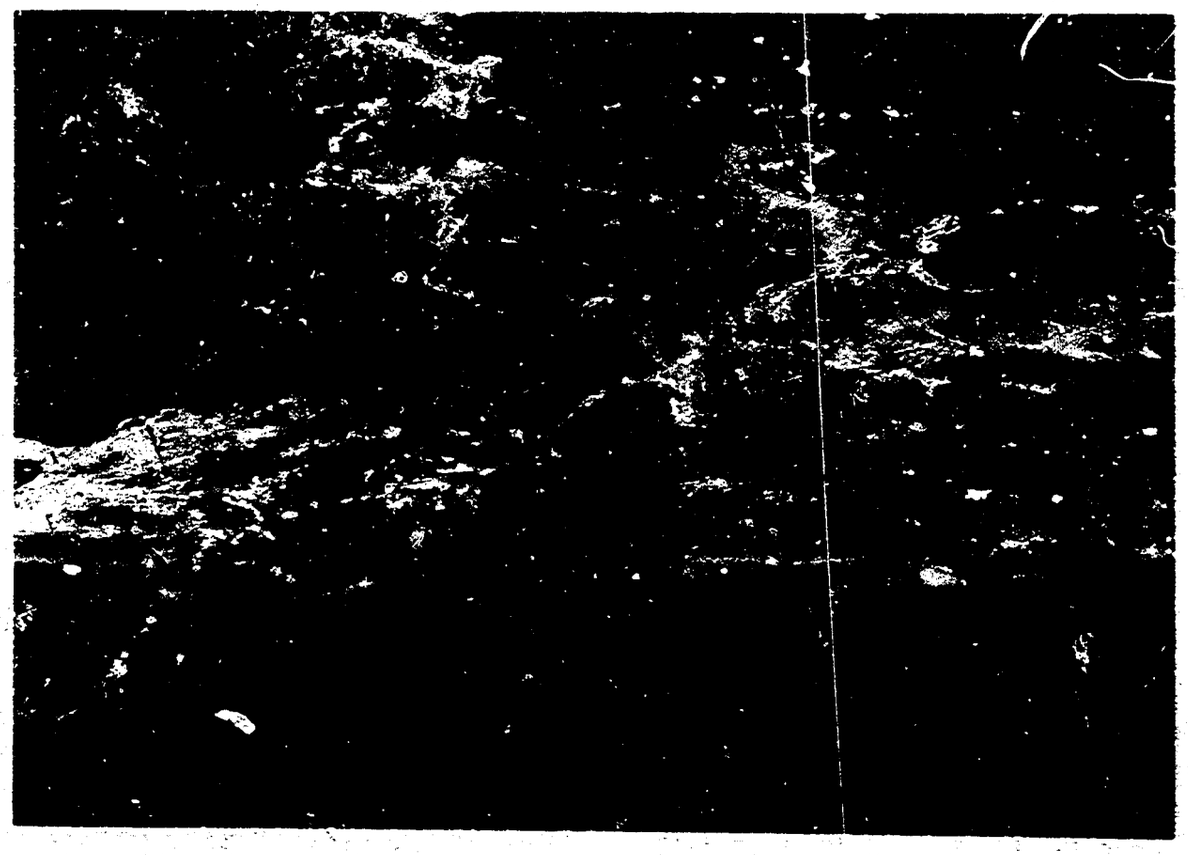












Imperial Oil Enterprises Ltd.
IOE et al Arrowhead L 49 60° 28' 122° 39' DST # 1

NOMENCLATURE (Definition of Symbols)

Q	= average production rate during test, bbls./day
Q_g	= measured gas production rate during test MCF/day
k	= permeability, md
h	= net pay thickness, ft (when unknown, test interval is chosen)
μ	= fluid viscosity, centipoise
Z	= compressibility factor
T_r	= reservoir temperature, ° Rankine
m	= slope of final SIP buildup plot, psig/cycle ($psig^2$/cycle for gas)
b	= approximate radius of investigation, feet
r_w	= wellbore radius, feet
t_p	= total flowing time, minutes
P_*	= Extrapolated maximum reservoir pressure, psig
P_f	= final flowing pressure, psig
P.I.	= productivity index, bbls./day/psi
$P.I._*$	= theoretical productivity index with damage removed, bbl./day/psi
D.R.	= damage ratio
E.D.R.	= estimated damage ratio
AOF	= absolute open flow potential, MCF/D
AOF_*	= theoretical absolute open flow if damage were removed
Z	= subsea depth
W	= water gradient based on salinity
Ω_w	= potentiometric surface

In making any interpretation, our employees will give Customer the benefit of their best judgment as to the correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical, mechanical or other measurements, we cannot, and do not, guarantee the accuracy or correctness of any interpretations, and we shall not be liable or responsible, except in the case of gross or wilful negligence on our part, for any loss, costs, damages or expenses incurred or sustained by Customer resulting from any interpretation made by any of our agents or employees.

