NSM

ARROWHEAD G-69

9211-N9-2-1-IRE

D.A.# 1138

Canada Oil and Gas Lands Administration / Administration du pétrole et du gaz des terres du Canada

E.A.# 175

Nova Scotia	☐	West Coast	☐	Exploratory	X
Newfoundland	☐	Northern	X	Development	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Delineation	☐
				Service	☐

AUTHORITY TO DRILL A WELL

APPLICATION

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

Well Name in Full: NSM ARROWHEAD J-69

Operator: NSM RESOURCES LTD. | Drilling Program No.: N/A

Contractor: Regent Drilling Ltd. | Permit or Lease No.: N/A

Drilling Rig or Unit: #2 | Estimated Well Cost: $2,100,000

Location Unit: J | Section: 69 | Grid Area: 60-40-122-45

Coordinates Lat: 60° 38' 32" N | Long: 122° 57' 00" W

Area: Cameron Hills | Field/Pool: N/A

Elevation ~~KB~~: 508 m ~~Ground~~: 503 m

Approx. Spud Date: 1984-02-05 | Estimated Days on Location: 40

Anticipated Total Depth: 2425 mKB | Target Horizon(s): Slave Point

UWI: 300J696040122450

ADEQUATE !
RELEASED PN
DATE 84-01-25

EVALUATION PROGRAM

Ten metre sample intervals: None

Five metre sample intervals: 20 mKB to TD

Canned sample intervals: All Bagged and Vials

Conventional cores at: 2265 mKB est.

Logs and Tests: DIL-SP, BHCS-G-C, CNL-FDC TD to Surf. Casing
DST's as required; Velocity Survey at TD

CASING AND CEMENTING PROGRAM

O.D.	Weight	Grade	Setting Depth mKB	Cementing Program (Volumes)
508	140.0 kg/m	H-40	18	7 t Const. to Surf.
339	81.1	J-55	300	40 t CL "G" to Surf.
244	53.6	J-55	700	23 t 1:1 +2% to 250 mKB
139.7	25.3	K-55	2200	15 t CL "G" to 1925 mKB
139.7	25.3	MODIFIED N-80	2425	

BOP Equipment: 1- Annular, 2- Single Gates 21 mPa
1- Rotating Head while Drilling w/Air

Other Information: See Attached: - Drilling Program
- Contingency Plans
- Comments on Divertors

Signed: [signature] JAN 5/84 | Title: Vice-President, Resource Division

Date | Company: NSM Resources Ltd.

APPROVAL

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

Signed: [signature] Engineering Branch

Date: 84.02.02

File: 9211-J9-2-1

Department of Energy, Mines and Resources / Ministère de l'Énergie, des Mines et des Ressources

Department of Indian Affairs and Northern Development / Ministère des affaires indiennes et du Nord canadien

Canada

Canada Oil and Gas Lands Administration | Administration du pétrole et du gaz des terres du Canada

				Well Status	
Nova Scotia	☐	West Coast	☐	Suspended	☒
Newfoundland	☐	Northern	☒	Completed	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Abandoned	☐

WELL TERMINATION RECORD

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

WELL DATA

Well Name: NSM ARROWHEAD G-69 Area: Cameron Hills

Grid Area: 60-40-122-45 Field/Pool: Exploratory

Permit or Lease No.: N/A Final Coordinates: Lat.: 60°38' 24.43" N. Long: 122°57' 2.47"W

Drilling Unit: Regent #2 Elevations-RT/KB: 496.1 SF/GL: 502.0

Spud Date: 2000 hrs. 84/02/13 Rig Released: 1300 hrs. 84/03/30 Total Depth: 2502 MKB

CASING AND CEMENTING

O.D.:	Weight:	Grade:	Depth Set:	Cement and Additives:
340 mm	81.1	K-55	297.5 MKB	42 T Cl'G' + 2% $CaCl_2$
244 mm	53.57	K-55	751 MKB	9.5T Cl.G; +6% Gel and 20.0 T CL'G' + .5%FRC-1 +.5%FLC-1
177.8 mm	38.69	MN80	2500 MKB	Stage 1 20 T CL'G' + .75% FRC-1 + .25% FLC-1 + .70% CRH
	34.22	MN80	2000 MKB	Stage 2 40 T CL'G' + .75% FRC-1 + .2% CRL

PLUGGING PROGRAM

Approval of the following program was obtained by (person) G. Hagel from (person) M.D. Thomas of the Canada Oil and Gas Lands Administration by means of Letter on March 26 19 84

Type of Plug:	Interval:	Felt:	Cement and Additives:
	N/A		
178 mm casing ran and cemented - not drilled out.			

Lost Circulation/Overpressure Zones: Ft. Simpson Shale — Geo. Pressured

Equipment left on Seafloor (Describe): N/A

Provision for Re-entry (Describe and attach sketch): 177.8 mm Casing Stub with Cap welded on to accept Wellhead

Cores Type: N/A Intervals:

Other Downhole Completion/Suspension Equipment: N/A

CERTIFICATION

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

Signed: ..... P. Eng. Title: Consulting Engineer

Name: W.G. Hegel Date: 84/04/16

Acknowledged by: M.D. Thomas Engineering Branch

Date: 25 April 84

File: 9211-NG-2-1

Department of Energy, Mines and Resources / Ministère de l'Énergie, des Mines et des Ressources

Department of Indian Affairs and Northern Development / Ministère des Affaires indiennes et du Nord canadien

Canada

				Well Status	
Nova Scotia	☐	West Coast	☐	Suspended	☒
Newfoundland	☐	Northern	☒	Completed	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Abandoned	☐

APPLICATION TO ALTER CONDITION OF A WELL

ADEQUATE ✓
REVIEWED BY [illegible]
DATE 84-01-02

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

Well Name: NSM Arrowhead G-69 ✓ Area: Cameron Hills ✓

Coordinates: Lat: 60°38' 24.43"N Long: 122° 57' 2.47"W ✓

Operator: NSM Resources Ltd. Contractor: Roll'n Drilling ✓

Drilling Rig or Unit: Rig #10 (See Attached) ✓ Depth: 2502 MKB ✓

Date ATDW Issued: 84-02-02 Date of Last Operation 84-03-30 ✓

TYPE OF OPERATION

Well testing operation through casing and thereafter complete the well or abandon same in accordance with the regulations. ✓

SUMMARY OF PROPOSED OPERATIONS

Begin operations January 5, 1985 by testing the well according to the attached program. Testing operation including operation to complete or abandon is expected to take 20 days. See the attached map for the approximate location of this well. ✓

Signed: [signature] Title: Vice-President ✓

Date: December 19, 1984 Company: NSM Resources Ltd. ✓

APPROVAL

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

Signed: [signature]
Conservation Engineer

Date: 3 Jan 85

ATDW No: 1138 File: 9211-N9-2-1

Department of Energy, Mines and Resources
Ministère de l'Énergie, des Mines et des Ressources
Department of Indian Affairs and Northern Development
Ministère des Affaires indiennes et du Nord canadien

Canada

OTTAWA COPY

9211-N9-2-1

Support Material for this plan is recorded as number F.B. 33516 C.L.S.R.

CANADA OIL AND GAS LANDS ADMINISTRATION
ADMINISRATION DU PÉTROLE ET DU GAZ DES TERRES DU CANADA
JAN 16 1987
ENGINEERING BRANCH
GÉNIE

CANADA LANDS SURVEYS RECORDS
7 0 6 7 2
DATE 13 JAN. 1987

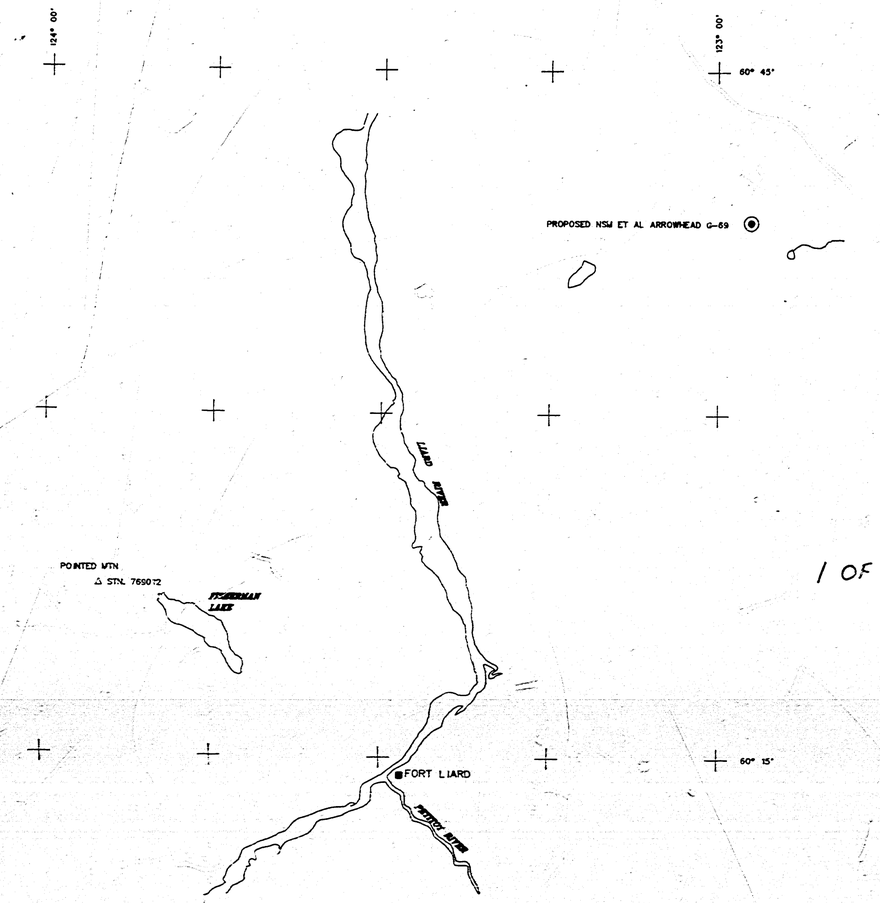
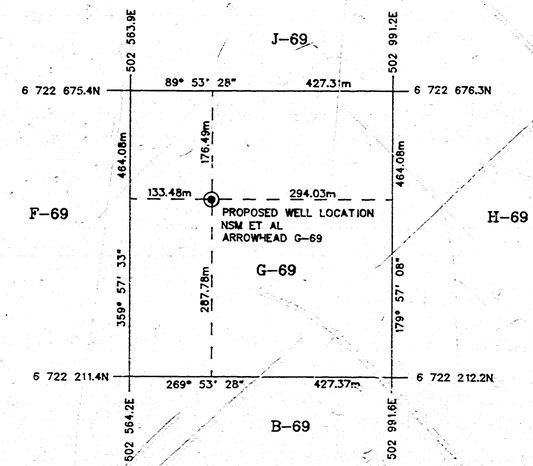


DIAGRAM SHOWING SURVEY OF WELLSITE

SCALE 1 : 250 000



DETAIL OF UNIT G SECTION 69

SCALE 1 : 5 000

100m 0 100 200m

1 OF

OIL AND GAS GRID COORDINATES, NAD 27					
		GEOGRAPHIC		UTM ZONE 10, C.M. 123°W	
	CORNER	LATITUDE, N	LONGITUDE, W	NORTHING (m)	EASTING (m)
GRID AREA	NE	60° 40'	122° 45'	6 725 481.1	513 883.4
	NW	60° 40'	123° 00'	6 725 455.1	500 000.0
	SE	60° 30'	122° 45'	6 706 917.8	513 734.0
	SW	60° 30'	123° 00'	6 706 891.7	500 000.0
UNIT G SECTION 69	NE			6 722 676.3	502 991.2
	NW			6 722 675.4	502 563.9
	SE			6 722 212.2	502 991.6
	SW			6 722 211.4	502 564.2

PROPOSED WELL LOCATION COORDINATES, NAD						
STATION	GEODETIC BEARING	SEA LEVEL DISTANCE	GEOGRAPHIC			
			LATITUDE, N	LONGITUDE, W	NORTHING (m)	EASTING (m)
CLS #2	55° 37' 50"	214.89	60° 38' 18.12"	122° 57' 22.58"	6 722 303.8	502 382.0
CLS #1	54° 45' 25"	127.77	60° 38' 22.04"	122° 57' 10.92"	6 722 425.1	502 569.1
1	89° 04' 00"	24.13	60° 38' 24.42"	122° 57' 04.06"	6 722 498.9	502 673.3
WELL LOC			60° 38' 24.43"	122° 57' 02.47"	6 722 499.3	502 697.4

PLAN AND FIELD NOTES

OF SURVEY OF ONSHORE

EXPLORATORY WELL LOCATION

NSM ET AL ARROWHEAD G-69

LATITUDE 60° 38' 24.43"N

LONGITUDE 122° 57' 02.47"W

GRID AREA 60° 40'N, 122° 45'W

SURVEYED JAN. 31 TO FEB. 3, 1984

BY MCELHANNEY SURVEYING AND ENGINEERING LTD

FOR NSM RESOURCES LTD.

LEGEND

Positioning was done by simultaneous Doppler satellite observations using Magnavox MX-1502 receivers between a base station on Pointed Mountain (GSC 769012) and station CLS #1. The post-processing of the combined data from both stations was carried out using the GEODOP program, documentation for which is available from the Geodetic Survey of Canada. The values used for the local datum shift conversion from the broadcast ephemeris datum to NAD 1927 were $\Delta x = -4m$, $\Delta y = +165m$, $\Delta z = +179m$, and were obtained from the Geodetic Survey of Canada.

Bearings and distances shown on the Unit Detail are UTM plane referred to Zone 10, Central Meridian 123°W, using a false easting of 500 000m.

All other distances are surface distances and are not reduced to the UTM plane unless indicated. Coordinates are referred to Doppler Satellite Station CLS #1. Bearings are Geodetic bearings derived from the astronic observation to Baotis #369 at Station 1.

All geographic coordinates are referred to 1927 North American Datum (1927NAD). UTM coordinates are computed for Zone 10, Central Meridian 123°W.

Elevations were derived from Station CLS # 1 and are expressed in metres and decimals thereof.

SURVEYED BY MCELHANNEY SURVEYING AND ENGINEERING LTD
SURVEY APPROVED
SURVEYOR'S SEAL

ASSESSMENT REPORT RECORDED
5 1 8 0 5

ASSESSMENT REPORT APPROVED
V 0 8 5 1

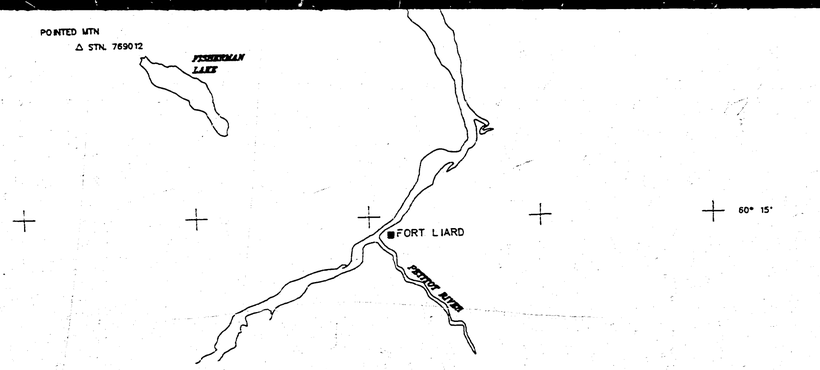


DIAGRAM SHOWING SURVEY OF WELLSITE

SCALE 1 : 250 000

25 000m 0 50 000m

OIL AND GAS GRID COORDINATES, NAD 27

		GEOGRAPHIC		UTM ZONE 10, C.M. 123°W	
	CORNER	LATITUDE, N	LONGITUDE, W	NORTHING (m)	EASTING (m)
GRID AREA	NE	60° 40'	122° 45'	6 725 481.1	513 683.4
	NW	60° 40'	123° 00'	6 725 455.1	500 000.0
	SE	60° 30'	122° 45'	6 706 917.8	513 734.0
	SW	60° 30'	123° 00'	6 706 891.7	500 000.0
UNIT G SECTION 69	NE			6 722 678.3	502 991.2
	NW			6 722 675.4	502 563.9
	SE			6 722 212.2	502 991.6
	SW			6 722 211.4	502 564.2

PROPOSED WELL LOCATION COORDINATES, NAD

STATION	GEODETIC BEARING	SEA LEVEL DISTANCE	GEOGRAPHIC			
			LATITUDE, N	LONGITUDE, W	NORTHING (m)	EASTING (m)
CLS #2			60° 38' 18.12"	122° 57' 22.58"	6 722 303.8	502 392.0
	55° 37' 50"	214.89				
CLS #1			60° 38' 22.04"	122° 57' 10.92"	6 722 425.1	502 569.1
	54° 45' 25"	127.77				
1			60° 38' 24.42"	122° 57' 04.06"	6 722 498.9	502 673.3
	89° 04' 00"	24.13				
WELL LOC			60° 38' 24.43"	122° 57' 02.47"	6 722 499.3	502 897.4

PRIMARY SURVEY

SUMMARY OF DOPPLER SATELLITE POINT SURVEY

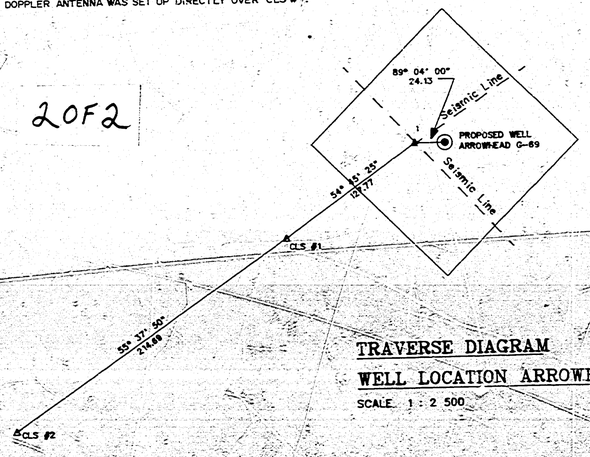
	CONTROL STATION GSC 769012 — 22 accepted passes observed between 17h GMT day 31 and 18h day 34, 1984			DERIVED STATION CLS #1 — 61 accepted passes observed between 18h GMT day 31 and 19h day 34, 1984	
	1927 NAD CO-ORDINATES (CLSR Plan no. 99000)*	OBSERVED GEOCENTRIC CO-ORDINATES (1) (broadcast ephemeris datum)	DERIVED DATUM SHIFT (Geocentric minus NAD)	OBSERVED GEOCENTRIC CO-ORDINATES (1) (broadcast ephemeris datum)	DERIVED 1927 NAD CO-ORDINATES (Geocentric minus Datum shift)
cartesian co-ordinates x	-1 764 041.701	-1 764 046.58m	-4.88m	-1 705 605.92m	-1 705 601.03m
cartesian co-ordinates y	-2 624 002.035	-2 623 840.83m	+161.21m	-2 630 953.32m	-2 631 114.53m
cartesian co-ordinates z	+5 522 191.065	+5 522 377.38m	+186.32m	+5 536 184.88m	+5 535 998.56m
Latitude φ	60° 22' 23.9618"N				60° 38' 22.037"N
Longitude λ	123° 54' 42.5324"W				122° 57' 10.921"W
Ht. above sea level H	1 406.19m				495.13m
Geoid ht.(GEM 10b) (2) N	10.57m				9.87m
Ht. above ellipsoid h	1 416.76m				504.80m

(1) Co-ordinates are on the geocentric World Geodetic System (WGS 72) as provided by the satellite's broadcast ephemeris.

(2) GEM-10B is the Goddard Earth Model of the geoid for which the given heights are computed relative to an eccentric 1927 NAD ellipsoid. The eccentricity used was the published datum shift at station 769012 $X_0 = -4$, $Y_0 = +165$, $Z_0 = +179$ (in Surveying Offshore Canada Lands for Mineral Resource Development, Third Edition, 1983).

DOPPLER ANTENNA WAS SET UP DIRECTLY OVER CLS # 1

2 OF 2



TRAVERSE DIAGRAM

WELL LOCATION ARROWHEAD G-69

SCALE 1 : 2 500

LEGEND

Positioning was done by simultaneous Doppler satellite observations using Magnavox MX-1502 receivers between a base station on Pointed Mountain (GSC 769012) and station CLS #1. The post-processing of the combined data from both stations was carried out using the GEODOP program, documentation for which is available from the Geodetic Survey of Canada. The values used for the local datum shift conversion from the broadcast ephemeris datum to NAD 1927 were $\Delta x = -4$m, $\Delta y = +165$m, $\Delta z = +179$m, and were obtained from the Geodetic Survey of Canada.

Bearings and distances shown on the Unit Detail are UTM plane referred to Zone 10, Central Meridian 123°w, using a false easting of 500 000m.

All other distances are surface distances and are not reduced to the UTM plane unless indicated. Coordinates are referred to Doppler Satellite Station CLS #1. Bearings are Geodetic bearings derived from the astronomic observation to Bootis #369 at Station 1.

All geographic coordinates are referred to 1927 North American Datum (1927NAD). UTM coordinates are computed for Zone 10, Central Meridian 123°W.

Elevations were derived from Station CLS # 1 and are expressed in metres and decimals thereof.

Monuments placed (1 Metre Iron Bars) shown thus ..... Δ

All open traverse legs were measured twice, independently for direction and distance.

I HEREBY CERTIFY THAT THE SURVEY REPRESENTED ON THIS PLAN IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

R.O. Blackadder
C.L.S.

Don Legg
WITNESS

Feb 13, 1984
DATE

NSM RESOURCES LTD.

DATE

DATE: FEB. 8, 1984

McELHANNEY SURVEYING & ENGINEERING LTD. 1920.15

MICROFILMED
SUR MICROFILM:

Section I: Summary of Well Data

(a) Well Name: NSM Arrowhead G-69

(b) Permitee: NSM Resources Ltd.

(c) Operator: NSM Resources Ltd
300, 555-4th Ave S.W.
Calgary, Alberta
T2P 3E7

(d) Location: G-69-60-40-122-45
60° 38' 24" N
122° 57' 02" W
UWI 300G696040122450

(e) Permit No.: Not Applicable

(f) Drilling Contractor: Regent Drilling Ltd.
Rig No. 2
Brewster N-55

(g) Drilling Authority: DA #1138
1984/02/02

(h) Classification: New Field Wildcat

(i) Elevations: Ground: 496.1 m
K.B.: 502.0 m

(j) Spud Date: 2000 hrs 1984/02/13

(k) Completed Drilling Date: 1500 hrs. 1984/03/21

(l) Total Depth: TD 2500 mkb
PBTD 2488.82 mkb

(m) Status: Suspended waiting on completion

(n) Rig Release: 1200 hrs. 1984/03/30

(o) Casing and Hole Sizes: Surface: 444 mm w/ 340 mm csg.
Intermediate: 311 mm w/ 244 mm csg
Production: 222 mm w/ 178 mm csg.

WELL DATA SUMMARY

Well Name:	NSM ARROWHEAD
Location:	G-69
Operator:	NSM RESOURCES LTD.
Spud Date:	February 13, 1984 @ 2000 hrs
Elevations:	Ground Level 496.1 m Kelly Bushing 502.01 m
Drilling Contractor:	Regent Drilling Ltd. #2
Surface Casing:	29 joints Takaski, 81,1 Kg/m, 340 mm, landed at 297.5 m, cemented with 42 tonnes 0-1-0 cement, 2% $CaCl_2$
Intermediate Casing:	62 joints, 244 mm Algoma, K-55, 53.57 Kg/m landed at 751 m, cemented with 29.5 tonnes - (9.5 tonnes 0-1-6 and 20 tonnes 0-1-0)
Production Casing:	198 joints of 177.8 m casing, 34.22 & 38.69 Kg/m, MN80, LT&C casing, landed at 2498 m KB, Stage 1: cemented with 20 tonnes class G + .75% FRC-1 + .25% FLC-1 + .70% CRH, Stage 2: cemented with 40 tonnes class G + .75% FRC-1 + .2% CRL
Logs Run:	DIL-SP BHC-SGRC CNL-CDL-GRC
Drilling Foreman:	Bill Simpson
Tool Pusher:	Gerard Ouimet - Regent Drilling Ltd.
Geologist:	David Zgodzinski - Daymar Well Logging Ltd.

NSM ARROWHEAD G-69

FORMATION TOPS

Formation	Sample	Log	Subsea
Banff	573	581	- 79
Exshaw	-	952	- 450
Kotcho	965	964	- 462
Tetcho	1341	1341	- 839
Kakisa	1507	1476	- 974
Fort Simpson Shale	1523	1507	- 1005
Muskwa	-	2213	- 1711
Slave Point	2237	2235	- 1733
Watt Mountain	-	2338	- 1836
Sulphur Point	2344	2347	- 1845
Pine Point	2381	2371	- 1869
Keg River ?	-	2450	- 1948
TD	2500	2502	- 2000

Section II: Operations and Engineering Summary

(a) Daily Drilling Summary	Attachment 1
(b) Bit Record	Attachment 2
(c) Mud Record	Attachment 3
(d) Deviation Record	Attachment 4
(e) Casing Record	Attachment 5
(f) Drill Stem Test	Attachment 6

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

DAILY DRILLING PRECIS

DATE	DEPTH (M.)	PROGRESS	BREAKDOWN OF RIG TIME
84/02/10			Rigging up
84/02/11			Rigging up
84/02/12			Rigging up
84/02/13			Spud at 2000 hrs
84/02/14	64	64	Drilling 444 mm hole
84/02/15	173	109	Drilling 444 mm hole
84/02/16	256	83	" " " "
84/02/17	297.5	45	Drill, Prepare to run casing
84/02/18	297.5	0	Run and Cement casing
84/02/19	297.5	0	NIpple up and Test BOP
84/02/20	297.5	0	Locate Leak in surface casing
84/02/21	297.5	0	Squeeze leak and pressure test
84/02/22	399	98	Drill 311 mm hole
84/02/23	644	245	Drill 311 mm hole with air
84/02/24	710	66	Drill
84/02/25	751	41	Drill change to mud
84/02/26	751	0	Log, prepare to run casing
84/02/27	751	0	Run 244 mm casing and Cement
84/02/28	751	0	Nipple up test BOP
84/02/29	810	59	Drill out Dry hole to air drill
84/03/01	1179	369	Air drill 222 mm hole
84/03/02	1387	208	Air Drill
84/03/03	1539	152	Air Drill
84/03/04	1794	255	Air Drill
84/03/05	1965	171	Air Drill
84/03/06	2017	52	Mud up drill 222mm hole w/ mud
84/03/07	2026	9	Drill and Clean hole
84/03/08	2066	40	Drill
84/03/09	2115	49	Drill
84/03/10	2167	52	Drill
84/03/11	2222	55	Drill
84/03/12	2298	76	Drill
84/03/13	2322	24	Drill
84/03/14	2322	0	Ream and Clean
84/03/15	2322	0	Ream and Clean
84/03/16	2322	0	Ream and Clean
84/03/17	2322	0	Ream and Clean
84/03/18	2333	11	Ream and Drill
84/03/19	2359	26	Drill and trip for bit
84/03/20	2418	59	Drill
84/03/21	2485	67	Drill
84/03/22	2502	15	Drill and trip
84/03/23	2502	0	Logging
84/03/24	2502	0	Clean hole Logging
84/03/25	2502	0	Trip to clean out and DST
84/03/26	2502	0	Testing
84/03/27	2502	0	Testing
84/03/28	2502	0	Clean out to run casing
84/03/29	2502	0	Run casing
84/03/30	2498	0	Run and cement casing, 2 stages
84/03/31	2498	0	Rig Released, Move out

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

BIT RECORD

WELL NAME & LOCATION: NSM ARROWHEAD G-69

BIT NO	SIZE	MAKE	TYPE	OUT	METERS	HRS	AVG DRLG RATE	JET SIZES	WT	RPM	CONDITION
1A	444	Sm	SDT	173	173	30 3/4	5.6	3/18	2/5	120	4-3-1
2A	444	Sm	SDS	301	128	34½	3.7	3/18	4/6	120	3-2-1
1B	311	SM	FDG	710	409	19½	21.0	open	4/8	120	4-2-0
2B	311	Sm	SDT	751	41	10½	4.1	"	8/16	80	3-2-1
1	222	Sm	F4	1473	722	57 3/4	12.5	"	8/12	80/100	4-2-1
2	222	Sm	F4	2017	544	49½	11.0	"	8/18	85	4-2-1
3	222	Re	HS51	2322	305	124.5	2.5	3/10	18	65	7-2-0
4	222	Sm	F3	Reaming and Cleaning							
5	222	Sm	V2H	2333	11	9	1.2	3/13	18	65	7-7-1
4RR	222	Sm	F3	2500	167	65 3/4	2.5	3/14	20	65	4-4-1
6	222	Sm	V2H	2500	Clean out for logging						

WRB - 1

WESTERN ROCK BIT COMPANY LIMITED

BIT RECORD

METRIC

NEW T1 T2 T3 T4 T5 T6 T7 T8
DEGREE OF TOOTH DULLNESS

Page.....Of

Province	Field		LSD	Section	Twnship.	Range	(2) Operator		Elev.
Northwest Territories		Canada				W	NSM RESOURCES LTD.	KB	502.01

Location	(1) Contractor		Rig No.	Rig Make & Type	Tool Pusher
NSM ARROWHEAD G-69	Regent Drilling Ltd.		2		

	No.	O.D.	I.D.
DRILL COLLARS	1.		
	2.		

TOOL JOINTS	Make	Size	Type	O.D.
	1.			
	2.			

Year / Month / Day Time 00:00 to 24:00

Spudded ___/___/___
Set Surface ___/___/___
Under Surface ___/___/___
Under Inter. ___/___/___
Completion ___/___/___
Release ___/___/___

PUMPS: Type 1. ___ Type 2. ___

Field Salesman

Stockpoint | Stkpt. Code

Mud Type
To ___ M. ___
To ___ M. ___
To ___ M. ___
Special Additives

Lost Circulation Depths | Key Seat Depths | Other Remarks - Reaming, Re-Drilling, Etc.

Lic. Formation:
Lic. Depth:

(1) (2) (3)			No.	Size	Make	Type	Jets	Serial	Depth Out	Metre Drilled	Hours	Accum. Hours	Dull Cond T	B	G	No. of DC	Force Wt. on Bit daN	R.P.M.	Vert. Dev.	Pump Pres.	No. 1 Spm	Liner	No. 2 Spm	Liner	Mud Density	Vis	Re Fo Cu
	5		1A	444	Smith		SDT	AL 5801	173	30 3/4	30 3/4		4	3	1		4	120	1/2	4000	120	152	50	140	1110	55	
	4		2A	444	Smith		SDS		301	34 1/2	34 1/2		3	2	1		2/5	120	1/2	4000	120	152	50	14	1110	55	
			1	311	Smith		FGD		710	409	19 1/2		4	2	0		6/4	100	2 1/2	200		AIR		AIR			
			2	311	Smith		SDT		751	41	10 1/2		3	2	1		8 1/16	80	2 1/2	6000							
			1	222	Smith		F4		1473	722	57 3/4		4	2	1		8/2	80/100	2 1/2			AIR					
			2	222	Smith		F4		2017	544	49 1/2		4	2	1		8 1/18	85	3 3/4	8500	120	127			1150	45	
			3	222	Reed		HS51		2322	305	124.5		7	2	0		18	85/65	1/2	8500	120	127			1250	160	
			4	222	Smith		F3		CLEANING																		
			5	222	Smith		STC		2333	11 :	9		7	7	1		18	65	1 1/2	9500	120	127			1250	160	
			4	222	Smith		F3		2500	167	55 3/4		2	3	1		18	65	1 1/2		120	127			1400	350	

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

MUD REPORT

DATE	DEPTH	WT	VIS	WL	GEL	CAUSTIC	XC LIME	Barite SAWDUST	LCM	FLUID LOSS ADDITIVE	Peltex THINNER	Soda Ash OTHER
84/02/24	710	1100	87	8.5	360	17	-	-	-	-	4	2
84/02/25	751	1150	100	7	140	2	5	200	-	-	-	3
84/02/26	751	1180	182	8	32							
84/02/27	751	1155	66	6.2	15	2					11	
84/02/28	751	1130	48	9								
84/02/29	810	AIR DRILL										
84/03/05	1965	1080	48	12	55	1	2					
84/03/06	2001	1130	45	8.8	50	5	4	294				
84/03/07	2017	1200	115	6.8	83	3	4	289				
84/03/08	2060	1210	110	7.2	72	8	4	77				
84/03/09	2100	1200	74	8.0	75	11	5	35			4	
84/03/10	2172	1210	90	7.2	20	9	3	100			4	
84/03/11	2220	1210	78	7.6	36	4	2	9				
84/03/12	2280	1210	84	8.0	19	7	1	11			3	
84/03/13	2322	1250	200	7.2	43	4	1	59				
84/03/14	2322	1285	210	6.7	35	4	1	36				
84/03/15	2322	1310	300	6.0	30	2	1	212				
84/03/16	2322	1340	210	6.2	76	8	5	411			4	
84/03/17	2322	1365	290	6.0	25	9	2	726			6	
84/03/18	2333	1405	400+	6.0	62	9	5	395			9	
84/03/19	2356	1390	270	6.2		9	1	123			2	
84/03/20	2414	1420	375	7.2		8	3	521			3	
84/03/21	2480	1420	385	6.8		9	3	169			10	
84/03/22	2500	1420	360	7.4		2	2	56			16	
84/03/23	2500	1420	360	7.4		1		200				
84/03/24	2500	1415	265	5.8	20			160				
84/03/25	2500	1415	265	5.8								
84/03/26	2500	1415	265	5.8								
84/03/27	2500	1395	235	6.8	12	6	4	40			10	
84/03/28	2500	1415	233	6.6		1					4	
84/03/29	2500	1415	235	6.6	15			120			19	
			TOTAL		1275	141	58	4243			109	5

DEVIATION SURVEYS

23 m	1/8°
44 m	3/4°
54 m	1/2°
82 m	1/8°
100 m	3/4°
146 m	3/4°
155 m	1/8°
173 m	1/2°
192 m	1/4°
210 m	1/4°
229 m	1/16°
247 m	1/8°
266 m	1/4°
285 m	1/4°
333 m	3/4°
370 m	1/8°
399 m	1/8°
494 m	1/2°
634 m	2°
701 m	2 1/2°
728 m	1 1/2°
800 m	1 3/4°
905 m	2°
1000 m	2 1/8°
1103 m	3 1/8°
1122 m	3°
1141 m	3 1/2°
1160 m	3 3/4°
1188 m	3 1/4°
1207 m	3 1/2°
1217 m	3 1/4°
1235 m	3 1/4°
1264 m	3 1/4°
1302 m	3 1/4°
1396 m	3 1/4°
1454 m	2 1/2°
1503 m	3 1/2°
1625 m	3 1/2°
1663 m	3 1/2°
1692 m	3 1/2°
1719 m	3 1/2°
1742 m	3 3/4°
1775 m	3 3/4°
1804 m	3 1/4°
1832 m	3 1/4°
1860 m	3 1/8°
1889 m	4°

Deviation Surveys

1908 m	3 1/2°
1937 m	3 1/2°
1965 m	3 1/2°
1993 m	3 3/4°
2058 m	4 1/4°
2134 m	1 1/2°

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

SURVEYS

DEPTH	DEGREES	DEPTH	DEGREES	DEPTH	DEGREES
33	1/8	1188	3	1965	3½
54	½	1207	3½	1997	3½
82	1/8	1217	3¼	2058	4¼
109	½	1235	3¼	2134	1½
146	3/4	1264	3¼	2432	½
192	¼	1302	3¼	2498	½
229	1/8	1396	3¼		
266	¼	1454	2½		
285	¼	1539	3		
333	¼	1589	3½		
371	1/8	1625	3½		
494	½	1663	3½		
634	2	1692	3½		
701	2½	1719	3½		
728	1½	1742	33/4		
800	1 3/4	1775	3 3/4		
905	2½	1864	3¼		
1000	2 1/8	1832	3¼		
1103	3 1/8	1860	3 1/8		
1122	3	1889	4		
1141	3½	1908	3½		
1160	3 3/4	1937	3½		

Attachment 5

Casing Record

A. Surface:

Ran 29 jts 340 mm, 81.1 kg/m, ST&C, K-55 casing.
- Total Length 302.39 m
- Guide shoe .45 m
- Float Collar .34 m
- Landed at 297.5 mkb

Centralizers on first [illegible] joints
Cemented to surface with 42 t Cl'g' + 2%$CaCl_2$

B. Intermediate:

Ran 63 jts 244 mm 53.6 kg/m LT&C K-55 casing.
- Total Length 752.11 m
- Float shoe .52 m
- Float Collar .35 m
- Landed at 751 mkb

Centralizers on first 4 joints
Cemented to surface with 9.5 t Cl'G'+ 6% Gel
20 t Cl'G' + .5% FRC-1
+ .5% FLC-1

C.Production:

Ran 198 jts 177.8 mm casing as follows:
62 jts, 177.8 mm, 38.7 kg/m K-55 LT&C
136 jts, 177.8 mm, 34.2 kg/m K-55 LT&C

- Total Length 2499.78 m
- Float Shoe .46 m
- Float Collar .51 m
- Stage Collar .53 m
- Landed at 2498.9 mkb
- Stage Collar at 1683.0 mkb

Centralizers at 2498 - 2460 6
2275 - 2310 4
1665 - 1694 2
1470 - 1510 3

Scratchers at 1665 - 1694 6
1470 - 1510 6

Cemented in two stages:

Stage 1: 20 t Cl'G' + .75% FRC-1
+ .7% FLC -1
+.7% CRL

Stage 2: 40 t Cl'G' +.75% FRC-1
+.2% CRL

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

DRILL STEM TEST REPORT

DST NO.: 1

DATE: 84/03/24

WELL NAME AND LOCATION: NSM ARROWHEAD G-69

TEST INTERVAL: 2450 - 2500 mkb M. FORMATION: Pine Point

TESTING CO.: Northstar TYPE OF TEST: Conventional

HOLE SIZE: 222 MM PACKER SIZE: 196 MM CHOKE SIZE: 19.05 MM

AUXILARY EQUIPMENT: Floor Manifold

RESULTS:

TIMES: (MIN.) P.F. 10 ISI 30 V.O. 60 FSI 120

PREFLOW DESCRIPTION: Fair increasing to strong

BLOW DESCRIPTION: Fair decreasing to weak G.T.S. after F.S.I.

MEASURED WITH: T.S.T.M.

PRESSURES: IHP 34458 P.F. 11156 ISIP 23695 IFP 14866

KPA FFP 23589 FSIP 23908 FHP 33930 BHT ____ °C

FLUID RECOVERY: 1194 M. MUD 119 M. OIL Muddy Wat~~er~~ WATER 975 M. Cushio

NO. OF SAMPLES: 3 FROM: 100m 1194, 1110, 1000

SAMPLES SENT TO: C&G Edmonton

REMARKS:

Ran 975 m Water Cushion

Small gas flare when Rotated pipe on F.S.I.

DST # 2 1470- 1505 misrun, DST #3 2275 - 2310 misrun. DST #4 2265 - 2310 misrun

WITNESS: _____ FIELD SUPERVISOR: W.H. Simpson

NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S Resources Ltd.
WELL NAME N S M Arrowhead G-69
WELL LOCATION 60-38N-122-57W
INTERVAL 2450-2500 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY - m

DATE 84/03/24
TICKET # 1422 DST.# One
FORMATION Pine Point
TYPE of TEST Bottom Hole

WELL NAME N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1422
D.S.T. No. One

RECORDER DATA

ALL MEASUREMENTS ARE 'SI'

PF	10	REC.#	10964	3898	3899
SI	30	RANGE	42058	43437	43437
SF	60	CLOCK	24	24	24
FS	120	DEPTH	2443.07	2450.69	2450.69
			kPa	kPa	kPa kPa
A. Init. Hyd.			34300	34384	34383
B. First Flow			10341	10575	10580
B1.Final Flow			11305	11363	11371
C. In Shut-in			23228	23353	23358
D. Init. Flow			14644	15879	15930
E. Final Flow			23398	23570	23576
F. Fi Shut-in			23579	23657	23653
G. Final Hyd.			32420	32504	32508
Inside/Outside			Inside	Outside	Outside

HOLE and TEST DESCRIPTION

T STARTED	06:00	Hr. BTM.CHOKE	19.05	mm	
T ON BTM	12:00	Hr. HOLE SIZE	222	mm	
T OPEN	13:05	Hr. D.COLL I.D.	71.4	mm	
T [illegible]	16:45	Hr. D.PIPE I.D.	97.2	mm	
T GO	00:30	Hr. D.C.LENG	118.78	m	
TOOL WT.	15 000	daN D.P.LENG	2321.56	m	
WT SET ON PACKER	20 000	daN			
WT PULLED LOOSE	80 000	daN			
INITIAL STR WT	52 000	daN			
UNSEATED STR WT	53 000	daN			

MUD DATA

MUD TYPE	Gel Chem		
WEIGHT	1420	kg/m^3	
VIS	360	S/L	
W.L.	7.4	cm^3	
F.C.	2	mm	
MUD DROP	No	m	
AMT.OF FILL	Nil	m	
BTM.H.TEMP	59	C°	
POROSITY %	-		
HOLE COND	Good		

RECOVERY

TOTAL FLUID 1194 m of 119 m in D.C. and 1075 m in D.P.

100 m of muddy water
119 m of mud
975 m of water sassified
- m of 1 000 meters water cushion run

GAS RECOVERY MEASURED WITH -

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
-				

REMARKS:

PREFLOW - Fair air blow increasing to strong.
SECONDFLOW - Fair air blow decreasing to weak. Small gas flare when tool rotated to shut-in.
Tool plugged off at the shut-in tool.

TEST SUCCESSFUL

Note - Lesal location is 60 degrees 38 minutes 24.43 seconds N 122 degrees 57 minutes 2.47 seconds W.

CONVENTIONAL

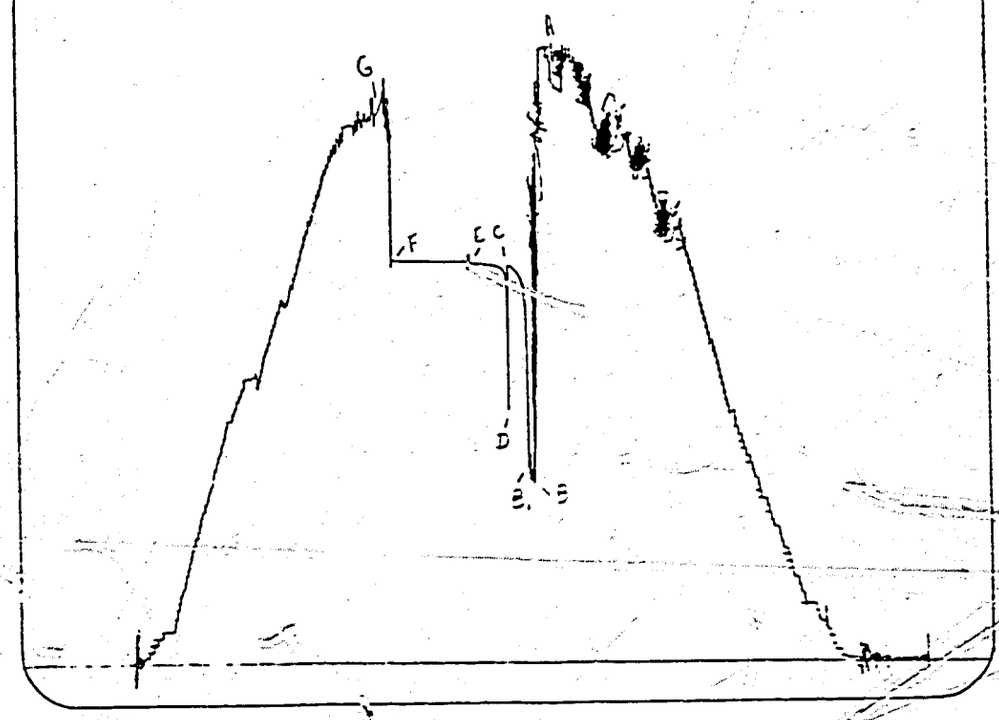
PO Sub	.30
XO Sub	.30
Shut-in Tool	1.57
Hydraulic Tool	1.66
REC. # 10964	1.47
Jars	1.41
Safety Joint	.90
PACKER	1.77
Depth m 2448.62	-
TOTAL TOOL ABOVE INTERVAL	10.85
PACKER	1.47
Depth m 2450.09	-
Stub	.30
Perfs	.30
REC. # 3898	&
REC. # 3899	1.47
XO Sub	.30
Drill Collar	46.62
XO Sub	.30
Bullnose	.62
T.DEPTH m 2500.00	-
TOTAL INTERVAL 49.91	-
TOTAL TEST TOOL 14.14	

CUSTOMER REP B. Simpson
TESTER G. MacKay /S2S

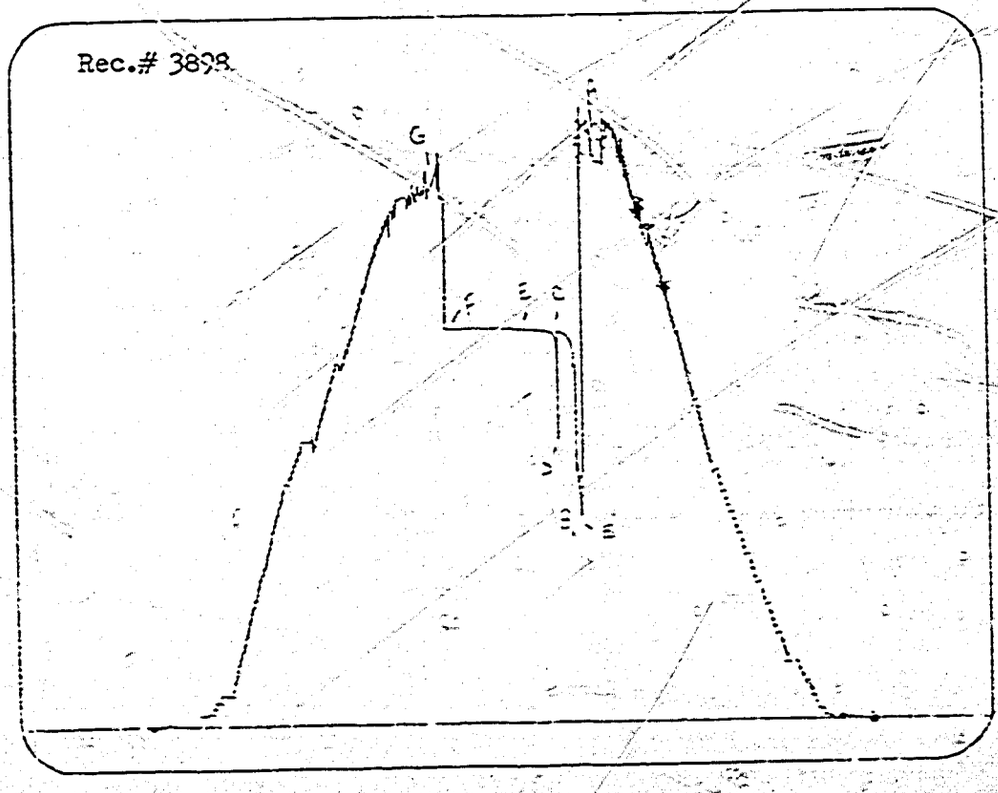
NORTHSTAR DRILLSTEM TESTERS LTD.

NSM Arrowhead G-69 60-38N-122-57W T.# 1422 D.S.T.# One

Rec.# 10964



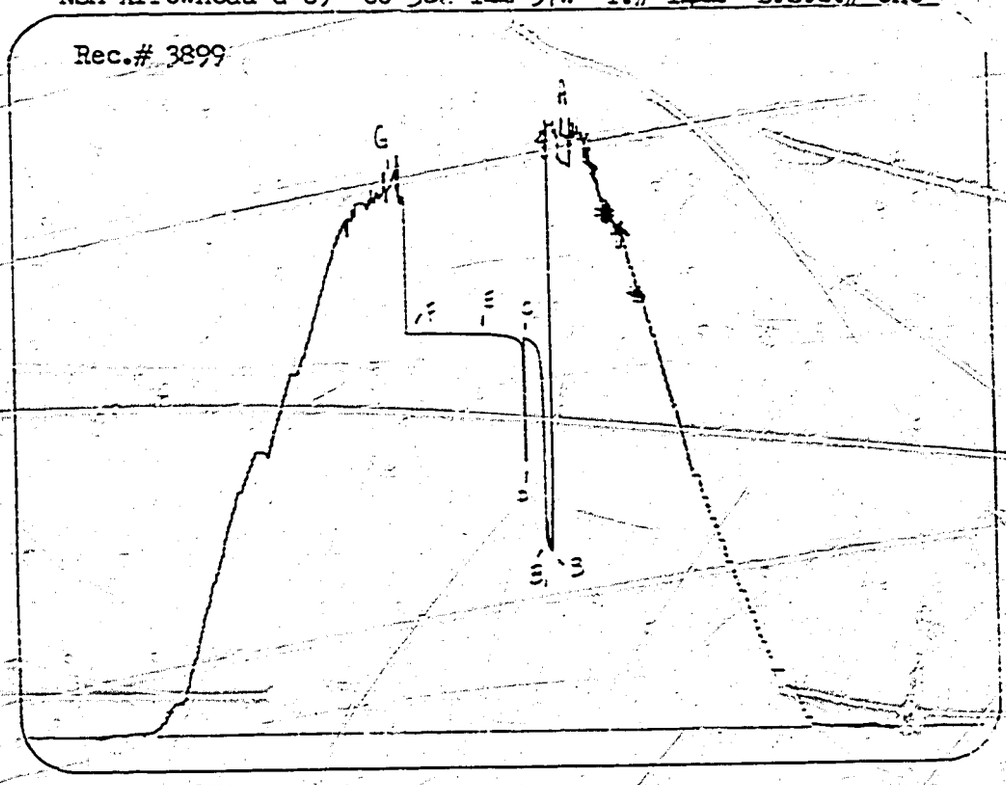
Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

NSM Arrowhead G-69 60-38N-122-57W T.# 1422 D.S.T.# One

Rec.# 3899



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL NAME N S M Arrowhead G69
WELL LOCATION 60-38N-122-57W
INTERVAL 1470-1505 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY _ m

DATE 84/03/25
TICKET # 1423 DST.# Two
FORMATION _
TYPE of TEST Straddle

WELL NAME: N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1423
D.S.T. No. Two

RECORDER DATA — ALL MEASUREMENTS ARE 'SI'

PF	00	REC.#	10964	3898	3899
SI	00	RANGE	42058	43437	43437
SF	00	CLOCK	24	24	24
FS	00	DEPTH	1461.50	1470.86	1470.86
			kPa	kPa	kPa kPa
A. Init. Hyd.			21440	21549	21548
B. First Flow			_	_	_
B1.Final Flow			_	_	_
C. In Shut-in			_	_	_
D. Init. Flow			Packer	Seat	Failed
E. Final Flow			_	_	_
F. Fi Shut-in			_	_	_
G. Final Hyd.			21567	21668	21668
Inside/Outside			Inside	Outside	Outside

HOLE and TEST DESCRIPTION

T STARTED	04:30	Hr. BTM.CHOKE	19.05 mm
T ON BTM	08:15	Hr. HOLE SIZE	222 mm
T OPEN	10:00	Hr. D.COLL I.D.	71.4 mm
T PACKED	00:00	Hr. D.PIPE I.D.	97.2 mm
T OUT	00:00	Hr. D.C.LENG	_ m
TOOL WT.	4 000	daN D.P.LENG	_ m
WT SET ON PACKER	_	daN	
WT PULLED LOOSE	_	daN	
INITIAL STR WT	38 000	daN	
UNSEATED STR WT	_	daN	

MUD DATA

mm MUD TYPE	Gel Chem	
mm WEIGHT	1420	kg/m^3
mm VIS	360	S/L
mm W.L.	7.4	cm^3
m F.C.	2.0	mm
m MUD DROP	No	m
daN AMT.OF FILL	Nil	m
daN BTM.H.TEMP	_	C°
daN POROSITY %	_	
daN HOLE COND	Good	

RECOVERY

TOTAL FLUID _ m of _ m in D.C. and _ m in D.P.
_ m of _
_ m of _
_ m of _
_ m of _

GAS RECOVERY MEASURED WITH _

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
_				

REMARKS:

Packers failed to pump up - tried 3 times.

TEST MISRUN

See DST #1 for lesal location.

INFLATE

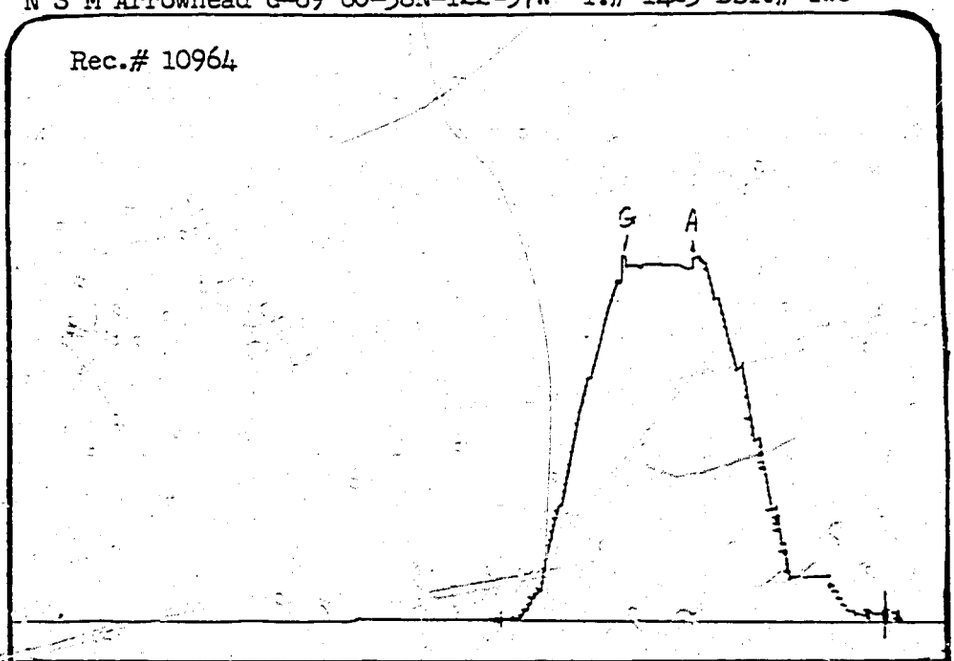
Reversing Sub	.30
XO Sub	.30
Drill Collars	_
R.T.V.	2.02
Downhole Sampler	_
Reciprocating Joint	1.77
REC. # 10964	1.47
Jars	1.67
Clutch	_
Safety Joint	1.04
Pump	1.50
Screen	1.34
ABOVE INTERVAL 13.19	_
PACKER	1.78
Depth m 1470.00	_
Perfs	.66
REC. # 3898 & 3899	
Spacing	3.65
XO Sub	.30
Drill Collar	27.90
XO Sub	.30
Stub	.42
Depth m 1504.89	_
TOTAL INTERVAL 34.89	_
Drasspring	_
Total Test Tool 20.18	_

Customer Rep. B. Simpson
Tester G. MacKay /S30

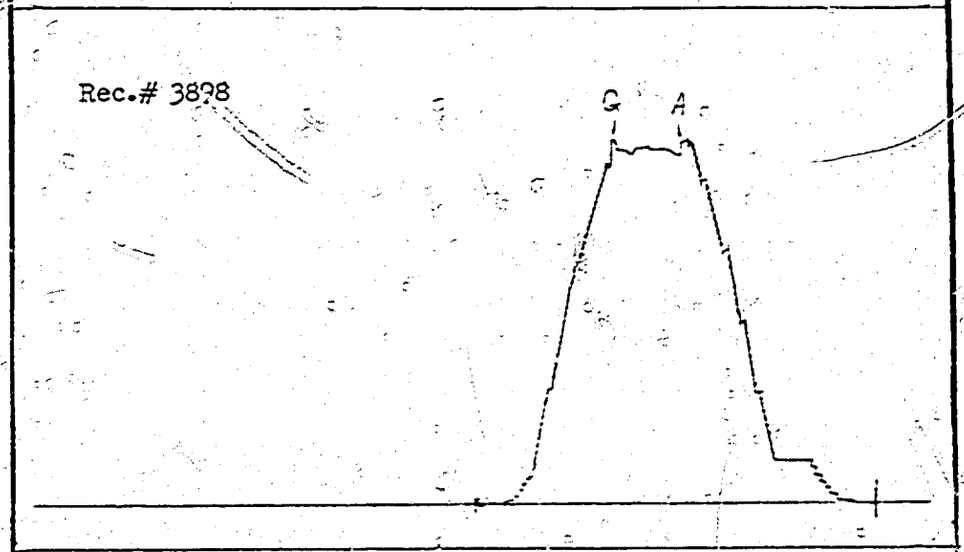
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1423 DST.# Two

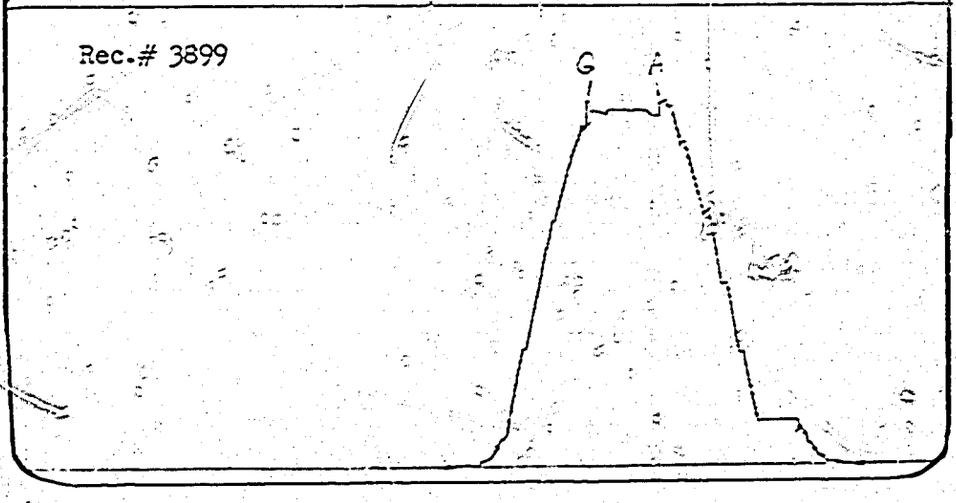
Rec.# 10964



Rec.# 3898



Rec.# 3899



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL NAME N S M Arrowhead G-69
WELL LOCATION 60-38N-122-57W
INTERVAL 2275-2310 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY _ m

DATE 84/03/25
TICKET # 1424 DST.# Three
FORMATION _
TYPE of TEST Bypass Straddle

WELL NAME: N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1424
D.S.T. No. Three

RECORDER DATA

ALL MEASUREMENTS ARE 'SI'

PF	00	REC.#	10964	3898	3899	
SI	00	RANGE	42058	43437	43437	
SF	00	CLOCK	24	24	24	
FS	00	DEPTH	2267.06	2279.60	2317.80	
			kPa	kPa	kPa	kPa
A. Init. Hyd.			31238	31371	31794	
B. First Flow			3956	9180	21734	
B1.Final Flow			_	_	_	
C. In Shut-in			_	_	_	
D. Init. Flow			Lost	Mud	_	
E. Final Flow			_	_	_	
F. Fl Shut-in			_	_	_	
G. Final Hyd.			_	30673	31091	
Inside/Outside			Inside	Outside	Outside	

HOLE and TEST DESCRIPTION

T STARTED	17:00	Hr. BTM.CHOKE	19.05	mm	
T ON BTM	22:00	Hr. HOLE SIZE	222	mm	
T OPEN	22:30	Hr. D.COLL I.D.	71.4	mm	
T PU	23:00	Hr. D.PIPE I.D.	97.2	mm	
T OUT	06:00	Hr. D.C.LENG	138.07	m	
TOOL WT.	10 000	daN D.P.LENG	2129.62	m	
WT SET ON PACKER	20 000			daN	
WT PULLED LOOSE	90 000			daN	
INITIAL STR WT	47 000			daN	
UNSEATED STR WT	47 000			daN	

MUD DATA

MUD TYPE	Gel Chem		
WEIGHT	1410	kg/m^3	
VIS	235	S/L	
W.L.	_	cm^3	
F.C.	_	mm	
MUD DROP	No		
AMT.OF FILL	2	m	
BTM.H.TEMP	_	C°	
POROSITY %	_		
HOLE COND	Good		

RECOVERY

TOTAL FLUID _ m of _ m in D.C. and _ m in D.P.
_ m of _
_ m of _
_ m of _
_ m of _

GAS RECOVERY MEASURED WITH _

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
_				

REMARKS:

Lost mud when tool opened - tried 3 times - Pulled out of hole.

TEST MISRUN

See DST #1 for legal location.

CONVENTIONAL

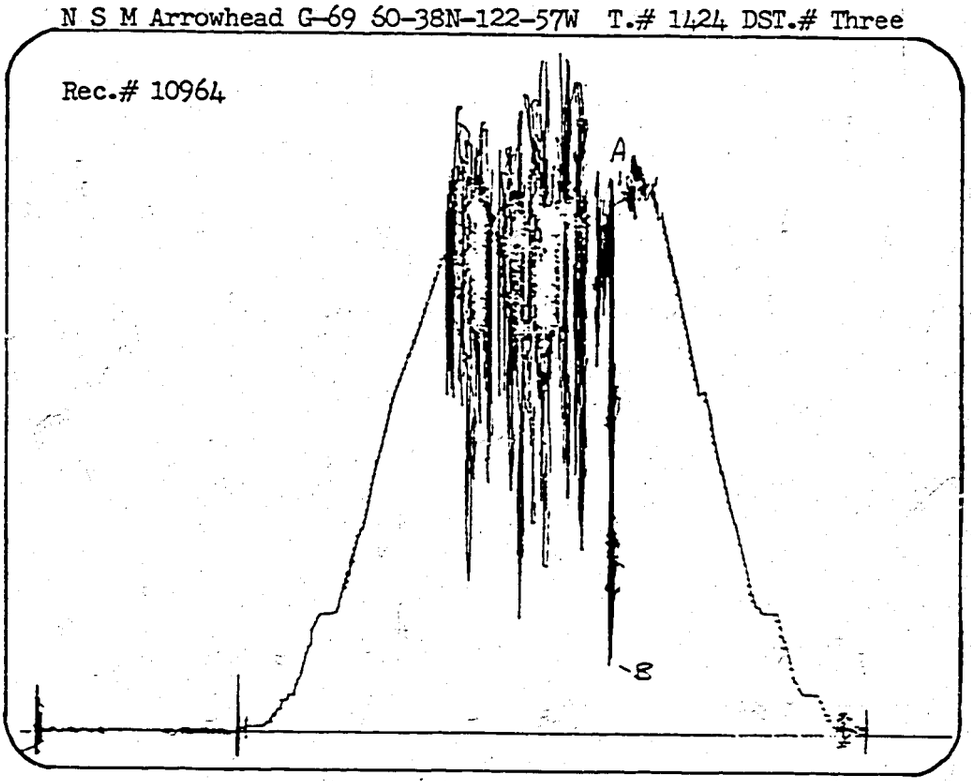
PO Sub		.30
XO Sub		.30
Shut-in Tool		1.57
Hydraulic Tool		1.66
REC. #	10964	1.47
Jars		1.41
Safety Joint		.90
By Pass Hnsr.		.30
PACKER		1.77
Depth m	2272.91	_
TOTAL TOOL ABOVE INTERVAL	11.81	
PACKER		2.13
Depth m	2275.04	_
Stub		.30
Perfs		3.96
By Pass Recev		.30
REC. #	3898	1.47
XO Sub		.30
Drill Collar		27.33
XO Sub		.30
Stub		1.00
Depth m	2310.00	_
PACKER		1.43
TOTAL INTERVAL	34.96	_
Depth m	2311.43	_
PACKER		1.77
Perfs		4.60
REC. #	3899	1.47
XO Sub		.30
Drill Pipe		179.51
XO Sub		.30
Bullnose		.62
T.DEPTH m	2500.00	_
TOTAL TAIL PIPE	190.00	
TOTAL TEST TOOL	29.83	

CUSTOMER REP B. Simpson
TESTER G. MacKay /30

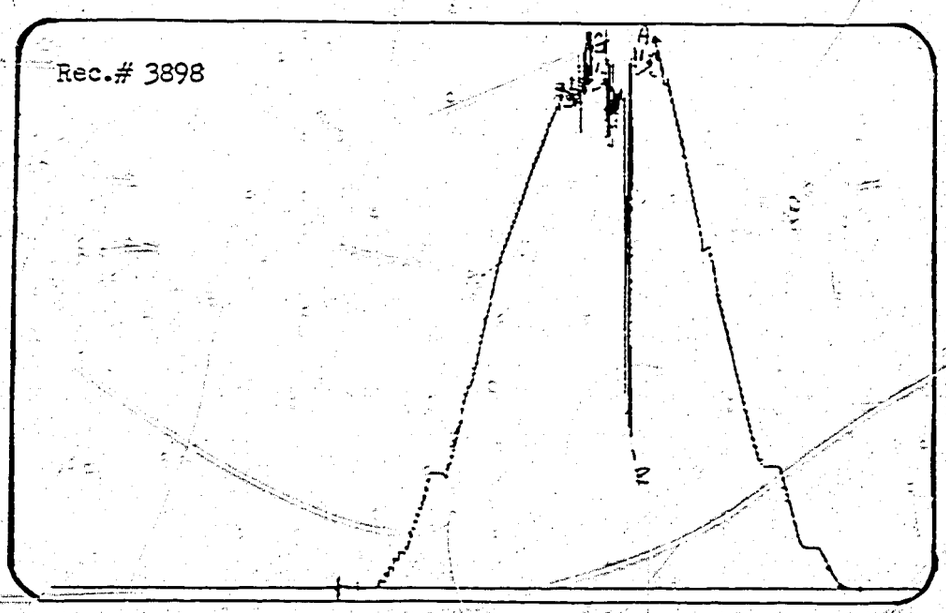
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1424 DST.# Three

Rec.# 10964

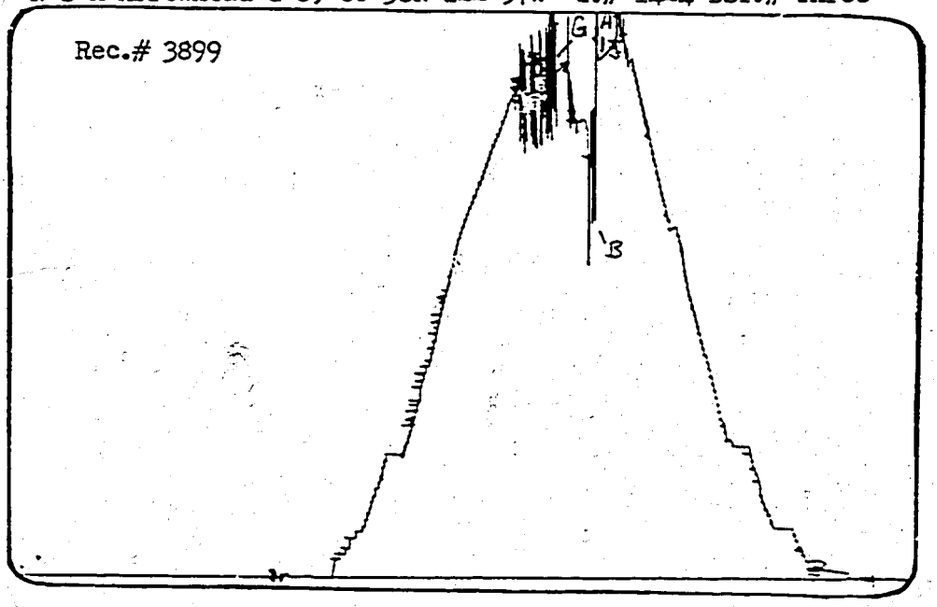


Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1424 DST.# Three



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL NAME N S M Arrowhead G-69
WELL LOCATION 60-38N-122-57W
INTERVAL 2265-2310 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY _ m

DATE 84/03/27
TICKET # 1425 DST.# Four
FORMATION _
TYPE of TEST Bypass Straddle

WELL NAME: N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1425
D.S.T. No. Four

RECORDER DATA

ALL MEASUREMENTS ARE 'SI'

PF	00	REC.#	10964	3898	3899	
SI	00	RANGE	42058	43437	43437	
SF	00	CLOCK	24	24	24	
FS	00	DEPTH	2257.04	2268.66	2318.97	
			kPa	kPa	kPa	kPa
A. Init. Hyd.			_	31006	31560	
B. First Flow			_	_	_	
B1. Final Flow			_	_	_	
C. In Shut-in			_	_	_	
D. Init. Flow			Lost	Mud	_	
E. Final Flow			_	_	_	
F. Fi Shut-in			_	_	_	
G. Final Hyd.			_	_	_	
Inside/Outside			Inside	Outside	Outside	

HOLE and TEST DESCRIPTION

T STARTED	03:00	Hr.	STM.CHOKE	18.05	mm	MUD TYPE	Gel Chem
T ON BTM	00:00	Hr.	HOLE SIZE	222	mm	WEIGHT	1390 kg/m^3
T OPEN	00:00	Hr.	D.COLL I.D.	71.4	mm	VIS	235 S/L
T PU[illegible]	09:00	Hr.	D.PIPE I.D.	97.2	mm	W.L.	5.8 cm^3
T OU[illegible]	00:00	Hr.	D.C.LENG	135.00	m	F.C.	2.0 mm
TOOL WT.	10 000	daN	D.P.LENG	2120.5	m	MUD DROP	No m
WT SET ON PACKER	_				daN	AMT.OF FILL	_ m
WT PULLED LOOSE	100 000				daN	BTM.H.TEMP	_ C°
INITIAL STR WT	56 000				daN	POROSITY %	_
UNSEATED STR WT	65 000				daN	HOLE COND	Good

RECOVERY

TOTAL FLUID _ m of _ m in D.C. and _ m in D.P.

_ m of _
_ m of _
_ m of _
_ m of _

GAS RECOVERY MEASURED WITH _

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
_				

REMARKS:

Losing mud in annulus to pipe before packers set.

TEST MISRUN

500 meter water cushion run.

CONVENTIONAL

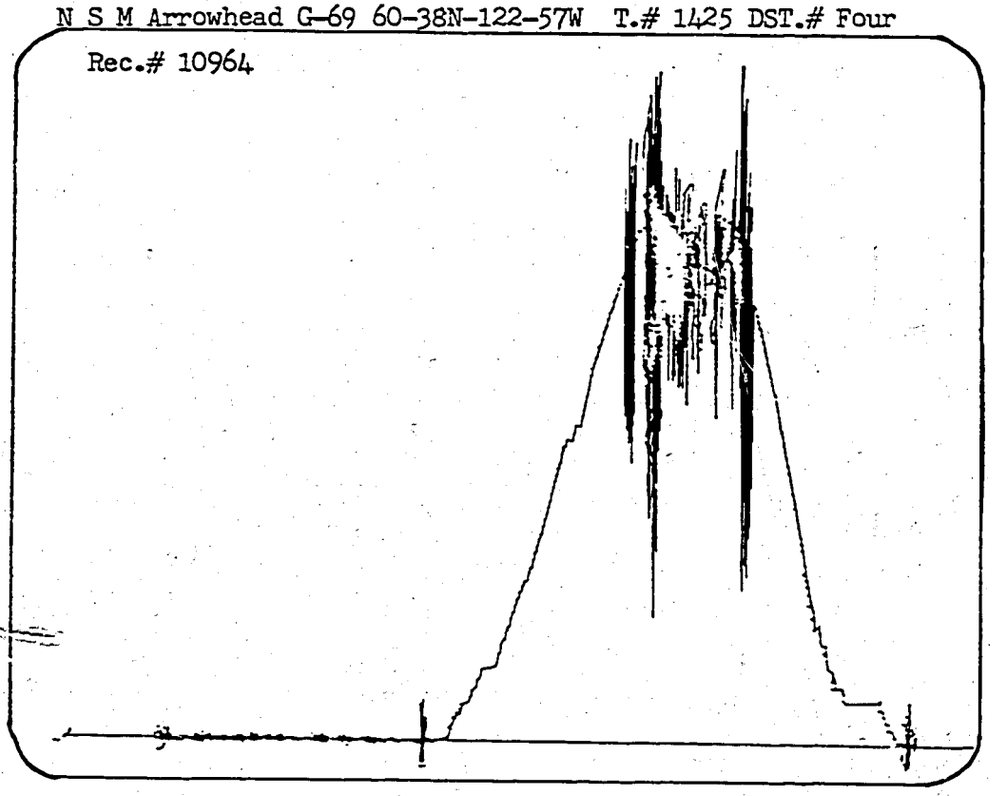
PO Sub		.30
XO Sub		.30
Shut-in Tool		1.57
Hydraulic Tool		1.66
REC. #	10964	1.47
Jars		1.41
Safety Joint		.90
By Pass Hnsr.		.30
PACKER		1.77
Depth m		_
TOTAL TOOL ABOVE INTERVAL		11.81
PACKER		2.13
Depth m	2265.02	_
Stub		.30
Perfs		3.04
By Pass Recev		.30
REC. #	3898	1.47
XO Sub		.30
Drill Collar		38.47
XO Sub		.30
Stub		1.00
Depth m	2310.20	_
PACKER		2.43
TOTAL INTERVAL	45.18	_
Depth m	2312.63	_
PACKER		1.77
Perfs		4.57
REC. #	3899	1.47
XO Sub		.30
Drill Pipe		179.34
XO Sub		.30
Bullnose		.62
T.DEPTH m	2500.00	_
TOTAL TAIL PIPE	190.80	
TOTAL TEST TOOL	29.98	

CUSTOMER REP B. Simpson
TESTER G. MacKay /S30

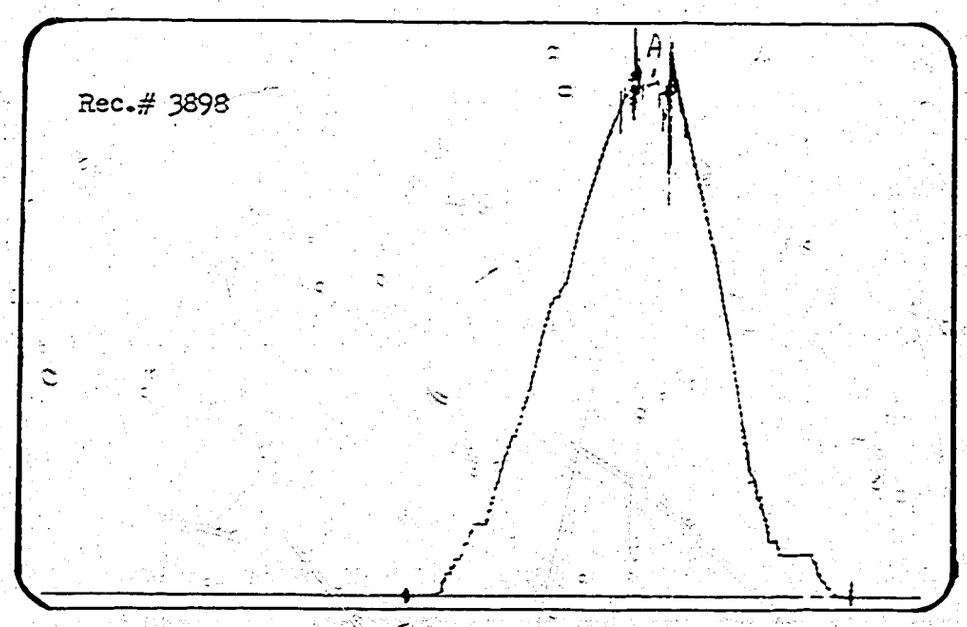
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1425 DST.# Four

Rec.# 10964

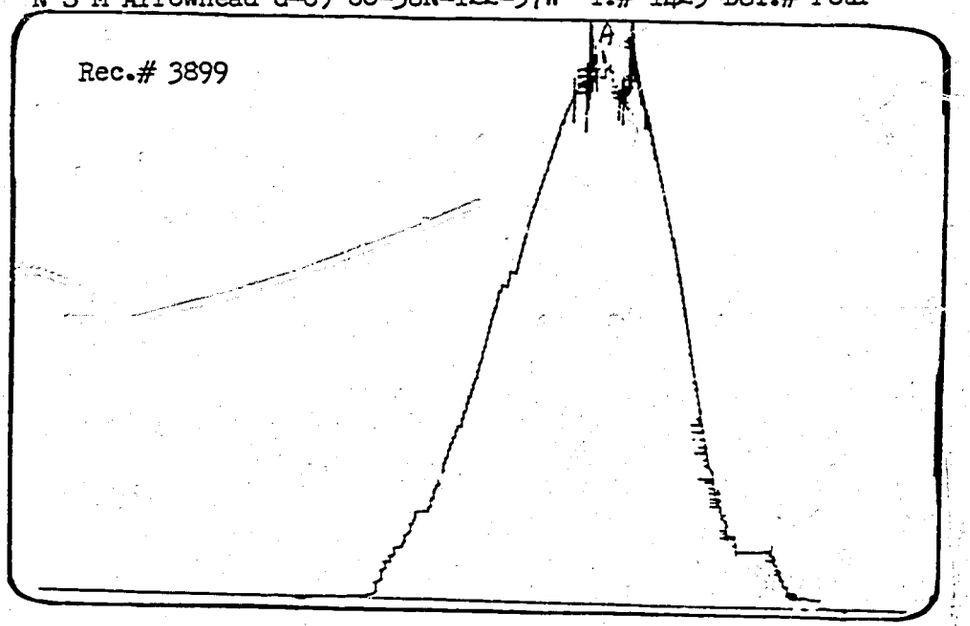


Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1425 DST.# Four



DRILL STEM TESTS

DST #1 PINE POINT 2450 - 2500 m

10/30/60/120

PF: Fair air blow, increasing to strong air blow
VO: Fair air blow, decreasing to weak air blow

IH	34458 kPa
IF	11156 kPa
ISI	23695 kPa
FF	23589 kPa
FSI	23908 kPa
FH	33930 kPa

Note* Ran 1000 m fresh water cushion
Water cushion hydrostatic pressure - 9810

Recovered 119 m mud
100 m muddy water
975 m clear fresh water

Note* 1 m sweet gas flame 10 minutes into FSI, lasting throughout

DST #2 KAKISA 1471 - 1504 m

Misrun
Packer Failure

DST #3 SLAVE POINT 2275 - 2310 m

Misrun
Packer Failure

DST #4 SLAVE POINT

Misrun
Tool opened while running in

Section III

Geological Summary

(a) Formation Tops: Attachment 7

(b) Cores: None Taken

(c) Mud Log/Sample Descriptions: Attachment 8

(d) Electric Logs: Attachment 9
Logs ran as follows:
CNL/CNS TD. to 298 mkb
BCS/GR/CAL TD to 298 mkb
DIL TD to 298 mkb

Attachment 7

Formation Tops

KB Elev. 502 m

Formation	Age	Drill Depth	Subsea
Spud	Cretaceous		-502 m
Banff	Mississippian	581 m	-79 m
Exshaw		952 m	-450 m
Kotcho	Devonian	964 m	-462 m
Tetcho		1341 m	-839 m
Kakisa		1476 m	-974 m
Fort Simpson Shale		1507 m	-1005 m
Muskwa		2213 m	-1711 m
Slave Point		2235 m	-1733 m
Watt Mountain		2338 m	-1836 m
Sulphur Point		2347 m	-1845 m
Pine Point		2371 m	-1869 m
Keg River		2450 m	-1948 m
Total Depth		2502 m	-2000 m

NSM RESOURCES LTD.

NSM ARROWHEAD G-69

TABLE OF CONTENTS

Geological Report

Daily Temperature Graph

Temperature Plot

Composite and Lithological Log

...ND GAS LANDS
...ON
...N DU PÉTROLE ET DU
...TS DU CANADA
JUIN 1 1984
ENGINEERING AND CONTROL
BRANCH
...QUE ET DU CONTROLE

GEOLOGICAL REPORT

on

NSM ARROWHEAD

G-69

Northwest Territories, Canada

for

NSM RESOURCES LTD.

TABLE OF CONTENTS

Well Data Summary 1

Formation Tops 2

Deviation Surveys 3

Bit Record 5

Drill Stem Tests 6

Lithology and Formation Evaluation 7

Sample Descriptions 11

Composite and Lithological Log ..... Included

March 1984

David Zgodzinski
Geological Technician

LITHOLOGY AND FORMATION EVALUATION

TERTIARY

The Tertiary formations are made up primarily of sandstone, salt and pepper, light to medium gray, very fine to fine grained, subangular to subrounded, fair to well sorted, siliceous in part, calcareous in part, kaolinitic in part, interbedded with siltstone, good trace of glauconite. The sandstone is interbedded with siltstone, medium gray, arenaceous, slightly calcareous in part and traces of red-brown, arenaceous. Shale, medium to dark gray, subfissile to fissile, micro micaceous, medium hard, good trace fossils.

Conclusion: There is an abundance of sand in the Tertiary with some evidence of porosity and reservoir potential, but there are no hydrocarbon shows in the samples and the gas detector readings remained quite low. This is an interesting zone but does not appear to have any commercial value.

CRETACEOUS

The Cretaceous formation consists of interbedded sandstone, siltstone and shale. The sandstone is light to medium gray, salt and pepper, fine to very fine grained, subangular to subrounded, well sorted, calcareous and kaolinitic, argillaceous in part, well cemented to friable, trace porosity, good trace glauconite. Siltstone, medium gray, arenaceous, well cemented, friable, good trace glauconite, from (515 - 545 m) there are good traces of oil staining. Shale, dark gray, subfissile to blocky, medium hard, micro micaceous, very slightly calcareous, silty in part.

Conclusion: The oil staining present in the siltstone at 515 - 545 m is encouraging, but not accompanied by evidence of porosity. There is not much evidence of porous sand in the Cretaceous, but the section should be examined carefully on E-logs.

BANFF

The Banff is made up of a thick section of shale with scattered bands of limestone. The upper shale is medium gray, blocky to subfissile, calcareous, silty with traces of pyrite. The limestone beds are light to medium gray, tan, cream, bioclastic, fragmental, with traces of crinoid, bryozoa, brachiopod and ostracod. The lower shale is medium to dark gray, subfissile to blocky, medium hard, micro micaceous, slightly calcareous.

Lithology and Formation Evaluation

Conclusion: The limestone stringers in the Banff, though fossiliferous and coarsely crystalline in part, show no evidence of porosity. There were no hydrocarbon shows in the samples or on the gas detection equipment. This is a marginal zone of little interest.

KOTCHO

The Kotcho formation has an upper carbonate member overlying interbedded shale and limestone. The upper dolomite is light to medium gray, micro crystalline, argillaceous and silty, dense, hard. The limestone is light to medium gray, micro crystalline, very argillaceous, dolomitic in part, dense, traces of pyrite. The lower shale is medium gray, blocky to subfissile, medium hard, micro micaceous,calcareous, trace fossiliferous, interbedded with limestone, tan, medium gray, micro crystalline to crypto crystalline, argillaceous, hard, dolomitic.

