HYDRO DESIGNS
Consultants in Hydrogeology & Hydrology

1225 U.S. Highway 1, Suite 220
Juno Beach, Florida 33408
(305) 626-8250

FINAL REPORT

INSTALLATION OF PIEZOMETERS IN THE ALLIGATOR ALLEY WELL

by

HYDRODESIGNS, INC.

and

DRILLERS, INC.

for the

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

APRIL, 1987

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HYDRO DESIGNS
Consultants in Hydrogeology & Hydrology

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Sharon M. Trost
Director
Hydrogeology Division
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, Fl. 33408

April 28, 1987

Dear Ms. Sharon Trost,

We are pleased to present this report to the District on the rehabilitation of the Alligator Alley well. This was a difficult project, but proceeded smoothly and the piezometers were set in the zones specified by the District. The report is divided into three parts; the final well design, procedures and materials, and an appendix containing the daily site and Dowell reports.

The rehabilitation was successful due in large part to the participation and insight provided by the District staff. Mr. Martin Braun (District Project Manager) was instrumental in these efforts and committed himself to many long hours at the site.

We appreciate the opportunity of working with the professional staff of the District on this very important project.

Sincerely,

Michael S. Knapp, CPGS
President

ABSTRACT

A 2811 foot deep exploratory well with 895 feet of 16" casing was drilled in the Everglades along Alligator Alley by the U.S. Geological Survey in 1980. The South Florida Water Management District subsequently received proprietorship of the well and in early December, 1986, subcontracted with Drillers Inc. and HydroDesigns Inc. to convert it into a multi zone monitor by installing three (3) piezometers.

Construction began on February 12, 1987 and proceeded in three stages until project completion in April of 1987. In the first stage of construction the approximately 1200 gallons per minute of flow from the well was subdued with a heavy bentonite mud solution. The well head was then modified and construction proceeded to the second stage. This stage involved setting three steel piezometers that are epoxy coated and PVC lined to retard corrosive processes. The well was reamed from the base of casing at 895' to 1300' to allow enough annular space for the three piezometers and the two inch work string used by the Drillers for cementing and gravel packing. The deepest piezometer is 2 3/8" in diameter and monitors the zone below 2447 feet, the overlying piezometer is 1" in diameter monitoring the zone from 1728 feet to 1648 feet, and the uppermost 1" piezometer monitors the zone between 1164 and 1104 feet. Stainless steel screen was gravel packed into the zones monitored by the 1" piezometers. A fourth zone is monitored in the well from the base of casing at 895 feet to the top of the cement seal on the uppermost piezometer at 1052 feet. There are two additional monitor tubes that were constructed with the original well in 1980. They are constructed of 2 7/8" diameter steel and extend 834 feet and 330 feet respectively in the annular space outside the well casing. The third and final stage of this project involved the installation of pressure gauges and valves on the wellhead for the now isolated monitor zones, final development of the zones, and site restoration. The wellhead pressure and water level of the isolated zones were measured on April 28, 1987 and reported 7'6" feet below land surface (2447' - 2811'), 19 psi (1648' - 1728'), 18 psi (1104' - 1164'), and 16.5 psi (895' - 1054').

INTRODUCTION

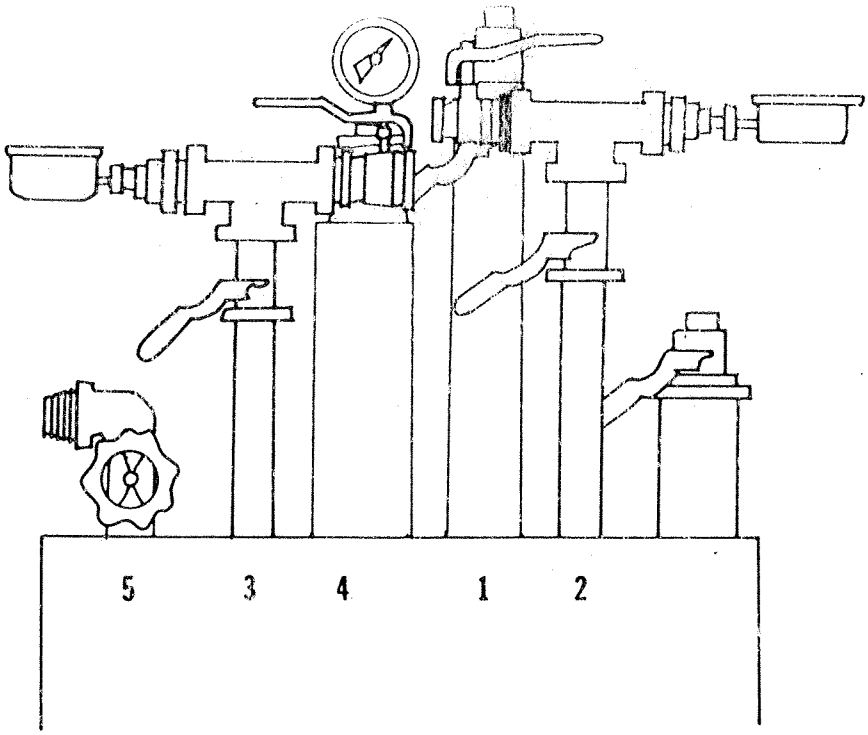
In early December 1986, HydroDesigns and Drillers Inc. were contracted by the South Florida Water Management District to rehabilitate the Alligator Alley well. The 2811 feet deep well was open to several geologic formations and a large portion of the Floridan Aquifer System. The major geologic formations and producing zones in the well are outlined in an unpublished U.S. Geological Survey report and depicted on Figure 1. This report showed the major water producing zones in the well to be from 895 to 1054 below land surface (producing zones 2 and 3 - 35% of the flow) and from 2400 to 2811 feet below land surface (producing zones 13 and 14 - 33% of the flow). The District wished to convert this well into a long term multi-horizonal monitor system to collect data from several producing zones and determine the possible influence of coastal injection wells. This was accomplished by installing three piezometers and leaving the upper portion of the well open from 895 to 1052 feet (Figure 1). The bottoms of the individual monitor tubes/screens are at 2447 feet, 1728 feet and 1164 feet. The well now monitors four zones in the Floridan Aquifer System. An additional zone is monitored from 811' to 816' by a 2 inch steel tube installed in 1980 during the construction of the original well. During the rehabilitation of the well a total of 1005 cubic feet of cement was pumped to install the piezometers and separate the zones.