DEFINITION OF SYMBOLS

Recorder Depth 1850 ft. Subsea depth ft. Ticket No. 0775 Hour Recorder No. 906

t_0 = 5 Mins. Initial Shut-in Pressure | Second Flow Pressure | t_0 = 65 Mins. Final Shut-in Pressure

Time, Min. Ø	$\frac{t_0 + Ø}{Ø}$	PSIG	PSIG² ÷10⁶ (Gas)	Time Defl. .000"	PSIG	Time, Min. Ø	$\frac{t_0 + Ø}{Ø}$	PSIG	PSIG² ÷10⁶ (Gas)
0	----	28				0	----	105	
5	2.000	617				5	14.000	510	
10	1.500	627				10	7.500	556	
15	1.333	630				15	5.333	596	
20	1.250	631				20	4.250	604	
25	1.200	632				25	3.600	610	
30	1.167	634				30	3.167	614	
35	1.143	635				35	2.857	616	
40	1.125	636				40	2.625	617	
45	1.111	638				45	2.444	619	
50	1.100	638				50	2.300	620	
55	1.091	639				55	2.182	621	
60	1.083	640				60	2.083	622	
						65	2.000	623	
						70	1.928	624	
						75	1.867	624	
						80	1.813	625	
						85	1.764	525	
						90	1.722	626	

Recorder Depth ft. Subsea depth ft. Ticket No. Hour Recorder No.

t_0 = Mins. Initial Shut-in Pressure | Second Flow Pressure | t_0 = Mins. Final Shut-in Pressure

Time, Min. Ø	$\frac{t_0 + Ø}{Ø}$	PSIG	PSIG² ÷10⁶ (Gas)	Time Defl. .000"	PSIG	Time, Min. Ø	$\frac{t_0 + Ø}{Ø}$	PSIG	PSIG² ÷10⁶ (Gas)

Interval of Pressure Readings (Mins.) 1st Flow Press: 5 2nd Flow Press: 5

Remarks

DST #1

PRESSURE DATA

Recorder Depth 1875 ft. Subsea depth ft. Ticket No. 0274 Hour Recorder No. 968

t_o = 5 Mins. Initial Shut-in Pressure				Second Flow Pressure		t_o = 65 Mins. Final Shut-in Pressure			
Time, Min. Δt	$\frac{t_o + \Delta t}{\Delta t}$	PSIG	PSIG² ÷10⁶ (Gen)	Time Defl. .000"	PSIG	Time, Min. Δt	$\frac{t_o + \Delta t}{\Delta t}$	PSIG	PSIG² ÷10⁶ (Gen)
						0	----	113	
						5	14.000	327	
						10	7.500	542	
0	----	60				15	5.333	594	
5	2.000	621				20	4.250	610	
10	1.500	635				25	3.600	618	
15	1.333	640				30	3.167	623	
20	1.250	643				35	2.857	626	
25	1.200	644				40	2.625	628	
30	1.167	645				45	2.444	630	
35	1.143	647				50	2.300	631	
40	1.125	648				55	2.182	632	
45	1.111	649				60	2.083	633	
50	1.100	649				65	2.000	635	
55	1.091	650				70	1.928	636	
60	1.083	650				75	1.867	636	
						80	1.812	637	
						85	1.764	637	
						90	1.722	637	

Recorder Depth ft. Subsea depth Ck. Ticket No. Hour Recorder No.

t_o = Mins. Initial Shut-in Pressure				Second Flow Pressure		t_o = Mins. Final Shut-in Pressure			
Time, Min. Δt	$\frac{t_o + \Delta t}{\Delta t}$	PSIG	PSIG² ÷10⁶ Δt	Time Defl. .000"	PSIG	Time, Min. Δt	$\frac{t_o + \Delta t}{\Delta t}$	PSIG	PSIG² ÷10⁶ (Gen)

Interval of Pressure Readings (Mins.) ISIP 5 2nd Flow Press. FSIP 5

Remarks DST # 1

PRESSURE DATA

Recorder Depth 1880 ft. Subsea depth ft. Ticket No. 07214 Hour Recorder No. 909

t_o = 5 Mins. Initial Shut-in Pressure				Second Flow Pressure		t_o = 65 Mins. Final Shut-in Pressure			
Time, Min. Θ	$\frac{t_o + \Theta}{\Theta}$	PSIG	PSIG² ÷10⁶ (Gas)	Time Defl. 200"	PSIG	Time, Min. Θ	$\frac{t_o + \Theta}{\Theta}$	PSIG	PSIG² ÷10⁶ (Gas)
						0	------	115	
0	------	47				5	14.000	349	
5	2.000	625				10	7.500	554	
10	1.500	636				15	5.333	595	
15	1.333	639				20	4.250	610	
20	1.250	642				25	3.600	618	
25	1.200	642				30	3.167	622	
30	1.167	643				35	2.857	624	
35	1.143	645				40	2.625	626	
40	1.125	646				45	2.444	628	
45	1.111	647				50	2.300	630	
50	1.100	648				55	2.182	632	
55	1.091	649				60	2.083	633	
60	1.083	649				65	2.000	634	
						70	1.928	635	
						75	1.867	636	
						80	1.812	636	
						85	1.764	637	
						90	1.722	637	

Recorder Depth ft. Subsea depth ft. Ticket No. Hour Recorder No.

t_o = Mins. Initial Shut-in Pressure				Second Flow Pressure		t_o = Mins. Final Shut-in Pressure			
Time, Min. Θ	$\frac{t_o + \Theta}{\Theta}$	PSIG	PSIG² ÷10⁶ Θ	Time Defl. 200"	PSIG	Time, Min. Θ	$\frac{t_o + \Theta}{\Theta}$	PSIG	PSIG² ÷10⁶ (Gas)

Interval of Pressure Readings (Mins.) ISIP 5 2nd Flow Press. FSIP 5

Remarks: DST # 1

PRESSURE DATA

LYNES UNITED SERVICES LTD.

TEST DATA | Test No. 1 | Lynes Test 1

Formation: Basal Cret Ss. | T.D. | Ft.
Interval Tested: 1845 Ft. to 1892 Ft.
Feet of Net Pay Tested: 47 Ft.
Type of Test: Dual Bottom Hole Conventional
Cushion: Amount Ft.
Started in Hole at: 1030 Hrs. Final Open at: 1215 Hrs.