Conclusion: There was a small gas peak at 1301 m which occured in a shale zone with calcite evident in the samples. This was followed by connection gases after a trip. This thin zone, possibly at a fracture, showed the only potential in the formation. It should be checked on E-logs.

TETCHO

The Tetcho consists of an upper limestone section over an interbedded shale and carbonate section. The upper limestone is cream, tan, micro crystalline, hard, dolomitic, argillaceous in part. The lower shale is medium to dark gray, subfissile to blocky, hard, micro micaceous in part, calcareous in part, interbedded with limestone, light to medium brown, tan, medium gray, micro crystalline to crypto crystalline, argillaceous in part, silty in part, and dolomite, light to medium gray, micro crystalline to very fine crystalline, micro sucrosic in part, medium hard, argillaceous, calcareous infilling.

Conclusion: The carbonated portions of the Tetcho do not present any good evidence of porosity or hydrocarbon shows. The porosity in the dolomite is clogged with calcareous material. There were no substantial gas increases. This is an intermediate zone but it should be checked on E-logs. Air drilling with subsequent poor sample quality may have obscured some zones of interest.

KAKISA

The Kakisa consists of dolomite with limestone interbeds and possible cherty sandstone lenses. The dolomite is light green-gray, very fine

crystalline to micro crystalline, argillaceous, silty, trace disseminated pyrite. The limestone is tan, medium gray, micro crystalline to very fine crystalline, dolomitic and argillaceous, hard. There are numerous traces of vari-colored, coarse chert fragments and trace fossils.

Conclusion: The dolomite of the Kakisa might have some porosity, but there were no hydrocarbon shows and the gas readings remained low. This is an intermediate zone, and should be checked carefully on E-logs.

FORT SIMPSON

The Fort Simpson consists of a thick shale section. There are interbeds of dolomite in the upper half. The dolomite is tan, light to medium gray, green-gray, micro crystalline to very fine crystalline, argillaceous in part, silty in part. The shale is medium to dark gray, subfissile to blocky, micro micaceous, silty in part, slightly calcareous, and dark gray to black, subfissile to splintery, micro micaceous, trace pyrite.

Conclusion: The Fort Simpson is a zone of little interest.

SLAVE POINT

The Slave Point consists of limestone, white, cream, micro crystalline to very fine crystalline, chalky, soft and tan, light gray, very fine to fine crystalline, bioclastic, bituminous in part, hard, trace fossil, trace calcite.

Conclusion: The Slave Point appeared to be tite. There were no shows in the samples, and the gas readings stayed quite low. This zone should be examined carefully on logs, but does not appear to have reservoir potential.

SULPHUR POINT

The Sulphur Point consists of limestone, light to medium gray, cream, dark tan, micro crystalline to very fine crystalline, chalky and soft, and dark gray to blocky, tan, micro crystalline to very fine crystalline, bituminous and cherty, bioclastic in part.

Conclusion: The Sulphur Point shows no evidence of porosity or hydrocarbon anomalies. It should be checked on logs, but appears to be of intermediate interest.

Lithology and Formation Evaluation

PINE POINT

The Pine Point consists of an upper limestone and lower dolomite. The limestone is light brown, cream, mottled, micro crystalline, chalky, medium soft and dark tan, dark gray to blocky, micro crystalline to very fine crystalline, bituminous, dolomitic in part, trace calcite. The lower dolomite is white, medium to coarse crystalline, hard, trace fair to good intercrystalline porosity, abundant bitumen, trace pyrite.

Conclusion: The lower dolomite looks like a good reservoir, but despite some encouraging gas readings, is most probably wet. It should be checked very carefully on logs as it seems to have the best potential in the well.

SAMPLE DESCRIPTIONS

30 m — Shale, 100%, light gray, silty clay

35 m — No sample

40 m — Sandstone, 100%, clear, salt and pepper, very fine to fine grained, subangular, well sorted, siliceous in part, calcareous in part, fair to good intergranular porosity, interstitial bitumen, trace glauconite, trace coarse, rounded quartz and chert pebbles

45 m — Sandstone, 100%, as above, predominantly siliceous, unconsolidated

50 m — Sandstone, 100%, clear, very fine grained, subangular to subrounded, well sorted, predominantly siliceous, calcareous in part, unconsolidated, trace glauconite

55 m — Siltstone, 20%, medium gray, arenaceous, friable, interbedded with sandstone, Sandstone, 80%, clear, very fine grained, subangular to subrounded, siliceous in part, calcareous in part, friable, fair to good intergranular porosity, trace interstitial bitumen, carbonaceous material, trace glauconite, trace coarse chert and quartz pebbles

60 m — Siltstone, 20%, as above, Sandstone, 80%, as above

65 m — Shale, 20%, light to medium gray, blocky, soft, bentonitic, silty, Sandstone, 80%, clear, salt and pepper, medium gray, very fine to fine grained, subangular to subrounded, siliceous in part, calcareous in part, friable to well cemented, interbedded with siltstone in part, trace glauconite, trace carbonaceous material, trace fair to good intergranular porosity

70 m — Shale, 30%, as above, good trace siderite, Sandstone, 70%, as above, trace mica

75 m — Shale, 30%, light to medium gray, blocky, silty, medium soft, slightly bentonitic, Sandstone, 70%, salt and pepper, light to medium gray, very fine to fine grained, subangular to subrounded, fairly sorted, siliceous in part, calcareous in part, slightly kaolinitic in part, interbedded with siltstone, trace mica, trace glauconitic

80 m — Shale, 50%, as above, Sandstone, 50%, as above

85 m — Shale, 70%, medium to dark gray, subfissile, micro micaceous, medium hard, silty in part, Siltstone, 30%, red-brown, arenaceous, well cemented

90 m — Shale, 80%, as above, trace fossils, Siltstone, 20%, medium gray, argillaceous in part, arenaceous in part, friable to well cemented

Sample Descriptions

95 m Shale, 100%, medium to dark gray, subfissile, micro micaceous, medium hard, silty in part

100 m Shale, 100%, as above

105 m Shale, 90%, medium to dark gray, subfissile to fissile, micro micaceous, medium hard, trace carbonaceous fossils, Siltstone, 10%, medium gray, red-brown, argillaceous in part, arenaceous in part, trace pyrite, well cemented to friable, calcareous in part

110 m Shale, 90%, as above, Siltstone, 10%, as above

115 m Shale, 80%, medium to dark gray, subfissile, micro micaceous, medium hard, abundant black and orange fossils, possible chitin, Siltstone, 20%, light to medium gray, slightly calcareous in part, argillaceous, trace light gray limestone, well cemented to friable

120 m Shale, 70%, as above, Siltstone, 30%, as above

125 m Shale, 80%, medium to dark gray, subfissile, medium hard, micro micaceous, silty in part, good trace black and orange fossils, Siltstone, 20%, medium gray, arenaceous, slightly calcareous in part, well cemented

130 m Shale, 100%, influx medium gray, blocky, soft clay, slightly bentonitic

135 m Shale, 100%, as above, increasingly silty

140 m Shale, 60%, medium to dark gray, subfissile, micro micaceous in part, silty in part, blocky, soft, silty, bentonitic in part, Siltstone, 40%, medium gray, argillaceous, bentonitic, friable, trace glauconite

145 m Shale, 50%, as above, Siltstone, 50%, as above

150 m Shale, 80%, medium gray, blocky, soft, bentonitic, silty in part, Siltstone, 20%, medium gray, bentonitic, argillaceous, friable

155 m Shale, 60%, as above, increasingly hard, Siltstone, 40%, as above, trace glauconite, increasingly well cemented

160 m Shale, 40%, medium gray, blocky to subfissile, medium hard, micro micaceous in part, silty in part, Siltstone, 60%, medium gray, red-brown, argillaceous, slightly calcareous in part, friable to well cemented

165 m Shale, 30%, as above, Siltstone, 70%, predominantly red-brown, arenaceous, well cemented, trace pyrite

170 m Siltstone, 20%, as above, Sandstone, 80%, clear, medium gray, very fine to fine grained, subangular to subrounded, fairly sorted, calcareous in part, siliceous in part, well cemented to friable, good trace glau-

Sample Descriptions

conite, trace Inoceramus, trace dull yellow fluorescence, no cut

175 m Shale, 20%, medium to dark gray, blocky to subfissile, micro micaceous in part, medium hard, Siltstone, 20%, light to medium gray, arenaceous, calcareous in part, bentonitic in part, trace glauconite, friable to well cemented, Sandstone, 60%, as above

180 m Shale, 10%, as above, Siltstone, 20%, as above, interbedded with sandstone in part, Sandstone, 70%, salt and pepper, medium gray, very fine to fine grained, subangular to subrounded, well to fairly sorted, siliceous in part, calcareous in part, well cemented, interbedded with shale and siltstone, good trace glauconite

185 m Shale, 10%, medium to dark gray, blocky to subfissile, silty in part, Siltstone, 30%, predominantly red-brown, arenaceous, well cemented, sideritic, trace glauconite, Sandstone, 60%, as above

190 m Shale, 10%, as above, Siltstone, 20%, as above, Sandstone, 70%, light to medium gray, salt and pepper, very fine to fine grained, fairly sorted, siliceous in part, calcareous and kaolinitic in part, good trace glauconite, micaceous in part

195 m Shale, 10%, medium to dark gray, blocky to subfissile, silty, trace pyrite, trace Inoceramus, Siltstone, 40%, medium gray, argillaceous in part, arenaceous in part, interbedded with very fine grained sandstone in part, Sandstone, 50%, light to medium gray, salt and pepper, very fine grained, subangular to subrounded, well sorted, calcareous and kaolinitic, well cemented to friable, siliceous in part, abundant glauconite, trace carbonaceous material

200 m Siltstone, 20%, as above, Sandstone, 80%, as above

205 m Siltstone, 20%, medium gray, slightly calcareous, argillaceous, well cemented, Sandstone, 80%, light to medium gray, salt and pepper, fine grained to very fine grained, predominantly subangular, subrounded in part, well sorted, calcareous and kaolinitic, argillaceous, well cemented to friable, trace glauconite, trace fair porosity

210 m Siltstone, 10%, as above, Sandstone, 90%, as above, interbedded with siltstone in part

215 m Shale, 10%, medium to dark gray, subfissile to blocky, medium soft to medium hard, micro micaceous, Siltstone, 20%, medium gray, argillaceous in part, arenaceous in part, friable to well cemented, Sandstone, 70%, buff, light to medium gray, very fine to fine grained, subangular to subrounded, fairly sorted, sideritic and kaolinitic, friable, dead oil staining

220 m Shale, 10%, as above, Siltstone, 10%, as above, Sandstone, 80%, light

gray, salt and pepper, as above, well sorted, no staining, silty laminations, fair porosity

225 m Siltstone, 20%, medium gray, arenaceous, calcareous, friable, trace glauconite, Sandstone, 80%, light gray, salt and pepper, clear, very fine to fine grained, well sorted, calcareous and kaolinitic in part, siliceous in part, friable, good trace glauconite, fair to good porosity

230 m Shale, 10%, medium gray, blocky to subfissile, medium hard, silty in part, micro micaceous in part, Siltstone, 20%, as above, Sandstone, 70%, as above, increasingly fine grained, subangular, friable, good porosity

235 m Shale, 20%, medium to dark gray, subfissile to blocky, medium soft, micro micaceous in part, Siltstone, 10%, medium gray, argillaceous, light brown, arenaceous, sideritic in part, Sandstone, 70%, clear, fine grained, well sorted, calcareous, well cemented to friable, good trace glauconite, friable to good intergranular porosity

240 m Shale, 10%, as above, Siltstone, 20%, as above, trace glauconite, Sandstone, 70%, trace coal, fair to good porosity

245 m Shale, 10%, medium to dark gray, subfissile, micro micaceous, slightly carbonaceous in part, Siltstone, 30%, medium gray, arenaceous, well cemented to friable, Sandstone, 60%, as above, and influx buff staining

250 m Shale, 10%, as above, Siltstone, 20%, as above, increasingly red-brown, buff, sideritic, well cemented, Sandstone, 70%, clear, light gray, salt and pepper, fine grained to very fine grained, fairly sorted, calcareous, siliceous in part, friable to well cemented, abundant glauconite, decreasing porosity

255 m Shale, 10%, medium to dark gray, very subfissile to blocky, medium soft, micro micaceous in part, silty in part, Siltstone, 20%, buff, red-brown, sideritic, arenaceous, well cemented, good trace glauconite, Sandstone, 70%, as above, increasingly very fine grained, subrounded, good trace glauconite

260 m Shale, 10%, as above, Siltstone, 10%, as above, Sandstone, 80%, as above

265 m Shale, 20%, medium to dark gray, subfissile to blocky, micro micaceous, medium soft, very slightly calcareous, Siltstone, 10%, medium gray, argillaceous and arenaceous, well cemented, red-brown, arenaceous, sideritic, well cemented, Sandstone, 70%, clear, light gray, salt and pepper, fine grained, subangular, well sorted, calcareous and kaolinitic, friable to well cemented, good trace glauconite

270 m Shale, 10%, as above. Siltstone, 20%, as above, Sandstone, 70%, as above

Sample Descriptions

275 m Shale, 20%, medium gray, blocky to fissile, medium soft, micro micaceous, silty in part, Siltstone, 20%, light to medium gray, arenaceous in part, argillaceous in part, friable, Sandstone, 60%, light to medium gray, salt and pepper, very fine to fine grained, subangular to subrounded, fairly sorted, calcareous and kaolinitic in part, siliceous in part, friable to well cemented, good trace glauconite

280 m Shale, 20%, as above, Siltstone, 20%, as above, Sandstone, 60%, as above

285 m Shale, 20%, medium to dark gray, blocky to subfissile, medium soft, micro micaceous in part, silty in part, Siltstone, 30%, light to medium gray, arenaceous, calcareous, friable, trace glauconite, Sandstone, 50%, light to medium gray, salt and pepper, very fine to fine grained, subrounded to subangular, fairly sorted, calcareous and kaolonitic, well cemented to friable, good trace glauconite

290 m Shale, 30%, as above, Siltstone, 40%, as above, Sandstone, 30%, as above

295 m Shale, 40%, medium to dark gray, subfissile to blocky, micro micaceous, medium hard to medium soft, silty in part, trace fossils, Siltstone, 30%, medium gray, argillaceous and arenaceous, well cemented, trace glauconite, very sideritic, red-brown, Sandstone, 30%, light to medium gray, very fine to fine grained, subangular to subrounded, fairly sorted, calcareous and kaolinitic in part, siliceous in part, friable to well cemented, good trace glauconite

300 m Shale, 70%, as above, Siltstone, 30%, as above, trace pyrite

305 m Shale, 70%, medium gray, subfissile to blocky, medium hard, micro micaceous, Siltstone, 30%, light to medium gray, bentonitic, friable, trace glauconite

310 m No sample

315 m Shale, 50%, medium to dark gray, subfissile, micro micaceous, trace carbonaceous, silty in part, Siltstone, 50%, medium gray, buff to gray, arenaceous, well cemented, trace chert fragments

320 m No sample

325 m No sample

330 m Shale, 30%, as above, Siltstone, 70%, as above, grading to very fine grained sandstone in part

335 m Shale, 70%, dark gray, subfissile, micro micaceous, medium hard, silty in part, slight trace glauconite, Siltstone, 30%, light to medium gray, argillaceous, well cemented, trace glauconite, trace very fine grained

Sample Descriptions

sandstone, clear, subangular, well sorted, slightly calcareous, siliceous in part, well cemented to friable, good trace glauconite

340 m Shale, 60%, as above, Siltstone, 40%, buff-gray, arenaceous, siliceous, well cemented, trace sandstone

345 m Shale, 70%, dark gray, subfissile to blocky, micro micaceous, medium hard, silty in part, Siltstone, 30%, medium gray, buff, gray, arenaceous, well cemented, sideritic in part

350 m Shale, 80%, as above, Siltstone, 20%, as above

355 m No sample

360 m Shale, 60%, dark gray, subfissile, micro micaceous, medium hard, silty in part, Siltstone, 40%, light to medium gray, buff-gray, arenaceous, calcareous in part, well cemented to friable

365 m Shale, 40%, as above, Siltstone, 40%, as above, Sandstone, 20%, light to medium gray, buff, very fine grained, subangular to subrounded, calcareous, well cemented, tite

370 m Shale, 50%, dark gray, subfissile, micro micaceous, silty in part, Siltstone, 50%, light to medium gray, arenaceous, well cemented to friable, calcareous in part

375 m Shale, 80%, as above, Siltstone, 20%, as above

380 m Shale, 70%, dark gray, subfissile to blocky, silty, medium hard, micro micaceous in part, Siltstone, 30%, light to medium gray, arenaceous, well cemented, calcareous in part, siliceous in part, trace glauconite

385 m Shale, 80%, as above, Siltstone, 20%, as above

390 m Shale, 80%, as above, Siltstone, 20%, as above, trace siderite

395 m Shale, 90%, dark gray, subfissile, medium hard to medium soft, silty in part, Siltstone, 10%, medium to dark gray, argillaceous, calcareous, well cemented to friable, trace glauconite

400 m Shale, 80%, as above, Siltstone, 20%, as above

405 m Shale, 80%, dark gray to black, subfissile, micro micaceous, medium hard, blocky to silty in part, Siltstone, 20%, medium gray, buff-gray, slightly calcareous, well cemented, arenaceous

410 m Shale, 70%, as above, (trace steel balls), Siltstone, 30%, as above

Sample Descriptions

415 m Shale, 80%, dark gray, subfissile, medium hard, micro micaceous, silty in part, trace tan, calcareous, fossils, Siltstone, 20%, light to medium gray, argillaceous, well cemented to friable, slightly calcareous in part, trace pyrite, trace glauconite

420 m Shale, 90%, as above, Siltstone, 10%, as above

425 m Shale, 80%, as above, Siltstone, 20%, as above

430 m Shale, 80%, dark gray to black, subfissile, micro micaceous, medium hard, silty in part, trace fossils, Siltstone, 20%, medium gray, arenaceous, well cemented, trace glauconite

435 m Shale, 90%, as above, Siltstone, 10%, as above

440 m Shale, 70%, dark gray, subfissile, micro micaceous, medium hard, silty in part, Siltstone, 30%, medium to dark gray, arenaceous, calcareous in part, siliceous in part, well cemented, abundant glauconite

445 m Shale, 30%, as above, Siltstone, 50%, as above, abundant glauconite, Sandstone, 20%, medium gray, tan, very fine grained, subrounded to subangular, predominantly siliceous, calcareous in part, well cemented, abundant glauconite, tite

450 m Shale, 30%, dark gray, subfissile to blocky, micro micaceous, medium hard, silty in part, Siltstone, 40%, light to medium gray, arenaceous, siliceous, calcareous in part, well cemented, good trace glauconite, Sandstone, 30%, as above

455 m Shale, 20%, medium to dark gray, subfissile to blocky, silty in part, micro micaceous in part, trace pyrite and carbonaceous plant fossils, Siltstone, 40%, light to medium gray, arenaceous, calcareous in part, well cemented, light brown, sideritic, well cemented, good trace glauconite, Sandstone, 40%, light brown, light to medium gray, very fine grained, subrounded, fairly sorted, sideritic in part, siliceous in part, well cemented, abundant glauconite

460 m Shale, 40%, as above, trace pyrite and carbonaceous plant fossils, as above, Siltstone, 20%, as above, sideritic, Sandstone, 40%, as above, abundant glauconite, trace fair porosity

465 m Shale, 40%, dark gray, subfissile to blocky, hard, micro micaceous, silty in part, Siltstone, 50%, tan, gray-brown, sideritic, well cemented, arenaceous, trace glauconitic, grading to very fine grained sandstone in part, Sandstone, 10%, as above

470 m Shale, 40%, as above, Siltstone, 20%, as above, abundant siderite, Sandstone, 40%, tan, light to medium gray, very fine grained, subrounded to subangular, fair to well sorted, siliceous, well cemented

Sample Descriptions

475 m Shale, 40%, dark gray, subfissile, micro micaceous, medium hard, silty in part, trace pyrite, Siltstone, 50%, buff, tan, medium gray, sideritic, arenaceous, well cemented, trace glauconite, grading to very fine grained sandstone in part, trace pyrite, Sandstone, 10%, clear, buff, very fine grained, subangular to subrounded, well sorted, calcareous, sideritic in part, trace glauconite

480 m Shale, 70%, as above, Siltstone, 30%, as above

485 m Shale, 80%, dark gray, subfissile to platy, micro micaceous, medium soft to medium hard, brittle in part, Siltstone, 20%, medium gray, argillaceous, trace glauconite, well cemented

490 m Shale, 90%, as above, Siltstone, 10%, as above

495 m Shale, 70%, dark gray, subfissile to blocky, medium hard, micro micaceous, very slightly calcareous, silty in part, Siltstone, 30%, tan, sideritic, well cemented, arenaceous in part, trace pyrite

500 m Shale, 70%, as above, Siltstone, 30%, as above

505 m Shale, 60%, dark gray, subfissile to blocky, medium hard, micro micaceous in part, slightly calcareous in part, Siltstone, 40%, light to medium gray, arenaceous, siliceous, well cemented

510 m Shale, 60%, as above, Siltstone, 40%, as above

515 m Shale, 60%, dark gray, subfissile to blocky, medium hard, micro micaceous, silty in part, Siltstone, 40%, medium gray, arenaceous, predominantly siliceous, slightly calcareous, well cemented,good trace glauconite, trace oil stained bleeding cut, light brown, sideritic, dense

520 m Shale, 60%, as above, Siltstone, 40%, as above

525 m Shale, 70%, dark gray, subfissile to fissile, medium hard, slight trace fossils, Siltstone, 30%, light brown, sideritic, dense, medium to dark gray, argillaceous in part, arenaceous in part, well cemented to friable, very slight trace oil staining and bleeding cut

530 m Shale, 80%, as above, increasingly fissile, increasingly dark gray to black, Siltstone, 20%, as above

535 m Shale, 90%, dark gray to black, subfissile to fissile, medium hard to medium soft, micro micaceous in part, trace pyrite, Siltstone, 10%, medium gray, argillaceous, calcareous in part, well cemented

540 m Shale, 80%, as above, trace calcareous fossils, Siltstone, 20%, as above

Sample Descriptions

545 m Shale, 70%, dark gray to black, subfissile to fissile, micro micaceous, medium hard to medium soft, brittle in part, Siltstone, 30%, medium to dark gray, argillaceous, well cemented, fair to good trace oil staining, slow bleeding cut

550 m Shale, 70%, as above, Siltstone, 30%, as above

555 m Shale, 80%, as above, Siltstone, 20%, as above

560 m Shale, 80%, dark gray to black, fissile to platy, micro micaceous in part, medium hard to medium soft, brittle in part, trace calcite, Siltstone, 20%, medium gray, argillaceous, well cemented to friable

565 m Shale, 90%, as above, trace calcite, Siltstone, 10%, as above

570 m Shale, 90%, as above, abundant white and light blue gray, bentonitic clay, Siltstone, 10%, as above, good trace buff sandstone, very fine grained, subrounded, micaceous, poorly sorted, kaolinitic, friable, good trace coal and pyrite, possible dead oil staining

575 m Shale, 80%, dark gray to black, fissile to platy, micro micaceous, medium hard, good trace white bentonitic clay, Siltstone, 20%, medium gray, argillaceous, well cemented, micaceous in part, good trace pyrite

580 m Shale, 70%, as above, Siltstone, 30%, as above

585 m Shale, 70%, medium gray, subfissile to blocky, medium soft, silty, calcareous, trace orange chert fragments, Siltstone, 30%, medium gray, buff-gray, calcareous in part, good trace coal and carbonaceous fossils

590 m Shale, 90%, medium gray, buff, medium hard, calcareous, silty, Siltstone, 10%, medium gray, argillaceous, well cemented to friable, calcareous

595 m Shale, 90%, as above, trace fossils, Siltstone, 10%, as above

600 m Shale, 80%, medium gray, buff, medium hard, silty in part, calcareous, Limestone, 20%, cream, tan, coarse fossil fragments, ostracods and crinoids

605 m Shale, 90%, as above, Limestone, 10%, as above

610 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, calcareous, trace pyrite, good trace fossils, brachiopods, bryozoans, crinoids

615 m Shale, 100%, as above

620 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, silty in part, calcareous

Sample Descriptions

625 m Shale, 100%, as above

630 m Shale, 100%, medium gray, dark gray in part, subfissile to blocky, silty in part, calcareous

635 m Shale, 100%, as above

640 m Shale, 100%, as above, trace limestone, cream, tan, coarse fossil fragments

645 m Shale, 100%, medium to dark gray, blocky to subfissile, calcareous, silty in part, micro micaceous in part, trace pyrite

650 m Shale, 100%, as above

655 m Shale, 100%, as above

660 m Shale, 100%, medium gray, blocky to subfissile, medium hard, trace pyrite, trace limestone, cream, tan, coarse, fossil fragments, trace crinoids

665 m Shale, 100%, influx, light to medium brown, subfissile, medium hard, calcareous

670 m Shale, 100%, medium gray, increasingly dark gray, subfissile to blocky, medium hard, calcareous, silty in part

675 m Shale, 100%, as above, trace fossils

680 m Shale, 90%, as above, Limestone, 10%, light to medium gray, very fine to fine crystalline, bioclastic, hard, trace fossils

685 m Shale, 90%, medium to dark gray, subfissile to blocky, medium hard, calcareous, silty in part, Limestone, 10%, as above, sandy in part, trace crinoids, trace ostracods

690 m Shale, 80%, as above, Limestone, 20%, light to medium gray, very fine to fine crystalline, silty and sandy in part, bioclastic in part

695 m Shale, 90%, medium to dark gray, subfissile to blocky, medium hard, calcareous, silty in part, micro micaceous in part, Limestone, 10%, light to medium gray, cream, very fine to fine crystalline, bioclastic, fossiliferous, silty in part

700 m Shale, 90%, as above, Limestone, 10%, as above

705 m Shale, 100%, as above,trace limestone

Sample Descriptions

710 m Shale, 90%, medium to dark gray, subfissile to blocky, platy in part, calcareous, silty in part, trace crinoids, micro micaceous in part, Limestone, 10%, light to medium gray, micro to very fine crystalline, predominantly argillaceous, bioclastic in part, dense, tite, trace Amphipora

715 m Shale, 90%, as above, silty, trace pyrite, trace coarse, unconsolidated grains, very calcareous, trace calcite, Limestone, 10%, as above

720 m Shale, 80%, light to medium gray, blocky to subfissile, medium soft, very calcareous, silty in part, good trace pyrite, Limestone, 20%, light to medium gray, fine crystalline, very fine crystalline, fossil fragments, recrystallized in part, hard, trace brachiopods, crinoids, trace pyrite

725 m Shale, 100%, as above, influx light to medium brown, subfissile to blocky, medium hard, slightly to medium calcareous

730 m Shale, 100%, light to medium brown, blocky to subfissile, medium hard, silty in part, trace pyrite, trace calcite

735 m Shale, 90%, light to medium gray,subfissile to blocky, medium soft, silty in part, very calcareous, trace fossils, crinoids, ostracods, trace unconsolidated sandstone grains, Limestone, 10%, light to medium gray, fine crystalline, bioclastic, hard, recrystallized, trace ostracods, trace crinoids

740 m Shale, 100%, light to medium brown, blocky to subfissile, medium hard, silty, calcareous, trace bryozoans

745 m Shale, 100%, good trace coarse clear and pink sand grains, unconsolidated

750 m Shale, 100%, medium gray, subfissile to blocky, medium soft, very calcareous

755 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard to medium soft, silty in part, calcareous

760 m No sample

765 m Shale, 80%, as above, Siltstone, 20%, red-brown, argillaceous to friable

770 m Shale, 100%, medium to dark gray, subfissile, slightly calcareous, medium hard, micro micaceous in part, silty in part, trace pyrite

775 m Shale, 100%, as above

780 m Shale, 100%, medium to dark gray, subfissile, slightly to medium calcareous, medium hard

Sample Descriptions

785 m Shale, 100%, decreasingly calcareous

790 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, silty in part, slightly calcareous, trace pyrite, trace fossils

795 m Shale, 100%, as above

800 m Shale, 100%, medium to dark gray, subfissile, medium hard, slightly calcareous, trace pyrite

805 m Shale, 100%, as above, trace pyrite, trace siderite

810 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, slightly calcareous, trace pyrite

815 m Shale, 100%, as above, trace sideritic

820 m Shale, 100%, medium to dark gray, subfissile, micro micaceous, silty in part, medium hard, increasingly calcareous

825 m Shale, 100%, as above, trace pyrite

830 m Shale, 100%, medium to dark gray, subfissile to blocky, micro micaceous, silty in part, medium hard, calcareous, trace dolomitic

835 m Shale, 100%, as above

840 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous in part, slightly calcareous, trace medium brown, sideritic, orange dolomite, trace pyrite

845 m Shale, 100%, as above

850 m Shale, 100%, as above

855 m Shale, 100%, medium to dark gray, predominantly subfissile, blocky in part, medium hard, slightly calcareous, micro micaceous in part, trace pyrite, trace light brown, dolomitic, dense

860 m Shale, 100%, as above, trace pyrite

865 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, slightly calcareous, trace brown, dolomitic, hard

870 m Shale, 100%, as above, trace pyrite

875 m Shale, 100%, as above, trace pyrite

Sample Descriptions

880 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard to hard, micro micaceous in part, very slightly calcareous, light brown, dolomitic in part, hard

885 m Shale, 100%, as above

890 m Shale, 100%, medium to dark gray, subfissile to blocky, micro micaceous, medium hard to hard, silty in part, slightly calcareous, trace brown, hard, dolomitic

895 m Shale, 100%, as above

900 m Shale, 100%, medium to dark gray, subfissile to blocky, silty in part, micro micaceous in part, medium hard, brittle in part, very slightly calcareous

905 m Shale, 100%, as above

910 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, slightly calcareous, micro micaceous

915 m Shale, 100%, as above

920 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, slightly calcareous, trace brown, dolomitic, dense, trace pyrite

925 m Shale, 100%, as above

930 m Shale, 100%, medium to dark gray, subfissile, medium hard, micro micaceous, very slightly calcareous

935 m Shale, 100%, as above

940 m Shale, 100%, as above, trace pyrite

945 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, silty in part, slightly calcareous, trace light brown, dolomitic, hard

950 m Shale, 90%, as above, good trace pyrite, Limestone, 10%, light gray, micro to crypto crystalline, hard, dolomitic, argillaceous in part

955 m Shale, 100%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, silty in part, trace limestone

960 m Shale, 90%, as above, good trace pyrite, medium brown, subfissile to

Sample Descriptions

blocky, medium hard, Limestone, 10%, cream, light brown, micro to crypto crystalline, dense, dolomitic

965 m Shale, 90%, medium brown, blocky, medium soft, medium to dark gray, subfissile to blocky, slightly calcareous, medium hard, good trace pyrite, Limestone, 10%, cream, tan, micro to very fine crystalline, dolomitic, hard, light gray, argillaceous, micro crystalline, trace pyrite

970 m Shale, 20%, as above, Limestone, 80%, light gray, micro crystalline, dolomitic, slightly argillaceous, dense, trace pyrite

975 m Shale, 10%, as above, Limestone, 90%, as above, trace pyrite

980 m Limestone, 100%, light to medium gray, micro crystalline, dolomitic, very argillaceous, dense

985 m Dolomite, 100%, light to medium gray, micro crystalline, very argillaceous, calcareous, silty in part, hard, tite, trace pyrite

990 m Dolomite, 100%, as above

995 m Dolomite, 100%, light gray, micro to very fine crystalline, argillaceous and silty, dense, hard, increasingly calcareous, trace disseminated pyrite

1000 m Shale, 70%, medium to dark gray, blocky to subfissile, medium hard, dolomitic, silty in part, Dolomite, 30%, as above, very argillaceous

1005 m Shale, 30%, as above, Dolomite, 70%, light to medium gray, micro to very fine crystalline, argillaceous, dense, trace limestone

1010 m Shale, 100%, medium gray, subfissile to blocky, medium hard, micro micaceous, dolomitic, trace pyrite

1015 m Shale, 100%, as above

1020 m Shale, 100%, medium gray, subfissile to blocky, medium hard, micro micaceous, dolomitic

1025 m Shale, 100%, as above

1030 m Shale, 100%, medium gray, subfissile to blocky, medium hard, dolomitic, micro micaceous in part, trace fossils

1035 m Shale, 100%, brown-gray, subfissile, medium hard to medium soft, dolomitic

Sample Descriptions

1040 m Shale, 100%, medium to dark gray, blocky to subfissile, medium hard, dolomitic, trace pyrite

1045 m Shale, 100%, as above

1050 m Shale, 100%, as above, medium gray, blocky to subfissile, medium hard, micro micaceous, dolomitic, trace tan, limestone

1055 m Shale, 40%, as above, Limestone, 60%, light to medium gray, crypto to micro crystalline, dolomitic, argillaceous, dense, trace pyrite

1060 m Shale, 20%, medium gray, subfissile to blocky, medium hard, micro micaceous, dolomitic, Limestone, 80%, as above, trace pyrite

1065 m Shale, 20%, as above, Limestone, 80%, light to medium gray, tan -gray, crypto to micro crystalline, dolomitic, argillaceous, dense, bioclastic in part, trace crinoids

1070 m Shale, 80%, medium gray, blocky to subfissile, medium hard, micro micaceous, silty in part, Limestone, 20%, tan, light to medium gray, bioclastic, fossil fragments, micro to medium crystalline

1075 m Shale, 80%, as above, Limestone, 20%, as above

1080 m Shale, 70%, medium gray, blocky to subfissile, very calcareous, medium hard, micro micaceous in part, silty in part, Limestone, 30%, medium gray, tan, micro to crypto crystalline, argillaceous, dense, tite

1085 m Shale, 60%, as above, Limestone, 40%, as above, trace disseminated pyrite

1090 m Shale, 50%, as above, Limestone, 50%, as above, trace pyrite

1095 m Shale, 30%, medium gray, tan-gray, subfissile, very calcareous, hard, Limestone, 70%, tan, medium gray, crypto to micro crystalline, hard, argillaceous, slightly dolomitic, tite, trace pyrite

1100 m Shale, 70%, as above, Limestone, 30%, as above

1105 m Shale, 60%, as above, Limestone, 40%, as above

1110 m Shale, 30%, medium gray, blocky, medium hard, micro micaceous, very calcareous, silty in part, Limestone, 70%, tan, medium hard, micro to crypto crystalline, argillaceous, hard, dolomitic

1115 m Shale, 70%, as above, trace pyrite, Limestone, 30%, as above

1120 m Shale, 80%, as above, Limestone, 20%, as above

Sample Descriptions

1125 m Shale, 80%, medium gray, blocky to subfissile, medium hard, micro micaceous, very calcareous, trace pyrite, Limestone, 20%, medium gray, micro to crypto crystalline, very argillaceous, dolomitic in part, hard, silty in part

1130 m Shale, 70%, as above, Limestone, 30%, as above

1135 m Shale, 80%, as above, Limestone, 20%, as above

1140 m Shale, 90%, medium gray, subfissile to blocky, medium hard, micro micaceous, very calcareous, influx light to medium brown, subfissile to blocky, medium hard, very calcareous, trace ostracods, Limestone,10%, tan, medium gray, micro to crypto crystalline, dolomitic, hard

1145 m Shale, 90%, as above, Limestone, 10%, as above

1150 m Shale, 100%, medium gray, subfissile to blocky, micro micaceous, medium hard, very calcareous, silty in part

1155 m Shale, 80%, as above, light to medium brown, subfissile, medium hard, very calcareous, Limestone, 20%, tan, medium gray, crypto to micro crystalline, very argillaceous, hard, dolomitic

1160 m Shale, 100%, increasingly medium brown, dolomitic

1165 m Shale, 100%, medium gray, subfissile to blocky, micro micaceous, very calcareous, dolomitic in part, medium hard

1170 m Shale, 100%, as above

1175 m Shale, 100%, medium gray, subfissile to blocky, medium hard, micro micaceous, very calcareous, dolomitic in part, trace tan, crypto crystalline, dense limestone

1180 m Shale, 100%, as above

1185 m Shale, 100%, medium gray, subfissile, micro micaceous, very calcareous, light to medium brown, subfissile, hard, dolomitic

1190 m Shale, 100%, as above

1195 m Shale, 100%, light to medium gray, subfissile to blocky, micro micaceous, medium hard, very calcareous, trace pyrite

1200 m Shale, 100%, as above, trace pyrite

1205 m Shale, 90%, light to medium gray, subfissile, medium hard, brittle in part, increasingly calcareous, micro micaceous in part, Limestone, 10%, light brown, clear, light to medium gray, crypto crystalline,

Sample Descriptions

argillaceous in part, chalky in part, medium soft

1210 m Shale, 90%, as above, Limestone, 10%, as above

1215 m Shale, 100%, medium brown, subfissile, hard, very calcareous, dolomitic in part, light to medium gray, subfissile, calcareous, micro micaceous, medium hard, brittle in part

1220 m Shale, 100%, as above

1225 m Shale, 100%, medium gray, subfissile, medium hard, micro micaceous, very calcareous, brittle in part, trace cream, tan limestone

1230 m Shale, 90%, as above, trace calcite, trace pyrite, Limestone, 10%, light gray, tan, crypto crystalline, chalky, soft, dolomitic, hard in part

1235 m Shale, 90%, medium to dark gray, subfissile, medium hard, brittle in part, micro micaceous, calcareous, Limestone, 10%, as above

1240 m Shale, 90%, as above, Limestone, 10%, cream, buff, crypto to micro crystalline, chalky, soft

1245 m Shale, 90%, as above, Limestone, 10%, as above, dolomitic and hard in part

1250 m Shale, 90%, medium to dark gray, subfissile, micro micaceous, medium hard, calcareous, Limestone, 10%, cream, light to medium gray, micro to crypto crystalline, chalky, soft, dolomitic and hard in part

1255 m Shale, 90%, as above, Limestone, 10%, as above

1260 m Shale, 80%, as above, Limestone, 20%, as above

1265 m Shale, 80%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, calcareous, trace pyrite, Limestone, 20%, light to medium gray, tan, micro to crypto crystalline, dolomitic, hard, cream, chalky, soft

1270 m Shale, 90%, as above, Limestone, 10%, as above

1275 m Shale, 80%, medium to dark gray, tan-gray, medium hard, brittle, micro micaceous, calcareous, Limestone, 20%, cream, tan, light gray, chalky, soft,crypto to micro crystalline

1280 m Shale, 80%, as above, Limestone, 20%, as above

1285 m Shale, 90%, as above, Limestone, 10%, as above

Sample Descriptions

1290 m Shale, 80%, medium to dark gray, brown-gray, subfissile, medium hard, micro micaceous, very calcareous, Limestone, 20%, tan, cream, micro crystalline, dolomitic, hard, cream, light to medium gray, chalky, soft

1295 m Shale, 80%, as above, increasingly calcareous, trace pyrite, Limestone, 20%, as above

1300 m Shale, 80%, medium to dark gray, brown-gray, subfissile, micro micaceous, medium hard, dolomitic, trace pyrite, Limestone, 20%, cream, tan, micro crystalline, soft, chalky

1305 m Shale, 100%, medium to dark gray, subfissile, micro micaceous in part, medium hard, silty in part, calcareous, dolomitic in part, trace calcite

1310 m Shale, 100%, medium to dark gray, subfissile to blocky, micro micaceous, medium hard, calcareous

1315 m Shale, 100%, as above, increasingly blocky

1320 m Shale, 100%, medium gray, brown-gray, subfissile to blocky, medium hard, calcareous, dolomitic in part

1325 m Shale, 100%, as above

1330 m Shale, 100%, medium gray, brown-gray, subfissile to blocky, medium hard, micro micaceous, very calcareous

1335 m Shale, 100%, as above

1340 m Shale, 60%, as above, Limestone, 40%, tan, light to medium gray, crypto to micro crystalline, hard, dolomitic, argiliaceous in part

1345 m Shale, 40%, as above, Limestone, 60%, as above, trace pyrite

1350 m Shale, 30%, medium to dark gray, subfissile to blocky, micro micaceous, medium hard, calcareous, Limestone, 70%, cream, tan, micro to crypto crystalline, hard, dolomitic

1355 m Shale, 20%, as above, Limestone, 80%, as above, trace pyrite

1360 m Shale, 20%, medium to dark gray, blocky to subfissile, medium hard, calcareous, Limestone, 80%, tan, cream, micro to crypto crystalline, hard, dolomitic, argillaceous in part

1365 m Shale, 20%, as above, Limestone, 80%, as above

1370 m Shale, 40%, medium to dark gray, medium hard, micro micaceous, very calcareous, silty in part, Limestone, 60%, tan, cream, medium gray, micro to crypto crystalline, hard, dolomitic, increasingly argillaceous

Sample Descriptions

1375 m Shale, 40%, as above, Limestone, 60%, as above

1380 m Shale, 30%, as above, Limestone, 70%, as above, trace pyrite

1385 m Shale, 30%, medium gray, blocky, medium hard, calcareous, micro micaceous, Limestone, 70%, tan, micro to crypto crystalline, dolomitic, hard

1390 m Shale, 30%, as above, Limestone, 70%, as above

1395 m Shale, 40%, medium gray to dark gray, blocky to subfissile, micro micaceous, hard, calcareous, Limestone, 60%, cream, white, chalky, soft, crypto to micro crystalline, tan, dolomitic, hard, trace pyrite

1400 m Shale, 50%, as above, Dolomite, 50%, light to medium gray, tan, very fine to micro crystalline, micro sucrosic, hard, argillaceous in part, micritic infill, trace pyrite

1405 m Shale, 30%, medium to dark gray, blocky to subfissile, medium hard, micro micaceous, calcareous, Limestone, 40%, tan, cream, micro to crypto crystalline, hard, dolomitic, trace pyrite, Dolomite, 30%, as above

1410 m Shale, 40%, as above, Limestone, 30%, as above, Dolomite, 30%, light to medium gray, very fine crystailine, micro sucrosic in part, calcareous infill, argillaceous in part, trace pyrite

1415 m Shale, 20%, medium to dark gray, blocky to subfissile, medium hard, micro micaceous, calcareous, Limestone, 40%, light to medium brown, tan, light to medium gray, micro to crypto crystalline, argillaceous, dolomitic in part, hard, Dolomite, 40%, as above

1420 m Shale, 70%, medium gray, brown-gray, subfissile to blocky, micro micaceous in part, medium hard, calcareous, dolomitic in part, trace pyrite, Limestone, 30%, as above

1425 m Shale, 60%, as above, Limestone, 40%, cream, tan, crypto crystalline, chalky, soft, trace pyrite, light to medium gray, dolomitic, hard

1430 m Shale, 40%, brown-gray, subfissile, medium hard, calcareous, dolomitic in part, trace pyrite, Limestone, 30%, cream, tan, crypto crystalline, dolomitic hard, cream, light gray, crypto to micro crystalline, soft, chalky, Dolomite, 30%, as above

1435 m Shale, 60%, medium to dark gray, subfissile, micro micaceous, medium hard, slightly calcareous, Limestone, 20%, tan, crypto to micro crystalline, dolomitic, hard, trace pyrite, Dolomite, 20%, light to medium gray, micro to very fine crystalline, argillaceous

1440 m Shale, 50%, as above, Limestone, 40%, as above, Dolomite, 10%, as above

Sample Descriptions

1445 m Shale, 30%, medium to dark gray, subfissile, micro micaceous, medium hard, slight trace pyrite, calcareous, Limestone, 50%, tan, cream, micro crystalline, hard, trace pyrite, Dolomite, 20%, light to medium gray, micro to very fine crystalline, micro sucrosic, calcareous infill

1450 m Shale, 40%, as above, Limestone, 10%, as above, Dolomite, 50%, as above, argillaceous, increasingly micro sucrosic

1455 m Shale, 70%, medium to dark gray, subfissile to blocky, medium hard, increasingly dark, increasingly calcareous, Limestone, 30%, tan, medium gray, micro crystalline, argillaceous in part, dolomitic in part, hard, trace pyrite

1460 m Shale, 80%, as above, Limestone, 20%, as above

1465 m Shale, 90%, medium to dark gray, subfissile to blocky, hard, slightly calcareous, micro micaceous, Limestone, 10%, tan, medium to dark gray, micro crystalline, argillaceous, dolomitic in part, hard

1470 m Shale, 30%, as above, Limestone, 30%, as above, Dolomite, 40%, light to medium gray, micro to very fine crystalline, argillaceous in part, micro sucrosic, calcareous infill

1475 m Shale, 60%, medium to dark gray, subfissile to blocky, hard, micro micaceous in part, slightly to medium calcareous, Dolomite, 40%, light to medium gray, micro to very fine crystalline, micro sucrosic, medium hard, argillaceous

1480 m Shale, 70%, as above, Dolomite, 30%, as above

1485 m Shale, 30%, as above, Dolomite, 70%, as above, increasingly calcareous

1490 m Shale, 40%, medium to dark gray, blocky to subfissile, hard, micro micaceous, silty in part, slightly calcareous, Limestone, 60%, tan, medium gray, micro to crypto crystalline, argillaceous in part, silty in part

1495 m Shale, 20%, as above, Limestone, 80%, as above

1500 m Shale, 30%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, medium hard, very slightly calcareous, Limestone, 70%, tan, medium gray, micro to very fine crystalline, silty in part, trace pyrite

1505 m Shale, 60%, as above, Limestone, 40%, as above, increasingly argillaceous, increasingly silty

1510 m Shale, 60%, medium to dark gray, subfissile to blocky, medium hard, calcareous in part, Limestone, 40%, tan, medium to dark gray, micro to very fine crystalline, argillaceous and silty, dolomitic in part

Sample Descriptions

1515 m Shale, 20%, as above, Limestone, 20%, as above, increasingly silty, Dolomite, 60%, light green-gray, very fine to micro crystalline, argillaceous, silty, trace disseminated pyrite

1520 m Shale, 20%, medium to dark gray, subfissile, blocky in part, medium hard, micro micaceous, slightly calcareous, Limestone, 30%, tan, medium gray, micro to very fine crystalline, dolomitic in part, argillaceous in part, hard, Dolomite, 50%, as above

1525 m Shale, 30%, as above, Dolomite, 70%, light green-gray, silty, argillaceous, trace pyrite, trace vari-colored chert fragments, trace fossils

1530 m Shale, 50%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, slightly calcareous, Dolomite, 50%, as above

1535 m Shale, 40%, as above, Dolomite, 60%, light green-gray, tan-gray, micro to very fine crystalline, argillaceous, silty, trace coarse, vari-colored chert fragments

1540 m Shale, 70%, medium to dark gray, subfissile, blocky in part, micro micaceous, medium hard, silty in part, trace pyrite, Dolomite, 30%, as above

1545 m Shale, 70%, as above, Dolomite, 30%, light to medium gray, tan, silty, micro to very fine crystalline, trace chert fragments

1550 m Shale, 90%, medium to dark gray, subfissile to blocky, micro micaceous, silty in part, trace disseminated pyrite, calcareous, Dolomite, 10%, as above

1555 m Shale, 90%, as above, Dolomite, 10%, light to medium green-gray, tan, silty, argillaceous in part, micro to very fine crystalline

1560 m Shale, 90%, medium to dark gray, subfissile to blocky, micro micaceous, medium soft, brittle in part, slightly calcareous, Dolomite, 10%, medium green-gray, micro to very fine crystalline, silty, trace pyrite

1565 m Shale, 100%, as above

1570 m Shale, 100%, dark gray, dark brown-gray, medium gray, subfissile to fissile, micro micaceous, calcareous in part

1575 m Shale, 70%, as above, Dolomite, 30%, as above, trace chert fragments

1580 m Shale, 80%, medium to dark gray, subfissile, micro micaceous, medium soft, calcareous, brittle in part, Dolomite, 20%, as above

1585 m Shale, 90%, as above, trace pyrite, Dolomite, 10%, as above

Sample Descriptions

1590 m Shale, 80%, medium to dark gray, subfissile, medium soft, micro micaceous in part, slightly calcareous in part, Dolomite, 20%, tan, light to medium gray, micro to very fine crystalline, argillaceous in part, silty in part

1595 m Shale, 90%, as above, medium brown, subfissile, medium soft, brittle in part, Dolomite, 10%, as above

1600 m Shale, 100%, medium to dark gray, brown-gray, subfissile to fissile, predominantly medium soft, medium hard in part, slightly calcareous in part

1605 m Shale, 100%, as above

1610 m Shale, 80%, dark gray, subfissile to fissile, micro micaceous, medium hard, very slightly calcareous in part, Dolomite, 20%, light to medium gray, green-gray, micro to very fine crystalline, hard, argillaceous in part

1615 m Shale, 90%, as above, Dolomite, 10%, as above

1620 m Shale, 90%, dark gray to medium gray in part, subfissile, medium hard, micro micaceous, medium soft in part, Dolomite, 10%, light gray, green-gray, tan, micro to very fine crystalline, argillaceous in part, silty in part, trace limestone

1625 m Shale, 70%, as above, Dolomite, 30%, as above

1630 m Shale, 70%, dark gray, medium gray in part, subfissile to blocky, micro micaceous, Dolomite, 30%, tan, clear, light gray, very fine to micro crystalline, grading to limestone in part

1635 m Shale, 40%, as above, Dolomite, 60%, tan, very fine to fine crystalline, silty, hard, calcareous infill

1640 m Shale, 40%, medium to dark gray, subfissile to blocky, micro micaceous, medium hard, calcareous in part, Dolomite, 60%, as above

1645 m Shale, 60%, medium gray, dark gray in part, subfissile, micro micaceous, medium hard, slightly calcareous in part, Dolomite, 40%, predominantly light gray, clear, very fine to fine crystalline, hard, very silty

1650 m Shale, 60%, as above, Dolomite, 40%, as above

1655 m Shale, 70%, medium to dark gray, subfissile, blocky, medium hard, micro micaceous, slightly calcareous in part, Dolomite, 30%, tan, very fine to fine crystalline, silty, hard

1660 m Shale, 90%, as above, Dolomite, 10%, as above

Sample Descriptions

1665 m Shale, 90%, as above, Dolomite, 10%, as above

1670 m Shale, 90%, medium to dark gray, subfissile to blocky, medium hard, micro micaceous, silty in part, Dolomite, 10%, tan, medium gray, crypto to micro crystalline, silty, very calcareous in part

1675 m Shale, 90%, as above, Dolomite, 10%, as above

1680 m Shale, 90%, as above, Dolomite, 10%, as above

1685 m Shale, 100%, medium to dark gray, brown-gray, medium hard, micro micaceous in part, slightly calcareous in part, trace tan, dolomite

1690 m Shale, 100%, as above

1695 m Shale, 100%, medium gray, subfissile, micro micaceous, medium soft to medium hard

1700 m Shale, 100%, as above

1705 m Shale, 100%, dark gray, medium gray in part, subfissile, medium soft, micro micaceous in part, calcareous in part

1710 m Shale, 80%, as above, trace pyrite, Dolomite, 20%, tan, clear, micro to crypto crystalline, very fine crystalline in part, silty, hard

1715 m Shale, 90%, medium to dark gray, brown-gray, subfissile to blocky, medium soft, micro micaceous in part, slightly calcareous in part, Dolomite, 10%, as above

1720 m Shale, 100%, medium to dark gray, subfissile, micro micaceous, medium hard, slightly calcareous in part

1725 m Shale, 100%, as above

1730 m Shale, 100%, as above, trace dolomite

1735 m Shale, 90%, medium to dark gray, subfissile, blocky in part, micro micaceous in part, slightly calcareous in part, Dolomite, 10%, tan, medium gray, micro to crypto crystalline, very calcareous, argillaceous in part, silty in part, medium hard

1740 m Shale, 100%, as above

1745 m Shale, 100%, as above

1750 m Shale, 100%, medium to dark gray, brown-gray, subfissile to blocky in part, medium soft, medium hard in part, micro micaceous in part, calcareous in part

Sample Descriptions

1755 m Shale, 100%, as above

1760 m Shale, 100%, as above

1765 m Shale, 100%, medium to dark gray, increasingly dark,subfissile to blocky, medium soft to medium hard, micro micaceous in part, calcareous in part

1770 m Shale, 100%, as above, increasingly dark gray

1775 m Shale, 100%, as above, medium to dark gray

1780 m Shale, 100%, medium to dark gray, subfissile, micro micaceous, medium soft, slightly calcareous in part

1785 m Shale, 100%, as above, increasingly dark gray, trace tan, micro crystalline, dolomite

1790 m Shale, 100%, dark gray, subfissile, platy, medium soft, micro micaceous, very slightly calcareous in part, trace dolomite, tan, micro crystalline, silty, hard

1795 m Shale, 100%, as above

1800 m Shale, 100%, dark gray, medium gray in part, subfissile, blocky in part, micro micaceous, medium soft, brittle, slightly calcareous

1805 m Shale, 100%, as above

1810 m Shale, 100%, dark gray to medium gray, subfissile to blocky, medium soft, very slightly calcareous

1815 m Shale, 100%, as above

1820 m Shale, 100%, as above, trace tan, dolomite, micro crystalline, silty, hard

1825 m Shale, 100%, dark gray, medium gray, brown-gray in part, medium soft, micro micaceous, slightly calcareous in part, trace disseminated pyrite

1830 m Shale, 100%, as above, silty in part

1835 m Shale, 100%, medium to dark gray, subfissile to blocky, micro micaceous, silty in part, calcareous in part, medium hard to medium soft

1840 m Shale, 100%, as above, increasingly dark gray

1845 m Shale, 80%, dark gray, subfissile, blocky in part, micro micaceous, medium hard, calcareous, Dolomite, 20%, tan, medium gray, micro to very fine crystalline, argillaceous, silty in part, hard

Sample Descriptions

1850 m Shale, 90%, as above, Dolomite, 10%, as above

1855 m Shale, 100%, medium to dark gray, subfissile, medium soft, micro micaceous, calcareous in part

1860 m Shale, 100%, trace pyrite, trace tan, dolomite, micro crystalline, argillaceous

1865 m Shale, 100%, dark gray, subfissile to blocky, medium hard, medium soft, micro micaceous, calcareous in part, trace dolomite, tan, micro crystalline, silty

1870 m Shale, 100%, as above, trace dolomite

1875 m Shale, 100%, as above, trace dolomite, trace pyrite

1880 m Shale, 100%, dark gray, subfissile to fissile, blocky in part, micro micaceous, medium soft, brittle in part, trace tan, micro crystalline, dolomite

1885 m Shale, 100%, as above, trace pyrite

1890 m Shale, 100%, dark gray, subfissile, medium hard to medium soft, micro micaceous, slightly calcareous in part

1895 m Shale, 100%, as above, trace tan dolomite, crypto crystalline, silty

1900 m Shale, 100%, medium to cark gray, subfissile, medium soft, micro micaceous, calcareous

1905 m Shale, 100%, as above, trace dolomite

1910 m Shale, 100%, dark gray, subfissile to blocky, medium hard to medium soft, micro micaceous, increasingly calcareous

1915 m Shale, 100%, medium gray, dark gray in part, medium hard to medium soft, micro micaceous, trace pyrite, silty in part, calcareous in part

1920 m Shale, 100%, medium to dark gray, medium soft to medium hard, calcareous, micro micaceous

1925 m Shale, 100%, as above

1930 m Shale, 100%, medium to dark gray, subfissile to blocky, medium soft to medium hard, micro micaceous in part, calcareous, trace dolomite, tan, micro crystalline

1935 m Shale, 100%, as above

1940 m Shale, 100%, medium to dark gray, brown-gray, subfissile, blocky in

Sample Descriptions

part, micro micaceous, calcareous in part, silty in part

1945 m Shale, 100%, as above

1950 m Shale, 100%, medium gray, dark gray in part, subfissile to blocky, medium soft to medium hard, calcareous in part, slightly micro micaceous in part

1955 m Shale, 100%, as above

1960 m Shale, 100%, dark gray, subfissile to blocky, medium hard to medium soft, micro micaceous, calcareous, trace dolomite

1965 m Shale, 100%, as above

1970 m Shale, 100%, medium to dark gray, subfissile to splintery, micro micaceous, medium soft to medium hard, silty in part, calcareous in part

1975 m Shale, 100%, as above

1980 m Shale, 100%, as above, trace dolomite, light gray, green-gray, very fine crystalline, very silty

1985 m Shale, 100%, dark to medium gray, splintery, subfissile in part, micro micaceous, medium soft, silty in part, calcareous in part

1990 m Shale, 100%, as above, brown, splintery, silty in part

1995 m Shale, 100%, medium to dark gray, splintery to subfissile, micro micaceous, medium soft, calcareous in part

2000 m Shale, 100%, as above, silty in part

2005 m Shale, 100%, as above

2010 m Shale, 100%, medium to dark gray, splintery to subfissile, medium soft, micro micaceous, calcareous, silty in part, brittle

2015 m Shale, 100%, as above

2020 m Shale, 100%, dark gray, splintery to subfissile, medium soft, micro micaceous, calcareous, silty in part, trace pyrite

2025 m Shale, 100%, as above, trace light green-gray, dolomite, silty, very fine crystalline, trace disseminated pyrite

2030 m Shale, 100%, influx medium brown, splintery to subfissile, medium hard to medium soft, slightly calcareous in part, silty in part, trace fossiliferous limestone

Sample Descriptions

2035 m Shale, 100%, dark gray, medium gray in part, splintery to subfissile, medium soft to medium hard, calcareous,brittle

2040 m Shale, 100%, as above, trace pyrite, silty in part

2045 m Shale, 100%, medium to dark gray, subfissile to splintery, medium soft, brittle, micro micaceous in part, calcareous in part, silty in part, trace pyrite

2050 m Shale, 100%, as above

2055 m Shale, 100%, dark gray, medium gray in part, splintery to subfissile, micro micaceous in part, silty in part, calcareous in part, medium soft, brittle

2060 m Shale, 100%, as above, trace dolomitic siltstone, fossiliferous limestone

2065 m Shale, 100%, dark to medium gray, splintery to subfissile, medium hard to medium soft, calcareous in part, micro micaceous in part, silty in part, trace argillaceous, dolomitic siltstone

2070 m Shale, 100%, as above

2075 m Shale, 100%, dark gray, splintery to subfissile, medium hard to medium soft, brittle in part, calcareous in part, trace pyrite, trace calcite, trace fossiliferous limestone

2080 m Shale, 100%, as above, trace crinoids

2085 m Shale, 100%, dark gray, subfissile to splintery, medium hard, silty in part, slightly calcareous in part, trace limestone

2090 m Shale, 100%, influx medium brown, subfissile, splintery, medium soft to medium hard, calcareous in part, silty in part, trace fossils

2095 m Shale, 100%, dark to medium gray, subfissile to blocky, splintery in part, silty, medium hard to medium soft, calcareous in part

2100 m Shale, 100%, as above

2105 m Shale, 100%, brown, subfissile to splintery, medium soft, brittle, silty, calcareous

2110 m Shale, 100%, dark gray, subfissile, splintery in part, medium hard, micro micaceous in part, silty in part, calcareous in part

Sample Descriptions

2115 m Shale, 100%, as above, good trace dolomite, light green-gray, tan, very fine to micro crystalline, very silty, fossiliferous in part

2120 m Shale, 100%, dark to medium gray, fissile to splintery, medium hard to medium soft, micro micaceous in part, calcareous in part

2125 m Shale, 100%, as above, trace limestone, tan to medium gray, micro to very fine crystalline, dolomitic, argillaceous, hard

2130 m Shale, 100%, dark gray, fissile to splintery, medium hard, micro micaceous in part, calcareous in part

2135 m Shale, 100%, as above

2140 m Shale, 100%, dark gray, subfissile to splintery, medium hard, micro micaceous, calcareous in part

2145 m Shale, 100%, as above, trace pyrite, trace calcite

2150 m Shale, 100%, dark gray, medium gray, medium brown, subfissile to splintery, medium hard, calcareous in part, silty in part

2155 m Shale, 100%, as above

2160 m Shale, 100%, medium to dark gray, subfissile to splintery, blocky in part,medium hard, slightly calcareous in part

2165 m Shale, 100%, as above, increasingly dark gray, bituminous in part, good trace medium to dark gray, limestone, argillaceous, micro crystalline, silty, bituminous in part

2170 m Shale, 80%, as above, Limestone, 20%, medium to dark gray, dark tan, micro to very fine crystalline, argillaceous, hard, dolomitic in part, tite

2175 m Shale, 80%, medium gray, blocky, silty, medium hard, calcareous, trace pyrite, dark gray, tan, gray, subfissile to splintery, Limestone, 20%, as above, trace crinoids, fossil fragments

2180 m Shale, 90%, as above, trace calcite, Limestone, 10%, as above

2185 m Shale, 100%, medium to dark gray, blocky to subfissile, medium hard, micro micaceous in part, silty in part, calcareous in part, medium to dark brown-gray, subfissile, medium soft, slightly calcareous

2190 m Shale, 100%, dark gray, subfissile, splintery, medium hard, micro micaceous

Sample Descriptions

2195 m Shale, 100%, as above

2200 m Shale, 100%, dark gray, medium gray in part, subfissile to splintery, micro micaceous, medium hard, calcareous in part

2205 m Shale, 100%, as above

2210 m Shale, 100%, dark gray, subfissile to splintery, medium hard, blocky in part, silty in part, micro micaceous in part, trace pyrite

2215 m Shale, 100%, as above, trace pyrite

2220 m Shale, 100%, as above

2225 m Shale, 100%, dark gray-black, subfissile to blocky, micro micaceous, hard, trace pyrite

2230 m Shale, 100%, as above, trace pyrite

2235 m Shale, 100%, dark gray-black, subfissile to blocky, hard, trace pyrite, trace white calcareous laminae

2240 m Shale, 70%, as above, Limestone, 30%, white, micro crystalline, soft, chalky, tan, micro to crypto crystalline, hard, fossiliferous, very fine to fine crystalline in part, hard, argillaceous in part

2245 m Shale, 30%, as above, Limestone, 70%, as above, trace pyrite, trace bitumen

2250 m Shale, 30%, medium to dark gray, dark gray to black, subfissile to blocky, hard, calcareous in part, micro micaceous in part, silty in part, Limestone, 70%, white, micro to very fine crystalline, chalky, soft, trace bitumen, tan, medium gray, very fine to fine crystalline, bioclastic, medium soft, trace calcite, trace bitumen, argillaceous in part, tite

2255 m Shale, 40%, as above, Limestone, 60%, as above

2260 m Shale, 40%, as above, Limestone, 60%, white, light gray, micro crystalline, chalky, soft, trace bitumen, tan, light gray, micro to very fine crystalline, bioclastic, fossiliferous in part, bituminous in part, trace calcite

2265 m Shale, 30%, as above, Limestone, 70%, as above

2270 m Shale, 30%, dark gray, subfissile to splintery, micro micaceous, medium hard, calcareous in part, Limestone, 70%, tan, light gray, very fine to fine crystalline, bioclastic, trace calcite, trace bitumen, hard, white, micro to very fine crystalline, chalky, soft, trace bitumen

Sample Descriptions

2275 m Shale, 30%, as above, Limestone, 70%, as above, increasingly tan, bioclastic, hard, tite

2280 m Shale, 20%, as above, Limestone, 80%, white, cream, micro crystalline, chalky, soft, decreasingly tan, light to medium gray, micro to very fine crystalline, bioclastic, hard

2285 m Shale, 20%, as above, Limestone, 80%, as above, trace fossils

2290 m Shale, 30%, dark gray to black, subfissile to splintery, medium hard, micro micaceous, calcareous in part, Limestone, 70%, white, cream, micro crystalline, chalky, soft, light to medium gray, tan, micro to very fine crystalline, bioclastic, fossiliferous in part, trace calcite

2295 m Shale, 30%, as above, Limestone, 70%, as above, influx light to medium gray, cream, micro to very fine crystalline, bioclastic, hard, tite, trace bitumen

2300 m Shale, 30%, as above, Limestone, 70%, as above, trace fossils, trace calcite

2305 m Shale, 30%, as above, Limestone, 70%, light to medium gray, very fine to fine crystalline, bioclastic, trace calcite, white, micro crystalline, chalky, soft

2310 m Shale, 40%, as above, Limestone, 60%, as above, trace pyrite, dolomitic in part

2315 m Shale, 60%, dark gray to black, subfissile to splintery, micro micaceous, medium hard, slightly calcareous in part, Limestone, 40%, tan, cream, light to medium gray, crypto to micro crystalline, very fine to fine crystalline, bioclastic, hard, tite, trace calcite, trace bitumen, white, micro crystalline, chalky,soft

2320 m Shale, 50%, as above, Limestone, 50%, as above, increasingly bituminous, trace pyrite

2325 m Shale, 60%, as above, Limestone, 40%, tan, dark gray, cream, micro to very fine crystalline, predominantly hard, bituminous, soft and chalky in part

2330 m Shale, 40%, medium to dark gray, subfissile to splintery, medium hard, micro micaceous, Limestone, 60%, predominantly white, cream, micro crystalline, chalky, soft, tan, dark gray, micro to very fine crystalline, bioclastic in part, bituminous in part

2335 m Shale, 60%, as above, Limestone, 40%, as above, good trace pyrite, increasingly hard and bituminous

Sample Descriptions

2340 m Shale, 30%, as above, Limestone, 70%, white, cream, medium gray, brown, micro crystalline, chalky, soft, dark gray, tan, micro to very fine crystalline, bioclastic, bituminous in part, siliceous in part, trace chert

2345 m Shale, 20%, as above,Limestone, 60%, as above, Sandstone, 20%, clear, amber, rose, medium to coarse grained, subangular, unconsolidated, dolomitic in part

2350 m Shale, 20%, dark gray to black, subfissile to splintery, Limestone, 80%, dark gray to black, tan, micro to very fine crystalline, bituminous and chert, bioclastic in part, cream, light brown, micro crystalline, chalky, soft, trace sand grains, as above

2355 m Shale, 20%, as above, Limestone, 80%, as above, trace fossils, trace pyrite

2360 m Shale, 10%, as above, Limestone, 90%, cream, tan, dark gray to black, mottled, very fine crystalline, medium soft to hard, bituminous, bioclastic in part

2365 m Shale, 10%, medium brown, subfissile, medium soft, calcareous in part, trace pyrite, medium soft, Limestone, 90%, as above

2370 m Shale, 10%, medium gray, dark gray, subfissile, medium hard, micro micaceous in part, Limestone, 90%, light to medium gray, cream, dark tan, micro to very fine crystalline, chalky and soft in part, argillaceous in part, bituminous in part, cherty in part, hard

2375 m Limestone, 100%, as above, increasingly bituminous

2380 m Shale, 10%, medium to dark gray, subfissile to splintery, medium hard, calcareous in part, micro micaceous, Limestone, 90%, dark gray, dark tan, micro to very fine crystalline, argillaceous and bituminous, medium hard, siliceous in part, light to medium gray-brown, mottled, micro to very fine crystalline, chalky, soft

2385 m Limestone, 100%, as above

2390 m Limestone, 100%, light to medium gray-brown, mottled, micro crystalline, chalky, medium hard, dark gray to black, dark tan, micro to very fine crystalline, hard, tite, bituminous, trace pyrite

2395 m Limestone, 100%, as above, influx tan, micro crystalline, hard, slightly dolomitic

2400 m Limestone, 100%, as above

2405 m Limestone, 100%, light brown, cream, mottled, micro crystalline, chalky, medium soft, tan, dark gray to black, micro crystalline, bituminous, dolomitic in part, hard

Sample Descriptions

2410 m Limestone, 100%, as above

2415 m Limestone, 100%, dark tan, dark gray to black, micro to very fine crystalline, bituminous, dolomitic in part, hard, cream, light brown, mottled, micro crystalline, chalky,soft

2420 m Limestone, 100%, as above, dolomitic and micro sucrosic in part

2425 m Limestone, 100%, tan, micro to very fine crystalline, bioclastic, dolomitic in part, hard, bituminous in part, cream, light brown, micro crystalline, chalky, soft

2430 m Limestone, 100%, as above

2435 m Limestone, 100%, tan, crypto to micro crystalline, bioclastic, hard, tite, dolomitic in part, trace pyrite, cream, white, light brown, micro crystalline, chalky, soft, trace calcite

2440 m Limestone, 100%, as above

2445 m Limestone, 100%, dark gray to black, tan, micro to very fine crystalline, bioclastic, predominantly bituminous, hard, tite, trace calcite, cream, light brown, micro crystalline, chalky, soft

2450 m Limestone, 100%, as above

2455 m Limestone, 100%, as above, increasingly argillaceous

2460 m Limestone, 40%, as above, Dolomite, 60%, white, light gray, medium to coarse crystalline, fair to good intercrystalline porosity, good trace bitumen, trace pyrite, trace coarse calcite crystals, no shows

2465 m Limestone, 20%, dark gray to black, dark tan, micro crystalline, bioclastic, bituminous, hard, Dolomite, 80%, as above, trace calcite

2470 m Limestone, 80%, cream, light tan, micro crystalline, chalky,soft, tan, bioclastic, micro crystalline, hard, bituminous in part, Dolomite, 20%, as above

2475 m Limestone, 30%, as above, Dolomite, 70%, white, medium to coarse crystalline, clean, hard, trace fair intercrystalline porosity, trace bitumen, trace pyrite, no shows

2480 m Limestone, 10%, tan, micro crystalline, bioclastic, bituminous in part, hard, Dolomite, 90%, as above, trace bitumen, trace pyrite

2485 m Limestone, 20%, as above, Dolomite, 80%, white, medium to coarse crys-

Sample Descriptions

talline, clean, hard, poor to fair intercrystalline porosity, trace bitumen, good trace pyrite, trace calcite

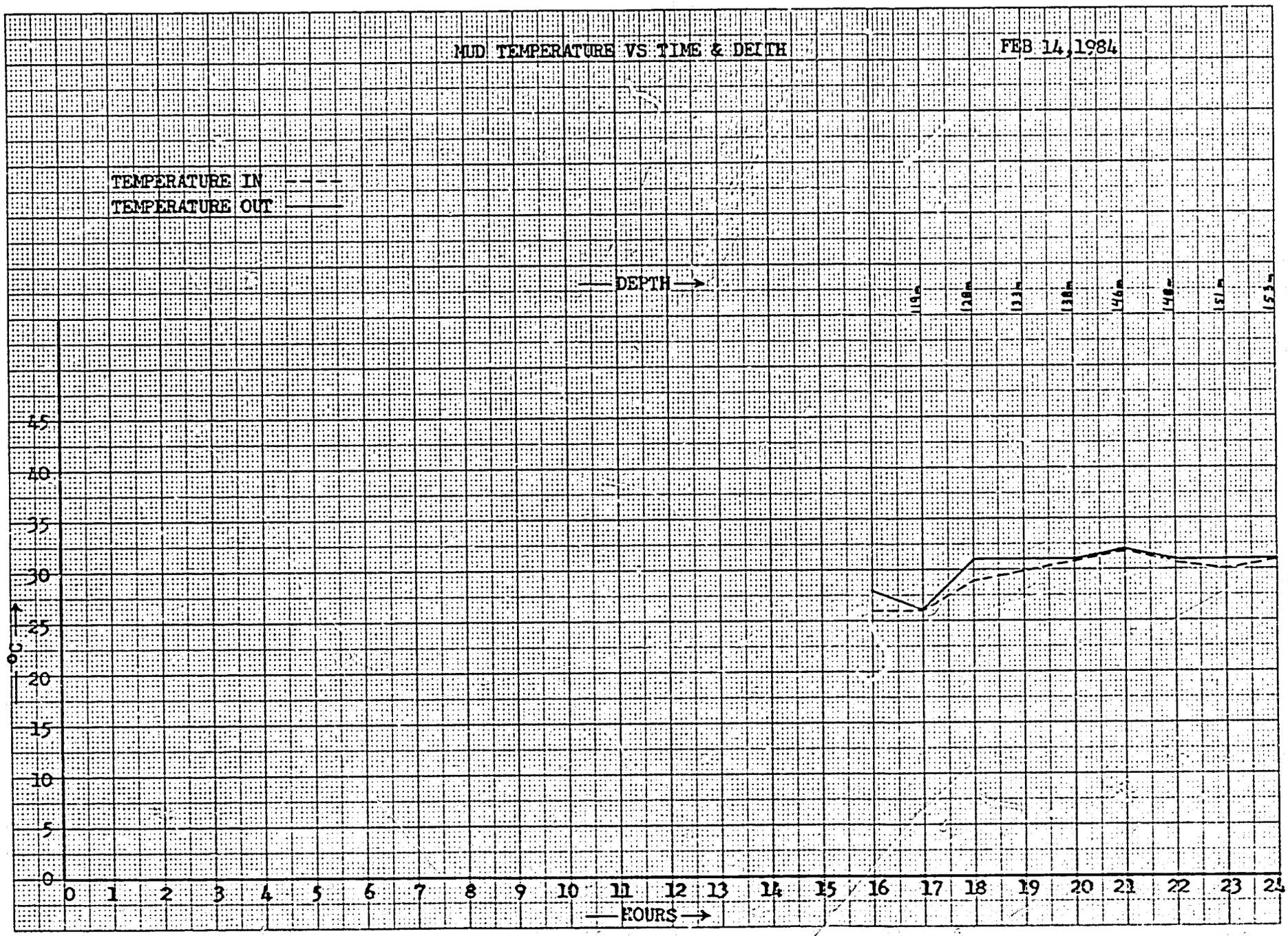
2490 m Limestone, 10%, as above, Dolomite, 90%, as above, fair to good porosity, with increased interstitial porosity, trace bitumen, good trace calcite, trace pyrite, slightly dull yellow fluorescence

2495 m Limestone, 10%, tan, dark gray to black, micro crystalline, bituminous, hard, tite, Dolomite, 90%, as above, trace pyrite, trace bitumen

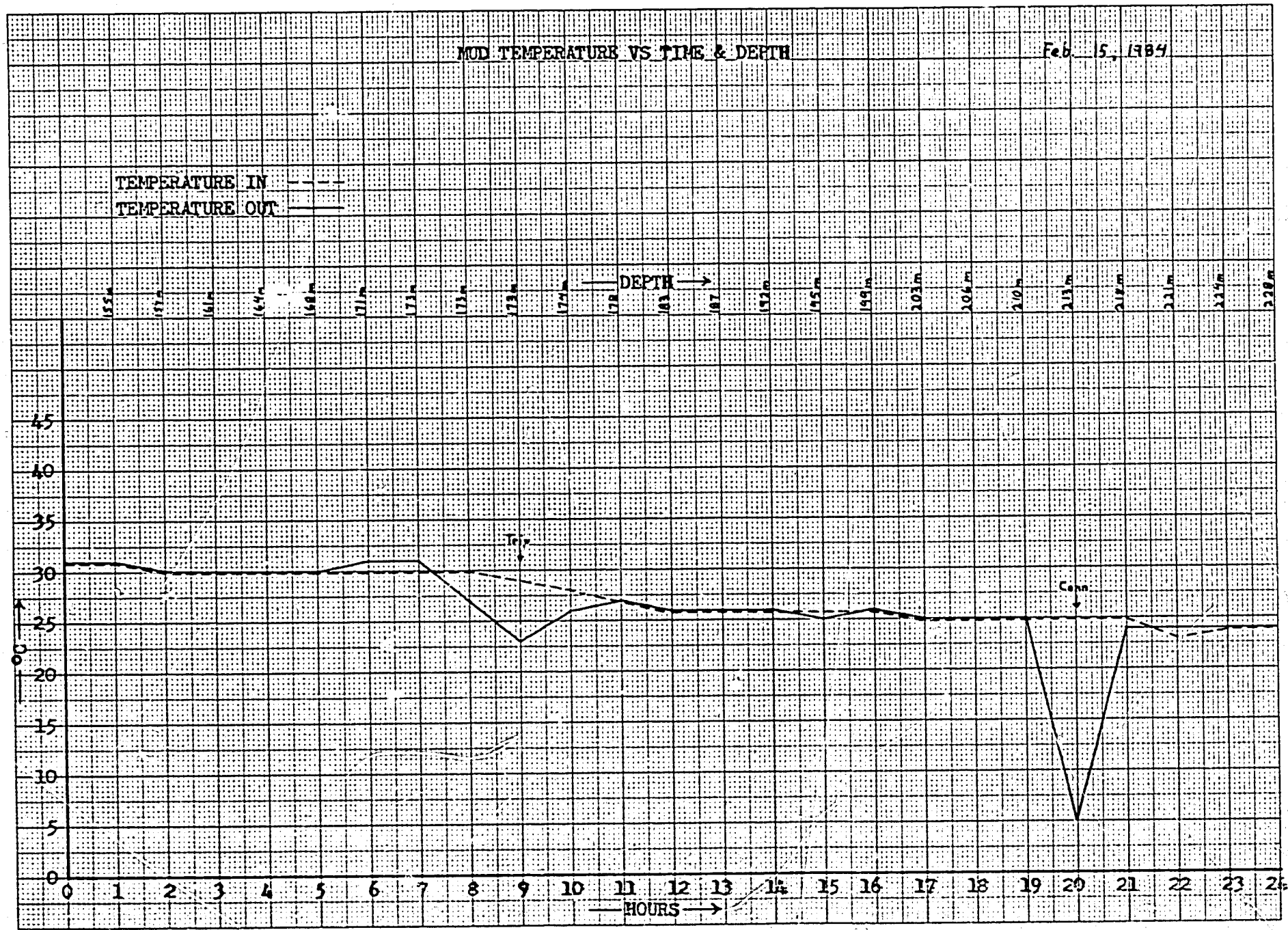
2500 m Limestone, 10%, as above, Dolomite, 90%, white, light tan, medium to coarse crystalline, clean, hard, trace fair to good intercrystalline, porosity, with interstitial bitumen, trace pyrite, trace calcite

K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

461510

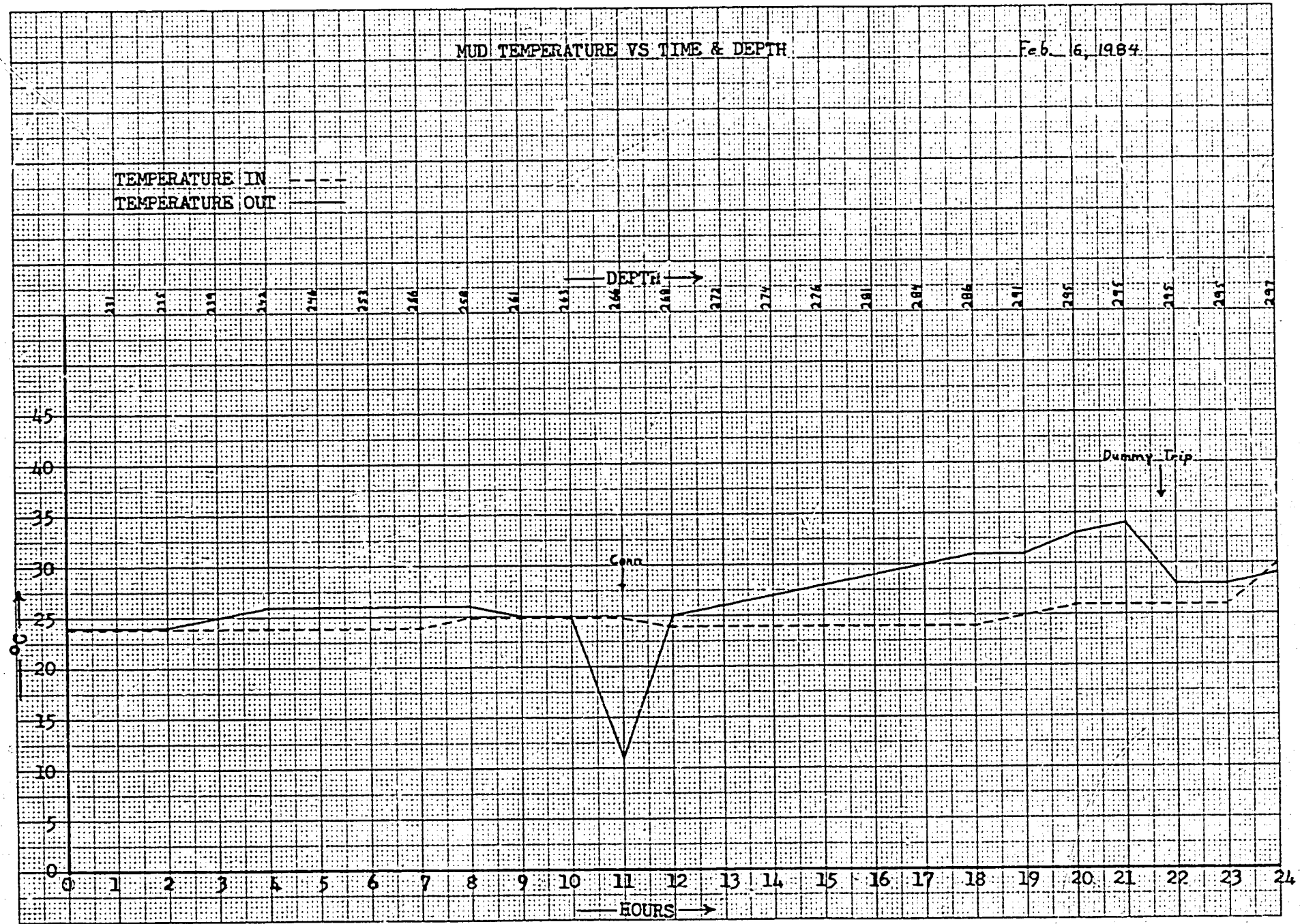


K•E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.



