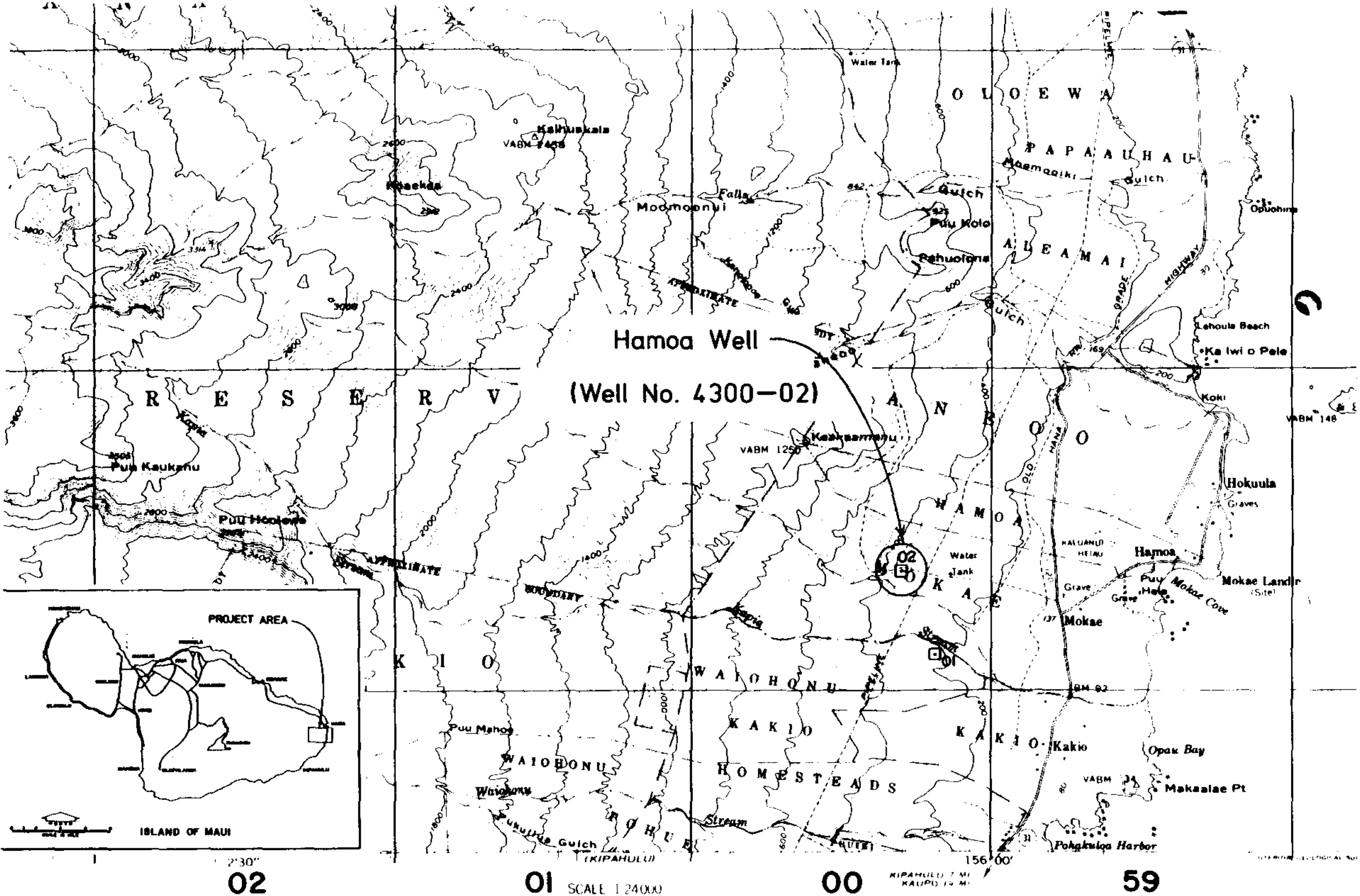


Hamoa Well
(Well No. 4300-02)
O L O E W A
P A P A A U H A U
Moomooiki Gulch
Kaihuakala
VABM 2458
Koaekea
Moomoonui
Falls
Puu Kolo
Pahuoiona
A L E A M A I
Gulch
Lehoula Beach
Ka Iwi o Pele
Koki
VABM 148
Opuohina
Water Tank
R E S E R V
A N
O O
Keakaamanu
VABM 1250
Puu Kaukanu
Puu Hoolewa
APPROXIMATE BOUNDARY
Hokuula
Graves
H A M O A
K A E
Water Tank
02
01
Hamoa
Puu Hele
Mokae Cove
Mokae Landing (Site)
Grave
Mokae
OLD HANA
HIGHWAY
GRADE
K I O
W A I O H O N U
K A K I O
H O M E S T E A D S
Puu Mahoe
W A I O H O N U
Waiohonu
Pukuilua Gulch
Stream
(KIPAHULU)
K A K I O
Kakio
Opau Bay
VABM 34
Makaalae Pt
Pohakuloa Harbor
PIPELINE
BM 92
PROJECT AREA
ISLAND OF MAUI
2'30"
156°00'
KIPAHULU 7 MI
KAUPO 14 MI
02
01
SCALE 1:24000
00
59

DOWALD Form 71(1)

DEPARTMENT OF LAND & NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

STATE

DRILLER'S REPORT

DESCRIPTION

Date of report 12-10-85 Person filing report Loran H. Runnells

A. OWNER State WELL NAME Hamoa (Hana) ISLAND Maui

B. GENERAL LOCATION Hana

C. DRILLING COMPANY Roscoe Moss Company

D. TYPE OF RIG 28L DRILLING COMPLETED Nov (month) 85 (year) DRILLER F. Runnells

E. ELEVATION, msl: Top of drilling platform 357 ft. Bench mark and method used to determine elevation: ——
Height of drilling platform above ground surface 0 ft.