Pre-Flow	5 Mins.	Initial Shut-in	60	Mins.
2nd Flow	Mins.	Second Shut-in		Mins.
Final Flow	60 Mins.	Final Shut-in	90	Mins.

Remarks:

Blow: Very weak initial puff, increasing slowly. Very weak air blow throughout the test.

GENERAL INFORMATION

Company: Imperial Oil Enterprises Ltd.
Address: 10025 Jasper Avenue, Edmonton, Alberta
Well Name: IOE et al Arrowhead L49
Well Number: 60° 28' 122° 39'
K.B. Elevation: 1723 Sub-Sea Elevation
Area: Arrowhead Province: N.W.T.
Company Rep.: Chuck Riley
Tester: Russ Yohemas
Contractor: SAT Rig No. 5
Ticket No.: 0774 Date: February 1, 1970
Service Reports To: 14 - above address

GAS FLOW MEASUREMENTS

Measured with

Time	Surface Choke	Bleeding Inches	Cubic Feet/Day

DRILL STEM TEST DATA

Mud Type: Gel Chemical
Weight: 9.4 Viscosity: 68 Water Loss: 5.2
Filter Cake: 2/32" Bottom Hole Temperature: 100°
Drill Pipe Size: 4 1/2" FH Weight: 16.60
Drill Collars: 3 1/4" I.D. 2 7/8" Feet Run: 433.40
Main Hole or Casing Size: 7 7/8"
Rathole or Liner Size: No. of Feet:
Bottom Hole Choke Size:
Surface Choke Size:
Packer Rubber Size: 7"

REMARKS: Shut-in pressures suggest average permeability within the interval tested.

RECOVERY

TOTAL FLUID RECOVERED: 110 Ft. Consisting of:
110 Ft. of Drilling mud
Ft. of
Ft. of
Ft. of
Test was/was not Reversed Circulated: WAS NOT
Oil Recovery A.P.I. Water Specific Gravity
Salinity

PRESSURE READINGS

	Inside X Outside	Inside Outside X	Inside Outside X	Inside Outside X
Recorder No.	906	966	909	6652
Capacity	3050	5060	4000	70 - 270°
Depth	1850	1875	1880	1868

NUMBER KEY:

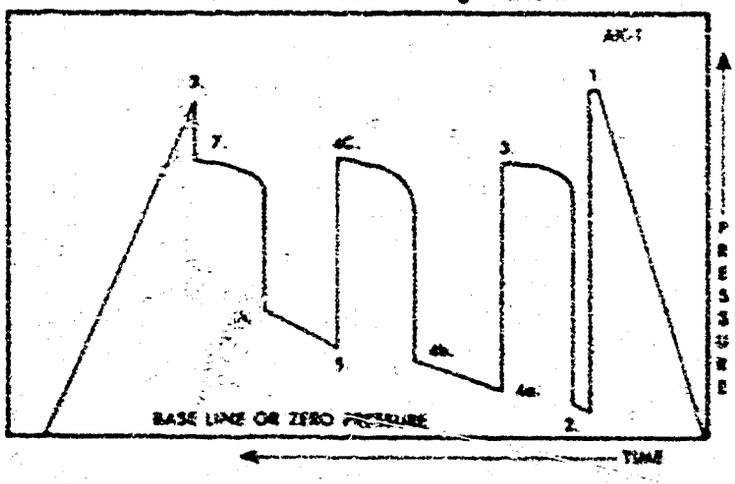
1 - INITIAL HYDROSTATIC	909	926	922	
2 - PRE-FLOW	28	40	47	100°
3 - INITIAL SHUT-IN	640	650	649	
4a - 2nd INITIAL FLOW				
4b - 2nd FINAL FLOW				
4c - 2nd SHUT-IN				
5 - 3rd INITIAL FLOW	51	56	65	
6 - FINAL FLOW	105	113	115	
7 - FINAL SHUT-IN	626	637	637	
8 - FINAL HYDROSTATIC	900	919	917	

Imperial Oil Enterprises Ltd. — Company
IOE et al Arrowhead L49 60° 28' 122° 39' — Well Name and Description
1 — Test No.
February 1, 1970 — Date of Test

LYNES

GUIDE TO INTERPRETATION AND IDENTIFICATION OF LYNES DRILL STEM TEST PRESSURE CHARTS

AK-1 recorders. Read from right to left.

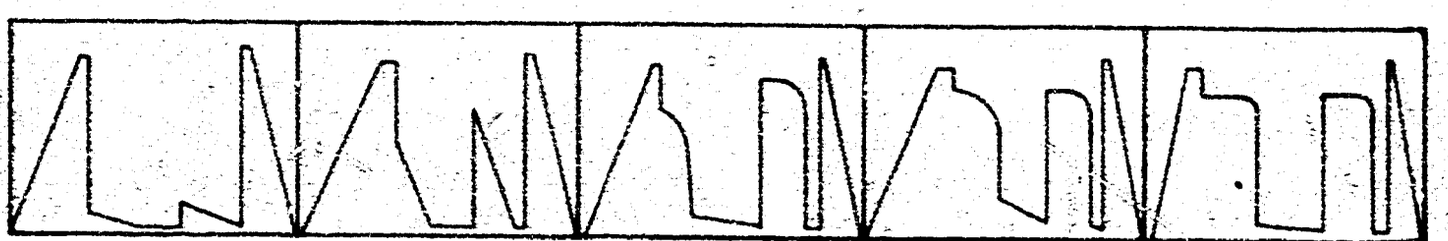


K-3 recorders. Read from left to right.