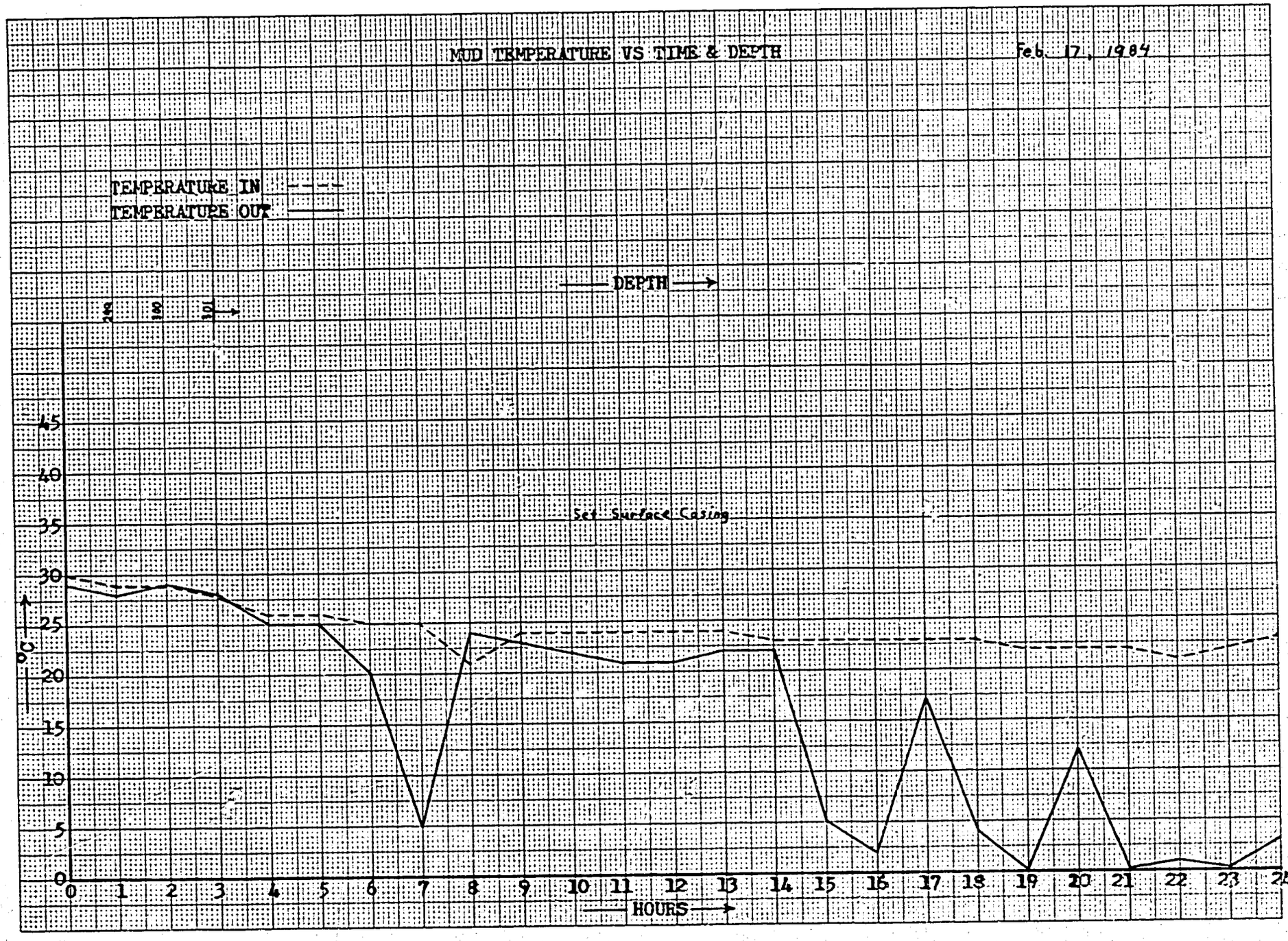
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO MADE IN U.S.A.

461510



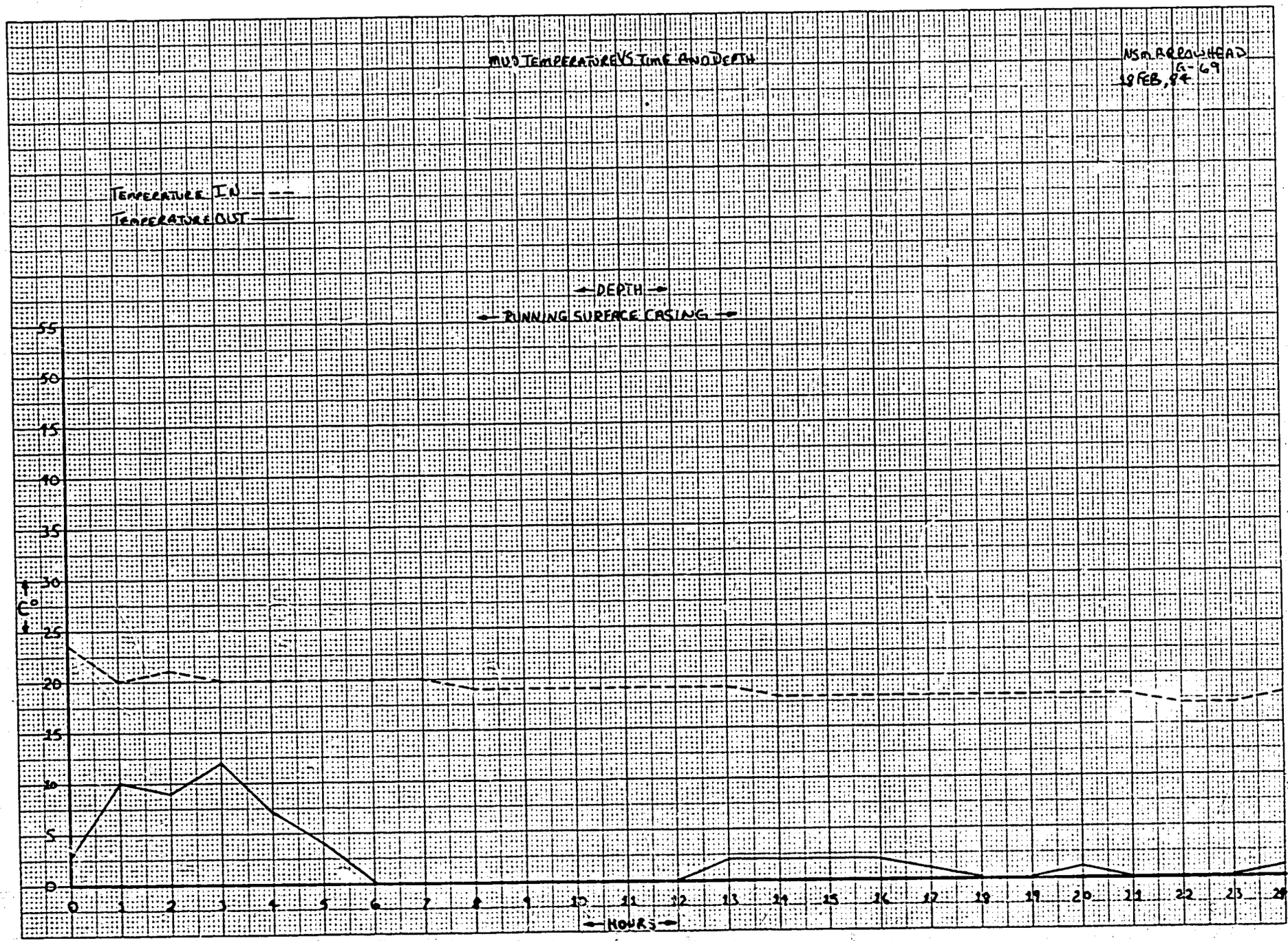
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

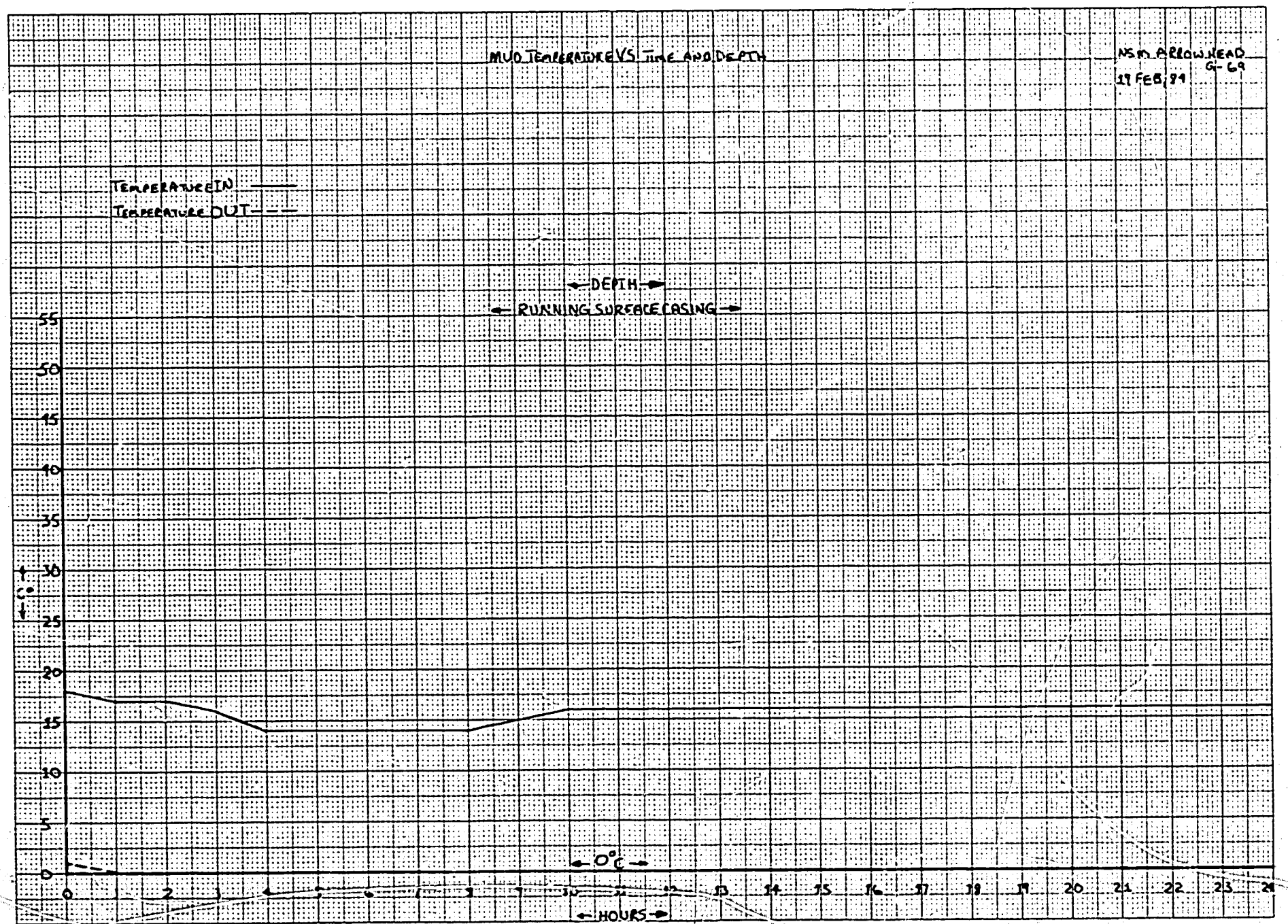
461510



K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

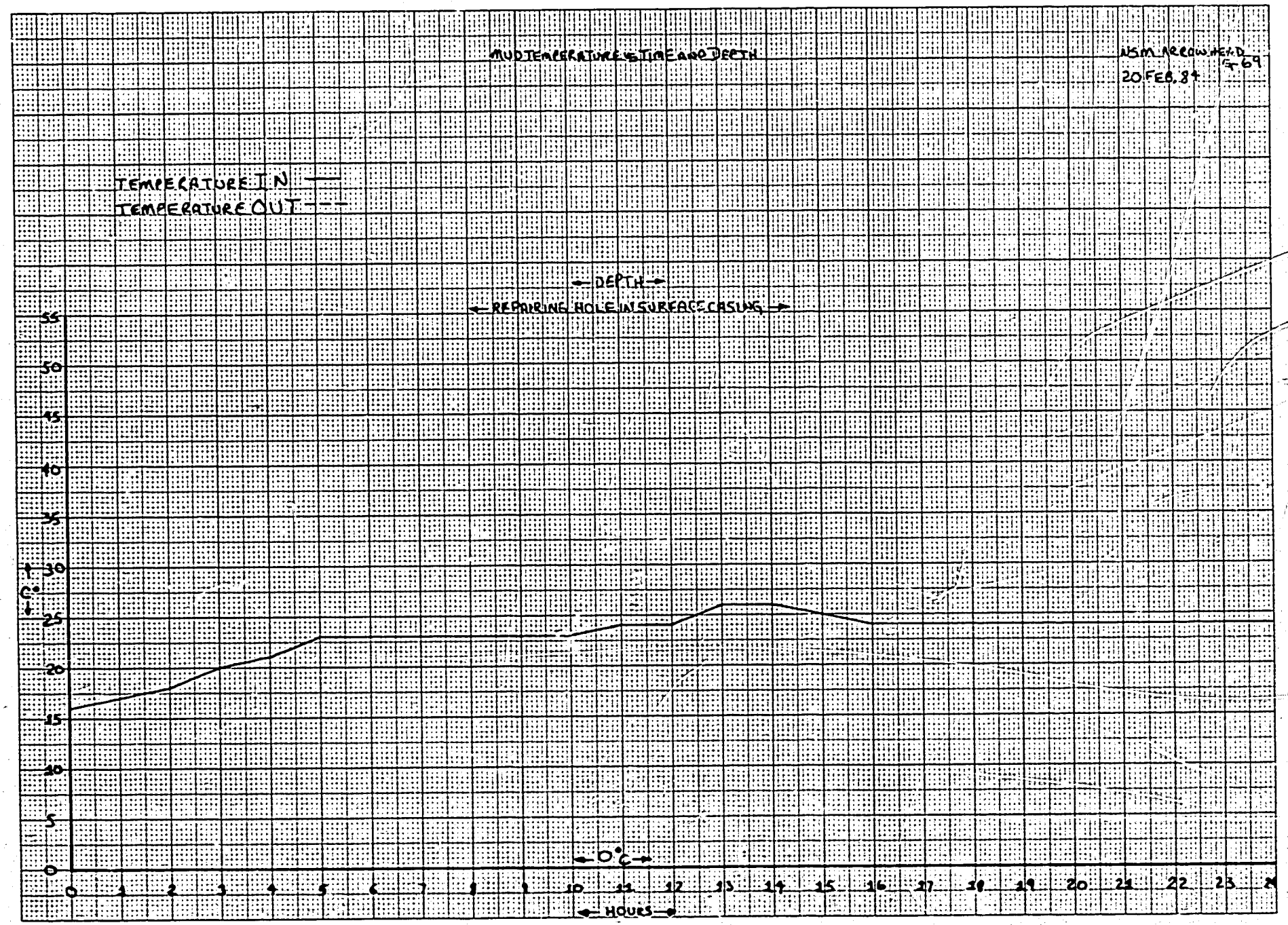
461510




MUD TEMPERATURE VS TIME AND DEPTH
NSM ARROWHEAD G-69
19 FEB, 81
TEMPERATURE IN ——
TEMPERATURE OUT – – –
←DEPTH→
← RUNNING SURFACE CASING →
55
50
45
40
35
30
25
20
15
10
5
0
°C
0°C
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
←HOURS→

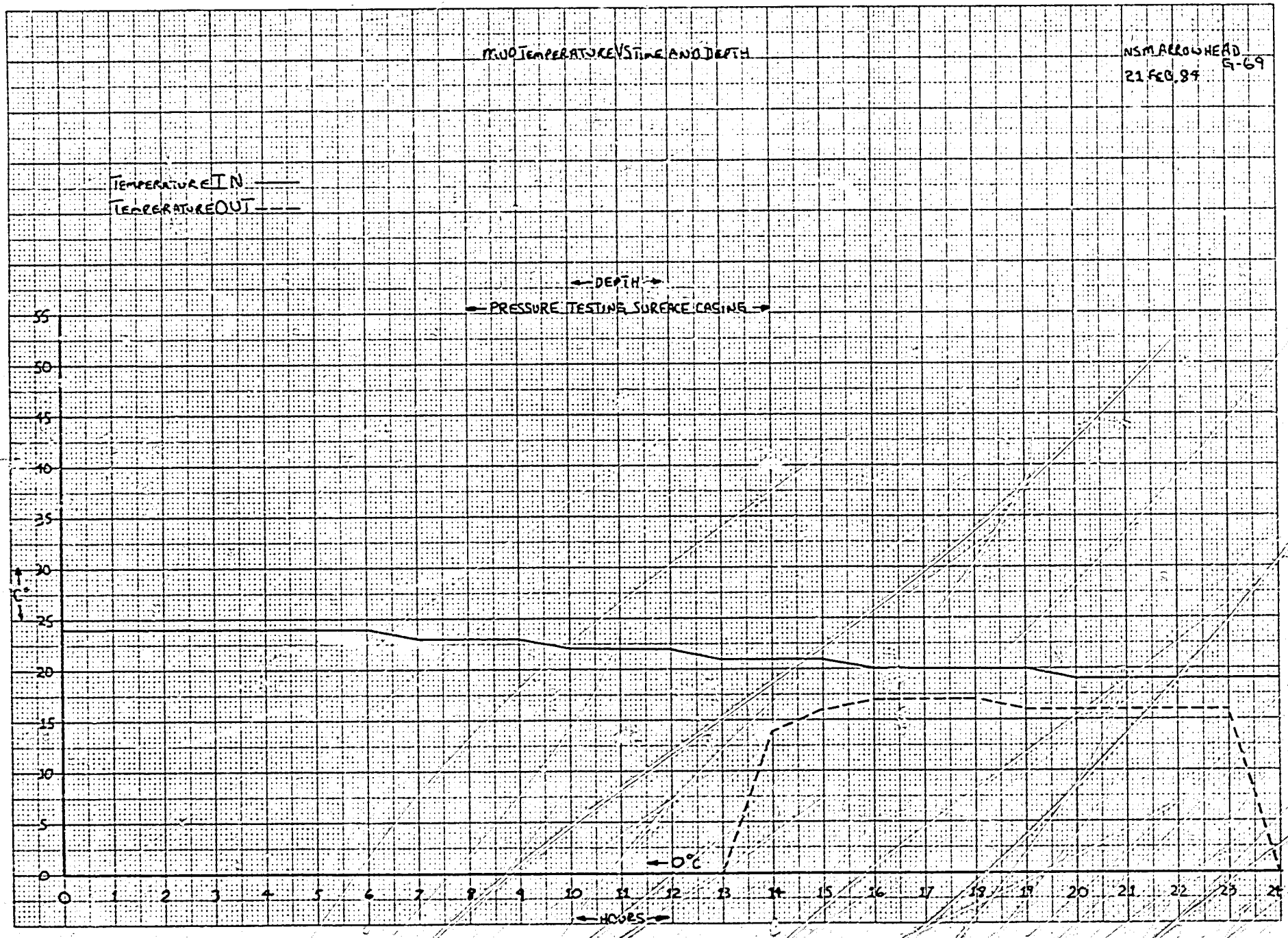
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

461510



K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO MADE IN U.S.A.

461510



K•E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

NSM ARROWHEAD
G-69
22 FEB. 84

AIR DRILLED ON FEBRUARY 22, 1984

NO MUD READINGS AVAILABLE

K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

MUD TEMPERATURE VS TIME & DEPTH

N3M ARROWHEAD
G-69
23 FEB 84

TEMPERATURE IN ——
TEMPERATURE OUT – – –

← DEPTH →

MUD UP AT 710

← DRILLED WITH AIR →

°C

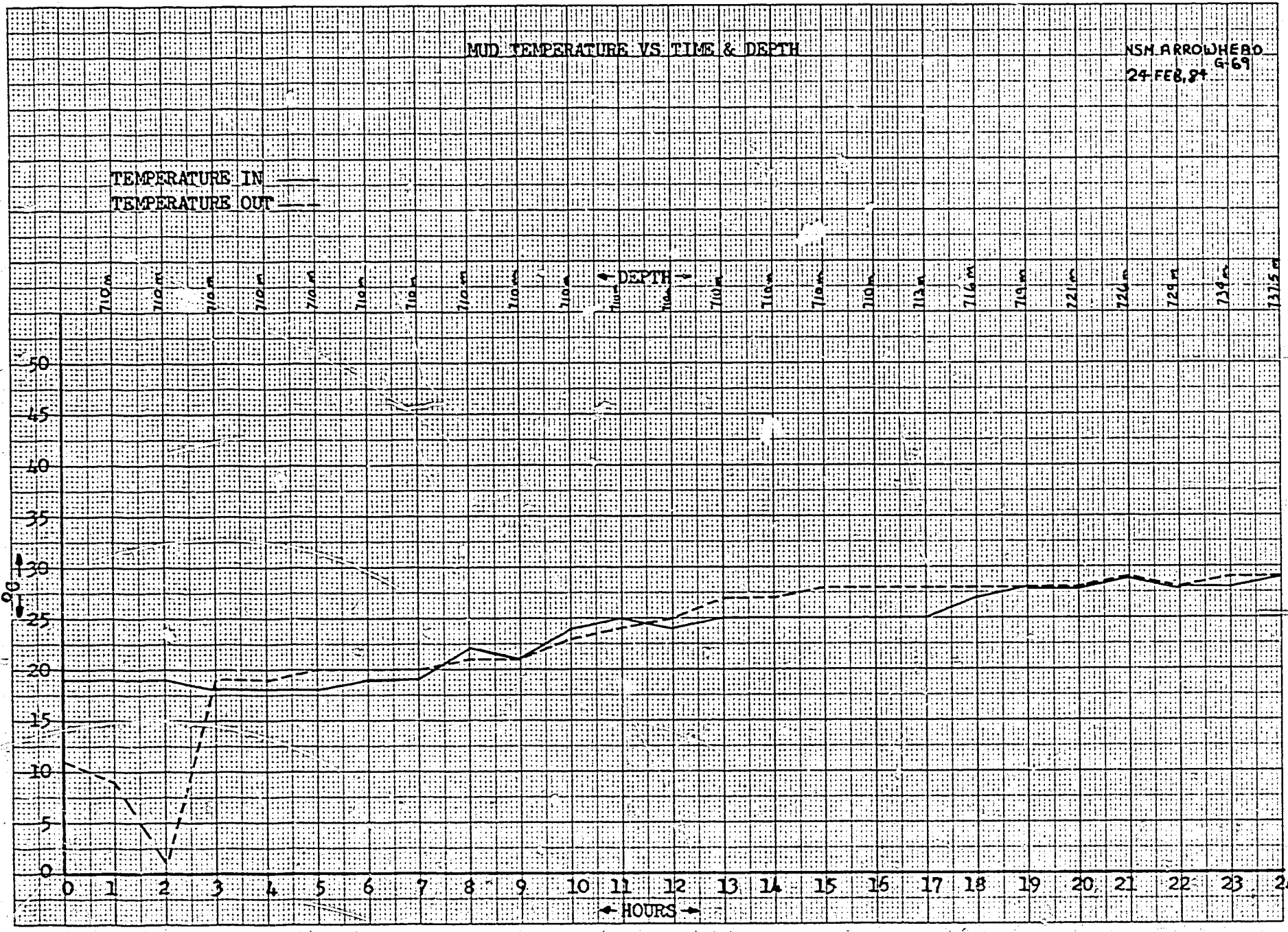
50
45
40
35
30
25
20
15
10
5
0

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

← HOURS →

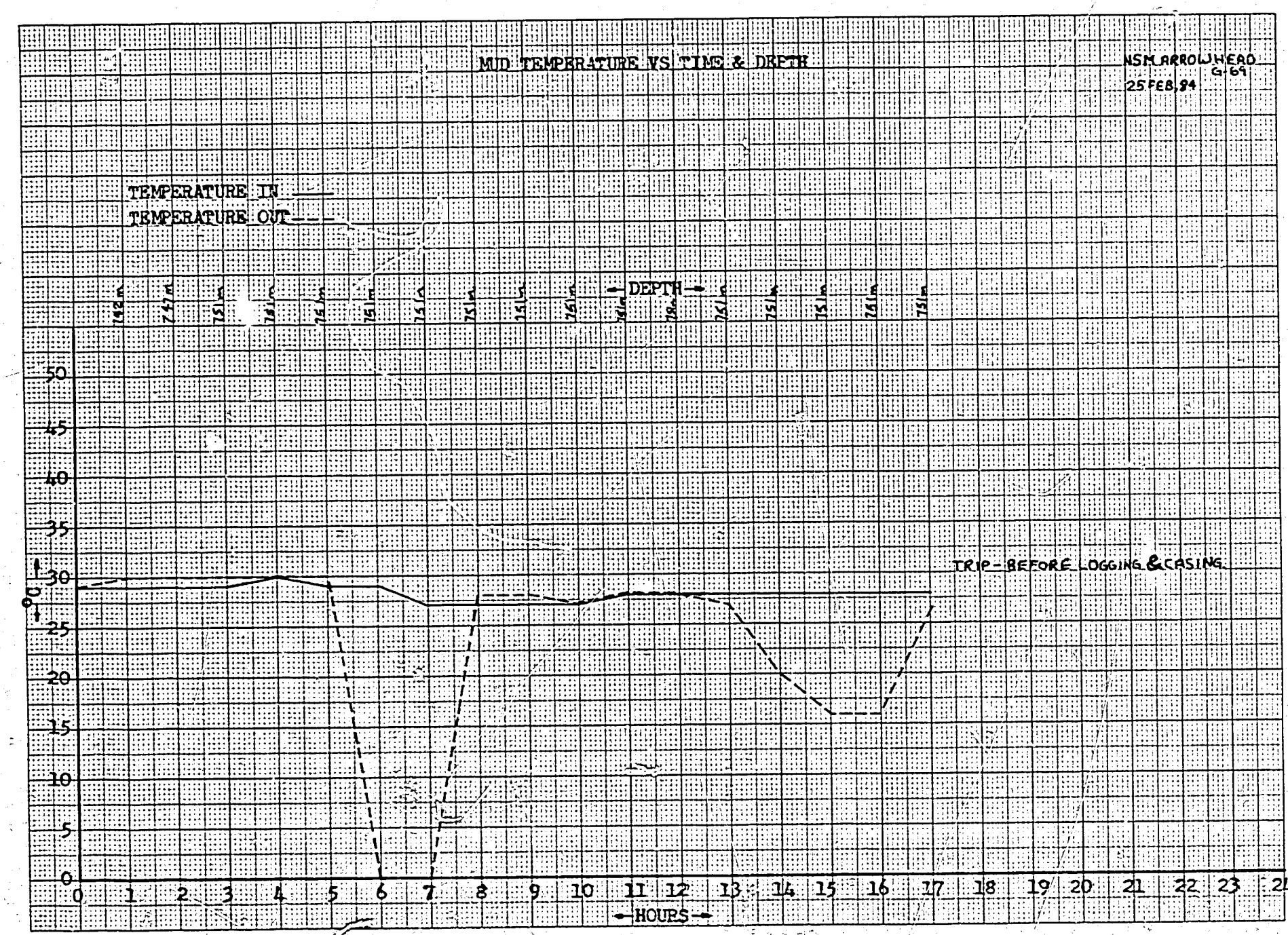
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

461510



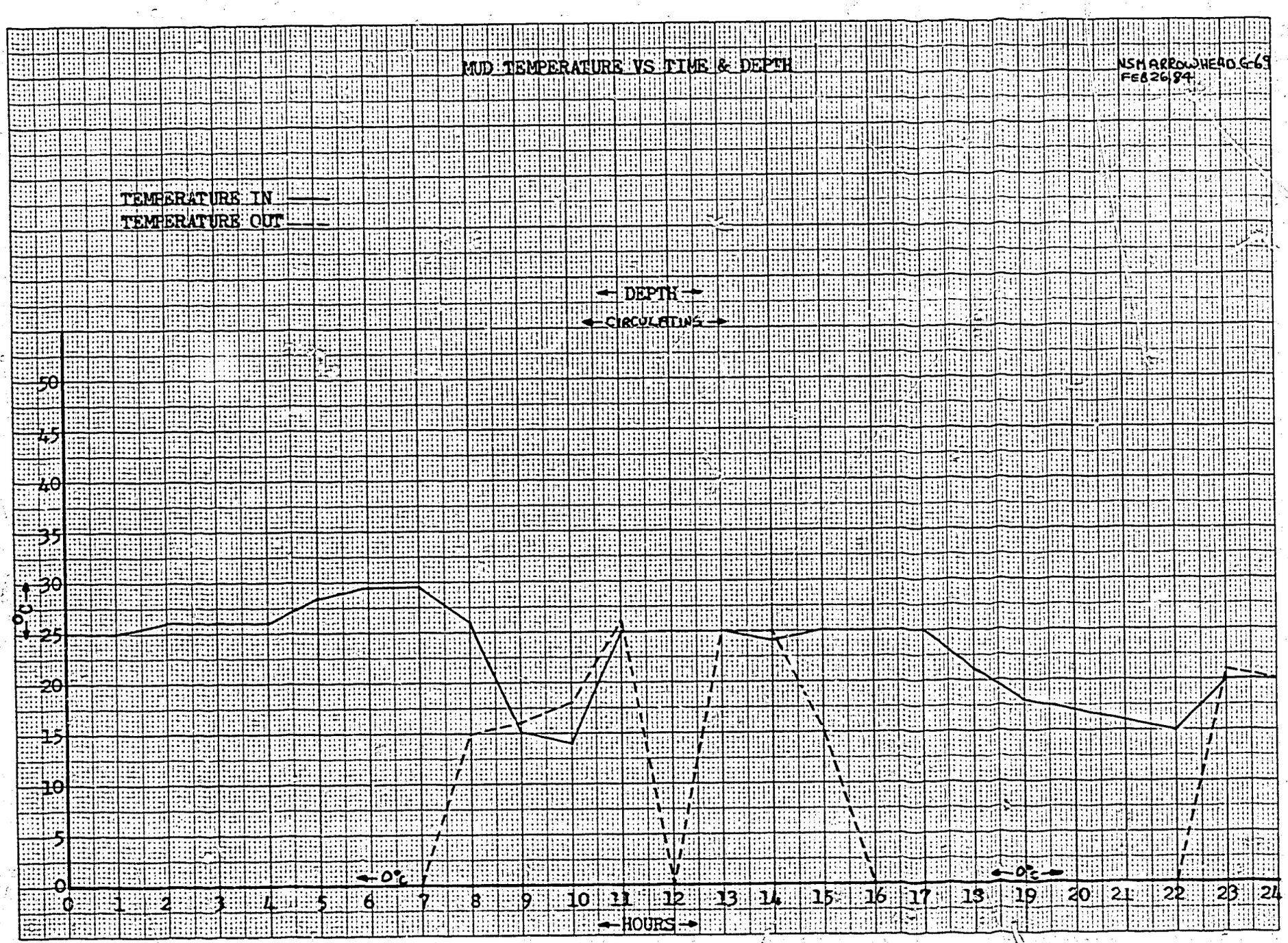
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

461510



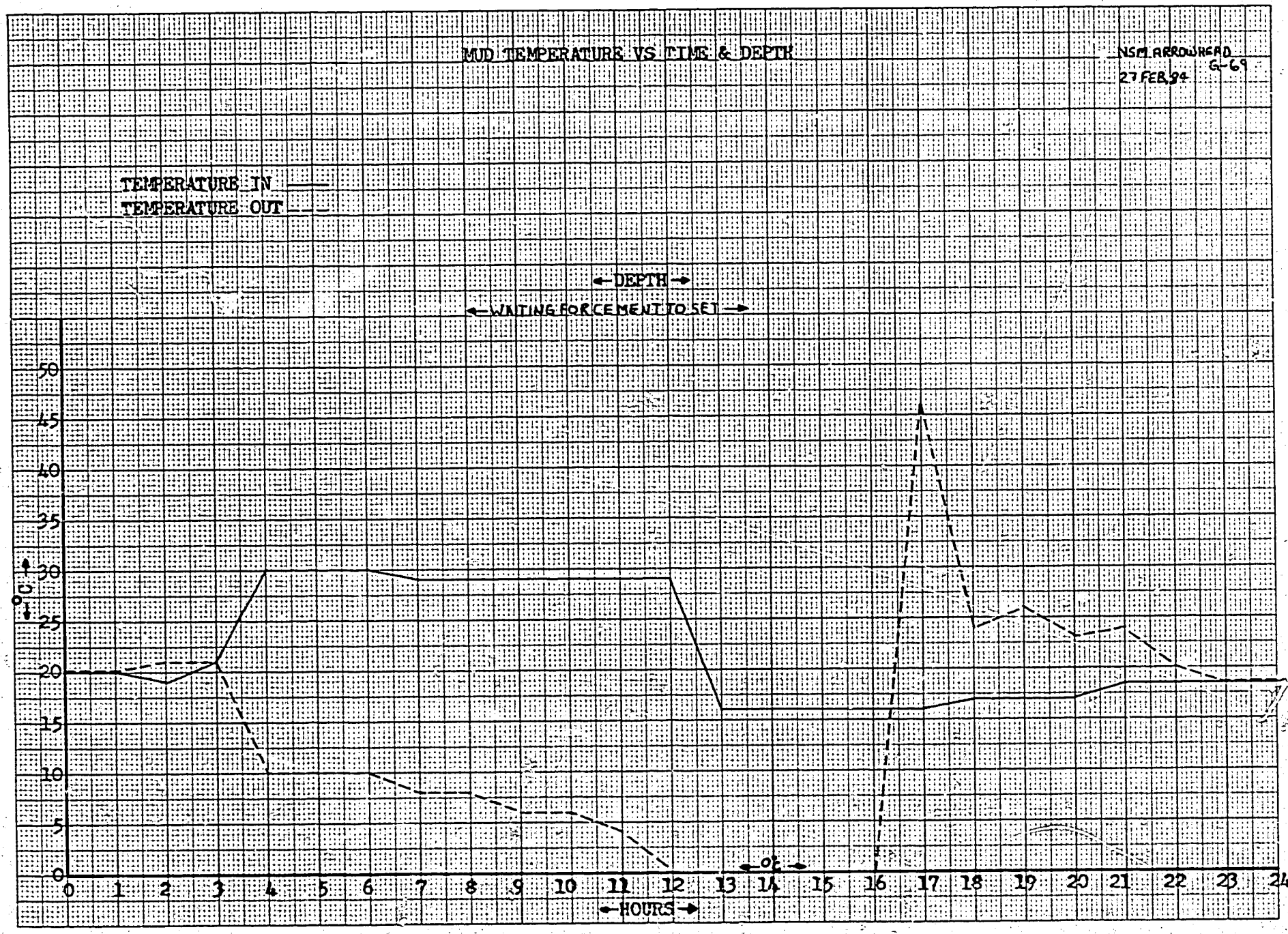
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

461510

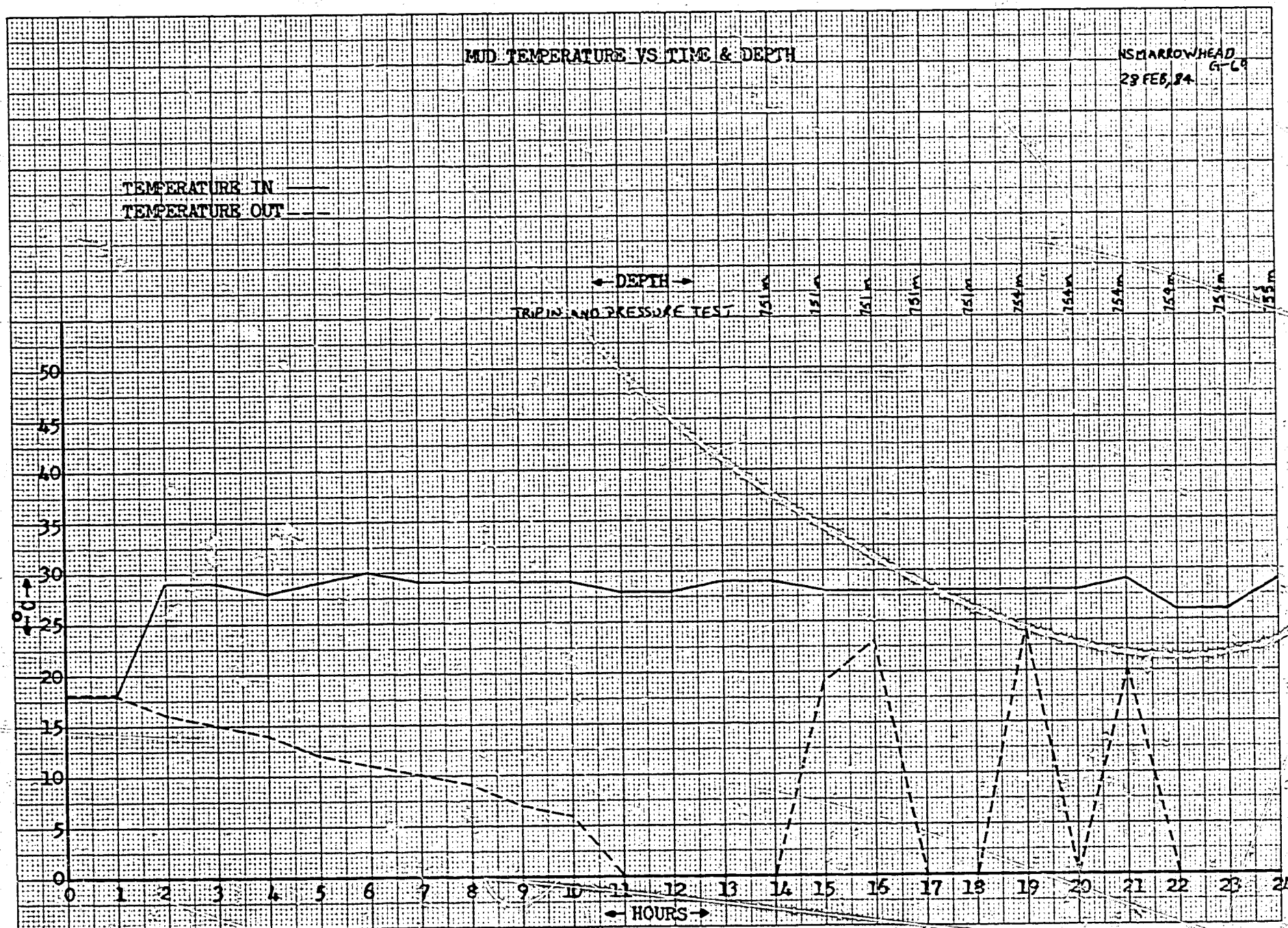


K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

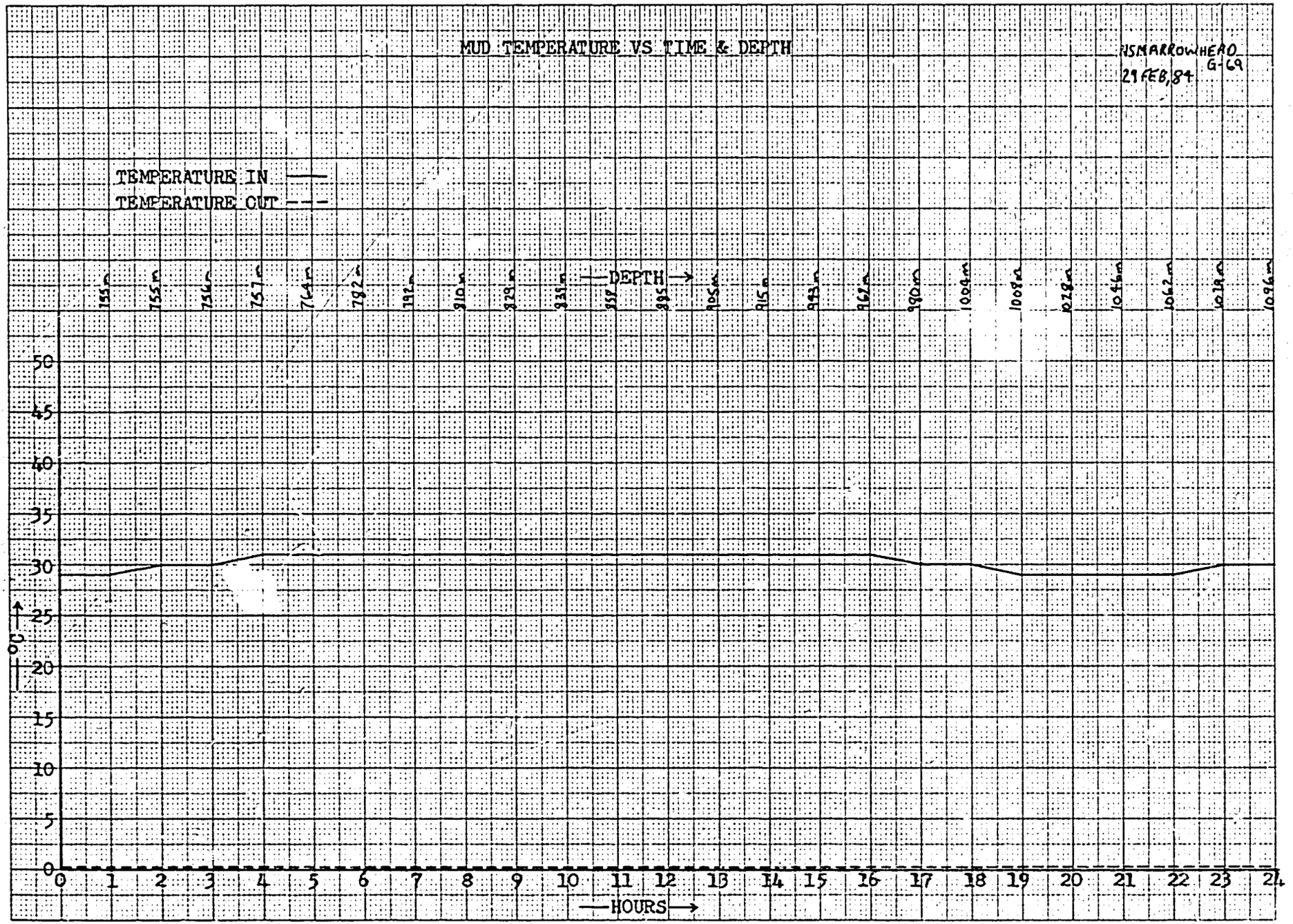
461510



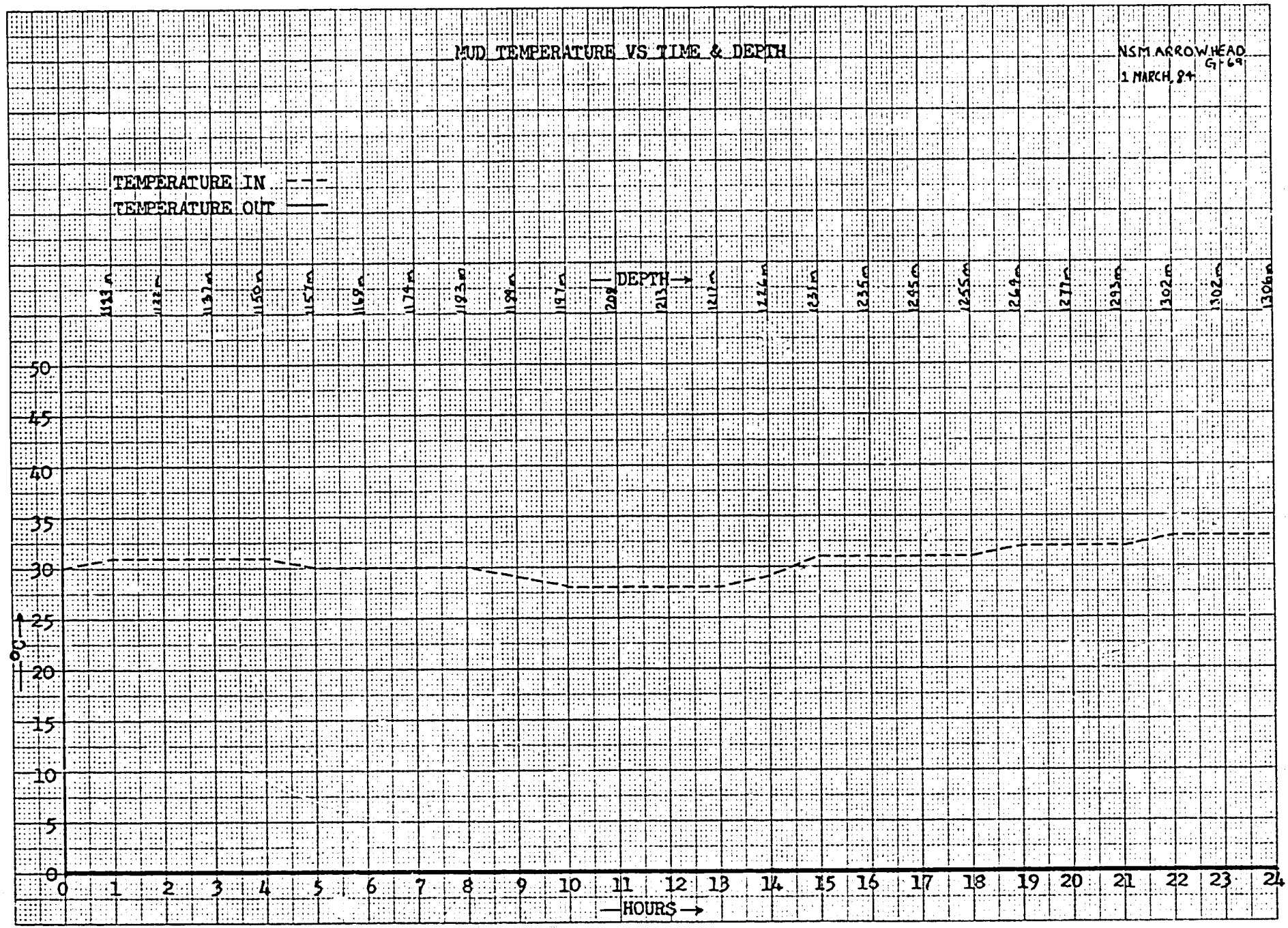
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

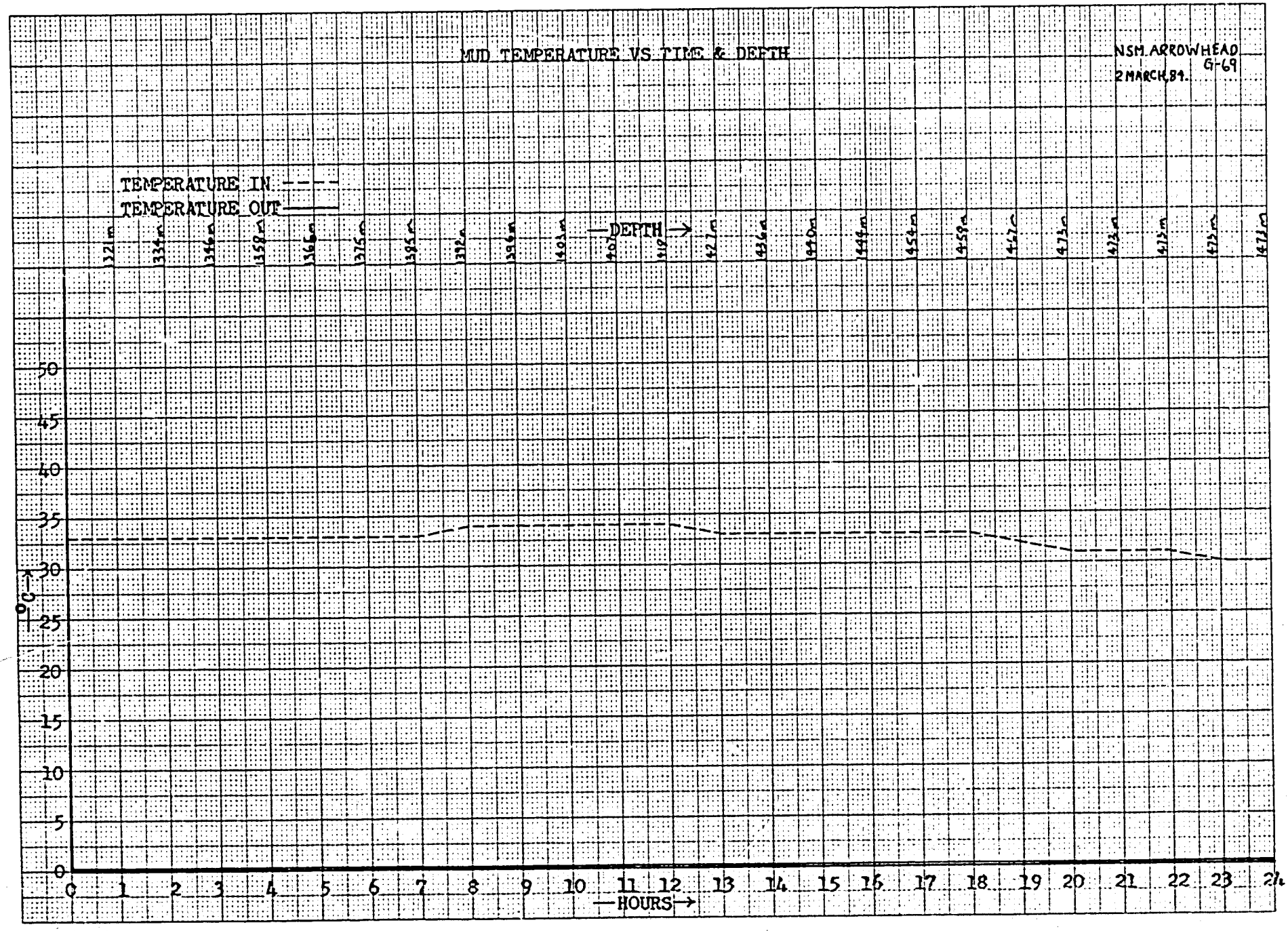


K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

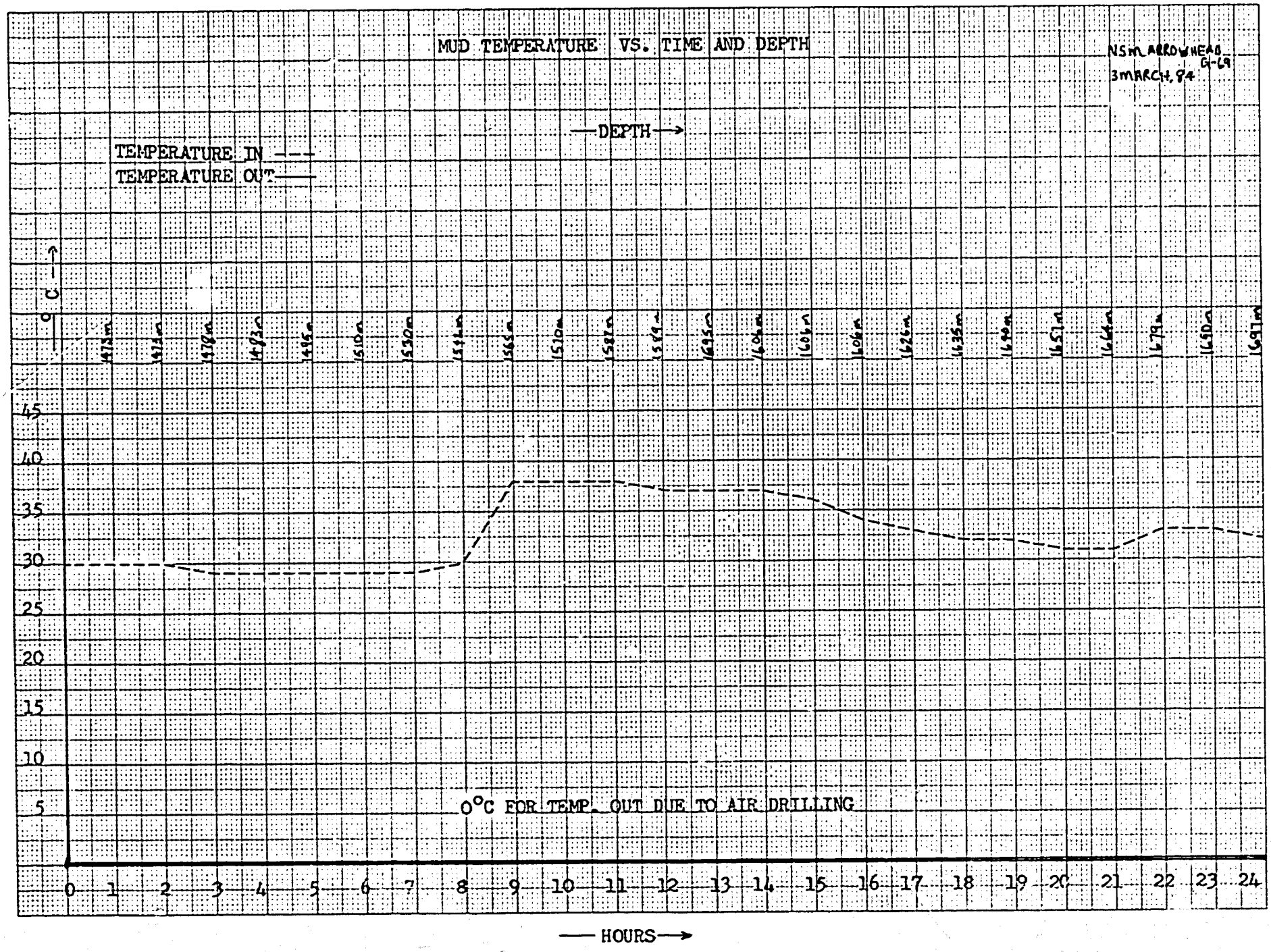


K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

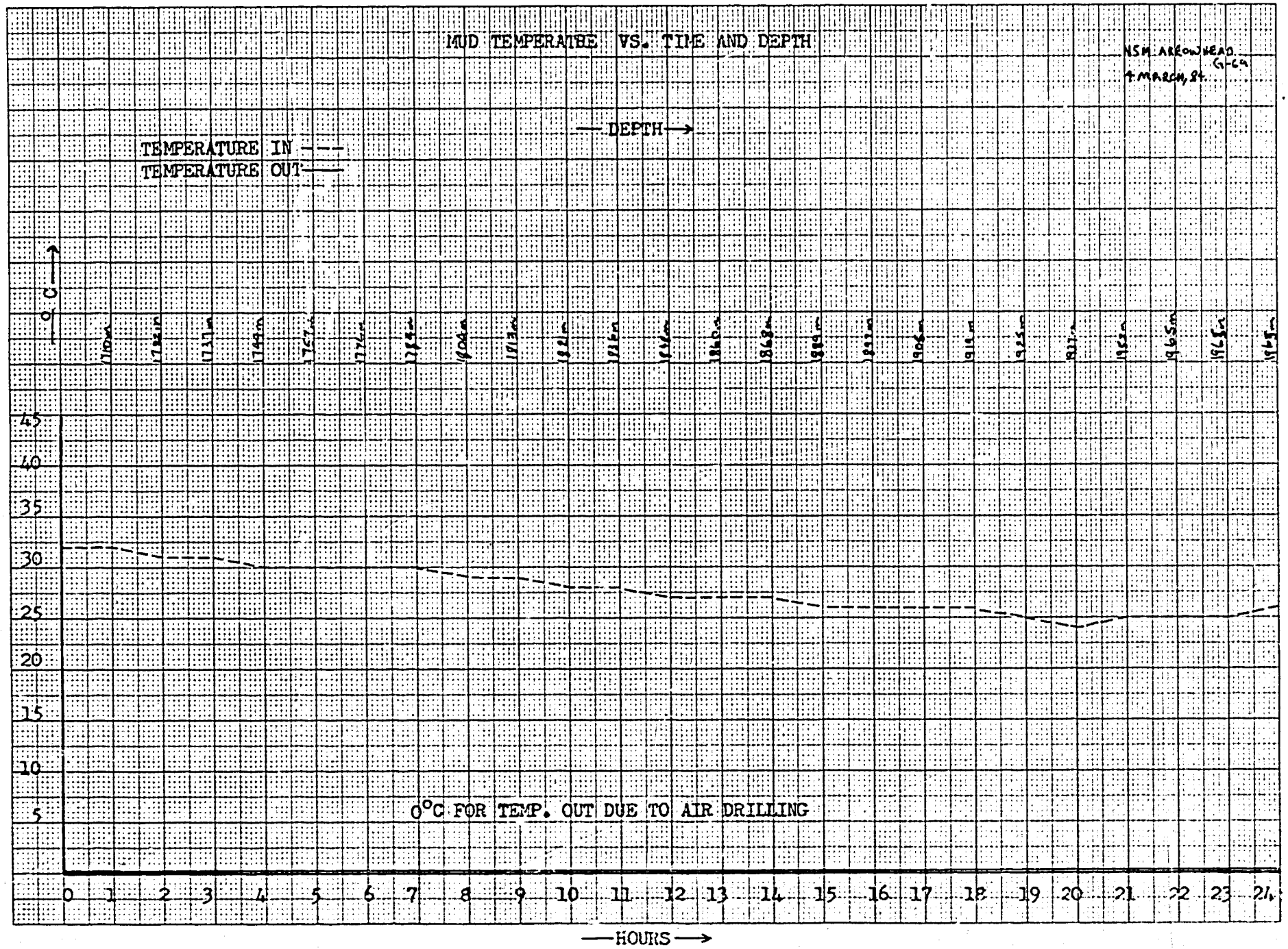
461510



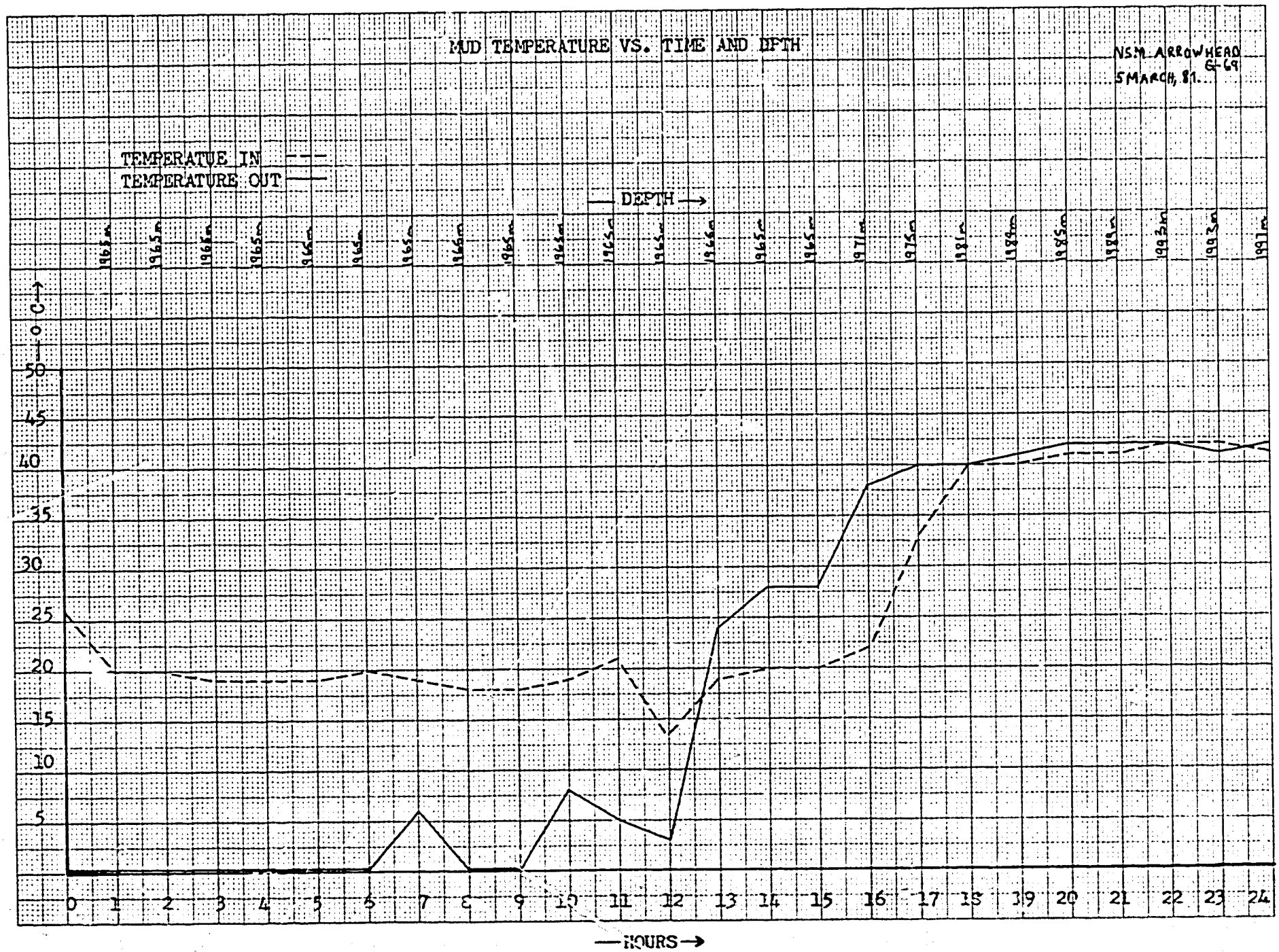
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.



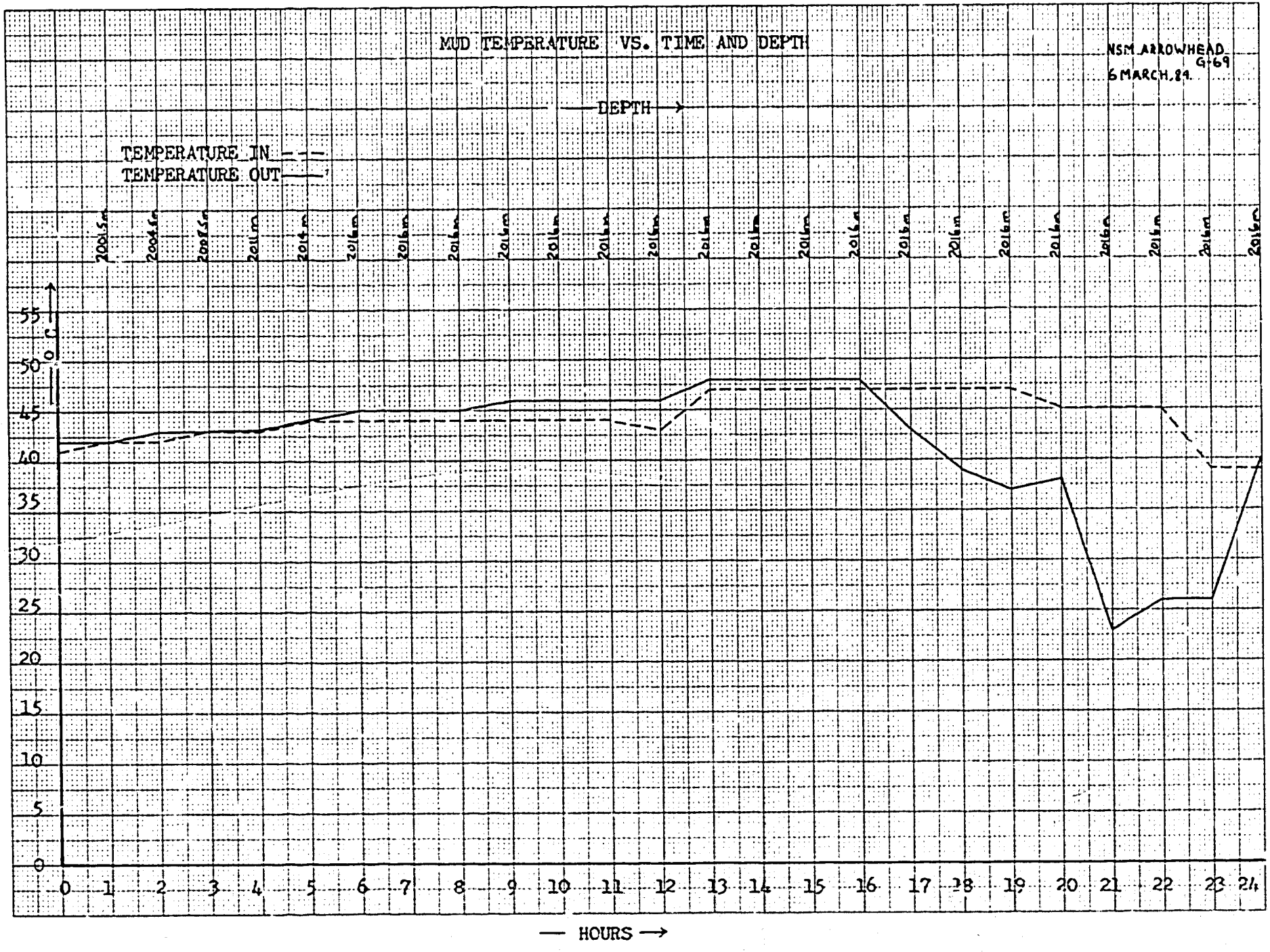
K+E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.



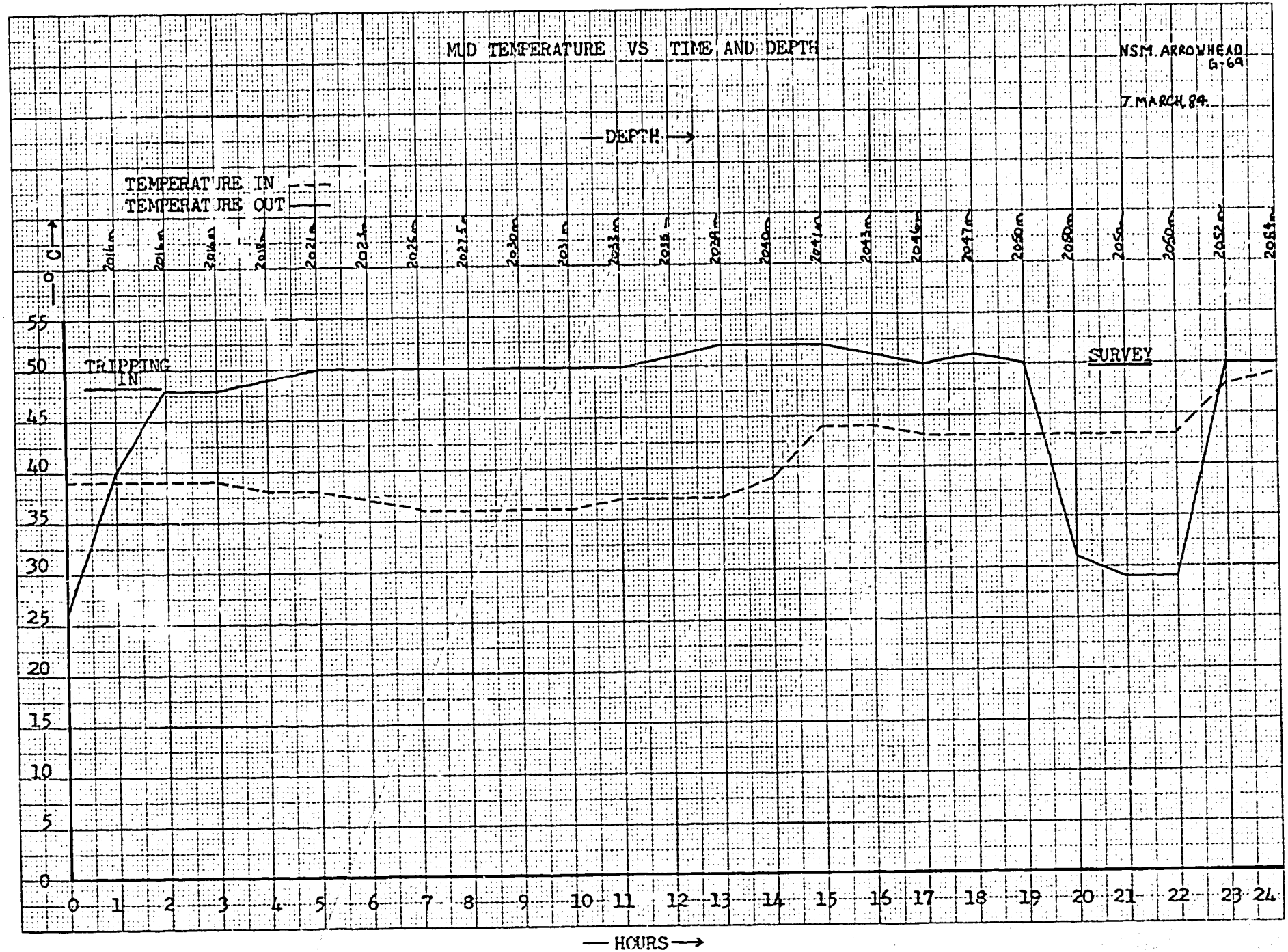
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.



K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

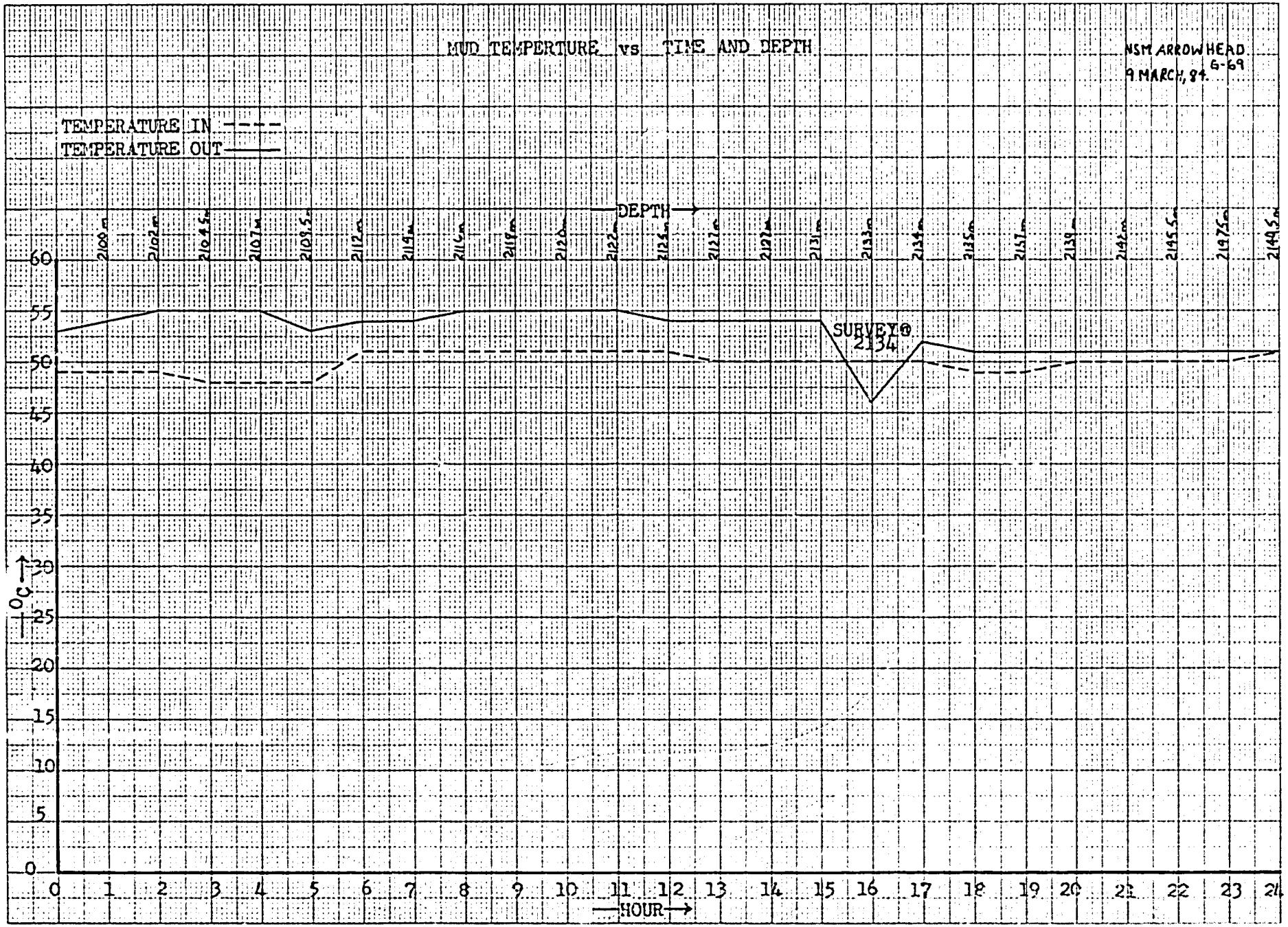


K·E 10 X 10 TO THE CENTIMETER 10 X 25 CM
KEUFFEL & ESSER CO MADE IN U.S.A.

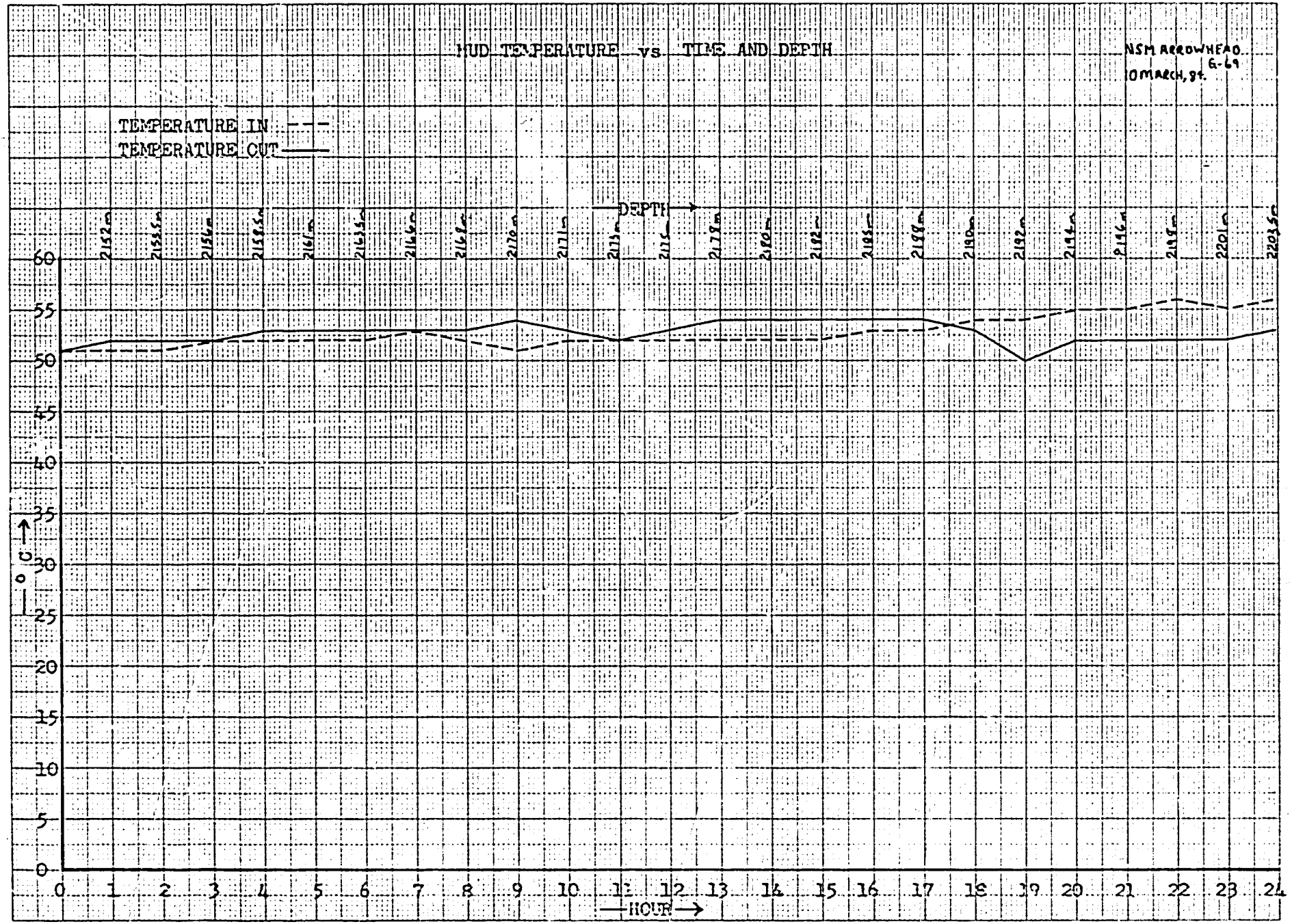


K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO MADE IN U.S.A.

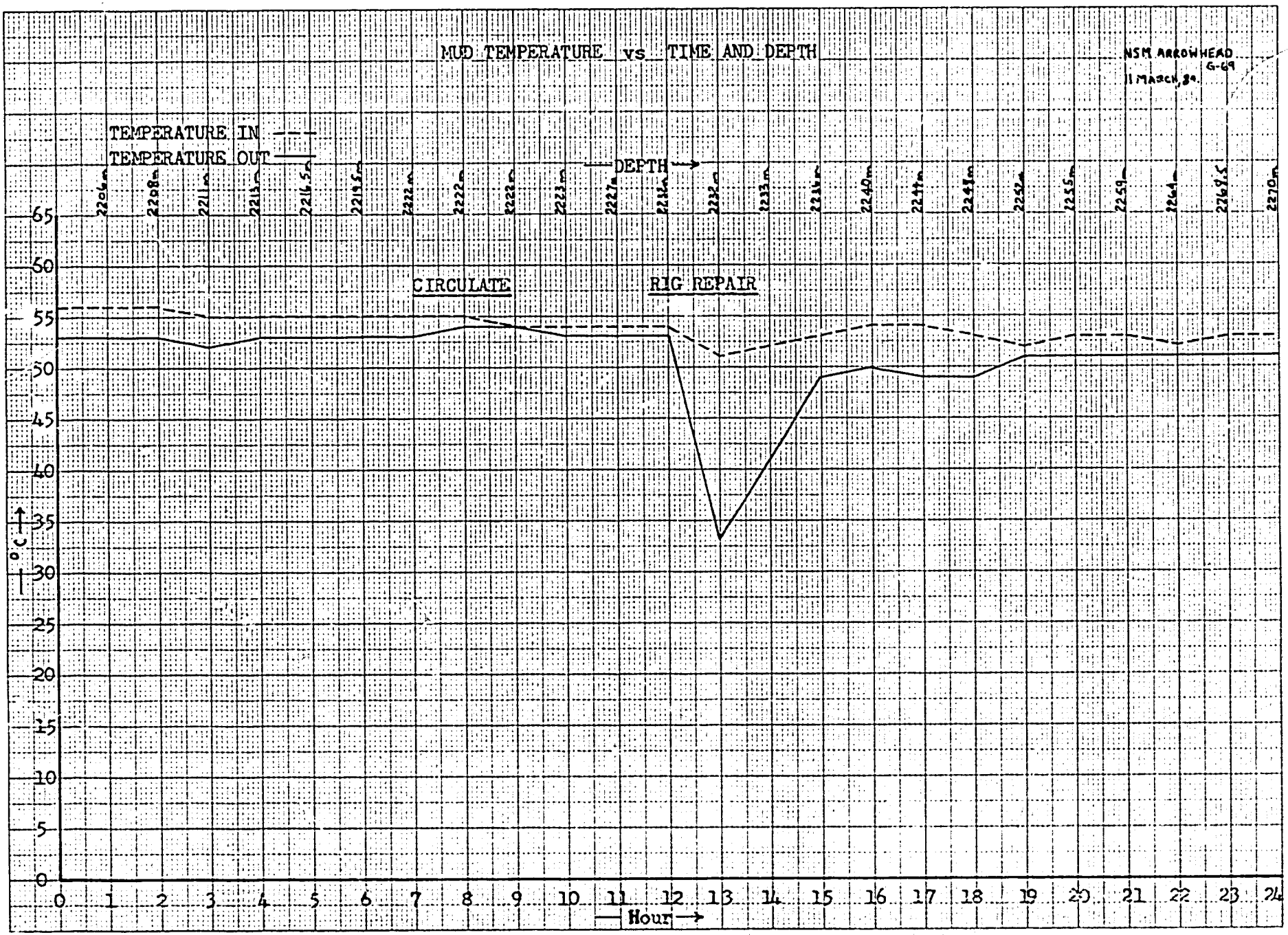
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

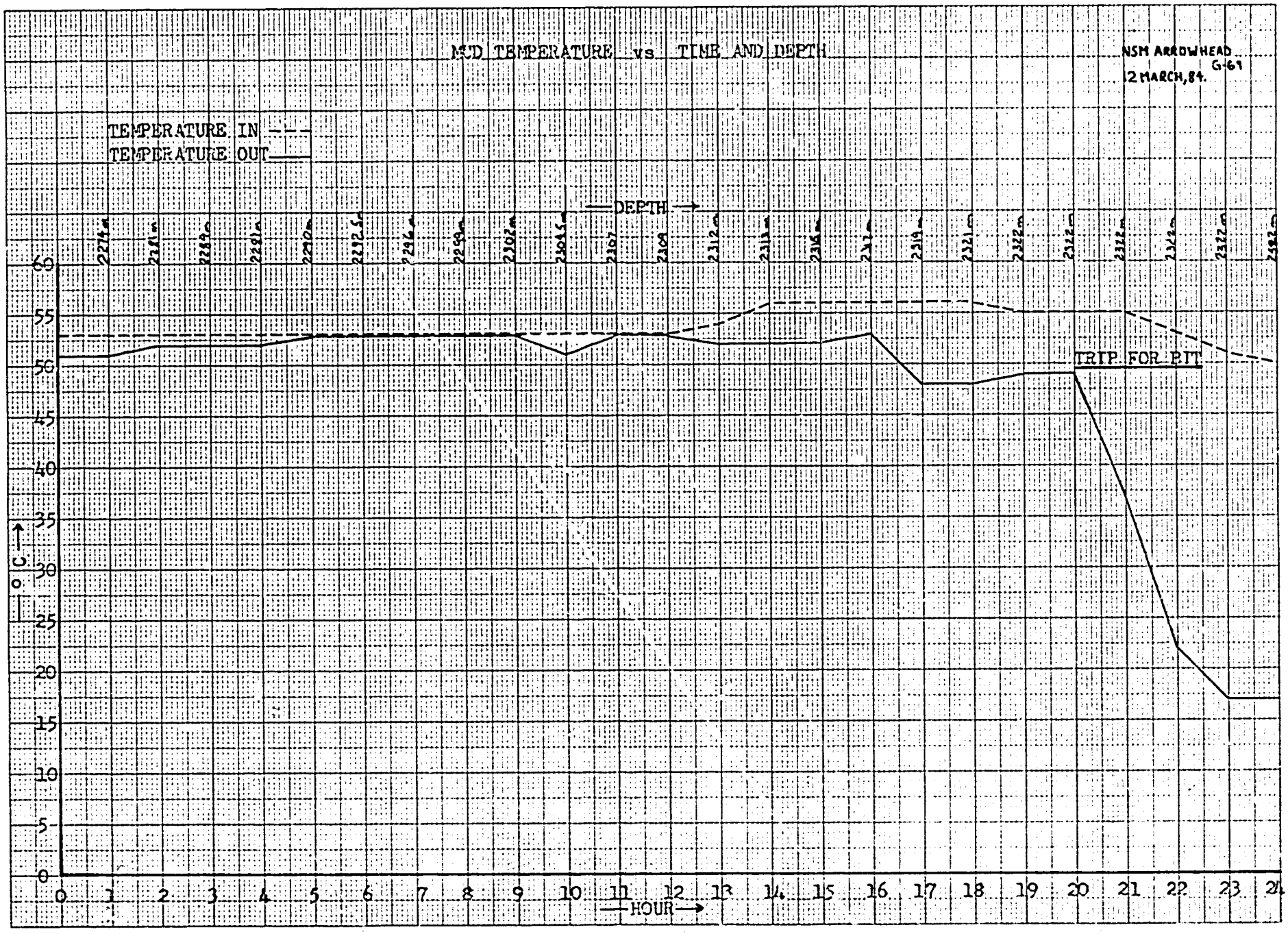


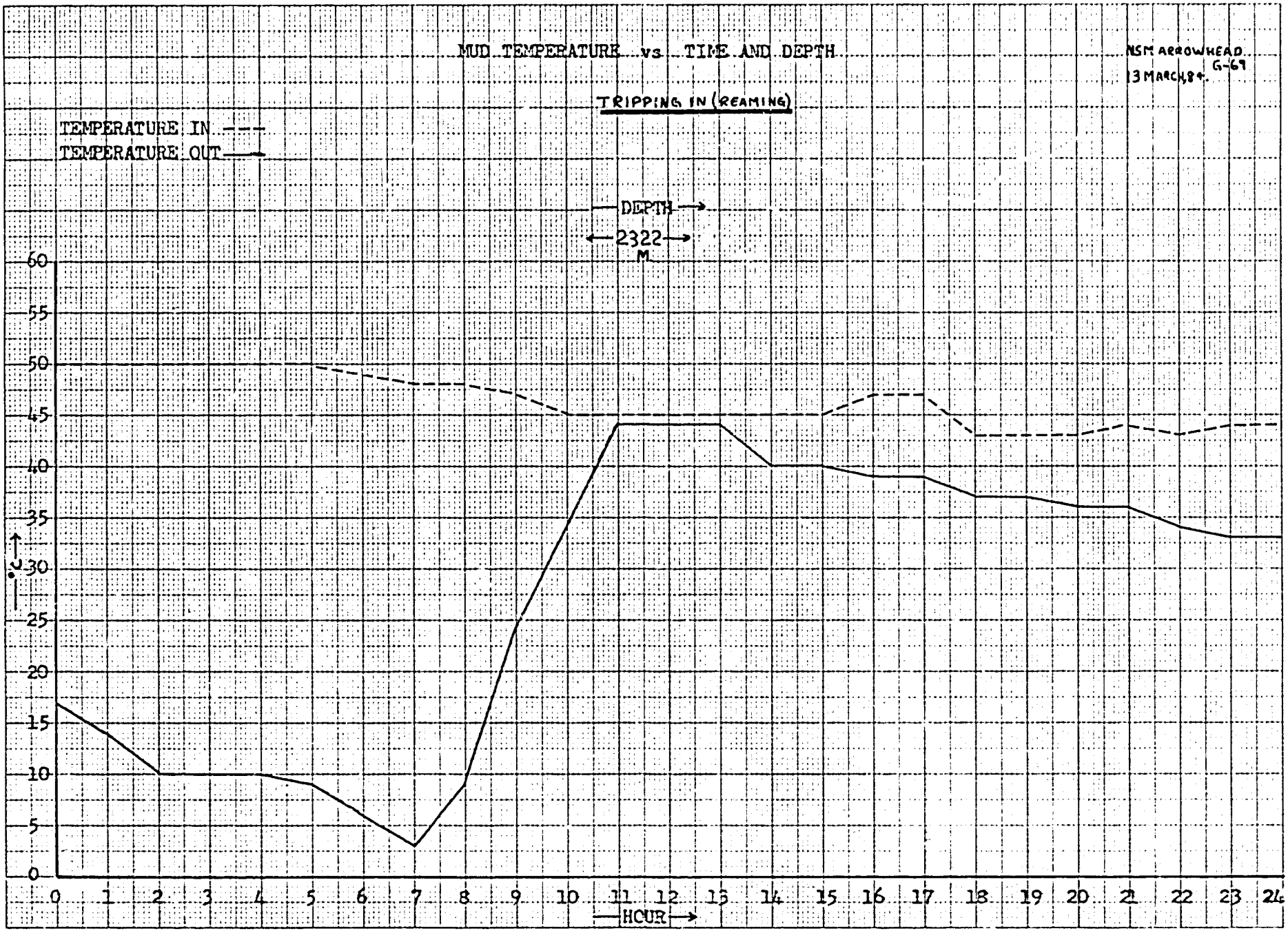
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



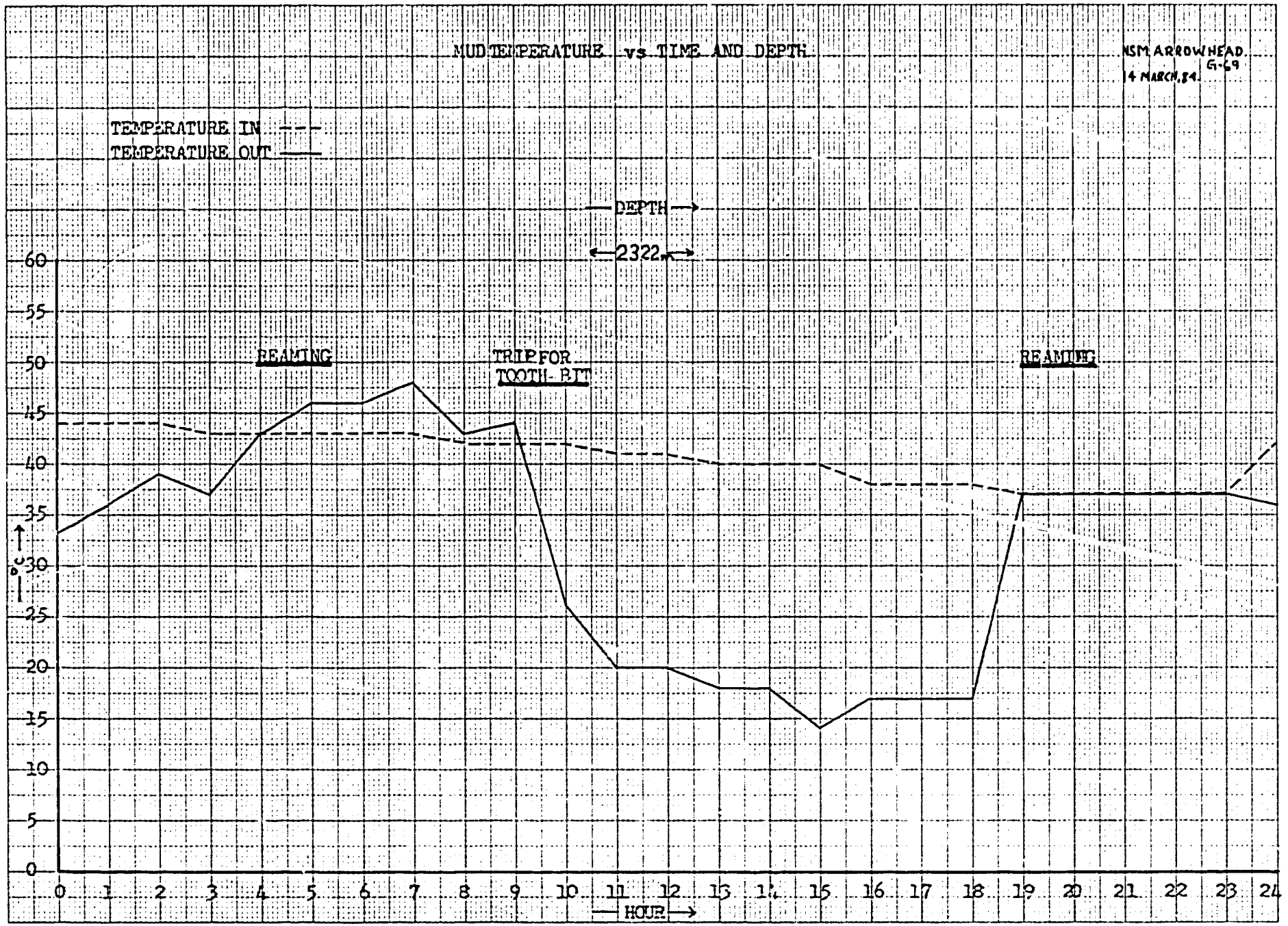
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.