F. HOLE SIZE: 17 inch dia. to 406 ft. below drilling platform.
inch dia. to ft. below drilling platform.
inch dia. to ft. below drilling platform.

G. CASING INSTALLED: 11 in. I.D. x .312 in. wall solid section to 366 ft. below drilling platform.
11 in. I.D. x .312 in. wall perforated section to 406 ft. below drilling platform.
Type of perforation Louver

H. ANNULUS: Grouted 0 ft. to 277 ft. below drilling platform.
Gravel packed 277 ft. to 406 ft. below drilling platform.

I. PERMANENT PUMP INSTALLATION:
Pump type, make, serial no. Capacity g.p.m.
Motor type, H.P., voltage, r.p.m.
Depth of pump intake setting ft. below which elevation is ft.
Depth of bottom of airline ft. below which elevation is ft.

HYDROLOGY

J. INITIAL WATER LEVEL 350.5 ft. below drilling platform. Date of measurement.

K. INITIAL CHLORIDE: 10 ppm, total depth of well 407 ft. below drilling platform Sampling Date

L. PUMPING TESTS: Reference point (R.P.) used: which elevation is ft.

Date	11-04-85				Date				
Start water level	350.5 ft. below R. P.				Start water level	ft. below R. P.			
End water level	ft. below R. P.				End water level	ft. below R. P.			
Depth of well	406 ft. below R. P.				Depth of well	ft. below R. P.			
Elapsed Time (hours)	Rate (gpm)	Draw-down (ft.)	Cl- (ppm)	Temp. F	Elapsed Time (hours)	Rate (gpm)	Draw-down (ft.)	Cl- (ppm)	Temp. F
to					to				
93 to hours	700	5.65	10		to				
to					to				
to					to				
to					to				
to					to				

SUBSURFACE FORMATION

M. DRILLER'S LOG:

Depth, ft.	Rock Description & Remarks	Water Level ft.	Depth, ft.	Rock Description & Remarks	Water Level ft.
0 to 15	Boulders		194 to 200	Cinder	
15 to 35	Black rock		200 to 244	Med. hard rock	
35 to 55	Cinders		244 to 265	Red cinder	
55 to 88	Porous rock		265 to 278	Hard rock	
88 to 92	Hard rock		278 to 330	Porous rock	
92 to 115	Porous rock		330 to 363	Gray muddy rock	
115 to 132	Cinder		363 to 381	Porous rock	
132 to 142	Hard rock		381 to 405	Red cinder	
152 to 148	Cinder		405 to 407	Hard rock	
148 to 160	Hard rock		to		
160 to 194	Med. hard rock		to		

N. REMARKS:

FOR DRILLER'S USE

Job Name

INSTRUCTIONS: Send three(3) copies to: Manager-Chief Engineer, Division of Water and Land Development, P. O. Box 373, Honolulu, Hawaii 96809.

REFERENCES: Chapter 178, entitled "Artesian Wells, Generally," HRS, as amended by Act 123 SLH 1970. Honolulu Board of Water Supply, "Rules and

FOR OFFICIAL USE

Latitude 20 43 22

Longitude 1?/ 156 00

RECEIVED ... DIV. WATER & LAND DEVELOPMENT ... 8 : 53

November 13, 1985

Mr. Vince Bagoyo, Director
Department of Water Supply
County of Maui
P.O. Box 1109
Wailuku, Maui 96793-0343

Dear Mr. Bagoyo:

Hamoa Well 4300-02, Job No. 35-MW-39, Maui

We are pleased to inform you that the Hamoa exploratory well has been successfully completed. On November 4-8, 1985, the Hamoa well was pump tested at a sustained rate of 700 gallons per minute (one million gallons per day) for approximately 90 hours. The drawdown of water level ranged between 4.5 and 5.0 feet, and the chloride content of the water was 10 parts per million (250 parts per million is the upper limit for potable water). The water temperature was 19.0°C (66.2°F).

Based on the pumping test results, the well is capable of producing 700 gpm of potable water; however, the 11-inch diameter casing probably will physically limit the size of pump that can be desirably installed in the well to a capacity of about 500 gpm.

The drilling of the well was completed in October 1985 and the pertinent physical data include:

Ground elevation	357± feet
Depth to water	350± feet, below ground elev.
11" I.D. Solid Casing	0 to 366 feet depth
11" I.D. Screen Casing	366 to 406 feet depth
Total depth of well	406 feet (-49 ft., mean sea level)

The pump test and other data for the Hamoa well will be sent to you when it is assembled. In the meantime, if you or your staff have any questions please feel free to contact Dan Lum at 548-7643.

Sincerely,

MANABU TAGOMORI
Manager-Chief Engineer

DL:dh

Mitchell
November 22, 1985

MEMORANDUM FOR THE RECORD

FROM: Mitchell K. Ohye

SUBJECT: T.V. Log Hamoa Well 4300-02, Hana, Maui

Present on the site were P. Wanke, T. Riddle, P. Mihlbauer of Roscoe Moss Co.

On November 20, 1985, I visited the Hamoa Well 4300-02 to witness a television log performed by Paul Wanke of Roscoe Moss Company. We used the camera lense as zero and top of casing as reference point.