1. INITIAL HYDROSTATIC MUD PRESSURE
2. PRE-FLOW
3. INITIAL SHUT-IN
4a. 2nd INITIAL FLOW
4b. 2nd FINAL FLOW
4c. 2nd SHUT-IN
5. 3rd INITIAL FLOW
6. FINAL FLOW
7. FINAL SHUT-IN
8. FINAL HYDROSTATIC MUD PRESSURE

N.B. When only two shut-in and flow periods are run, 4a, 4b and 4c are omitted.

Typical charts for visual field analysis ranging from very low to high permeability.



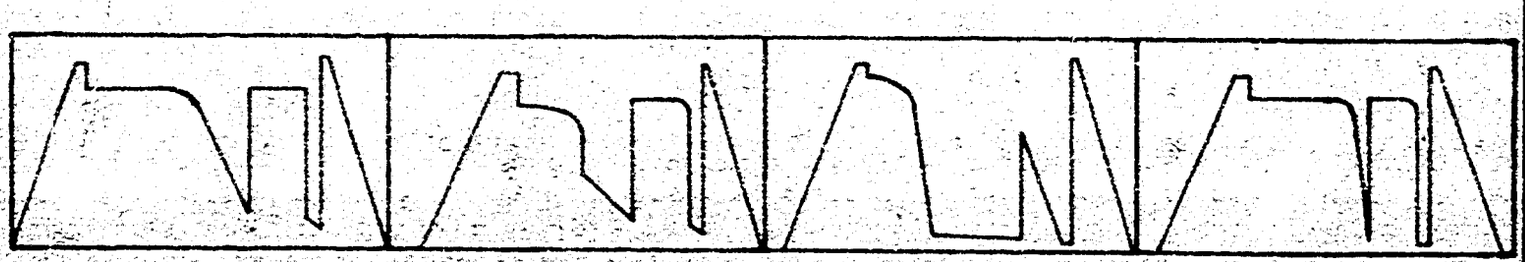
Very low permeability. Usually only mud recovered from interval tested. Virtually no permeability.

Slightly higher permeability. Again usually mud recovered.

Slightly higher permeability Small recovery, less than 200' ft).

Average permeability. Final and initial shut-ins differ by 50 psi.

Average permeability. Strong damage effect. High shut-in pressure, low flow pressure.



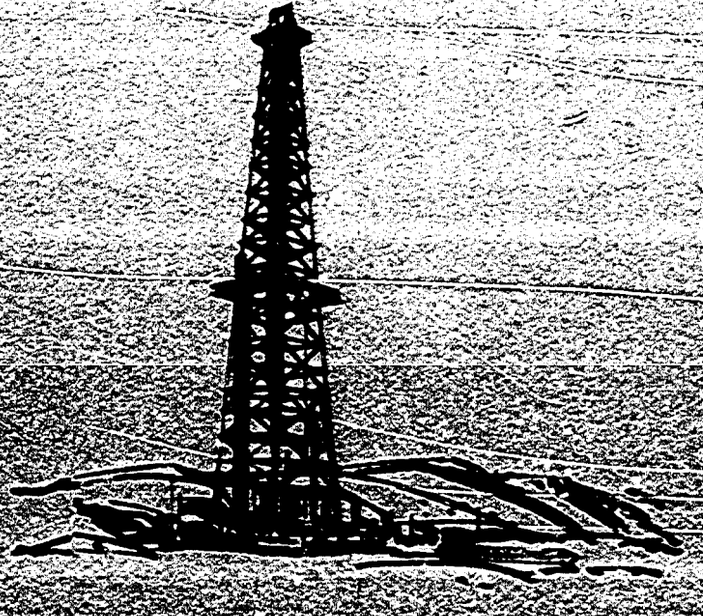
Excellent permeability where final flow final shut-in pressure.

High permeability where ISIP and FSIP are within 10 psi.

Deep well bore invasion or damage. Final shut-in higher than the initial shut-in.

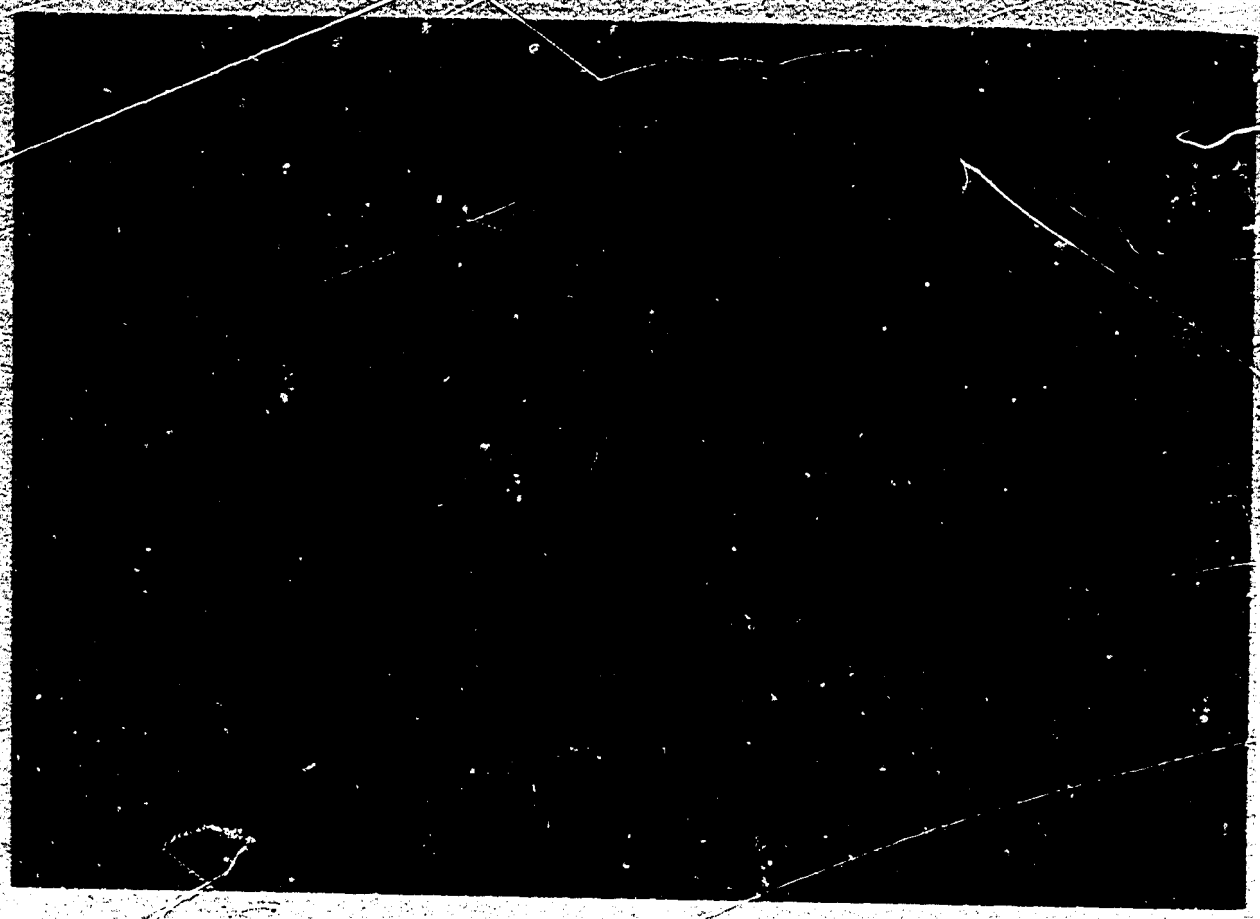
Tight hole chamber tester. Permeability very difficult to interpret unless the recovery is less than chamber length. Flow pressure builds up rapidly if recovery is large, similar to a shut-in.