This report is a summary of the daily construction activities at the Alligator Alley well. It is chiefly concerned with the final well design, its monitor zones, and the methods and materials used during the rehabilitation. The daily construction reports and Dowell cement reports are included in the appendix.

FINAL WELL DESIGN

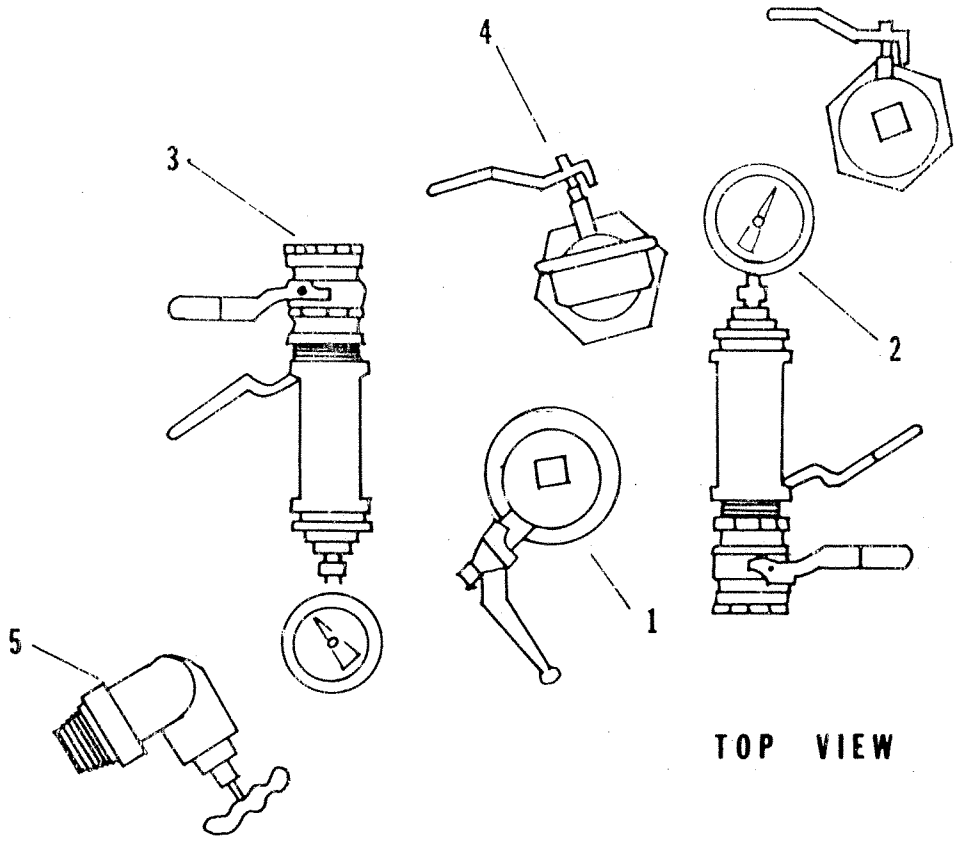
The final well design and intervals monitored in the rehabilitated Alligator Alley well are described in this section of the report. All of the piezometers used in the rehabilitation are steel tubing that has been PVC lined and epoxy coated to resist corrosive processes. The technical specifications and quantities of the materials used during the installation of the tubes will be discussed in a later section of this report. The major water bearing zones discussed in this section of the report have been assigned numbers (1 through 14 - Figure 1) by the U.S. Geological Survey in an unpublished document (Water Resources Inv. 81-xxx, 1981).

The Lower Floridan Aquifer System (Monitor Zone 1) is monitored by a 2 3/8 inch diameter piezometer set at 2447 feet below land surface in the middle of the Oldsmar Formation. The lower 719 feet of this tube is set and sealed by three bentonite/gravel packs and three cement plugs. The piezometer monitors a total of 364 feet of open hole to the full depth of the well at 2811 feet. Only 10 feet of zone 12 is monitored in this interval and zone 13 and 14 are fully monitored (Figure 1). Zone 13 contributed a calculated 32 percent of the total flow to the original well and zone 14 only 1 percent. The water level in this piezometer was measured at 7'6" below land surface on April 22, 1987 after the well had been allowed to stabilized for