Started logging at 1215 hrs. The solid cased section of the well is in good condition. The camera lense hit water at 348 ft.; water very cloudy, difficult to see. As best as I could determine, the slotted casing section began at 361 ft. in depth. At 394 ft., the camera lense hit what appeared to be some fine fill. The driller will bail hole and check the bottom which he says, should be at 406 ft. Television log ended at 1240 hrs.

MITCHELL OHYE

MO:ko

JANUARY 13, 1986

MEMO: TO THE RECORDS

FROM: M.OHYE

SUBJECT: FINAL INSPECTION AND WATER LEVEL MEASUREMENT
HAMOA WELL 4300-02,HANA,MAUI

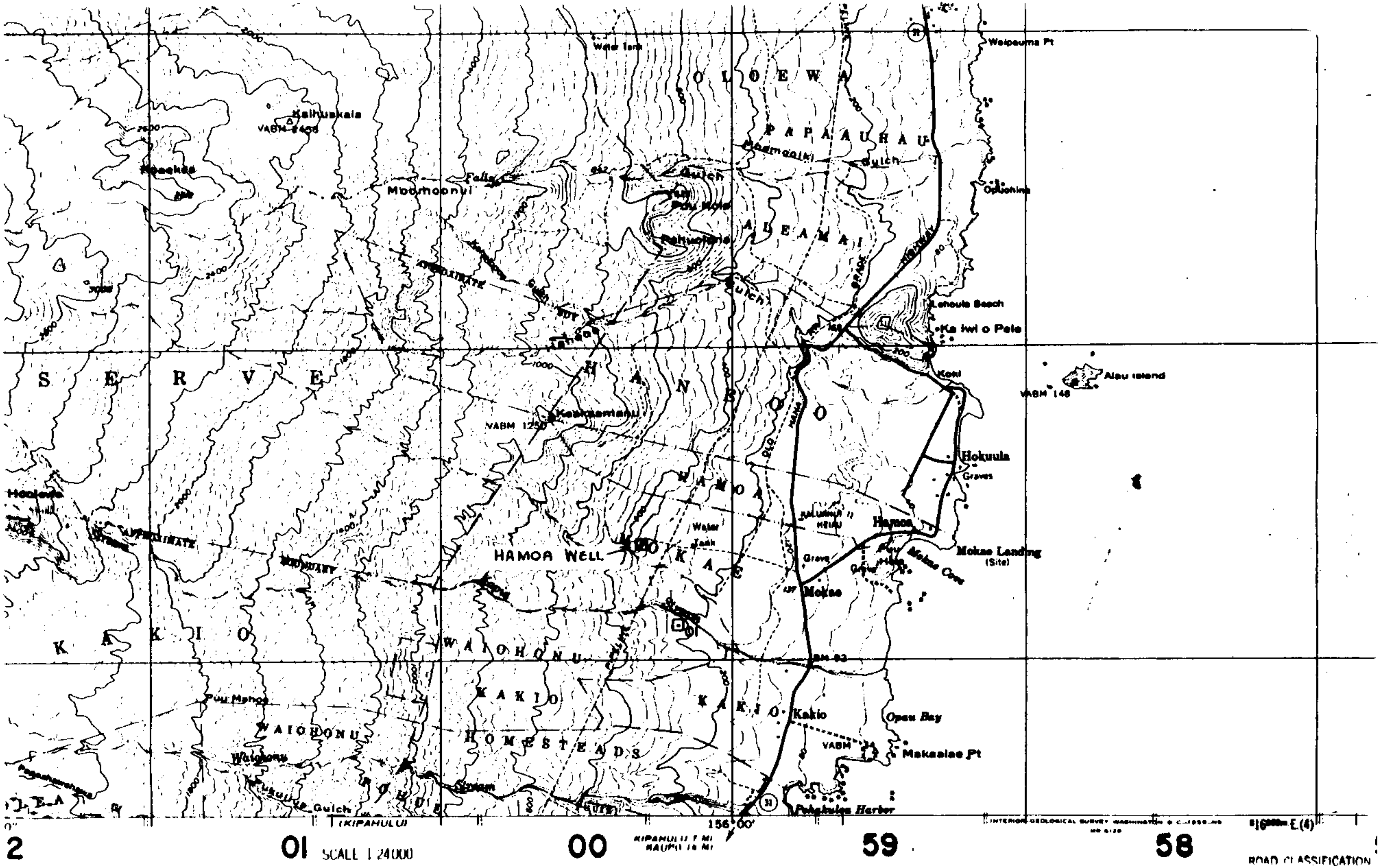
On friday January 10, 1986 I visited the subject well to conduct a final inspection of the well and to obtain a water level measurement.The general area around the well is clear and free of debris.The steel casing is capped with a .25 inch thick steel plate and a 6 inch coupling with cross plug was installed to provide access into the well (See attached photos).

At about 1030 hrs. a steel surveyor's tape was lowered into the well and the tape measured 353.00 ft. at the top of the 6 inch coupling and a wet line chalk mark was recorded at 2.60 ft.

The depth to water,therefore was 350.40 ft. below the top of the coupling (elevation 358.27 ft.,msl as determined by the MAUI DWS survey crew).The static water level of the Hamoa Well was 7.87 ft.,msl, on Jan. 10, 1986.