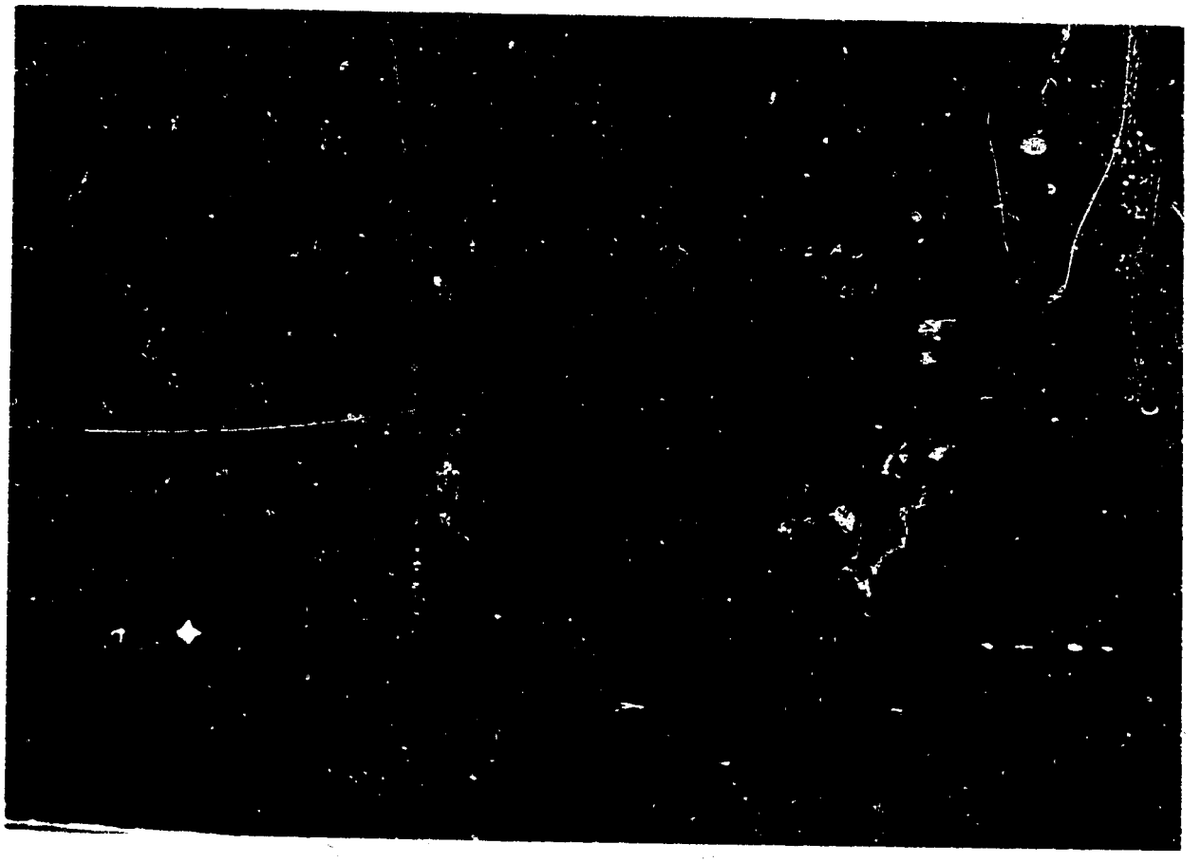
LYNES



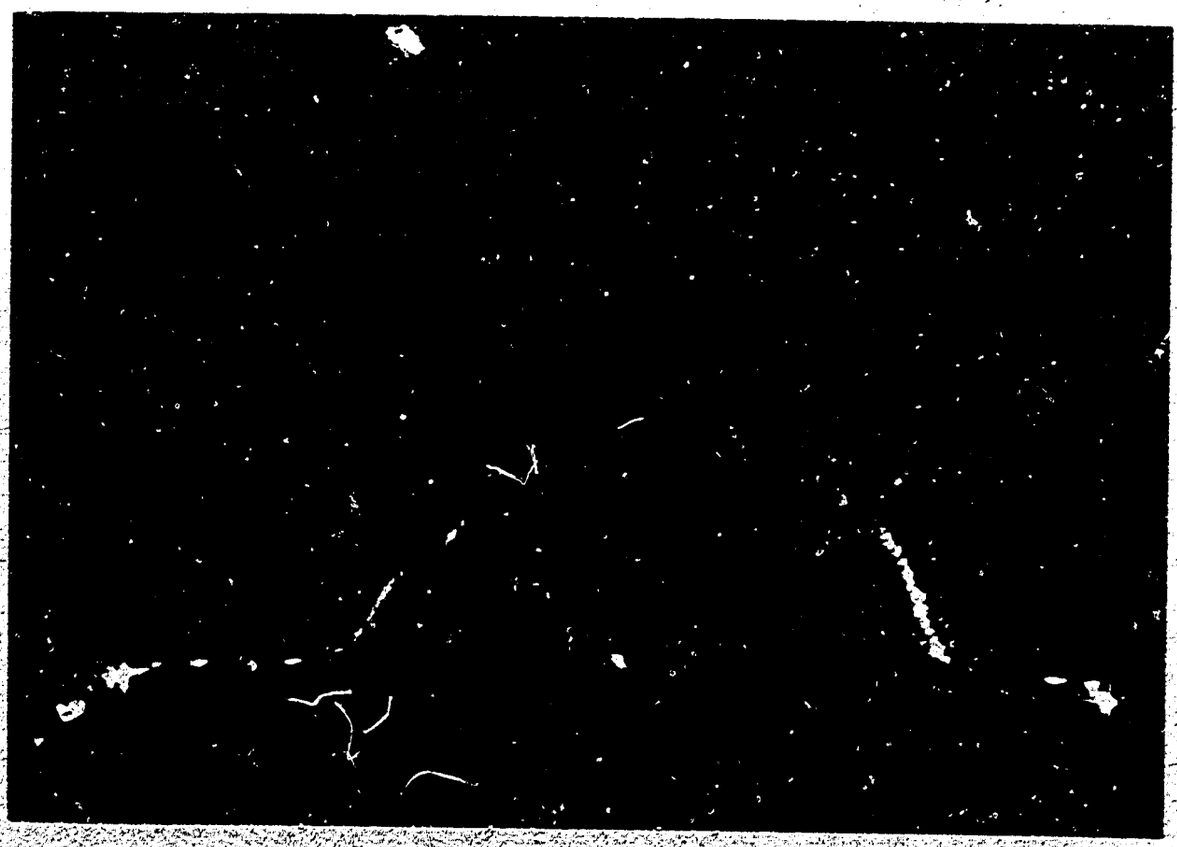
DRILL STEM TEST
TECHNICAL SERVICE REPORT

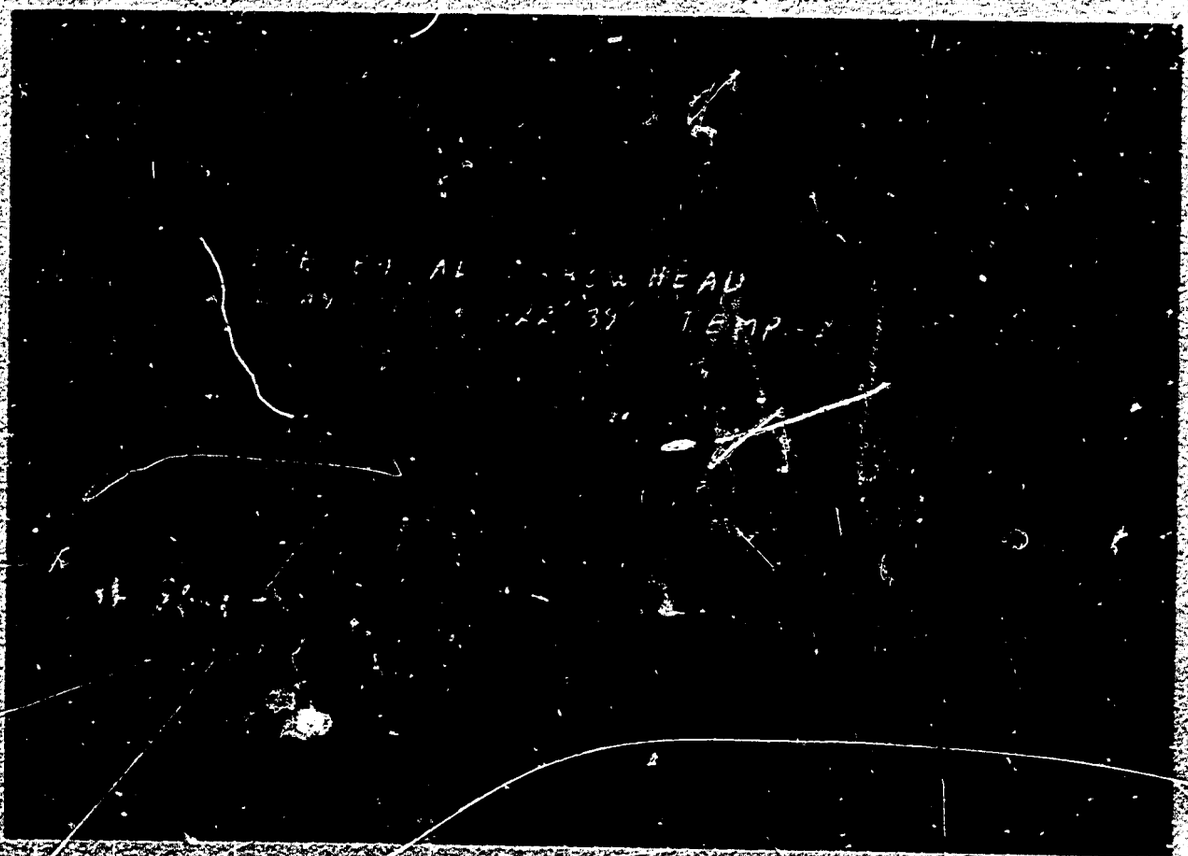




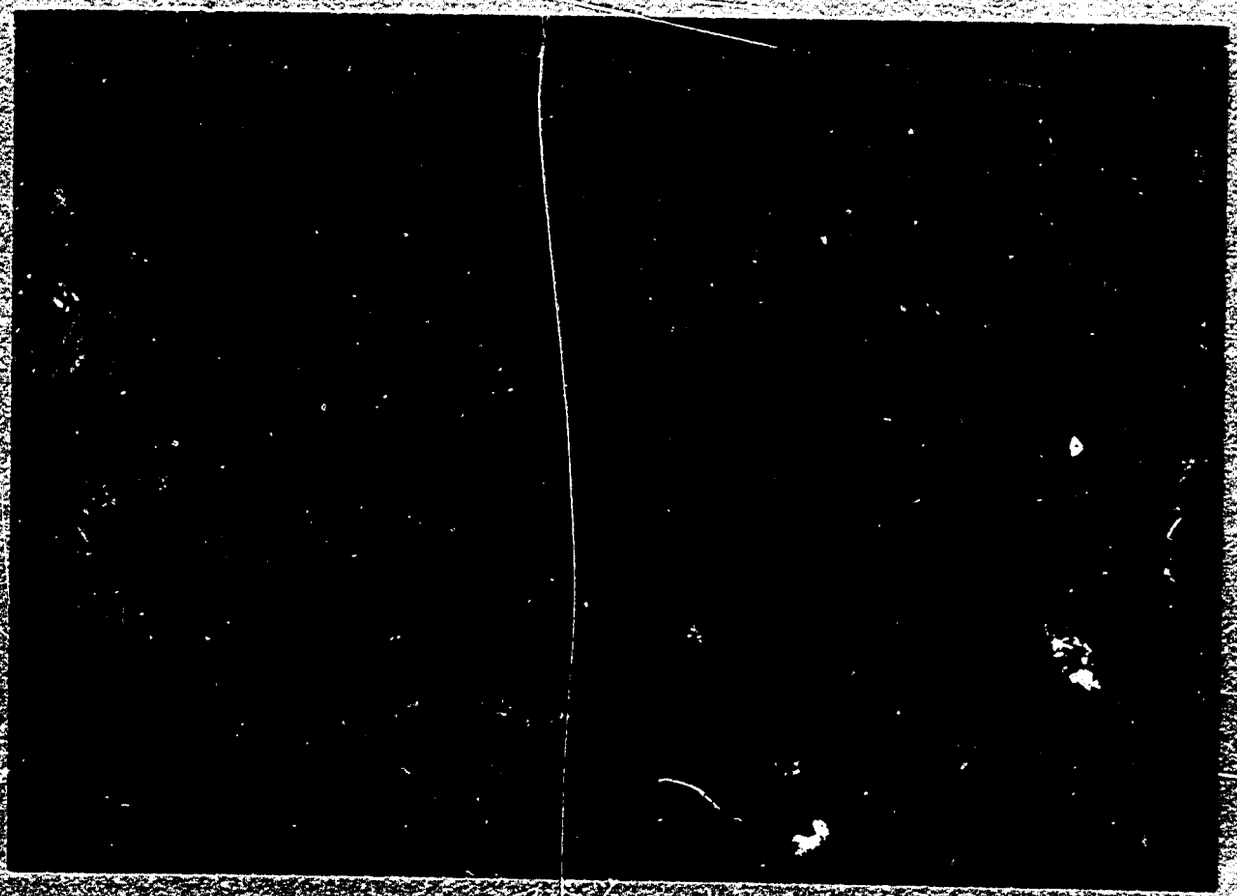







HEAD
TEMP





LYNES UNITED SERVICES LTD.

TEST DATA | Test No. 2 | Cushion Tool 2

Formation: Basal Cret Ss | From 2420 | To
Interval Tested: 1845 | To 1900
Feet of Pipe Tested: 555
Type of Test: Dual Straddle DST-Pass
Cushion: Amount
Started in Hole at: 2115 hrs | Tool Open at: 2121 hrs
Pre Flow: 5 Mins | Initial Shut-in: 60 Mins