SIDE VIEW

MONITOR ZONE	#
2447 - 2811	1
1648 - 1728	2
1104 - 1164	3
895 - 1052	4
811 - 816	5



TOP VIEW

FIGURE 1 Plant Water Rate Design

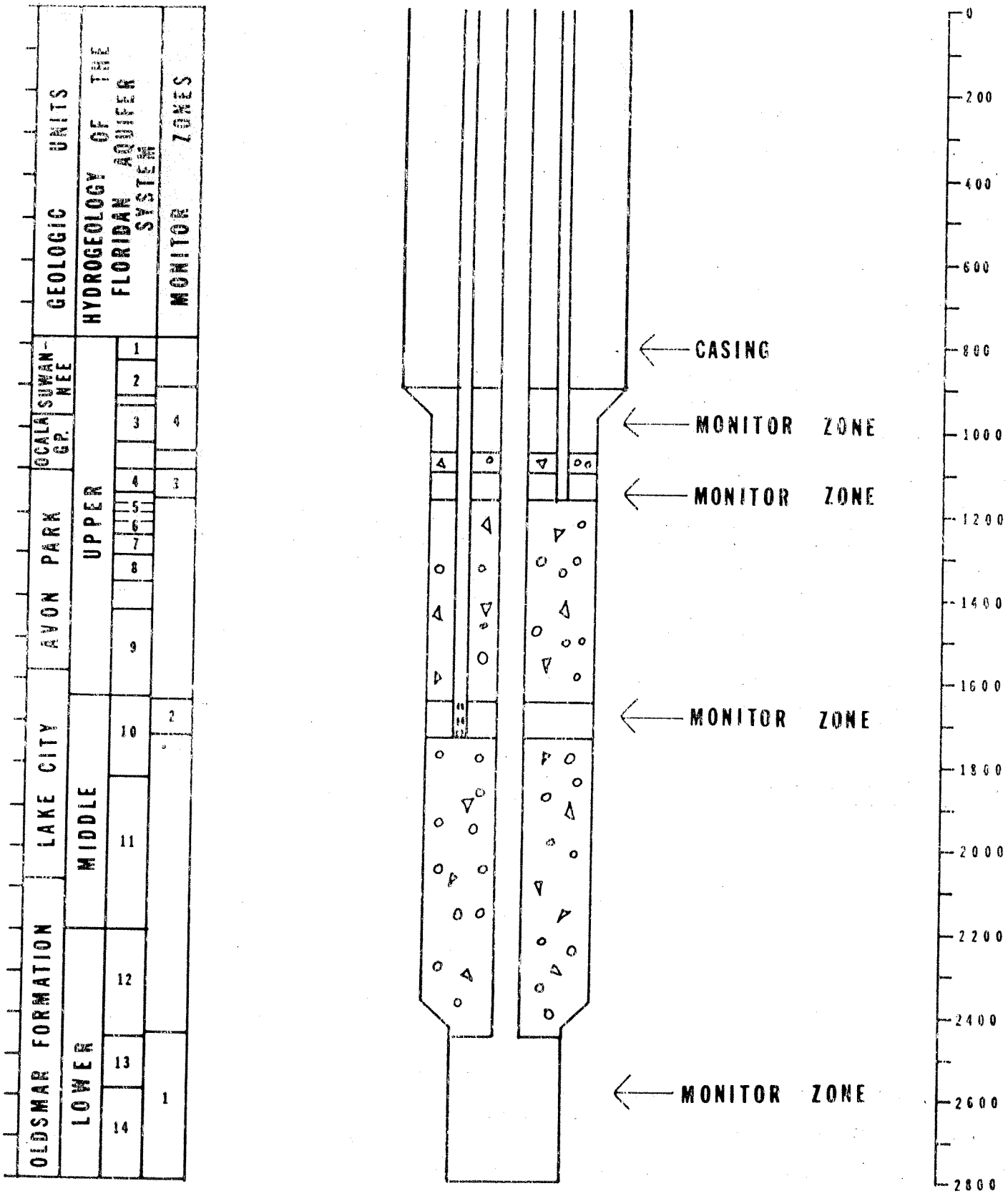


FIGURE 1 **Final Well Design**

several days. The presence of very dense water in the lower Floridan affects the water level in the piezometer and corrections for density need to be applied to calculate the true pressure head of this zone.

The Middle Floridan Aquifer System is monitored through a 1 inch diameter piezometer with 80 feet of .020 slot stainless steel screen at the base. The screen monitors the upper portion of the Lake City Limestone from 1648 to 1728 feet (Monitor Zone 2). This piezometer is placed in the upper portion of producing zone 10 (figure 1). The monitor zone is completely packed with 93 feet of quartz gravel from the bottom of the screen up to 1635 feet. A limestone gravel pack and sand cap were placed immediately above the quartz from 1603 to 1635 feet to serve as the base for the cement plug. Three cement plugs and two mixtures of bentonite and limestone gravel were used to grout 439 feet of this piezometer up to the base of the next monitoring zone at 1164 feet below land surface. The pressure in this zone was recorded at 19 psi on April 22, 1987.

The rehabilitated well contains two monitor zones in the Upper Floridan Aquifer System. The deepest interval (Monitor Zone 3) is monitored by a 1 inch diameter piezometer with 60 feet of .020 slot stainless steel screen. This monitors all of producing zone 4 in the upper portion of the Avon Park from 1104 to 1164 feet. It has a quartz gravel pack for 65 feet of annulus that extends 5 feet above the screen from 1099 to 1164 feet. Limestone gravel with a quartz sand cap was placed above the quartz gravel pack to 1084 feet below land surface. A 32 foot cement plug extends up to 1052 feet isolating this monitor zone. The overlying zone (Monitor Zone 4) extends 157 feet from the top of the cement plug at 1052 feet to the base of 16 inch casing at 895 feet. Producing zones 2 (1% of total flow) and 3 (34 of total flow) are included in this interval. Monitor Zone 4 includes the lower part of the Suwannee Limestone and the upper portion of the Ocala Group. The pressure in both of these zones was read on April 22, 1987. Monitor Zone 3 (1104' to 1164') had a pressure of 18 psi and Monitor Zone 4 (895' to 1052') a pressure of 16.5 psi.

Producing zone 1 of the upper Floridan Aquifer System is monitored by a 2 7/8 inch steel tube that was installed with original well in 1980. This tube is monitoring a zone in the upper portion of the Suwannee Limestone. The tube is grouted from 834 feet to land surface and perforated from 811 feet to 816 feet to allow monitoring.