Mitchell K. Ohye

MITCHELL K. OHYE



Water Tank
Waipauma Pt
O L O E W A
Kaihuakala
VABM 2400
P A P A A U H A U
Puu Kole
A L E A M A I
Lehoula Beach
Ka Iwi o Pele
Koki
Alau Island
VABM 146
Moomoonui
Falls
Opuohina
S E R V E
H A N
O O
Kaukamanu
VABM 1250
Hokuula
Graves
HAMOA
Hamoa
HAMOA WELL
Water Tank
O K A E
Grave
Mokae
Mokae Landing
(Site)
Mokae Cove
APPROXIMATE
BOUNDARY
K A K I O
W A I O H O N U
K A K I O
BM 83
Kakio
Opeu Bay
VABM 24
Makaalae Pt
Puu Mahoe
W A I O H O N U
Waiohonu
H O M E S T E A D S
Pohakulau Harbor
Gulch
Stream
156°00'
2
01
SCALE 1:24000
00
59
58
ROAD CLASSIFICATION

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY PROCESS DATE 02/06/86
204322156005101 - [redacted] CNTY, [redacted] HANA MAUI DISTRICT CODE 15

WATER QUALITY DATA

DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	HARD-NESS (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	PERCENT SODIUM (00932)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)
NOV , 1985												
05... @ 0830	.16	16	3.8	1.6	8.6	1	51	1.6	[redacted]	2.3	<.10	17

DATE	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	HARD-NESS NONCAR-BONATE (MG/L AS CACO3) (95902)	ARSENIC TOTAL (UG/L AS AS) (01002)	BARIUM, TOTAL RECOV-ERABLE (UG/L AS BA) (01007)	BERYL-LIUM, TOTAL RECOV-ERABLE (UG/L AS BE) (01012)	CADMIUM TOTAL RECOV-ERABLE (UG/L AS CD) (01027)	CHRO-MIUM, TOTAL RECOV-ERABLE (UG/L AS CR) (01034)	COBALT, TOTAL RECOV-ERABLE (UG/L AS CO) (01037)
NOV , 1985											
05...	9	<1	56	24	0	<1	<100	<10	<1	<10	<1

DATE	COPPER, TOTAL RECOV-ERABLE (UG/L AS CU) (01042)	IRON, TOTAL RECOV-ERABLE (UG/L AS FE) (01045)	LEAD, TOTAL RECOV-ERABLE (UG/L AS PB) (01051)	MANGA-NESE, TOTAL RECOV-ERABLE (UG/L AS MN) (01055)	MOLYB-DENUM, TOTAL RECOV-ERABLE (UG/L AS MO) (01062)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ALUM-INUM, TOTAL RECOV-ERABLE (UG/L AS AL) (01105)	LITHIUM TOTAL RECOV-ERABLE (UG/L AS LI) (01132)	SELE-NIUM, TOTAL (UG/L AS SE) (01147)
NOV , 1985											
05...	2	70	1	10	<1	2	<1	<10	70	<10	<1

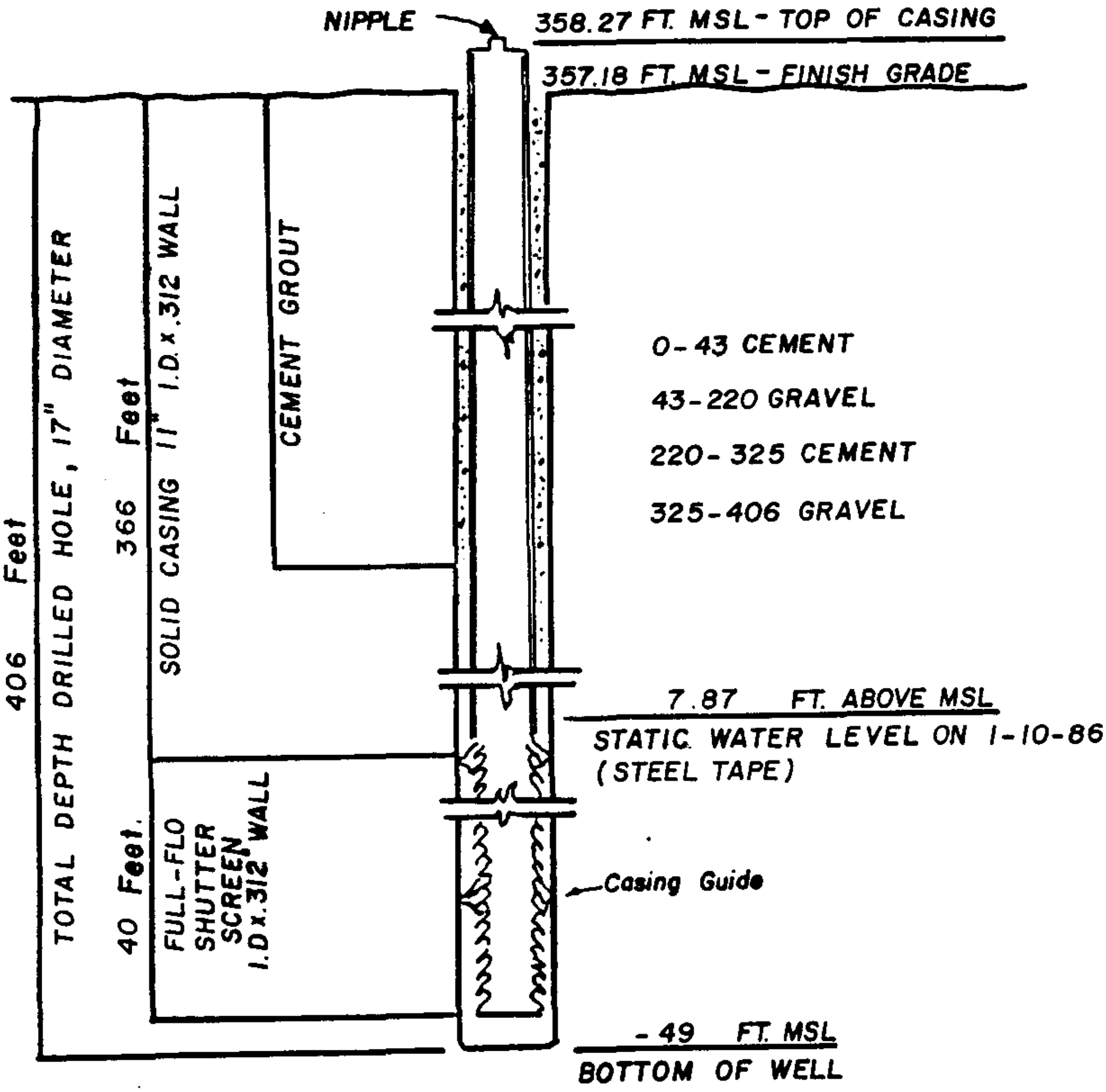
STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF WATER AND LAND DEVELOPMENT