46 1510

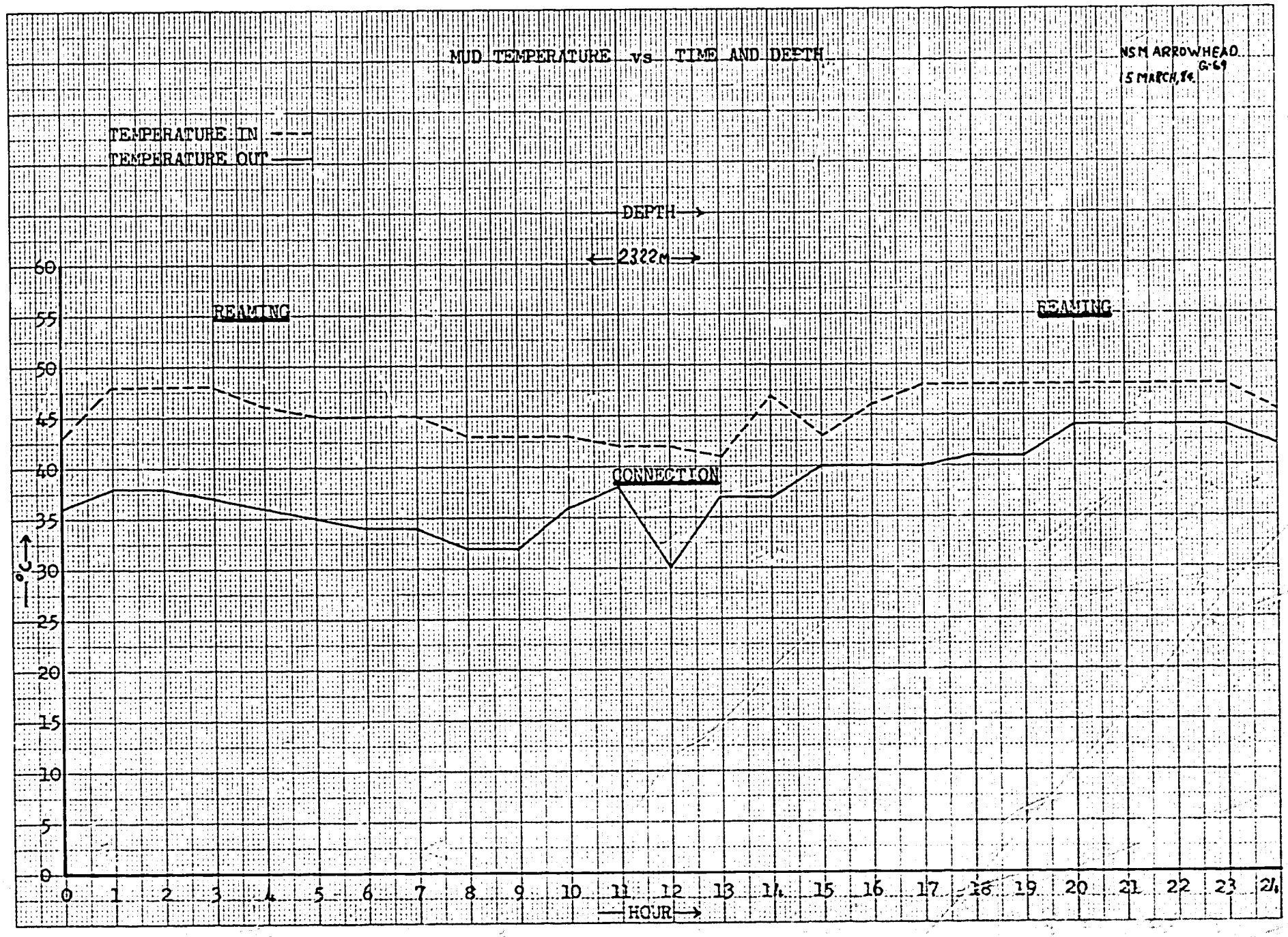



MUD TEMPERATURE vs TIME AND DEPTH
NSM ARROWHEAD G-69
13 MARCH, 84.
TRIPPING IN (REAMING)
TEMPERATURE IN ---
TEMPERATURE OUT——
DEPTH
2322
M
60
55
50
45
40
35
30
25
20
15
10
5
0
°C
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HOUR

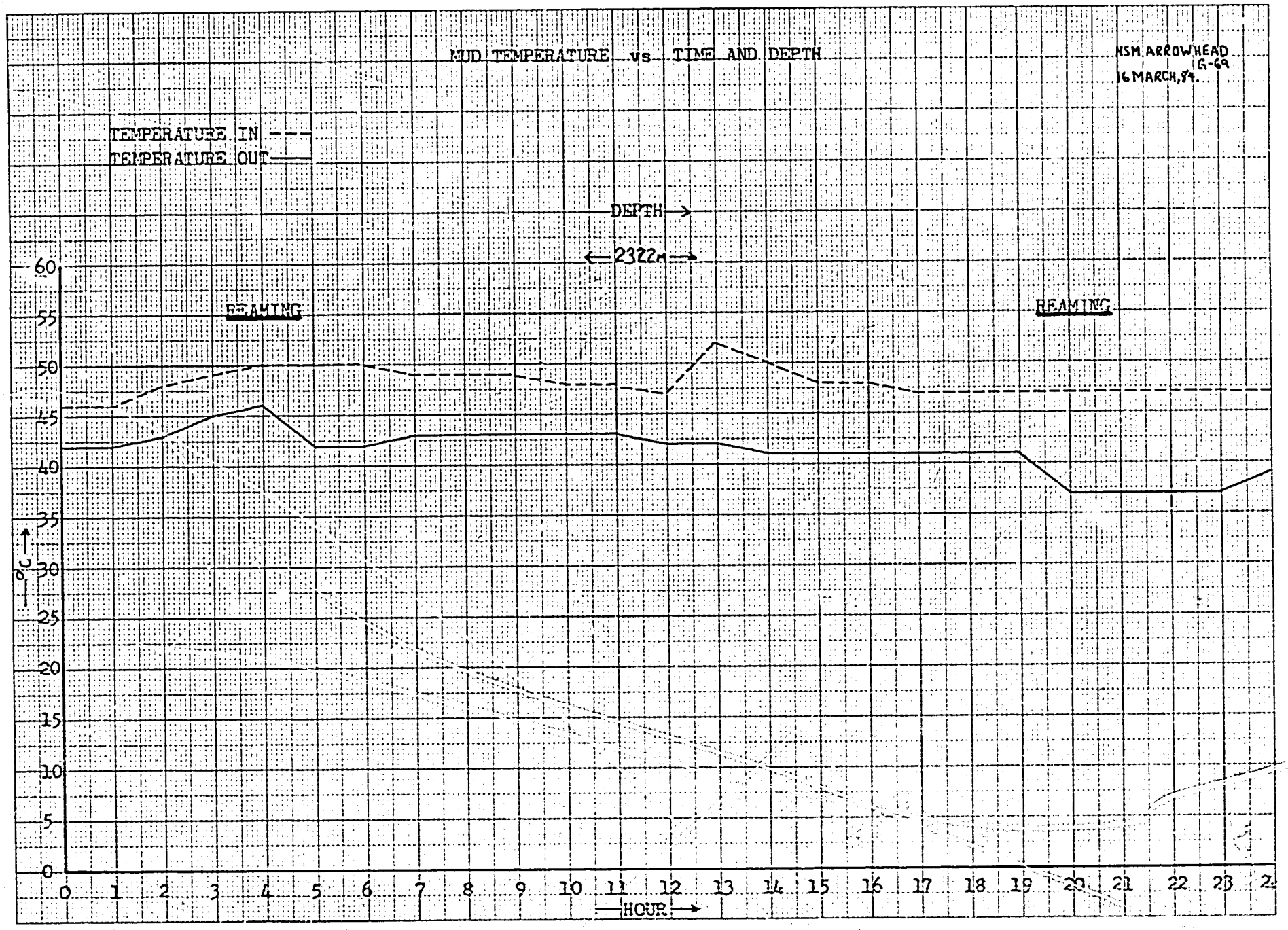
K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM
KEUFFEL & ESSER CO. MADE IN U.S.A.

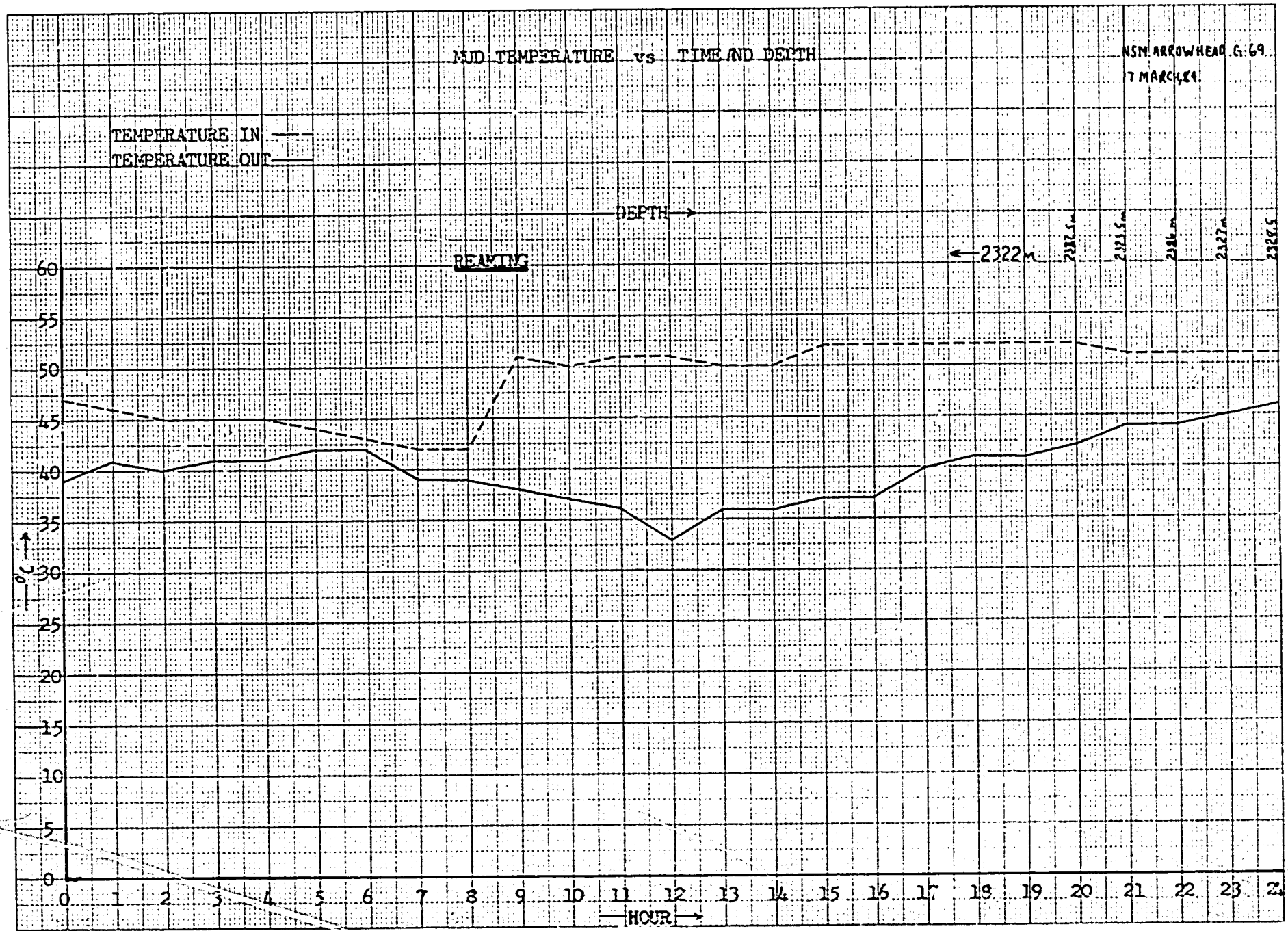


K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

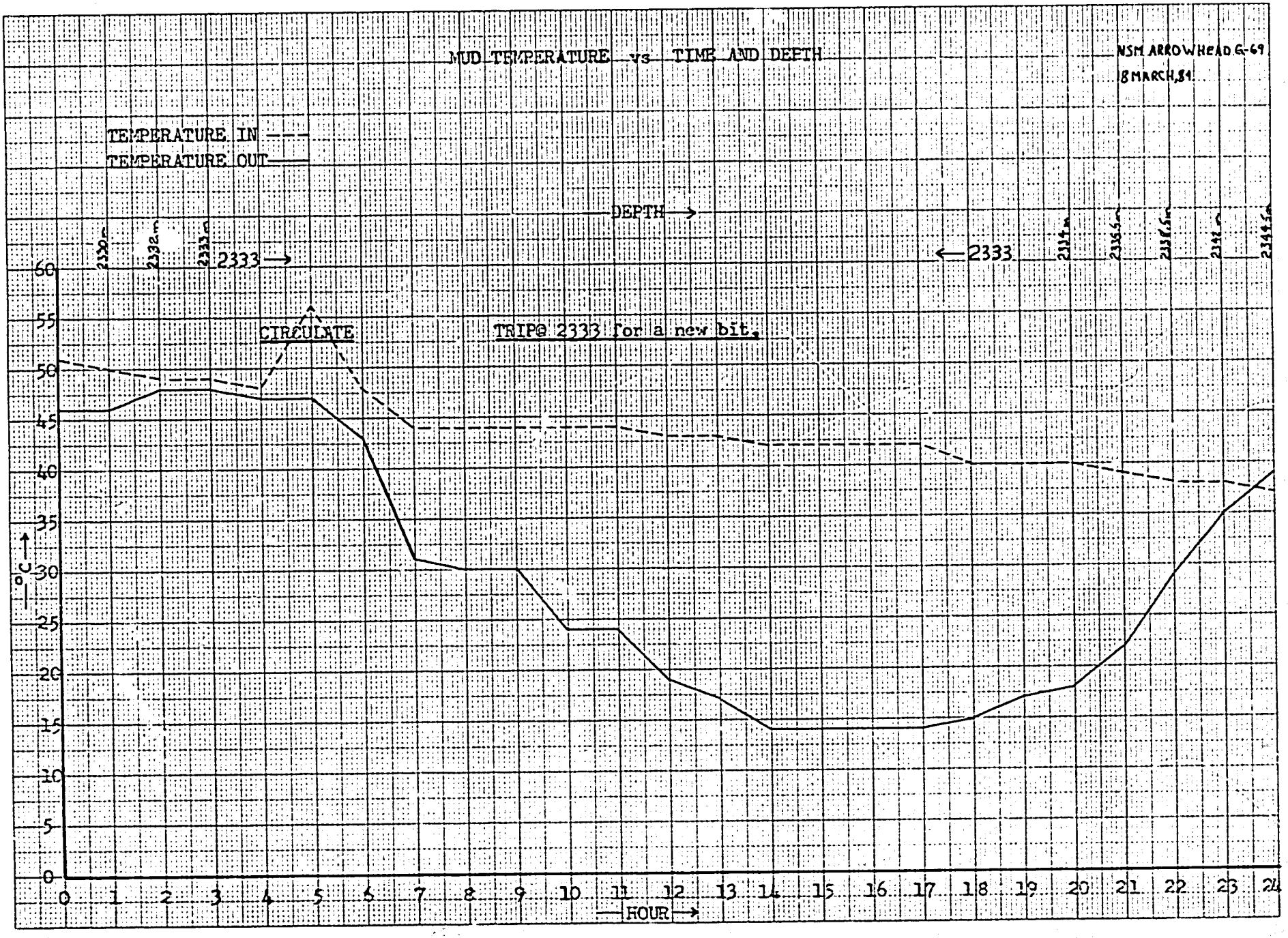


K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.

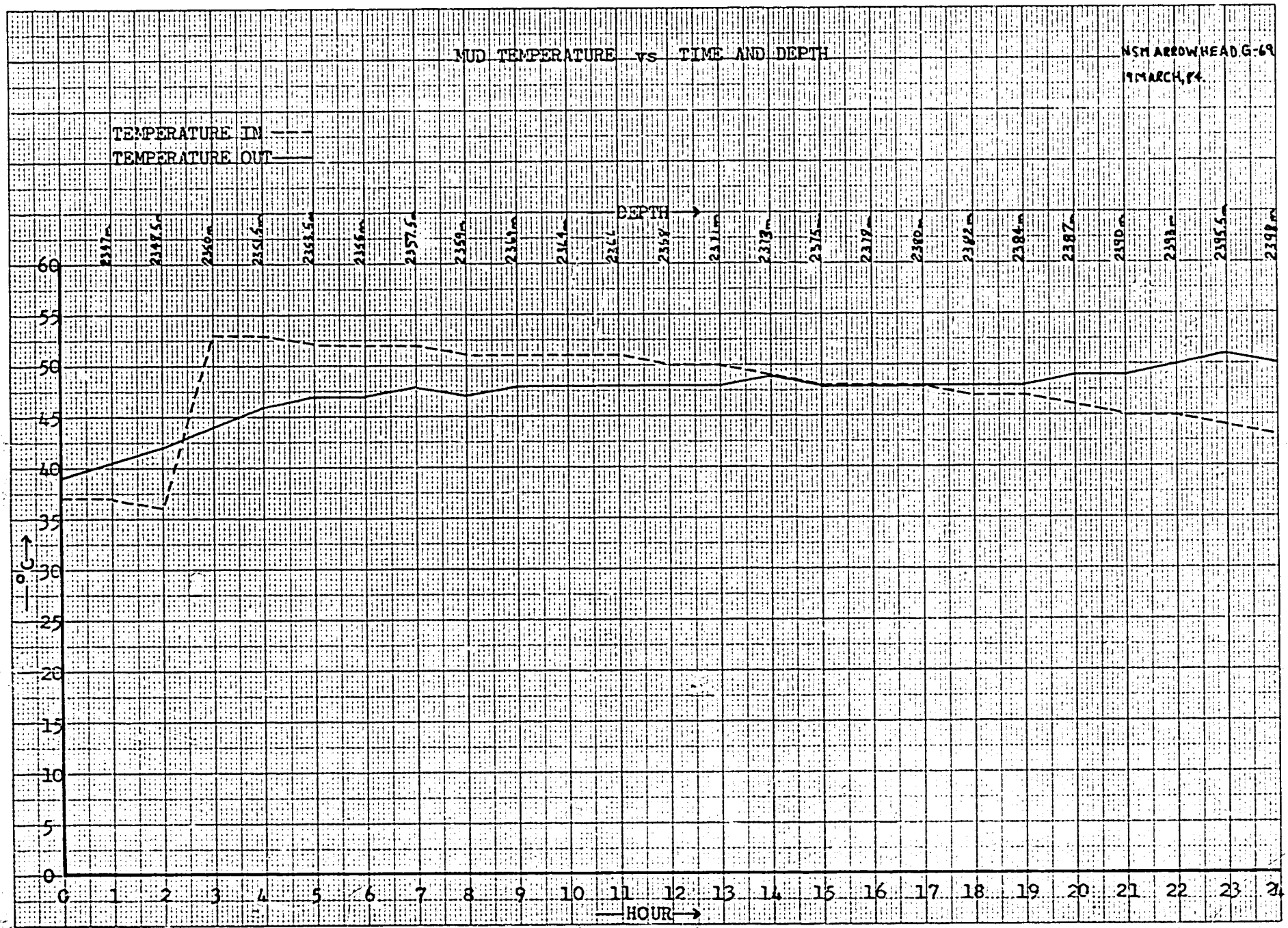



MUD TEMPERATURE vs TIME AND DEPTH
NSM ARROWHEAD G-69
7 MARCH 64
TEMPERATURE IN
TEMPERATURE OUT
DEPTH
REAMING
2322m
2327.5m
2331.5m
2336m
2342m
2346.5m
60
55
50
45
40
35
30
25
20
15
10
5
0
°C
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
HOUR

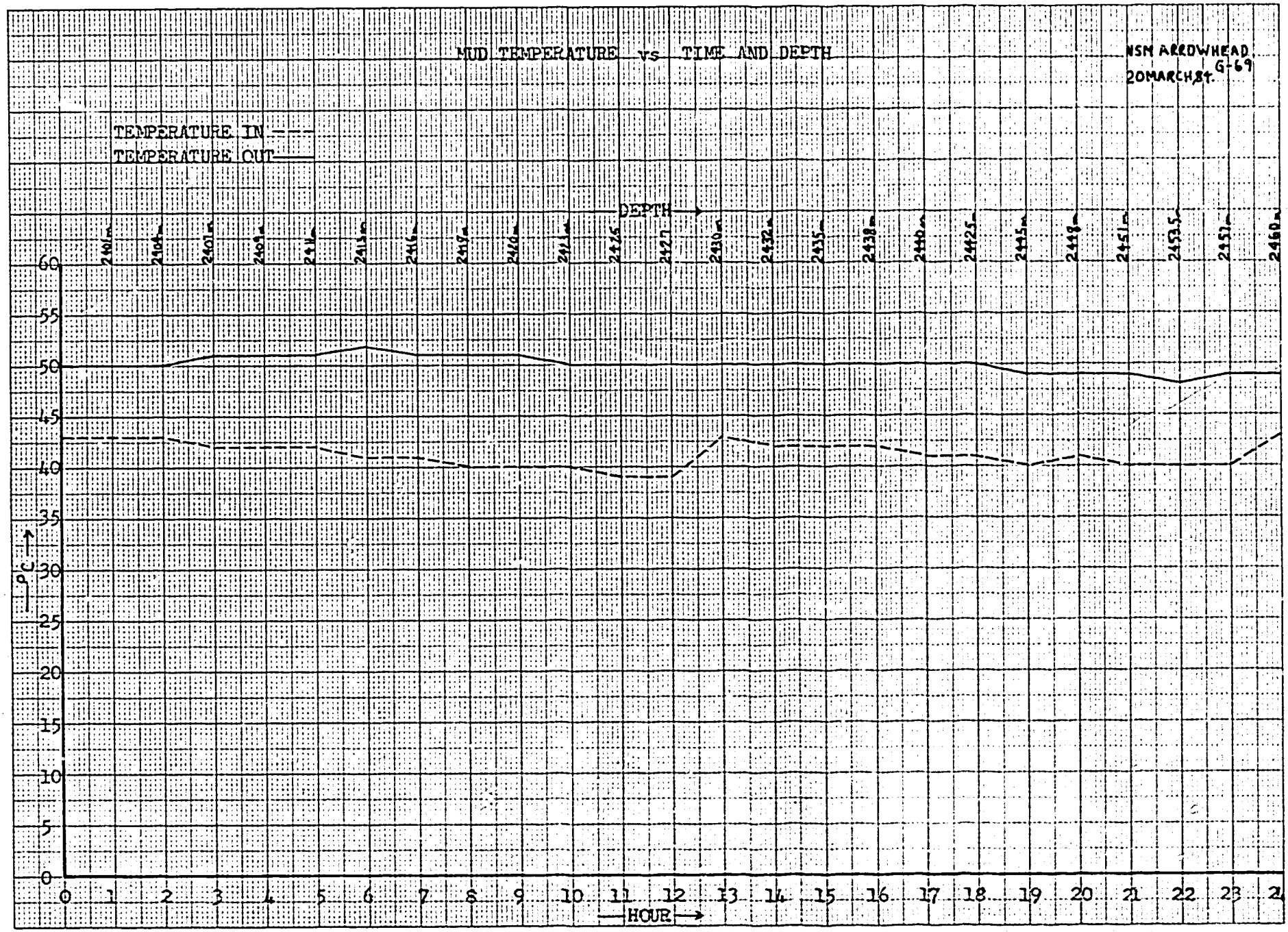
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM. KEUFFEL & ESSER CO. MADE IN U.S.A.



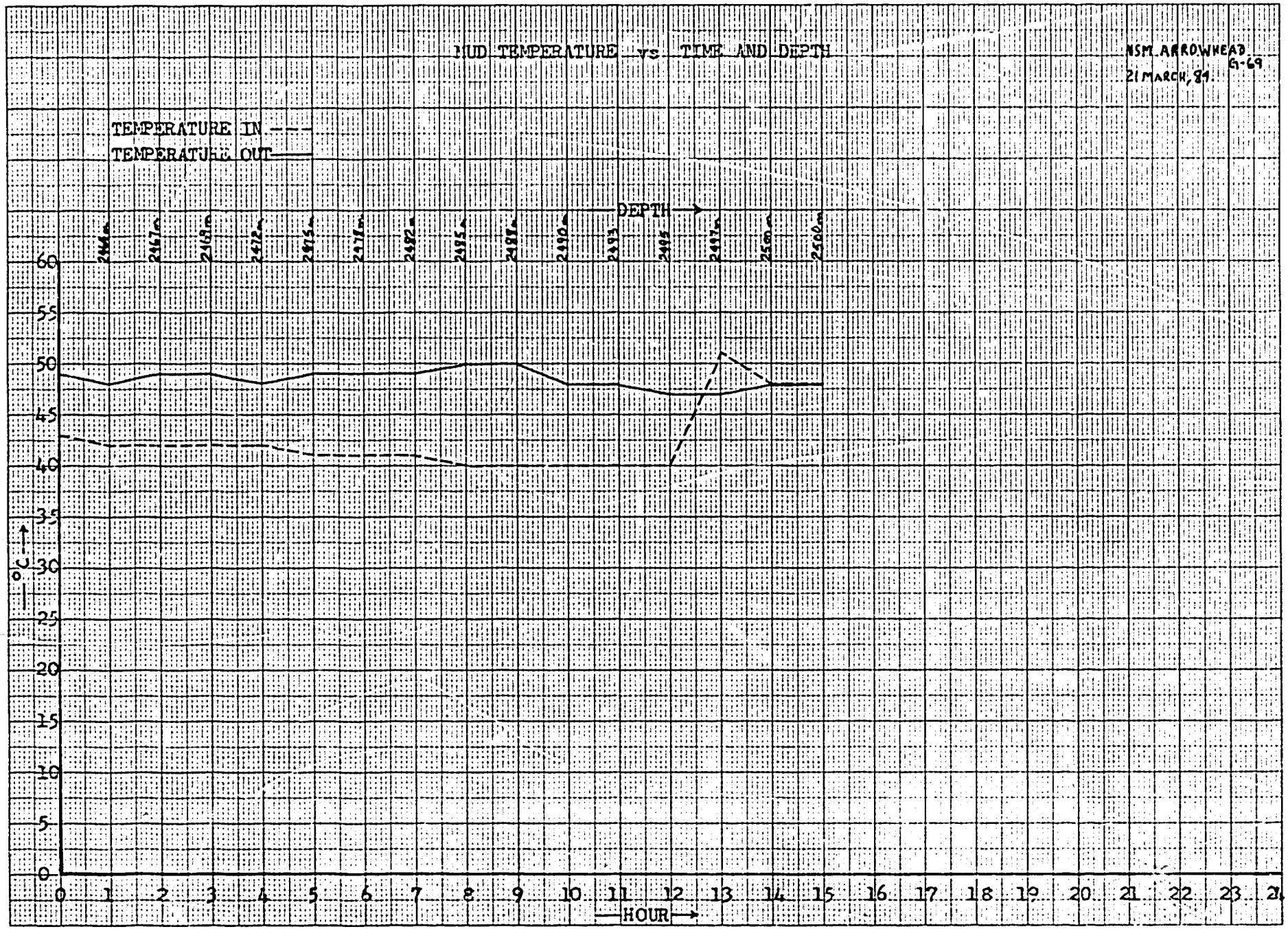
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



K·E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



9211-N9-2-1

NSM ARROWHEAD G-69

60° 38' 24" N
122° 57' 02" W
Northwest Territories

CANADA OIL AND GAS LANDS ADMINISTRATION
ADMINISTRATION DU PÉTROLE ET DU GAZ DES TERRES DU CANADA
1314
JUNE 1 1984
ENGINEERING AND CONTROL BRANCH
TECHNIQUE ET DU CONTRÔLE

Prepared by: W. G. Hegel
1984/04/13

NSM ARROWHEAD G-69

SECTION I: Summary of Well Data

SECTION II: Operations and Engineering Summary

SECTION III: Geological Summary

Section I: Summary of Well Data

(a) Well Name: NSM Arrowhead G-69

(b) Permitee: NSM Resources Ltd.

(c) Operator: NSM Resources Ltd
300, 555-4th Ave S.W.
Calgary, Alberta
T2P 3E7

(d) Location: G-69-60-40-122-45
60° 38' 24" N
122° 57' 02" W
UWI 300G696040122450

(e) Permit No.: Not Applicable

(f) Drilling Contractor: Regent Drilling Ltd.
Rig No. 2
Brewster N-55

(g) Drilling Authority: DA #1138
1984/02/02

(h) Classification: New Field Wildcat

(i) Elevations: Ground: 496.1 m
K.B.: 502.0 m

(j) Spud Date: 2000 hrs 1984/02/13

(k) Completed Drilling Date: 1500 hrs. 1984/03/21

(l) Total Depth: TD 2500 mkb
PBTD 2488.82 mkb

(m) Status: Suspended waiting on completion

(n) Rig Release: 1200 hrs. 1984/03/30

(o) Casing and Hole Sizes: Surface: 444 mm w/ 340 mm csg.
Intermediate: 311 mm w/ 244 mm csg
Production: 222 mm w/ 178 mm csg.

Section II: Operations and Engineering Summary

(a) Daily Drilling Summary	Attachment 1
(b) Bit Record	Attachment 2
(c) Mud Record	Attachment 3
(d) Deviation Record	Attachment 4
(e) Casing Record	Attachment 5
(f) Drill Stem Test	Attachment 6

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

DAILY DRILLING PRECIS

DATE	DEPTH (M.)	PROGRESS	BREAKDOWN OF RIG TIME
84/02/10			Rigging up
84/02/11			Rigging up
84/02/12			Rigging up
84/02/13			Spud at 2000 hrs
84/02/14	64	64	Drilling 444 mm hole
84/02/15	173	109	Drilling 444 mm hole
84/02/16	256	83	" " " "
84/02/17	297.5	45	Drill, Prepare to run casing
84/02/18	297.5	0	Run and Cement casing
84/02/19	297.5	0	NIpple up and Test BOP
84/02/20	297.5	0	Locate Leak in surface casing
84/02/21	297.5	0	Squeeze leak and pressure test
84/02/22	399	98	Drill 311 mm hole
84/02/23	644	245	Drill 311 mm hole with air
84/02/24	710	66	Drill
84/02/25	751	41	Drill change to mud
84/02/26	751	0	Log, prepare to run casing
84/02/27	751	0	Run 244 mm casing and Cement
84/02/28	751	0	Nipple up test BOP
84/02/29	810	59	Drill out Dry hole to air drill
84/03/01	1179	369	Air drill 222 mm hole
84/03/02	1387	208	Air Drill
84/03/03	1539	152	Air Drill
84/03/04	1794	255	Air Drill
84/03/05	1965	171	Air Drill
84/03/06	2017	52	Mud up drill 222mm hole w/ mud
84/03/07	2026	9	Drill and Clean hole
84/03/08	2066	40	Drill
84/03/09	2115	49	Drill
84/03/10	2167	52	Drill
84/03/11	2222	55	Drill
84/03/12	2298	76	Drill
84/03/13	2322	24	Drill
84/03/14	2322	0	Ream and Clean
84/03/15	2322	0	Ream and Clean
84/03/16	2322	0	Ream and Clean
84/03/17	2322	0	Ream and Clean
84/03/18	2333	11	Ream and Drill
84/03/19	2359	26	Drill and trip for bit
84/03/20	2418	59	Drill
84/03/21	2485	67	Drill
84/03/22	2502	15	Drill and trip
84/03/23	2502	0	Logging
84/03/24	2502	0	Clean hole Logging
84/03/25	2502	0	Trip to clean out and DST
84/03/26	2502	0	Testing
84/03/27	2502	0	Testing
84/03/28	2502	0	Clean out to run casing
84/03/29	2502	0	Run casing
84/03/30	2498	0	Run and cement casing, 2 stages
84/03/31	2498	0	Rig Released, Move out

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

BIT RECORD

WELL NAME & LOCATION: NSM ARROWHEAD G-69

BIT NO	SIZE	MAKE	TYPE	OUT	METERS	HRS	AVG DRLG RATE	JET SIZES	WT	RPM	CONDITION
1A	444	Sm	SDT	173	173	30 3/4	5.6	3/18	2/5	120	4-3-1
2A	444	Sm	SDS	301	128	34½	3.7	3/18	4/6	120	3-2-1
1B	311	SM	FDG	710	409	19½	21.0	open	4/8	120	4-2-0
2B	311	Sm	SDT	751	41	10½	4.1	"	8/16	80	3-2-1
1	222	Sm	F4	1473	722	57 3/4	12.5	"	8/12	80/100	4-2-1
2	222	Sm	F4	2017	544	49½	11.0	"	8/18	85	4-2-1
3	222	Re	HS51	2322	305	124.5	2.5	3/10	18	65	7-2-0
4	222	Sm	F3	Reaming and Cleaning							
5	222	Sm	V2H	2333	11	9	1.2	3/13	18	65	7-7-1
4RR	222	Sm	F3	2500	167	65 3/4	2.5	3/14	20	65	4-4-1
6	222	Sm	V2H	2500	Clean out for logging						

NEZ PERCE ENGINEERI[illegible] MANAGEMENT LTD.

MUD REPORT

DATE	DEPTH	WT	VIS	WL	GEL	CAUSTIC	XC LIME	Barite SAWDUST	LCM	FLUID LOSS ADDITIVE	Peltex THINNER	Soda Ash OTHER
84/02/24	710	1100	87	8.5	360	17	-	-	-	-	4	2
84/02/25	751	1150	100	7	140	2	5	200	-	-	-	3
84/02/26	751	1180	182	8	32							
84/02/27	751	1155	66	6.2	15	2					11	
84/02/28	751	1130	48	9								
84/02/29	810	AIR DRILL										
84/03/05	1965	1080	48	12	55	1	2					
84/03/06	2001	1130	45	8.8	50	5	4	294				
84/03/07	2017	1200	115	6.8	83	3	4	289				
84/03/08	2060	1210	110	7.2	72	8	4	77				
84/03/09	2100	1200	74	8.0	75	11	5	35			4	
84/03/10	2172	1210	90	7.2	20	9	3	100			4	
84/03/11	2220	1210	78	7.6	36	4	2	9				
84/03/12	2280	1210	84	8.0	19	7	1	11			3	
84/03/13	2322	1250	200	7.2	43	4	1	59				
84/03/14	2322	1285	210	6.7	35	4	1	36				
84/03/15	2322	1310	300	6.0	30	2	1	212				
84/03/16	2322	1340	210	6.2	76	8	5	411			4	
84/03/17	2322	1365	290	6.0	25	9	2	726			6	
84/03/18	2333	1405	400+	[illegible]	62	9	5	395			9	
84/03/19	2356	1390	270	[illegible]		9	1	123			2	
84/03/20	2414	1420	375	7.2		8	3	521			3	
84/03/21	2480	1420	385	6.8		9	3	169			10	
84/03/22	2500	1420	360	7.4		2	2	56			16	
84/03/23	2500	1420	360	7.4		1		200				
84/03/24	2500	1415	265	5.8	20			160				
84/03/25	2500	1415	265	5.8								
84/03/26	2500	1415	265	5.8								
84/03/27	2500	1395	235	6.8	12	6	4	40			10	
84/03/28	2500	1415	233	6.6		1					4	
84/03/29	2500	1415	235	6.6	15			120			19	
			TOTAL		1275	141	58	4243			109	5

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

SURVEYS

DEPTH	DEGREES	DEPTH	DEGREES	DEPTH	DEGREES
33	1/8	1188	3	1965	3½
54	½	1207	3½	1997	3½
82	1/8	1217	3¼	2058	4¼
109	½	1235	3¼	2134	1½
146	3/4	1264	3¼	2432	½
192	¼	1302	3¼	2498	½
229	1/8	1396	3¼		
266	¼	1454	2½		
285	¼	1539	3		
333	¼	1589	3½		
371	1/8	1625	3½		
494	½	1663	3½		
634	2	1692	3½		
701	2½	1719	3½		
728	1½	1742	33/4		
800	1 3/4	1775	3 3/4		
905	2½	1864	3¼		
1000	2 1/8	1832	3¼		
1103	3 1/8	1860	3 1/8		
1122	3	1889	4		
1141	3½	1908	3½		
1160	3 3/4	1937	3½		

Attachment 5

Casing Record

A. Surface:

Ran 29 jts 340 mm, 81.1 kg/m, ST&C, K-55 casing.
- Total Length 302.39 m
- Guide shoe .45 m
- Float Collar .34 m
- Landed at 297.5 mkb

Centralizers on first 4 joints
Cemented to surface with 42 t Cl'g' + 2%CaCl$_2$

B. Intermediate:

Ran 63 jts 244 mm 53.6 kg/m LT&C K-55 casing.
- Total Length 752.11 m
- Float shoe .52 m
- Float Collar .35 m
- Landed at 751 mkb

Centralizers on first 4 joints
Cemented to surface with 9.5 t Cl'G'+ 6% Gel
20 t Cl'G' + .5% FRC-1
+ .5% FLC-1

C.Production:

Ran 198 jts 177.8 mm casing as follows:
62 jts, 177.8 mm, 38.7 kg/m K-55 LT&C
136 jts, 177.8 mm, 34.2 kg/m K-55 LT&C

- Total Length 2499.78 m
- Float Shoe .46 m
- Float Collar .51 m
- Stage Collar .53 m
- Landed at 2498.9 mkb
- Stage Collar at 1683.0 mkb

Centralizers at 2498 - 2460 6
2275 - 2310 4
1665 - 1694 2
1470 - 1510 3

Scratchers at 1665 - 1694 6
1470 - 1510 6

Cemented in two stages:

Stage 1: 20 t Cl'G' + .75% FRC-1
+ .7% FLC -1
+.7% CRL

Stage 2: 40 t Cl'G' +.75% FRC-1
+.2% CRL

NEZ PERCE ENGINEERING & MANAGEMENT LTD.

DRILL STEM TEST REPORT

DST NO.: 1

DATE: 84/03/24

WELL NAME AND LOCATION: NSM ARROWHEAD G-69

TEST INTERVAL: 2450 - 2500 mkb M. FORMATION: Pine Point

TESTING CO.: Northstar TYPE OF TEST: Conventional

HOLE SIZE: 222 MM PACKER SIZE: 196 MM CHOKE SIZE: 19.05 MM

AUXILARY EQUIPMENT: Floor Manifold

RESULTS:

TIMES: (MIN.) P.F. 10 ISI 30 V.O. 60 FSI 120

PREFLOW DESCRIPTION: Fair increasing to strong

BLOW DESCRIPTION: Fair decreasing to weak G.T.S. after F.S.I.

MEASURED WITH: T.S.T.M.

PRESSURES: IHP 34458 P.F. 11156 ISIP 23695 IFP 14866

KPA FFP 23589 FSIP 23908 FHP 33930 BHT ____ °C

FLUID RECOVERY: 1194 M. MUD 119 M. OIL Muddy Wat M. WATER 975 M. Cushic

NO. OF SAMPLES: 3 FROM: 100m 1194, 1110, 1000

SAMPLES SENT TO: C&G Edmonton

REMARKS:

Ran 975 m Water Cushion

Small gas Flare when Rotated pipe on F.S.I.

DST # 2 1470- 1505 misrun, DST #3 2275 - 2310 misrun. DST #4 2265 - 2310 misrun

WITNESS: ____ FIELD SUPERVISOR: W.H. Simpson

NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL N S M Arrowhead G-69
WELL LOCATION 60-38N-122-57W
INTERVAL 2450-2500 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY - m

DATE 84/03/24
TICKET # 1422 DST.# One
FORMATION Pine Point
TYPE of TEST Bottom Hole

RECORDER DATA — ALL MEASUREMENTS ARE 'SI'

PF	10	REC.#	10964	3898	3899
SI	30	RANGE	42058	43437	43437
SF	60	CLOCK	24	24	24
FS	120	DEPTH	2443.07	2450.69	2450.69
			kPa	kPa	kPa kPa
A. Init. Hyd.			34300	34384	34383
B. First Flow			10341	10575	10580
B1.Final Flow			11305	11363	11371
C. In Shut-in			23228	23353	23358
D. Init. Flow			14644	15879	15930
E. Final Flow			23398	23570	23576
F. Fi Shut-in			23579	23657	23653
G. Final Hyd.			32420	32504	32508
Inside/Outside			Inside	Outside	Outside

HOLE and TEST DESCRIPTION

T STARTED	06:00	Hr. BTM.CHOKE	19.05
T ON BTM	12:00	Hr. HOLE SIZE	222
T OPE	13:05	Hr. D.COLL I.D.	71.4
T PU	16:45	Hr. D.PIPE I.D.	97.2
T OUT	00:30	Hr. D.C.LENG	118.78
TOOL WT.	15 000	daN D.P.LENG	2321.56
WT SET ON PACKER	20 000		
WT PULLED LOOSE	80 000		
INITIAL STR WT	52 000		
UNSEATED STR WT	53 000		

MUD DATA

MUD TYPE	Gel Chem	
WEIGHT	1420	kg/m^3
VIS	360	S/L
W.L.	7.4	cm^3
F.C.	2	mm
MUD DROP	No	m
AMT.OF FILL	Nil	m
BTM.H.TEMP	59	C°
POROSITY %	-	
HOLE COND	Good	

RECOVERY

TOTAL FLUID 1194 m of 119 m in D.C. and 1075 m in D.P.

100 m of muddy water
119 m of mud
975 m of water sassified
- m of 1 000 meters water cushion run

GAS RECOVERY MEASURED WITH -

TIME	ORIFICE	PRESSURE	H^20	RATE
mins.	mm	kPa	mm	m^3/d
-				

REMARKS:

PREFLOW - Fair air blow increasing to strong.
SECONDFLOW - Fair air blow decreasing to weak. Small gas flare when tool rotated to shut-in.
Tool plugged off at the shut-in tool.

TEST SUCCESSFUL

Note - Legal location is 60 degrees 38 minutes 24.43 seconds N 122 degrees 57 minutes 2.47 seconds W.

CONVENTIONAL

PO Sub	.30
XO Sub	.30
Shut-in Tool	1.57
Hydraulic Tool	1.66
REC. # 10964	1.47
Jars	1.41
Safety Joint	.90
PACKER	1.77
Depth m 2448.62	-
TOTAL TOOL ABOVE INTERVAL	10.85
PACKER	1.47
Depth m 2450.09	-
Stub	.30
Perfs	.30
REC. # 3898	&
REC. # 3899	1.47
XO Sub	.30
Drill Collar	46.62
XO Sub	.30
Bullnose	.62
T.DEPTH m 2500.00	-
TOTAL INTERVAL 49.91	-
TOTAL TEST TOOL 14.14	-

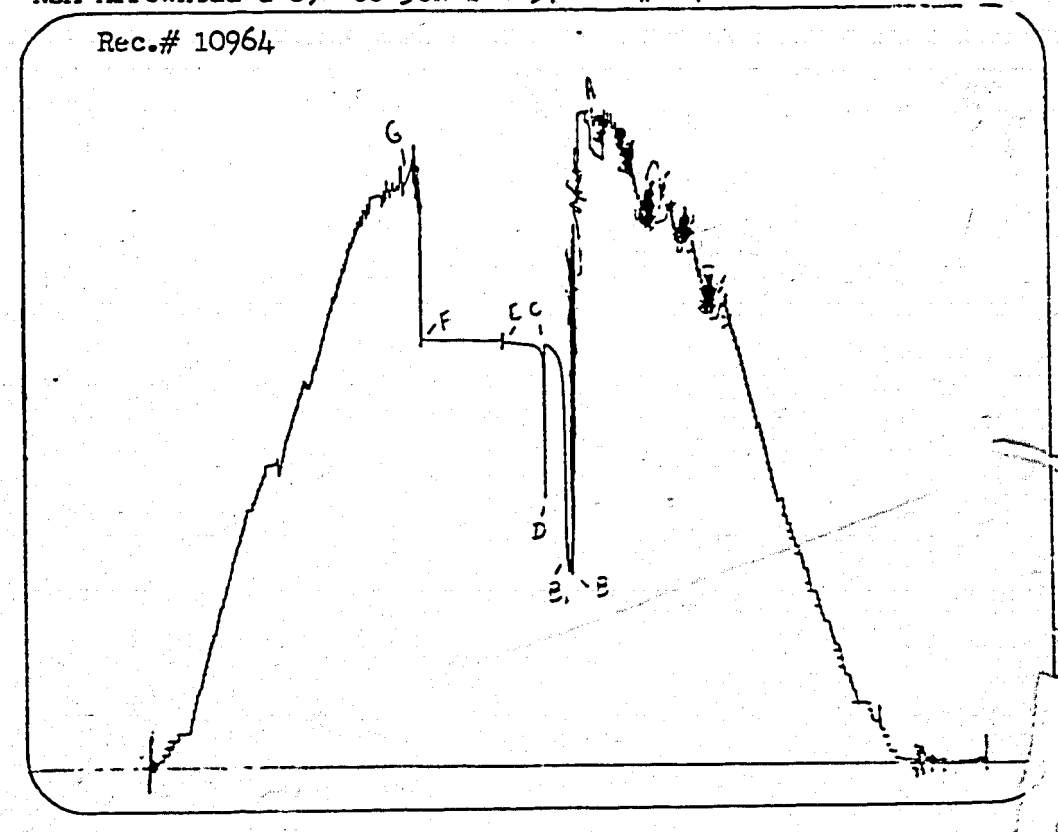
CUSTOMER REP B. Simpson
TESTER G. MacKay /S2S

WELL NAME N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1422
O.S.T. No. One

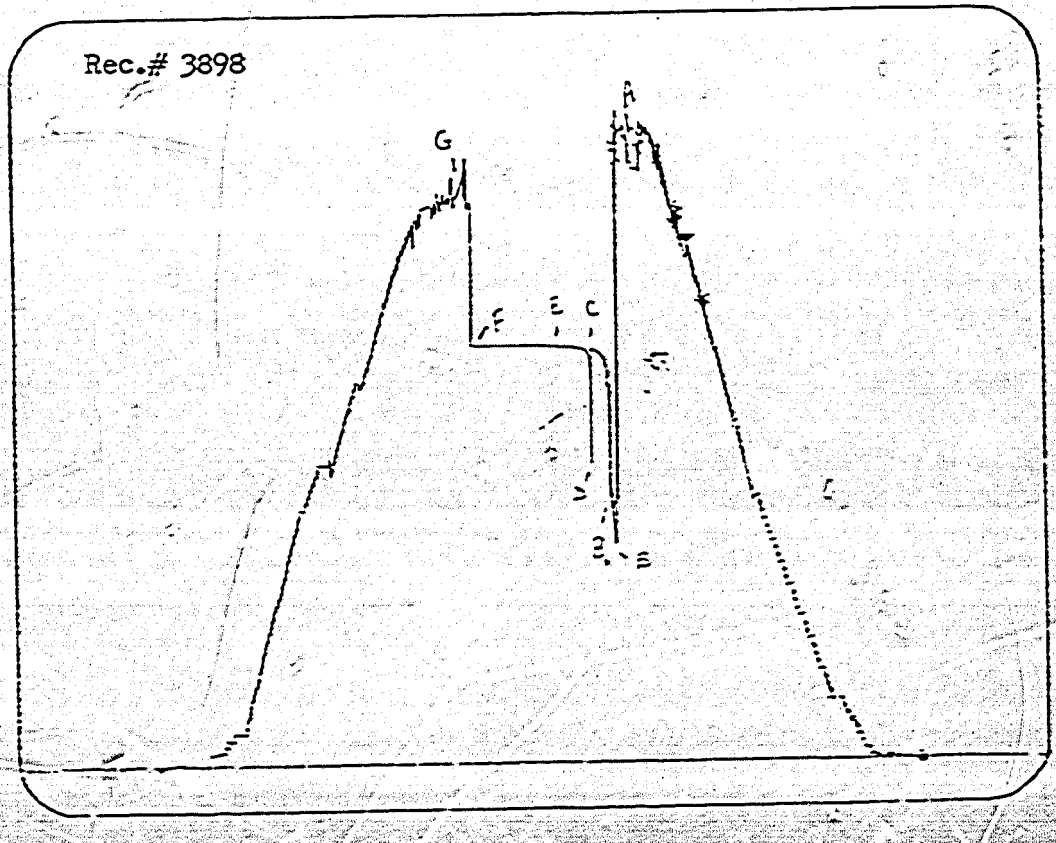
NORTHSTAR DRILLSTEM TESTERS LTD.

NSM Arrowhead G-69 60-38N-122-57W T.# 1422 D.S.T.# One

Rec.# 10964



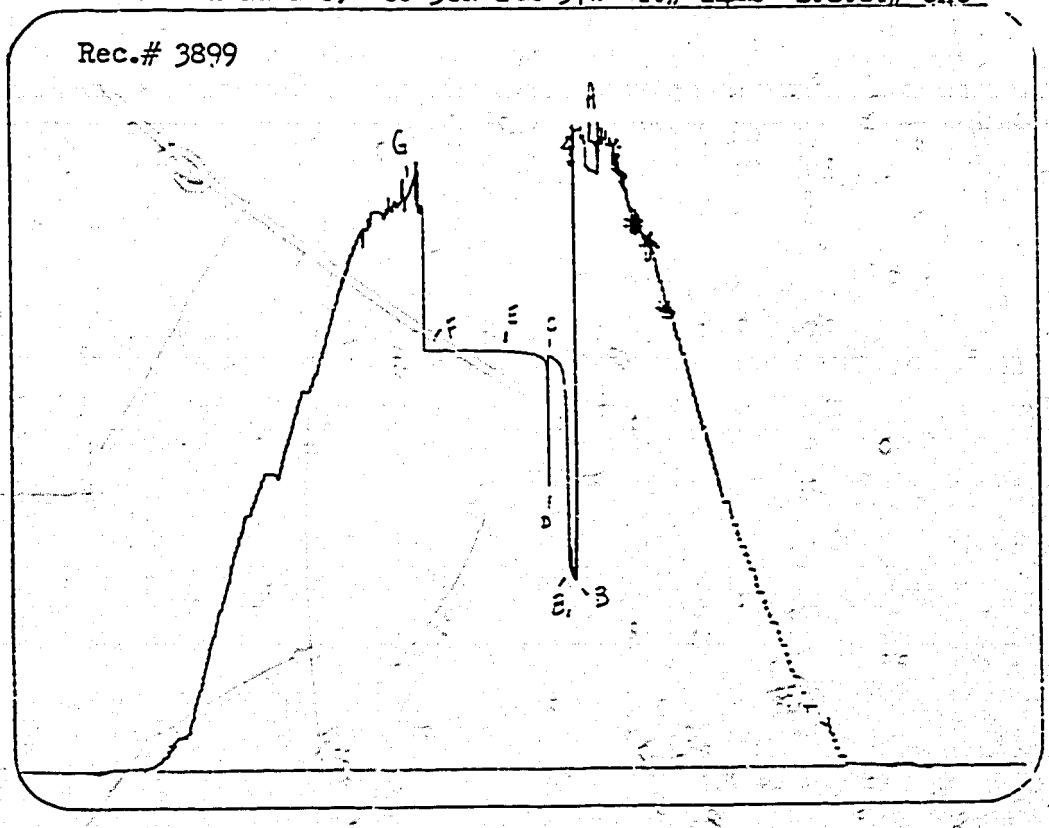
Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

NSM Arrowhead G-69 60-38N-122-57W T.# 1422 D.S.T.# One

Rec.# 3899



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL N[illegible] N S M Arrowhead G69
LL L[illegible]N 60-38N-122-57W
NTERVAL 1470-1505 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY _ m

DATE 84/03/25
TICKET # 1423 DST.# Two
FORMATION _
TYPE of TEST Straddle

WELL NAME: N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1423
D.S.T. No. Two

ECORDER DATA — ALL MEASUREMENTS ARE 'SI'

F 00	REC.#	10964	3898	3899
I 00	RANGE	42058	43437	43437
F 00	CLOCK	24	24	24
S 00	DEPTH	1461.50	1470.86	1470.86
		kPa	kPa	kPa
. Init. Hyd.		21440	21549	21548
. First Flow		–	–	–
1.Final Flow		–	–	–
. In Shut-in		–	–	–
. Init. Flow		Packer	Seat	Failed
. Final Flow		–	–	–
. Fi Shut-in		–	–	–
. Final Hyd.		21567	21668	21668
Inside/Outside		Inside	Outside	Outside

OLE and TEST DESCRIPTION

T STARTED	04:30	Hr. BTM.CHOKE	19.05
T ON BTM	08:15	Hr. HOLE SIZE	222
T OPE[illegible]	10:00	Hr. D.COLL I.D.	71.4
T PU[illegible]	00:00	Hr. D.PIPE I.D.	97.2
T OUT	00:00	Hr. D.C.LENG	_
TOOL WT.	4 000	daN D.P.LENG	_
WT SET ON PACKER	_		
WT PULLED LOOSE	_		
INITIAL STR WT	38 000		
RESEATED STR WT	_		

MUD DATA

mm MUD TYPE	Gel Chem	
mm WEIGHT	1420	kg/m^3
mm VIS	360	S/L
mm W.L.	7.4	cm^3
m F.C.	2.0	mm
m MUD DROP	No	m
daN ART.OF FILL	Nil	m
daN BTM.H.TEMP	_	C°
daN POROSITY %	_	
daN HOLE COND	Good	

ECOVERY

TOTAL FLUID _ m of _ m in D.C. and _ m in D.P.
_ m of _
_ m of _
_ m of _
_ m of _

GAS RECOVERY MEASURED WITH _

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
–				

EMARKS:

Packers failed to pump up - tried 3 times.

TEST MISRUN

S[illegible]T #1 for lesal location.

INFLATE

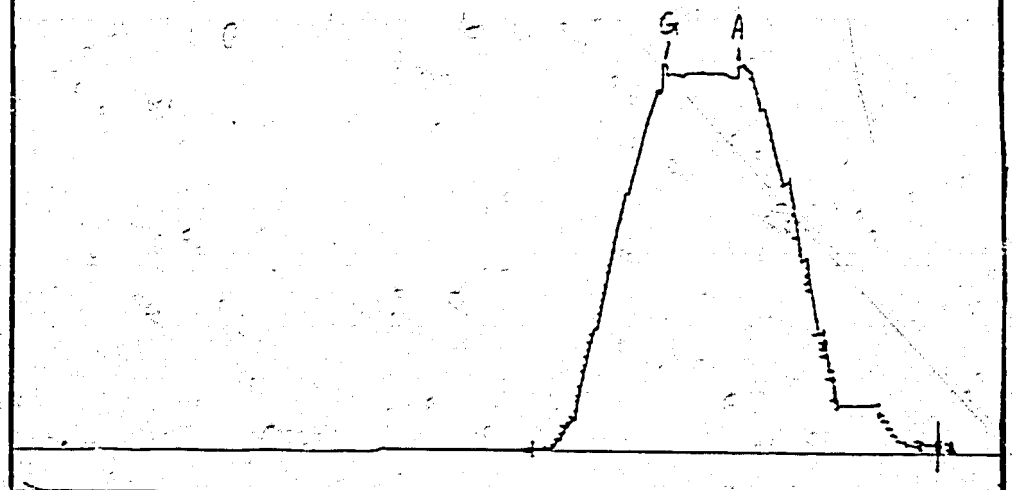
Reversing Sub	.30
XO Sub	.30
Drill Collars	–
R.T.V.	2.02
Downhole Sampler	–
Reciprocating Joint	1.77
REC. # 10964	1.47
Jars	1.67
Clutch	–
Safety Joint	1.04
Pump	1.50
Screen	1.34
ABOVE INTERVAL 13.19	–
PACKER	1.78
Depth m 1470.00	–
Perfs	.88
REC. # 3898 & 3899	
Spacing	3.65
XO Sub	.30
Drill Collar	27.90
XO Sub	.30
Stub	.42
Depth m 1504.89	–
TOTAL INTERVAL 34.89	–
Drasspring	–
Total Test Tool 20.18	–

Customer Rep. B. Simpson
Tester G. MacKay /S30

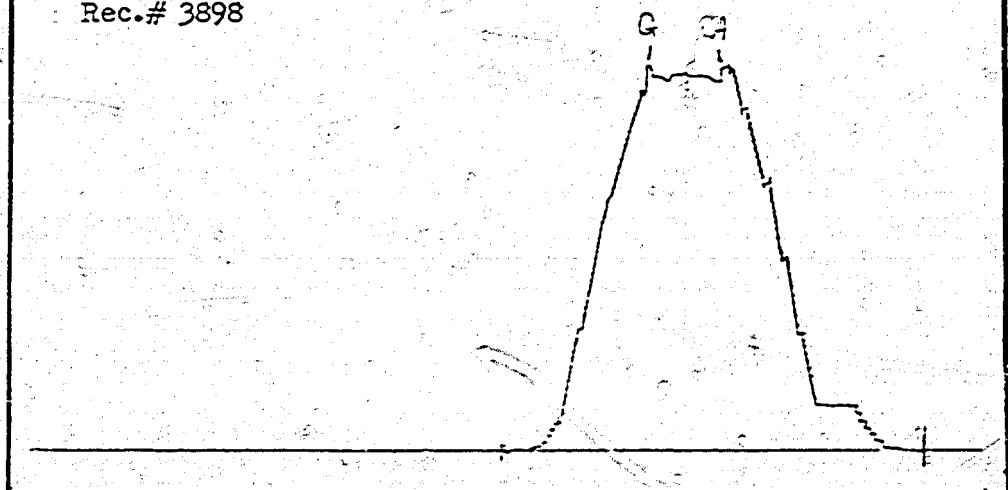
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1423 DST.# Two

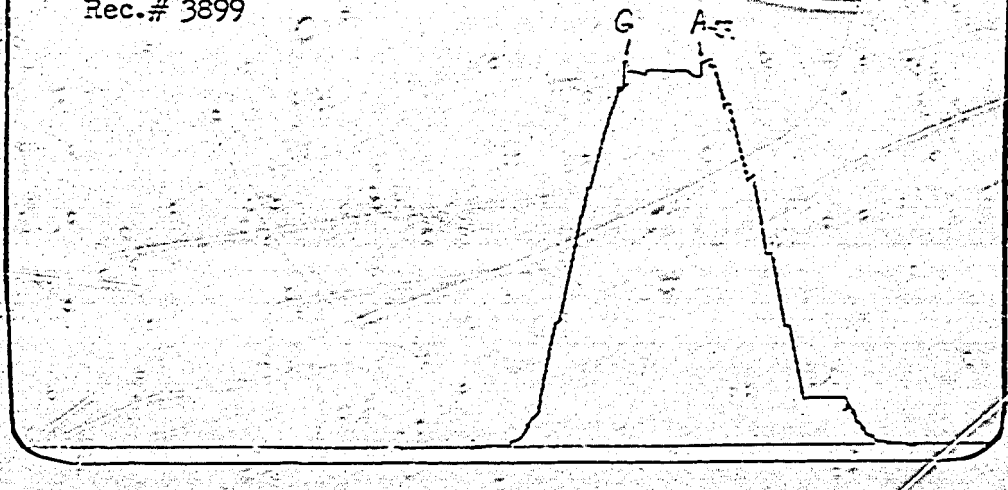
Rec.# 10964



Rec.# 3898



Rec.# 3899



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd.
WELL N S M Arrowhead G-69
WELL LOCATION 60-38N-122-57W
INTERVAL 2275-2310 T.D. 2500 m

KB ELV. 502.01 m
GR ELV. 496.10 m
NET PAY — m

DATE 84/03/25
TICKET # 1424 DST.# Three
FORMATION —
TYPE of TEST Bypass Straddle

WELL NAME N S M Arrowhead G-69 60-38N-122-57W
TICKET No. 1424
D.S.T. No. Three

RECORDER DATA

ALL MEASUREMENTS ARE 'SI'

PF	00	REC.#	10964	3898	3899	
SI	00	RANGE	42058	43437	43437	
GF	00	CLOCK	24	24	24	
FS	00	DEPTH	2267.06	2279.60	2317.80	
			kPa	kPa	kPa	kPa
A.		Init. Hyd.	31238	31371	31794	
B.		First Flow	3956	9180	21734	
B1.		Final Flow	—	—	—	
C.		In Shut-in	—	—	—	
D.		Init. Flow	Lost	Mud	—	
E.		Final Flow	—	—	—	
F.		Fi Shut-in	—	—	—	
G.		Final Hyd.	—	30673	31091	
Inside/Outside			Inside	Outside	Outside	

HOLE and TEST DESCRIPTION

T STARTED	17:00	Hr.	STM.CHOKE	19.05	mm		
T ON BTM	22:00	Hr.	HOLE SIZE	222	mm		
T OFF	22:30	Hr.	D.COLL I.D.	71.4	mm		
T PULL	23:00	Hr.	D.PIPE I.D.	97.2	mm		
T OUT	06:00	Hr.	D.C.LENG	138.07	m		
TOOL WT.	10 000	daN	D.P.LENG	2129.62	m		
WT SET ON PACKER	20 000	daN					
WT PULLED LOOSE	90 000	daN					
INITIAL STR WT	47 000	daN					
UNSEATED STR WT	47 000	daN					

MUD DATA

MUD TYPE	Gel Chem	
WEIGHT	1410	kg/m^3
VIS	235	S/L
W.L.	—	cm^3
F.C.	—	mm
MUD DROP	No	m
AMT.OF FILL	2	m
BTM.H.TEMP	—	C°
POROSITY %	—	
HOLE COND	Good	

RECOVERY

TOTAL FLUID — m of — m in D.C. and — m in D.P.

— m of —
— m of —
— m of —
— m of —

GAS RECOVERY MEASURED WITH —

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
—				

REMARKS:

Lost mud when tool opened - tried 3 times. Pulled out of hole.

TEST MISRUN

See DST #1 for legal location.

CONVENTIONAL

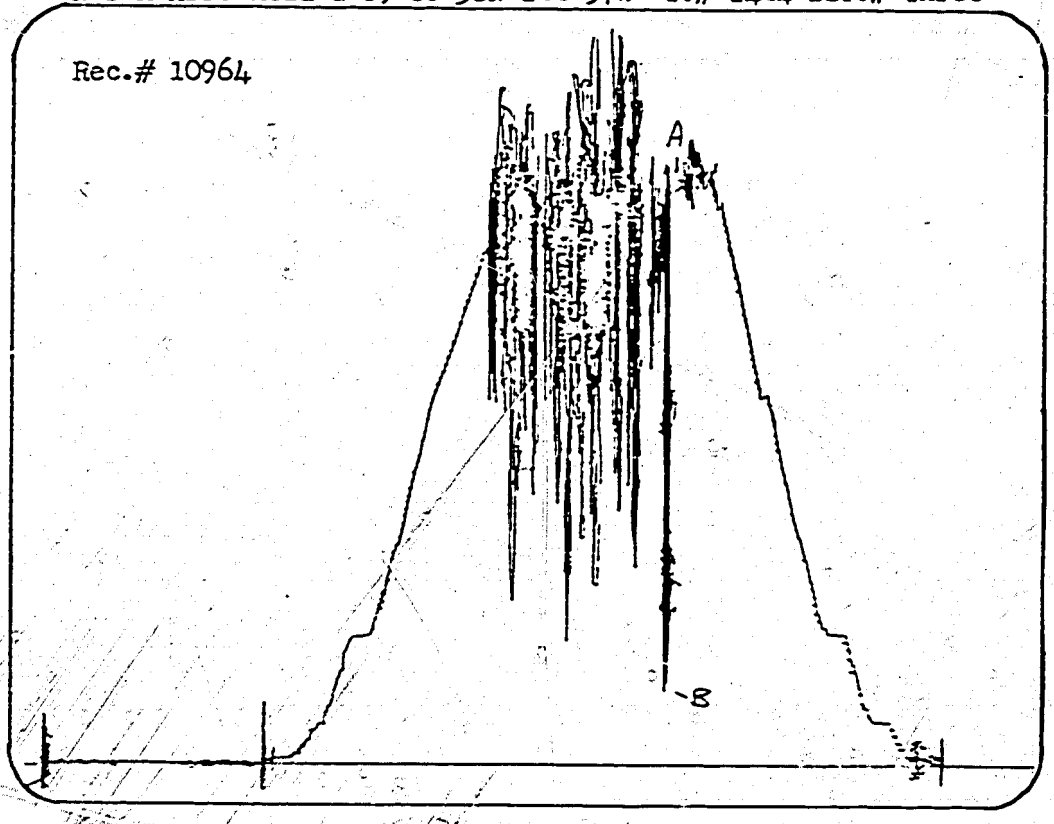
PO Sub		.30
XO Sub		.30
Shut-in Tool		1.57
Hydraulic Tool		1.66
REC. #	10964	1.47
Jars		1.41
Safety Joint		.90
By Pass Hnsr.		.30
PACKER		1.77
Depth m	2272.91	—
TOTAL TOOL ABOVE INTERVAL	11.81	
PACKER		2.13
Depth m	2275.04	—
Stub		.30
Perfs		3.96
By Pass Recev		.30
REC. #	3898	1.47
XO Sub		.30
Drill Collar		27.33
XO Sub		.30
Stub		1.00
Depth m	2310.00	—
PACKER		1.43
TOTAL INTERVAL	34.86	—
Depth m	2311.43	—
PACKER		1.77
Perfs		4.60
REC. #	3899	1.47
XO Sub		.30
Drill Pipe		178.51
XO Sub		.30
Bullnose		.62
T.DEPTH m	2500.00	—

TOTAL TAIL PIPE 190.00
TOTAL TEST TOOL 29.93
CUSTOMER REP B. Simpson
TESTER G. MacKay /30

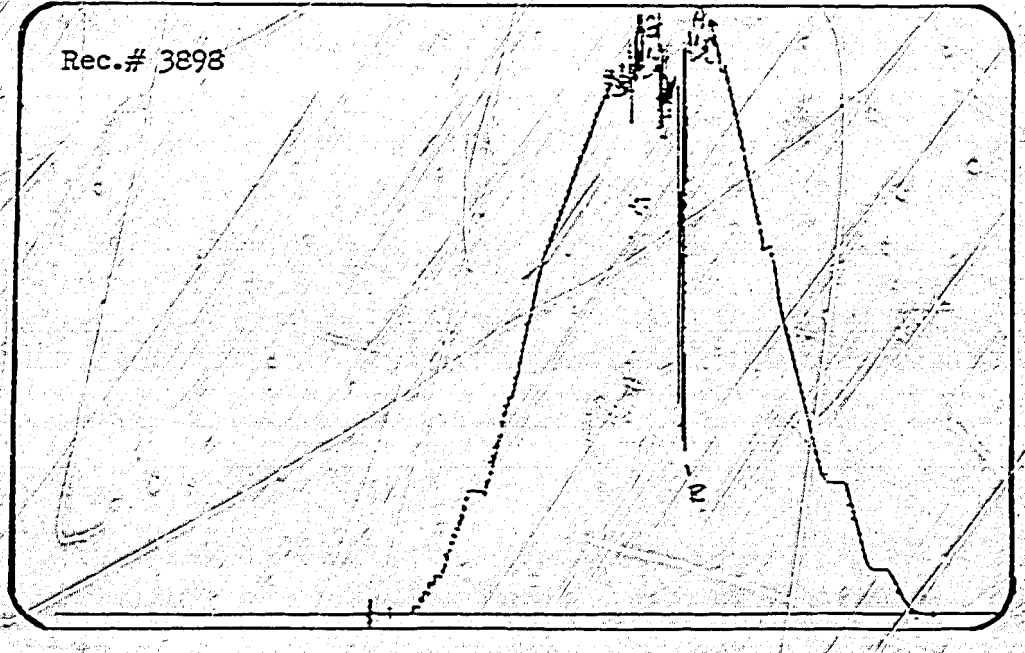
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1424 DST.# Three

Rec.# 10964



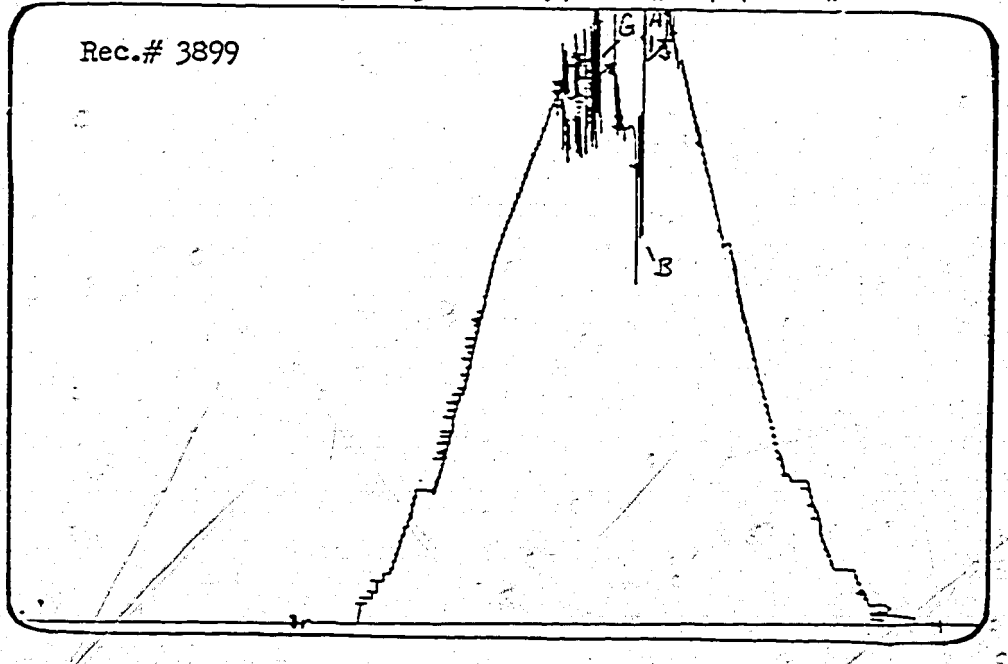
Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1424 DST.# Three

Rec.# 3899



NORTHSTAR DRILLSTEM TESTERS LTD.

COMPANY N S M Resources Ltd. | DATE 84/03/27

WELL NAME N S M Arrowhead G-69 | KB ELV. 502.01 m | TICKET # 1425 | DST.# Four

WELL LOCATION 60-38N-122-57W | GR ELV. 496.10 m | FORMATION _

INTERVAL 2265-2310 | T.D. 2500 m | NET PAY _ m | TYPE of TEST Bypass Straddle

RECORDER DATA — ALL MEASUREMENTS ARE 'SI'

00	REC.#	10964	3898	3899
00	RANGE	42058	43437	43437
00	CLOCK	24	24	24
00	DEPTH	2257.04	2268.66	2318.97
		kPa	kPa	kPa
	Init. Hyd.	_	31006	31560
	First Flow	_	_	_
	Final Flow	_	_	_
	In Shut-in	_	_	_
	Init. Flow	Lost	Mud	_
	Final Flow	_	_	_
	Fi Shut-in	_	_	_
	Final Hyd.	_	_	_
	Inside/Outside	Inside	Outside	Outside

TOOL and TEST DESCRIPTION

TOOL STARTED	03:00	Hr. BTM.CHOKE	19.05	mm	
ON BTM	00:00	Hr. HOLE SIZE	222	mm	
OPEN	00:00	Hr. D.COLL I.D.	71.4	mm	
PULL	09:00	Hr. D.PIPE I.D.	97.2	mm	
OUT	00:00	Hr. D.C.LENG	135.00	m	
TOOL WT.	10 000	daN D.P.LENG	2120.5	m	
WT SET ON PACKER	_			daN	
WT PULLED LOOSE	100 000			daN	
INITIAL STR WT	55 000			daN	
RESEATED STR WT	65 000			daN	

MUD DATA

MUD TYPE	Gel Chem	
WEIGHT	1390	Kg/m^3
VIS	235	S/L
W.L.	5.8	cm^3
F.C.	2.0	mm
MUD DROP	No	m
AKT.OF FILL	_	m
BTM.H.TEMP	_	C°
POROSITY %	_	
HOLE COND	Good	

RECOVERY

TOTAL FLUID _ m of _ m in D.C. and _ m in D.P.

_ m of _

_ m of _

_ m of _

_ m of _

GAS RECOVERY MEASURED WITH _

TIME	ORIFICE	PRESSURE	H^2O	RATE
mins.	mm	kPa	mm	m^3/d
_				

REMARKS:

Losing mud in annulus to pipe before packers set.

TEST MISRUN

50 meter water cushion run.