The final well head design (Figure 2) allows for sampling from these five different zones by the use of shut off valves. Three inch pressure gauges (0 to 60 psi) are installed on the 1728 foot piezometer, 1664 foot piezometer, and the annular monitor (1052 foot). The 2447 foot piezometer does not flow and is sealed with a ball valve. A 48 inch diameter (5/8 inch thick) steel casing with a locking lid was installed around the wellhead to prevent vandalism.

PROCEDURES AND MATERIALS

Construction on the Alligator Alley well began on February 11, 1987 with the arrival of the contractors equipment and supplies at the site. The final well head was installed on March 16th and site restoration and demobilization finished on April 22, 1987. The schedule of events which took place at the drill site are presented in Table 1. The materials used in the well rehabilitation are shown on Table 2.

On February 12th, a mixture of gel (bentonite drilling mud), barite and mica were pumped into the well to stop the strong artesian flow of over 1200 gpm. Once this was accomplished the existing wellhead was removed and a 14 inch diameter tee was installed to allow accessability to the well. A 10 inch PVC elbow was then assembled from the tee to the 10 inch discharge line to allow the well to flow away from the work area. The monitor tubing arrived to the site on February 24th and the well was reamed with a nominal 12 1/4 inch bit to 1300 feet. A 7 7/8 inch bit was then lowered to 2490 feet to clear any obstructions that might interfere with the placement of the piezometers.

From March 4th through the 9th the first piezometer (2 3/8" diameter) was constructed and installed to 2447 feet. Because the well had begun to flow again a heavy bentonite mud had to be used to kill the well before any cement was pumped. A gravel pack of limestone and quartz was added and two cement lifts were pumped by Dowell. Six subsequent lifts, two of limestone gravel and bentonite and four of cement were then pumped from March 7th to March 9th to 1728 feet (Table 1).

From March 9th through March 13th the second piezometer (1" diameter) with 80 feet of stainless steel screen was constructed and installed with its monitor zone from 1648 to 1728 feet. A quartz gravel pack was pumped around the monitor screen. It was topped with limestone gravel, a sand cap and cement plug. The well flow had to be stopped at this time and would remain dead through the duration of the project. The well flow was killed and four consecutive lifts were pumped, three of cement and one gravel pack of limestone and bentonite (Table 1).

On March 13th construction began on the final piezometer tube. This piezometer (1" diameter) has 60 feet of stainless steel screen and monitors from 1104 to 1164 feet. The screen was then gravel packed with quartz gravel, topped with limestone gravel, a sand cap and cement plug. An additional annular monitor zone extends from the base of this cement plug at 1052 feet to 895 feet.

On March 16th the final wellhead was constructed. Valves were attached to the four monitor tubes and also to the 2 7/8 inch diameter tube that runs 335 feet deep. Pressure gauges (0 to 60 psi) were installed on the annular monitor, 1164' monitor and the 1728' monitor. The tube to 834 feet has an existing valve. The wellhead was contained by a 48" diameter steel cover and locking lid.

TABLE ONE - PROCEDURES

DATE	SCHEDULE OF EVENTS
2/11/87	Mobilize tanker, gel, barite, etc., to site.
2/12/87	Kill well with heavy mud solution, install new well head. The tubing and screen were ordered.
2/23/87	Mobilize drill rig and equipment to site.
2/24/87	Arrival of piezometer tubing.
2/27/87	Begin reaming hole from 895' to 1050' with a 12 1/4 inch bit. Lost 4 collars and bit down the hole.
2/28/87	Retrieve collars and bit.
3/1/87	Ream hole to 1300' with 12 1/4" bit.
3/3/87	Run drill pipe to 2490' with 7 7/8" bit.
3/4/87	Install 2 3/8" piezometer to 2447' with a cement basket at 2443' and 2447'..
3/6/87	Kill well. Gravel pack piezometer with 59 cubic feet of limestone and quartz gravel to 2386'. Pump lift #1- 30.8 cubic feet of Neat cement through a 2 7/8" tremie.
3/7/87	Tag cement at 2359'. Pump lift #2- 84 cubic feet of cement with additives. Tag at 2305'. Gravel pack with 57 cubic feet of limestone and bentonite. Tag at 2225'. Pump lift #3- 421 cubic feet of cement with additives.
3/8/87	Tag cement at 1952'. Pump lift #4- 190 cubic feet of cement with additives. Tag at 1890'.
3/9/87	Gravel pack with 33.5 cubic feet of limestone and bentonite to 1754'. Pump lift #5- 19.5 cubic feet of cement with additives. Tag at 1748'. Pump lift #6- 14 cubic feet of cement with additives . Begin assembling and installing 1" piezometer tube.
3/10/87	Tag cement at 1728'. Install 1" piezometer to 1728'. Quartz gravel pack with 78.4 cubic feet to 1635'. Limestone gravel pack of 16 cubic feet to 1608'. A sand cap of 5.6 cubic feet to 1603'.
3/10/87	Pump lift #7- 28 cubic feet of Neat cement.
3/11/87	Tag at 1578'. Gravel pack with 164.5 cubic feet of limestone and bentonite to 1405'. Kill well. Pump lift #8- 50.5 cubic feet of cement with additives. Tag at 1353'.
3/12/87	Gravel pack with 130 cubic feet of limestone and bentonite to 1215'. Pump lift #9- 61.5 cubic feet of cement with additives. Tag at 1206'. Pump lift #10- 47.5 cubic feet of cement with additives. Begin installing final 1" piezometer.
3/13/87	Tag cement at 1164'. Install piezometer to 1164'. Quartz gravel pack with 42 cubic feet to 1099'. Add 7 cubic feet of limestone gravel to 1089'. Add 5.6 cubic feet of coarse quartz sand to 1084'. Pump lift #11- 56.1 cubic feet of Neat cement.
3/14/87	Tag cement at 1052'. Begin rigging down and installing final well head.
3/16/87	Install final well head. Seal 16" casing with steel plate. Install ball valves to four monitor tubes. Install 0 to 60 psi pressure gauge to annular monitor, 1164' monitor tube and 1748' monitor tube. Cement a 48" protective steel cover with lid around wellhead.
4/22/87	Demobilize and restore site.