HAMOA WELL 4300-02

AS-BUILT SECTION

Driller: ROSCOE MOSS COMPANY

Drilled: OCTOBER 1985



NOT TO SCALE

JOB.35-MW-39

HAMOA EXPLORATORY WELL 4300-02 , MAUI

Ground Elevation - - - - - - - - - - - - -	357.18	ft. msl
Top of Casing - - - - - - - - - - - - - -	358.27	ft. msl
Casing Size - - - - - - - - - - - - - - -	11	I.D. inches
Blank Casing Depth - - - - - - - - - - -	366	ft.(- 9 ft. msl)
Shutter Screen Depth - - - - - - - - - -	406	ft.(- 49 ft. msl)
Total Depth of Well - - - - - - - - - -	406	ft.(- 49 ft. msl)
Static Water Level - - - - - - - - - - -	350	ft.(+ 7.9 ft. msl)
Bottom of Airline - - - - - - - - - - -	370	ft.(- 13 ft. msl)
Test Conducted by - - - - - - - - - - -	M. OHYE	

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (F)	Remarks

TEST NO. 1

NOVEMBER 4 , 1985

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (F)	Remarks
1100		0	19.45				METER RDG
1115		0	19.45 (STATIC)				
			ADJUST TO 200 GPM				
1135	1	212	18.85	.60	10	19.5	
1145		203	18.85	.60			
1200		212	18.85	.60			
1215		203	18.85	.60			
1230		203	18.85	.60			
			ADJUST TO 400 GPM				
1235		417	17.65	1.80			
1245	2	405	17.65	1.80	10	19.5	

HAMO XPLORATORY WELL 4300-02 UI

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (C)	Remarks
NOVEMBER 4, 1985							
1300		405	17.65	1.80			
1315		405	17.65	1.80			
1330		405	17.65	1.80			
			ADJUST TO 600 GPM				
1335		620	15.65	3.80			
1345	3	620	15.65	3.80	10	19.0	
1400		616	15.30	4.15			
1415		610	15.25	4.20			
1430		610	15.20	4.25			
1435		610	15.20	4.25			
1445		600	15.65	3.80			
1500		600	15.65	3.80			
			ADJUST TO 800 GPM				
1505	4	800	13.45	6.00	10	19.0	
1515		800	13.25	6.20			
1530		800	13.25	6.20			
1545		815	13.10	6.35			
1600		800	13.10	6.35			
			ADJUST TO 700 GPM				
1605	5	700	14.15	5.30	10	19.0	
1700		700	14.15	5.30			
1800	6	700	14.15	5.30			
1900		700	14.00	5.45			
2000	7	700	14.00	5.45			
2100		700	13.90	5.55			
2200	8	700	13.85	5.60			
2300		700	13.85	5.60			
2400	9	700	13.80	5.65	10		
OVEMBER 5, 1985							
0100		700	13.80	5.65			
0200	10	700	13.80	5.65	10		
0300		700	13.75	5.70			
0400	11	700	13.70	5.75			
0500		700	13.75	5.70			
0600	12	700	13.75	5.70	10		
0700		700	13.80	5.65			
0800	13	700	13.85	5.60	10		

HAMOA EXPLORATORY WELL 4300-02 , MAUI

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (C)	Remarks
NOVEMBER 5 , 1985							
0900		700	14.05	5.40			
1000	14	700	14.20	5.25	10	19.0	
1100		700	14.20	5.25			
1200	15	700	14.15	5.30	10		
1300		700	14.20	5.25			
1400	16	700	14.20	5.25			
1500		700	14.45	5.00			
1600	17	700	14.80	4.65			
1700		700	14.75	4.70			
1800	18	700	14.70	4.75	10		
1900		700	14.65	4.80			
2000	19	700	14.60	4.85			
2100		700	14.55	4.90			
2200	20	700	14.55	4.90			
2300		700	14.50	4.95			
2400	21	700	14.50	4.95	10		
NOVEMBER 6 , 1985							
0100		700	14.50	4.95			
0200	22	700	14.50	4.95			
0300		700	14.45	5.00			
0400	23	700	14.40	5.05			
0500		700	14.40	5.05			
0600	24	700	14.45	5.00	10		
0700		700	14.45	5.00			
0800	25	700	14.50	4.95			
0900		700	14.60	4.85			
1000	26	700	14.70	4.75	10		
1100		700	14.80	4.65			
1200		700	14.85	4.60			
1300		695	14.90	4.55			
1400	27	699	15.00	4.45			
1500		700	14.95	4.50			
1600		702	14.90	4.55			
1700		701	14.85	4.60			
1800	28	700	14.75	4.70			
1900		702	14.65	4.80			
2000		700	14.65	4.80			
2100		700	14.65	4.80			
2200	29	700	14.65	4.80	10		
2300		699	14.70	4.75			
2400			14.65	4.80			