2nd Flow: Mins | Second Shut-in: Mins
Final Flow: 60 Mins | Final Shut-in: 90 Mins
Remarks:

Blow: Strong initial puff. Strong air blow on valve open decreasing to nothing in 30 minutes.

GENERAL INFORMATION

Company: Imperial Oil Enterprises Ltd.
Address: 1400 Jasper Avenue, Edmonton, Alberta
Well No. etc: IOE et al Arrowhead L-49
Well Name: [illegible]
K.B. Elevation: 1710 | Sub Sea Elevation
Area: Arrowhead | Province: N.W.T.
Company Rep: Chuck Riley
Tester: Ross Tonneas
Contractor: S&T | Rig No. 3
Ticket No: 0773 | Date: February 4, 1970
Service Report To:
14 - above address

GAS FLOW MEASUREMENTS

Measured with:

Time	Orifice Choke	Reading Inches	Cubic Feet/Day

MUD AND HOLE DATA

Mud Type: Gel Chemical
Weight: 9.4 | Viscosity: 74 | Water Loss: 4.8
Filter Cake: 2/32" | Bottom Hole Temperature: 97°
Drill Pipe Size: 4 1/2" FH | Weight: 16.60
Drill Collars: 6 1/4" | ID: 2 7/8" | Feet: 293.10
Hole or Casing Size: 7 7/8"
Rathole or Liner Size: | No. of Feet:
Bottom Hole Choke Size:
Surface Choke Size:
Packer Rubber Size: 7"

REMARKS: Shut-in pressures suggest excellent permeability within the interval tested.