CONVENTIONAL

PO Sub	.30
XO Sub	.30
Shut-in Tool	1.57
Hydraulic Tool	1.66
REC. # 10964	1.47
Jars	1.41
Safety Joint	.90
By Pass Hnsr.	.30
PACKER	1.77
Depth m	_
TOTAL TOOL ABOVE INTERVAL	11.81
PACKER	2.13
Depth m 2265.02	_
Stub	.30
Perfs	3.04
By Pass Recev	.30
REC. # 3898	1.47
XO Sub	.30
Drill Collar	38.47
XO Sub	.30
Stub	1.00
Depth m 2310.20	_
PACKER	2.43
TOTAL INTERVAL 45.18	_
Depth m 2312.63	_
PACKER	1.77
Perfs	4.57
REC. # 3899	1.47
XO Sub	.30
Drill Pipe	179.34
XO Sub	.30
Bullnose	.62
T.DEPTH m 2500.00	_

TOTAL TAIL PIPE 180.80

TOTAL TEST TOOL 29.58

CUSTOMER REP B. Simpson

TESTER G. MacKay /S30

WELL NAME: N S M Arrowhead G-69 60-38N-122-57W

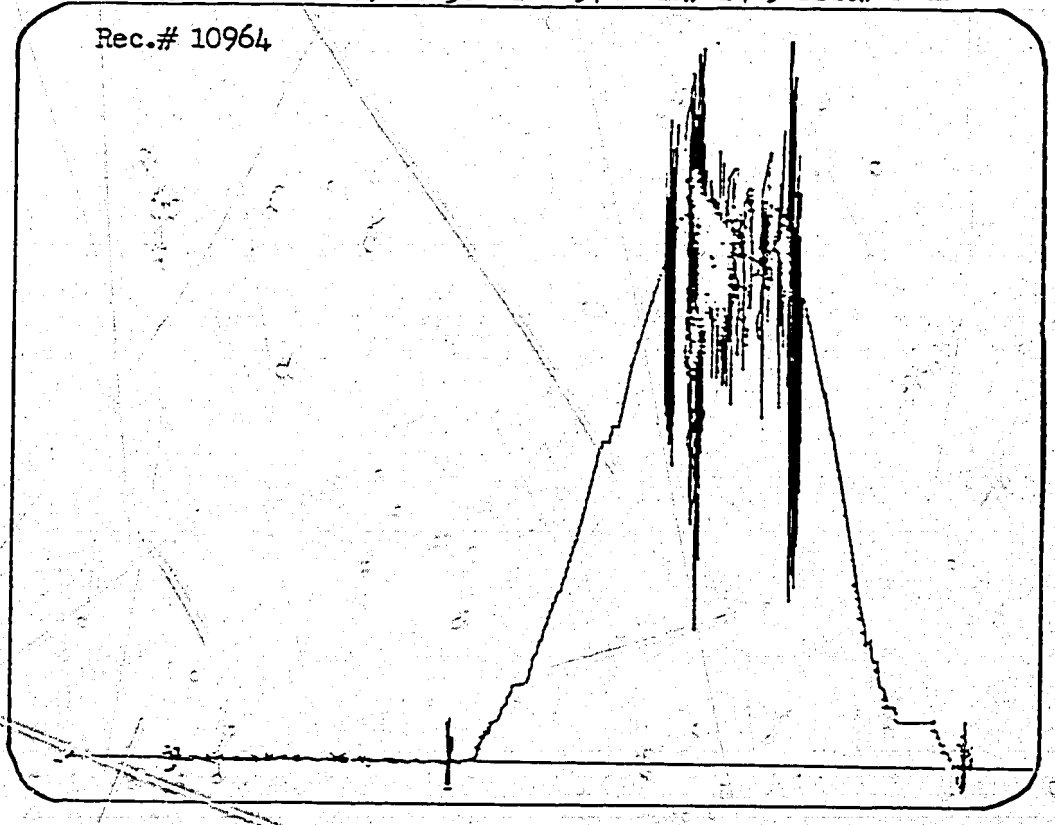
TICKET No. 1425

D.S.T. No. Four

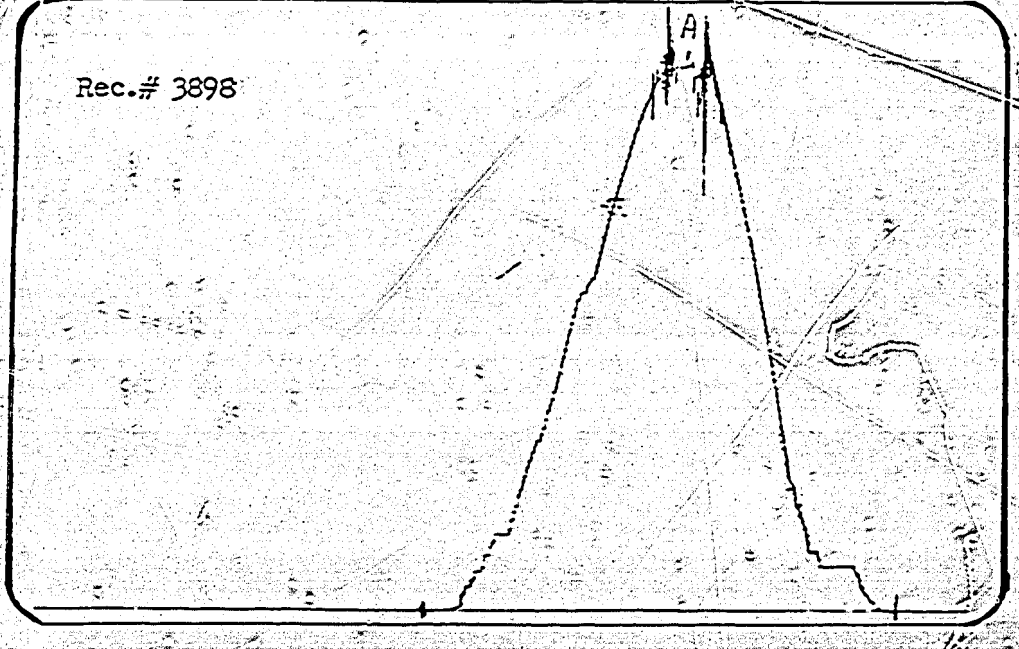
NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1425 DST.# Four

Rec.# 10964



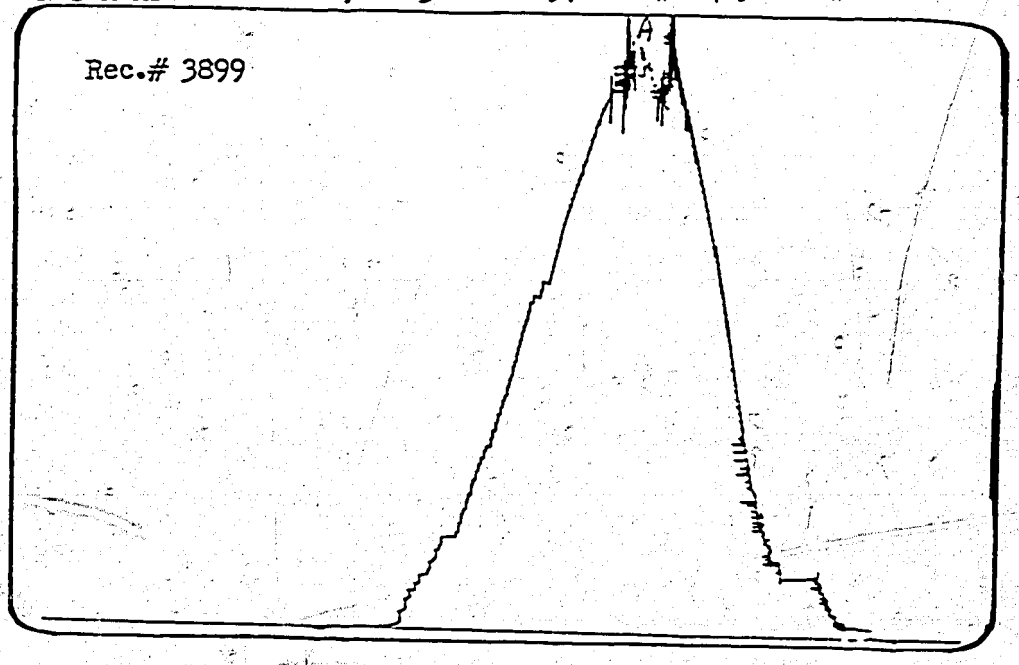
Rec.# 3898



NORTHSTAR DRILLSTEM TESTERS LTD.

N S M Arrowhead G-69 60-38N-122-57W T.# 1425 DST.# Four

Rec.# 3899



Section III Geological Summary

(a) Formation Tops: Attachment 7

(b) Cores: None Taken

(c) Mud Log/Sample Descriptions: Attachment 8

(d)Electric Logs: Attachment 9
Logs ran as follows:
CNL/CNS TD. to 298 mkb
BCS/GR/CAL TD. to 298 mkb
DIL TD to 298 mkb

Attachment 7

Formation Tops

KB Elev. 502 m

Formation	Age	Drill Depth	Subsea
Spud	Cretaceous		-502 m
Banff	Mississippian	581 m	-79 m
Exshaw		952 m	-450 m
Kotcho	Devonian	964 m	-462 m
Tetcho		1341 m	-839 m
Kakisa		1476 m	-974 m
Fort Simpson Shale		1507 m	-1005 m
Muskwa		2213 m	-1711 m
Slave Point		2235 m	-1733 m
Watt Mountain		2338 m	-1836 m
Sulphur Point		2347 m	-1845 m
Pine Point		2371 m	-1869 m
Keg River		2450 m	-1948 m
Total Depth		2502 m	-2000 m

OTTAWA COPY

NSM ARROWHEAD G-69 (Re-entry)

60 Degrees 38 Minutes 24.43 Seconds North
122 Degrees 57 Minutes 02.47 Seconds West

Northwest Territories

Prepared by: F. T. Nadir, P. Eng.
October 25, 1985

INDEX

NSM ARROWHEAD G-69

SECTION I	Summary of Well Data
SECTION II	Daily Operation Summary
SECTION III	Production Test Summary
SECTION IV	Cased Well Logs
	Gamma-Ray Neutron Cement Bond Log
	Gamma-Ray Neutron Collar Log
	Perforating Log
SECTION V	Daily Workover and Production Report
SECTION VI	Detailed Production Test Results
SECTION VII	Bottomhole Pressure Reports
SECTION VIII	Fluid Analysis Reports
SECTION IX	Well Stimulation Reports

SECTION I

SUMMARY OF WELL DATA

a) Well Name:	NSM Arrowhead G-69
b) Permittee:	NSM Resources Ltd.
c) Operator:	NSM Resources Ltd. 300, 555-4th Avenue S.W. Calgary, Alberta, T2P 3E7
d) Location:	G-69-60-40-122-45 60 Degrees 38 Minutes 24.43 Seconds North 122 Degrees 57 Minutes 2.47 Seconds West UWI 300G696040122450
e) Permit No.:	Not Applicable
f) Service Rig Contractor:	Roll'n Well Servicing Rig No. 10
g) Authority to Alter Condition:	No. 1138 Dated 3 January, 1985
h) Classification:	Re-entry for testing
i) Elevations:	Ground: 496.1 m KB: 502.0 m
j) Re-entry Date:	6 January 1985
k) Intervals Tested	Keg River 2484.5-2488.5 mKB Keg River 2458 - 2463 mKB Slave Point 2292 - 2301 mKB Slave Point 2282 - 2287 mKB
l) Completed Testing Date:	22 January 1985
m) Total Depth:	TD: 2500 mKB PBTD: 2489 mKB
n) Status:	Suspended gas well
o) Rig Release:	0100 hrs. 23 January 1985
p) Tubing size:	None
q) Wellhead:	7000 kpa

SECTION II

DAILY OPERATION SUMMARY

NSM ARROWHEAD G-69

DATE	ZONE	DESCRIPTION OF OPERATION
4 January 1985		Setting up camp
5 January 1985		Moving in service rig
6 January 1985		Rigged up. Ran in hole with bit, scraper and tubing
7 January 1985		Circulated to 9 #/gal KCl water. Waited on collars, bit & power swivel.
8 January 1985		Drilled out stage collar.
9 January 1985		Ran CBL, GR, N CCL Logs
10 January 1985	Keg River	Perforated 2484.5-2488.5 mKB. Acidized. Found communication between tubing and Annulus.
11 January 1985	Keg River	Circulated hole to KCl water. Re-ran tubing and Packer.
12 January 1985	Keg River	Waited on tubing plug.
13 January 1985	Keg River	Swabbed well. Gas to surface too small to measure.
14 January 1985	Keg River	Acidized. Gas too small to measure. Tripped out tubing and packer. Ran Bridge plug @ 2480 mKB.
15 January 1985	Keg River	Spotted cement on bridge plug. Perforated 2458-2463 mKB. Ran tubing. Acidized. Hooked up test equipment. Maximum gas rate 2.7 mmcf/d
16 January 1985	Keg River	Ran bottom hole pressure recorders. Continued testing well.
17 January 1985	Keg River	Ran modified isochronal test.
18 January 1985	Keg River	Completed isochronal test. Shut well in for pressure build-up.
19 January 1985	Keg River	Pull out of hole with packer and tubing. Set bridge plug @ 2430 mKB. Set 10 meter cement plug on top of bridge plug. Perforated 2292-2301 mKB. Ran in with tubing and packer.
20 January 1985	Slave Point	Acidized. Swabbed. Recovered salt water ; 1% H2S, salinity 150,000 ppm.
21 January 1985	Slave Point	Set bridge plug at 2290 mKB. Perforated interval 2282-2287 mKB. Acidized. Swabbed.
22 January 1985	Slave Point	Swabbed and tested. Maximum estimated gas rate 0.117 mmcf/d. Water rate=11.6 cu.m./d. salinity 57000 ppm. H2S content 1%.
23 January 1985	Slave Point	Set Bridge plug at 2200 mKB. Run 30 meter cement on top of plug. Fill hole with inhibited water & top 150 feet with diesel fuel. Rig Released at 0100 hrs.

SECTION III

PRODUCTION TESTING SUMMARY

NSM ARROWHEAD G-69

			PRODUCTION TOTAL	PRODUCTION AVERAGE DAILY
TEST	No. 1	Oil	0 cubic meters	0.0 cu. m./day
DATE	9-10 January 1985	Gas	0 cubic meters	0 cu. m./day
ZONE	Keg River	Water	2 cubic meters	5.3 cu. m./day
INTERVAL	2484.5-2488.5 mKB	Salinity	0 ppm	
HOURS ON	9 Hours	H2S content	0%	
TEST	No. 2	Oil	0 cubic meters	0.0 cu. m./day
DATE	14-18 January 1985	Gas	56144 cubic meters	22458 cu. m./day
ZONE	Keg River	Water	12.8 cubic meters	5.1 cu. m./day
INTERVAL	2458-2463 mKB	Salinity	161984 ppm	
HOURS ON	60 Hours	H2S content	3%	
TEST	No. 3	Oil	0 cubic meters	0.0 cu. m./day
DATE	18-21 January 1985	Gas	0 cubic meters	0 cu. m./day
ZONE	Slave Point	Water	10.6 cubic meters	14.1 cu. m./day
INTERVAL	2292-2301 mKB	Salinity	70437 ppm	
HOURS ON	18 Hours	H2S content	1%	
TEST	No. 4	Oil	0 cubic meters	0.0 cu. m./day
DATE	21-22 January 1985	Gas	N/A cubic meters	0 cu. m./day
ZONE	Slave Point	Water	15.0 cubic meters	11.6 cu. m./day
INTERVAL	2292-2297 mKB	Salinity	65875 ppm	
HOURS ON	31 Hours	H2S content	3%	

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 4,1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Setting up camp

Work performed last 24 hrs:

Moved in camp

1 - D-7 Cat & 1 - D-6 Cat. Filling in sump.

B. Keir
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 5/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 19 people in camp

Moving in service rig.

Work performed last 24 hrs:

Rigged up camp and well site trailer. Medical supervisor arrived on lease. Cooks & camp personnel arrived on lease.

Cost - $66,876.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 6/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 22 people in camp

Running bit, scraper & tubing

Work performed last 24 hrs:

Moved in & rigged up Roll'n Rig #10. Cut off casing. Installed tubing spool & BOP;s. Mixed 150 bbls H_2O with KCl to weight of 9.0#/gal. Pressure tested blind rams to 21,000 kPA (3000 psi) Held OK. Ran in hole with 6¼" bit, 2" casing scraper & 75 jts 73mm tubing.

Cost - $82,866.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 7/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -5° C 26 people in camp
Waiting on power swivel and collars

Work performed last 24 hrs:

Ran into 1680 mKB with 174 jts tubing, bit & scraper. Unable to get deepeer. Pulled out of hole. Layed down bit & scraper Ran in with 174 jts tubing. Tagged plug at 1680 mKB. Determined stage collar in hole. Circulated hole to 9.0#/gal KCl water. Pulled out of hole. Waiting on collars, bit & power swivel.

Cost - $93,377.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7
TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 8/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 26 people in camp

Trip out of hole

Work performed last 24 hrs:

Wait on swivel & collars till noon. Made up bottom hole assembly and ran as follows:

6" bit - bit sub - crossover sub

3 - 3½" drill collars - crossover sub

70.3mm tubing

Tagged cement @ 1665 mKB. Rigged up power swivel and drill to 1678.6 mKB. Ran in to bottom @ 2493.46 mKB (pipe tally). Displaced hole to 9.0#/gal KCl water. Circulated to 2494 mKB Tripping out of hole to log.

Cost - $127,024.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 9/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 27 people in camp

Logging

Work performed last 24 hrs:

Finished out of hole with bit. Rigged up Computalog & RAN CBL, GR, N, CCL logs from 2486.2 mKB to 1400 mKB. Neutron tool would not operate. Ran in with 6¼" bit, casing scraper, 3 - 3½" drill collars & 73mm tubing to PBD. Rigged up power swivel & drill to 2488.6 mKB (logger's depth) Tripped out of hole. Rigged up Computalog to relog to obtain Neutron log. This run tool would not work. Ran 3rd tool. This tool is operating.

Cost - $151,647.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: Jan. 10/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 28 people in camp

Circulate Hole & Condition Mud

Work performed last 24 hrs:

Ran Neutron-Gamma Ray-CCL log from PBD to 1400 mKB. Perf intervals 2488.5 - 2484.5 mKB. 4" casing gun 7 spm. Rigged out Computalog

Rigged up and ran tubing and packer as follows:

2 jts 73mm tubing, 1 Site Omegamatic 7" packer,

1 bomb hanger, 1 - 73mm PSN, 247 jts - 73mm tubing.

Tubing bottom @ 2487.5 mKB, packer @ 2468.5 mKB. Set packer and pressure tested annulus to 7000 kPa. OK. Rigged up Dowell and acidized with 2500 litres 20% inhibited HCl acid. Displaced acid to perfs & washed 3 washes of 100 litres per wash every 10 minutes. Holding max. back pressure of 7000 kPa. No bleed off to formation. Attempted to squeeze. Increased to 10,000 kPa. No feed to formation. A gradual increase on surface pressure to 14,000 kPa was noticed without pumping. Tore out Dowell. Hooked up Otis & flowed back well. Recovered 12.8 bbls KCl water in 2 hrs. Well died. Hooked up Dowell & attempted to squeeze. Filled hole with 8 bbls KCl water. Pressure up to 8000 kPa. Found communication between tubing & annulus. Backwashed acid from tubing string. Circulated hole and mixed KCl to circulating fluid.

Cost - $195,480.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 11, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -20°C 33 people in camp

Attempt to pressure test packer

Work performed last 24 hrs:

Mixed 70 bbls KCl water to 9.0#/gal. Circulated hole to remove gas pockets & obtain consistent fluid weight. Shut in well for observation. Well dead. Pulled out of hole with tubing & packer. Found seals in bypass of packer damaged.

Ran packer #2 as follows:

2 jts - 73mm tubing, 1 - 7" Site omegamatic packer, 1 - collar stop, 1 - 73mm PSN, 1 - 73mm x 4' pup, 256 jts 23mm tubing, 2 - 10' x 73mm pups, 1 - 6' x 73mm pup, 1 jt - 73mm tubing.

Tubing landed @ 2487 mKB. Attempted to pressure test annulus communications. Reset packer 5 times. Unable to obtain pressure test. Tripped out of hole. Ran 3rd packer same string as above less collar stop. Attempted to pressure test annulus. Would not hold. Will obtain tubing plug & pressure test tubing prior to pulling out of hole.

Cost - $206,833.

F. Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 12/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 28 people in camp
Tripping out of hole

Work performed last 24 hrs:

Well shut in. Waiting on tubing plug to arrive on location. Arrived @ 1:00 A.M. Ran tubing plug by Otis to 845 mKB. Restriction in tubing. Set plug & pressure tested tubing to 1000 psi, 7000 kPA. Held OK. Pulled tubing to plug. Found crimped jt. Layed down same. Reran plug to 2251 mKB. Found restriction. Set plug. Pressure tested to 1000 psi, 7000 kPA. Held OK. Tripping out to plug.

Cost - $219,988

Dome j
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 13,/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -16°C 28 people in camp

Swabbing

Work performed last 24 hrs:

Pulled tubing to tight spot @ 2251 mKB. Recovered plug & layed down damaged joint. Ran plug into seating nipple. Attempted to pressure test. Unable to do so. Found 2 jts immediately below 2251 m marked with numerous holes. Pulled out of hole & layed down remainder of tubing. Rigged to run tubing & packer in as follows:

2 jts - 73mm tubing, 1 - 2" Omegamatic packer

1 - 73mm PSN, 209 jts - 73mm tubing.

Landed @ 2487.5 mKB. Set packer. Pressure tested annulus to 17,500 kPA. Held OK. Rigged to swab. Pulled 11 swabs. Recovered 46 bbls KCl water. Well dry. Gas to surface too small to measure.

Cost - $242,084.

Domeij
Wellsite Supervisor

Attn: L Brandon

NSM RESOURCES LTD.
300 - 555 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 14/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -15°C 30 people in camp
Running dump bailer

Work performed last 24 hrs:

Pulled 1 swab. Recovered ½ bbl. Followed by trace of gas too small to measure. Rigged Dowell to acidize with 1500litres of 15% HCl + 1% A-200 + .5% W-35 + 9 Kg/m L-41 + .2% F-75 followed by 5700 litres of KCl H_2O (35.85 bbls). Started squeeze @ 11:47 hrs with 14,000 kPA increasing to 28,000 kPA. Annulus pressure held within 3500 kPA of injection pressure. Injected 316 litres (1.9 bbls) KCl water plus 254 litres (1.59 bbls) 15% acid into formation. 1815 hrs backwashed acid. Reset packer. Pressure tested annulus to 14,000 kPA. Held OK. Rigged out Dowell. Rigged to swab. Pulled 11 swabs 6.67 cu/m (42 bbls) KCl water. On Swab #12 rig air compressor blew up. Rig down 2½ hrs. Hooked up to Dowell's air compressor. Finished pulling Swab #12. Tubing built to 400 psi during repairs. Small gas blow too small to measure. Filled tubing with KCl water. Released packer. Circulated hole. Tripped out with tubing & packer. Ran Baker 178mm Model S bridge plug. Set @ 2480 mKB by Computalog.

Cost - $263,678.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69 (cont.)

Status as of 0800 hrs: January 15/85 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Flow Testing Well

Work performed last 24 hrs: _____

Time	Tubing Pressure	Flow Temp	Rate MCF/d	Cum Fluid Recovery	H_2S	Salinity
2120	1540 psi					
2200	1484 "		1,406,823	13.33 bbls		
2300	1392 "	63°	2,710,240	21.13 "		
2400	1270 "	64°	2,533,392			287,000 ppm
100	982 "	63°	2,493,941	42.27 "	2500 ppm	
200	940 "	61°	2,160,855	46.64 "		231,000 "
300	920 "	59°	2,100,919	49.62 "	"	
400	870 "	61°	2,034,871	53.30 "	"	225,000 "
500	775 "	57°	1,804,419	54.67 "	"	196,000 "
600	720 "	57°	1,640,024	56.97 "	"	196,000 "
700	680 "	57°	1,548,725	59.27 "	"	196,000 "

Cost - $292,861.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 16/85 (Todays date)

Tubing Pressure: 1750 psig, Casing Pressure: _____

Operation: Temp -20°C 23 people in camp

Flow Testing

Work performed last 24 hrs:

Time	Tubing Pressure	Flow Temp.	Rate MCF/D	Cum.Fluid Recovery
800	644	55°	1,494,303	62.26
850	Reduce to 16/64 choke			
900	685	55°	864,956	62.26
1000	798	55°	868,526	62.26
1030	Shut well in for buildup.			

Ran pressure gradient. Stopped at 1000' intervals for five minutes and at TD for 10 minutes. Set collar stop at 2447 mKB. Ran and set tandem recorders with 180 hr clocks. Shut in well at 1700 hrs. Tubing pressure 1540 psig. At 0400 hrs opened well for a modified isochromal test.

400	1790	Opened well on 10/64 choke		
600	1640	41°	688,272	
	Shut well in			

Cost - $310,876.

Domeij
Wellsite Supervisor

Attn: L V. Brandon

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 17/85 (Todays date)

Tubing Pressure: 437 psig, Casing Pressure: 0

Operation: -20°C 24 people in camp
Flow Testing

Work performed last 24 hrs:

Time	Choke Size	Tubing Pressure	Wellhead Temp.	Rate SCF/D	Water Produced
1000	14/64	1435	46	1,400,286	1.38
	Shut well in				
1200	Opened well on final rate				
1400	18/64	1060	50	1,856,212	0.9
1600	"	820	48	1,401,325	0.

Time	Tubing Pressure	Wellhead Temp.	Rate	H_2S	Water Prod.	Salinity
1800	650	46	999,108	3%	.46	73,200
2000	590	46	861,111	3%	0	119,000
2200	575	46	923,253	3%	0	144,000
2400	540	46	747,796		0.47	163,000
0200	517	45	752,185		0.92	170,000
0400	485	45	738,814		1.83	173,000
0600	463	45	744,892			173,000
0700	440	45	753,674		2.3	173,000

Cost - $323,468.

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 18, 1985 (Todays date)

Tubing Pressure: 1250, Casing Pressure: -

Operation: Temp -20°C 24 people in camp

Shut in for pressure build up

Work performed last 24 hrs:

Time	Tubing Pressure	Wellhead Temp	Rate MCF/D	Water Produced	H^2S	Salinity
0.800	428 PSI	45°	680,387	.45 bals	3%	160,000 PPM
0.900	425 PSI	45°	679,289	1.84 bals	3%	170.000 PPM

Shut in at 9:00 a.m.

Hours	Pressure Build-up	Hours	Pressure Build-up	Hours	Pressure Build-up
9.05	520 PSI	1400	902 PSI	0200	1168 PSI
910	545 "	1500	929 "	0300	1181 "
915	565 "	1600	960 "	0400	1196 "
930	602 "	1700	985 "	0500	1211 "
945	628 "	1800	1010 "	0600	1225 "
1000	650 "	1900	1033 "	0700	1235 "
1030	695 "	2000	1053 "	0800	1250 "
1100	735 "	2100	1073 "		
1130	768 "	2200	1092 "		
1200	799 "	2300	1111 "		
1230	839 "	2400	1132 "		
1300	853 "	0100	1150 "		

Cost 339,991

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 19, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -35°C 28 people in camp

Pressure testing packer

Work performed last 24 hrs:

Well shut in 0800 to 0900 for pressure build up. Rig up otis & retrieve pressure recorders pressure tested kill line & BOP's. Kill well w/9.1#gal. KCL water. Pull packer loose & tried to reversecirc. Well on vacum Trip out of hole & fill hole periodically Rig up computalog and run 178mm bridge plug set @ 2430 m KB Ran 10m cement plug with dump bailer on bridge plug pumped 40 brls. KCL water Mixed additional KCL water to 9.0# gal Filled hole with 2 brls KCL water pressure tested bridge plug to 7000 KPA Held OK Perforated interval 2292-2301 m KB 4" casing gun 7 SPM ran tubing & packer as follows 2 jts 73 mm tubing 1-7" site Omegamatic packer 1-73 mm PSN 1-73mm x 8' PHP 240 JTS 73mm tubing Landed packer @ 2280.87m KB Tail pipe landed @ 2301mKB

Cost 432,549

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 20, 1985 (Todays date)

Tubing Pressure: _____ Casing Pressure: _____

Operation: Temp -25°C 24 people in camp

Swabbing

Work performed last 24 hrs:

Pressure tested packer to 14000 KPA for 10 min held ok. Rig up Dowell and Acidize w/2500 liters 20% HCL acid + 1.2% W35 + 15Kg/L41. Started acid @ 10.25 a.m. acid on perfs 10.53 a.m. washed 1500 liters past perfs in 300 liter stages every 5 minutes. Max. wash pressure 2000 KPA bled off to 6000 KPA Closed circ. port squeezed 1000 liters to perfs @ rate of 100 liters/min. @ max. pressure of 18,500 KPA Switched to annulus opened circ. port and squeezed to formation 1500 liters @ rate of 150 liters/min @ 18,500 KPA rig out Dowell Rig to swab Recovered 61.5 brls in 18 hrs Hole dry Pulling 1 swab per hour over last 12 hrs. Tubing volume & acid squeezed 58.7 brls. New fluid recovered 2.78 brls. salinity 150,000 PPM PH-4 H^2S 1% No gas No Hydrocarbons

Cost - 453,466

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 21, 1985 (Todays date)

Tubing Pressure: 0, Casing Pressure: 0

Operation: Temp -35°C 28 people in camp

Swabbing

Work performed last 24 hrs:

Pulled 1 swab recovered 1 brl H^2O salinity 150,000 PPM Rig up & kill well w/KCL water. Pull tubing & packer rig up computalog set bridge plub @ 2290mKB Pressure test packer to 7000 KPA 10 min held ok. Perforate interval 2282-2287mKB 4" Gun 6PSM. Rig up ran tubing & packer as follows - 2 jts - 73mm tubing 1-7" Omega matic packer 1-73mm PSN 1-73mm x 8' pup 235 jts-73mm tubing 1-73mmx8' pup 1-73,, x 10' pup 1jt - 73mm Tubing 1-73 mm x 4' pup Packer set @ 2270mKB TBG Bottom @ 2289mKB Pressure test annulus & packer to 10,000 KPA held ok. Acidized by Dowell w/3000 liters 20% HCL + 1.2% A-200 + 0.2% W35 + 18kg L-41 Displace acid to bottom @ 2254 PM wash 1000 liters in 9 stages every 5 min. Max. pressure 19,000 KPA bled off to 18,500 KPA closed circ. port in packer squeezed 2000 liters to formation @ 100 liters/min. @ 21,000 KPA Opened circ. port & squeezed acid from annulus @ rate of 150 liters/min @ 20,000 KPA Closed circ. post & rigged to swab. Pulled 4 swabs rec 55 brls gas to surface @ 0445 am 400 PSI Tubing + acid volume = 62.4 brls. Flowed well thru 21/64 choke for 10 minutes tubing pressure dropping opened well to 45/64 choke well dead @ 6.45 am Total fluid produced 89.2 brls.

Salinity 220,000PPM H^2S 1%

Pulled 1 swab fluid level 4000'

Total fluid recovered 96.7 brls.

Cost 480,661

Dowell
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 22, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -5°C 24 people in camp

Swabbing & Testing

Work performed last 24 hrs:

0745 A.M.	Swab #1 2.76 bbls.
0820	Swab #2 Fluid Level 4000', Salinity 148,000 ppm 3.68 bbls
0900	184# tubing. Opened to test equipment
0910	172,000 MCF/D
0915	100,000 MCF/D
0927	Well dead
0945	Swab #3 F.L. 4000', 7.35 bbls recovered, Salinity 109,000 ppm
1015	Swab #4, F.L. 5000', 6.73 bbls recovered, Salinity 100,000 ppm
1030	30# psi, 92,000 MCF/D, Temp +2°C, 1" choke
1100	2# psi, 18,500 MCF/D, Temp +2°C,
1120	Swab #5, F.L. 5500', 5.05 bbls rec. Salinity 91,000 ppm
1130	12# psi, 147,000 MCF/D
1145	2# psi Temp 3°C, 54,200 MCF/D
1200	Well dead.
1215	Swab #6, F.L. 5.51 bbls, Salinity 91,000 ppm
1230	6 psi, Temp 4°C, 82,200 MCF/D
1242	Well dead
1315	Swab #7, F.L. (gassy, unable to tell), 3.68 bbls rec. 83,900 ppm
1330	10 psi, Temp 9°C, 125,000 MCF/D

Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 22, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Swabbing & Testing

Work performed last 24 hrs:

1345	Well dead
1413	Swab #8, F.L. 2.99 bbls rec., 82,100 ppm
1415	0 psi
1430	5 psi, Temp 9°C, 102,000 MCF/D
1445	2 psi, Temp 9°C 43,000 MCF/D
1530	Swab #9, 4.80 bbls rec. Salinity 83,900 ppm
1545	4 psi, 9°C, 88,000 MCF/D
1600	Well dead
1619	Swab #10, 2.76 bbls, 72,300 ppm
1630	5 psi, 7°C, 94,000 MCF/D
1645	0 psi, 7°C, 18,400 MCF/D
1700	0 psi, 25,500 MCF/D
1722	Swab #11, 3.68 bbls 67,800 ppm
1730	7 psi, 8°C, 111,700 MCF/D
1745	2 psi, 6°C, 52,000 MCF/D
1800	0 psi, 5°C, 24,500 MCF/D
1826	Swab #12 3.28 bbls. 61,100 ppm
1830	8 psi, 3°C, 111,300 MCF/D
1845	0 psi, 4°C, 27,900 MCF/D
1905	Swab #13 .918 bbls 57,100 ppm
1930	6 psi, 5°C, 87,000 MCF/D
1945	0 psi, 6°C, 19,400 MCF/D

Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 22, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Swabbing & Testing

Work performed last 24 hrs:

2000	Swab #14	.459 bbls	60,700 ppm
2015	0 psi		
2030	7 psi, 6°C,	96,000 MCF/D	
2100	Swab #15	3.22 bbls	57,100 ppm
2130	10 psi, 7°C	96,000 MCF/D	
2145	0 psi, 5°C,	39,000 MCF/D	
2200	Swab #16	3.22 bbls	55,400 ppm
2230	12 psi, 8°C,	43,100 MCF/D	
2245	0 psi, 6°C,	23,700 MCF/D	
2300	0 psi 3°C,	23,700 MCF/D	
2305	Swab #17	3.22 bbls	55,400 ppm
2330	8 psi, 7°C	94,000 MCF/D	
2345	0 psi, 5°C,	36,200 MCF/D	
2400	o psi, 2°C	16,500 MCF/D	
2420	Swab #18	1.72 bbls	55,400 ppm
0040	Swab #19	1.75 bbls	55,400 ppm
	Flowing to tank, no readings		
0115	Swab #20	No recovery	
0130	Shut in for build-up		
0145	Tubing 55 psi		
0200	90 psi		
0205	105 psi		

Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 22, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Swabbing & Testing

Work performed last 24 hrs:

0210	Swab #21	.46 bbls	55,400 ppm
0230	8 psi, 7°C,	114,000 MCF/D	
0245	2 psi, 4°C	34,700 MCF/D	
0300	0 psi,	21,500 MCF/D	
0310	Swab #22	1.37 bbls	51,800 ppm
0330	11 psi, 8°C	114,500 MCF/D	
0345	0 psi, 5°C	33,300 MCF/D	
0400	0 psi, 3°C	15,200 MCF/D	
0410	Swab #23	3.22 bbls	46,400 ppm
0430	15 psi 9°C	90,000 MCF/D	
0445	7 psi 6°C	30,900 MCF/D	
0500	0 psi 2°C	23,100 MCf/D	
0510	Swab #24	.91 bbls	46,400 ppm
0530	0 psi 6°C	71,500 MCF/D	
0545	0 psi 4°C	13,000 MCF/D	
0600	0 psi 3°C	13,600 MCF/D	
0610	Swab #25	2.06 bbls	42,900 ppm
0630	20 psi 7°C	129,000 MCF/D	
0645	0 psi 5°C	56,500 MCF/D	
0700	0 psi 5°C	31,000 MCF/D	
0727	Swab #26	3.68 bbls	48,200 ppm
0730	0 psi 5°C	89,000 MCF/D	

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 22, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -5°C 24 people in camp

Work performed last 24 hrs:

Took 26 swabs. Total water produced 78.48 BBls. Salinity stabilized at 48000 ppm. Gas production rate averaged 50 MCF/D containing 1% H^2S

Domeij
Wellsite Supervisor

NSM RESOURCES LTD.
300 - 555 - 4th Ave. S.W.
CALGARY, ALBERTA T2P 3E7

TELEPHONE (403) 261-5790

DAILY WORKOVER AND PRODUCTION REPORT

Well Name and Location: NSM Arrowhead G-69

Status as of 0800 hrs: January 23, 1985 (Todays date)

Tubing Pressure: _____, Casing Pressure: _____

Operation: Temp -10°C 21 people in camp

Moving out service rig

Work performed last 24 hrs:

Pulled 1 swab recovered 1.4 brls H^2O recovered gas & water samples Killed well Circulated hole to inhibited KCL water Pull out of hole w/tubing & packer Lay down tubing Run baker 7" bridge plug by Computalog Set @ 2200 MKB Run 30m cement plug on top off bridge plug w/dump baker Fill hole w/inhibited water & top 150' w/deisel fuel Pressure tested to 7000 KPA Held ok. Remove BOP's install well head Pressure tested to 7000 KPA Held ok. Tear out rig Rig released @ 0100 hrs. January 23, 1985

Cost - 526,671

Domeij
Wellsite Supervisor

N.S.M. RESOURCES LTD.

G-69

KEG RIVER ZONE

85JAN15

N.S.M. RESOURCES LTD.

G-69

SUBSURFACE PRESSURE SURVEY

CO. ADDRESS:	300-555 4 AVE. S.W. CALGARY ALTA.
DATE OF SURVEY:	85JAN15
WELL NAME:	N.S.M. ARROWHEAD
FIELD & POOL:	KEG RIVER ZONE
STATUS:	GAS
TYPE OF SURVEY:	STATIC GRADIENT
SURVEY COMPANY:	OTIS ENG. CO. LTD.
CASING FLANGE ELEVATION:	496.1 m
KELLY BUSHING ELEVATION:	502.01 m
PRODUCING THROUGH:	73MM TUBING
PRODUCING INTERVAL(S):	2452.09-2457.09 mCF
MPP:	2454.59 mCF
POOL DATUM:	N/A mSUB-SEA
DATUM DEPTH:	N/A mCF
SHUT-IN DATE:	N/A
TUBING PRESSURE:	8030 kPa (DWT)
CASING PRESSURE:	0 kPa (DWT)
SURFACE TEMP:	-5 C
ON BOTTOM:	1330 HRS.
OFF BOTTOM:	1340 HRS.
UPPER-LOWER GAUGE DEPTH:	178cm
RUN DEPTH:	2460 mCF
RUN DEPTH TEMP:	136 C
GRADIENT:	10 kPa/m
PRESSURE AT RUN DEPTH:	13319 kPa
PRESSURE AT MPP:	13263 kPa
NOTE:	DEPTHS FROM LOWER GAUGE

	UPPER GAUGE	LOWER GAUGE
ELEMENT SERIAL #:	32544	32547
RANGE:	27580.0 kPa	27580.0 kPa
CLOCK RANGE:	3 HRS.	3 HRS.
MODULUS:	545.9 kPa/mm	551.3 kPa/mm
INTERCEPT:	40.4 kPa	67.3 kPa
LAST CALIBRATION:	84SEP13	84DEC17
THEORETICAL ACCURACY:	69.4 kPa	70.2 kPa

COMMENTS: S.F AT END: TOP=9558 kPa BOTTOM=9520 kPa

OPERATOR: DON KLEISINGER
REPORT SENT ON: 85JAN21
TO THE ATTENTION OF: FI NADIR

INTERPRETATION BY: OTIS ENG. CO. LTD.
#5-7493 49 AVE. CRES.
RED DEER, ALBERTA
P.O. BOX 206, T4P 1X6
PH: (403) 342-7796
ATTN: GEORGE SLAUENWHITE

N S.M. RESOURCES LTD.

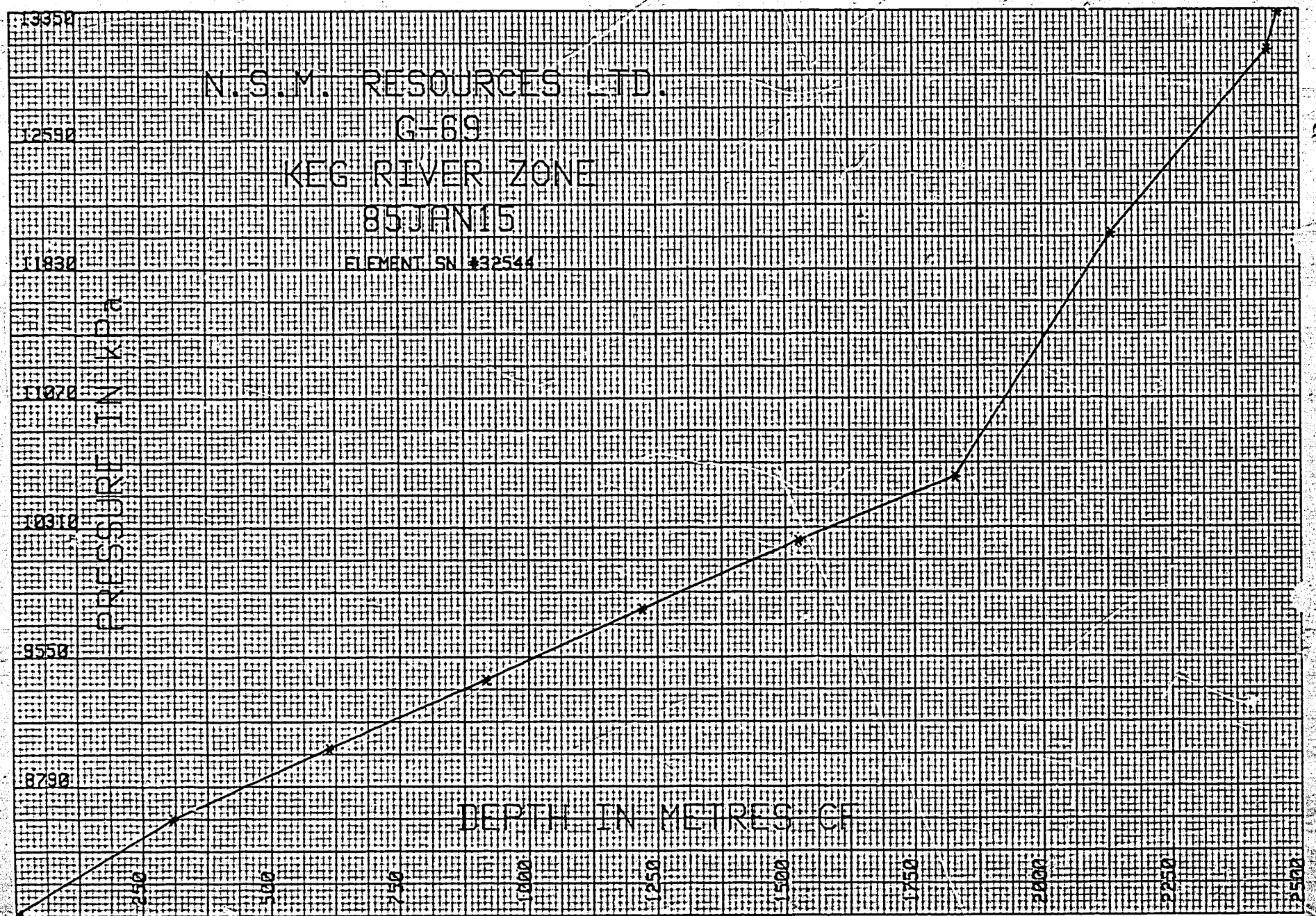
G-69

SUBSURFACE PRESSURE SURVEY

85JAN15

TIME				UPPER GAUGE				LOWER GAUGE				REMARKS
DAY	ARRV.	DEPT.	DEPTH	DEFLECTION	P-PC	CORRECTED	GRADIENT	DEFLECTION	P-PC	CORRECTED	GRADIENT	
			mCF	mm	kPa	kPa	kPa/m	mm	kPa	kPa	kPa/m	
15	1157	1202	0.00	14.605	18.0	8030.6	0.0	14.338	32.1	8804.3	0.0	SURFACE FLEX
15	1215	1220	304.80	15.621	19.2	8586.3	1.8	15.316	36.1	8547.4	1.8	
15	1224	1229	609.60	16.383	20.0	7083.1	1.4	16.066	39.2	8763.5	1.4	
15	1234	1239	914.40	17.120	20.9	9486.0	1.3	16.828	42.3	9386.7	1.4	
15	1244	1249	1219.20	17.882	21.7	9822.9	1.4	17.539	45.2	9781.7	1.3	
15	1254	1259	1524.80	18.618	22.6	10225.8	1.3	18.237	48.1	10169.7	1.3	
15	1304	1309	1828.80	19.304	23.4	10600.7	1.2	18.936	50.9	10537.6	1.3	
15	1314	1319	2133.60	21.933	26.4	12038.9	4.7	21.527	54.6	11989.7	4.7	
15	1324	1329	2438.40	23.701	28.6	13115.7	3.5	23.495	56.9	13075.2	3.6	
15	1330	1340	2460.00	24.308	29.1	13338.8	10.3	23.901	55.8	13299.3	10.4	ON/OFF BUTTON

OTIS


N.S.M. RESOURCES LTD.
G-69
KEG RIVER ZONE
85JAN15
ELEMENT SN #32544
PRESSURE - kPa
13350
12590
11830
11070
10310
9550
8790
250
500
750
1000
1250
1500
1750
2000
2250
2500
DEPTH IN METRES GR

N.S.M. RESOURCES LTD.

G-69

KEG RIVER ZONE

85JAN15

N.S.M. RESOURCES LTD.

G-69

SUBSURFACE PRESSURE SURVEY

CO. ADDRESS: 300 565-4 AVE. S.W. CALGARY ALTA.
DATE OF SURVEY: 85JAN15 TO 85JAN18
WELL NAME: N.S.M. ARROWHEAD
FIELD & POOL: KEG RIVER ZONE
STATUS: GAS
TYPE OF SURVEY: FLOW & BUILD-UP
SURVEY COMPANY: OTIS ENG. CO. LTD.
TEST COMPANY: OTIS ENG. CO. LTD.

RUN DEPTH: 2447 mCF
MAX TEMP AT RUN DEPTH: 110 C
CASING FLANGE ELEVATION: 496.1 m
KELLY BUSHING ELEVATION: 502.01 m
PRODUCING THROUGH: 73MM TUBING
PRODUCING INTERVAL: 2452.09-2457.09 mCF
MIDPOINT OF INTERVAL: 2454.59 mCF
POOL DATUM: N/A mSUB-SEA
DATUM DEPTH: N/A mCF

	UPPER GAUGE	LOWER GAUGE
ELEMENT SERIAL #:	32544	32547
CLOCK RANGE:	180 HRS.	180 HRS.
LEAD SCREW:	S.P.	S.P.
RANGE:	27580.0 kPa	27580.0 kPa
MODULUS:	546.5 kPa/mm	551.4 kPa/mm
INTERCEPT:	57.7 kPa	94.8 kPa
LAST CALIBRATION:	85JAN04	85JAN04

COMMENTS: CLOCK STOPPED ON TOP RECORDER DURING FINAL BUILD-UP
COMMENTS: (SEE PRINT OUT FOR EXACT TIME) REMAINDER OF TOP
COMMENTS: CHART IS ESTIMATED PRESSURES.

OPERATOR: DON KLEISINGER
REPORT SENT ON: 85FEB01
TO THE ATTENTION OF: FI NADIR

INTERPRETATION BY: OTIS ENG. CO. LTD.
#5-7493 49 AVE. CRES.
RED DEER, ALBERTA
P.O. BOX 206, T4P 1X6
PH: (403) 342-7796
ATTN: GEORGE SLAUENWHITE

N.S.M. RESOURCES LTD.

G-69

SUBSURFACE PRESSURE SURVEY

85JAN15

TIME			UPPER GAUGE			LOWER GAUGE			REMARKS
DAY	24HR.	DELTA	DEFLECTION mm	P-PC kPa	CORRECTED kPa	DEFLECTION mm	P-PC kPa	CORRECTED kPa	
15	1700	0.00	26.924	34.8	14805.9	26.619	70.4	14842.8	ON BOTTOM
15	1720	.33	27.087	34.8	14894.8	26.680	70.3	14876.3	
15	1720	0.00	27.087	34.8	14894.8	26.680	70.3	14876.3	SHUT-IN
15	1735	.25	27.175	34.8	14943.3	26.774	70.1	14920.0	
15	1750	.50	27.381	34.8	15055.7	26.914	69.9	15004.8	
15	1805	.75	27.658	34.7	15207.0	27.206	69.3	15165.3	
15	1820	1.00	27.658	34.7	15207.0	27.343	69.1	15240.7	
15	1835	1.25	27.785	34.7	15276.4	27.343	69.1	15240.7	
15	1850	1.50	27.950	34.7	15366.5	27.460	68.9	15304.9	
15	1905	1.75	28.077	34.6	15435.9	27.625	68.6	15395.7	
15	1920	2.00	28.186	34.6	15495.6	27.760	68.4	15469.7	
15	1950	2.50	28.435	34.6	15631.6	28.031	67.9	15619.8	
15	2020	3.00	28.687	34.5	15769.0	28.268	67.5	15748.9	
15	2120	4.00	29.098	34.5	15993.8	28.760	66.6	16019.7	
15	2220	5.00	29.512	34.4	16219.9	29.152	65.9	16234.7	
15	2320	6.00	29.870	34.3	16415.6	29.520	65.3	16437.1	
16	20	7.00	30.190	34.1	16590.3	29.873	64.1	16630.6	
16	120	8.00	30.536	33.5	16778.4	30.170	62.4	16792.8	
16	220	9.00	30.823	32.9	16934.7	30.467	60.8	16955.1	
16	320	10.00	31.092	32.4	17081.3	30.764	59.2	17117.3	
16	400	10.67	31.306	32.0	17197.5	30.940	58.2	17213.0	
16	400	0.00	31.306	32.0	17197.5	30.940	58.2	17213.0	OPEN TO RATE # 1
16	403	.04	31.483	31.6	17294.3	31.092	57.4	17296.2	
16	415	.25	30.861	32.8	16955.4	30.500	60.6	16973.1	
16	430	.50	30.432	33.7	16721.7	30.112	62.7	16760.9	
16	445	.75	30.112	34.3	16547.4	29.812	64.4	16597.3	
16	500	1.00	29.883	34.3	16422.5	29.528	65.2	16441.3	
16	530	1.50	29.472	34.4	16197.7	29.086	66.0	16198.4	
16	600	2.00	29.113	34.5	16002.1	28.750	66.6	16014.1	
16	600	0.00	29.113	34.5	16002.1	28.750	66.6	16014.1	SHUT-IN RATE # 1
16	615	.25	29.807	34.4	16380.9	29.375	65.5	16357.6	
16	630	.50	29.977	34.3	16473.9	29.581	63.1	16470.6	
16	645	.75	30.089	34.3	16534.9	29.741	64.8	16558.5	
16	700	1.00	30.259	34.0	16627.6	29.901	63.9	16645.9	
16	730	1.50	30.539	33.5	16779.5	30.175	62.4	16795.6	
16	800	2.00	30.792	33.0	16918.1	30.429	61.0	16934.3	
16	800	0.00	30.792	33.0	16918.1	30.429	61.0	16934.3	OPEN TO RATE # 2
16	801	.02	30.955	32.7	17006.6	30.574	60.2	17013.3	
16	815	.25	29.098	34.5	15993.8	28.804	66.5	16043.4	
16	830	.50	27.795	34.7	15281.9	27.478	68.9	15314.7	
16	845	.75	27.140	34.8	14923.9	26.759	70.1	14919.6	
16	900	1.00	26.492	34.9	14570.1	26.167	71.2	14594.3	
16	930	1.50	25.273	35.1	13904.8	24.958	73.3	13929.8	
16	1000	2.00	24.455	35.3	13457.2	24.072	74.9	13442.6	
16	1000	0.00	24.455	35.3	13457.2	24.072	74.9	13442.6	SHUT-IN RATE # 2
16	1015	.25	26.218	35.0	14420.2	25.768	71.9	14375.2	
16	1030	.50	26.830	34.9	14754.6	26.439	70.7	14743.7	
16	1045	.75	27.351	34.8	15039.1	26.990	69.7	15046.7	
16	1100	1.00	27.724	34.7	15243.1	27.351	69.1	15244.9	
16	1130	1.50	28.181	34.6	15492.8	27.854	68.2	15521.3	
16	1200	2.00	28.494	34.6	15663.5	28.156	67.7	15687.4	
16	1200	0.00	28.494	34.6	15663.5	28.136	67.7	15687.4	OPEN TO RATE # 3

N.S.M. RESOURCES LTD.

G-69

SUBSURFACE PRESSURE SURVEY

85JAN16

TIME			UPPER GAUGE			LOWER GAUGE			REMARKS
DAY	24HR.	DELTA	DEFLECTION mm	P-PC kPa	CORRECTED kPa	DEFLECTION mm	P-PC kPa	CORRECTED kPa	
16	1203	.05	28.631	34.6	15738.4	28.278	67.4	15754.5	
16	1215	.25	24.976	35.2	13741.6	24.661	73.8	13766.5	
16	1230	.50	23.238	35.5	12792.5	22.990	76.8	12847.9	
16	1245	.75	21.613	35.8	11904.4	21.339	79.7	11940.4	
16	1300	1.00	20.460	36.0	11274.4	20.198	81.7	11313.6	
16	1315	1.25	19.561	35.5	10782.6	19.291	80.2	10812.1	
16	1330	1.50	18.628	34.4	10272.1	18.428	74.7	10330.4	
16	1345	1.75	17.953	33.5	9902.3	17.668	70.0	9986.9	
16	1400	2.00	17.351	32.8	9572.3	17.023	65.9	9547.1	
16	1430	2.50	16.330	31.6	9013.1	16.048	59.8	9003.2	
16	1445	2.75	15.954	31.1	8807.2	15.667	57.4	8790.7	
16	1500	3.00	15.799	30.9	8722.3	15.537	56.6	8718.5	
16	1515	3.25	15.560	30.2	8591.6	15.296	55.1	8583.9	
16	1530	3.50	15.491	30.6	8554.0	15.184	54.4	8521.6	
16	1545	3.75	15.235	30.3	8413.5	14.968	53.0	8401.2	
16	1600	4.00	15.192	30.2	8389.7	14.923	52.7	8375.7	
16	1615	4.25	14.935	29.9	8249.4	14.666	51.1	8232.6	
16	1630	4.50	14.958	29.9	8261.9	14.689	51.3	8245.4	
16	1645	4.75	15.306	30.3	8452.5	15.083	53.7	8464.5	
16	1653	4.89	16.002	31.2	8833.6	15.738	57.8	8830.4	
16	1700	5.00	15.509	30.6	8563.8	15.237	54.7	8551.3	
16	1715	5.25	14.956	29.9	8260.5	14.618	50.8	8205.7	
16	1730	5.50	14.689	29.6	8114.4	14.425	49.6	8098.1	
16	1745	5.75	14.549	29.4	8037.9	14.298	48.8	8027.2	
16	1800	6.00	14.481	29.4	8040.4	14.237	48.4	7993.2	
16	1830	6.50	14.412	29.3	7962.8	14.155	47.9	7947.9	
16	1900	7.00	14.318	29.2	7911.3	14.061	47.3	7895.5	
16	2000	8.00	14.252	29.1	7875.2	14.008	47.0	7865.8	
16	2100	9.00	14.158	29.0	7823.7	13.904	46.3	7807.7	
16	2200	10.00	13.955	28.7	7712.4	13.693	45.0	7690.1	
16	2300	11.00	13.675	28.4	7559.4	13.424	43.3	7540.8	
16	2400	12.00	13.462	28.1	7442.5	13.236	42.1	7435.1	
17	100	13.00	13.312	27.9	7360.4	13.086	41.2	7351.6	
17	200	14.00	13.132	27.7	7261.7	12.896	40.0	7245.3	
17	300	15.00	12.911	27.5	7140.6	12.680	38.6	7124.9	
17	400	16.00	12.728	27.2	7040.5	12.522	37.6	7037.1	
17	500	17.00	12.504	27.0	6918.1	12.268	36.1	6895.5	
17	600	18.00	12.370	26.8	6844.3	12.159	35.4	6834.6	
17	700	19.00	12.228	26.6	6766.4	11.979	34.2	6734.0	
17	800	20.00	12.050	26.4	6669.0	11.781	33.0	6623.5	
17	900	21.00	11.890	26.2	6581.4	11.669	32.3	6561.2	
17	900	0.00	11.890	26.2	6581.4	11.669	32.3	6561.2	SHUT-IN FOR FINAL BUILD-UP
17	915	.25	13.165	27.8	7279.8	13.038	40.8	7320.4	
17	930	.50	13.942	28.7	7705.4	13.810	45.7	7755.3	
17	945	.75	14.823	29.8	8188.2	14.633	50.9	8214.2	
17	1000	1.00	15.326	30.4	8463.6	15.180	53.8	8474.8	
17	1030	1.50	16.114	31.3	8894.8	15.908	58.9	8925.3	
17	1100	2.00	16.787	32.1	9263.5	16.507	62.7	9259.6	
17	1130	2.50	17.262	32.7	9523.6	17.028	65.9	9550.8	
17	1200	3.00	17.681	33.2	9753.2	17.437	68.5	9778.0	
17	1230	3.50	18.047	33.7	9953.5	17.841	71.0	10003.2	
17	1300	4.00	18.438	34.1	10167.7	18.222	73.4	10215.7	

N.S.M. RESOURCES LTD.

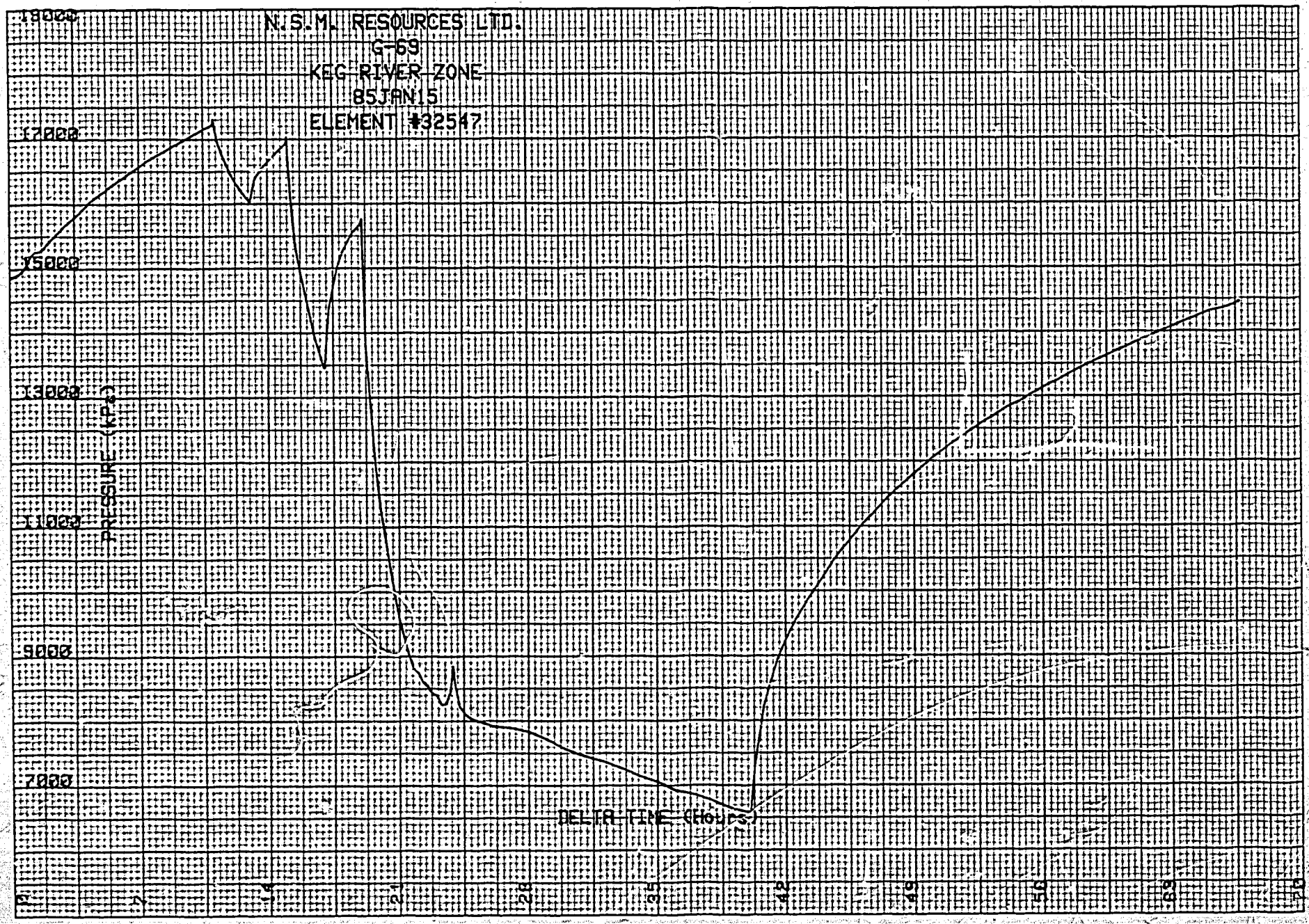
G-69

SUBSURFACE PRESSURE SURVEY

85JAN17

TIME			UPPER GAUGE			LOWER GAUGE			REMARKS
DAY	24HR.	DELTA	DEFLECTION mm	P-PC kPa	CORRECTED kPa	DEFLECTION mm	P-PC kPa	CORRECTED kPa	
17	1330	4.50	18.814	34.6	10373.6	18.600	75.8	10426.8	
17	1400	5.00	19.192	35.0	10580.9	18.941	78.0	10616.6	
17	1500	6.00	19.822	35.8	10925.9	19.568	81.9	10966.5	
17	1600	7.00	20.376	36.0	11228.7	20.130	81.8	11275.9	
17	1700	8.00	20.909	35.9	11520.1	20.643	80.9	11557.9	
17	1800	9.00	21.366	35.8	11769.8	21.095	80.1	11806.4	
17	1900	10.00	21.765	35.7	11987.7	21.534	79.4	12047.9	
17	2000	11.00	22.230	35.6	12241.6	21.923	78.7	12261.5	
17	2100	12.00	22.667	35.6	12480.3	22.286	78.0	12461.2	CLOCK STOPPED OR TOP RECORDER
17	2200	13.00	22.949	35.5	12634.3	22.619	77.4	12644.1	
17	2300	14.00	23.185	35.5	12763.4	22.934	76.9	12817.2	
17	2400	15.00	23.630	35.4	13006.2	23.205	76.4	12966.5	
18	100	16.00	23.879	35.4	13142.2	23.508	75.9	13132.7	
18	200	17.00	24.163	35.3	13300.4	23.774	75.4	13279.3	
18	300	18.00	24.364	35.3	13407.2	24.054	74.9	13432.8	
18	400	19.00	24.559	35.3	13514.1	24.303	74.5	13571.0	
18	500	20.00	24.834	35.2	13663.9	24.547	74.0	13703.7	
18	600	21.00	25.154	35.1	13838.8	24.770	73.6	13826.5	
18	700	22.00	25.481	35.1	14017.8	25.014	73.2	13960.5	
18	800	23.00	25.657	35.1	14113.5	25.230	72.8	14079.2	
18	900	24.00	25.872	35.0	14231.5	25.433	72.5	14190.9	
18	1000	25.00	26.078	35.0	14343.9	25.657	72.1	14313.7	
18	1100	26.00	26.241	35.0	14432.7	25.791	71.8	14387.7	
18	1140	26.67	26.355	34.9	14495.1	25.913	71.6	14454.7	OFF BOTTOM

OTIS


N.S.M. RESOURCES LTD.
G-69
KEG RIVER ZONE
85JAN15
ELEMENT #32547
18000
17000
15000
13000
11000
9000
7000
PRESSURE (kPa)
DELTA TIME (Hours)
0
14
21
28
35
42
49
56
63
70

DOWELL SCHLUMBERGER CANADA INC. — SERVICE REPORT

CUSTOMER NAME AND ADDRESS NSM Resources Ltd. 300, 555 – 4th Avenue S.W., Calgary, Alberta T2P 3E7	TREATMENT INVOICE NUMBER 29-14-7705 DS DISTRICT Fort St. John DS SUPERVISOR Bruce Weir TYPE SERVICE Acid	DATE January 09, 1985 DS OUTPOST Fort Nelson CUSTOMER REPRESENTATIVE B. Weir, F. Domeij SERVICE NAME Wash & Squeeze
SERVICE INSTRUCTIONS, REMARKS, MATERIALS To supply men, equipment and 2500 litres of 20% HCl + 10 litres A-200 + 12.5 litres W35 + 5 litres F-75, 15 kg. L-41 to wash and squeeze above location as instructed.	WELL NAME NSM Arrowhead LOCATION G-69 FORMATION Keg River TYPE OF WELL OIL ☐ GAS ☐ INJ/DISP. ☐ OTHER ☐	PROVINCE N.W.T. RIG NAME Rollin 10 AGE OF WELL NEW ☒ REWORK ☐

PACKER TYPE	PACKER DEPTH	TOTAL DEPTH	BHST/BHCT
Site	2468 m	2489 m	

FLOAT/STG. TYPE	FLOAT/STG. DEPTH	PERFORATED INTERVALS TOP	BOTTOM	NO. OF HOLES
		—		

TOTAL FLUID INJECTED OIL	WATER 2.5 m^3	AVG. PRESSURE 10 MPa	CEMENT TEMPERATURE	LINER SIZE	FROM-TO	—	
ACID 2.5 m^3	CEMENT	MAX. INJ. PRESSURE 10 – 5 MPa	WATER TEMPERATURE	CASING SIZE 178 mm	TUBING SIZE	—	
OTHER (SPECIFY)		FINAL INJ. PRESSURE 17 MPa	SLURRY TEMPERATURE	CASING DEPTH 2489 m	TUBING DEPTH 2488 m	—	
AVG. INJECTION RATE 0.23 m^3/min		INST. SHUT IN PRESSURE 17 MPa	RETURNS TEMPERATURE	CASING/ANN. VOL. 0.3 m^3	TUBING VOLUME 7.5 m^3	—	
MAX. INJECTION RATE 0.25 m^3/min		WIPER PLUG PRESSURED TO	AVG. SLURRY DENSITY FILL	ARRIVE LOCATION 1400 Jan 9/85		—	
—			TAIL-IN	LEAVE LOCATION 0530 Jan 10/54		—	

TIME	PRESSURE TBG MPa	PRESSURE CSG MPa	INJ. RATE m^3/min	VOLUME STAGE m^3	VOLUME CUMM. m^3	CHART REF.	SERVICE LOG DETAIL	PAGE OF
1650							Hold Safety Meeting	
1658	50						Pressure Test	
1703	–	–	0.25	2.5			Start Pump Acid	
1713	4	1	0.22	5.3	2.5		Send Away, Start KCl Water	
1737	16	3.5			7.3		Stop Pump (Acid across Perfs) Wash #1	
1749	4	4	0.03	0.1			Bleeddown Press & Start Pump Wash #2	
1752	4.5	4			7.9		Stop Pump	
1302	4.5	4.5	0.05	0.1			Bleeddown Press & Start Pump Wash #3	
1804	6	5			8.0		Stop Pump	
1820	6	6		–			Set Packer and Pump Up Press to Maximum	
1820	9	–			8.0		Stop Pump	
1957	12	–	–	–			Bleed off treating iron	
2001	10.5	–			8.6		Open Up Well to Recorder	
247	17	–		–			Bleed Off Treating Iron & Rig Down	
0300	–	–	0.1	0.5			Start Squeeze (found communication)	
0305	8.5	3.5			8.0		Stop Squeeze (Set Up Rig to Backwash Acid out)	

LBF 4/82

DOWELL SCHLUMBERGER CANADA INC. — SERVICE REPORT

CUSTOMER NAME AND ADDRESS	TREATMENT INVOICE NUMBER	DATE
NSM Resources Ltd.	29-14-7668	January 15, 1985
#300, 555 - 4th Avenue S.W.,	DS DISTRICT: Fort St. John	DS OUTPOST: Fort Nelson
Calgary, Alberta T2P 3E7	DS SUPERVISOR: Bruce Weir	CUSTOMER REPRESENTATIVE: B. Kier, F. Domeij
	TYPE SERVICE: Acid	SERVICE NAME: Wash & Squeeze

SERVICE INSTRUCTIONS, REMARKS, MATERIALS

To supply men, equipment and 5,000 litres 20% HCl Acid + 1.2% A-200 + 0.5% W-35, 6 kg/1000 L-41 0.2% F-75 to wash and squeeze above well as per instructed

WELL NAME: NSM Arrowhead			
LOCATION: G-69		PROVINCE: N.W.T.	
FORMATION: Keg River		RIG NAME: Rolin 10	
TYPE OF WELL: OIL ☐ GAS ☒ INJ/DISP ☐ OTHER ☐		AGE OF WELL: NEW ☒ REWORK ☐	
PACKER TYPE: Site	PACKER DEPTH: 2446 m	TOTAL DEPTH	BHST/BHCT
FLOAT/STG. TYPE	FLOAT/STG. DEPTH	PERFORATED INTERVALS: TOP	BOTTOM — NO. OF HOLES
LINER SIZE	FROM - TO	2458	2463
CASING SIZE: 173 mm	TUBING SIZE: 73 mm		
CASING DEPTH	TUBING DEPTH: 2466 m		
CASING/ANN VOL: 0.12	TUBING VOLUME: 7.8		
ARRIVE LOCATION: 1500			
LEAVE LOCATION: 1800			

TOTAL FLUID INJECTED	AVG. PRESSURE	CEMENT TEMPERATURE
OIL / WATER: 1.5 m^3	8 MPa	
ACID: 5.0 m^3 / CEMENT	MAX. INJ. PRESSURE: 0.4 m^3/minute	WATER TEMPERATURE
OTHER (SPECIFY)	FINAL INJ. PRESSURE: 0.4 m^3/minute	SLURRY TEMPERATURE
AVG. INJECTION ~~Rate~~ Pressure: 0.35 m^3/minute	INST. SHUT IN PRESSURE	RETURNS TEMPERATURE
MAX. INJECTION ~~Rate~~ Pressure: 9 MPa	PER PLUG PRESSURED TO	AVG. SLURRY DENSITY: FILL
		TAIL-IN

TIME	PRESSURE TBG. (MPa)	PRESSURE CSG. (MPa)	INJ. RATE (m^3/min)	VOLUME STAGE (m^3)	VOLUME CUMM (m^3)	CHART REF	SERVICE LOG DETAIL
1630							Hold Pretreatment Safety Meeting
1633	24	-					Fill lines and pressure test
1640	-	-	0.25	5.0			Start circulate acid to perforations
1700	4	4	0.25	2.5	5.0		Acid away, pump KCl behind
1710	5	5			7.5		Stop pump, Acid across perfs., Wash No. 1
1714	1	1	0.03	0.1			Bleed down pressure and start pump
1717	5	5.5			7.6		Stop pump
1718	5	5.5	0.05	0.1			Start pump, Wash no. 2
1720	7	7			7.7		Stop Pump
1723	6	6.5	0.01	0.1			Start pump
1724	9	9			7.8		Stop pump, Wash No. 3
1728	3	2	0.01	0.1			Start pump
1729	9	8			7.9		Stop Pump Wash No. 4
1733	4	1	0.2	0.6			Start Pump, Feed of 0.3 m^3/minute at 7 MPa
1736	7	6			8.5		Stop pump, close perforations on tool
1742	1	2	0.4	4.0			Start Squeeze
1752	9	1			12.5		Stop Squeeze, Final inj. rate of 0.4 m^3/min at MPa

PAGE OF

LBF 4/82

JWELL SCHLUMBERGER CANADA INC. — SERVICE REPORT

CUSTOMER NAME AND ADDRESS	TREATMENT INVOICE NUMBER	DATE
NSM Resources Ltd.	29-14-0683	January 19, 1985
300, 555 - 4th Avenue S.W.,	DS DISTRICT: Fort St. John	DS OUTPOST: Fort Nelson
Calgary, Alberta T2P 3E7	DS SUPERVISOR: Bruce Weir	CUSTOMER REPRESENTATIVE: F. Domeij, B Keir
	TYPE SERVICE: Acid	SERVICE NAME: Wash & Squeeze

SERVICE INSTRUCTIONS, REMARKS, MATERIALS	WELL NAME	
To supply men, equipment and 2.5 m^3	NSM Arrowhead	
20% HCl Acid + 0.4% A-200 + 2.0% W35	LOCATION: G-69	PROVINCE: N.W.T.
+ 6 kg/1000 litres L-41	FORMATION: Slave Point	RIG NAME: Rollin 10
	TYPE OF WELL: OIL ☐ GAS ☐ INJ/DISP. ☐ OTHER ☐	AGE OF WELL: NEW ☒ REWORK ☐

PACKER TYPE	PACKER DEPTH	TOTAL DEPTH	BHST/BHCT
Site	2280 m	2302 m	

FLOAT/STG. TYPE	FLOAT/STG. DEPTH	PERFORATED INTERVALS TOP	BOTTOM	NO. OF HOLES
		2292	2301	

TOTAL FLUID INJECTED OIL	WATER 7.6 m^3	AVG. PRESSURE 16 MPa	CEMENT TEMPERATURE
ACID 2.5 m^3	CEMENT	MAX. INJ. PRESSURE 18.5 MPa	WATER TEMPERATURE
OTHER (SPECIFY)		FINAL INJ. PRESSURE 18.5 MPa	SLURRY TEMPERATURE
AVG. INJECTION RATE 0.05 m^3/min		INST. SHUT IN PRESSURE 15.0 MPa	RETURNS TEMPERATURE
MAX. INJECTION RATE 0.15 m^3/min		WIPER PLUG PRESSURED TO	AVG. SLURRY DENSITY FILL
		10 min Shut-In 15.5 MPa	TAIL-IN

LINER SIZE	FROM - TO	CASING SIZE	TUBING SIZE	CASING DEPTH	TUBING DEPTH	CASING/ANN. VOL.	TUBING VOLUME	ARRIVE LOCATION	LEAVE LOCATION
		178 mm	73 mm	2302 m	2301 m	0.1422	6.903	0700	1400

TIME	PRESSURE TBG.	PRESSURE CSG.	INJ. RATE	VOLUME STAGE	VOLUME CUMM.	CHART REF.	SERVICE LOG DETAIL	PAGE 1 OF 2
	MPa	MPa	m^3/min	m^3	m^3			
1025							Hold Pretreatment Safety Meeting	
1029	21						Pressure Test	
1037	10	-					Start Pump (knife seal partially closed, casing pressure)	
1040	10	-	0.20	2.5			Start Pump Acid	
1053	10	-	0.17	4.5	2.5		Acid Away, Start Pump KCl	
1120	10	8			6.0		Stop Pump, Acid across perfs (Pressure up Arm to open knife seal)	
1123	7	6	0.1	0.1			Bleed off pressure, start pump Wash #1	
1124	9	4			6.1		Stop Pump	
1127	4	3	0.0125	0.025			Bleed off pressure, start pump Wash #2	
1129	9	5			6.125		Stop Pump	
1133	5	1	0.025	0.025			Bleed off pressure, start pump Wash #3	
1134	9	1			6.15		Stop Pump (Pressure Up Annulus to open knife seal)	
1137	3	3	0.025	0.025			Bleed off pressure, start pump Wash #4	
1138	9	3			6.175		Stop Pump	
1141	3	1	0.0125	0.025			Bleed off pressure, start pump Wash #5	
1143	7	1			6.2		Stop Pump	

LBF 4/82

DOWELL SCHLUMBERGER
CANADA INC.

Supplementary Service Log

TREATMENT NUMBER	WELL NAME	LOCATION	DATE	PAGE
20-74-7623	[illegible] Arrowhead	C-69	January 19/85	2 OF 2

TIME	PRESSURE TBG.	PRESSURE CSG.	INJ. RATE	VOLUME STAGE	VOLUME CUMM.	CHART REF.	SERVICE LOG DETAIL
	MPa	MPa	m^3/min	m^3	m^3		
1146	2	1	0.05		6.2		Bleed off, start pump Wash #6
1147	10	1		0.05	6.25		Stop Pump
1151	3	1	0.05	0.05			Bleed off, start pump Wash #7
1152	10	1			6.3		Stop Pump
1155	4	1	9.05	0.05			Bleed off, start pump Wash #8
1156	10.5	1			6.35		Stop Pump
1159	4	1					Pull packer up to eliminate knife seal problem!
1200	2	1	0.175	0.35			Start Pump Wash #9
1202	13	11			6.7		Stop Pump
1204	9	8	0.075	0.15			Bleed off pressure, start pump Wash #10
1206	14.5	12.5			6.85		Stop Pump
1211	9	8	0.15	0.15			Bleed off pressure, start pump Wash #11
1212	17	15			7.0		Stop Pump
1216	13	12	0.125	0.125			Bleed off pressure, start pump Wash #12
1217	16	15			7.125		Stop Pump
1221	11	11	0.125	0.125			Bleed off pressure, start pump Wash #13
1222	17	15			7.25		Stop Pump
1224	11	10	0.0625	0.125			Bleed off pressure, start pump Wash #14
1226	17	15.5			7.325		Stop Pump
1227	16	15	0.125	0.125			Bleed off pressure, start pump Wash #15
1228	16	15.5			7.5		Stop Pump
1230							Close knife seal on packer
1232	15	15	0.10	1.0			Start Squeeze
1242	18.5	13.5			8.5		Stop Squeeze
							Switch lines around to squeeze down Annulus
							and open knife seal on packer
1313	13	12	0.10	1.6			Start squeeze down Annulus
1329	18.5	17			10.1		Stop Squeeze
							Maximum rate down tubing 0.1 m^3/min @ 18.5 MPa
							Maximum rate down Ann. 0.15 m3/min @ 18.5 MPa

PLEASE PRESS FIRMLY - YOU ARE MAKING MULTIPLE COPIES - WRITE HARD ON SURFACE

CPC - 9/85 - 2M

DOWELL SCHLUMBERGER CANADA INC.

SERVICE REPORT

CUSTOMER NAME AND ADDRESS NSM Resources Ltd. #300, 555 - 4th Avenue S.W., Calgary, Alberta T2P 3E7		TREATMENT INVOICE NUMBER 29-14-7694	DATE January 20 & 21/85
		DS DISTRICT Fort St. John	DS OUTPOST Fort Nelson
		DS SUPERVISOR Bruce Weir	CUSTOMER REPRESENTATIVE F. Domeij, B. Keir
		TYPE SERVICE Acid	SERVICE NAME Wash & Squeeze
SERVICE INSTRUCTIONS, REMARKS, MATERIALS To supply men, equipment and 3.0 m^3 20% HCl Acid + 1.2% A200 + 2.0% W-35 + 6 kg/1000 litres L-41 to Wash and Squeeze above well as per instructed		WELL NAME NSM Arrowhead	
		LOCATION G-69	PROVINCE N.W.T.
		FORMATION	RIG NAME Rolln #10
		TYPE OF WELL OIL ☐ GAS ☐ INJ/DISP. ☐ OTHER ☐	AGE OF WELL NEW ☒ REWORK ☐
		PACKER TYPE Site	PACKER DEPTH
		TOTAL DEPTH 2291 metres	BHST/BHCT
		FLOAT/STG. TYPE	FLOAT/STG. DEPTH
		PERFORATED INTERVALS TOP: 2282 — BOTTOM: 2287	NO. OF HOLES

TOTAL FLUID INJECTED OIL / WATER 8.1 m^3	AVG. PRESSURE 16 MPa	CEMENT TEMPERATURE	LINER SIZE / FROM - TO
ACID 3.0 m^3 / CEMENT	MAX. INJ. PRESSURE 21 MPa	WATER TEMPERATURE	CASING SIZE 178 mm / TUBING SIZE 73 mm
OTHER (SPECIFY)	FINAL INJ. PRESSURE 21 MPa	SLURRY TEMPERATURE	CASING DEPTH 2291 m / TUBING DEPTH 2289 m
AVG. INJECTION RATE 0.10 m^3/minute	INST. SHUT IN PRESSURE 20 MPa	RETURNS TEMPERATURE	CASING/ANN. VOL. 0.17 m^3 / TUBING VOLUME 6.8 m^3
MAX. INJECTION RATE 0.13 m^3/minute	WIPER PLUG PRESSURED TO	AVG. SLURRY DENSITY FILL	ARRIVE LOCATION 1800
		TAIL-IN	LEAVE LOCATION 0230

TIME	PRESSURE TBG.	PRESSURE CSG.	INJ. RATE	VOLUME STAGE	VOLUME CUMM.	CHART REF.	SERVICE LOG DETAIL
	MPa	MPa	m^3/min	m^3	m^3		PAGE 1 OF 2
1110							Pretreatment Safety Meeting
1115	20						Fill Lines & Pressure Test
1125	15	-	0.2	3.0			Start circulate acid to bottom
1140	2	2	0.29	4.0	3.0		Acid away, start pump KCl
1154	5	3			7.0		Stop Pump, Acid across perfs Wash No. 1
1200	4	2	0.05	0.1			Bleed off pressure, start pump Wash No. 2
1202	7	5	-		7.1		Stop Pump
1205	7	5	0.05	0.1			Bleed off pressure, start pump Wash No. 3
1207	10	8			7.2		Stop Pump
1210	10	8	0.05	0.1			Bleed off pressure, start pump Wash No. 4
1212	12	10			7.3		Stop Pump
1215	12	10	0.05	0.1			Bleed off pressure, start pump Wash No. 5
1217	14	12			7.4		Stop Pump
1220	14	12	0.05	0.1			Bleed off pressure, start pump Wash No. 6
1222	16	14			7.5		Stop Pump

DOWELL SCHLUMBERGER CANADA INC.

Supplementary Service Log

TREATMENT NUMBER	WELL NAME	LOCATION	DATE	PAGE
29-14-7694	NSM Arrowhead	G-69	January 20 & 21/7	2 OF 2

TIME	PRESSURE TBG.	PRESSURE CSG.	INJ. RATE	VOLUME STAGE	VOLUME CUMM.	CHART REF.	SERVICE LOG DETAIL
	MPa	MPa	m^3/min	m^3	m^3		
1225	16	14	0.05	0.1			Bleed down pressure, start pump Wash No. 7
1227	18	16			7.6		Stop Pump
1230	16	13	0.05	0.1			Bleed down pressure, start pump Wash No. 8
1232	18	16			7.7		Stop Pump
1235	16	14	0.10	0.3			Bleed down pressure, start pump Wash No. 9
1238	19.5	17			8.0		Stop pump, set down packer to squeeze
1242	17	16	0.13	2.0			Start Squeeze
1257	21	13.5			10.0		Stop Squeeze
							Rig in Dowell to annulus to squeeze wash acid down into perforations
0133	15	12.5	0.08	1.1			Start Squeeze
0147	20	15			11.1		Stop Squeeze

CPC-9/85-7M

PLEASE PRESS FIRMLY - YOU ARE MAKING MULTIPLE COPIES - WRITE HARD ON SURFACE

FEB - 5 1985

GEOTECH Analytical

NSM ARROWHEAD

G-69

Water and Gas Analysis

Prepared For

NSM RESOURCES LTD.

FILE 85-AS-5090

FEB. 04, 1985

ORIGINAL

tti GEOTECHnical resources ltd.
4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3 (403) 230-4128
TELEX 03-825879

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

GEOTECH Analytical

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W1

CONTAINER IDENTITY:

WATER ANALYSIS

OPERATORS NAME: NSM RESOURCES LTD.

SAMPLE LOCATION	WELL NAME	ELEVATIONS KB	ELEVATIONS GRD
	NSM ARROWHEAD G-69 G-69	502	

FIELD OR AREA	POOL OR ZONE	NAME OF SAMPLER	COMPANY
	SLAVE POINT		OTIS ENGINEERING

TEST RECOVERY: WATER

TEST TYPE	NO.	MULTIPLE RECOVERY	TEST INTERNAL FROM	TO	PERFORATIONS FROM	TO
			2292	2301		

SAMPLING POINT	AMT. AND TYPE OF CUSHION	MUD RESISTIVITY (Ω/m)
FLOWLINE TO PIT		

PUMPING: ☐ FLOWING: ☐ GAS LIFT: ☐ SWAB: ☐

WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

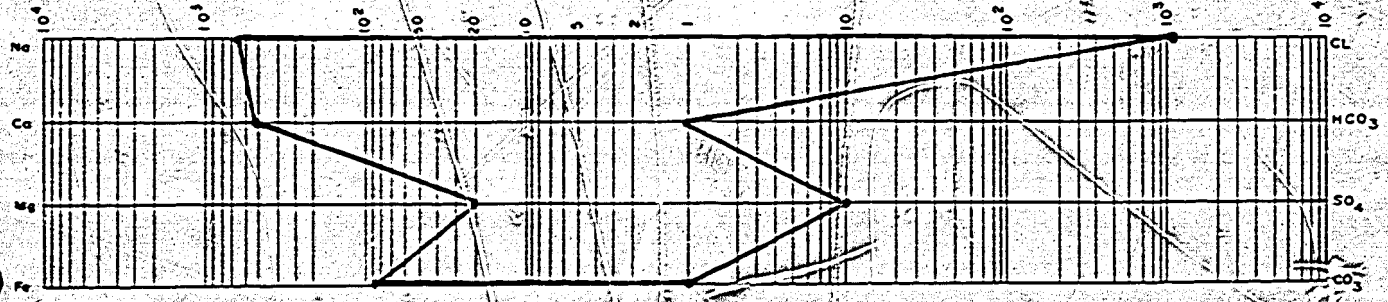
	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa					
TEMPERATURE (°C)					

DATE SAMPLED Y-M-D H:M	DATE RECEIVED Y-M-D	DATE ANALYZED Y-M-D	ANALYST
85-01-20	85-01-29	85-01-31	KW/BS

SUMMARY DATA

TOTAL HARDNESS AS $CaCO_3$	29736	g/m^3
TOTAL ALKALINITY	22	g/m^3
SALINITY	6.97	%
SATURATION INDEX	*	
STABILITY INDEX	*	
CORROSION TENDENCY	2473.68	

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS

* No Temperature Data

WATER ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD G-69
LOCATION	G-69
SAMPLING POINT	FLOWLINE TO PIT

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W1

CATIONS

ION	g/m³	MASS FRACTION	MEQ/L
Na	15200	0.22	664
K	3640	0.05	93
Ca	10200	0.14	508
Mg	258	0.00	21
Ba	26.5	0.00	0.4
Sr	177	0.00	4
Fe	1660	0.02	89
Mn			
Al			
Si			
B	52.9		
U			
Th			

ANIONS

ION	g/m³	MASS FRACTION	MEQ/L
Cl	38500	0.56	1087
Br			
I	5.00	0.00	0.04
F			
HCO_3	27.1	0.00	0.4
CO_3	0.000	0.00	0.000
OH	0.000	0.00	0.000
SO_4	510	0.01	10
H_2S			
PO_4			

TOTAL SOLIDS (g/m³)

EVAPORATED AT 110°C	EVAPORATED AT 180°C
AT IGNITION	CALCULATED
	70437

SPECIFIC GRAVITY	REFRACTIVE INDEX (RI)
at 15°C	1.352 at 25°C

OBSERVED pH	RESISTIVITY (RW) Ωm
5.69 at 25°C	0.108 at 25°C

REDOX POTENTIAL (E_h)	DISSOLVED O_2
	g/m³

TOTAL METALS

METAL	g/m³
Fe	
Mn	

REMARKS:

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W2

CONTAINER IDENTITY:

WATER ANALYSIS

OPERATOR'S NAME: NSM RESOURCES LTD.