HAMOA EXPLORATORY WELL 4300-02 , MAUI

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (C)	Remarks
NOVEMBER 7 , 1985							
0100		700	14.70	4.75			
0200	30	702	14.70	4.75	10		
0300		707	14.65	4.80			
0400		702	14.65	4.80			
0500		700	14.60	4.85			
0600	31	700	14.60	4.85			
0700		699	14.55	4.90			
0800		700	14.60	4.85			
0900		710	14.55	4.90			
1000	32	714	14.60	4.85	10	19.0	
1100		700	14.70	4.75			
1200		700	14.75	4.70			
1300		701	14.90	4.55			
1400	33	707	14.85	4.60			
1500		705	14.85	4.60			
1600		711	14.80	4.65			
1700		711	14.70	4.75			
1800	34	700	14.65	4.80			
1900		700	14.60	4.85			
2000		700	14.50	4.95			
2100		705	14.50	4.95			
2200	35	700	14.50	4.95			
2300		700	14.55	4.90			Missed
2400							Rdg.
NOVEMBER 8 , 1985							
0100		706	14.60	4.85			
0200	36	711	14.65	4.80			
0300		705	14.65	4.80			
0400		701	14.60	4.85			
0500		699	14.55	4.90			
0600	37	706	14.50	4.95		19.0	
0700		706	14.50	4.95			
0800		700	14.45	5.00			
0830		0	(STOP PUMPING)				

HAMOA EXPLORATORY WELL 4300-02 , MAUI

(RECOVERY TEST)

Date & Time	Sample No.	Pumping Rate (gpm)	Airline (feet)	Drawdown (feet)	Chlorides (ppm)	Temp. (C)	Remarks
NOVEMBER 8 , 1985							
0830		0	(STOP PUMPING) 19.45 (STATIC)				
Elapsed Time in Mins.							
01		0	20.20	+.75			
03		0	18.90	.55			
05		0	18.95	.55			
07		0	18.95	.55			
09		0	18.95	.55			
11		0	18.95	.55			
15		0	18.95	.55			
20		0	18.95	.55			
30		0	18.95	.55			
45		0	18.97	.48			
60		0	19.00	.45			
75		0	19.05	.40			
90		0	19.08	.37			
120		0	19.13	.32			
150		0	19.18	.27			
165		0	19.25	.20			

(END RECOVERY)

Dowald 8/63

CHLORIDE TITRATION RECORD
for
HAMOA Well 4300-02 (No.)

MAUI Island 35-MW-39 Project or Job No. NOV. 4 1985
Titrations conducted by M. OHYE

Sample No.	Date Taken	Sample (ml)	Burette Rdg Before	Burette Rdg After	$AgNO_3$ (ml)	$AgNO_3$ -.2 ml	Mult. Factor	Chlorides (ppm)
NOVEMBER 4, 1985								
1	1135	50	12.2	13.2	1.0	-	10	10
2	1245		13.2	14.2	1.0	-	10	10
3	1345		14.2	15.15	.95	-	10	10
4	1505		15.2	16.15	.95	-	10	10
5	1605		16.2	17.15	.95	-	10	10
6								
7	2000		16.5	17.5	1.0	-	10	10
8								
9	2400		15.5	16.5	1.0	-	10	10
NOVEMBER 5 1985								
10								
11	0400		14.5	15.5	1.0	-	10	10
12								
13	0800		13.5	14.5	1.0	-	10	10
14								
15	1200		21.0	22.0	1.0	-	10	10
16								
17								
18	1800		23.0	24.0	1.0	-	10	10
19								
20								
21	2400		24.0	25.0	1.0	-	10	10
NOVEMBER 6, 1985								
22								
23								
24	0600		22.0	23.0	1.0	-	10	10
25								
26	1000		20.0	21.0	1.0	-	10	10
27								
28								