TABLE 2 - MATERIALS

PIEZOMETER 1

74	sections of 2 3/8 inch diameter EUE 8RD New R-2D & T 7000 PSI Seal-Tite PVC lining with threaded ends and epoxy coated; 33.2' lengths.
74	seals, Seal-Tite seals with an O ring at each end, plastic.
2	cement baskets; 11" diameter with 7 PVC ribs.
262	cubic feet of limestone gravel.
14	cubic feet of quartz gravel.
30.8	cubic feet of ASTM Florida Type II Neat cement with 2% Calciun Chloride and 1/2 lb. per sack of cellophane flakes.
731	cubic feet of ASTM Florida Type II cement with 12% Bentonite, 10 lb. Kolite per sack, 1/2 lb. cellophane flake per sack and 2% Calcium Chloride.

CEMENTING AND GRAVEL PACK PROGRAM

DEPTH	CUBIC FEET	CEMENT OR GRAVEL USED
2447' - 2386'	59	Limestone and quartz gravel
2386' - 2359'	30.8	Neat cement
2305' - 2359'	84	Cement with additives
2225' - 2305'	57	Limestone gravel
1890' - 2225'	612	Cement with additives
1754' - 1890'	160	Limestone gravel
1728' - 1754'	33.5	Cement with additives

PIEZOMETER 2

66	sections of 1 inch NUE 10RD New D & T7000 PSI Seal-Tite, PVC lining with threaded ends and epoxy coated; 25' lengths.
66	seals, Seal-Tite seals with an O ring at each end, plastic.
8	sections of 1 inch diameter, .020 slot stainless steel screen; 10' lengths
5.6	cubic feet of coarse quartz sand
310	cubic feet of limestone gravel
78.4	cubic feet of quartz gravel
28	cubic feet of ASTM Florida Type II Neat cement with 2% CaCl and 1/2 lb. cellophane flake per sack.
160	cubic feet of ASTM Florida Type II cement with 12% Bentonite, 10 lb. Kolite per sack, 1/2 lb.cellophane flake per sack and 2% CaCl.

CEMENTING AND GRAVEL PACK PROGRAM

DEPTH	CUBIC FEET	CEMENT OR GRAVEL USED
1635' - 1728'	78.4	Quartz gravel
1608' - 1635'	16	Limestone gravel
1603' - 1608'	5.6	Coarse quartz sand
1578' - 1603'	28	Neat cement
1405' - 1578'	164.5	Limestone gravel
1353' - 1405'	50.5	Cement with additives
1215' - 1353'	130	Limestone gravel
1164' - 1215'	109	Cement with additives

TABLE 2 - Continued

PIEZOMETER 3

45	sections of 1 inch NUE 10RD New D & T 7000 PSI Seal-Tite, PVC lining with threaded ends and epoxy coating; 25' lengths.
45	seals, Seal-Tite seals with an O ring at each end, plastic.
6	sections of 1 inch diameter, .020 slot stainless steel screen; 10' lengths.
5.6	cubic feet of coarse quartz sand.
7	cubic feet of limestone gravel
42	cubic feet of quartz gravel
56.1	cubic feet of ASTM Florida Type II Neat cement with 2% CaCl and 1/2 lb. cellophane flakes per sack.

CEMENTING AND GRAVEL PACK PROGRAM

DEPTH	CUBIC FEET	CEMENT OR GRAVEL USED
1099' - 1164'	42	Quartz gravel
1089' - 1099'	7	Limestone gravel
1084' - 1089'	5.6	Quartz sand
1052' - 1089'	56.1	Neat cement

TOTAL CEMENT AND GRAVEL USED THROUGHOUT PROJECT:

114.8	cubic feet of Neat cement
890.2	cubic feet of cement with additives
579	cubic feet of limestone gravel
134.4	cubic feet of quartz gravel
11.2	cubic feet of coarse quartz sand

ADDITIONAL MATERIALS

1	14" steel tee
1	10" PVC elbow
95	sections of 2 3/8" steel tremie, 31' lengths
1	48" diameter steel casing; 2 1/2' in length
1	48" diameter steel plate
3	3" diameter pressure gauges.
280	Baroid barite sacks, 100 lb. per sack.
100	Aqua Gel, 150 lb. per sack.
15	bags of Mica.

APPENDIX

HYDRO DESIGNS
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Juno Beach, Florida 33408

CONSTRUCTION REPORT

DATE March 16, 1987; Monday

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO.