SAMPLE LOCATION	WELL NAME	ELEVATIONS KB	ELEVATIONS GRD
	NSM ARROWHEAD G-69	502	

FIELD OR AREA	POOL OR ZONE	NAME OF SAMPLER	COMPANY
	KEG RIVER		OTIS ENGINEERING

TEST RECOVERY: WATER

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERNAL FROM: 2458

TO: 2463

PERFORATIONS FROM:

TO:

SAMPLING POINT: SEPARATOR

AMT. AND TYPE OF CUSHION:

MUD RESISTIVITY (Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

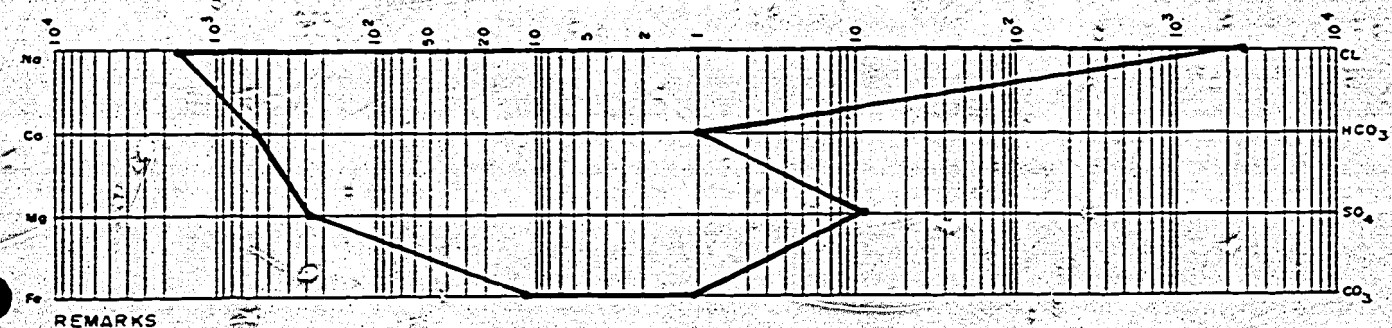
	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa					
TEMPERATURE (°C)					

DATE SAMPLED Y – M – D H:M	DATE RECEIVED Y – M – D	DATE ANALYZED Y – M – D	ANALYST
85-01-17	85-01-29	85-01-31	KW/BS

SUMMARY DATA

TOTAL HARDNESS AS $CaCO_3$	45525	g/m³
TOTAL ALKALINITY	44	g/m³
SALINITY	17.49	%
SATURATION INDEX	*	
STABILITY INDEX	*	
CORROSION TENDENCY	3087.77	

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS

* No Temperature Data

WATER ANALYSIS
DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD
LOCATION	G-69
SAMPLING POINT	SEPARATOR

FILE NUMBER: 85AS5090
LABORATORY NUMBER: 5090-W2

CATIONS

ION	g/m³	MASS FRACTION	MEQ/L
Na	40400	0.17	1760
K	10100	0.04	258
Ca	12100	0.05	607
Mg	3410	0.01	280
Ba	24.4	0.00	0.4
Sr	585	0.00	13
Fe	232	0.00	12
Mn			
Al			
Si			
B	87.7		
U			
Th			

ANIONS

ION	g/m³	MASS FRACTION	MEQ/L
Cl	96800	0.73	2729
Br			
I	19.9	0.00	0.2
F			
HCO_3	54.2	0.00	0.9
CO_3	0.000	0.00	0.000
OH	0.000	0.00	0.000
SO_4	582	0.00	12
H_2S			
PO_4			

TOTAL SOLIDS (g/m³)

EVAPORATED AT 110°C	EVAPORATED AT 180°C
AT IGNITION	CALCULATED
	164610

SPECIFIC GRAVITY	REFRACTIVE INDEX (RI)
@ 15°C	1.372 @ 25°C

OBSERVED pH	RESISTIVITY (RW) Ω.m
5.61 @ 25°C	0.062 @ 25°C

REDOX POTENTIAL (E_h)	DISSOLVED O_2
	g/m³

TOTAL METALS

METAL	g/m³
Fe	
Mn	

REMARKS:

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W3

CONTAINER IDENTITY:

WATER ANALYSIS

OPERATORS NAME: NSM RESOURCES LTD.

SAMPLE LOCATION:

WELL NAME: NSM ARROWHEAD G-69 G-69

ELEVATIONS KB: 502m GRD:

FIELD OR AREA:

POOL OR ZONE: KEG RIVER

NAME OF SAMPLER:

COMPANY: OTIS ENGINEERING

TEST RECOVERY:

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERNAL FROM: 2458 TO: 2463

PERFORATIONS FROM: TO:

SAMPLING POINT: SEPARATOR

AMT. AND TYPE OF CUSHION:

MUD RESISTIVITY (Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

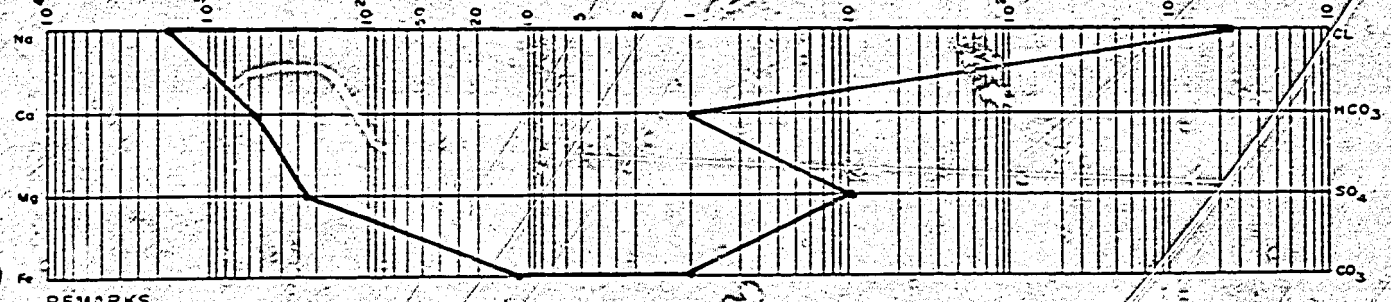
	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa					
TEMPERATURE (°C)					

DATE SAMPLED Y – M – D H:M	DATE RECEIVED Y – M – D	DATE ANALYZED Y – M – D	ANALYST
85-01-17	85-01-29	85-01-31	KW/BS

SUMMARY DATA

TOTAL HARDNESS AS $CaCO_3$	41438	g/m^3
TOTAL ALKALINITY	0	g/m^3
SALINITY	16.95	%
SATURATION INDEX	*	
STABILITY INDEX	*	
CORROSION TENDENCY	0.00	

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS

* No Temperature Data

WATER ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD G-69
LOCATION	G-69
SAMPLING POINT	SEPARATOR

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W3

CATIONS

ION	g/m³	MASS FRACTION	MEQ/L
Na	39200	0.10	1708
K	10600	0.03	271
Ca	11000	0.03	553
Mg	3090	0.01	254
Ba	23.6	0.00	0.3
Sr	528	0.00	12
Fe	228	0.00	12
Mn			
Al			
Si			
B	81.4		
U			
Th			

ANIONS

ION	g/m³	MASS FRACTION	MEQ/L
Cl	93800	0.83	2644
Br			
I	20.2	0.00	0.2
F			
HCO_3	0.000	0.00	0.000
CO_3	0.000	0.00	0.000
OH	0.000	0.00	0.000
SO_4	555	0.00	11
H_2S			
PO_4			

TOTAL SOLIDS (g/m³)

EVAPORATED AT 110°C	EVAPORATED AT 180°C
AT IGNITION	CALCULATED
	159358

SPECIFIC GRAVITY	REFRACTIVE INDEX (RI)
at 15°C	1.372 at 23°C

OBSERVED pH	RESISTIVITY (Rw) Ωm
5.52 at 25°C	0.063 at 25°C

REDOX POTENTIAL (E_h)	DISSOLVED O_2
	g/m³

TOTAL METALS

METAL	g/m³
Fe	
Mn	

REMARKS:

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W4

CONTAINER IDENTITY:

WATER ANALYSIS

OPERATOR'S NAME: NSM RESOURCES LTD.

SAMPLE LOCATION:

WELL NAME: NSM ARROWHEAD G-69 G-69

ELEVATIONS KB: 502m GRD:

FIELD OR AREA:

POOL OR ZONE: SLAVE POINT

NAME OF SAMPLER:

COMPANY: OTIS ENGINEERING

TEST RECOVERY:

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERVAL FROM: 2282 TO: 2287

PERFORATIONS FROM: TO:

SAMPLING POINT: FLOWLINE

AMT. AND TYPE OF CUSHION:

MUD RESISTIVITY (Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

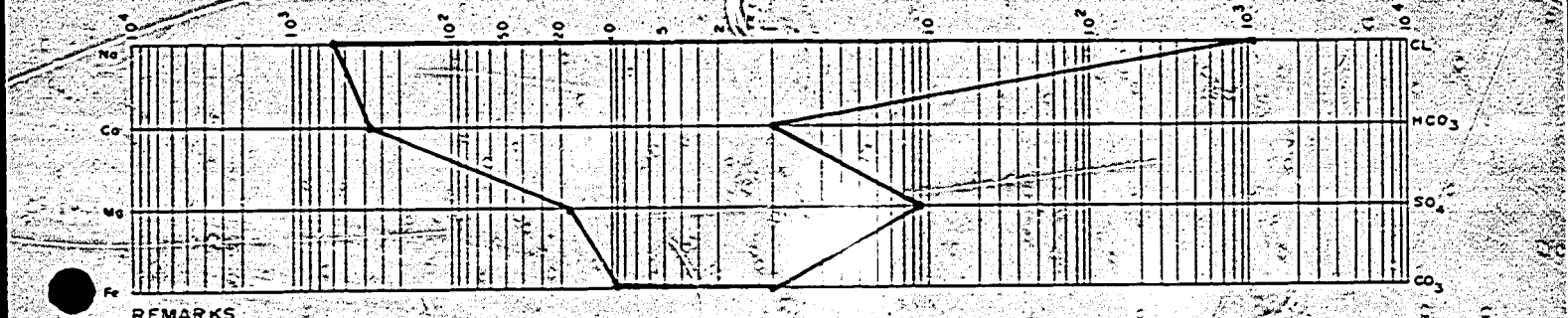
	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE (kPa)					
TEMPERATURE (°C)					

DATE SAMPLED Y — M — D H:M	DATE RECEIVED Y — M — D	DATE ANALYZED Y — M — D	ANALYST
85-01-21	85-01-29	85-01-31	KW/BS

SUMMARY DATA

TOTAL HARDNESS AS $CaCO_3$	20709	g/m^3
TOTAL ALKALINITY	0	g/m^3
SALINITY	6.88	%
SATURATION INDEX	*	
STABILITY INDEX	*	
CORROSION TENDENCY	0.00	

LOGARITHMIC PATTERN MEQ PER LITRE



REMARKS

* No Temperature Data

WATER ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD G-69
LOCATION	G-69
SAMPLING POINT	FLOWLINE

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-W4

CATIONS

ION	g/m³	MASS FRACTION	MEQ/L
Na	13900	0.03	605
K	5070	0.01	129
Ca	7720	0.02	385
Mg	225	0.00	18
Ba	30.0	0.00	0.4
Sr	145	0.00	3
Fe	178	0.00	9
Mn			
Al			
Si			
B	42.0		
U			
Th			

ANIONS

ION	g/m³	MASS FRACTION	MEQ/L
Cl	38000	0.94	1073
Br			
I	12.8	0.00	0.1
F			
HCO_3	0.000	0.00	0.000
CO_3	0.000	0.00	0.000
OH	0.000	0.00	0.000
SO_4	450	0.00	9
H_2S			
PO_4			

TOTAL SOLIDS (g/m³)

EVAPORATED AT 110°C	EVAPORATED AT
AT IGNITION	CALCULATED
	65875

SPECIFIC GRAVITY	REFRACTIVE INDEX (RI)
at 15°C	1.352 at 25°C

OBSERVED pH	RESISTIVITY (Rw) Ωm
5.22 at 25°C	0.116 at 25°C

REDOX POTENTIAL (E_h)	DISSOLVED O_2
	g/m³

TOTAL METALS

METAL	g/m³
Fe	
Mn	

REMARKS:

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

GEOTECH Analytical

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G1

CONTAINER IDENTITY: 3309

GAS ANALYSIS

OPERATOR'S NAME: NSM RESOURCES LTD.

SAMPLE LOCATION	WELL NAME	ELEVATIONS KB	ELEVATIONS GRD
	NSM ARROWHEAD G 69	502	

FIELD OR AREA	POOL OR ZONE	NAME OF SAMPLER	COMPANY
	SLAVE POINT		OTIS ENGINEERING

TEST RECOVERY: GAS

TEST TYPE: | NO.:

MULTIPLE RECOVERY:

TEST INTERVAL FROM: | TO:

PERFORATIONS FROM: 2282 TO: 2287

SAMPLING POINT: WELLHEAD

AMT. AND TYPE OF CUSHION:

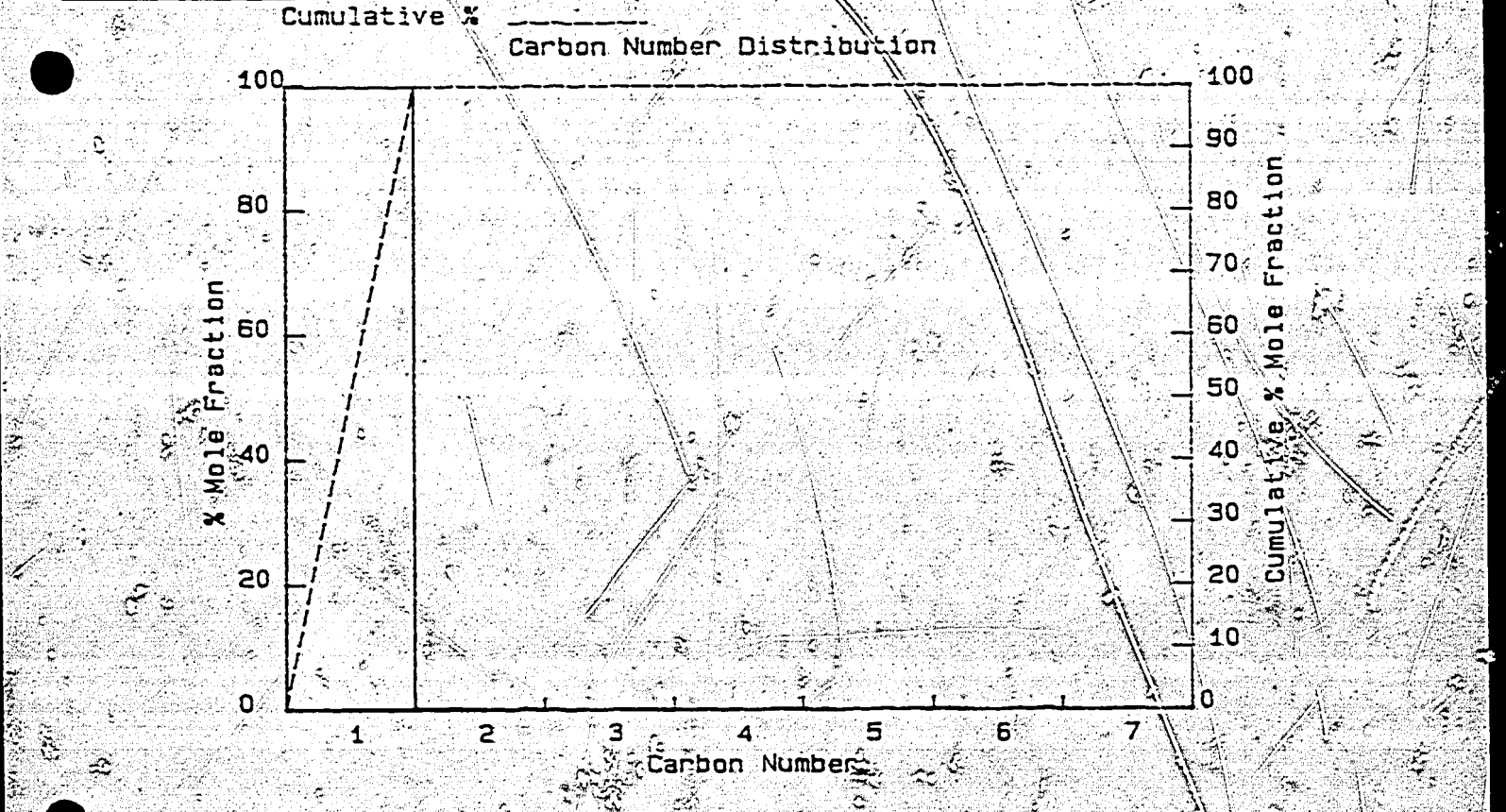
MUD RESISTIVITY (Ω/m):

PUMPING: | FLOWING: | GAS LIFT: | SWAB:

WATER: m^3/d | OIL: m^3/d | GAS: $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa				696	65
TEMPERATURE (°C)				1	50

DATE SAMPLED Y - M - D	DATE RECEIVED Y - M - D	DATE ANALYZED Y - M - D	ANALYST
85-01-21	85-01-29	85-01-29	DF



Weighted Average Carbon Number : 1

GAS ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD
LOCATION	G 69
SAMPLING POINT	WELLHEAD

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G1

COMPOSITION

COMP.	MOLE FRACTION		PETROLEUM
	AIR FREE AS RECEIVED	AIR FREE ACID GAS FREE	LIQUID CONTENT mL/m^3
H_2	0.0047	0.0061	
He	0.0016	0.0021	
N_2	0.0385	0.0498	
CO_2	0.2257	0.0000	
H_2S	0.0000	0.0000	
C_1	0.7287	0.9410	
C_2	0.0007	0.0009	
C_3	0.0001	0.0001	0.4
IC_4	0.0000	0.0000	0.0
NC_4	0.0000	0.0000	0.0
IC_5	0.0000	0.0000	0.0
NC_5	0.0000	0.0000	0.0
C_6	0.0000	0.0000	0.0
C_7+	0.0000	0.0000	0.0
C_8			
C_9			
$C_{10}+$			
TOTAL	1.0000	1.0000	0.4

CALCULATED GROSS HEATING VALUE

MJ/m^3 at 15°C + 101.325 kPa

MOISTURE FREE	MOISTURE & ACID GAS FREE
35.75	27.69

VAPOUR PRESSURE

PENTANES PLUS: 0.00 kPa

RELATIVE DENSITY

MOISTURE FREE		ACID GAS FREE		DENSITY
MEASURED	CALCULATED	MEASURED	CALCULATED	MOISTURE FREE
	0.785		0.571	0.961

CALCULATED PSEUDO CRITICAL PROPERTIES

MOISTURE FREE		ACID GAS FREE	
pPc (abs)	pTc	pPc (abs)	pTc
5163.0 kPa	212.8 °K	4515.2 kPa	186.1 °K

RELATIVE MOLECULAR MASS

MOISTURE FREE	C_7+
22.74	0.00

H_2S g/m^3

REMARKS: Analysis performed to C10+.

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

GEOTECH Analytical

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G3

CONTAINER IDENTITY:

GAS ANALYSIS

OPERATORS NAME: NSM RESOURCES LTD.

SAMPLE LOCATION:

WELL NAME: NSM ARROWHEAD G69

ELEVATIONS KB: 502 GRD:

FIELD OR AREA:

POOL OR ZONE: SLAVE POINT

NAME OF SAMPLER:

COMPANY: OTIS ENGINEERING

TEST RECOVERY: GAS

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERNAL FROM:

TO:

PERFORATIONS FROM: 2282

TO: 2287

SAMPLING POINT: SEPARATOR

AMT. AND TYPE OF CUSHION:

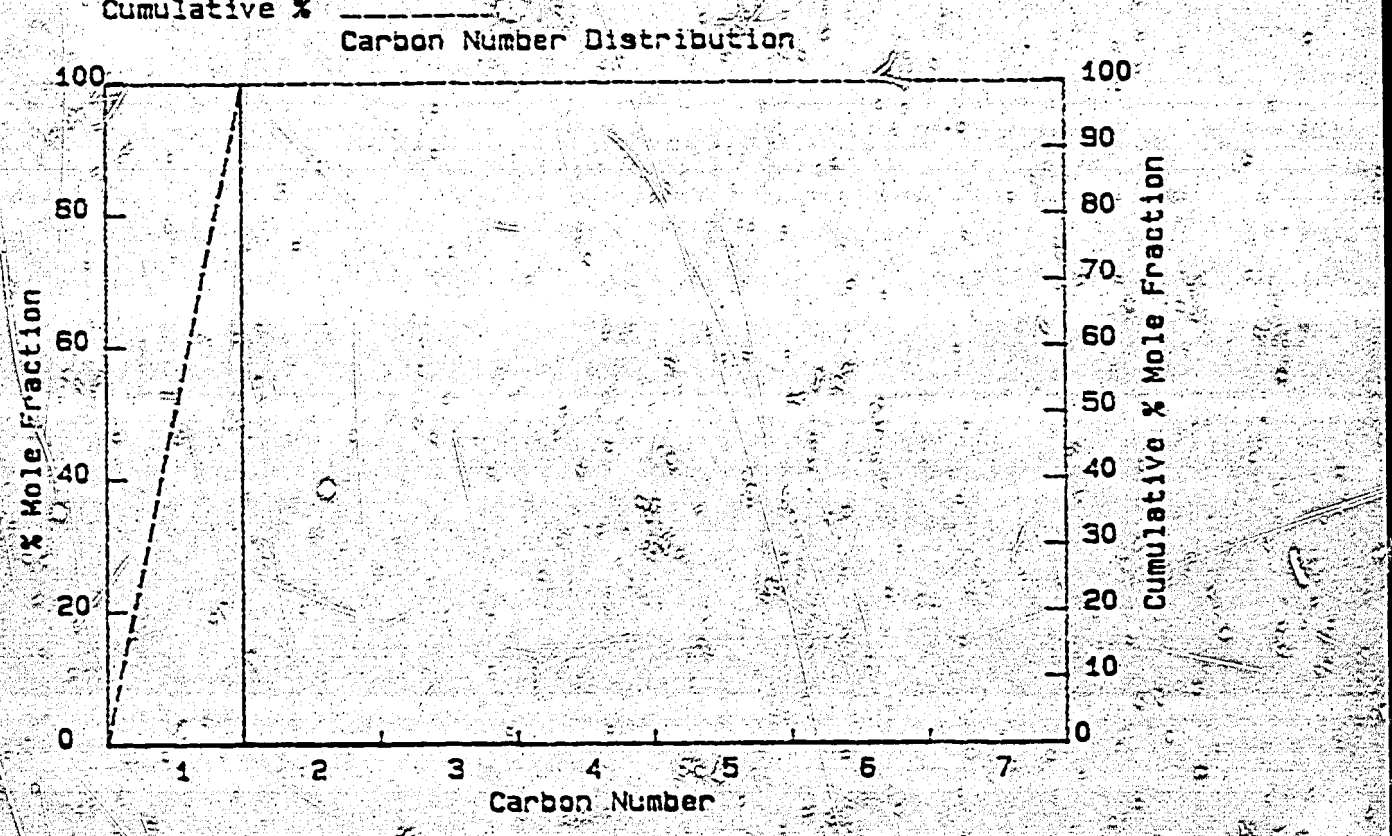
MUD RESISTIVITY (Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa				34	230
TEMPERATURE (°C)				10	50

DATE SAMPLED Y-M-D H:M	DATE RECEIVED Y-M-D	DATE ANALYZED Y-M-D	ANALYST
85-01-21	85-01-29	85-01-30	DF



Weighted Average Carbon Number : 1

GAS ANALYSIS

DETAILED REPORT

GEOTECH Analytical

		FILE NUMBER
OPERATOR'S NAME	NSM RESOURCES LTD.	85AS5090
WELL NAME	NSM ARROWHEAD	LABORATORY NUMBER 5090-G3
LOCATION	G69	
SAMPLING POINT	SEPARATOR	

COMPOSITION

COMP.	MOLE FRACTION		PETROLEUM
	AIR FREE AS RECEIVED	AIR FREE ACID GAS FREE	LIQUID CONTENT mL/m³
H_2	0.0009	0.0009	
He	0.0016	0.0016	
N_2	0.3983	0.3995	
CO_2	0.0030	0.0000	
H_2S	0.0000	0.0000	
C_1	0.5952	0.5970	
C_2	0.0007	0.0007	
C_3	0.0002	0.0002	0.7
IC_4	0.0000	0.0000	0.0
NC_4	0.0000	0.0000	0.0
IC_5	0.0000	0.0000	0.0
NC_5	TRACE	TRACE	0.0
C_6	0.0001	0.0001	0.5
C_7+	0.0000	0.0000	0.0
C_8			
C_9			
$C_{10}+$			
TOTAL	1.0000	1.0000	1.3

CALCULATED GROSS HEATING VALUE

MJ/m³ at 15°C + 101.325 kPa

MOISTURE FREE	MOISTURE & ACID GAS FREE
22.69	22.62

VAPOUR PRESSURE

PENTANES PLUS: 34.20 kPa

RELATIVE DENSITY

MOISTURE FREE		ACID GAS FREE		DENSITY
MEASURED	CALCULATED	MEASURED	CALCULATED	MOISTURE FREE
	0.721		0.719	0.882

CALCULATED PSEUDO CRITICAL PROPERTIES

MOISTURE FREE		ACID GAS FREE	
ppc (abs)	pTc	ppc(abs)	pTc
4122.6 kPa	164.9 °K	4112.8 kPa	164.5 °K

RELATIVE MOLECULAR MASS

MOISTURE FREE	C_7+
20.88	0.00

H_2S g/m³

REMARKS:

ANALYSIS PERFORMED TO C10+. TRACE IS DEFINED AS LESS THAN .0001 MOLE FRACTION.

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

GEOTECH Analytical

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G2

CONTAINER IDENTITY: 3376

GAS ANALYSIS

OPERATOR'S NAME: NSM RESOURCES

SAMPLE LOCATION:

WELL NAME: NSM ARROWHEAD G 69

ELEVATIONS KB: 502 GRD:

FIELD OR AREA:

POOL OR ZONE: KEG RIVER

NAME OF SAMPLER:

COMPANY: OTIS ENGINEERING

TEST RECOVERY: WELLHEAD GAS

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERNAL FROM:

TO:

PERFORATIONS FROM: 2458

TO: 2463

SAMPLING POINT: WELLHEAD

AMT. AND TYPE OF CUSHION:

MUD RESISTIVITY (Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

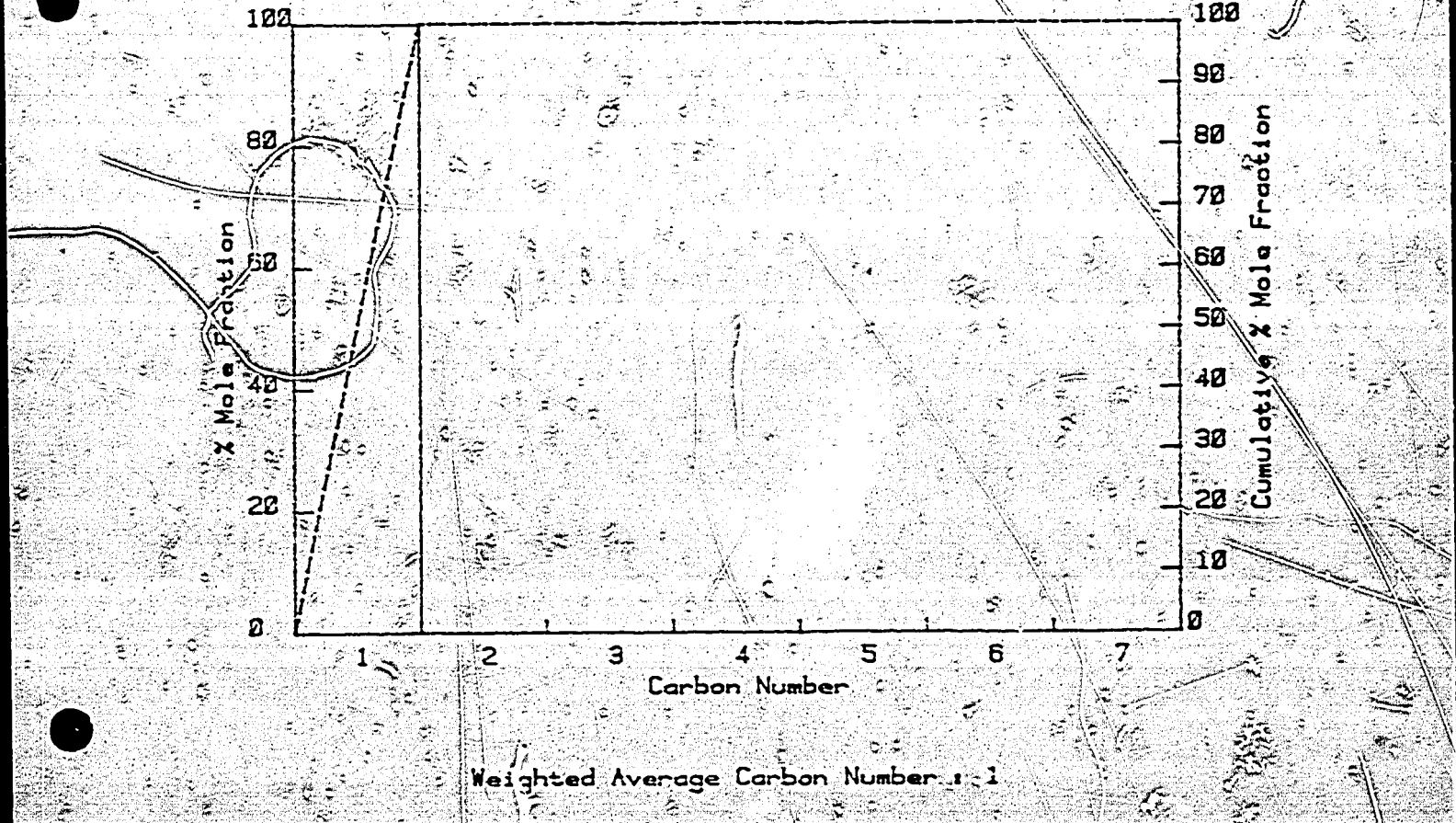
WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa				2999	135
TEMPERATURE (°C)				/	50

DATE SAMPLED Y – M – D H:M	DATE RECEIVED Y – M – D	DATE ANALYZED Y – M – D	ANALYST
85-01-17	85-01-29	85-01-29	DF

Cumulative % _____

Carbon Number Distribution



Weighted Average Carbon Number : 1

GAS ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES
WELL NAME	NSM ARROWHEAD
LOCATION	G 69
SAMPLING POINT	WELLHEAD

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G2

COMPOSITION

COMP.	MOLE FRACTION AIR FREE AS RECEIVED	MOLE FRACTION AIR FREE ACID GAS FREE	PETROLEUM LIQUID CONTENT mL/m³
H_2	0.0000	0.0000	
He	0.0025	0.0032	
N_2	0.0420	0.0532	
CO_2	0.2103	0.0000	
H_2S	0.0000	0.0000	
C_1	0.7447	0.9430	
C_2	0.0005	0.0006	
C_3	0.0000	0.0000	0.0
IC_4	0.0000	0.0000	0.0
NC_4	0.0000	0.0000	0.0
IC_5	0.0000	0.0000	0.0
NC_5	0.0000	0.0000	0.0
C_6	0.0000	0.0000	0.0
C_{7+}	0.0000	0.0000	0.0
C_8			
C_9			
C_{10}^+			
TOTAL	1.0000	1.0000	0.0

CALCULATED GROSS HEATING VALUE

MJ/m³ at 15°C + 101.325 kPa

MOISTURE FREE	MOISTURE & ACID GAS FREE
35.73	28.22

VAPOUR PRESSURE

PENTANES PLUS: 0.00 kPa

RELATIVE DENSITY

MOISTURE FREE		ACID GAS FREE		DENSITY
MEASURED	CALCULATED	MEASURED	CALCULATED	MOISTURE FREE
	0.774		0.575	0.946

CALCULATED PSEUDO CRITICAL PROPERTIES

MOISTURE FREE pPc (abs)	MOISTURE FREE pTc	ACID GAS FREE pPc (abs)	ACID GAS FREE pTc
5127.6 kPa	211.4 °K	4526.4 kPa	186.6 °K

RELATIVE MOLECULAR MASS

MOISTURE FREE	C_7^+
22.40	0.00

H_2S g/m³

REMARKS: Analysis performed to C10+.

tti GEOTECHnical resources ltd.

4500 - 5th STREET N.E., CALGARY, ALBERTA T2E 7C3

(403) 230-4128

GEOTECH Analytical

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G4

GAS ANALYSIS

CONTAINER IDENTITY: 3697

OPERATORS NAME: NSM RESOURCES LTD.

SAMPLE LOCATION:

WELL NAME: NSM ARROWHEAD G 69

ELEVATIONS KB: 502 GRD:

FIELD OR AREA:

POOL OR ZONE: KEG RIVER

NAME OF SAMPLER:

COMPANY: OTIS ENGINEERING

TEST RECOVERY: H.P. GAS

TEST TYPE: NO.:

MULTIPLE RECOVERY:

TEST INTERNAL FROM:

TO:

PERFORATIONS FROM: 2458

TO: 2463

SAMPLING POINT: METER RUN

AMT. AND TYPE OF CUSHION:

MUD RESISTIVITY(Ω/m):

PUMPING: FLOWING: GAS LIFT: SWAB:

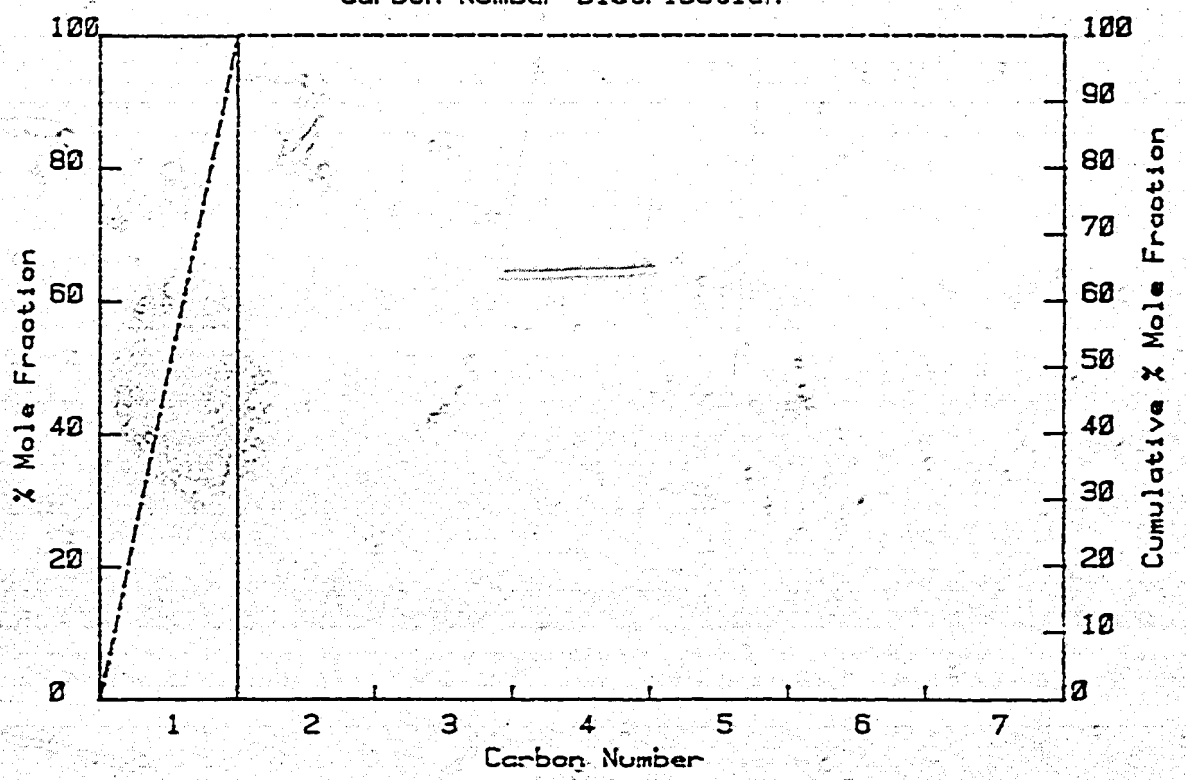
WATER: m^3/d OIL: m^3/d GAS: $10^3 m^3/d$

	SEPARATOR	TREATER	RESERVOIR	SAMPLED	RECEIVED
GAUGE PRESSURE kPa				2765	3200
TEMPERATURE (°C)				8	50

DATE SAMPLED Y – M – D H:M	DATE RECEIVED Y – M – D	DATE ANALYZED Y – M – D	ANALYST
85-01-16	85-01-29	85-01-29	DF

Cumulative % _____

Carbon Number Distribution



Weighted Average Carbon Number : 1

GAS ANALYSIS

DETAILED REPORT

GEOTECH Analytical

OPERATOR'S NAME	NSM RESOURCES LTD.
WELL NAME	NSM ARROWHEAD
LOCATION	G 69
SAMPLING POINT	METER RUN

FILE NUMBER: 85AS5090

LABORATORY NUMBER: 5090-G4

COMPOSITION

COMP.	MOLE FRACTION AIR FREE AS RECEIVED	MOLE FRACTION AIR FREE ACID GAS FREE	PETROLEUM LIQUID CONTENT mL/m³
H_2	0.0000	0.0000	
He	0.0025	0.0031	
N_2	0.0430	0.0530	
CO_2	0.1878	0.0000	
H_2S	0.0000	0.0000	
C_1	0.7662	0.9433	
C_2	0.0005	0.0006	
C_3	0.0000	0.0000	0.0
IC_4	0.0000	0.0000	0.0
NC_4	0.0000	0.0000	0.0
IC_5	0.0000	0.0000	0.0
NC_5	0.0000	0.0000	0.0
C_6	0.0000	0.0000	0.0
C_7 +	0.0000	0.0000	0.0
C_8			
C_9			
C_{10}+			
TOTAL	1.0000	1.0000	0.0

CALCULATED GROSS HEATING VALUE

MJ/m³ at 15°C + 101.325 kPa

MOISTURE FREE	MOISTURE & ACID GAS FREE
35.74	29.03

VAPOUR PRESSURE

PENTANES PLUS: 0.00 kPa

RELATIVE DENSITY

MOISTURE FREE MEASURED	MOISTURE FREE CALCULATED	ACID GAS FREE MEASURED	ACID GAS FREE CALCULATED
	0.752		0.575

DENSITY

MOISTURE FREE: 0.920

CALCULATED PSEUDO CRITICAL PROPERTIES

MOISTURE FREE ppc (abs)	MOISTURE FREE pTc	ACID GAS FREE ppc(abs)	ACID GAS FREE pTc
5063.8 kPa	208.7 °K	4527.1 kPa	186.6 °K

RELATIVE MOLECULAR MASS

MOISTURE FREE	C_7^+
21.78	0.00

H_2S g/m³

REMARKS:

Analysis performed to C10+.

Description

NSM RESOURCES LTD.

NSM ARROW HEAD G-69

WILDCAT

85JAN10 - 85JAN22

TEST OBJECTIVE: Perform a 3 point modified isochronal test on the formation Upper Keg River in the Wildcat Area for the well (NSM Arrowhead G-69)
Monitor surface tubing, tubing temperatures, water and gas flow rates. The other two zones were swabbed and liquid recovered was monitored.
The first zone Keg River was opened and shut-in to monitor tubing Build-ups. Liquid produced was KCL.
Duplicate gas samples were taken in addition to well head gas samples for analysis in Calgary.

TEST DESCRIPTION: The well was tested on four zones and swabbing was performed on zones 3 & 4 to recover liquid.
Zones 1 & 2 were opened and shut-in to test well for gas,oil and water rates. No gas was produced in zone 1 and a small amount of oil was collected.
Zone 2 produced gas and water rates.
Oil, water and gas production was monitored where the following cumulatives were produced. for each zone.

Gas:	56,143.5	M3 - Zone 2
Water:	12.8	M3 - Zone 2
Water:	15.0	M3 - Zone 4
Oil / Condensate:	2.0	M3 - Zone 1

Sequence of Operations

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	1	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY: FLOYD DOMEIJ / BILL KEIR

OTIS TEST SUPERVISOR: GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN05	0800	TRAVEL TO GRANDE PRAIRIE
2	85JAN06	0700	PICKED UP EQUIPMENT
3	85JAN07	0930	RIGGED IN FLOWLINES AND EQUIPMENT
4	85JAN08	0800	STAND-BY WHILE ROLLIN DRILLED THROUGH PLUG
5	85JAN09	0700	STAND-BY WHILE HOLE IS LOGGED,RUNNING TUBING,PERFORATING,ACIDIZING
6		2300	OPEN WELL TO CLEAN UP ACID WATER
7	85JAN10	0001	CONTINUE FLOWING WELL
8		0050	WELL WENT DEAD
9		0130	STOP COCKING WELL
10		0240	SHUT-IN WELL, RIG OUT FLOW LINES
11		0800	PACKER LEAKING, CIRCULATE WITH KCL WATER DOWN TUBING AND CASING
12		1430	PULL OUT OF HOLE
13		1830	PIPE AND PACKER OUT OF HOLE
14		2115	RUN IN HOLE WITH PIPE AND NEW PACKER
15		2130	SET PACKER AND PRESSURE TEST - PACKER DID NOT HOLD
16		2400	SET PACKER HIGHER - PRESSURE TEST, DID NOT HOLD
17	85JAN11	0330	PULLED PIPE AND CHANGED PACKER
18		0630	RUN BACK IN HOLE - PRESSURE TEST, DID NOT HOLD
19		0800	OTIS ORDERED A PLUG TO RUN AND SET IN TUBING

OTIS

SEQUENCE OF OPERATIONS

OLC-672-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	2	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY: FLOYD DOMEIJ / BILL KEIR

OTIS TEST SUPERVISOR: GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN11	1200	WAIT FOR PLUG
2		2400	STAND-BY FOR PLUG
3	85JAN12	0100	OTIS RIGGED UP TO SET PLUG
4		0430	PULLED 845 METERS OF PIPE AND RAN E CIRCULATING PLUG IN TUBING
5			PRESSURE TEST TUBING TO 1000 LBS., PULLED PLUG, RIGGED OUT LUB.
6		0630	PULLED 44 STANDS OF PIPE AND LAY DOWN DAMAGED TUBING
7			RIGGED UP WIRELINE, RAN GAUGE RING, AND RAN TEST PLUG BACK IN
8		0700	PRESSURE TEST TUBING - DID NOT HOLD
9		0730	PULLED OUT OF HOLE WITH PLUG, STUCK AT 1299 METERS
10		0930	OUT OF HOLE WITH THE PLUG
11		1000	SERVICE TOOLS AND GET READY TO RUN IN HOLE
12		1100	RUN PLUG PLUG BACK IN HOLE TO PRESSURE TEST LAST 200 M OF PIPE
13		1530	FOUND LEAKS IN TUBING - LAY DOWN TUBING AND PICK UP 50 NEW JOINTS
14		1800	RIG RAN IN ABOUT 40 STANDS
15		1945	OTIS RAN IN WITH PLUG TO PRESSURE TEST
16		2300	FINISH PRESSURE TESTING AND CAME OUT OF HOLE WITH E CIR. PLUG
17	85JAN13	0300	PULLED A SWAB FROM 300 METERS / RECOVERED APPROX. 6 BARRELS
18		0320	PULLED A SWAB FROM 600 METERS / RECOVERED APPROX. 6 BARRELS
19		0340	PULLED A SWAB FROM 910 METERS / RECOVERED APPROX. 4 BARRELS

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	3	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY: FLOYD DOMEIJ / BILL KEIR

OTIS TEST SUPERVISOR: GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN13	0400	PULLED A SWAB FROM 1100 METERS / RECOVERED APPROX. 6 BARRELS
2		0420	PULLED A SWAB FROM 1400 METERS / RECOVERED APPROX. 6 BARRELS
3		0440	PULLED A SWAB FROM 1750 METERS / RECOVERED APPROX. 6 BARRELS
4		0500	PULLED A SWAB FROM 2000 METERS / RECOVERED APPROX. 6 BARRELS
5		0530	PULLED A SWAB FROM P.S.N / RECOVERED APPROX. 6 GALLONS
6		0600	SWITCHED FLOW THROUGH THE TEST UNIT BYPASS LINES TO PROD. TANKS
7		0645	PULLED A SWAB FROM P.S.N. - NO RECOVERY
8		0700	SWITCH FLOW BACK TO RIG TANK
9		0730	PULLED A SWAB FROM P S.N. / RECOVERED APPROX. 5 BARRELS
10			TOTAL FLUID RECOVERY = 47 BARRELS
11		0845	DOWELL STARTED TO RIG UP TO DO ACID JOB
12		1027	PULLED A SWAB FROM P.S.N. / RECOVERED APPROX. 25 BARRELS
13		1048	DOWELL STARTED TO FILL HOLE AND SPOT ACID
14		1300	ACID SPOTTED
15		1400	PUMP INTO FORMATION
16		1500	PUMP INTO FORMATION
17		1600	DOWELL STOPPED AND SQUEZZED APPROX. 50 LITRES INTO FORMATION
18		1610	RIG IN LINE TO TANK AND BLEED OFF THE TUBING
19		1620	PULL UP TUBING STRING TO OPEN KNIFE SEAL ON PACKER

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	4	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
FLOYD DOMEIJ / BILL KEIR	GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN13	1630	STARTED TO BACK WASH APPROX. 28 BARRELS OF KCL TO RIG TANK
2		1650	RIGGED IN LINE TO PIT TO BACK WASH ACID
3		1700	BACK WASHING ACID TO PIT
4		1715	PRESURE TEST THE ANNULUS
5		1800	RIG IN FOR SWABBING
6		1820	PULL SWAB #1 FROM 300 METERS / FLUID AT SURFACE / REC. APPROX 4 BBLS
7		1835	PULL SWAB #2 FROM 450 METERS / FLUID AT 200 M / REC. APPROX 5 BBLS
8		1845	PULL SWAB #3 FROM 750 METERS / FLUID AT 450 M / REC. APPROX 4 BBLS
9		1855	PULL SWAB #4 FROM 1100 METERS / FLUID AT 750 M / REC. APPROX 5 BBLS
10		1915	PULL SWAB #5 FROM 1300 METERS / FLUID AT 1000 M / REC APPROX 6 BBLS
11		1930	PULL SWAB #6 FROM 1500 METERS / FLUID AT 1300 M / REC. APPROX 3 BBLS
12		1945	PULL SWAB #7 FROM 1800 METERS / FLUID AT 1500 M / REC. APPROX 4 BBLS
13		2000	PULL SWAB #8 FROM 2000 METERS / FLUID AT 1700 M / REC. APPROX 6 BBLS
14		2015	PULL SWAB #9 FROM 2300 METERS / FLUID AT 1800 M / REC. APPROX 5 BBLS
15		2145	PULL SWAB #10 FROM P.S.N. / REC. NOTHING
16		2220	PULL SWAB #11 FROM P.S.N. / FLUID AT 1900 M / REC. APPROX 3 BBLS
17			TOTAL WATER RECOVERED APPROX. 45 BARRELS WITH A SALINITY= 94,600 PPM
18	85JAN14	0230	RIG PRESSURE TESTED THE TUBING
19		0245	RIG PULLED OUT OF HOLE

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	5	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
FLOYD DOMEIJ / BILL KEIR	GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN14	0540	COMPUTALOG RIGGED UP AND RAN BRIDGE PLUG AND PERFORATED ON UP KEG ZONE
2		1030	COMPUTALOG RIGGED OUT AND RIG CREW STARTED TO RUN PIPE
3		1500	DOWELL RIGGED UP TO DO ACID JOB
4		1800	FINISH ACID JOB
5		1810	OPEN KNIFE SEAL ON PACKER AND BACK WASHED
6		1815	DOWELL RIGGED OUT AND RIG RIGGED UP SWAB HEAD
7		1830	PRESSURE TESTED ANNULUS
8		1900	RIGGED UP LUBRICATOR TO SWAB WELL
9		1910	PULLED SWAB #1 AND RECOVERED 6 BARRELS OF WATER
10		1930	PULL SWAB #2 AND REC. 4 BAR. OF H20 / FLD. @ 328 FT. PULL FROM 1312 FT.
11		1940	PULL SWAB #3 AND REC. 4 BAR. OF H20 / FLD @ 328 FT. PULL FROM 1476 FT.
12		2030	PULL SWAB #4 AND REC. NOTHING / FLD. @ 328 FT. PULL FROM 1476 FT.
13		2040	RIGGED FLOW LINE TO PIT
14		2050	FLOWED WELL TO PIT
15		2100	PRESSURE UP FLOW LINE TO THE TEST UNIT
16		2105	BLEED OFF LINE TO TIGHTEN LEAKS
17		2115	PRESSURE UP FLOW LINE
18		2120	OPEN WELL ON 5/64 CHOKE
19		2121	INCREASE CHOKE TO 8/64 IN.

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER: 1 - 4

RIG NAME: ROLLIN RIG 10

CUSTOMER: NSM RESOURCES LTD

WELL NAME OR NUMBER: NSM ARROWHEAD G-69

FIELD: WILDCAT

AREA:

CUSTOMER REPRESENTED BY: FLOYD DOMEIJ / BILL KEIR

OTIS TEST SUPERVISOR: GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN14	2122	INCREASE CHOKE TO 10/64 IN.
2		2123	INCREASE CHOKE TO 10/64 IN.
3		2124	INCREASE CHOKE TO 14/64 IN.
4		2130	INCREASE CHOKE TO 15/64 IN.
5		2135	PUT GAS METER IN SERVICE
6		2140	INCREASE CHOKE TO 16/64 IN.
7		2143	INCREASE CHOKE TO 22/64 IN.
8	85JAN15	0850	DECREASE CHOKE TO 16/64 IN.
9		1039	SHUT-IN WELL TO RUN STATIC GRADIENT AND UNLATCH RECORDERS
10		1700	LANDED 130 HR. RECORDERS AT 8028.28 FT.
11		1800	CAME OUT OF HOLE AND RIGGED IN WELL HEAD CONNECTIONS
12	85JAN16	0400	OPEN CHOKE ON 10/64 IN. FOR 3 POINT MODIFIED ISOCHRONAL TEST
13		0415	PUT METER IN SERVICE WITH .75 ORIFICE PLATE
14		0600	SHUT-IN WELL
15		0800	OPEN WELL ON 14/64 CHOKE TO START SECOND RATE
16		1000	SHUT-IN WELL
17		1200	OPEN WELL ON 18/64 CHOKE FOR THIRD RATE
18		1400	FLOW ON 18/64 CHOKE FOR EXTENDED
19		1647	FLOW LINE FROZE / INJECT METHANOL

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER: 1 - 4

RIG NAME: ROLLIN RIG 10

PAGE 7 OF 9

CUSTOMER: NSM RESOURCES LTD.

WELL NAME OR NUMBER: NSM ARROWHEAD G-69

FIELD: WILDCAT

AREA: -

CUSTOMER REPRESENTED BY: FLOYD DOMEIJ / BILL KEIR

OTIS TEST SUPERVISOR: GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN16	1730	TOOK GAS GRAVITY OF .782
2		1823	CHANGE ORIFICE PLATE TO 1.0 IN.
3		1826	TOOK DUPLICATE GAS SAMPLES
4		1900	CHANGE ORIFICE PLATE TO .875 IN.
5		1930	LOWER HEATER TEMP.
6		2110	LOWER BACK PRESSURE VALVE TO 230 PSI
7	85JAN17	0400	CHANGE CHARTS AND BLOW DOWN LINES
8		0845	TOOK TWO WELL HEAD SAMPLES
9		0900	SHUT-IN WELL
10		2400	CONTINUE TO MONITOR TUBING PRESSURES
11	85JAN18	0900	FINISH BUILD-UPS / AND OTIS RUN IN TO PULL RECORDERS
12		1200	RECORDERS OUT AND TUBING IS BLED DOWN
13		1300	RIG CREW PROCEEDED TO KILL WELL
14		1800	PULL PIPE OUT OF HOLE
15		1830	COMPUTALOG SET A BRIDGE PLUG
16		2100	DUMPED 5 METERS OF CEMENT ON BRIDGE PLUG
17	85JAN19	0100	PRESSURE TESTED PLUG TO 7000 KPA.
18		0315	PERFORATED 2292-2301 METERS
19		0715	RUN PIPE BACK IN HOLE AND SET PACKER AT 2280.87 M

OTIS **SEQUENCE OF OPERATIONS**

OEC—872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	8	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD	NSM ARROWHEAD G-69	WILDCAT	-

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
FLOYD DOMEIJ / BILL KEIR	GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN19	0900	DOWELL RIGGED UP TO DO ACID JOB
2		1400	ACID JOB COMPLETE
3		1445	RIG RIGGED UP TO SWAB WELL
4		1450	OPEN WELL TO RIG TANK / FLOWING SLIGHTLY ON ITS OWN
5		1500	START TO SWAB WELL
6		2400	PULLED 17 SWABS AND RECOVERED 52.5 BARRELS
7	85JAN20	0900	PULL ANOTHER 11 SWABS AND RECOVERED A TOTAL OF 66.5 BARRELS
8		0941	RIG PUMPED IN 20 BARRELS OF KCL DOWN TUBING
9		1100	START TO PULL PIPE OUT OF HOLE
10		1400	COMPUTALOG RIGGED IN TO RUN BRIDGE PLUG
11		1545	PRESSURE TESTED THE PLUG TO 7000 KPA
12		2100	RIG RAN PIPE IN HOLE
13		2300	DOWELL DOES ACID JOB
14	85JAN21	0355	FLOW WELL TO RIG TANK
15		0400	START TO SWAB WELL
16		0830	CONTINUE SWABBING WELL
17		2400	CONTINUE SWABBING WELL
18	85JAN22	0100	CONTINUE SWABBING WELL
19		0922	PULL LAST SWAB AND TOOK DUPLICATE WELL HEAD GAS SAMPLES

OTIS

SEQUENCE OF OPERATIONS

OEC-872-B

TEST NUMBER	RIG NAME	PAGE	OF
1 - 4	ROLLIN RIG 10	9	9

CUSTOMER	WELL NAME OR NUMBER	FIELD	AREA
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	—

CUSTOMER REPRESENTED BY	OTIS TEST SUPERVISOR
FLOYD DOMEIJ / BILL KEIR	GENE FLATO

	DATE	TIME	OPERATIONS
1	85JAN22	1000	STARTED TO RIG OUT TEST EQUIPMENT
2		1700	FINISH RIGGING OUT
3	85JAN23	0800	STAND-BY FOR TRUCKS TO RIG OUT EQUIPMENT
4		1400	STAND-BY FOR TRUCKS TO RIG OUT EQUIPMENT
5		2200	TRAVEL TO FT. NELSON FROM LOCATION
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

Test Results
—English

TEST RESULTS

OEC-859-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
1	NSM ARROWHEAD G-69	-		09JAN85	1 2

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8151-8164.4 Ft	14.650 PRESS. psi 60 TEMP F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☐ Xmscf / GOR bbl / ☐ bbl / OGR MMscf	WOR (bbl/bbl)	WGR (bbl/MMscf)	LGR BL/MMCF	
1 09 2300	0.00	0	0	0.0				RIG IN FLOW LINE AND D.W.T. LINE							1
2 09 2345	.75	942	0	14.0											2
3 09 2350	.83	120	0	29.0				LIQUID TO SURFACE							3
4 09 2355	.92	-50	0	29.0				SWITCH FROM D.W.T. TO PSI GAUGE (0-200 PSI)							4
5 10 0005	1.08	30	0	35.0	0			0.00	132.37	0.00	0.000	0.00	0.00	0.00	5
6 10 0010	1.17	40	0	35.0											6
7 10 0015	1.25	37	0	40.0											7
8 10 0020	1.33	32	0	49.0											8
9 10 0030	1.50	32	0	49.0											9
10 10 0045	1.75	0	0	64.0	0			0.00	148.72	0.00	0.000	0.00	0.00	0.00	10
11 10 0050	1.83	0	0	64.0											11
12 10 0050	0.00	0	0	0.0				SHUT-IN FOR BUILD-UPS							12
13 10 0105	.25	100	0	0.0				OPEN WELL ON 50/64							13
14 10 0105	0.00	0	0	50.0											14
15 10 0118	.22	0	0	50.0											15
16 10 0118	0.00	0	0	0.0				SHUT-IN WELL							16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
2300	0118			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	10	0.0			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
1	NSM ARROWHEAD G-69	–		10JAN85	2	2

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8151-8164.4 Ft	14.650 psi PRESS. 60 F TEMP

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☒ mscf/bbl ☐ bbl/MMscf	WOR bbl/bbl	WGR bbl/mscf	LGR BL/MMCF
1 10 0130	.20	52	0	50.0	0			OPEN WELL 0.00	88.13	0.00	0.000	0.00	0.00	0.00
2 10 0240	1.37	0	0	0.0				SHUT-IN WELL AND RIG OFF FLOWLINE						
3 10 0240	0.00	0	0	0.0										
4 10 0300	.33	0	0	0.0				RIG OUT FLOW LINE, PROD. LINE, DWL, TO DRAIN FLD						
5 10 0330	.83	0	0	0.0				RIG IN TO FLOW TO MUD TANK						
6 10 0800	5.33	0	0	0.0				DRAINED WATER INTO FLARE PIT (1.77 IN.)						
7 10 0800	0.00	0	0	0.0				LIQID PROD. WAS KCL, NO GAS DURING FLOW PERIOD						
8 10 0800	0.00	0	0	0.0				END OF TEST #1						
9														
10														
11														
12														
13														
14														
15														
16														

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0118	0800		END	xxx TEST

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS (mscf):	OIL (bbl):	WATER (bbl):
0.0	2.8	0.0	0.0	12.9	0.0

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		14JAN85	1 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF	
1 14 1900	0.00	0	0	0.0											RIG UP TO SWAB
2 14 1910	.17	0	0	0.0											PULL SWAN #1 / RECOVER 6 BARRELS
3 14 1930	.50	0	0	0.0											PULL SWAN #2 / RECOVER 4 BARRELS
4 14 1940	.67	0	0	0.0											PULL SWAN #3 / RECOVER 4 BARRELS
5 14 2030	1.50	0	0	0.0											PULL SWAN #4 / RECOVER 0 BARRELS
6 14 2040	1.67	0	0	0.0											RIG UP FLOW LINE TO PIT
7 14 2050	1.83	0	0	0.0											
8 14 2050	0.00	0	0	0.0											OPEN WELL TO PIT
9 14 2100	.17	0	0	0.0											PRESSURE UP FLOW LINE TO UNIT
10 14 2105	.25	0	0	0.0											BLEED OFF LINE / FIX LEAKS
11 14 2115	.42	0	0	0.0											PRESSURE UP FLOW LINE AND DWT LINE TO UNIT
12 14 2120	.50	1540	0	5.0											OPEN CHOKE
13 14 2121	.52	1507	0	6.0											INCREASE CHOKE
14 14 2122	.53	1500	0	8.0											INCREASE CHOKE
15 14 2123	.55	1506	0	10.0											INCREASE CHOKE
16 14 2124	.57	1514	0	14.0											INCREASE CHOKE

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	OF	NUMBER
1900	2124				

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0.0	0.0			

TEST RESULTS

OTIS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		14JAN85	2 15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP. @ 0 Ft	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
14 2125	.58	1527	0	14.0										1
						INCREASE CHOKE								2
14 2130	.67	1540	0	15.0										3
						METER IN SERVICE / OPENING GAUGE =1.77 IN.								4
14 2135	.75	1545	0	15.0										
						INCREASE CHOKE								5
14 2140	.83	1525	0	16.0										6
						INCREASE CHOKE								
14 2143	.88	1370	0	22.0										7
14 2155	1.08	1370	0	22.0										8
14 2205	1.25	1484	63	22.0	310			1428.20	0.00	87.66	0.000	0.00	61.38	61.38
						VAPORIZER BLEW OUT / RELIT PILOT								9
14 2215	1.42	1497	63	22.0										10
14 2225	1.58	1485	63	22.0										11
14 2230	1.67	1480	63	22.0	370			2372.31	0.00	0.00	0.000	0.00	0.00	0.00
14 2245	1.92	1455	63	22.0										12
14 2300	2.17	1392	63	22.0	420			1901.66	0.00	374.75	0.000	0.00	197.06	197.06
14 2330	2.67	1350	61	22.0	407			1764.11	0.00	0.00	0.000	0.00	0.00	13 0.00
						SAL.=287,000 PPM								14
14 2400	3.17	1270	64	22.0	385			1770.37	0.00	0.00	0.000	0.00	0.00	0.00
15 0030	3.67	1187	63	22.0	407			1723.85	0.00	0.00	0.000	0.00	0.00	15 0.00
15 0100	4.17	982	63	22.0	400			1743.88	0.00	1014.45	0.000	0.00	581.72	16 581.72

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
2124	0100			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
228.4	0	40.2			

OTIS

TEST RESULTS

OEC—665-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		15JAN85	3	15

CUSTOMER: NSM RESOURCES LTD.

OIL GRAVITY @ 60° F (°API): 0.0 | GAS SPECIFIC GRAVITY (AIR = 1): .7200 | INTERVAL TESTED ( ): 8064.3-8080.7Ft | STANDARD CONDITIONS: 14.650 PRESS. psi, 60 TEMP F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psia	BOTTOM HOLE TEMP @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ Xmscf / bbl	OGR ☐ bbl / MMscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 15 0130	4.67	944	61	22.0	400			1549.21	0.00	0.00	0.000		0.00	0.00	0.00
SAL.=231,000 PPM															
2 15 0200	5.17	940	61	22.0	402			1509.98	0.00	176.45	0.000		0.00	116.86	116.86
3 15 0230	5.67	930	59	22.0	410			1434.81	0.00	0.00	0.000		0.00	0.00	0.00
SAL.=216,000 PPM / SODIUM CHLORIDE=22%															
4 15 0300	6.17	920	59	22.0	401			2133.71	0.00	176.45	0.000		0.00	82.70	82.70
5 15 0330	6.67	880	59	22.0	395			2063.15	0.00	0.00	0.000		0.00	0.00	0.00
SAL.=225,000 PPM															
6 15 0400	7.17	870	61	22.0	400			2068.70	0.00	176.45	0.000		0.00	85.30	85.30
7 15 0430	7.67	805	57	22.0	385			1872.24	0.00	0.00	0.000		0.00	0.00	0.00
SAL.= 196,000 PPM															
8 15 0500	8.17	775	57	22.0	385			1832.76	0.00	66.10	0.000		0.00	36.07	36.07
SAL.=196,000 PPM															
9 15 0600	9.17	720	57	22.0	385			1665.57	0.00	0.00	0.000		0.00	0.00	0.00
10 15 0630	9.67	708	59	22.0	385			1665.57	0.00	0.00	0.000		0.00	0.00	0.00
11 15 0700	10.17	680	57	22.0	287			1769.17	0.00	220.70	0.000		0.00	124.75	124.75
12 15 0730	10.67	656	57	22.0	287			1714.92	0.00	0.00	0.000		0.00	0.00	0.00
13 15 0800	11.17	644	55	22.0	232			1509.10	0.00	143.40	0.000		0.00	95.02	95.02
14 15 0830	11.67	620	55	22.0	230			1529.97	0.00	0.00	0.000		0.00	0.00	0.00
CHANGE ORIFICE PLATE TO 1.125 / CHOKE TO 16/64															
15 15 0850	12.00	620	55	16.0											
16 15 0900	12.17	685	55	16.0											

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0100	0900			

GAS (mscf): 573.2 OIL (bbl): 0.0 WATER (bbl): 20.0 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	—		15JAN85	4 15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS PRESS.	TEMP
NSM RESOURCES LTD.	0.0	.7200	8064.3-8080.7Ft	14.650 psi	60 F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ Xmscf/bbl ☐ bbl/MMscf	WOR bbl/bbl	WGR bbl/mscf	LGR BL/MMCF
1 15 0930	12.67	768	55	16.0	222			869.73	0.00	0.00	0.000	0.00	0.00	1 0.00
2 15 1000	13.17	798	55	16.0	223			879.59	0.00	0.00	0.000	0.00	0.00	2 0.00
3 15 1030	13.67	810	55	16.0	227			998.39	0.00	0.00	0.000	0.00	0.00	3 0.00
4 15 1039	13.82	810	55	16.0										4
5 15 1039	0.00	0	0	0.0										5
6 15 1700	6.35	0	0	0.0										6
7 15 1800	7.35	1540	0	0.0										7
8 15 1830	7.85	1577	0	0.0										8
9 15 1900	8.35	1598	0	0.0										9
10 15 1930	8.85	1613	0	0.0										10
11 15 2000	9.35	1627	0	0.0										11
12 15 2030	9.85	1641	0	0.0										12
13 15 2100	10.35	1653	0	0.0										13
14 15 2130	10.85	1667	0	0.0										14
15 15 2200	11.35	1678	0	0.0										15
16 15 2230	11.85	1690	0	0.0										16

H2S = 2,500 PPM

SHUT-IN WELL / RUN RECORDERS

RUN 180 HR. RECORDERS @ 8028.72 FT.

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0900	2230			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
63.5	0	0	0.0		

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		15JAN85	5	15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ Ft psig	BOTTOM HOLE TEMP. @ Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ Xmscf / bbl ☐ bbl / MMscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF	
1 15 2300	12.35	1701	0	0.0											1
2 15 2330	12.85	1712	0	0.0											2
3 15 2400	13.35	1722	0	0.0											3
4 16 0030	13.85	1732	0	0.0											4
5 16 0100	14.35	1740	0	0.0											5
6 16 0130	14.85	1749	0	0.0											6
7 16 0200	15.35	1759	0	0.0											7
8 16 0230	15.85	1767	0	0.0											8
9 16 0300	16.35	1777	0	0.0											9
10 16 0330	16.85	1785	0	0.0											10
11 16 0400	17.35	1790	0	0.0											11
12 16 0400	0.00	1790	0	0.0	OPEN WELL										12
13 16 0405	.08	1764	0	10.0	CHOKE AT 10/64										13
14 16 0410	.17	1747	0	10.0											14
15 16 0415	.25	1737	43	10.0	METER IN SERVICE / OR PLT AT .75										15
16 16 0430	.50	1709	41	10.0	404			698.08	0.00	.00	0.000	0.00	0.00	0.00	16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
2230	0430			

GAS (mscf): 7.3 OIL (bbl): 0.0 WATER (bbl): 0.0 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		16JAN85	6 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ ~~mscf/bbl~~ ☐ ~~bbl~~/MMscf	WOR bbl/~~bbl~~	WGR bbl/~~mscf~~	LGR BL/MMCF
1 16 0445	.75	1697	41	10.0	400			715.26	0.00	0.00	0.000	0.00	0.00	0.00
2 16 0500	1.00	1680	41	10.0	407			713.70	0.00	0.00	0.000	0.00	0.00	0.00
3 16 0530	1.50	1652	41	10.0	407			671.51	0.00	0.00	0.000	0.00	0.00	0.00
4 16 0600	2.00	1640	41	10.0	407			700.91	0.00	0.00	0.000	0.00	0.00	0.00
						SHUT-IN WELL								
5 16 0600	0.00	1640	0	0.0										
6 16 0605	.08	1670	0	0.0										
7 16 0610	.17	1682	0	0.0										
8 16 0615	.25	1688	0	0.0										
9 16 0630	.50	1702	0	0.0										
10 16 0645	.75	1712	0	0.0										
11 16 0700	1.00	1723	0	0.0										
12 16 0715	1.25	1733	0	0.0										
13 16 0730	1.50	1738	0	0.0										
14 16 0745	1.75	1745	0	0.0										
15 16 0800	2.00	1750	0	0.0										
						OPEN WELL FOR RATE #2								
16 16 0800	0.00	1750	0	0.0										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0430	0800			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
58.1	0	0	0.0		

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69			16JAN85	7 15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ Xmscf/bbl ☐ bbl/MMscf	WOR (bbl/bbl)	WGR (bbl/mscf)	LGR BL/MMCF
1 16 0805	.08	1710	0	14.0										
2 16 0810	.17	1645	0	14.0										
3 16 0815	.25	1595	0	14.0										
4 16 0830	.50	1532	45	14.0	404			1591.70	0.00	0.00	0.000	0.00	0.00	0.00
5 16 0836	.60	1532	45	14.0										
6 16 0845	.75	1560	45	14.0	402			1433.07	0.00	0.00	0.000	0.00	0.00	0.00
7 16 0900	1.00	1545	46	14.0	394			1400.23	0.00	66.10	0.000	0.00	47.21	47.21
8 16 0915	1.25	1530	46	14.0	395			1499.39	0.00	0.00	0.000	0.00	0.00	0.00
9 16 0930	1.50	1494	46	14.0	399			1478.16	0.00	0.00	0.000	0.00	0.00	0.00
10 16 0945	1.75	1462	46	14.0	398			1428.90	0.00	0.00	0.000	0.00	0.00	0.00
11 16 1000	2.00	1435	46	14.0	398			1426.71	0.00	132.20	0.000	0.00	92.66	92.66
12 16 1000	0.00	0	0	0.0										
13 16 1005	.08	1515	0	0.0										
14 16 1005	.08	1515	0	0.0										
15 16 1010	.17	1550	0	0.0										
16 16 1015	.25	1572	0	0.0										

CHANGE CHOKE TO 14/64

FLUID TO SURFACE

SALINITY AT 170,000 PPM

SHUT-IN RATE #2

H2S = 3%

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0800	1015			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
122.4	0.0	2.1			

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		16JAN85	8 15

CUSTOMER: NSM RESOURCES LTD.

OIL GRAVITY @ 60° F (°API): 0.0 | GAS SPECIFIC GRAVITY (AIR = 1): 0.0000 | INTERVAL TESTED ( ): 3064.3-8080.7Ft | STANDARD CONDITIONS: 14.650 psi PRESS. 60 F TEMP

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☐ Xmscf/bbl ☐ bbl/MMscf	WOR (bbl/bbl)	WGR (bbl/Mscf)	LGR BL/MMCF	
1 16 1030	.50	1572	0	0.0											1
2 16 1045	.75	1622	0	0.0											2
3 16 1100	1.00	1640	0	0.0											3
4 16 1115	1.25	1660	0	0.0											4
5 16 1130	1.50	1672	0	0.0											5
6 16 1145	1.75	1685	0	0.0											6
7 16 1200	2.00	1695	0	0.0											7
8 16 1200	0.00	1695	0	18.0	OPEN FOR RATE #3										8
9 16 1205	.08	1520	0	18.0	CHOKE AT 18/64 / OR. PLT. AT 1.25										9
10 16 1210	.17	1455	0	18.0											10
11 16 1215	.25	1415	48	18.0	412			2309.78	0.00	0.00	0.000	0.00	0.00	0.00	11
12 16 1230	.50	1407	50	18.0	414			2207.28	0.00	0.00	0.000	0.00	0.00	0.00	12
13 16 1245	.75	1330	50	18.0	414			2363.30	0.00	0.00	0.000	0.00	0.00	0.00	13
14 16 1300	1.00	1275	50	18.0	414			2096.82	0.00	88.51	0.000	0.00	42.21	42.21	14
15 16 1315	1.25	1207	50	18.0	407			2061.92	0.00	0.00	0.000	0.00	0.00	0.00	15
16 16 1330	1.50	1132	50	18.0	411			2064.90	0.00	0.00	0.000	0.00	0.00	0.00	16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1015	1330			

GAS (mscf): 179.9 OIL (bbl): 0 WATER (bbl): .9 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		16JAN85	9 15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psia	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR ☐ bbl OR mmscf	WOR (bbl)/(bbl)	WGR (bbl)/(mmscf)	LGR BL/MMCF
1 16 1345	1.75	1112	50	18.0	410			1963.16	0.00	0.00	0.000	0.00	0.00	0.00
2 16 1400	2.00	1060	50	18.0	408			SALINITY=135,000 PPM / H2S=3% 1895.54	0.00	87.38	0.000	0.00	46.10	46.10
3 16 1430	2.50	970	50	18.0	407			1728.76	0.00	0.00	0.000	0.00	0.00	0.00
4 16 1500	3.00	925	50	18.0	405			SALINITY=129,000 PPM 1589.39	0.00	11.20	0.000	0.00	7.05	7.05
5 16 1530	3.50	868	46	18.0	402			1267.82	0.00	0.00	0.000	0.00	0.00	0.00
6 16 1600	4.00	820	48	18.0	405			1425.55	0.00	0.00	0.000	0.00	0.00	0.00
7 16 1630	4.50	765	48	18.0	412			1210.99	0.00	0.00	0.000	0.00	0.00	0.00
8 16 1647	4.78	0	0	0.0				FLOW LINE FREEZING OFF / INJECT METHANOL						
9 16 1700	5.00	802	48	18.0	405			SALINITY=82,100 PPM 1314.63	0.00	11.20	0.000	0.00	8.52	8.52
10 16 1730	5.50	683	50	18.0	404			H2S=3% 1248.08	0.00	0.00	0.000	0.00	0.00	0.00
11 16 1800	6.00	650	46	18.0	401			SALINITY=73,200 PPM 1022.97	0.00	21.85	0.000	0.00	21.36	21.36
12 16 1823	6.38	650	46	18.0				CHANGE OR. PLT. TO 1.0						
13 16 1826	6.43	650	46	18.0				TOOK DUPLICATE GAS/COND. SAMPLES #3075 AND #3697						
14 16 1830	6.50	635	46	18.0	400			1000.47	0.00	0.00	0.000	0.00	0.00	0.00
15 16 1900	7.00	622	46	18.0	400			SALINITY=119,000 PPM / CHANGE OR. PLT. TO .875 743.50	0.00	43.69	0.000	0.00	58.77	58.77
16 16 1930	7.50	605	46	18.0	400			LOWER HEATER TEMP. 902.62	0.00	0.00	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1330	1930			

GAS (mscf): 319.7 OIL (bbl): 0 WATER (bbl): 2.7 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		16JAN85	10	15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7820	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
								H2S=3% / SOD. CHLORIDE=12.5%						
1 16 2000	8.00	590	46	18.0	400			882.08	0.00	0.00	0.000	0.00	0.00	0.00
2 16 2030	8.50	580	46	18.0	400			893.14	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=144,000 PPM / SOD. CHL.=15%						
3 16 2100	9.00	576	46	18.0	400			879.84	0.00	88.51	0.000	0.00	100.59	100.59
4 16 2230	10.50	562	46	18.0	230			789.70	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=158,000 PPM / SOD. CHL.=16.6%						
5 16 2300	11.00	550	45	18.0	230			760.76	0.00	66.10	0.000	0.00	86.88	86.88
6 16 2330	11.50	550	45	18.0	230			755.69	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=163,000 PPM / SOD. CHL.=17%						
7 16 2400	12.00	540	46	18.0	230			758.66	0.00	22.41	0.000	0.00	29.53	29.53
8 17 0030	12.50	532	46	18.0	230			742.88	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=167,000 PPM / SOD. CHL.=17%						
9 17 0100	13.00	534	45	18.0	230			725.37	0.00	43.69	0.000	0.00	60.23	60.23
10 17 0130	13.50	522	45	18.0	230			747.23	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=170,000 PPM / SOD. CHL.=17%						
11 17 0200	14.00	517	45	18.0	235			763.81	0.00	44.25	0.000	0.00	57.94	57.94
12 17 0230	14.50	515	46	18.0	234			690.88	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=170,000 PPM / SOD. CHL.=17.2%						
13 17 0300	15.00	505	46	18.0	237			708.35	0.00	44.25	0.000	0.00	62.47	62.47
14 17 0330	15.50	500	45	18.0	230			772.46	0.00	0.00	0.000	0.00	0.00	0.00
								SALINITY=173,000 PPM / SOD. CHL.=17.6%						
15 17 0400	16.00	485	45	18.0	230			750.08	0.00	87.95	0.000	0.00	117.25	117.25
16 17 0430	16.50	492	45	18.0	230			637.30	0.00	0.00	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	OF	NUMBER
1930	0430				

GAS (mscf): 288.3 OIL (bbl): 0 WATER (bbl): 8.3 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		17JAN85	11	15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7820	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

	DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP @ 0 F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☐X mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1	17								SALINITY=173,000 PPM / SOD. CHL.=17.8%						1
2	0500	17.00	487	45	18.0	237			749.29	0.00	88.51	0.000	0.00	118.12	118.12
3	17 0530	17.50	462	45	18.0	234			675.46	0.00	0.00	0.000	0.00	0.00	0.00
4	17 0600	18.00	463	45	18.0	230			SALINITY=177,000 PPM / SOD. CHL.=18% 755.69	0.00	0.00	0.000	0.00	0.00	0.00
5	17 0630	18.50	470	45	18.0	235			750.86	0.00	0.00	0.000	0.00	0.00	0.00
6	17 0700	19.00	440	45	18 0	232			SALINITY=173,000 PPM / SOD. CHL.=17.2% 762.34	0.00	110.35	0.000	0.00	144.75	144.75
7	17 0730	19.50	435	45	18.0	230			765.17	0.00	0.00	0.000	0.00	0.00	0.00
8	17 0800	20.00	428	45	18.0	233			SALINITY=169,000 PPM / SOD. CHL.=17% 691.82	0.00	21.85	0.000	0.00	31.58	31.58
9	17 0830	20.50	435	45	18.0	237			697.76	0.00	0.00	0.000	0.00	0.00	0.00
10	17 0845	20.75	435	45	18.0				TOOK 2 WELL HEAD SAMPLES #3376 AND #3099						10
11	17 0900	21.00	425	45	18.0	232			SALINITY=170,000 PPM / SOD. CHL.=17% 0.00	0.00	87.95	0.000	0.00	0.00	0.00
12	17 0900	0.00	425	45	18 0				SHUT-IN WELL						11 12
13	17 0905	.08	520	0	0.0										13
14	17 0910	.17	545	0	0.0										14
15	17 0915	.25	565	0	0.0										15
16	17 0930	.50	602	0	0.0										16
	17 0945	.75	628	0	0.0										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0430	0945			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
141.2	0	6.4			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		17JAN85	12 15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf / GOR bbl ☐ bbl / OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 17 1000	1.00	650	0	0.0										1
2 17 1030	1.50	695	0	0.0										2
3 17 1100	2.00	735	0	0.0										3
4 17 1130	2.50	768	0	0.0										4
5 17 1200	3.00	799	0	0.0										5
6 17 1230	3.50	839	0	0.0										6
7 17 1300	4.00	853	0	0.0										7
8 17 1330	4.50	875	0	0.0										8
9 17 1400	5.00	902	0	0 0										9
10 17 1430	5.50	922	0	0.0										10
11 17 1500	6.00	929	0	0 0										11
12 17 1530	6.50	946	0	0.0										12
13 17 1600	7.00	960	0	0.0										13
14 17 1630	7.50	975	0	0.0										14
15 17 1700	8.00	985	0	0.0										15
16 17 1730	8.50	990	0	0.0										16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0945	1730			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0.0	0	0	0.0		

TEST RESULTS

OTIS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		17JAN85	13 15

CUSTOMER: NSM RESOURCES LTD.