Dowald 8/63

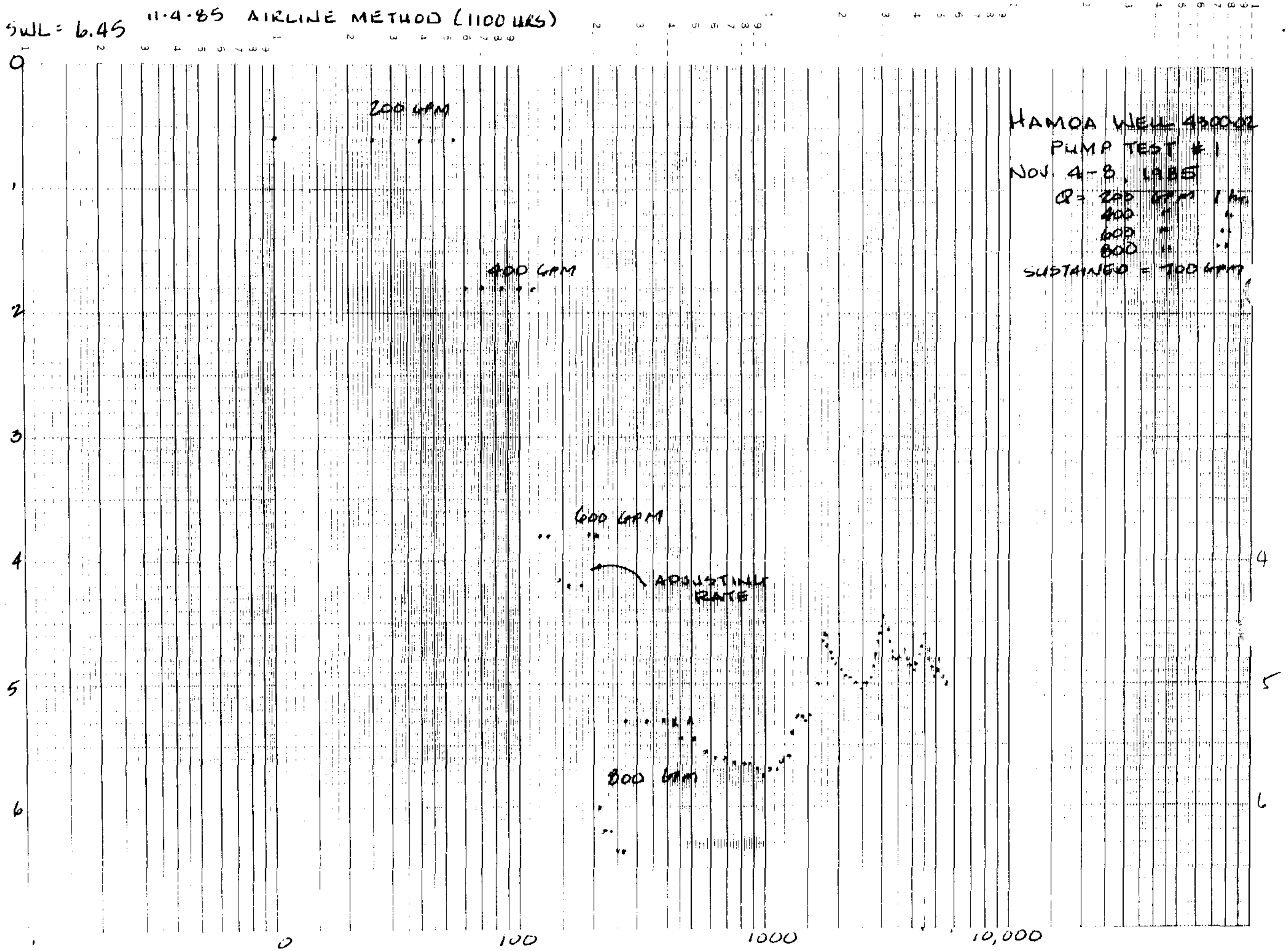
CHLORIDE TITRATION RECORD
for
HAMOA Well 4300-02
(No.)

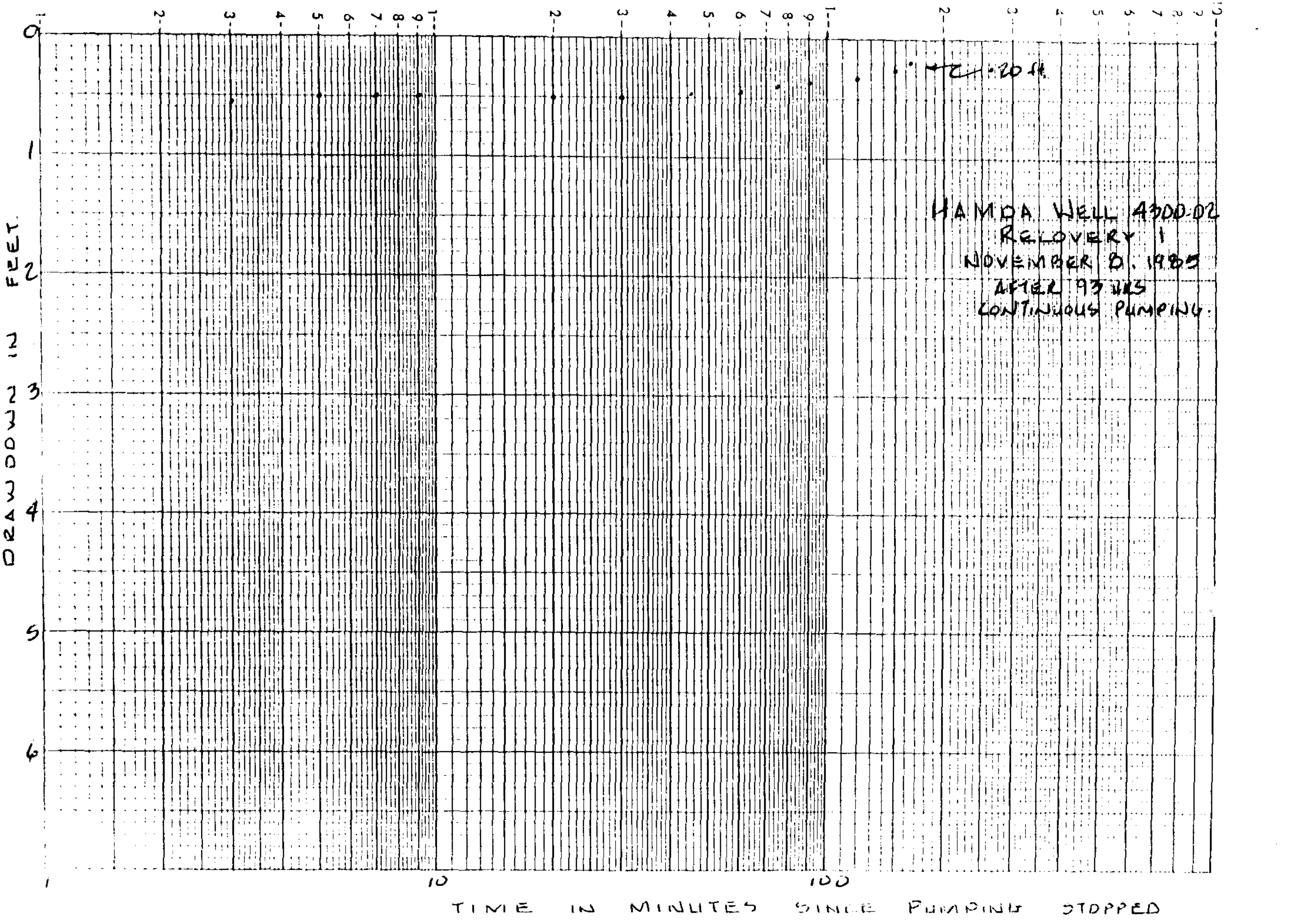
MAUI Island 35-MW-39 Project or Job No. ______ 19__
Titrations conducted by ______