CONTRACTOR Drillers, Inc. WEATHER sunny & breezy

CONTRACTOR'S REPRESENTATIVE

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0945 Remove 14" tee and weld plate on 16" well head ~~and~~ sealing it off completely

1015 Put extensions on the 3 piezometers inside the casing and also on the 2" tubing that is sealed off. Nothing was done to the 2" monitor tube running along the outside of the casing

1300 The piece of 48" casing has been situated around the 16" well and 1.62 feet of cement has been poured inside to above the top of the 16" casing

1350 A total of 7 valves have been installed
1 valve on the annular monitor
1 valve on the 2" tubing that is sealed off
2 valves on the 1" piezometer to 1164'. 1 opens the tubing and the other releases the flow.
2 valves on the 1" piezometer to 1728' serving the same purpose 1
1 valve has been installed on the 2500' piezometer and it is sealed off

Three 3" pressure gauges with maximum readings of 60 psi have been installed on the annular monitor, the 1164 monitor & the 1728 monitor. A steel lid is hinged on the 48" protective casing and the casing and lid has been painted green

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CONSTRUCTION REPORT

DATE March 14, 1987; Saturday

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO. _____

CONTRACTOR Drillers, Inc. WEATHER Sunny & cool

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0730 Tag cement at 1052'. This indicates a 32' plug.
0845 Notify the District of this tag. Marty Braun said this is acceptable and another lift will not be needed.
1000 Work crew begins rigging down

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Juno Beach, Florida 33408

CONSTRUCTION REPORT

DATE March 13, 1987, Friday

PROJECT NAME Alligator Alley (SFWMD) PROJECT NO.

CONTRACTOR Drillers Inc. WEATHER overcast & windy

CONTRACTOR'S REPRESENTATIVE

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0400 Tag cement with 2 3/8" work string at 1164'
0420 In hole with rest of 1" to get more accurate tag
0515 1" won't go past 1126' There is a 13" ledge at this depth. Trying to work past it.
0530 Pulling 2 3/8" out of hole, give more room in the hole to work with 1" tubing
0715 Out of hole with work string.
0930 Out of hole with 1" tubing.
1105 In hole with 1" tubing. Tubing going in very easy no hang ups.
1200 On top of cement with 1" tubing at 1164'.
1230 Wait on Dowell to help with gravel pack. Marty Braun on site.
1245 Begin gravel pack with quartz gravel, 60 buckets, Tag at 1151'
1900 Tremmie is plugged
1730 Unplug tremmie; Dowell hooked up to pump ~~cement~~ gravel
1800 Pumped 8 buckets, plugged up, trip out of hole to unplug tremie
2000 Adding quartz gravel through tremmie. Tremmie is not plugging off as it did earlier.
2050 Tag quartz gravel at 1099' - 5 feet above screen
2100 Adding lime rock above quartz gravel
2150 Tag lime at 1089' - 10 feet of lime rock
~~2330~~
2245 Add 8 buckets of sand, Tag at 1084' Sand layer is 5' thick
2330 Dowell pumping 10bbl of neat + celloflake at 1084' This should give 39' of theoretical fill. Will tag at 0730.

HYDRO DESIGNS
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CONSTRUCTION REPORT

DATE March 13, 1987; Friday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1" tubing 3rd piezometer:

#	length	#	length	#	length	#	length	#	length
1	3048	11	2480	21	2481	31	2482	41	2512
2	3031	12	2482	22	2481	32	2482	42	2525
3	2531	13	2512	23	2482	33	2482	43	2612
4	2523	14	2482	24	2521	34	2481	44	2528
5	2481	15	2482	25	2519	35	2484	45	2524
6	2482	16	2482	26	2481	36	2482	46	2526
7	2482	17	2476	27	2522	37	2510	47	2481
8	2482	18	2521	28	2524	38	2482		
9	2580	19	2482	29	2482	39	2513		
10	2482	20	2481	30	2482	40	2487		

* #1 & #2 are screens and equal 60.79' in length

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CONSTRUCTION REPORT

DATE March 12, 1987; Thursday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR Drillers Inc., WEATHER Clear

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0100 Begin pumping gravel into well, Pump not strong enough - once pressure builds up the pump wont even pump water.
0300 Well came alive inside tubing, 2 bags barite killed it.
0400 Dowell on site, pumped 3bbl of 11 wt., well is dead.
0430 pump 40 buckets of lime gravel Tag at 1243'
0545 pump 30 buckets of lime gravel, Tag at 1233'
0700 pump 25 buckets of lime gravel, Tag at 1230'
0710 pump 30 buckets of lime gravel, Tag at 1223',
0745 pump 50 buckets of lime gravel, Tag at 1215'
0800 Will pump 10 bbl of 12% Tag cement at 1600.
0805 Begin pumping 1 bbl pre wash, 11 bbl 12% + additives, 7½ bbl flush
1400 Head inside casing is 20 feet below well head, has not risen since early this morning
1645 Marty Braun on site. Tag cement at 1206'. Cement plug is 9 linear feet thick. Must make another lift. The gravel pack below the cement must be compacting under the weight of the cement thus accounting for the cement loss.
2000 Dowell on site pumping 8.5 bbl of 12% with additives (Kcalite, celloflake and 2% CaCl)
2100 Trip 40 jts of the 1" piezometer in hole wait on cement. The six lengths of screen have been tack welded and each connection is has a seal placed in it and is also painted coated with an epoxy paint.

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CONSTRUCTION REPORT

DATE March 11, 1987; Wednesday (2/2)

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR Drillers Inc. WEATHER clear & warm

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE Aimee Barrett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1450 Preflush with 2bbl, Pump 9bbl 12%, Flush with 5 barrels Pull 4 joints. Tag at 2300.