OIL GRAVITY @ 60° F (°API): 0.0

GAS SPECIFIC GRAVITY (AIR = 1): 0.0000

INTERVAL TESTED ( ): 8064.3-8080.7Ft

STANDARD CONDITIONS: 14.650 PRESS. psi, 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP @ 0 F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf / GOR bbl ☐ bbl / GOR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL./MMCF
1 17														1
1800 17	9.00	1010	0	0.0										2
1830 17	9.50	1022	0	0.0										3
1900 17	10.00	1033	0	0.0										4
1930 17	10.50	1043	0	0.0										5
2000 17	11.00	1053	0	0.0										6
2030 17	11.50	1063	0	0.0										7
2100 17	12.00	1073	0	0.0										8
2130 17	12.50	1082	0	0.0										9
2200 17	13.00	1092	0	0.0										10
2230 17	13.50	1102	0	0.0										11
2300 17	14.00	1111	0	0.0										12
2330 17	14.50	1121	0	0.0										13
2400 18	15.00	1132	0	0.0										14
0030 18	15.50	1143	0	0.0										15
0100 18	16.00	1150	0	0.0										16
0130	16.50	1158	0	0.0										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1730	0130			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0.0	0	0	0.0		

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		18JAN85	14 15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD	0.0	0.0000	8064.3-8080.7Ft	14.650 PRESS. psi 60 TEMP F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☐X mscf / GOR bbl ☐ bbl / OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL./MMCF
1 18 0200	17.00	1167	0	0.0										1
2 18 0230	17.50	1173	0	0.0										2
3 18 0300	18.00	1181	0	0.0										3
4 18 0330	18.50	1188	0	0.0										4
5 18 0400	19.00	1196	0	0.0										5
6 18 0430	19.50	1204	0	0.0										6
7 18 0500	20.00	1211	0	0.0										7
8 18 0530	20.50	1218	0	0.0										8
9 18 0600	21.00	1225	0	0.0										9
10 18 0630	21.50	1230	0	0.0										10
11 18 0700	22.00	1235	0	0.0										11
12 18 0730	22.50	1240	0	0.0										12
13 18 0800	23.00	1247	0	0.0										13
14 18 0830	23.50	1250	0	0.0										14
15 18 0900	24.00	1256	0	0.0										15
16 18 0905	24.08	0	0	0.0	BLEED OFF FLOWLINE / RIGGED UP TO PULL RECORDERS									16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0130	0905			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0	0	0.0		

OTIS

TEST RESULTS

OEC—869-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		18JAN85	15 15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	8064.3-8080.7Ft	14.650 Press. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP @ 0 F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☒ mscf/bbl ☐ bbl/mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF	
18 1207	27.12	0	0	0.0											RECORDERS OUT OF HOLE / BLED OFF TUBING
18 1300	28.00	0	0	0.0											TUBING BLED OFF / PROCEEDED TO KILL THE WELL
18 1300	28.00	0	0	0.0											END OF TEST #2

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0905	1300		END	xxx TEST

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS (mscf)	OIL (bbl)	WATER (bbl)
0.0	0.0	0.0	1981.9	0.0	80.6

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	1 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf OR bbl ☐ bbl OR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF	
1 21 0230	0.00	0	0	0.0				DOWELL FINISHED ACID JOB							1
2 21 0240	.17	0	0	0.0				WELL FLOWED ON BY ITSELF TO RIG TANK							2
3 21 0305	.58	0	0	0.0				FLOWED 20 BARRELS BACK TO RIG TANK							3
4 21 0400	1.50	0	0	0.0				PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							4
5 21 0415	1.75	0	0	0.0				PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							5
6 21 0430	2.00	0	0	0.0				PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							6
7 21 0440	2.17	0	0	0.0				PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							7
8 21 0445	2.25	0	0	0.0				WELL FLOWED BY ITSELF (RECOVERED 15 BARRELS)							8
9 21 0450	2.33	440	0	0.0				SWITCH THROUGH TO SEPARATOR ON 21/64 CHOKE							9
10 21 0455	2.42	516	0	21.0	0			OPEN GAUGE READING WAS 2.76 IN. 0.00	0.00	31.99	0.000	0.00	0.00	0.00	10
11 21 0500	2.50	430	0	25.0				INCREASE CHOKE							11
12 21 0505	2.58	460	0	35.0				INCREASE CHOKE							12
13 21 0510	2.67	225	0	45.0				INCREASE CHOKE							13
14 21 0515	2.75	175	0	45.0											14
15 21 0533	3.05	175	0	35.0				CUT CHOKE BACK							15
16 21 0600	3.50	0	0	35.0				NO PRESSURE ON TUBING							16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0230	0600			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0.0	0	3.2			

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	2 8

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STAND. RC CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	GOR ☒ mscf/bbl ☐ bbl/mmscf	WGR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF	
21 0700	4.50	0	0	35.0				NO PRESSURE ON TUBING							1
21 0700	0.00	0	0	0.0				SHUT-IN WELL							2
21 0745	.75	0	0	0.0				PULL SWAB #1 (FLUID AT 4000 FT.)							3
21 0820	1.33	0	0	0.0				PULL SWAB #2 (FLUID AT 4000 FT.)							4
21 0830	0.00	0	0	0.0				SHUT-IN WELL / TOOK GAS SAMPLES / GAS GRAV.=1%							5
21 0830	0.00	100	0	0.0											6
21 0844	.23	175	0	0.0											7
21 0900	.50	184	0	0.0											8
21 0900	0.00	184	0	64.0				OPEN WELL THROUGH SEPARATOR TO GET GAS RATE							9
21 0910	.17	84	26	64 0	80			SALINITY=148,000 PPM 0.00	0.00	85.61	0.000	0.00	0.00	0.00	10
21 0915	.25	20	26	64.0											11
21 0927	.45	0	0	0.0				WELL WENT DEAD / RIG CREW READY TO PULL SWAB							12
21 0945	.75	0	0	64.0	0			SALINITY=109,600 PPM 0.00	0.00	529.35	0.000	0.00	0.00	0.00	13
21 1015	1.25	0	0	64.0	0			PULL SWAB #4 / SAL.=100,000 PPM / FLD @ 5000 FT 0.00	0.00	308.65	0.000	0.00	0.00	0.00	14
21 1030	1.50	30	37	64.0											15
21 1045	1.75	27	37	64.0											16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0600	1045			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0.	0	32.6			

TEST RESULTS

OTIS — OKC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	3 8

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP. @ 0 Ft	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf / GOR bbl ☐ bbl / OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 21 1100	2.00	2	37	64.0										1
2 21 1120	2.33	0	0	64.0	0			PULL SWAB #5 / SALINITY=91,000 PPM 0.00	0.00	363.82	0.000	0.00	0.00	0.00
3 21 1130	2.50	12	46	64.0										3
4 21 1145	2.75	2	37	64.0										4
5 21 1200	3.00	0	0	64.0				WELL WENT DEAD						5
6 21 1215	3.25	0	0	64.0	0			PULL SWAB #6 / SALINITY=91,000 PPM 0.00	0.00	264.40	0.000	0.00	0.00	0.00
7 21 1230	3.50	4	43	64.0										7
8 21 1242	3.70	0	0	64.0				WELL WENT DEAD						8
9 21 1315	4.25	0	0	64.0				PULL SWAB #7 / PULLED FROM P.S.N.						9
10 21 1330	4.50	10	48	64.0	0			SALINITY=83,900 PPM 0.00	0.00	88.23	0.000	0.00	0.00	0.00
11 21 1330	4.50	10	48	64.0										11
12 21 1345	4.75	0	43	64.0										12
13 21 1413	5.22	0	43	64.0	0			PULL SWAB #8 / SALINITY=82,100 PPM 0.00	0.00	153.64	0.000	0.00	0.00	0.00
14 21 1415	5.25	0	43	64.0										14
15 21 1430	5.50	5	48	64.0										15
16 21 1445	5.75	2	48	64.0										16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1045	1445			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0	0	0	17.2		

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	4 8

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR ☐ bbl ☐ bbl OGR mmscf	WOR (bbl)/bbl	WGR (bbl)/mmscf	LGR BL/MMCF	
21 1530	6.50	2	48	64.0	0		PULL SWAB #9 / SALINITY=83,900 PPM	0.00	0.00	154.60	0.000	0.00	0.00	0.00	1
21 1545	6.75	4	48	64.0											2
21 1600	7.00	0	0	64.0			WELL WENT DEAD								3
21 1619	7.32	0	0	64.0	0		PULL SWAB #10 / SALINITY=72.300 PPM	0.00	0.00	77.60	0.000	0.00	0.00	0.00	4
21 1630	7.50	5	45	64.0											5
21 1645	7.75	0	45	64.0											6
21 1700	8.00	0	45	64.0											7
21 1722	8.37	0	45	64.0	0		PULL SWAB #11 / SALINITY=67,800 PPM	0.00	0.00	240.61	0.000	0.00	0.00	0.00	8
21 1730	8.50	7	46	64.0											9
21 1745	8.75	2	43	64.0											10
21 1800	9.00	0	41	64.0											11
21 1826	9.43	0	41	64.0	0		PULL SWAB #12 / SALINITY=61,100 PPM	0.00	0.00	127.33	0.000	0.00	0.00	0.00	12
21 1830	9.50	8	37	64.0											13
21 1845	9.75	0	39	64.0											14
21 1915	10.25	0	39	64.0	0		PULL SWAB #13 / SALINITY=57,100 PPM	0.00	0.00	44.25	0.000	0.00	0.00	0.00	15
21 1930	10.50	6	41	64.0											16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1445	1930			

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS ( )	OIL ( )	WATER ( )
0.0	0	13.6			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	5 8

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft	BOTTOM HOLE TEMP. @ 0 Ft	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 21 1945	10.75	0	43	64.0										1
2 21 2010	11.17	0	43	64.0	0	PULL SWAB #14 / SALINITY=60,700 PPM		0.00	0.00	158.64	0.000	0.00	0.00	0.00 2
3 21 2030	11.50	7	43	64.0										3
4 21 2045	11.75	0	39	64.0										4
5 21 2100	12.00	0	39	64.0	0	PULL SWAB #15 / SALINITY=57,100 PPM		0.00	0.00	308.09	0.000	0.00	0.00	0.00 5
6 21 2130	12.50	10	45	64.0										6
7 21 2145	12.75	0	41	64.0										7
8 21 2200	13.00	0	41	64.0	0	PULL SWAB #16 / SALINITY=55,400 PPM		0.00	0.00	309.21	0.000	0.00	0.00	0.00 8
9 21 2230	13.50	12	46	64.0										9
10 21 2245	13.75	0	43	64.0										10
11 21 2300	14.00	0	37	64.0										11
12 21 2305	14.08	0	37	64.0	0	PULL SWAB #17 / SALINITY=55,400 PPM		0.00	0.00	927.62	0.000	0.00	0.00	0.00 12
13 21 2330	14.50	8	45	64.0										13
14 21 2345	14.75	0	41	64.0										14
15 21 2400	15.00	0	36	64.0										15
16 22 0020	15.33	0	36	64.0		PULL SWAB #18 / SALINITY=55,400 PPM								16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1930	0020			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0	12.4			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
0	NSM ARROWHEAD G-69	-		22JAN85	6 8

CUSTOMER	OIL GRAVITY 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 22								PULL SWAB #19 / SALINITY=55,400 PPM						1
0040	15.67	0	36	64.0	0			0.00	0.00	99.15	0.000	0.00	0.00	0.00
2 22								PULL SWAB #20 / SALINITY=55,400 PPM						2
0115	16.25	0	36	64.0										3
3 22														
0130	16.50	55	0	64.0										4
4 22								SHUT-IN FOR BUILD-UP						
0130	0.00	0	0	0.0										5
5 22														
0200	.50	90	0	0.0										6
6 22								BLEED PRESSURE OFF TO TANKS						
0205	.58	105	0	0.0										7
7 22								OPEN WELL						
0205	0.00	105	0	0.0										8
8 22								PULL SWAB #21 / SALINITY=55,400 PPM						
0210	.08	8	45	64.0	0			0.00	0.00	11.92	0.000	0.00	0.00	0.00
9 22														9
0230	.42	8	45	64.0										10
10 22														
0245	.67	2	39	64.0										11
11 22														
0300	.92	0	39	64.0										12
12 22								PULL SWAB #22 / SALINITY=51,800 PPM						
0310	1.08	0	39	64.0	0			0.00	0.00	132.76	0.000	0.00	0.00	0.00
13 22														13
0330	1.42	11	46	64.0										14
14 22														
0345	1.67	0	41	64.0										15
15 22														
0400	1.92	0	37	64.0										16
16 22								PULL SWAB #23 / SALINITY=46,400 PPM						
0410	2.08	0	37	64.0	0			0.00	0.00	462.13	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0020	0410			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0	6.0			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	--	22JAN85	7 8

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0 0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☐Xmscf GOR bbl ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 22								DECREASE CHOKE TO 30/64						1
0430	2.42	15	48	30.0										
2 22														2
0445	2.67	7	43	30.0										
3 22														3
0500	2.92	0	36	30.0										
4 22								PULL SWAB #24 / SALINITY=46,400 PPM						4
0515	3.17	0	36	30.0	0			0.00	0.00	88.51	0.000	0.00	0.00	0.00
5 22								DECREASE CHOKE TO 25/64						5
0530	3.42	0	43	25.0										
6 22														6
0545	3.67	0	39	25.0										
7 22														7
0600	3.92	0	37	25.0										
8 22								PULL SWAB #25 / SALINITY=42,900 PPM / CHK AT 64						8
0610	4.08	0	37	64.0	0			0.00	0.00	265.52	0.000	0.00	0.00	0.00
9 22														9
0630	4.42	20	45	64.0										
10 22														10
0645	4.67	0	43	64.0										
11 22														11
0700	4.92	0	41	64.0										
12 22								PULL SWAB #26 / SALINITY=48,200 PPM						12
0727	5.37	0	41	64.0	0			0.00	0.00	220.33	0.000	0.00	0.00	0.00
13 22														13
0730	5.42	0	41	64.0										
14 22														14
0745	5.67	0	41	64.0										
15 22														15
0800	5.92	0	41	64.0										
16 22								PULL SWAB #27 / SALINITY=44,600 PPM						16
0813	6.13	0	41	64.0	0			0.00	0.00	152.54	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0410	0813			

GAS (mscf):	OIL (bbl):	WATER (bbl):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0	8.3			

TEST RESULTS

OTIS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		22JAN85	8 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	7486.9-7503.3Ft	14.650 PRESS. psi 60 TEMP F

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE psig	WELL HEAD TEMP. F	CHOKE SIZE 64th	SEPARATOR PRESSURE psig	BOTTOM HOLE PRESSURE @ 0 Ft psig	BOTTOM HOLE TEMP. @ 0 Ft F	CORRECTED GAS FLOW RATE Q_g mscf/d	CORRECTED OIL FLOW RATE Q_o bbl/d	WATER FLOW RATE bbl/d	☒ mscf GOR bbl / ☐ bbl OGR mmscf	WOR (bbl/bbl)	WGR (bbl/mmscf)	LGR BL/MMCF
1 22 0815	6.17	0	41	64.0										
2 22 0830	6.42	0	41	64.0										
3					WELL WENT DEAD									
4 22 0845	6.67	0	0	64.0										
5 22 0922	7.28	0	41	64.0	0	PULL SWAB #28 / SALINITY=46,400 PPM		0.00	0.00	38.13	0.000	0.00	0.00	0.00
22 0922	7.28	0	0	0.0		TOOK GAS SAMPLES #4363 & #3309 / END OF TEST #4								
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF xxx TEST
0813	0922		END	

GAS (mscf)	OIL (bbl)	WATER (bbl)	GAS (mscf)	OIL (bbl)	WATER (bbl)
0.0	0.0	1.4	0.0	0.0	94.6

Test Results
—Blank

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
1	NSM ARROWHEAD G-69	-		09JAN85	1 2

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2484.5-2488 M	101.008 Press. kPa 16 Temp C

	DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
1	09 2300	0.00	0	0	0.0			RIG IN FLOW LINE AND D.W.T. LINE								1
2	09 2345	.75	6495	0	5.6											2
3	09 2350	.83	827	0	11.5			LIQUID TO SURFACE								3
4	09 2355	.92	-345	0	11.5			SWITCH FROM D.W.T. TO PSI GAUGE (0-200 PSI)								4
5	10 0005	1.08	207	0	13.9	0			0	21.05	0.00	0.000	0.00	0.00	0.00	5
6	10 0010	1.17	276	0	13.9											6
7	10 0015	1.25	255	0	15.9											7
8	10 0020	1.33	221	0	19.4											8
9	10 0030	1.50	221	0	19.4											9
10	10 0045	1.75	0	0	25.4	0			0	23.65	0.00	0.000	0.00	0.00	0.00	10
11	10 0050	1.83	0	0	25.4											11
12	10 0050	0.00	0	0	0.0			SHUT-IN FOR BUILD-UPS								12
13	10 0105	.25	689	0	0.0			OPEN WELL ON 50/64								13
14	10 0105	0.00	0	0	19.8											14
15	10 0118	.22	0	0	19.8											15
16	10 0118	0.00	0	0	0.0			SHUT-IN WELL								16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
2300	0118			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	1.0	0.0			

OTIS oils

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
1	NSM ARROWHEAD G-69	-		10JAN85	2 2

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2484.5-2488 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 10 0130	.20	359	0	19.8	0			0	14.01	0.00	0.000	0.00	0.00	0.00
2 10 0240	1.37	0	0	0.0										
3 10 0240	0.00	0	0	0.0										
4 10 0300	.33	0	0	0.0										
5 10 0330	.83	0	0	0.0										
6 10 0800	5.33	0	0	0.0										
7 10 0800	0.00	0	0	0.0										
8 10 0800	0.00	0	0	0.0										

1 OPEN WELL

2 SHUT-IN WELL AND RIG OFF FLOWLINE

4 RIG OUT FLOW LINE, PROD. LINE, DWL, TO DRAIN FLD

5 RIG IN TO FLOW TO MUD TANK

6 DRAINED WATER INTO FLARE PIT (1.77 IN.)

7 LIQID PROD. WAS KCL, NO GAS DURING FLOW PERIOD

8 END OF TEST #1

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0118	0800		END	xxx TEST

GAS (M3):	OIL (M3):	WATER (M3):	GAS (M3):	OIL (M3):	WATER (M3):
0.0	0.0	0.0	0.0	0.0	2.0

OTIS

TEST RESULTS

OEC—869-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	--		14JAN85	1 15

CUSTOMER	OIL GRAVITY 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)		
1 14 1900	0.00	0	0	0.0										RIG UP TO SWAB	1
2 14 1910	.17	0	0	0.0										PULL SWAN #1 / RECOVER 6 BARRELS	2
3 14 1930	.50	0	0	0.0										PULL SWAN #2 / RECOVER 4 BARRELS	3
4 14 1940	.67	0	0	0.0										PULL SWAN #3 / RECOVER 4 BARRELS	4
5 14 2030	1.50	0	0	0.0										PULL SWAN #4 / RECOVER 0 BARRELS	5
6 14 2040	1.67	0	0	0.0										RIG UP FLOW LINE TO PIT	6
7 14 2050	1.83	0	0	0.0											7
8 14 2050	0.00	0	0	0.0										OPEN WELL TO PIT	8
9 14 2100	.17	0	0	0.0										PRESSURE UP FLOW LINE TO UNIT	9
10 14 2105	.25	0	0	0.0										BLEED OFF LINE / FIX LEAKS	10
11 14 2115	.42	0	0	0.0										PRESSURE UP FLOW LINE AND DWT LINE TO UNIT	11
12 14 2120	.50	10618	0	2.0										OPEN CHOKE	12
13 14 2121	.52	10390	0	2.4										INCREASE CHOKE	13
14 14 2122	.53	10342	0	3.2										INCREASE CHOKE	14
15 14 2123	.55	10384	0	4.0										INCREASE CHOKE	15
16 14 2124	.57	10439	0	5.6										INCREASE CHOKE	16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1900	2124			

GAS (M3)	OIL (M3)	WATER (M3)	GAS ( )	OIL ( )	WATER ( )
0.	0.	0.	0.0		

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-	14JAN85	2 15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 14 2115	.58	10528	0	5.6										1
2 14 2130	.67	10618	0	6.0				INCREASE CHOKE						2
3 14 2135	.75	10652	0	6.0				METER IN SERVICE / OPENING GAUGE =1.77 IN.						3
4 14 2140	.83	10515	0	6.4				INCREASE CHOKE						4
5 14 2143	.88	9446	0	8.7				INCREASE CHOKE						5
6 14 2155	1.08	9446	0	8.7										6
7 14 2205	1.25	10232	17	8.7	2137			40458	0.00	13.94	0.000	0.00	.00	.00 7
8 14 2215	1.42	10321	17	8.7				VAPORIZER BLEW OUT / RELIT PILOT						8
9 14 2225	1.58	10239	17	8.7										9
10 14 2230	1.67	10204	17	8.7	2551			67203	0.00	0.00	0.000	0.00	0.00	0.00 10
11 14 2245	1.92	10032	17	8.7										11
12 14 2300	2.17	9598	17	8.7	2896			53870	0.00	59.58	0.000	0.00	.00	.00 12
13 14 2330	2.67	9308	16	8.7	2806			49974	0.00	0.00	0.000	0.00	0.00	0.00 13
14 14 2400	3.17	8756	18	8.7	2654			SAL.=287,000 PPM 50151	0.00	0.00	0.000	0.00	0.00	0.00 14
15 15 0030	3.67	8184	17	8.7	2806			48833	0.00	0.00	0.000	0.00	0.00	0.00 15
16 15 0100	4.17	6771	17	8.7	2758			49400	0.00	161.28	0.000	0.00	.00	.00 16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	OF	NUMBER
2124	0100				

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
6469.8	0	6.4			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		15JAN85	3 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 15 0130	4.67	6509	16	8.7	2758			43886	0.00	0.00	0.000	0.00	0.00	0.00
2 15 0200	5.17	6481	16	8.7	2772		SAL.=231,000 PPM	42775	0.00	28.05	0.000	0.00	.00	.00
3 15 0230	5.67	6412	15	8.7	2827			40645	0.00	0.00	0.000	0.00	0.00	0.00
4 15 0300	6.17	6343	15	8.7	2765		SAL.=216,000 PPM / SODIUM CHLORIDE=22%	60443	0.00	28.05	0.000	0.00	.00	.00
5 15 0330	6.67	6067	15	8.7	2723			58445	0.00	0.00	0.000	0.00	0.00	0.00
6 15 0400	7.17	5998	16	8.7	2758		SAL.=225,000 PPM	58602	0.00	28.05	0.000	0.00	.00	.00
7 15 0430	7.67	5550	14	8.7	2654			53036	0.00	0.00	0.000	0.00	0.00	0.00
8 15 0500	8.17	5343	14	8.7	2654		SAL.= 196,000 PPM	51918	0.00	10.51	0.000	0.00	.00	.00
9 15 0600	9.17	4964	14	8.7	2654		SAL.=196,000 PPM	47182	0.00	0.00	0.000	0.00	0.00	0.00
10 15 0630	9.67	4881	15	8.7	2654			47182	0.00	0.00	0.000	0.00	0.00	0.00
11 15 0700	10.17	4688	14	8.7	1979			50117	0.00	35.09	0.000	0.00	.00	.00
12 15 0730	10.67	4523	14	8.7	1979			48580	0.00	0.00	0.000	0.00	0.00	0.00
13 15 0800	11.17	4440	13	8.7	1600			42749	0.00	22.80	0.000	0.00	.00	.00
14 15 0830	11.67	4275	13	8.7	1586			43341	0.00	0.00	0.000	0.00	0.00	0.00
15 15 0850	12.00	4275	13	6.4			CHANGE ORIFICE PLATE TO 1.125 / CHOKE TO 16/64							
16 15 0900	12.17	4723	13	6.4										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0100	0900			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
16238.0	0	3.2			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	–		15JAN85	4 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 15 0930	12.67	5295	13	6.4	1531			24638	0.00	0.00	0.000	0.00	0.00	0.00
2 15 1000	13.17	5502	13	6.4	1538		H2S = 2,500 PPM	24917	0.00	0.00	0.000	0.00	0.00	0.00
3 15 1030	13.67	5585	13	6.4	1565			28282	0.00	0.00	0.000	0.00	0.00	0.00
4 15 1039	13.82	5585	13	6.4										
5 15 1039	0.00	0	0	0.0			SHUT-IN WELL / RUN RECORDERS							
6 15 1700	6.35	0	0	0.0			RUN 180 HR. RECORDERS @ 8028.72 FT.							
7 15 1800	7.35	10618	0	0.0										
8 15 1830	7.85	10873	0	0.0										
9 15 1900	8.35	11018	0	0.0										
10 15 1930	8.85	11121	0	0.0										
11 15 2000	9.35	11218	0	0.0										
12 15 2030	9.85	11314	0	0.0										
13 15 2100	10.35	11397	0	0.0										
14 15 2130	10.85	11494	0	0.0										
15 15 2200	11.35	11569	0	0.0										
16 15 2230	11.85	11652	0	0.0										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0900	2230			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
1798.4	0	0.0			

TEST RESULTS

OTIS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		15JAN85	5 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 Press. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 15 2300	12.35	11728	0	0.0										1
2 15 2330	12.85	11804	0	0.0										2
3 15 2400	13.35	11873	0	0.0										3
4 16 0030	13.85	11942	0	0.0										4
5 16 0100	14.35	11997	0	0.0										5
6 16 0130	14.85	12059	0	0.0										6
7 16 0200	15.35	12128	0	0.0										7
8 16 0230	15.85	12183	0	0.0										8
9 16 0300	16.35	12252	0	0.0										9
10 16 0330	16.85	12307	0	0.0										10
11 16 0400	17.35	12342	0	0.0										11
12 16 0400	0.00	12342	0	0.0			OPEN WELL							12
13 16 0405	.08	12162	0	4.0			CHOKE AT 10/64							13
14 16 0410	.17	12045	0	4.0										14
15 16 0415	.25	11976	6	4.0			METER IN SERVICE / OR. PLT. AT .75							15
16 16 0430	.50	11783	5	4.0	2785			19775	0.00	0.00	0.000	0.00	0.00	16 0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
2230	0430			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
206.0	0	0.0			

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-	16JAN85	6 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3 / ☐ OGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 16 0445	.75	11700	5	4.0	2758			20262	0.00	0.00	0.000	0.00	0.00	0.00
2 16 0500	1.00	11583	5	4.0	2806			20218	0.00	0.00	0.000	0.00	0.00	0.00
3 16 0530	1.50	11390	5	4.0	2806			19022	0.00	0.00	0.000	0.00	0.00	0.00
4 16 0600	2.00	11307	5	4.0	2806			19855	0.00	0.00	0.000	0.00	0.00	0.00
5 16 0600	0.00	11307	0	0.0	SHUT-IN WELL									
6 16 0605	.08	11514	0	0.0										
7 16 0610	.17	11597	0	0.0										
8 16 0615	.25	11638	0	0.0										
9 16 0630	.50	11735	0	0.0										
10 16 0645	.75	11804	0	0.0										
11 16 0700	1.00	11880	0	0.0										
12 16 0715	1.25	11949	0	0.0										
13 16 0730	1.50	11983	0	0.0										
14 16 0745	1.75	12031	0	0.0										
15 16 0800	2.00	12066	0	0.0										
16 16 0800	0.00	12066	0	0.0	OPEN WELL FOR RATE #2									

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0430	0800			

GAS (M3): 1645.3 OIL (M3): 0 WATER (M3): 0.0 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-	16JAN85	7 15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☐K M3 / GOR M3 ☐ M3 / OGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
16 0805	.08	11790	0	5.6			CHANGE CHOKE TO 14/64								1
16 0810	.17	11342	0	5.6											2
16 0815	.25	10997	0	5.6											3
16 0830	.50	10563	7	5.6	2785			45090	0.00	0.00	0.000	0.00	0.00	0.00	4
16 0836	.60	10563	7	5.6			FLUID TO SURFACE								5
16 0845	.75	10756	7	5.6	2772			40596	0.00	0.00	0.000	0.00	0.00	0.00	6
16 0900	1.00	10652	8	5.6	2717			39666	0.00	10.51	0.000	0.00	.00	.00	7
16 0915	1.25	10549	8	5.6	2723			42475	0.00	0.00	0.000	0.00	0.00	0.00	8
16 0930	1.50	10301	8	5.6	2751			41873	0.00	0.00	0.000	0.00	0.00	0.00	9
16 0945	1.75	10080	8	5.6	2744			40478	0.00	0.00	0.000	0.00	0.00	0.00	10
16 1000	2.00	9894	8	5.6	2744		SALINITY AT 170,000 PPM	40416	0.00	21.02	0.000	0.00	.00	.00	11
16 1000	0.00	0	0	0.0			SHUT-IN RATE #2								12
16 1005	.08	10446	0	0.0			H2S = 3%								13
16 1005	.08	10446	0	0.0											14
16 1010	.17	10687	0	0.0											15
16 1015	.25	10839	0	0.0											16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0800	1015			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
3466.7	0	.3			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		16JAN85	8 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

DAY TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ M3 GOR M3 ☐ M3 OGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 16 1030	.50	10839	0	0.0										1
2 16 1045	.75	11183	0	0.0										2
3 16 1100	1.00	11307	0	0.0										3
4 16 1115	1.25	11445	0	0.0										4
5 16 1130	1.50	11528	0	0.0										5
6 16 1145	1.75	11618	0	0.0										6
7 16 1200	2.00	11687	0	0.0										7
8 16 1200	0.00	11687	0	7.1										8
9 16 1205	.08	10480	0	7.1										9
10 16 1210	.17	10032	0	7.1										10
11 16 1215	.25	9756	9	7.1	2841			65431	0.00	0.00	0.000	0.00	0.00	11 0.00
12 16 1230	.50	9701	10	7.1	2854			62528	0.00	0.00	0.000	0.00	0.00	12 0.00
13 16 1245	.75	9170	10	7.1	2854			66947	0.00	0.00	0.000	0.00	0.00	13 0.00
14 16 1300	1.00	8791	10	7.1	2854			59398	0.00	14.07	0.000	0.00	.00	14 .00
15 16 1315	1.25	8322	10	7.1	2806			58410	0.00	0.00	0.000	0.00	0.00	15 0.00
16 16 1330	1.50	7805	10	7.1	2834			58494	0.00	0.00	0.000	0.00	0.00	16 0.00

OPEN FOR RATE #3

CHOKE AT 18/64 / OR. PLT. AT 1.25

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1015	1330			

GAS (M3): 5096.4 OIL (M3): 0 WATER (M3): 1 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-	16JAN85	9 15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7200	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 16 1345	1.75	7667	10	7.1	2827			55612	0.00	0.00	0.000	0.00	0.00	0.00
2 16 1400	2.00	7308	10	7.1	2813		SALINITY=135,000 PPM / H2S=3%	53697	0.00	13.89	0.000	0.00	.00	.00
3 16 1430	2.50	6688	10	7.1	2806			48972	0.00	0.00	0.000	0.00	0.00	0.00
4 16 1500	3.00	6378	10	7.1	2792		SALINITY=129,000 PPM	45024	0.00	1.78	0.000	0.00	.00	.00
5 16 1530	3.50	5985	8	7.1	2772			35915	0.00	0.00	0.000	0.00	0.00	0.00
6 16 1600	4.00	5654	9	7.1	2792			40383	0.00	0.00	0.000	0.00	0.00	0.00
7 16 1630	4.50	5274	9	7.1	2841			34305	0.00	0.00	0.000	0.00	0.00	0.00
8 16 1647	4.78	0	0	0.0			FLOW LINE FREEZING OFF / INJECT METHANOL							
9 16 1700	5.00	5530	9	7.1	2792		SALINITY=82,100 PPM	37241	0.00	1.78	0.000	0.00	.00	.00
10 16 1730	5.50	4709	10	7.1	2785		H2S=3%	35356	0.00	0.00	0.000	0.00	0.00	0.00
11 16 1800	6.00	4482	8	7.1	2765		SALINITY=73,200 PPM	28978	0.00	3.47	0.000	0.00	.00	.00
12 16 1823	6.38	4482	8	7.1			CHANGE OR. PLT. TO 1.0							
13 16 1826	6.43	4482	8	7.1			TOOK DUPLICATE GAS/COND. SAMPLES #3075 AND #3697							
14 16 1830	6.50	4378	8	7.1	2758			28341	0.00	0.00	0.000	0.00	0.00	0.00
15 16 1900	7.00	4289	8	7.1	2758		SALINITY=119,000 PPM / CHANGE OR. PLT. TO .875	21062	0.00	6.95	0.000	0.00	.00	.00
16 16 1930	7.50	4171	8	7.1	2758		LOWER HEATER TEMP. C	25569	0.00	0.00	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1330	1930			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
9056.0	0	.4			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		16JAN85	10	15

CUSTOMER	OIL GRAVITY @ 60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7820	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M	BOTTOM HOLE TEMP. @ 0 C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	GOR ☒ M3/M3 ☐ DGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 16								H2S=3% / SOD. CHLORIDE=12.5%						1
2000	8.00	4068	8	7.1	2758			24988	0.00	0.00	0.000	0.00	0.00	0.00
2 16														2
2030	8.50	3999	8	7.1	2758			25301	0.00	0.00	0.000	0.00	0.00	0.00
3 16								SALINITY=144,000 PPM / SOD. CHL.=15%						3
2100	9.00	3971	8	7.1	2758			24924	0.00	14.07	0.000	0.00	.00	.00
4 16														4
2230	10.50	3875	8	7.1	1586			22370	0.00	0.00	0.000	0.00	0.00	0.00
5 16								SALINITY=158,000 PPM / SOD. CHL.=16.6%						5
2300	11.00	3792	7	7.1	1586			21551	0.00	10.51	0.000	0.00	.00	.00
6 16														6
2330	11.50	3792	7	7.1	1586			21407	0.00	0.00	0.000	0.00	0.00	0.00
7 16								SALINITY=163,000 PPM / SOD. CHL.=17%						7
2400	12.00	3723	8	7.1	1586			21491	0.00	3.56	0.000	0.00	.00	.00
8 17														8
0030	12.50	3668	8	7.1	1586			21044	0.00	0.00	0.000	0.00	0.00	0.00
9 17								SALINITY=167,000 PPM / SOD. CHL.=17%						9
0100	13.00	3682	7	7.1	1586			20548	0.00	6.95	0.000	0.00	.00	.00
10 17														10
0130	13.50	3599	7	7.1	1586			21167	0.00	0.00	0.000	0.00	0.00	0.00
11 17								SALINITY=170,000 PPM / SOD. CHL.=17%						11
0200	14.00	3565	7	7.1	1620			21637	0.00	7.04	0.000	0.00	.00	.00
12 17														12
0230	14.50	3551	8	7.1	1613			19571	0.00	0.00	0.000	0.00	0.00	0.00
13 17								SALINITY=170,000 PPM / SOD. CHL.=17.2%						13
0300	15.00	3482	8	7.1	1634			20066	0.00	7.04	0.000	0.00	.00	.00
14 17														14
0330	15.50	3447	7	7.1	1586			21882	0.00	0.00	0.000	0.00	0.00	0.00
15 17								SALINITY=173,000 PPM / SOD. CHL.=17.6%						15
0400	16.00	3344	7	7.1	1586			21248	0.00	13.98	0.000	0.00	.00	.00
16 17														16
0430	16.50	3392	7	7.1	1586			18053	0.00	0.00	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1930	0430			

GAS (M3): 8166.5 OIL (M3): 0 WATER (M3): 1.3 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		17JAN85	11	15

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	.7820	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 17								SALINITY=173,000 PPM / SOD. CHL.=17.8%						1
0500	17.00	3358	7	7.1	1634			21226	0.00	14.07	0.000	0.00	.00	.00
2 17														2
0530	17.50	3185	7	7.1	1613			19134	0.00	0.00	0.000	0.00	0.00	0.00
3 17								SALINITY=177,000 PPM / SOD. CHL.=18%						3
0600	18.00	3192	7	7.1	1586			21407	0.00	0.00	0.000	0.00	0.00	0.00
4 17														4
0630	18.50	3241	7	7.1	1620			21270	0.00	0.00	0.000	0.00	0.00	0.00
5 17								SALINITY=173,000 PPM / SOD. CHL.=17.2%						5
0700	19.00	3034	7	7.1	1600			21596	0.00	17.54	0.000	0.00	.00	.00
6 17														6
0730	19.50	2999	7	7.1	1586			21676	0.00	0.00	0.000	0.00	0.00	0.00
7 17								SALINITY=169,000 PPM / SOD. CHL.=17%						7
0800	20.00	2951	7	7.1	1606			19598	0.00	3.47	0.000	0.00	.00	.00
8 17														8
0830	20.50	2999	7	7.1	1634			19766	0.00	0.00	0.000	0.00	0.00	0.00
9 17								TOOK 2 WELL HEAD SAMPLES #3376 AND #3099						9
0845	20.75	2999	7	7.1										
10 17								SALINITY=170,000 PPM / SOD. CHL.=17%						10
0900	21.00	2930	7	7.1	1600			0	0.00	13.98	0.000	0.00	0.00	0.00
11 17								SHUT-IN WELL						11
0900	0.00	2930	7	7.1										
12 17														12
0905	.08	3585	0	0.0										
13 17														13
0910	.17	3758	0	0.0										
14 17														14
0915	.25	3896	0	0.0										
15 17														15
0930	.50	4151	0	0.0										
16 17														16
0945	.75	4330	0	0.0										

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0430	0945			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
4000.8	0	1.0			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-	17JAN85	12 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 17 1000	1.00	4482	0	0.0										1
2 17 1030	1.50	4792	0	0.0										2
3 17 1100	2.00	5068	0	0.0										3
4 17 1130	2.50	5295	0	0.0										4
5 17 1200	3.00	5509	0	0.0										5
6 17 1230	3.50	5785	0	0.0										6
7 17 1300	4.00	5881	0	0.0										7
8 17 1330	4.50	6033	0	0.0										8
9 17 1400	5.00	6219	0	0.0										9
10 17 1430	5.50	6357	0	0.0										10
11 17 1500	6.00	6405	0	0.0										11
12 17 1530	6.50	6522	0	0.0										12
13 17 1600	7.00	6619	0	0.0										13
14 17 1630	7.50	6722	0	0.0										14
15 17 1700	8.00	6791	0	0.0										15
16 17 1730	8.50	6826	0	0.0										16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0945	1730			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0.0	0	0.0		

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		17JAN85	13 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 Press. kPa 16 Temp C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 17 1800	9.00	6964	0	0.0										1
2 17 1830	9.50	7046	0	0.0										2
3 17 1900	10.00	7122	0	0.0										3
4 17 1930	10.50	7191	0	0.0										4
5 17 2000	11.00	7260	0	0.0										5
6 17 2030	11.50	7329	0	0.0										6
7 17 2100	12.00	7398	0	0.0										7
8 17 2130	12.50	7460	0	0.0										8
9 17 2200	13.00	7529	0	0.0										9
10 17 2230	13.50	7598	0	0.0										10
11 17 2300	14.00	7660	0	0.0										11
12 17 2330	14.50	7729	0	0.0										12
13 17 2400	15.00	7805	0	0.0										13
14 18 0030	15.50	7881	0	0.0										14
15 18 0100	16.00	7929	0	0.0										15
16 18 0130	16.50	7984	0	0.0										16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1730	0130	-		

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0	0	0.0		

OTIS

TEST RESULTS

OEC-865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
2	NSM ARROWHEAD G-69	-		18JAN85	14 15

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.C08 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 18 0200	17.00	8046	0	0.0										1
2 18 0230	17.50	8088	0	0.0										2
3 18 0300	18.00	8143	0	0.0										3
4 18 0330	18.50	8191	0	0.0										4
5 18 0400	19.00	8246	0	0.0										5
6 18 0430	19.50	8301	0	0.0										6
7 18 0500	20.00	8350	0	0.0										7
8 18 0530	20.50	8398	0	0.0										8
9 18 0600	21.00	8446	0	0.0										9
10 18 0630	21.50	8481	0	0.0										10
11 18 0700	22.00	8515	0	0.0										11
12 18 0730	22.50	8549	0	0.0										12
13 18 0800	23.00	8598	0	0.0										13
14 18 0830	23.50	8618	0	0.0										14
15 18 0900	24.00	8660	0	0.0										15
16 18 0905	24.08	0	0	0.0	BLEED OFF FLOWLINE / RIGGED UP TO PULL RECORDERS									16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	OF	NUMBER
0130	0905				

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0.0	0.0	0.0			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
2	NSM ARROWHEAD G-69	-		18JAN85	15	15

CUSTOMER	OIL GRAVITY @ 60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2458-2463 M	101.008 PRESS. kPa 16 TEMP C

	DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3 / ☐ M3 / ☐ OGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1	18 1207	27.12	0	0	0.0										
	RECORDERS OUT OF HOLE / BLED OFF TUBING														
2	18 1300	28.00	0	0	0.0										
	TUBING BLED OFF / PROCEEDED TO KILL THE WELL														
3	18 1300	28.00	0	0	0.0										
	END OF TEST #2														
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0905	1300		END	xxx TEST

GAS (M3):	OIL (M3):	WATER (M3):	GAS (M3):	OIL (M3):	WATER (M3):
0	0	0	56143.5	0.0	12.8

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	—	21JAN85	1 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.00 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 21 0230	0.00	0	0	0.0			DOWELL FINISHED ACID JOB							1
2 21 0240	.17	0	0	0.0			WELL FLOWED ON BY ITSELF TO RIG TANK							2
3 21 0305	.58	0	0	0.0			FLOWED 20 BARRELS BACK TO RIG TANK							3
4 21 0400	1.50	0	0	0.0			PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							4
5 21 0415	1.75	0	0	0.0			PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							5
6 21 0430	2.00	0	0	0.0			PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							6
7 21 0440	2.17	0	0	0.0			PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)							7
8 21 0445	2.25	0	0	0.0			WELL FLOWED BY ITSELF (RECOVERED 15 BARRELS)							8
9 21 0450	2.33	3034	0	0.0			SWITCH THROUGH TO SEPARATOR ON 21/64 CHOKE							9
10 21 0455	2.42	3558	0	8.3	0		OPEN GAUGE READING WAS 2.76 IN.	0	0.00	5.09	0.000	0.00	0.00	10 0.00
11 21 0500	2.50	2965	0	9.9			INCREASE CHOKE							11
12 21 0505	2.58	3172	0	13.9			INCREASE CHOKE							12
13 21 0510	2.67	1551	0	17.9			INCREASE CHOKE							13
14 21 0515	2.75	1207	0	17.9										14
15 21 0533	3.05	1207	0	13.9			CUT CHOKE BACK							15
16 21 0600	3.50	0	0	13.9			NO PRESSURE ON TUBING							16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0230	0600			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0	.5			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	2 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 Press. kPa 16 Temp C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
1 21 0700	4.50	0	0	13.9			NO PRESSURE ON TUBING								1
2 21 0700	0.00	0	0	0.0			SHUT-IN WELL								2
3 21 0745	.75	0	0	0.0			PULL SWAB #1 (FLUID AT 4000 FT.)								3
4 21 0820	1.33	0	0	0.0			PULL SWAB #2 (FLUID AT 4000 FT.)								4
5 21 0830	0.00	0	0	0.0			SHUT-IN WELL / TOOK GAS SAMPLES / GAS GRAV.=1%								5
6 21 0830	0.00	689	0	0.0											6
7 21 0844	.23	1207	0	0.0											7
8 21 0900	.50	1269	0	0.0											8
9 21 0900	0.00	1269	0	25.4			OPEN WELL THROUGH SEPARATOR TO GET GAS RATE								9
10 21 0910	.17	579	-3	25.4	552		SALINITY=148,000 PPM 0	0.00	13.61	0.000	0.00	0.00		0.00	10
11 21 0915	.25	138	-3	25.4											11
12 21 0927	.45	0	0	0.0			WELL WENT DEAD / RIG CREW READY TO PULL SWAB								12
13 21 0945	.75	0	0	25.4	0		SALINITY=109,600 PPM 0	0.00	84.16	0.000	0.00	0.00		0.00	13
14 21 1015	1.25	0	0	25.4	0		PULL SWAB #4 / SAL.=100,000 PPM / FLD @ 5000 FT 0	0.00	49.07	0.000	0.00	0.00		0.00	14
15 21 1030	1.50	207	3	25.4											15
16 21 1045	1.75	186	3	25.4											16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0600	1045			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0	5.2			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	3 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287	M 101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
21 1100	2.00	14	3	25.4											1
21 1120	2.33	0	0	25.4	0	PULL SWAB #5 / SALINITY=91,000 PPM		0	0.00	57.84	0.000	0.00	0.00	0.00	2
21 1130	2.50	83	8	25.4											3
21 1145	2.75	14	3	25.4											4
21 1200	3.00	0	0	25.4		WELL WENT DEAD									5
21 1215	3.25	0	0	25.4	0	PULL SWAB #6 / SALINITY=91,000 PPM		0	0.00	42.04	0.000	0.00	0.00	0.00	6
21 1230	3.50	28	6	25.4											7
21 1242	3.70	0	0	25.4		WELL WENT DEAD									8
21 1315	4.25	0	0	25.4		PULL SWAB #7 / PULLED FROM P.S.N.									9
21 1330	4.50	69	9	25.4	0	SALINITY=83,900 PPM		0	0.00	14.03	0.000	0.00	0.00	0.00	10
21 1330	4.50	69	9	25.4											11
21 1345	4.75	0	6	25.4											12
21 1413	5.22	0	6	25.4	0	PULL SWAB #8 / SALINITY=82,100 PPM		0	0.00	24.43	0.000	0.00	0.00	0.00	13
21 1415	5.25	0	6	25.4											14
21 1430	5.50	34	9	25.4											15
21 1445	5.75	14	9	25.4											16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1045	1445			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0	0	2.7		

OTTS

TEST RESULTS

OEC—865-1-D

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	–		21JAN85	4 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 Press. kPa 16 Temp C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
21								PULL SWAB #9 / SALINITY=83,900 PPM							1
1530	6.50	14	9	25.4	0			0	0.00	24.58	0.000	0.00	0.00	0.00	
21															2
1545	6.75	28	9	25.4											
21								WELL WENT DEAD							3
1600	7.00	0	0	25.4											
21								PULL SWAB #10 / SALINITY=72,300 PPM							4
1619	7.32	0	0	25.4	0			0	0.00	12.34	0.000	0.00	0.00	0.00	
21															5
1630	7.50	34	7	25.4											
21															6
1645	7.75	0	7	25.4											
21															7
1700	8.00	0	7	25.4											
21								PULL SWAB #11 / SALINITY=67,800 PPM							8
1722	8.37	0	7	25.4	0			0	0.00	38.25	0.000	0.00	0.00	0.00	
21															9
1730	8.50	48	8	25.4											
21															10
1745	8.75	14	6	25.4											
21															11
1800	9.00	0	5	25.4											
21								PULL SWAB #12 / SALINITY=61,100 PPM							12
1826	9.43	0	5	25.4	0			0	0.00	20.24	0.000	0.00	0.00	0.00	
21															13
1830	9.50	55	3	25.4											
21															14
1845	9.75	0	4	25.4											
21								PULL SWAB #13 / SALINITY=57,100 PPM							15
1915	10.25	0	4	25.4	0			0	0.00	7.04	0.000	0.00	0.00	0.00	
21															16
1930	10.50	41	5	25.4											

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1445	1930			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0	2.2			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		21JAN85	5 8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OER M3/M3	WCR (M3/M3)	WGR (M3/M3)	LGR M3/M3	
21 1945	10.75	0	6	25.4											1
21 2010	11.17	0	6	25.4	0	PULL SWAB #14 / SALINITY=60,700 PPM		0	0.00	25.22	0.000	0.00	0.00	0.00	2
21 2030	11.50	48	6	25.4											3
21 2045	11.75	0	4	25.4											4
21 2100	12.00	0	4	25.4	0	PULL SWAB #15 / SALINITY=57,100 PPM		0	0.00	48.98	0.000	0.00	0.00	0.00	5
21 2130	12.50	69	7	25.4											6
21 2145	12.75	0	5	25.4											7
21 2200	13.00	0	5	25.4	0	PULL SWAB #16 / SALINITY=55,400 PPM		0	0.00	49.16	0.000	0.00	0.00	0.00	8
21 2230	13.50	83	8	25.4											9
21 2245	13.75	0	6	25.4											10
21 2300	14.00	0	3	25.4											11
21 2305	14.08	0	3	25.4	0	PULL SWAB #17 / SALINITY=55,400 PPM		0	0.00	147.48	0.000	0.00	0.00	0.00	12
21 2330	14.50	5	7	25.4											13
21 2345	14.75	0	5	25.4											14
21 2400	15.00	0	2	25.4											15
22 0020	15.33		2	25.4		PULL SWAB #18 / SALINITY=55,400 PPM									16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
1930	0020			

GAS (M3):	OIL (M3):	WATER (M3):	GAS ( ):	OIL ( ):	WATER ( ):
0	0	2.0			

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
4	NSM ARROWHEAD G-69	-		22JAN85	6	8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 22 0040	15.67	0	2	25.4	0			PULL SWAB #19 / SALINITY=55,400 PPM 0	0.00	15.76	0.000	0.00	0.00	0.00
2 22 0115	16.25	0	2	25.4				PULL SWAB #20 / SALINITY=55,400 PPM						
3 22 0130	16.50	379	0	25.4										
4 22 0130	0.00	0	0	0.0				SHUT-IN FOR BUILD-UP						
5 22 0200	.50	621	0	0.0										
6 22 0205	.58	724	0	0.0				BLEED PRESSURE OFF TO TANKS						
7 22 0205	0.00	724	0	0.0				OPEN WELL						
8 22 0210	.08	55	7	25.4	0			PULL SWAB #21 / SALINITY=55,400 PPM 0	0.00	1.89	0.000	0.00	0.00	0.00
9 22 0230	.42	55	7	25.4										
10 22 0245	.67	14	4	25.4										
11 22 0300	.92	0	4	25.4										
12 22 0310	1.08	0	4	25.4	0			PULL SWAB #22 / SALINITY=51,800 PPM 0	0.00	21.11	0.000	0.00	0.00	0.00
13 22 0330	1.42	76	8	25.4										
14 22 0345	1.67	0	5	25.4										
15 22 0400	1.92	0	3	25.4										
16 22 0410	2.08	0	3	25.4	0			PULL SWAB #23 / SALINITY=46,400 PPM 0	0.00	73.47	0.000	0.00	0.00	0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0020	0410			

GAS (M3): 0 OIL (M3): 0 WATER (M3): .9 GAS ( ): OIL ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE	OF
4	NSM ARROWHEAD G-69	-		22JAN85	7	8

CUSTOMER	OIL GRAVITY @60° F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 PRESS. kPa 16 TEMP C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3/M3 ☐ OGR M3/M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 22 0430	2.42	103	9	11.9			DECREASE CHOKE TO 30/64							1
2 22 0445	2.67	48	6	11.9										2
3 22 0500	2.92	0	2	11.9										3
4 22 0515	3.17	0	2	11.9	0		PULL SWAB #24 / SALINITY=46,400 PPM	0	0.00	14.07	0.000	0.00	0.00	4 0.00
5 22 0530	3.42	0	6	9.9			DECREASE CHOKE TO 25/64							5
6 22 0545	3.67	0	4	9.9										6
7 22 0600	3.92	0	3	9.9										7
8 22 0610	4.08	0	3	25.4	0		PULL SWAB #25 / SALINITY=42,900 PPM / CHK AT 64	0	0.00	42.21	0.000	0.00	0.00	8 0.00
9 22 0630	4.42	138	7	25.4										9
10 22 0645	4.67	0	6	25.4										10
11 22 0700	4.92	0	5	25.4										11
12 22 0727	5.37	0	5	25.4	0		PULL SWAB #26 / SALINITY=48,200 PPM	0	0.00	35.03	0.000	0.00	0.00	12 0.00
13 22 0730	5.42	0	5	25.4										13
14 22 0745	5.67	0	5	25.4										14
15 22 0800	5.92	0	5	25.4										15
16 22 0813	6.13	0	5	25.4	0		PULL SWAB #27 / SALINITY=44,600 PPM	0	0.00	24.25	0.000	0.00	0.00	16 0.00

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	OF	NUMBER
0410	0813				

GAS (M3): 0 OIL (M3): 0 WATER (M3): 1.3 GAS ( ): ( ): WATER ( ):

OTIS

TEST RESULTS

OEC—865-1-B

TEST NUMBER	WELL NAME OR NUMBER	AREA	RATE/BUILD-UP NUMBER	DATE (DAY MO YR)	PAGE OF
4	NSM ARROWHEAD G-69	-		22JAN85	8 8

CUSTOMER	OIL GRAVITY @60°F (°API)	GAS SPECIFIC GRAVITY (AIR = 1)	INTERVAL TESTED ( )	STANDARD CONDITIONS
NSM RESOURCES LTD.	0.0	0.0000	2282-2287 M	101.008 Press. kPa 16 Temp C

DAY / TIME (24 HR CLOCK)	FLOW OR SHUT-IN TIME (HOURS)	WELL HEAD PRESSURE kPag	WELL HEAD TEMP. C	CHOKE SIZE mm	SEPARATOR PRESSURE kPag	BOTTOM HOLE PRESSURE @ 0 M kPag	BOTTOM HOLE TEMP. @ 0 M C	CORRECTED GAS FLOW RATE Q_g M3/d	CORRECTED OIL FLOW RATE Q_o M3/d	WATER FLOW RATE M3/d	☒ GOR M3 / ☐ CGR M3	WOR (M3/M3)	WGR (M3/M3)	LGR M3/M3
1 22 0815	6.17	0	5	25.4										1
2 22 0830	6.42	0	5	25.4										2
3 22 0845	6.67	0	0	25.4			WELL WENT DEAD							3
4 22 0922	7.28	0	5	25.4	0		PULL SWAB #28 / SALINITY=46,400 PPM	0	0.00	6.06	0.000	0.00	0.00	0.00 4
5 22 0922	7.28	0	0	0.0			TOOK GAS SAMPLES #4363 & #3309 / END OF TEST #4							5
6														6
7														7
8														8
9														9
10														10
11														11
12														12
13														13
14														14
15														15
16														16

TOTAL WELL EFFLUENTS PRODUCED

FLOW TIME FROM	FLOW TIME TO	NUMBER FOR RATE	FLOW TIME/END FOR TEST UP TO	NUMBER OF
0813	0922		END	xxx TEST

GAS (M3):	0.0	OIL (M3):	0	WATER (M3):	2	GAS (M3):	0.0	OIL (M3):	0.0	WATER (M3):	15.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9053-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
1	1	NSM ARROWHEAD G-69	8151-8164.4	09JAN85	1	2

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD	WILDCAT	KEG RIVER	------	------

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	09	RIG IN FLOW LINE AND D.W.T. LINE										0.000	0.00		60	0.000	0.00	0.00	0.0 [1]
	2300	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
2	09											0.000	0.00		60	0.000	0.00	0.00	0.0 [2]
	2345	.8	942	0	0	0	14	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
3	09	LIQUID TO SURFACE										0.000	0.00		60	0.000	0.00	0.00	0.0 [3]
	2350	8	120	0	0	0	29	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
4	09	SWITCH FROM D.W.T. TO PSI GAUGE (0-200 PSI)										0.000	0.00		60	0.000	0.00	0.00	0.0 [4]
	2355	9	-50	0	0	0	29	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
5	10											0.000	5.12		60	0.000	0.00	0.00	0.0 [5]
	0005	1.1	30	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
6	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [6]
	0010	1.2	40	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
7	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [7]
	0015	1.2	37	0	0	0	40	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
8	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [8]
	0020	1.3	32	0	0	0	49	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
9	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [9]
	0030	1.5	32	0	0	0	49	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
10	10											0.000	8.66		60	0.000	0.00	0.00	0.0 [10]
	0045	1.7	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
11	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [11]
	0050	1.8	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
12	10	SHUT-IN FOR BUILD-UPS										0.000	0.00		60	0.000	0.00	0.00	0.0 [12]
	0050	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
13	10	OPEN WELL ON 50/64										0.000	0.00		60	0.000	0.00	0.00	0.0 [13]
	0105	3	100	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
14	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [14]
	0105	0.0	0	0	0	0	50	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
15	10											0.000	0.00		60	0.000	0.00	0.00	0.0 [15]
	0118	2	0	0	0	0	50	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
16	10	SHUT-IN WELL										0.000	0.00		60	0.000	0.00	0.00	0.0 [16]
	0118	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
17	10	OPEN WELL										0.000	11.02		60	0.000	0.00	0.00	0.0 [17]
	0130	2	52	0	0	0	50	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
1	1	NSM ARROWHEAD G-69	8151-8164.4	10JAN85	2	2

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE (BBLS)	(INS H₂O)
NSM RESOURCES LTD.	WILDCAT	KEG RIVER	——— (INS)	———	———

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H₂O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE [ ] FLARE [X]	4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM [ ] DOWNSTREAM [X]

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING				OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H₂O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H₂S	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) COND. METER DIFF. PRESS. (INS H₂O)	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY 60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	10	SHUT-IN WELL AND RIG OFF FLOWLINE										0.000	0.00		60	0.000	0.00	0.00	0 0	1
	0240	1.4	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	10											0.000	0.00		60	0.000	0.00	0.00	0.0	2
	0240	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	10	RIG OUT FLOW LINE, PROD. LINE, DWL, TO DRAIN FLD										0.000	0.00		60	0.000	0.00	0.00	0.0	3
	0300	.3	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0 0	
4	10	RIG IN TO FLOW TO MUD TANK										0.000	0.00		60	0.000	0.00	0.00	0.0	4
	0330	.8	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	10	DRAINED WATER INTO FLARE PIT (1.77 IN.)										0.000	0.00		60	0.000	0.00	0.00	0.0	5
	0800	5.3	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	10	LIQID PROD WAS KCL, NO GAS DURING FLOW PERIOD										0.000	0.00		60	0.000	0.00	0.00	0.0	6
	0800	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	10	END OF TEST #1										0.000	0.00		60	0.000	0.00	0.00	0.0	7
	0800	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0 0	
8																				8
9																				9
10																				10
11																				11
12																				12
13																				13
14																				14
15																				15
16																				16
17																				17

OTS

FIELD READINGS

Single Stage Unit

OEC — 9058-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	14JAN85	1	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)...(INS. H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	14	RIG UP TO SWAB										0.000	0.00		0	0.000	0.00	0.00	0.0_1
	1900	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
2	14	PULL SWAB #1 / RECOVER 6 BARRELS										0.000	0.00		0	0.000	0.00	0.00	0.0_2
	1910	.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
3	14	PULL SWAB #2 / RECOVER 4 BARRELS										0.000	0.00		0	0.000	0.00	0.00	0.0_3
	1930	.5	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
4	14	PULL SWAB #3 / RECOVER 4 BARRELS										0.000	0.00		0	0.000	0.00	0.00	0.0_4
	1940	.7	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
5	14	PULL SWAB #4 / RECOVER 0 BARRELS										0.000	0.00		0	0.000	0.00	0.00	0.0_5
	2030	1.5	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
6	14	RIG UP FLOW LINE TO PIT										0.000	0.00		0	0.000	0.00	0.00	0.0_6
	2040	1.7	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
7	14											0.000	0.00		0	0.000	0.00	0.00	0.0_7
	2050	1.8	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
8	14	OPEN WELL TO PIT										0.000	0.00		0	0.000	0.00	0.00	0.0_8
	2050	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
9	14	PRESSURE UP FLOW LINE TO UNIT										0.000	0.00		0	0.000	0.00	0.00	0.0_9
	2100	.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
10	14	BLEED OFF LINE / FIX LEAKS										0.000	0.00		0	0.000	0.00	0.00	0.0_{10}
	2105	.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
11	14	PRESSURE UP FLOW LINE AND DWT LINE TO UNIT										0.000	0.00		0	0.000	0.00	0.00	0.0_{11}
	2115	.4	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
12	14	OPEN CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0_{12}
	2120	.5	1540	0	0	0	5	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
13	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0_{13}
	2121	.5	1507	0	0	0	6	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
14	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0_{14}
	2122	.5	1500	0	0	0	8	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
15	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0_{15}
	2123	.5	1506	0	0	0	10	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
16	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0_{16}
	2124	.6	1514	0	0	0	14	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
17	14											0.000	0.00		0	0.000	0.00	0.00	0.0_{17}
	2125	.6	1527	0	0	0	14	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9094

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	14JAN85	2	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS.H2O)
NSM RESOURCES-LTD.	WILDCAT	UPPER KEG RIVER	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIA)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H2S	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	COMB. METER ORIFICE SIZE (INS) COND. METER DIFF. PRESS. (INS H2O)	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR Wf	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	14	INCREASE CHOKE										0.000	0.00			0.000	0.00	0.00	0.0 1
	2130	.7	1540	0	0	0	15	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
2	14	METER IN SERVICE / OPENING GAUGE =1.77 IN.										0.000	0.00		0	0.000	0.00	0.00	0.0 2
	2135	.7	1545	0	0	0	15	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
3	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0 3
	2140	.8	1525	0	0	0	16	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
4	14	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0 4
	2143	.9	1370	0	0	0	22	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
5	14											0.000	0.00		0	0.000	0.00	0.00	0.0 5
	2155	1.1	1370	0	0	0	22	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
6	14											.720	0.00		0	0.000	0.00	11.42	32.0 6
	2205	1.2	1484	63	0	0	22	1.250	310	70	55	0.000	0.00		0	0.000	0.0	0.00	0.0
7	14	VAPORIZER BLEW OUT / RELIT PILOT										0.000	0.00		0	0.000	0.00	0.00	0.0 7
	2215	1.4	1497	63	0	0	22	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
8	14											0.000	0.00		0	0.000	0.00	0.00	0.0 8
	2225	1.6	1485	63	0	0	22	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
9	14											.720	0.00		0	0.000	0.00	11.42	32.0 9
	2230	1.7	1480	63	0	0	22	1.250	370	160	55	0.000	0.00		0	0.000	0.0	0.00	0.0
10	14											0.000	0.00		0	0.000	0.00	0.00	0.0 10
	2245	1.9	1455	63	0	0	22	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
11	14											.720	0.00		0	0.000	0.00	18.11	32.0 11
	2300	2.2	1392	63	0	0	22	1.250	420	90	55	0.000	0.00		0	0.000	0.0	0.00	0.0
12	14											.720	0.00		0	0.000	0.00	18.11	32.0 12
	2330	2.7	1350	61	0	0	22	1.250	407	81	59	0.000	0.00		0	0.000	0.0	0.00	0.0
13	14	SAL. =287,000 PPM										.720	0.00		0	0.000	0.00	18.11	32.0 13
	2400	3.2	1270	64	0	0	22	1.250	385	89	70	0.000	0.00		0	0.000	0.0	0.00	0.0
14	15											.720	0.00		0	0.000	0.00	18.11	32.0 14
	0030	3.7	1187	63	0	0	22	1.250	407	81	77	0.000	0.00		0	0.000	0.0	0.00	0.0
15	15											.720	0.00		0	0.000	0.00	36.22	32.0 15
	0100	4.2	982	63	0	0	22	1.250	400	84	75	0.000	0.00		0	0.000	0.0	0.00	0.0
16	15											.720	0.00		0	0.000	0.00	36.22	32.0 16
	0130	4.7	944	61	0	0	22	1.250	400	66	73	0.000	0.00		0	0.000	0.0	0.00	0.0
17	15	SAL. =231,000 PPM										.720	0.00		0	0.000	0.00	39.37	26.4 17
	0200	5.2	940	61	0	0	22	1.250	402	63	77	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC -- 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	15JAN85	3	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)...(INS H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER		

TEST UNIT DESCRIPTION (∞, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE [X] FLARE [ ]	4" [ ] 2" CRITICAL FLOW PROVER [ ]	3.826 (INS)	0-200	UPSTREAM [ ] DOWNSTREAM [X]

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	15											.720	0.00		0	0.000	0.00	39.37	26.4	1
	0230	5.7	930	59	0	0	22	1.250	410	56	79	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	15	SAL =216,000 PPM / SODIUM CHLORIDE=22%										.720	0.00		0	0.000	0.00	42.52	25.0	2
	0300	6.2	920	59	0	0	22	1.500	401	60	79	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	15											.720	0.00		0	0.000	0.00	42.52	25.0	3
	0330	6.7	880	59	0	0	22	1.500	395	57	79	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	15	SAL =225,000 PPM										.720	0.00		0	0.000	0.00	45.67	25.8	4
	0400	7.2	870	61	0	0	22	1.500	400	56	75	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	15											.720	0.00		0	0.000	0.00	45.67	25.8	5
	0430	7.7	805	57	0	0	22	1.500	385	48	77	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	15	SAL = 196,000 PPM										.720	0.00		0	0.000	0.00	46.85	23.0	6
	0500	8.2	775	57	0	0	22	1.500	385	46	77	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	15	SAL =196,000 PPM										.720	0.00		0	0.000	0.00	46.85	23.0	7
	0600	9.2	720	57	0	0	22	1.500	385	38	77	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	15											.720	0.00		0	0.000	0.00	46.85	23.0	8
	0630	9.7	708	59	0	0	22	1.500	385	38	77	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	15											.720	0.00		0	0.000	0.00	50.79	23.0	9
	0700	10.2	680	57	0	0	22	1.500	287	58	77	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	15											.720	0.00		0	0.000	0.00	50.79	23.0	10
	0730	10.7	656	57	0	0	22	1.500	287	55	81	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	15											.720	0.00		0	0.000	0.00	53.35	23.0	11
	0800	11.2	644	55	0	0	22	1.500	232	52	75	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	15											.720	0.00		0	0.000	0.00	53.35	23.0	12
	0830	11.7	620	55	0	0	22	1.500	230	52	59	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	15	CHANGE ORIFICE PLATE TO 1.125 / CHOKE TO 16/64										0.000	0.00		0	0.000	0.00	0.00	0.0	13
	0850	12.0	620	55	0	0	16	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	15											0.000	0.00		0	0.000	0.00	53.35	23.0	14
	0900	12.2	685	55	0	0	16	1.125	225	56	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	15											.720	0.00		0	0.000	0.00	53.35	23.0	15
	0930	12.7	768	55	0	0	16	1.125	222	55	48	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	15	H2S = 2,500 PPM										.720	0.00		0	0.000	0.00	53.35	23.0	16
	1000	13.2	798	55	0	0	16	1.125	223	56	48	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	15											.720	0.00		0	0.000	0.00	53.35	23.0	17
	1030	13.7	810	55	0	0	16	1.125	227	72	55	0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9051

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	15JAN85	4	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)—(INS H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE [ ] FLARE [X]	4" [ ] 2" CRITICAL FLOW PROVER [ ]	3.826 (INS)	0-200	UPSTREAM [ ] DOWNSTREAM [X]

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	15											0.000	0.00		0	0.000	0.00	0.00	0.0	1
	1039	13.8	810	55	0	0	16	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	15	SHUT-IN WELL / RUN RECORDERS										0.000	0.00		0	0.000	0.00	0.00	0.0	2
	1039	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	15	RUN 180 HR. RECORDERS @ 8028.72 FT.										0.000	0.00		0	0.000	0.00	0.00	0.0	3
	1700	6.4	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	15											0.000	0.00		0	0.000	0.00	0.00	0.0	4
	1800	7.4	1540	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	15											0.000	0.00		0	0.000	0.00	0.00	0.0	5
	1830	7.9	1577	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	15											0.000	0.00		0	0.000	0.00	0.00	0.0	6
	1900	8.4	1598	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	15											0.000	0.00		0	0.000	0.00	0.00	0.0	7
	1930	8.9	1613	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	15											0.000	0.00		0	0.000	0.00	0.00	0.0	8
	2000	9.4	1627	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	15											0.000	0.00		0	0.000	0.00	0.00	0.0	9
	2030	9.9	1641	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	15											0.000	0.00		0	0.000	0.00	0.00	0.0	10
	2100	10.4	1653	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	15											0.000	0.00		0	0.000	0.00	0.00	0.0	11
	2130	10.9	1667	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	15											0.000	0.00		0	0.000	0.00	0.00	0.0	12
	2200	11.4	1678	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	15											0.000	0.00		0	0.000	0.00	0.00	0.0	13
	2230	11.9	1690	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	15											0.000	0.00		0	0.000	0.00	0.00	0.0	14
	2300	12.4	1701	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	15											0.000	0.00		0	0.000	0.00	0.00	0.0	15
	2330	12.9	1712	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	15											0.000	0.00		0	0.000	0.00	0.00	0.0	16
	2400	13.4	1722	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	16											0.000	0.00		0	0.000	0.00	0.00	0.0	17
	0030	13.9	1732	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	

FIELD READINGS

Single Stage Unit

OEC – 9091

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD C-69	8064.3-8080.7	16JAN85	5	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	------	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING		
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	16											0.000	0.00		0	0.000	0.00	0.00	0.0	1
	0100	14.4	1740	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	16											0.000	0.00		0	0.000	0.00	0.00	0.0	2
	0130	14.9	1749	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	16											0.000	0.00		0	0.000	0.00	0.00	0.0	3
	0200	15.4	1759	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	16											0.000	0.00		0	0.000	0.00	0.00	0.0	4
	0230	15.9	1767	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	16											0.000	0.00		0	0.000	0.00	0.00	0.0	5
	0300	16.4	1777	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	16											0.000	0.00		0	0.000	0.00	0.00	0.0	6
	0330	16.9	1735	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	16											0.000	0.00		0	0.000	0.00	0.00	0.0	7
	0400	17.4	1790	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	16	OPEN WELL										0.000	0.00		0	0.000	0.00	0.00	0.0	8
	0400	0.0	1790	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	16	CHOKE AT 10/64										0.000	0.00		0	0.000	0.00	0.00	0.0	9
	0405	.1	1764	0	0	0	10	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	16											0.000	0.00		0	0.000	0.00	0.00	0.0	10
	0410	.2	1747	0	0	0	10	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	16	METER IN SERVICE / OR PLT. AT 75										0.000	0.00		0	0.000	0.00	0.00	0.0	11
	0415	.2	1737	43	0	0	10	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	16											.720	0.00		0	0.000	0.00	53.35	23.0	12
	0430	.5	1709	41	0	0	10	.750	404	108	86	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	16											.720	0.00		0	0.000	0.00	53.35	23.0	13
	0445	.7	1697	41	0	0	10	.750	400	114	84	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	16											.720	0.00		0	0.000	0.00	53.35	23.0	14
	0500	1.0	1680	41	0	0	10	.750	407	112	86	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	16											.720	0.00		0	0.000	0.00	53.35	23.0	15
	0530	1.5	1652	41	0	0	10	.750	407	98	81	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	16											.720	0.00		0	0.000	0.00	53.35	23.0	16
	0600	2.0	1640	41	0	0	10	.750	407	107	82	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	16	SHUT-IN WELL										0.000	0.00		0	0.000	0.00	0.00	0.0	17
	0600	0.0	1640	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9094

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	16JAN85	6	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	——— (INS)	(BBLS) ___ (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P T #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL			GAS METERING				OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (BBLS OR ___)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	16 / 0605	1	1670	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_1
												0.000	0.00			0.000	0.0	0.00	0.0
2	16 / 0610	.2	1682	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_2
												0.000	0.00			0.000	0.0	0.00	0.0
3	16 / 0615	.2	1688	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_3
												0.000	0.00			0.000	0.0	0.00	0.0
4	16 / 0630	.5	1702	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_4
												0.000	0.00			0.000	0.0	0.00	0.0
5	16 / 0645	.7	1712	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_5
												0.000	0.00			0.000	0.0	0.00	0.0
6	16 / 0700	1.0	1723	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_6
												0.000	0.00			0.000	0.0	0.00	0.0
7	16 / 0715	1.2	1733	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_7
												0.000	0.00			0.000	0.0	0.00	0.0
8	16 / 0730	1.5	1738	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_8
												0.000	0.00			0.000	0.0	0.00	0.0
9	16 / 0745	1.7	1745	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_9
												0.000	0.00			0.000	0.0	0.00	0.0
10	16 / 0800	2.0	1750	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_{10}
												0.000	0.00			0.000	0.0	0.00	0.0
11	16 / 0800	OPEN WELL FOR RATE #2 / 0.0	1750	0	0	0	0	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_{11}
												0.000	0.00			0.000	0.0	0.00	0.0
12	16 / 0805	CHANGE CHOKE TO 14/64 / .1	1710	0	0	0	14	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_{12}
												0.000	0.00			0.000	0.0	0.00	0.0
13	16 / 0810	.2	1645	0	0	0	14	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_{13}
												0.000	0.00			0.000	0.0	0.00	0.0
14	16 / 0815	.2	1595	0	0	0	14	0.000	0	0	0	0.000	0.00			0.000	0.00	0.00	0.0_{14}
												.720	0.00			0.000	0.00	53.35	23.0_{15}
15	16 / 0830	5	1532	45	0	0	14	1.000	404	167	66	0.000	0.00			0.000	0.0	0.00	0.0
												0.000	0.00			0.000	0.00	0.00	0.0_{16}
16	16 / 0836	FLUID TO SURFACE / .6	1532	45	0	0	14	0.000	0	0	0	0.000	0.00			0.000	0.0	0.00	0.0
												.720	0.00			0.000	0.00	53.35	23.0_{17}
17	16 / 0845	.7	1560	45	0	0	14	1.000	402	132	54	0.000	0.00			0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC – 909-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	16JAN85	7	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	——— (INS)	(BBLS) – (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY	FLOW OR SHUT IN DURATION	TUBING PRESSURE	TEMP.	CASING PRESSURE	MANIFOLD CHOKE SIZE	HEATER CHOKE SIZE	ORIFICE SIZE	STATIC PRESSURE	DIFF. PRESS.	TEMP.	GAS GRAVITY (AIR=1)	# TANK OR METER READING	COND. METER ORIFICE SIZE (INS)	#1 OIL TEMP.	WEATHERING FACTOR	OIL GRAVITY @60°F (°API)	#1 TANK OR METER READING	SALINITY
	24 HR. CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(64th INCH)	(64th INCH)	(INS)	(PSIG)	(INS H_2O)	(°F)	% H_2S	#2 TANK OR METER READING (INS OR BBLS)	COND. METER DIFF. PRESS. (INS H_2O)	#2 OIL TEMP.	W_f	BSW (%)	#2 TANK OR METER READING (INS OR BBLS)	(%)
1	16											.720	0.00		0	0.000	0.00	53.94	23.0
	0900	1.0	1545	46	0	0	14	1.000	394	126	46	0.000	0.00		0	0.000	0.0	0.00	0.0
2	16											.720	0.00		0	0.000	0.00	53.94	23.0
	0915	1.2	1530	46	0	0	14	1.000	395	144	46	0.000	0.00		0	0.000	0.0	0.00	0.0
3	16											.720	0.00		0	0.000	0.00	53.94	23.0
	0930	1.5	1494	46	0	0	14	1.000	399	140	50	0.000	0.00		0	0.000	0.0	0.00	0.0
4	16											.720	0.00		0	0.000	0.00	53.94	23.0
	0945	1.7	1462	46	0	0	14	1.000	398	133	55	0.000	0.00		0	0.000	0.0	0.00	0.0
5	16	SALINITY AT 170,000 PPM										.720	0.00		0	0.000	0.00	55.12	0.0
	1000	2.0	1435	46	0	0	14	1.000	398	134	59	0.000	0.00		0	0.000	0.0	0.00	0.0
6	16	SHUT-IN RATE #2										0.000	0.00		0	0.000	0.00	0.00	0.0
	1000	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
7	16	H2S = 3%										0.000	0.00		0	0.000	0.00	0.00	0.0
	1005	.1	1515	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
8	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1005	.1	1515	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
9	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1010	.2	1550	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
10	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1015	.2	1572	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
11	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1030	.5	1572	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
12	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1045	.7	1622	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
13	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1100	1.0	1640	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
14	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1115	1.2	1660	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
15	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1130	1.5	1672	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
16	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1145	1.7	1685	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
17	16											0.000	0.00		0	0.000	0.00	0.00	0.0
	1200	2.0	1695	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0

FIELD READINGS

Single Stage Unit

OEC — 5059-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	16JAN85	8	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T #2	[ ] PIPELINE [X] FLARE	[4"] [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	16	OPEN FOR RATE #3										0.000	0.00		0	0.000	0.00	0.00	0.0	1
	1200	0.0	1695	0	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	16	CHOKE AT 18/64 / OR. PLT. AT 1.25										0.000	0.00		0	0.000	0.00	0.00	0.0	2
	1205	.1	1520	0	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	16											0.000	0.00		0	0.000	0.00	0.00	0.0	3
	1210	.2	1455	0	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	16											.720	0.00		0	0.000	0.00	55.12	0.0	4
	1215	.2	1415	48	0	0	18	1.250	412	135	54	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	16											.720	0.00		0	0.000	0.00	55.12	0.0	5
	1230	.5	1407	50	0	0	18	1.250	414	120	46	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	16											.720	0.00		0	0.000	0.00	55.12	0.0	6
	1245	.7	1330	50	0	0	18	1.250	414	132	32	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	16											.720	0.00		0	0.000	0.00	55.91	0.0	7
	1300	1.0	1275	50	0	0	18	1.250	414	104	32	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	16											.720	0.00		0	0.000	0.00	55.91	0.0	8
	1315	1.2	1207	50	0	0	18	1.250	407	104	37	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	16											.720	0.00		0	0.000	0.00	55.91	0.0	9
	1330	1.5	1132	50	0	0	18	1.250	411	105	43	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	16											.720	0.00		0	0.000	0.00	55.91	0.0	10
	1345	1.7	1112	50	0	0	18	1.250	410	96	46	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	16	SALINITY=135,000 PPM / H2S=3%										720	0.00		0	0.000	0.00	56.69	0.0	11
	1400	2.0	1060	50	0	0	18	1.250	408	91	50	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	16											.720	0.00		0	0.000	0.00	56.69	0.0	12
	1430	2.5	970	50	0	0	18	1.250	407	78	60	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	16	SALINITY=129,000 PPM										.720	0.00		0	0.000	0.00	56.89	0.0	13
	1500	3.0	925	50	0	0	18	1.250	405	67	64	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	16											.720	0.00		0	0.000	0.00	56.89	0.0	14
	1530	3.5	868	46	0	0	18	1.250	402	44	73	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	16											.720	0.00		0	0.000	0.00	56.89	0.0	15
	1600	4.0	820	48	0	0	18	1.250	405	56	79	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	16											.720	0.00		0	0.000	0.00	56.89	0.0	16
	1630	4.5	765	48	0	0	18	1.250	412	40	82	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	16	FLOW LINE FREEZING OFF / INJECT METHANOL										0.000	0.00		0	0.000	0.00	0.00	0.0	17
	1647	4.8	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	

FIELD READINGS

Single Stage Unit — OEC — 9091

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO, YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	16JAN85	9	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)...(INS. H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	------	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY	FLOW OR SHUT IN DURATION	TUBING PRESSURE	TEMP.	CASING PRESSURE	MANIFOLD CHOKE SIZE	HEATER CHOKE SIZE	ORIFICE SIZE	STATIC PRESSURE	DIFF. PRESS.	TEMP.	GAS GRAVITY (AIR=1)	# TANK OR METER READING	COND. METER ORIFICE SIZE (INS)	#1 OIL TEMP.	WEATHERING FACTOR	OIL GRAVITY @60°F (°API)	#1 TANK OR METER READING	SALINITY
	24 HR. CLOCK	(HOURS)	(PSIG)	(°F)	(PSIG)	(64th INCH)	(64th INCH)	(INS)	(PSIG)	(INS H_2O)	(°F)	% H_2S	#2 TANK OR METER READING (INS OR BBLS)	COND. METER DIFF. PRESS. (INS H_2O)	#2 OIL TEMP.	W_f	BSW (%)	#2 TANK OR METER READING (INS OR BBLS)	(%)
1	16	SALINITY=82,100 PPM										.782	0.00		0	0.000	0.00	57.09	0.0 1
	1700	5.0	802	48	0	0	18	1.250	405	52	88	0.000	0.00		0	0.000	0.0	0.00	0.0
2	16	H2S=3%										.782	0.00		0	0.000	0.00	57.09	0.0 2
	1730	5.5	683	50	0	0	18	1.250	404	47	88	0.000	0.00		0	0.000	0.0	0.00	0.0
3	16	SALINITY=73,200 PPM										.782	0.00		0	0.000	0.00	57.48	0.0 3
	1800	6.0	650	46	0	0	18	1.250	401	32	90	0.000	0.00		0	0.000	0.0	0.00	0.0
4	16	CHANGE OR. PLT. TO 1.0										0.000	0.00		0	0.000	0.00	0.00	0.0 4
	1823	6.4	650	46	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
5	16	TOOK DUPLICATE GAS/COND. SAMPLES #3075 AND #3697										0.000	0.00		0	0.000	0.00	0.00	0.0 5
	1826	6.4	650	46	0	0	93	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
6	16											.782	0.00		0	0.000	0.00	57.48	0.0 6
	1830	6.5	635	46	0	0	18	1.000	400	76	91	0.000	0.00		0	0.000	0.0	0.00	0.0
7	16	SALINITY=119,000 PPM / CHANGE OR. PLT. TO .875										.782	0.00		0	0.000	0.00	58.26	0.0 7
	1900	7.0	622	46	0	0	18	.875	400	72	91	0.000	0.00		0	0.000	0.0	0.00	0.0
8	16	LOWER HEATER TEMP.										.782	0.00		0	0.000	0.00	58.26	0.0 8
	1930	7.5	605	46	0	0	18	.875	400	106	91	0.000	0.00		0	0.000	0.0	0.00	0.0
9	16	H2S=3% / SOD. CHLORIDE=12.5%										.782	0.00		0	0.000	0.00	58.26	0.0 9
	2000	8.0	590	46	0	0	18	.875	400	100	86	0.000	0.00		0	0.000	0.0	0.00	0.0
10	16											.782	0.00		0	0.000	0.00	58.26	0.0 10
	2030	8.5	580	46	0	0	18	.875	400	102	84	0.000	0.00		0	0.000	0.0	0.00	0.0
11	16	SALINITY=144,000 PPM / SOD. CHL.=15%										.782	0.00		0	0.000	0.00	59.84	0.0 11
	2100	9.0	576	46	0	0	18	.875	400	98	80	0.000	0.00		0	0.000	0.0	0.00	0.0
12	16											.782	0.00		0	0.000	0.00	59.84	0.0 12
	2230	10.5	562	46	0	0	18	.875	230	140	82	0.000	0.00		0	0.000	0.0	0.00	0.0
13	16	SALINITY=158,000 PPM / SOD. CHL.=16.6%										.782	0.00		0	0.000	0.20	61.02	0.0 13
	2300	11.0	550	45	0	0	18	.875	230	130	82	0.000	0.00		0	0.000	0.0	0.00	0.0
14	16											.782	0.00		0	0.000	0.00	61.02	0.0 14
	2330	11.5	550	45	0	0	18	.875	230	128	81	0.000	0.00		0	0.000	0.0	0.00	0.0
15	16	SALINITY=163,000 PPM / SOD. CHL.=17%										.782	0.00		0	0.000	0.00	61.42	0.0 15
	2400	12.0	540	46	0	0	18	.875	230	129	81	0.000	0.00		0	0.000	0.0	0.00	0.0
16	17											.782	0.00		0	0.000	0.00	61.42	0.0 16
	0030	12.5	532	46	0	0	18	.875	230	124	82	0.000	0.00		0	0.000	0.0	0.00	0.0
17	17	SALINITY=167,000 PPM / SOD. CHL.=17%										.782	0.00		0	0.000	0.00	62.20	0.0 17
	0100	13.0	534	45	0	0	18	.875	230	118	81	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9051-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO, YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	17JAN85	10	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	——— (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. ($INS H_2O$)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. ($INS H_2O$)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	17											.782	0.00		0	0.000	0.00	62.20	0.0 1
	0130	13.5	522	45	0	0	18	.875	230	126	84	0.000	0.00		0	0.000	0.0	0.00	0.0
2	17	SALINITY=170,000 PPM / SOD. CHL.=17%										.782	0.00		0	0.000	0.00	62.99	0.0 2
	0200	14.0	517	45	0	0	18	.875	235	128	81	0.000	0.00		0	0.000	0.0	0.00	0.0
3	17											.782	0.00		0	0.000	0.00	62.99	0.0 3
	0230	14.5	515	46	0	0	18	.875	234	106	84	0.000	0.00		0	0.000	0.0	0.00	0.0
4	17	SALINITY=170,000 PPM / SOD. CHL.=17.2%										.782	0.00		0	0.000	0.00	63.78	0.0 4
	0300	15.0	505	46	0	0	18	.875	237	110	84	0.000	0.00		0	0.000	0.0	0.00	0.0
5	17											.782	0.00		0	0.000	0.00	63.78	0.0 5
	0330	15.5	500	45	0	0	18	.875	230	134	82	0.000	0.00		0	0.000	0.0	0.00	0.0
6	17	SALINITY=173,000 PPM / SOD. CHL.=17.6%										.782	0.00		0	0.000	0.00	65.35	0.0 6
	0400	16.0	485	45	0	0	18	.875	230	125	77	0.000	0.00		0	0.000	0.0	0.00	0.0
7	17											.782	0.00		0	0.000	0.00	65.35	0.0 7
	0430	16.5	492	45	0	0	18	.875	230	90	75	0.000	0.00		0	0.000	0.0	0.00	0.0
8	17	SALINITY=173,000 PPM / SOD. CHL.=17.8%										.782	0.00		0	0.000	0.00	66.93	0.0 8
	0500	17.0	487	45	0	0	18	.875	237	120	73	0.000	0.00		0	0.000	0.0	0.00	0.0
9	17											.782	0.00		0	0.000	0.00	66.93	0.0 9
	0530	17.5	462	45	0	0	18	.875	234	100	78	0.000	0.00		0	0.000	0.0	0.00	0.0
10	17	SALINITY=177,000 PPM / SOD. CHL.=18%										.782	0.00		0	0.000	0.00	66.93	0.0 10
	0600	18.0	463	45	0	0	18	.875	230	128	81	0.000	0.00		0	0.000	0.0	0.00	0.0
11	17											.782	0.00		0	0.000	0.00	66.93	0.0 11
	0630	18.5	470	45	0	0	18	.875	235	124	82	0.000	0.00		0	0.000	0.0	0.00	0.0
12	17	SALINITY=173,000 PPM / SOD. CHL.=17.2%										.782	0.00		0	0.000	0.00	68.90	0.0 12
	0700	19.0	440	45	0	0	18	.875	232	133	84	0.000	0.00		0	0.000	0.0	0.00	0.0
13	17											.782	0.00		0	0.000	0.00	68.90	0.0 13
	0730	19.5	435	45	0	0	18	.875	230	128	70	0.000	0.00		0	0.000	0.0	0.00	0.0
14	17	SALINITY=169,000 PPM / SOD. CHL.=17%										.782	0.00		0	0.000	0.00	69.29	0.0 14
	0800	20.0	428	45	0	0	18	.875	233	102	64	0.000	0.00		0	0.000	0.0	0.00	0.0
15	17											.782	0.00		0	0.000	0.00	69.29	0.0 15
	0830	20.5	435	45	0	0	18	.875	237	102	64	0.000	0.00		0	0.000	0.0	0.00	0.0
16	17	TOOK 2 WELL HEAD SAMPLES #3376 AND #3099										0.000	0.00		0	0.000	0.00	0.00	0.0 16
	0845	20.8	435	45	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
17	17	SALINITY=170,000 PPM / SOD. CHL.=17%										.782	0.00		0	0.000	0.00	70.86	0.0 17
	0900	21.0	425	45	0	0	18	0.000	232	100	63	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 909-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	17JAN85	11	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)__(INS. H_2O)
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	------	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE [X] FLARE [ ]	4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM [ ] DOWNSTREAM [X]