Sample No.	Date Taken	Sample (ml)	Burette Rdg Before	Burette Rdg After	$AgNO_3$ (ml)	$AgNO_3$ -.2 ml	Mult. Factor	Chlorides (ppm)
NOVEMBER 6, 1985								
29		50						
NOVEMBER 7, 1985								
30								
31								
32	1000		19.0	20.0	1.0	-	10	10
33								
34								
35								
NOVEMBER 8, 1985								
36								
37	0600		21.5	22.5	1.0	-	10	10

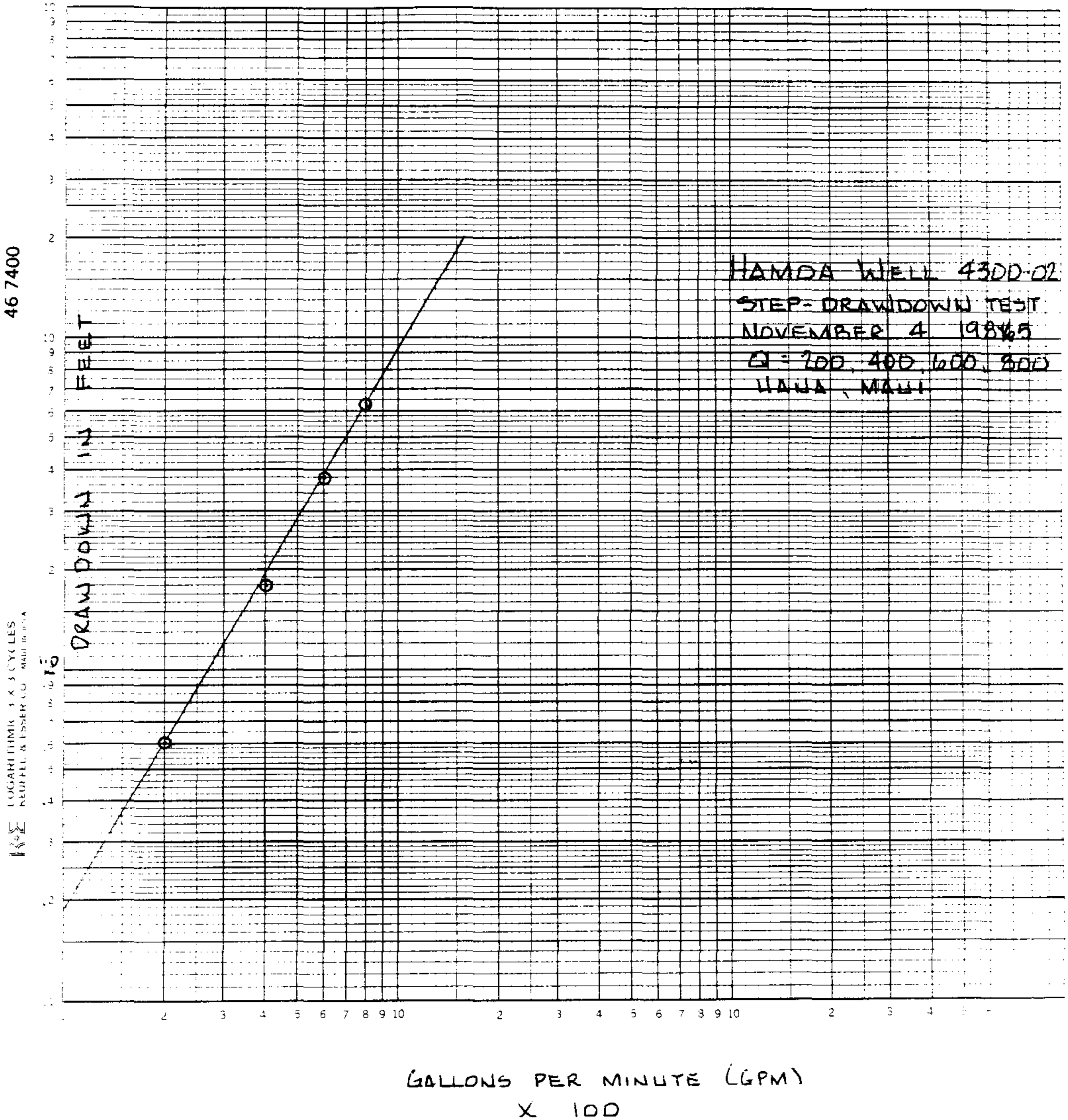
K+E SEMI-LOGARITHMIC 5 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

46 6210





HAMDA WELL 4300-02
RECOVERY 1
NOVEMBER 8, 1985
AFTER 93 HRS
CONTINUOUS PUMPING.
.20 ft.
DRAWDOWN IN FEET
0
1
2
3
4
5
6
1
10
100
TIME IN MINUTES SINCE PUMPING STOPPED



46 7400
HAMOA WELL 4300-02
STEP-DRAWDOWN TEST
NOVEMBER 4 1985
Q = 200, 400, 600, 800
HANA, MAUI
DRAWDOWN IN FEET
GALLONS PER MINUTE (GPM)
X 100