1530 Top of mud plug is 10 feet below well head. Drillers prepared to dump Barite into head if well tries to come alive.

2300 Tag cement at 1353', this gives us 52' of cement plug in the last lift with only 25% formation loss.

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Juno Beach, Florida 33408

CONSTRUCTION REPORT

(1/2)

DATE March 11, 1987; Wednesday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER clear and cool

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1235 Tag lift #7 at 1578'. This gives a 25' plug above the intermediate monitor zone. The zone extends from 1728' to 1658' with a quartz gravel pack from 1728' to 1644', (13' above top of screen), A limestone gravel pack sits on the quartz and is 27' thick with a 5' cap of sand above that. at 1603'

0330 Pump 50 buckets of limestone. Tag at 1545'

0545 Pump 150 buckets of lime. gravel. Tag at 1463'

0730 Pump 35 buckets. Tag at 1435'

0840 Cloudy water is flowing from 10" discharge pipe. This discoloration is from the lime rock. The zone at this depth must be flowing. We will kill the well before cementing

0930 Mixing mud. Tag cement at 1405'

1100 Will attempt to kill well by first killing flow in tubing then killing flow in top of well head

1105 Seal wellhead

1130 Delivery of quartz gravel and lime rock to site.

1300 Prepare to kill well, mixing mud in Dowell hopper

1400 Pump 2 bbl of mud at 13.0 wt. into 2 3/8" work string, tubing killed.

1420 Pump 20 bbl of mud at 12.0 wt into well head. Well still alive.

1430 Pump 10 bbl mud at 12.0 wt. into well head. Rate of flow from 1" tubing has not fluctuated while killing well. Good indication monitor zone is sealed. Well is dead. Will cement at 1405'.

1450 Dowell pumping 9 bbl of 12% with cello flake + Kcoalite + 2% CaCl.

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[305] 626-8250
1225 US Highway 1, Suite 220
Juno Beach, Florida 33408

CONSTRUCTION REPORT

DATE March 10, 1987, Tuesday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0120 Trip 1" tubing

0215 Tag lift #6 at 1728' with 1" monitor tube. Did not get good tag with 2" work string, would go through cement lift

0240 Tubing in hole to 1728' right on top of last lift. and flowing.

0345 Add 100 buckets of quartz gravel. Tag at 1645'

0445 Pump 12 buckets of quartz gravel. Tag at 1635'.

0550 Pump 15 buckets of lime gravel. Tag at 1617'

0815 Pump 8 buckets of lime gravel. Tag at 1608'

0910 Pump 7 buckets of quartz sand Tag at 1603'

1615 Dowell on site, pump 5 bbl wash, 5bbl neat cement with celloflake, 6bbl flush. Theoretical gives 55ft of fill

1800 Pull 2 3/8" work string for tally count, possible mis-calculation on tally

2100 Drill pipe tally is correct. Wait on cement.

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CONSTRUCTION REPORT

DATE March 9, 1987 Monday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1204 75 buckets tag at 1886'
140 buckets tag at 1770'
0330 Dump 3 buckets tremie is plugged, unplugging tremie
Tag at 1768'
0215 Dump 6 buckets tag at 1760'
0300 Dump 7 buckets tag at 1754'
2340 Dowell prepares, pump 5 flush, 3.5 bbl 12%, 7 flush then pull 3 joints
1200 Tag at 1748', Gives us 6' of fill, need more for a plug, Marty Braun on site
1500 Dowell on site will pump 2.64 bbl 12%
1520 Dowell pumped 2.5 bbl of 12% with kaolite and celloflake
4 bbl prewash 6½ bbl flush brings cement to theoretical of 1730' but will tag.
1540 Randy Cape on site
1600 The slotted screen is tack welded between each 10' section
1730 In hole with 1" slotted screen 80' total, 10' sections tack welded.
1750 Tripping 1" monitor tubing to 1500' then will wait to tag cement. Seals are placed in each connection and coated with epoxy
2000 1" tubing suspended in hole to 1553' Waiting to tag cement.

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CONSTRUCTION REPORT

DATE _____

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1" tubing to 1730'

*	31.40	11 25.27	21 24.82	31 24.82	41 24.81	51 25.11	61 24.82
		281.08	529.62	779.48	1029.63	1279.34	1528.63
* 2	29.20	12 24.84	22 25.11	32 25.13	42 24.81	52 24.82	62 25.21
	60.60	305.90	554.73	804.61	1054.44	1304.16	1553.84
* 3	20.25	13 24.81	23 25.11	33 24.81	43 24.82	53 24.82	63 25.21
	80.85	330.71	579.84	829.42	1079.26	1329.30	1579.05
4	25.29	14 24.82	24 24.82	34 25.08	44 25.13	54 24.82	64 24.78
	106.14	355.53	604.66	854.50	1104.39	1354.12	1603.83
5	24.82	15 24.84	25 25.21	35 24.81	45 25.11	55 25.23	65 25.22
	130.96	380.37	629.87	879.31	1129.50	1379.35	1629.05
6	24.81	16 24.83	26 24.81	36 24.81	46 24.81	56 24.82	66 24.78
	155.77	405.20	654.68	904.12	1154.34	1404.17	1653.83
7	25.29	17 24.81	27 25.19	37 25.26	47 25.13	57 24.82	67 24.80
	181.06	430.01	679.87	929.38	1179.34	1428.99	1678.63
8	25.11	18 24.83	28 24.86	38 25.12	48 24.81	58 25.20	68 24.80
	206.17	454.84	704.73	954.50	1204.25	1454.19	1703.43
9	24.82	19 25.14	29 24.82	39 25.17	49 24.81	59 24.82	69 25.18
	230.99	479.98	729.55	979.67	1229.06	1479.01	1728.61
10	24.82	20 24.82	30 25.11	40 25.15	50 25.17	60 24.80	70
	255.81	504.80	754.66	1004.82	1254.23	1503.81	

The first three sections are the slotted screen. These sections were tack welded going into the hole.