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64TH INCH)	HEATER CHOKE SIZE (64TH INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	17 / 0900	SHUT-IN WELL																		1
		0.0	425	45	0	0	18	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	
2	17 / 0905	.1	520	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	2
												0.000	0.00		0	0.000	0.0	0.00	0.0	
3	17 / 0910	.2	545	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	3
												0.000	0.00		0	0.000	0.0	0.00	0.0	
4	17 / 0915	.2	565	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	4
												0.000	0.00		0	0.000	0.0	0.00	0.0	
5	17 / 0930	.5	602	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	5
												0.000	0.00		0	0.000	0.0	0.00	0.0	
6	17 / 0945	.7	628	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	6
												0.000	0.00		0	0.000	0.0	0.00	0.0	
7	17 / 1000	1.0	650	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	7
												0.000	0.00		0	0.000	0.00	0.00	0.0	
8	17 / 1030	1.5	695	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	8
												0.000	0.00		0	0.000	0.00	0.00	0.0	
9	17 / 1100	2.0	735	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	9
												0.000	0.00		0	0.000	0.00	0.00	0.0	
10	17 / 1130	2.5	768	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	10
												0.000	0.00		0	0.000	0.00	0.00	0.0	
11	17 / 1200	3.0	799	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	11
												0.000	0.00		0	0.000	0.00	0.00	0.0	
12	17 / 1230	3.5	839	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	12
												0.000	0.00		0	0.000	0.00	0.00	0.0	
13	17 / 1300	4.0	853	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	13
												0.000	0.00		0	0.000	0.00	0.00	0.0	
14	17 / 1330	4.5	875	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	14
												0.000	0.00		0	0.000	0.00	0.00	0.0	
15	17 / 1400	5.0	902	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	15
												0.000	0.00		0	0.000	0.00	0.00	0.0	
16	17 / 1430	5.5	922	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	16
												0.000	0.00		0	0.000	0.00	0.00	0.0	
17	17 / 1500	6.0	929	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	17

OTIS

FIELD READINGS

Single Stage Unit

OEC – 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064 3-8080 7	17JAN85	12	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD	WILDCAT	UPPER KEG RIVER	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING		
DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1 17 1530	6.5	946	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_1$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
2 17 1600	7.0	960	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_2$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
3 17 1630	7.5	975	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_3$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
4 17 1700	8.0	985	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_4$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
5 17 1730	8.5	990	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_5$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
6 17 1800	9.0	1010	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_6$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
7 17 1830	9.5	1022	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_7$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
8 17 1900	10.0	1033	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_8$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
9 17 1930	10.5	1043	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_9$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
10 17 2000	11.0	1053	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{10}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
11 17 2030	11.5	1063	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{11}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
12 17 2100	12.0	1073	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{12}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
13 17 2130	12.5	1082	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{13}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
14 17 2200	13.0	1092	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{14}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
15 17 2230	13.5	1102	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{15}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
16 17 2300	14.0	1111	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{16}$
											0.000	0.00		0	0.000	0.0	0.00	0.0	
17 17 2330	14.5	1121	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	$_{17}$

OTIS

FIELD READINGS

Single Stage Unit

OEC — 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	17JAN85	13	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	——— (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	17 / 2400	15.0	1132	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.00	0.00 / 0.00	0.0 / 0.0	1
2	18 / 0030	15.5	1143	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	2
3	18 / 0100	16.0	1150	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	3
4	18 / 0130	16.5	1158	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	4
5	18 / 0200	17.0	1167	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	5
6	18 / 0230	17.5	1173	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	6
7	18 / 0300	18.0	1181	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	7
8	18 / 0330	18.5	1188	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	8
9	18 / 0400	19.0	1196	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	9
10	18 / 0430	19.5	1204	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	10
11	18 / 0500	20.0	1211	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0	0.00 / 0.00	0.0 / 0.0	11
12	18 / 0530	20.5	1218	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	12
13	18 / 0600	21.0	1225	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	13
14	18 / 0630	21.5	1230	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	14
15	18 / 0700	22.0	1235	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	15
16	18 / 0730	22.5	1240	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	16
17	18 / 0800	23.0	1247	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0	0.000	0.00 / 0.0	0.00 / 0.00	0.0 / 0.0	17

OTIS

FIELD READINGS

Single Stage Unit

OEC — 903-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
2	1	NSM ARROWHEAD G-69	8064.3-8080.7	18JAN85	14	14

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	UPPER KEG RIVER	——— (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	18											0.000	0.00		0	0.000	0.00	0.00	0.0	1
	0830	23.5	1250	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	18											0.000	0.00		0	0.000	0.00	0.00	0.0	2
	0900	24.0	1256	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	18	BLEED OFF FLOWLINE / RIGGED UP TO PULL RECORDERS										0.000	0.00		0	0.000	0.00	0.00	0.0	3
	0905	24.1	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	18	RECORDERS OUT OF HOLE / BLED OFF TUBING										0.000	0.00		0	0.000	0.00	0.00	0.0	4
	1207	27.1	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	18	TUBING BLED OFF / PROCEEDED TO KILL THE WELL										0.000	0.00		0	0.000	0.00	0.00	0.0	5
	1300	28.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	18	END OF TEST #2										0.000	0.00		0	0.000	0.00	0.00	0.0	6
	1300	28.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7																				7
8																				8
9																				9
10																				10
11																				11
12																				12
13																				13
14																				14
15																				15
16																				16
17																				17

OTIS

FIELD READINGS

Single Stage Unit

OEC — 909-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
3	CL-UP	NSM ARROWHEAD G-69	7519.7-7549.2	20 JAN 85	1	2

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT		

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
PT. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM X DOWNSTREAM

TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING				OIL OR CONDENSATE METERING					WATER METERING	
DAY 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	SWAB #	TEMP. (°F)	CASING PRESSURE (PSIG)	FLUID LEVEL FT.	HEATER CHOKE SIZE (64th INCH)	DEPTH PULLED FROM FT.	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	APPROX. FLUID RECOVERY	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	TOTAL FLUID	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
											bbls		bbls					
1515		1			SUR.		800				5		5					
1530		2			200		1000				3.75		8.75					
1545		3			500		1500				7.5		16.25					
1600		4			1400		2500				4		20.25					
1615		5			2100		3500				3.125		23.375					
1630		6			3500		4500				4		27.375					
1700		7			4500		5500				6.125		34					
1730		8			-		-				6		40					
1800		9			-		-				2.5		42.5					
1820		10			-		PSN				3		45.5					
1835		11			-		PSN				0		45.5					
1900		12			-		PSN				0		45.5					
1910		13			-		PSN				.5		46.0					
2030		14			-		PSN				1.5		47.5					
2145		15			-		PSN				3		50.5					105,800
2220		16			-		PSN				1		51.5					96,400
2320		17			-		PSN				1		52.5					73,200

FIELD READINGS

Single Stage Unit

OEC — 9093-I

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
3	CL-UP	NSM ARROWHEAD G-69	7519.7-7549.2	20 Jan 85	2	2

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)	(INS H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT			

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
PT. #2	PIPELINE X FLARE	4" 2" CRITICAL FLOW PROVER	3.826 (INS)	0 - 200	UPSTREAM X DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING				OIL OR CONDENSATE METERING						WATER METERING		
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	SJAB #	TEMP. (°F)	CASING PRESSURE (PSIG)	FLUID LEVEL FT.	HEATER CHOKE SIZE (64th INCH)	DEPTH PULLED FROM FT.	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	APPROX FLUID RECOVERY bbls	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	TOTAL FLUID bbls	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1																				1
2	30		18			-		PSN				1.5		54.0						2
3	130		19			-		PSN				1		55.0					82,100	3
4	230		20			-		PSN				2		57.0					82,100	4
5	330		21			-		PSN				1		58.0					109,600	5
6	430		22			-		PSN				1		59.0					69,600	6
7	530		23			-		PSN				0		59.0						7
8	630		24			-		PSN				.5		59.5					66,000	8
9	700		25			-		PSN				2		61.5					76,800	9
10	720		26			-		PSN				2		63.5						10
11	800		27			-		PSN				2		64.5					82,100	11
12	900		28			-		PSN				2		66.5					82,100	12
13																				13
14																				14
15																				15
16																				16
17																				17

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9095-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	21JAN85	1 - 7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) — (INS. H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	21	DOWELL FINISHED ACID JOB										0.000	0.00		0	0.000	0.00	0.00	0.0	1
	0230	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	21	WELL FLOWED ON BY ITSELF TO RIG TANK										0.000	0.00		0	0.000	0.00	0.00	0.0	2
	0240	.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	21	FLOWED 20 BARRELS BACK TO RIG TANK										0.000	0.00		0	0.000	0.00	0.00	0.0	3
	0305	.6	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	21	PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)										0.000	0.00		0	0.000	0.00	0.00	0.0	4
	0400	1.5	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	21	PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)										0.000	0.00		0	0.000	0.00	0.00	0.0	5
	0415	1.7	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	21	PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)										0.000	0.00		0	0.000	0.00	0.00	0.0	6
	0430	2.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	21	PULLED SWAB FROM 304M (RECOVERED 5 BARRELS)										0.000	0.00		0	0.000	0.00	0.00	0.0	7
	0440	2.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	21	WELL FLOWED BY ITSELF (RECOVERED 15 BARRELS)										0.000	0.00		0	0.000	0.00	0.00	0.0	8
	0445	2.2	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	21	SWITCH THROUGH TO SEPARATOR ON 21/64 CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0	9
	0450	2.3	440	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	21	OPEN GAUGE READING WAS 2.76 IN.										0.000	0.00		0	0.000	0.00	2.76	0.0	10
	0455	2.4	516	0	0	0	21	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	21	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0	11
	0500	2.5	430	0	0	0	25	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	21	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0	12
	0505	2.6	460	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	21	INCREASE CHOKE										0.000	0.00		0	0.000	0.00	0.00	0.0	13
	0510	2.7	225	0	0	0	45	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	21											0.000	0.00		0	0.000	0.00	0.00	0.0	14
	0515	2.7	175	0	0	0	45	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	21	CUT CHOKE BACK										0.000	0.00		0	0.000	0.00	0.00	0.0	15
	0533	3.0	175	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	21	NO PRESSURE ON TUBING										0.000	0.00		0	0.000	0.00	0.00	0.0	16
	0600	3.5	0	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	21	NO PRESSURE ON TUBING										0.000	0.00		0	0.000	0.00	0.00	0.0	17
	0700	4.5	0	0	0	0	35	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OEC — 909-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	21JAN85	2	7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD	WILDCAT	SLAVE POINT	——— (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	PIPELINE [ ] FLARE [X]	4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	UPSTREAM [ ] DOWNSTREAM [X]

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING		
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64TH INCH)	HEATER CHOKE SIZE (64TH INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. ($INS H_2O$)	TEMP. (°F)	GAS GRAVITY (AIR=1) / $\%H_2S$	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. ($INS H_2O$)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	21	SHUT-IN WELL										0.000	0.00		0	0.000	0.00	0.00	0.0	1
	0700	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	21	PULL SWAB #1 (FLUID AT 4000 FT.)										0.000	0.00		0	0.000	0.00	0.00	0.0	2
	0745	.8	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	21	PULL SWAB #2 (FLUID AT 4000 FT.)										0.000	0.00		0	0.000	0.00	0.00	0.0	3
	0820	1.3	0	0	0	0	0	0.000	0	0	0	1.000	0.00		0	0.000	0.0	0.00	0.0	
4	21	SHUT-IN WELL / TOOK GAS SAMPLES / GAS GRAV.=1%										0.000	0.00		0	0.000	0.00	0.00	0.0	4
	0830	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	21											0.000	0.00		0	0.000	0.00	0.00	0.0	5
	0830	0.0	100	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	21											0.000	0.00		0	0.000	0.00	0.00	0.0	6
	0844	.2	175	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	21											0.000	0.00		0	0.000	0.00	0.00	0.0	7
	0900	.5	184	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	21	OPEN WELL THROUGH SEPARATOR TO GET GAS RATE										0.000	0.00		0	0.000	0.00	0.00	0.0	8
	0900	0.0	184	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	21	SALINITY=148,000 PPM										0.000	0.00		0	0.000	0.00	15.75	0.0	9
	0910	.2	84	26	0	0	64	.625	80	50	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	21											0.000	0.00		0	0.000	0.00	15.75	0.0	10
	0915	.2	20	26	0	0	64	.625	20	50	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	21	WELL WENT DEAD / RIG CREW READY TO PULL SWAB										0.000	0.00		0	0.000	0.00	0.00	0.0	11
	0927	.4	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	21	SALINITY=109,600 PPM										0.000	0.00		0	0.000	0.00	25.20	0.0	12
	0945	.7	0	0	0	0	64	.625	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	21	PULL SWAB #4 / SAL.=100,000 PPM / FLD @ 5000 FT										0.000	0.00		0	0.000	0.00	30.71	0.0	13
	1015	1.2	0	0	0	0	64	.625	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	21											0.000	0.00		0	0.000	0.00	30.71	0.0	14
	1030	1.5	30	37	0	0	64	.625	0	105	50	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	21											0.000	0.00		0	0.000	0.00	30.71	0.0	15
	1045	1.7	27	37	0	0	64	.625	0	84	52	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	21											0.000	0.00		0	0.000	0.00	30.71	0.0	16
	1100	2.0	2	37	0	0	64	.625	0	4	50	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	21	PULL SWAB #5 / SALINITY=91,000 PPM										0.000	0.00		0	0.000	0.00	35.04	0.0	17
	1120	2.3	0	0	0	0	64	.625	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OKC – 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	21JAN85	3	7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)...(INS. H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	------	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64ths INCH)	HEATER CHOKE SIZE (64ths INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	21											0.000	0.00		0	0.000	0.00	35.04	0.0_1
	1130	2.5	12	46	0	0	64	.625	8	164	54	0.000	0.00		0	0.000	0.0	0.00	0.0
2	21											0.000	0.00		0	0.000	0.00	35.04	0.0_2
	1145	2.7	2	37	0	0	64	.625	2	30	59	0.000	0.00		0	0.000	0.0	0.00	0.0
3	21	WELL WENT DEAD										0.000	0.00		0	0.000	0.00	0.00	0.0_3
	1200	3.0	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
4	21	PULL SWAB #6 / SALINITY=91,000 PPM										0.000	0.00		0	0.000	0.00	39.76	0.0_4
	1215	3.2	0	0	0	0	64	.625	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
5	21											0.000	0.00		0	0.000	0.00	39.76	0.0_5
	1230	3.5	4	43	0	0	64	.625	0	80	55	0.000	0.00		0	0.000	0.0	0.00	0.0
6	21	WELL WENT DEAD										0.000	0.00		0	0.000	0.00	0.00	0.0_6
	1242	3.7	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
7	21	PULL SWAB #7 / PULLED FROM P.S.N.										0.000	0.00		0	0.000	0.00	0.00	0.0_7
	1315	4.2	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
8	21	SALINITY=83,900 PPM.										0.000	0.00		0	0.000	0.00	42.91	0.0_8
	1330	4.5	10	48	0	0	64	.625	0	180	57	0.000	0.00		0	0.000	0.0	0.00	0.0
9	21											0.000	0.00		0	0.000	0.00	42.91	0.0_9
	1330	4.5	10	48	0	0	64	.625	0	180	57	0.000	0.00		0	0.000	0.0	0.00	0.0
10	21											0.000	0.00		0	0.000	0.00	42.91	0.0_{10}
	1345	4.7	0	43	0	0	64	.625	0	15	57	0.000	0.00		0	0.000	0.0	0.00	0.0
11	21	PULL SWAB #8 / SALINITY=82,100 PPM										0.000	0.00		0	0.000	0.00	45.47	0.0_{11}
	1413	5.2	0	43	0	0	64	.625	0	15	57	0.000	0.00		0	0.000	0.0	0.00	0.0
12	21											0.000	0.00		0	0.000	0.00	45.47	0.0_{12}
	1415	5.2	0	43	0	0	64	.625	0	4	57	0.000	0.00		0	0.000	0.0	0.00	0.0
13	21											0.000	0.00		0	0.000	0.00	45.47	0.0_{13}
	1430	5.5	5	48	0	0	64	.625	0	122	61	0.000	0.00		0	0.000	0.0	0.00	0.0
14	21											0.000	0.00		0	0.000	0.00	45.47	0.0_{14}
	1445	5.7	2	48	0	0	64	.625	0	22	57	0.000	0.00		0	0.000	0.0	0.00	0.0
15	21	PULL SWAB #9 / SALINITY=83,900 PPM										0.000	0.00		0	0.000	0.00	49.61	0.0_{15}
	1530	6.5	2	48	0	0	64	.625	0	22	57	0.000	0.00		0	0.000	0.0	0.00	0.0
16	21											0.000	0.00		0	0.000	0.00	49.61	0.0_{16}
	1545	6.7	4	48	0	0	64	.625	0	90	61	0.000	0.00		0	0.000	0.0	0.00	0.0
17	21	WELL WENT DEAD										0.000	0.00		0	0.000	0.00	0.00	0.0_{17}
	1600	7.0	0	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0

OTIS

FIELD READINGS

Single Stage Unit

OEC — 9091

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	21JAN85	4	7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS)__(INS H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	21	PULL SWAB #10 / SALINITY=72,300 PPM										0.000	0.00		0	0.000	0.00	51.18	0.0	1
	1619	7.3	0	0	0	0	64	.625	0	90	61	0.000	0.00		0	0.000	0.0	0.00	0.0	
2	21											0.000	0.00		0	0.000	0.00	51.18	0.0	2
	1630	7.5	5	45	0	0	64	.625	0	106	57	0.000	0.00		0	0.000	0.0	0.00	0.0	
3	21											0.000	0.00		0	0.000	0.00	51.18	0.0	3
	1645	7.7	0	45	0	0	64	.625	0	7	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
4	21											0.000	0.00		0	0.000	0.00	51.18	0.0	4
	1700	8.0	0	45	0	0	64	.625	0	8	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
5	21	PULL SWAB #11 / SALINITY=67,800 PPM										0.000	0.00		0	0.000	0.00	54.33	0.0	5
	1722	8.4	0	45	0	0	64	.625	0	8	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
6	21											0.000	0.00		0	0.000	0.00	54.33	0.0	6
	1730	8.5	7	46	0	0	64	.625	0	160	57	0.000	0.00		0	0.000	0.0	0.00	0.0	
7	21											0.000	0.00		0	0.000	0.00	54.33	0.0	7
	1745	8.7	2	43	0	0	64	.625	0	32	55	0.000	0.00		0	0.000	0.0	0.00	0.0	
8	21											0.000	0.00		0	0.000	0.00	54.33	0.0	8
	1800	9.0	0	41	0	0	64	.625	0	7	54	0.000	0.00		0	0.000	0.0	0.00	0.0	
9	21	PULL SWAB #12 / SALINITY=61,100 PPM										0.000	0.00		0	0.000	0.00	56.30	0.0	9
	1826	9.4	0	41	0	0	64	.625	0	7	54	0.000	0.00		0	0.000	0.0	0.00	0.0	
10	21											0.000	0.00		0	0.000	0.00	56.30	0.0	10
	1830	9.5	8	37	0	0	64	.625	0	147	61	0.000	0.00		0	0.000	0.0	0.00	0.0	
11	21											0.000	0.00		0	0.000	0.00	56.30	0.0	11
	1845	9.7	0	39	0	0	64	.625	0	16	61	0.000	0.00		0	0.000	0.0	0.00	0.0	
12	21	PULL SWAB #13 / SALINITY=57,100 PPM										0.000	0.00		0	0.000	0.00	57.09	0.0	12
	1915	10.2	0	39	0	0	64	.625	0	16	61	0.000	0.00		0	0.000	0.0	0.00	0.0	
13	21											0.000	0.00		0	0.000	0.00	57.09	0.0	13
	1930	10.5	6	41	0	0	64	.625	0	88	68	0.000	0.00		0	0.000	0.0	0.00	0.0	
14	21											0.000	0.00		0	0.000	0.00	57.09	0.0	14
	1945	10.7	0	43	0	0	64	.625	0	4	64	0.000	0.00		0	0.000	0.0	0.00	0.0	
15	21	PULL SWAB #14 / SALINITY=60,700 PPM										0.000	0.00		0	0.000	0.00	59.45	0.0	15
	2010	11.2	0	43	0	0	64	.625	0	4	64	0.000	0.00		0	0.000	0.0	0.00	0.0	
16	21											0.000	0.00		0	0.000	0.00	59.45	0.0	16
	2030	11.5	7	43	0	0	64	.625	0	100	70	0.000	0.00		0	0.000	0.0	0.00	0.0	
17	21											0.000	0.00		0	0.000	0.00	59.45	0.0	17
	2045	11.7	0	39	0	0	64	.625	0	6	66	0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OEC — 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE(DAY MO. YR.)	PAGE	OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	21JAN85	5	7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	------ (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826(INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME	WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	21	PULL SWAB #15 / SALINITY=57,100 PPM										0.000	0.00		0	0.000	0.00	62.20	0.0_1
	2100	12.0	0	39	0	0	64	.625	0	6	66	0.000	0.00		0	0.000	0.0	0.00	0.0
2	21											0.000	0.00		0	0.000	0.00	62.20	0.0_2
	2130	12.5	10	45	0	0	64	.625	0	100	73	0.000	0.00		0	0.000	0.0	0.00	0.0
3	21											0.000	0.00		0	0.000	0.00	62.20	0.0_3
	2145	12.7	0	41	0	0	64	.625	0	17	70	0.000	0.00		0	0.000	0.0	0.00	0.0
4	21	PULL SWAB #16 / SALINITY=55,400 PPM										0.000	0.00		0	0.000	0.00	64.96	0.0_4
	2200	13.0	0	41	0	0	64	.625	0	17	70	0.000	0.00		0	0.000	0.0	0.00	0.0
5	21											0.000	0.00		0	0.000	0.00	64.96	0.0_5
	2230	13.5	12	46	0	0	64	.625	0	19	68	0.000	0.00		0	0.000	0.0	0.00	0.0
6	21											0.000	0.00		0	0.000	0.00	64.96	0.0_6
	2245	13.7	0	43	0	0	64	.625	0	6	64	0.000	0.00		0	0.000	0.0	0.00	0.0
7	21											0.000	0.00		0	0.000	0.00	64.96	0.0_7
	2300	14.0	0	37	0	0	64	.625	0	6	66	0.000	0.00		0	0.000	0.0	0.00	0.0
8	21	PULL SWAB #17 / SALINITY=55,400 PPM										0.000	0.00		0	0.000	0.00	67.72	0.0_8
	2305	14.1	0	37	0	0	64	.625	0	6	66	0.000	0.00		0	0.000	0.0	0.00	0.0
9	21											0.000	0.00		0	0.000	0.00	67.72	0.0_9
	2330	14.5	8	45	0	0	64	.625	0	96	59	0.000	0.00		0	0.000	0.0	0.00	0.0
10	21											0.000	0.00		0	0.000	0.00	67.72	0.0_{10}
	2345	14.7	0	41	0	0	64	.625	0	12	59	0.000	0.00		0	0.000	0.0	0.00	0.0
11	21											0.000	0.00		0	0.000	0.00	67.72	0.0_{11}
	2400	15.0	0	36	0	0	64	.625	0	3	61	0.000	0.00		0	0.000	0.0	0.00	0.0
12	22	PULL SWAB #18 / SALINITY=55,400 PPM										0.000	0.00		0	0.000	0.00	67.72	0.0_{12}
	0020	15.3	0	36	0	0	64	.625	0	3	61	0.000	0.00		0	0.000	0.0	0.00	0.0
13	22	PULL SWAB #19 / SALINITY=55,400 PPM										0.000	0.00		0	0.000	0.00	68.90	0.0_{13}
	0040	15.7	0	36	0	0	64	.625	0	3	61	0.000	0.00		0	0.000	0.0	0.00	0.0
14	22	PULL SWAB #20 / SALINITY=55,400 PPM										0.000	0.00		0	0.000	0.00	68.90	0.0_{14}
	0115	16.2	0	36	0	0	64	.625	0	3	61	0.000	0.00		0	0.000	0.0	0.00	0.0
15	22											0.000	0.00		0	0.000	0.00	0.00	0.0_{15}
	0130	16.5	55	0	0	0	64	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
16	22	SHUT-IN FOR BUILD-UP										0.000	0.00		0	0.000	0.00	0.00	0.0_{16}
	0130	0.0	0	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0
17	22											0.000	0.00		0	0.000	0.00	0.00	0.0_{17}
	0200	.5	90	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.0	0.00	0.0

FIELD READINGS

Single Stage Unit

OEC — 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	22JAN85	6 7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE (INS)	METER/DIFF. RANGE (BBLS) (INS H_2O)
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	———	

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING						WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) % H_2S	# TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) BSW (%)	#1 TANK OR METER READING #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)	
1	22	BLEED PRESSURE OFF TO TANKS																		
	0205	.6	105	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	1
												0.000	0.00		0	0.000	0.0	0.00	0.0	
2	22	OPEN WELL																		
	0205	0.0	105	0	0	0	0	0.000	0	0	0	0.000	0.00		0	0.000	0.00	0.00	0.0	2
												0.000	0.00		0	0.000	0.0	0.00	0.0	
3	22	PULL SWAB #21 / SALINITY=55,400 PPM																		
	0210	.1	8	45	0	0	64	.625	0	140	66	0.000	0.00		0	0.000	0.00	69.29	0.0	3
												0.000	0.00		0	0.000	0.0	0.00	0.0	
4	22																			
	0230	.4	8	45	0	0	64	.625	0	140	66	0.000	0.00		0	0.000	0.00	69.29	0.0	4
												0.000	0.00		0	0.000	0.0	0.00	0.0	
5	22																			
	0245	.7	2	39	0	0	64	.625	0	12	60	0.000	0.00		0	0.000	0.00	69.29	0.0	5
												0.000	0.00		0	0.000	0.0	0.00	0.0	
6	22																			
	0300	.9	0	39	0	0	64	.625	0	5	59	0.000	0.00		0	0.000	0.00	69.29	0.0	6
												0.000	0.00		0	0.000	0.0	0.00	0.0	
7	22	PULL SWAB #22 / SALINITY=51,800 PPM																		
	0310	1.1	0	39	0	0	64	.625	0	5	59	0.000	0.00		0	0.000	0.00	70.08	0.0	7
												0.000	0.00		0	0.000	0.0	0.00	0.0	
8	22																			
	0330	1.4	11	46	0	0	64	.625	0	144	70	0.000	0.00		0	0.000	0.00	70.08	0.0	8
												0.000	0.00		0	0.000	0.0	0.00	0.0	
9	22																			
	0345	1.7	0	41	0	0	64	.625	0	12	68	0.000	0.00		0	0.000	0.00	70.08	0.0	9
												0.000	0.00		0	0.000	0.0	0.00	0.0	
10	22																			
	0400	1.9	0	37	0	0	64	.625	0	4	64	0.000	0.00		0	0.000	0.00	70.08	0.0	10
												0.000	0.00		0	0.000	0.0	0.00	0.0	
11	22	PULL SWAB #23 / SALINITY=46,400 PPM																		
	0410	2.1	0	37	0	0	64	.625	0	4	64	0.000	0.00		0	0.000	0.00	72.83	0.0	11
												0.000	0.00		0	0.000	0.0	0.00	0.0	
12	22	DECREASE CHOKE TO 30/64																		
	0430	2.4	15	48	0	0	30	.625	0	88	73	0.000	0.00		0	0.000	0.00	72.83	0.0	12
												0.000	0.00		0	0.000	0.0	0.00	0.0	
13	22																			
	0445	2.7	7	43	0	0	30	.625	0	10	68	0.000	0.00		0	0.000	0.00	72.83	0.0	13
												0.000	0.00		0	0.000	0.0	0.00	0.0	
14	22																			
	0500	2.9	0	36	0	0	30	.625	0	6	66	0.000	0.00		0	0.000	0.00	72.83	0.0	14
												0.000	0.00		0	0.000	0.0	0.00	0.0	
15	22	PULL SWAB #24 / SALINITY=46,400 PPM																		
	0515	3.2	0	36	0	0	30	.625	0	6	66	0.000	0.00		0	0.000	0.00	73.62	0.0	15
												0.000	0.00		0	0.000	0.0	0.00	0.0	
16	22	DECREASE CHOKE TO 25/64																		
	0530	3.4	0	43	0	0	25	.625	0	58	68	0.000	0.00		0	0.000	0.00	73.62	0.0	16
												0.000	0.00		0	0.000	0.0	0.00	0.0	
17	22																			
	0545	3.7	0	39	0	0	25	.625	0	2	64	0.000	0.00		0	0.000	0.00	73.62	0.0	17
												0.000	0.00		0	0.000	0.0	0.00	0.0	

OTIS

FIELD READINGS

Single Stage Unit

OEC — 905-1

TEST NO.	RATE NO.	WELL NAME OR NUMBER	INTERVAL TESTED (FT.)	DATE (DAY MO. YR.)	PAGE	OF
4	1	NSM ARROWHEAD G-69	7486.9-7503.3	22JAN85	7	7

CUSTOMER	FIELD	FORMATION	COND./OIL METER SIZE	METER/DIFF. RANGE
NSM RESOURCES LTD.	WILDCAT	SLAVE POINT	------ (INS)	(BBLS) (INS H_2O)

TEST UNIT DESCRIPTION (#, SIZE, ETC.)	GAS PRODUCED TO	GAS MEASURED WITH	GAS METER RUN SIZE	DIFF. RANGE (INS. H_2O)	STATIC PRESSURE TAKEN
P.T. #2	[ ] PIPELINE [X] FLARE	[ ] 4" [ ] 2" CRITICAL FLOW PROVER	3.826 (INS)	0-200	[ ] UPSTREAM [X] DOWNSTREAM

	TIME		WELLHEAD DATA			FLOW CONTROL		GAS METERING					OIL OR CONDENSATE METERING					WATER METERING	
	DAY / 24 HR. CLOCK	FLOW OR SHUT IN DURATION (HOURS)	TUBING PRESSURE (PSIG)	TEMP. (°F)	CASING PRESSURE (PSIG)	MANIFOLD CHOKE SIZE (64th INCH)	HEATER CHOKE SIZE (64th INCH)	ORIFICE SIZE (INS)	STATIC PRESSURE (PSIG)	DIFF. PRESS. (INS H_2O)	TEMP. (°F)	GAS GRAVITY (AIR=1) / % H_2S	# TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	COND. METER ORIFICE SIZE (INS) / COND. METER DIFF. PRESS. (INS H_2O)	#1 OIL TEMP. / #2 OIL TEMP.	WEATHERING FACTOR W_f	OIL GRAVITY @60°F (°API) / BSW (%)	#1 TANK OR METER READING / #2 TANK OR METER READING (INS OR BBLS)	SALINITY (%)
1	22 / 0600	3.9	0	37	0	0	25	.625	0	2	63	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	73.62 / 0.00	0.0_1 / 0.0
2	22 / 0610	PULL SWAB #25 / SALINITY=42,900 PPM / CHK AT 4.1	0	37	0	0	64	.625	0	2	63	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	75.20 / 0.00	0.0_2 / 0.0
3	22 / 0630	4.4	20	45	0	0	64	.625	10	110	79	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	75.20 / 0.00	0.0_3 / 0.0
4	22 / 0645	4.7	0	43	0	0	64	.625	0	32	73	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	75.20 / 0.00	0.0_4 / 0.0
5	22 / 0700	4.9	0	41	0	0	64	625	0	11	70	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	75.20 / 0.00	0.0_5 / 0.0
6	22 / 0727	PULL SWAB #26 / SALINITY=48,200 PPM 5.4	0	41	0	0	64	.625	0	11	70	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	78.74 / 0.00	0.0_6 / 0.0
7	22 / 0730	5.4	0	41	0	0	64	.625	0	92	77	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	78.74 / 0.00	0.0_7 / 0.0
8	22 / 0745	5.7	0	41	0	0	64	.625	0	11	72	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	78.74 / 0.00	0.0_8 / 0.0
9	22 / 0800	5.9	0	41	0	0	64	.625	0	7	68	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	78.74 / 0.00	0.0_9 / 0.0
10	22 / 0813	PULL SWAB #27 / SALINITY=44,600 PPM 6.1	0	41	0	0	64	.625	0	7	68	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	79.92 / 0.00	0.0_{10} / 0.0
11	22 / 0815	6.2	0	41	0	0	64	.625	0	88	66	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	79.92 / 0.00	0.0_{11} / 0.0
12	22 / 0930	6.4	0	41	0	0	64	.625	0	7	66	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	79.92 / 0.00	0.0_{12} / 0.0
13	22 / 0845	WELL WENT DEAD 6.7	0	0	0	0	64	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	0.00 / 0.00	0.0_{13} / 0.0
14	22 / 0922	PULL SWAB #28 / SALINITY=46,400 PPM 7.3	0	41	0	0	64	.625	0	7	66	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	81.10 / 0.00	0.0_{14} / 0.0
15	22 / 0922	TOOK GAS SAMPLES #4363 & #3309 / END OF TEST #4 7.3	0	0	0	0	0	0.000	0	0	0	0.000 / 0.000	0.00 / 0.00		0 / 0	0.000 / 0.000	0.00 / 0.0	0.00 / 0.00	0.0_{15} / 0.0
16																			16
17																			17

Gas Flow
Rate Calculations

GAS FLOW RATE CALCULATIONS

OEC—862-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	1	-	NSM ARROWHEAD G-69	14JAN85	1 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =	MEAS. ☐ EST. ☐	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	14.73 psi 60°F	X OTHER 14.7psi,60F	14.7			.720

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1785	28.4387

DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O INCHES WATER	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d inches	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$				C_2	C ($C = C_1 \times C_2$)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ Mcf/d
							F_b	F_{tf}	F_{pv}	Y_2			
1 14 2205	1.2	325	70.0	55	150.75	1.250	318.03	1.0048	1.0410	1.0014	333.137	9474	1428.20
2 14 2230	1.7	385	160.0	55	248.08	1.250	318.03	1.0048	1.0493	1.0027	336.255	9563	2372.31
3 14 2300	2.2	435	90.0	55	197.78	1.250	318.03	1.0048	1.0565	1.0014	338.089	9615	1901.66
4 14 2330	2.7	422	81.0	59	184.81	1.250	318.03	1.0010	1.0531	1.0013	335.659	9546	1764.11
5 14 2400	3.2	400	89.0	70	188.60	1.250	318.03	.9905	1.0463	1.0015	330.080	9387	1770.37
6 15 0030	3.7	422	81.0	77	184.81	1.250	318.03	.9840	1.0467	1.0013	327.998	9328	1723.85
7 15 0100	4.2	415	84.0	75	186.63	1.250	318.03	.9859	1.0465	1.0013	328.569	9344	1743.88
8 15 0130	4.7	415	66.0	73	165.43	1.250	318.03	.9877	1.0472	1.0010	329.296	9365	1549.21
9 15 0200	5.2	417	63.0	77	162.02	1.250	318.03	.9840	1.0461	1.0010	327.722	9320	1509.98
10 15 0230	5.7	425	56.0	79	154.21	1.250	318.03	.9822	1.0465	1.0009	327.171	9304	1434.81
11													
12													
13													
14													
15													
16													
17													
18													

GAS FLOW RATE CALCULATIONS

OTIS

OEC-862-1-B

HIGH STAGE

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
2	2	-	NSM ARROWHEAD G-69	15JAN85	2 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	[ ] 14.73 psi 60°F [X] OTHER 14.7psi,60F	14.7			MEAS. [ ] EST. [ ] .720

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1785	28.4387

DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O manometer	DOWN STREAM GAS TEMP. °F	$\sqrt{h_w P_f}$	ORIFICE SIZE d inches	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$				C_2	C ($C = C_1 \times C_2$)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ mcf/d
							F_b	F_{tf}	F_{pv}	Y_2			
1 15 0300	6.2	416	60.0	79	157.92	1.500	462.27	.9822	1.0454	1.0009	475.101	13511	2133.71
2 15 0330	6.7	410	57.0	79	152.81	1.500	462.27	.9822	1.0447	1.0009	474.763	13502	2063.15
3 15 0400	7.2	415	56.0	75	152.38	1.500	462.27	.9859	1.0465	1.0009	477.367	13576	2068.70
4 15 0430	7.7	400	48.0	77	138.50	1.500	462.27	.9840	1.0441	1.0008	475.325	13518	1872.24
5 15 0500	8.2	400	46.0	77	135.59	1.500	462.27	.9840	1.0441	1.0007	475.309	13517	1832.76
6 15 0600	9.2	400	38.0	77	123.23	1.500	462.27	.9840	1.0441	1.0006	475.248	13515	1665.57
7 15 0630	9.7	400	38.0	77	123.23	1.500	462.27	.9840	1.0441	1.0006	475.248	13515	1665.57
8 15 0700	10.2	302	58.0	77	132.27	1.500	462.27	.9840	1.0326	1.0012	470.320	13375	1769.17
9 15 0730	10.7	302	55.0	81	128.81	1.500	462.27	.9804	1.0318	1.0012	468.166	13314	1714.92
10 15 0800	11.2	247	52.0	75	113.25	1.500	462.27	.9859	1.0267	1.0014	468.560	13325	1509.10
11 15 0830	11.7	245	52.0	59	112.79	1.500	462.27	1.0010	1.0294	1.0014	476.979	13565	1529.97
12													
13													
14													
15													
16													
17													
18													

GAS FLOW RATE CALCULATIONS

OTIS QTLS — OEC—862-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	3	–	NSM ARROWHEAD G-69	15JAN85	3 9

CUSTOMER: NSM RESOURCES LTD.

STANDARD CONDITIONS: 14.73 psi 60°F — X OTHER 14.7psi,60F — ATM. PRESS 14.7 — P_c = — T_c = — MEAS. ☐ EST. ☐ — GAS SPECIFIC GRAVITY-G .720

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24 1311	1.1785	28.4387

	DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d inches	F_b	F_{tf}	F_{pv}	Y_2	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$	C (C-C1 X C2)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MCF/d
1	15 0930	12.7	237	55.0	48	114.09	1.125	256.69	1.0117	1.0306	1.0015	268.066	7623	869.73
2	15 1000	13.2	238	56.0	48	115.36	1.125	256.69	1.0117	1.0307	1.0016	268.107	7625	879.59
3	15 1030	13.7	242	72.0	55	131.90	1.125	256.69	1.0048	1.0298	1.0020	266.153	7569	998.39
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

GAS FLOW RATE CALCULATIONS

OEC—662-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	4	–	NSM ARROWHEAD G-69	16JAN85	4 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =	MEAS. ☐ EST. ☐	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	14.73 psi 60°F ☐ X OTHER 14.7psi ; 60F	14.7				.720

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1785	28.4387

	DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O (INCHES WATER)	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d in (INCHES)	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$				C_2	C (C-C1 X C2)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MSCF/D
								F_b	F_{tf}	F_{pv}	Y_2			
1	16 0430	.5	419	108.0	86	212.64	.750	113.15	.9759	1.0436	1.0017	115.440	3283	698.08
2	16 0445	.7	415	114.0	84	217.42	.750	113.15	.9777	1.0438	1.0018	115.681	3290	715.26
3	16 0500	1.0	422	112.0	86	217.31	.750	113.15	.9759	1.0440	1.0018	115.483	3284	713.70
4	16 0530	1.5	422	98.0	81	203.28	.750	113.15	.9804	1.0455	1.0015	116.159	3303	671.51
5	16 0600	2.0	422	107.0	82	212.41	.750	113.15	.9795	1.0452	1.0017	116.034	3300	700.91
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

GAS FLOW RATE CALCULATIONS

OEC—862-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	5	-	NSM ARROWHEAD G-69	16JAN85	5 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	14.73 psi 60°F X OTHER 14.7psi,60F	14.7		MEAS. ☐ EST. ☐	.720

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1785	28.4387

$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$

DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O (INCHES WATER)	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d (INCHES)	F_b	F_{tf}	F_{pv}	Y_2	C_2	C (C=C₁ X C₂)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MSCF/d
1 16 0830	.5	419	167.0	66	264.41	1.000	202.20	.9943	1.0501	1.0026	211.674	6020	1591.70
2 16 0845	.7	417	132.0	54	234.52	1.000	202.20	1.0058	1.0343	1.0021	214.874	6111	1433.07
3 16 0900	1.0	409	126.0	46	226.91	1.000	202.20	1.0137	1.0564	1.0020	216.985	6171	1400.23
4 16 0915	1.2	410	144.0	46	242.88	1.000	202.20	1.0137	1.0566	1.0023	217.079	6173	1499.39
5 16 0930	1.5	414	140.0	50	240.65	1.000	202.20	1.0098	1.0555	1.0022	215.989	6142	1478.16
6 16 0945	1.7	413	133.0	55	234.27	1.000	202.20	1.0048	1.0533	1.0021	214.474	6099	1428.90
7 16 1000	2.0	413	134.0	59	235.15	1.000	202.20	1.0010	1.0518	1.0022	213.345	6067	1426.71
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													

GAS FLOW RATE CALCULATIONS

OEC—362-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	6	–	NSM ARROWHEAD G-69	16JAN85	6 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =	MEAS. ☐ EST. ☐	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	14.73 psi 60°F X OTHER 14.7psi,60F	14.7				.720

METER TYPE	METER RUNSIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1785	28.4387

DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O	DOWN STREAM GAS TEMP. °F	$\sqrt{h_w P_f}$	ORIFICE SIZE d in.	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$				C_2	C ($C = C_1 \times C_2$)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MSCF/D
							F_b	F_{tf}	F_{pv}	Y_2			
1 16 1215	.2	427	135.0	54	240.00	1.250	318.03	1.0058	1.0553	1.0021	338.421	9624	2309.78
2 16 1230	.5	429	120.0	46	226.80	1.250	318.03	1.0137	1.0595	1.0018	342.220	9732	2207.28
3 16 1245	.7	429	132.0	32	237.87	1.250	318.03	1.0281	1.0664	1.0020	349.357	9935	2363.30
4 16 1300	1.0	429	104.0	32	211.14	1.250	318.03	1.0281	1.0664	1.0016	349.207	9931	2096.82
5 16 1315	1.2	422	104.0	37	209.41	1.250	318.03	1.0229	1.0626	1.0016	346.233	9846	2061.92
6 16 1330	1.5	426	105.0	43	211.41	1.250	318.03	1.0168	1.0604	1.0016	343.454	9767	2064.90
7 16 1345	1.7	425	96.0	46	201.91	1.250	318.03	1.0137	1.0589	1.0015	341.897	9723	1963.16
8 16 1400	2.0	423	91.0	50	196.12	1.250	318.03	1.0098	1.0568	1.0014	339.870	9665	1895.54
9 16 1430	2.5	422	78.0	60	181.35	1.250	318.03	1.0000	1.0527	1.0012	335.198	9533	1728.76
10 16 1500	3.0	420	67.0	64	167.68	1.250	318.03	.9962	1.0509	1.0010	333.303	9479	1589.39
11 16 1530	3.5	417	44.0	73	135.40	1.250	318.03	.9877	1.0474	1.0007	329.258	9364	1267.82
12 16 1600	4.0	420	56.0	79	153.30	1.250	318.03	.9822	1.0459	1.0009	326.989	9299	1425.55
13 16 1630	4.5	427	40.0	82	130.64	1.250	318.03	.9795	1.0457	1.0006	325.960	9270	1210.99
14 16 1700	5.0	420	52.0	88	147.72	1.250	318.03	.9741	1.0518	1.0008	326.126	8899	1314.63
15 16 1730	5.5	419	47.0	88	140.27	1.250	318.03	.9741	1.0517	1.0007	326.059	8898	1248.08
16 16 1800	6.0	416	32.0	90	115.33	1.250	318.03	.9723	1.0506	1.0005	325.049	8870	1022.97
17													
18													

GAS FLOW RATE CALCULATIONS

OTIS — OEC—862-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE OF
HIGH STAGE 2	7	-	NSM ARROWHEAD G-69	16JAN85	7 9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS	P_c =	T_c =		GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD.	14.73 psi 60°F [X] OTHER 14.7psi,60F	14.7			MEAS. [ ] EST. [ ]	.782

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H20	0-1500 psi	24.1311	1.1308	27.2881

DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H2O	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d inches	$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$				C_2	C ($C = C_1 \times C_2$)	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MCFD
							F_b	F_{tf}	F_{pv}	Y_2			
16 1830	6.5	415	76.0	91	177.52	1.000	202.20	.9715	1.0501	1.0012	206.529	5636	1000.47

GAS FLOW RATE CALCULATIONS

OTS OEC—862-1-B

TEST NUMBER	RATE NUMBER	AREA	WELL NAME OR NUMBER	DATE (DAY, MO, YR)	PAGE	OF
HIGH STAGE 2	8	–	NSM ARROWHEAD G-69	16JAN85	8	9

CUSTOMER	STANDARD CONDITIONS	ATM. PRESS P_c =	T_c =	GAS SPECIFIC GRAVITY-G
NSM RESOURCES LTD	14.73 psi 60°F X OTHER 14.7psi,60F	14.7	MEAS. ☐ EST. ☐	.782

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3 8260	in BARTON	0-200 "H2O	0-1500 psi	24.1311	1.1308	27.2881

$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$

	DAY TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w INCHES WATER	DOWN STREAM GAS TEMP. (°F)	$\sqrt{h_w P_f}$	ORIFICE SIZE d INCHES	F_b	F_{tf}	F_{pv}	Y_2	C_2	C $(C = C_1 \times C_2)$	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MSCF/d
1	16 1900	7.0	415	72.0	91	172.79	.875	154.39	.9715	1.0501	1.0012	157.690	4303	743.50
2	16 1930	7.5	415	106.0	91	209.65	.875	154.39	.9715	1.0501	1.0017	157.776	4305	902.62
3	16 2000	8.0	415	100.0	86	203.63	.875	154.39	.9759	1.0519	1.0016	158.743	4332	882.08
4	16 2030	8.5	415	102.0	84	205.56	.875	154.39	.9777	1.0526	1.0016	159.149	4343	893.14
5	16 2100	9.0	415	98.0	80	201.58	.875	154.39	.9813	1.0540	1.0016	159.948	4365	879.84
6	16 2230	10.5	245	140.0	82	185.07	.875	154.39	.9795	1.0301	1.0038	156.369	4267	789.70
7	16 2300	11.0	245	130.0	82	178.34	.875	154.39	.9795	1.0301	1.0035	156.327	4266	760.76
8	16 2330	11.5	245	128.0	81	176.96	.875	154.39	.9804	1.0303	1.0035	156.492	4270	755.69
9	16 2400	12.0	245	129.0	81	177.65	.875	154.39	.9804	1.0303	1.0035	156.497	4270	758.66
10	17 0030	12.5	245	124.0	82	174.17	.875	154.39	.9795	1.0301	1.0034	156.301	4265	742.88
11	17 0100	13.0	245	118.0	81	169.91	.875	154.39	.9804	1.0303	1.0032	156.450	4269	725.37
12	17 0130	13.5	245	126.0	84	175.57	.875	154.39	.9777	1.0297	1.0034	155.963	4256	747.23
13	17 0200	14.0	250	128.0	81	178.76	.875	154.39	.9804	1.0309	1.0034	156.581	4273	763.81
14	17 0230	14.5	249	106.0	84	162.35	.875	154.39	.9777	1.0302	1.0028	155.949	4256	690.88
15	17 0300	15.0	252	110.0	84	166.38	.875	154.39	.9777	1.0306	1.0029	156.019	4257	708.35
16	17 0330	15.5	245	134.0	82	181.06	.875	154.39	.9795	1.0301	1.0036	156.344	4266	772.46
17	17 0400	16.0	245	125.0	77	174.82	.875	154.39	.9840	1.0311	1.0034	157.183	4289	750.08
18	17 0430	16.5	245	90.0	75	148.39	.875	154.39	.9859	1.0315	1.0024	157.389	4295	637.30

GAS FLOW RATE CALCULATIONS

OTS

OEC—862-1-B

HIGH STAGE | TEST NUMBER: 2 | RATE NUMBER: 8 | AREA: – | WELL NAME OR NUMBER: NSM ARROWHEAD G-69 | DATE (DAY, MO, YR): 17JAN85 | PAGE: 9 OF 9

CUSTOMER: NSM RESOURCES LTD.

STANDARD CONDITIONS: 14.73 psi 60°F | X OTHER 14.7psi,60F | ATM. PRESS 14.7 | P_c = | T_c = | MEAS. ☐ EST. ☐ | GAS SPECIFIC GRAVITY-G: .782

METER TYPE	METER RUN SIZE (INCHES)	FLOW RECORDER TYPE	h_w RANGE (INCHES WATER)	STATIC PRESS RANGE (psi)	F_u TABLE PREV. PAGE	$F_g = \sqrt{1/G}$	$C_1 = F_u \times F_g$
DANIELS	3.8260 in	BARTON	0-200 "H20	0-1500 psi	24.1311	1.1308	27.2881

$C_2 = F_b \times F_{tf} \times F_{pv} \times Y_2$

	DAY / TIME (24 HR CLOCK)	FLOW TIME (HOURS)	STATIC PRESSURE P_f psia	DIFFERENTIAL PRESSURE h_w "H20 (INCHES WATER)	DOWN STREAM GAS TEMP. °F	$\sqrt{h_w P_f}$	ORIFICE SIZE d (INCHES)	F_b	F_{tf}	F_{pv}	Y_2	C_2	C $(C = C_1 \times C_2)$	CORRECTED GAS FLOW RATE $Q_g = C\sqrt{h_w P_f}$ MSCFD
1	17 0500	17.0	252	120.0	73	173.78	.875	154.39	.9877	1.0329	1.0032	158.012	4312	749.29
2	17 0530	17.5	249	100.0	78	157.69	.875	154.39	.9831	1.0314	1.0027	156.975	4284	675.46
3	17 0600	18.0	245	128.0	81	176.96	.875	154.39	.9804	1.0303	1.0035	156.492	4270	755.69
4	17 0630	18.5	250	124.0	82	175.94	.875	154.39	.9795	1.0307	1.0033	156.390	4268	750.86
5	17 0700	19.0	247	130.0	84	179.07	.875	154.39	.9777	1.0299	1.0035	156.015	4257	762.34
6	17 0730	19.5	245	128.0	70	176.96	.875	154.39	.9905	1.0325	1.0035	158.455	4324	765.17
7	17 0800	20.0	248	102.0	64	158.93	.875	154.39	.9962	1.0343	1.0027	159.515	4353	691.82
8	17 0830	20.5	252	102.0	64	160.21	.875	154.39	.9962	1.0349	1.0027	159.660	4355	697.76
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														
19														

Oil Flow
Rate Calculations

OIL FLOW RATE CALCULATIONS - TANK MEASUREMENTS

OTIS

OEC—871-I

TEST NUMBER	RATE NUMBER	AREA	PAGE OF
1	1	—	1

CUSTOMER	WELL NAME OR NUMBER	STO GRAVITY (API) @ 60°F	STANDARD CONDITIONS
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	0.00	14.650 psi PRESS. 60 F TEMP.

TANK #1 CAPACITY (BBLS)	TANK #1 INSIDE DIMENSIONS (INCHES)	BBLS PER INCH FOR TANK #1	TANK #2 CAPACITY (BBLS)	TANK #2 INSIDE DIMENSIONS (INCHES)	BBLS PER INCH FOR TANK #2
210 bbl	in	1.167 bbl/in			

	DATE (DAY MO. YR)	TIME (24 HR CLOCK)	FLOW TIME (HOURS)	TANK USED (1 or 2)	FIELD OIL TANK READINGS (INCHES)	INCREASE IN TANK READINGS SINCE LAST READING (INCHES)	VOLUME BY TANK SINCE LAST READING V_t (BBLS)	TANK TEMP. (°F)	K FROM ASTM TABLES	BSW (%)	CORRECTED OIL VOLUME V_o (STD BBLS)	CORRECTED OIL FLOW RATE Q_o (STD BPD)	CORRECTED GAS FLOW RATE FROM GAS FLOW RATE CALC FORM Q_g (MSCF/D)	GOR (MSCF/STO BBL) OGR (STO BBL/MMSCF)
1	10JAN85	0005	1.1	1	5.12	5.12	5.98	60	1.0000	0.0	5.98	132.37		0
2	10JAN85	0045	1.7	1	8.66	3.54	4.13	60	1.0000	0.0	4.13	148.72		0
3	10JAN85	0130	.2	1	11.02	2.36	2.75	60	1.0000	0.0	2.75	88.13		0
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														
15														
16														
17														
18														

Surface Sample

OEC-8777-

TEST NUMBER	RUN NUMBER	RERUN	PAGE
TWO	EXT.	-	1 of 1

CUSTOMER	WELL NAME OR NUMBER	FIELD	FORMATION
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	KEG RIVER

ELEVATION (FEET)	STANDARD CONDITIONS	TIME WELL FLOWING OR SHUT IN BEFORE SAMPLING	INTERVAL TESTED (FEET)
	☐ 14.73 psi 60°F ☒ OTHER 14.65 PRESS. 60 TEMP.	21	8064.3-8080.7

SAMPLE #__ TAKEN 85 JAN 16

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
	C + G											
	#3075		On		H.P.	Meter						
1826	#3697		Vacuum		Gas	Run	401	90	14.65	-20		.5

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. / DEPTH (FT.) (psig)	BOTTOM HOLE TEMP. / DEPTH (FT.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (C)	OIL W_f (C)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)
650	46	18	401	90									.782				11.0

SAMPLE #__ TAKEN 85 JAN 17

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
	C + G											
	#3376				Wellhead							
0845	#3099				Gas	Wellhead	435	45	14.65	-22		.5

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. / DEPTH (FT.) (psig)	BOTTOM HOLE TEMP. / DEPTH (FT.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (C)	OIL W_f (C)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)
435	45	18	232	63									.782				43.0

SAMPLE #__ TAKEN 85 JAN 17

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
	C + G											
0850		1 Litre		1 Litre	Water	Separator				-22		.5

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. / DEPTH (FT.) (psig)	BOTTOM HOLE TEMP. / DEPTH (FT.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (C)	OIL W_f (C)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)
435	45	18	232	63													

) CONTAINER MAY BE INITIALLY FILLED WITH WATER OR MERCURY (H_g) OR BE EVACUATED (VACUUM).
) VOLUME OF WATER OR MERCURY LEFT WITH WELL EFFLUENT SAMPLE.
) C_f IS MEASURED CORRECTION FACTOR FOR CORRECTING OIL VOLUME FROM SEPARATOR TO STOCK TANK CONDITIONS. IT INCLUDES WEATHERING FACTOR, W_f, AND METER NONLINEARITY EFFECTS, M. $C_f = M^* W_f$.

SAMPLED BY

GENE FLATO

OEC—8775

TEST NUMBER FOUR | RUN CL-UP | AREA - | PAGE 1 OF 1

CUSTOMER	WELL NAME OR NUMBER	FIELD	FORMATION
NSM RESOURCES LTD.	NSM ARROWHEAD G-69	WILDCAT	SLAVE POINT

ELEVATION (FEET)	STANDARD CONDITIONS			TIME WELL FLOWING OR SHUT IN BEFORE SAMPLING	INTERVAL TESTED (FEET)
	☐ 14.73 psi 60°F	☒ OTHER 14.65	PRESS. 60 TEMP.	N/A	7486.9-7503.3

SAMPLE # — 85 JAN 21

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
	C + G											
	#3309		On		H.P.	Meter						
0820	#4363		Vaccum		Gas	Run	5	78	14.65	15		.5

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. DEPTH (ft.) (psig)	BOTTOM HOLE TEMP. DEPTH (ft.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)
6	41	64											.732				

SAMPLE # — 85 JAN 22

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
	C + G											
	#4363		On		Wellhead							
0922	#3309		Vaccum		Gas	Wellhead	0	41	14.65	35		.5

FIELD READINGS AND FACTORS USED

WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. DEPTH (ft.) (psig)	BOTTOM HOLE TEMP. DEPTH (ft.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☐ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)
0	41	64															

SAMPLE # — 2 PLASTIC BOTTLES OF WATER

TIME TAKEN	CONTAINER #	CONTAINER VOL. (cc) or (gal)	INITIALLY FILLED WITH (a)	VOL. OF FILL REMAINING WITH SAMPLE (b)	SAMPLE TYPE	SAMPLE TAKEN AT	SAMPLING PRESSURE (psig)	SAMPLING TEMP. (°F)	ATMOSPHERIC PRESS. (psi)	ATMOS. TEMP. (°F)	TRANSFER FLUID	TIME TO TAKE SAMPLE (min.)
0922	N/A	1 Litre	N/A	1 Litre	Liquid	Line Heater	-	41			1 Litre	1 Min

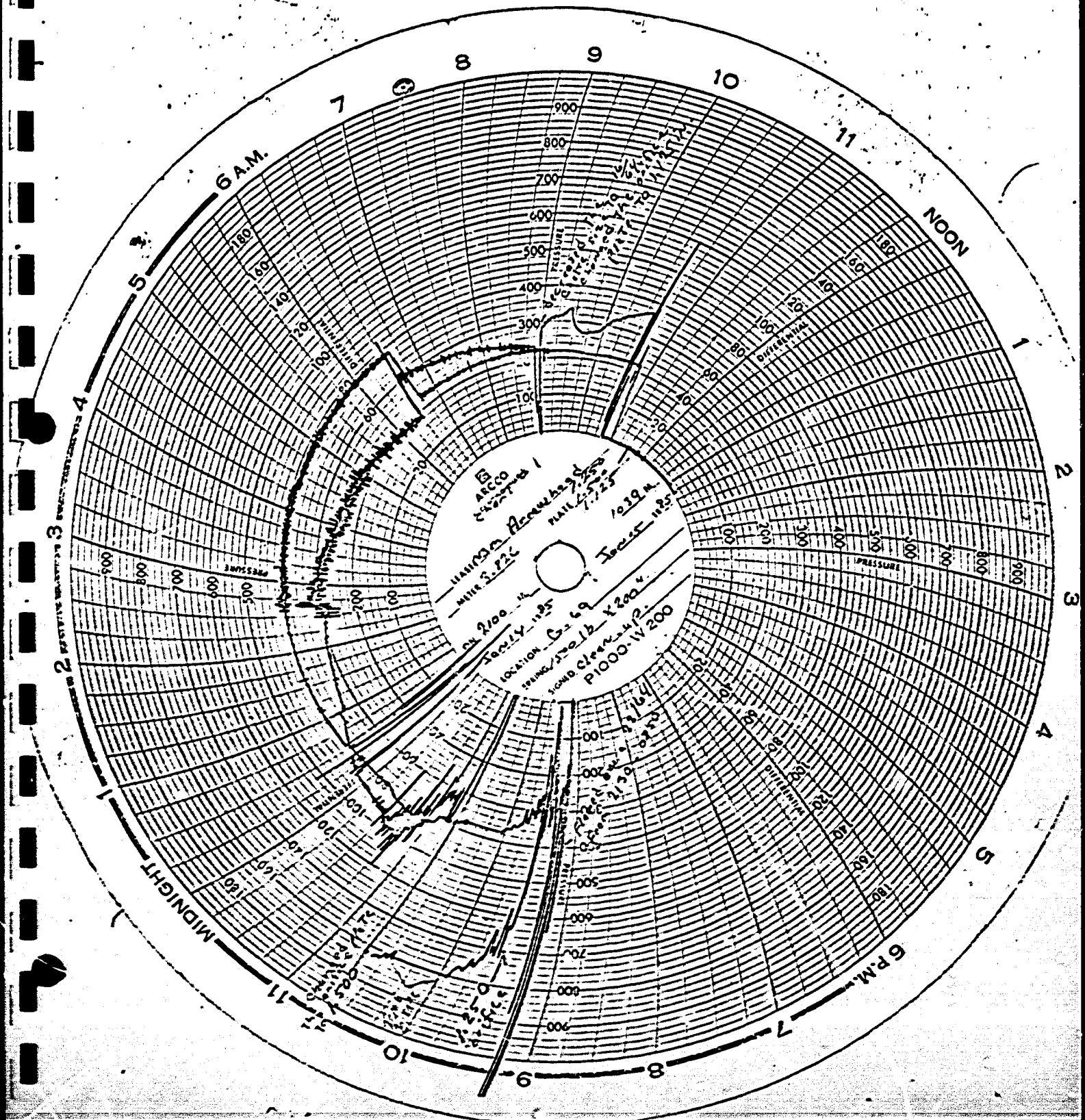
FIELD READINGS AND FACTORS USED

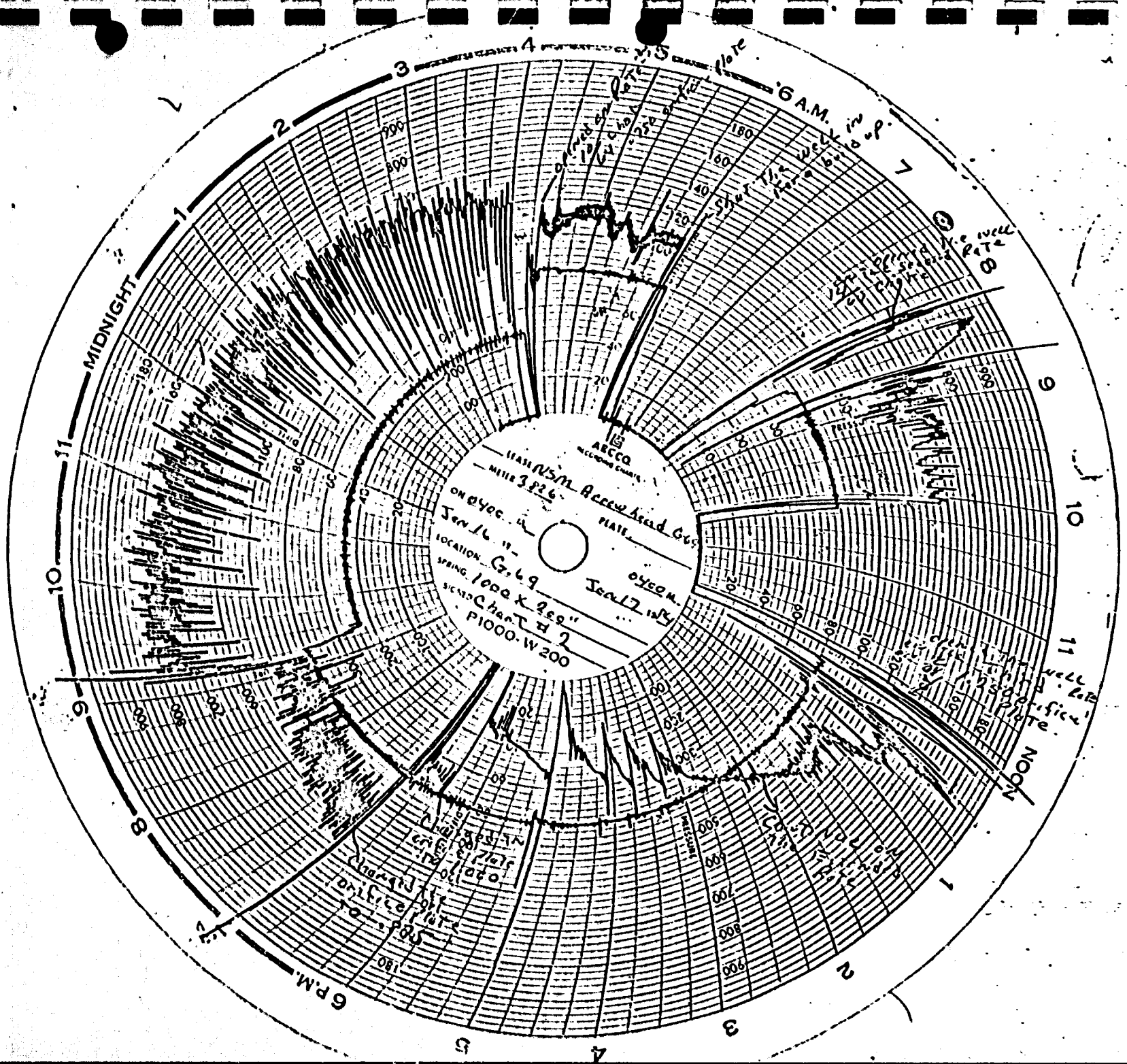
WELL HEAD PRESS. (psig)	WELL HEAD TEMP. (°F)	CHOKE SIZE (64th INCH)	HI STAGE SEP. PRESS. (psig)	HI STAGE SEP. TEMP. (°F)	LO STAGE SEP. PRESS. (psig)	LO STAGE SEP. TEMP. (°F)	BOTTOM HOLE PRESS. DEPTH (ft.) (psig)	BOTTOM HOLE TEMP. DEPTH (ft.) (°F)	OIL GRAVITY @ 60 °F (°API)	OIL BSW (%)	OIL C_f (c)	OIL W_f (c)	GAS GRAVITY (AIR=1)	GAS F_{pv}	TOTAL GAS/OIL FLOW RATE AT ☐ STOCK TANK ☐ SEP. COND. (BPD) (MMCF/D)	☐ GOR ☑ OGR ☐ STOCK TANK ☐ SEP. COND. (MCF/BBL) (BBL/MMCF)	WATER FLOW RATE (BPD)

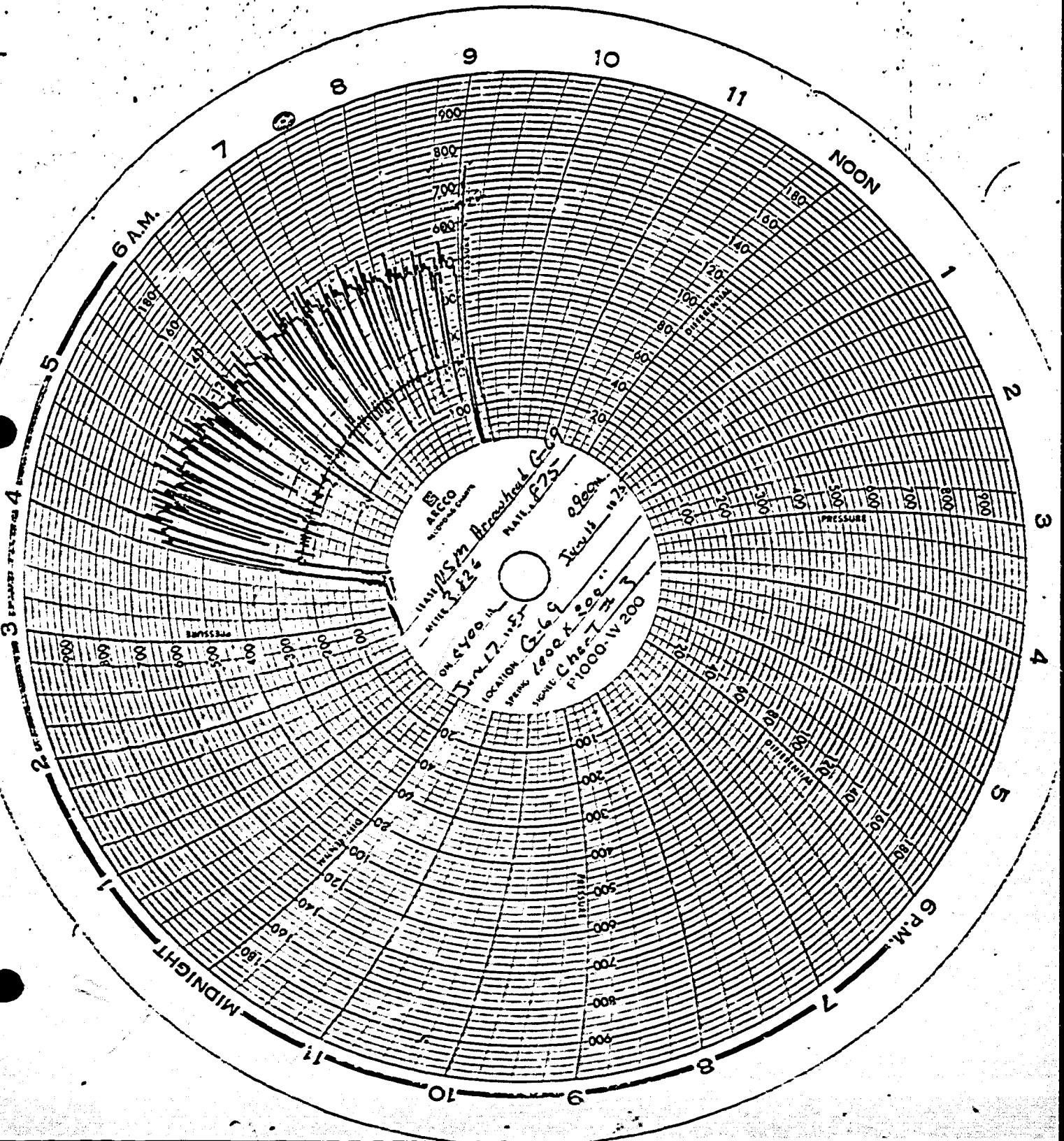
a) CONTAINER MAY BE INITIALLY FILLED WITH WATER OR MERCURY (Hg) OR BE EVACUATED (VACUUM).
b) VOLUME OF WATER OR MERCURY LEFT WITH WELL EFFLUENT SAMPLE.
c) C_f IS MEASURED CORRECTION FACTOR FOR CORRECTING OIL VOLUME FROM SEPARATOR TO STOCK TANK CONDITIONS. IT INCLUDES WEATHERING FACTOR, W_f, AND METER NONLINEARITY EFFECTS, M. $C_f = M \cdot W_f$.

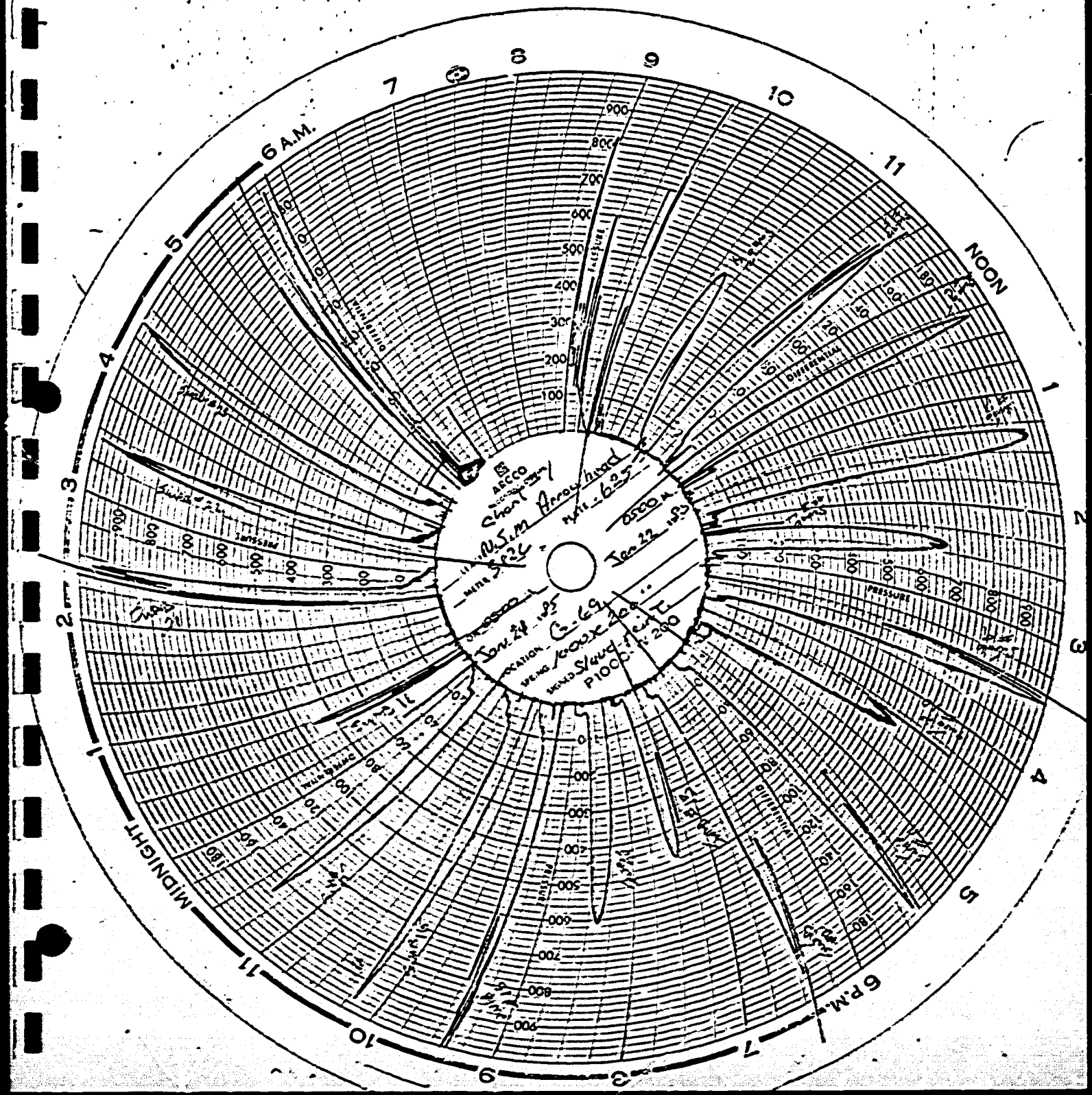
SAMPLED BY GENE FLATO

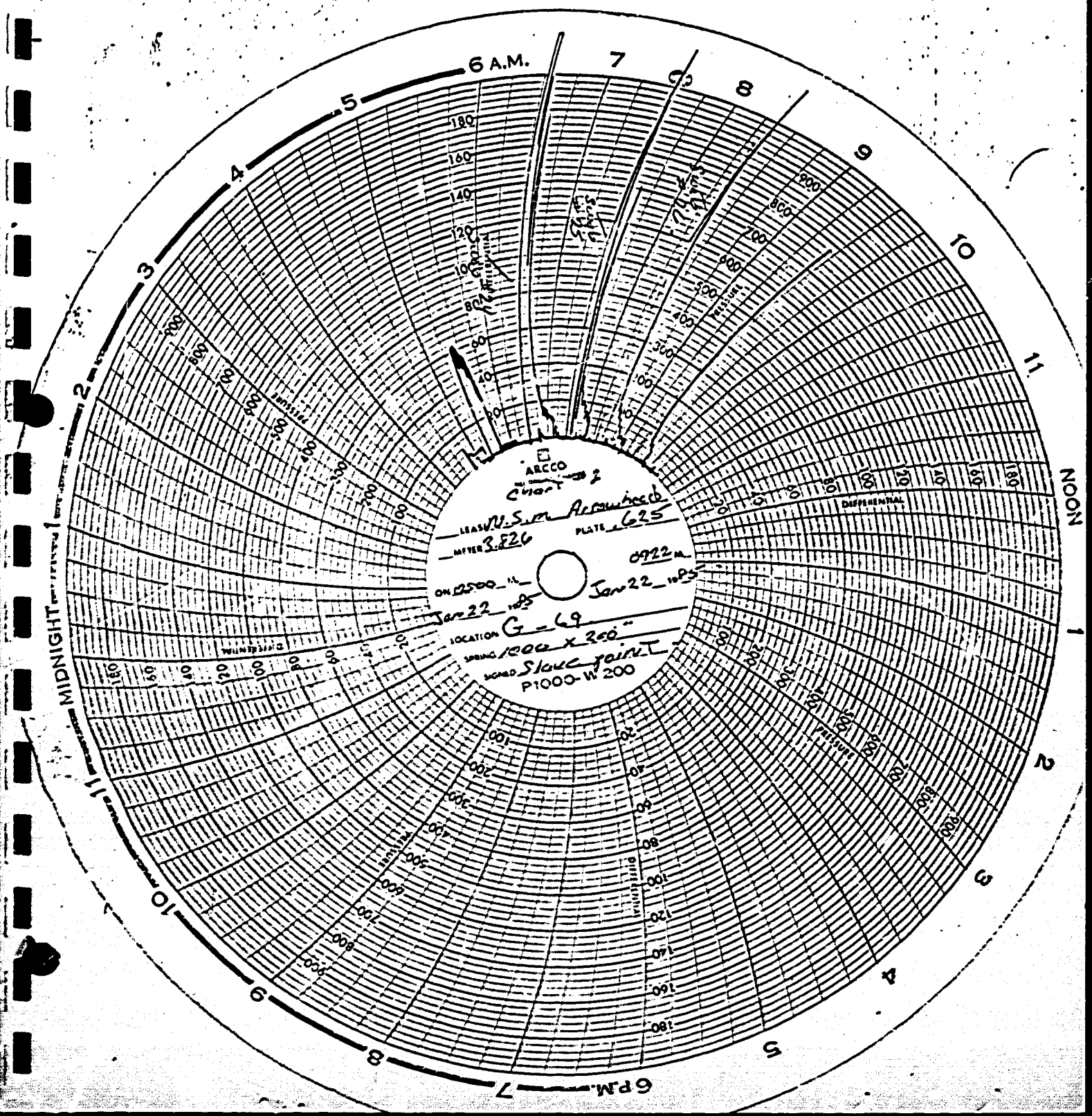
Schematics and Charts


6 A.M.
NOON
6 P.M.
MIDNIGHT
PRESSURE
DIFFERENTIAL
ARCCO
Amerada
Jones
1039
1125
Location
Signed
Clean-up
P1000-W 200


MIDNIGHT
6 A.M.
NOON
6 P.M.
ABCCO
Jan 16 19-
Jan 17 19-
Chart H 2
P1000-W 200


NOON
1
2
3
4
5
6 P.M.
7
8
9
10
11
MIDNIGHT
1
2
3
4
5
6 A.M.
7
8
9
10
11
PRESSURE
DIFFERENTIAL
ARCCO
Breathed G.G.
USM
Jun 18 1975
Jun 17 1975
Chart #3
W200


6 A.M.
NOON
6 P.M.
MIDNIGHT
ARCCO
Chart Arroyhead
U.S.M.
Sept 26
Jan 22
Jan 24
Co-69
Slaughter
P100
200
300
400
500
600
700
800
900
PRESSURE
DIFFERENTIAL


6 A.M.
7
8
9
10
11
NOON
1
2
3
4
5
6 P.M.
7
8
9
10
11
MIDNIGHT
1
2
3
4
5
ARCCO
Chart
LEASE W. South Arrowhead
METER 3826
PLATE 625
ON 12:00 M.
Jan 22
OFF 12:00 M.
Jan 22
LOCATION G-69
SPRING 1000 x 300
SIGNED Slauc Joint
P 1000 - W 200
DIFFERENTIAL
PRESSURE

Canada Oil and Gas Lands Administration
Administration du pétrole et du gaz des terres du Canada

D.A. 1138

				Well Status	
Nova Scotia	☐	West Coast	☐	Suspended	☒
Newfoundland	☐	Northern	☐	Completed	☐
Gulf of St. Lawrence	☐	Hudson Bay	☐	Abandoned	☐

Canada Oil and Gas Lands Administration
MAR 13 1987
Northern Region

WELL TERMINATION RECORD

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

WELL DATA

Well Name: NSM ARROWHEAD G-69 Area: CAMERON HILLS

Grid Area: 60-40-122-45 Field/Pool: EXPLORATORY

Permit or Lease No.: N/A Final Coordinates: Lat.: 60°38'24.43"N Long: 122°57'2.47"W

Drilling Unit: Regent No. 2 Elevations: KB: 496.1 m GL: 502.0 m

Spud Date: 2000 hrs 84/02/13 Rig Released: 1300 hrs 84/03/30 Total Depth: 2502 mKB

Re-entered (Roll'n Rig # 10 85-01-05 - 85-01-23)

CASING AND CEMENTING

O.D.:	Weight:	Grade:	Depth Set:	Cement and Additives:
340mm	81.1	K55	297.5 mKB	42 T Cl "G" + 2% $CaCl_2$
244mm	53.57	K55	751 mKB	9.5 T Cl "G" + 6%Gel and 20.0 T Cl "G" + .5% FRC + .5% FLC
177.8mm	38.69	MN80	2500 mKB	Stage 1 20 T CL"G" + .75% FRC-1 + .25% FLC-1 + .70%CRH
	34.22	MN80	2000 mKB	Stage 2 40T CL"G" + .75% FRC-1 + .2% CRL

PLUGGING PROGRAM

Approval of the following program was obtained by (person) F. DOMEIJ from (person) KEM SINGH of the Canada Oil and Gas Lands Administration by means of TELEPHONE on Jan. 23 19 85

Type of Plug:	Interval:	Felt:	Cement and Additives:
Bridge Plug & Cement	2480-2461 m KB	No Feel	
Bridge Plug & Cement	2430-2420 m KB	No Feel	
Bridge Plug	2290 m KB	No Feel	None
Bridge Plug & Cement	2200-2170 m KB	No Feel	

Lost Circulation/Overpressure Zones: Ft. Simpson Shale - Geo. Pressured

Equipment left on Seafloor (Describe): N/A

Provision for Re-entry (Describe and attach sketch): Wellhead

Cores: Type: N/A Intervals:

Other Downhole Completion/Suspension Equipment: N/A

CERTIFICATION

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

Signed: F. T. Nadir P. Eng. Title: Consulting Engineer

Name: F. T. Nadir Date: Feb. 11, 1987

ADEQUATE!
REVIEWED BY EK
DATE 87 03 25

Acknowledged by: Engineering Branch

Date: 30 Mar 87

File: 9211-N9-2-1

Department of Energy, Mines and Resources / Ministère de l'Énergie, des Mines et des Ressources

Department of Indian Affairs and Northern Development / Ministère des Affaires indiennes et du Nord canadien

Canada