RECOVERY

TOTAL FLUID RECOVERED: 1308 | Ft. Consisting of:
200 Ft. of Drilling mud
1100 Ft. of Salt water
Ft. of
Ft. of
Test was/was not Reversed Circulated: was not
Oil Recovery A.P.I. | Water Specific Gravity
Salinity: 21,100 PPM | 11,540 PPM

PRESSURE READINGS

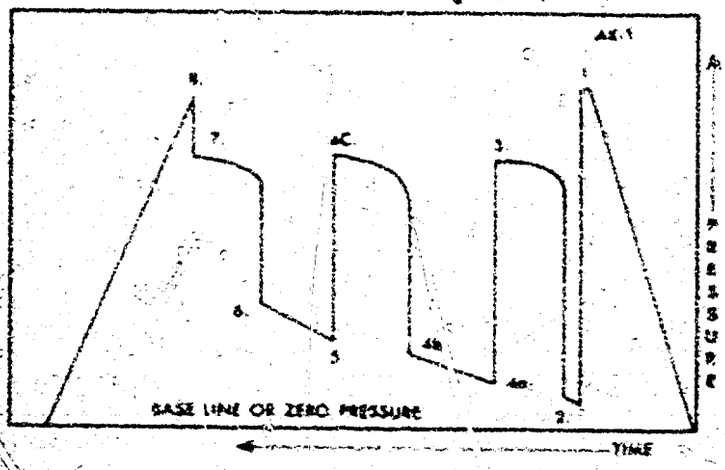
	Inside X Outside	Inside Outside X	Inside Outside X	Inside Outside X
Recorder No.	906	966	5864	6652
Capacity	3050	5040	5100	70 - 170°
Depth	1825	1880	1985	1890
1 - INITIAL HYDROSTATIC	901	930	1027	
2 - PRE-FLOW	545	600		97°
3 - INITIAL SHUT-IN	626	645		
4a - 2nd INITIAL FLOW				
4b - 2nd FINAL FLOW				
4c - 2nd SHUT-IN				
5 - 3rd INITIAL FLOW	582	628		
6 - FINAL FLOW	629	651		
7 - FINAL SHUT-IN	628	650		
8 - FINAL HYDROSTATIC	901	930	1027	

Imperial Oil Enterprises Ltd. — Company
IOE et al Arrowhead 60° 28' 122° 29' — Well Name and Description
2 — Test No.
February 4, 1970 — Date of Test

LYNES

GUIDE TO INTERPRETATION AND IDENTIFICATION OF LYNES DRILL STEM TEST PRESSURE CHARTS

AK-1 recorders. Read from right to left



1. INITIAL HYDROSTATIC MUD PRESSURE
2. PRE-FLOW
3. INITIAL SHUT-IN
4a. 2nd INITIAL FLOW
4b. 2nd FINAL FLOW
4c. 2nd SHUT-IN
5. 3rd INITIAL FLOW
6. FINAL FLOW
7. FINAL SHUT-IN
8. FINAL HYDROSTATIC MUD PRESSURE

K-3 recorders. Read from left to right.

N.B. When only two shut-in and flow periods are run, 4a, 4b and 4c are omitted.

Typical charts for visual field analysis ranging from very low to high permeability.



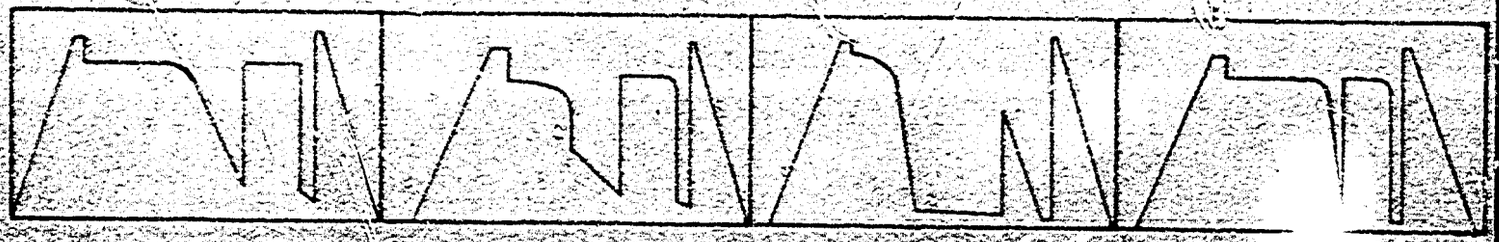
Very low permeability. Usually only mud recovered from interval tested. Virtually no permeability.

Slightly higher permeability. Again usually mud recovered.

Slightly higher permeability. Small recovery, less than 200' fill.

Average permeability. Final and initial shut-ins differ by 50 psi.

Average permeability. Strong drawdown effect. High shut-in pressure, low flow pressure.



Excellent permeability where final flow, final shut-in pressure.

High permeability where ISIP and FSIP are within 10 psi.

Deep well bore invasion or damage. Final shut-in higher than five minute shut-in.

Tight hole chamber tester. Permeability very difficult to interpret unless the recovery is less than chamber length. Flow pressure builds up rapidly if recovery is large, similar to a shut-in.