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CONSTRUCTION REPORT

DATE March 8, 1987, Sunday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0730 Tag lift #3 at 1952'

0830 Dowell pumping 5bbl flush, 34bbl 12% with celloflake + kcalite

0845 Follow with 7 bbl flush

2930 Unloading 120 bags barite, 50 bags caustic soda beads, 40 bags AquaGel

1700 Tag at 1890' 62ft of fill

1715 Will gravel to 145 linear feet, 109 ft^3

2000 Dowell on site. Hopper connected to 2" hose with check valve. Hose runs from Dowell to hopper to wellhead (2" tremie). Will attempt to get flow going into wellhead and once vaccuum starts will dump the gravel into well

2100 Hard to get gravel into hose, flow is inconsistent. Used 15 bags of Barite to get flow started. Mud came up well and out discharge pipe, no gravel came out.

2215 Hooked hose to pump in order to jet gravel down well. Dumped about 3 buckets. Pump clogged up and won't restart.

2330 Hooked hopper to 2" tremie and connected to Dowell.

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CONSTRUCTION REPORT

DATE March 7, 1987; Saturday

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO. _____

CONTRACTOR Drillers Inc. WEATHER Clear

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0900 Close valve, not totally closed
0910 Begin dumping mud for mixture, mud wt 12, Dowell will pumpin well
1000 Pumping mud
1010 Still alive
1020 Pump again, still alive
1045 Pump again, still alive, added 12 bags Barite, out of Barite
1100 Will go ahead and pump cement if there is a tag on the 1st lift
1140 Tag at 2359' this is 27ft of linear fill
Will pump 15bbls of 12% with Kwalite, this measures 89ft of vertical fill
1200 Begin pumping
1206 Stop pumping 15bbls were pumped 8bbl of flush
Pull 6 joints
1230 No cement returns out of discharge line
1645 Tag at 2305' 55ft of fill
1700 Add 25 buckets of lime gravel Tag at 2262
1750 Add 25 buckets of lime gravel Tag at 2225'
1853 Pump 35~~00~~ bbl 12% + Kwalite and celloflake w/2% CaCl
1915 Pull 7 tremie pump 40 bbl
1945 Pull 13 tremie jts; flush

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CONSTRUCTION REPORT

DATE March 6, 1987; Friday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE Aimee Burnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0800 Weld plate on well head
0830 Mixing gel in mud tank to get viscosity
0930 Marty Braun on site
1045 Randy Cape on site
1230 Add cement and barite to gel ; weight 9.4
1345 Mud weight ; 9.8
1350 Begin pumping mud through 2" hose from mud tank to kill well
1400 Stop pumping ; pumped 13" from 30'×7'×8' mud tank
Well is still alive.
1410 Resume pumping
1416 Stop pumping, pumped for 16 minutes, mud tank dropped a total of 16 inches, Well still alive
1420 Dowell setting up to pump
1421 Dowell pumping mud into hole
1431 Stop pumping total: 10 bbl of 13.0 weight
1640 Pump 30 5 gal buckets of lime rock and 20 of quartz gravel
1645 Tag at 2386' Add 3 buckets sand tag at 2385'
1650 Add 5 buckets of quartz sand
1700 Dowell will pump 5.5 bbl of neat with 2% CaCl. + celloflake.
1742 Start pumping with tremie 2365' (from ground level)
1748 Stop pumping ; pumped 5.5 bbl with 15.6 weight
1750 Pull 3 jts tremie
Flush with 3 bbl fresh H_2O pull 3 jts
1815 Weld 2 3/8" tremie to well head

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CONSTRUCTION REPORT

DATE March 5, 1987, Thursday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

E) REPRESENTATIVE _____

ESCRIPTION OF WORK OBSERVED AND REMARKS:

1130 Weld 2 3/8" tubing on horseshoe above wellhead cut 12.91' off top
The tubing sits 2447.58 (from ground level) with the upper
cement basket at 2442.58 from ground level

1200 Begin tripping 2 3/8" steel tremie

1500 In hole with 80 joints

1510 81 joints in hole, possibly tag cement basket at 2420'

1530 Randy Cape on site

1530 Rig hopper to pump gravel into hole. Pump 15 of 5 gallon buckets
of lime rock into hole. No tag. Last tag must have been ledge

1550 Pump 30 buckets, No tag Mud is coming out of discharge pipe

1630 Prepare to kill well.

1800 Weld well head shut and filling mud tank with canal water

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CONSTRUCTION REPORT

DATE 3-5-87; Thursday

OJECT NAME _____ PROJECT NO. _____

ON RACTOR _____ WEATHER _____

NTRACTOR'S REPRESENTATIVE _____

EL REPRESENTATIVE _____

SCRIPTION OF WORK OBSERVED AND REMARKS:

Tremie pipe 2 3/8" steel

#	LENGTH	#	LENGTH	#	LENGTH
1	31.28	11	31.67	21	2896
2	31.44	12	31.62	22	28.57
3	33.42	13	31.11	23	29.26
4	29.20	14	31.74	24	31.68
5	30.82	15	32.84	25	31.65
6	31.70	16	31.83	26	31.71
7	31.19	17	31.57	27	31.78
8	31.62	18	~~32.75~~ OUT	28	34.02
9	31.58	19	30.86	29	31.31
10	33.15	20	31.61	30	3155

#	LENGTH	#	LENGTH	#	LENGTH						
31	29.78	41	31.75	51	31.65	61	3172	71	2995	81	2977
32	34.25	42	~~31.67~~ OUT	52	28.02	62	31.40	72	3172	82	2928
33	31.19	43	31.62	53	31.49	63	31.53	73	3160		
34	28.83	44	31.46	54	~~33.25~~ OUT	64	31.58	74	2810		
35	31.35	45	31.63	55	28.92	65	31.50	75	2752		
36	30.39	46	31.68	56	31.65	66	31.40	76	3100		
37	31.57	47	31.73	57	31.30	67	31.62	77	3170		
38	31.73	48	31.57	58	31.27	68	33.15	78	2890		
39	29.74	49	31.58	59	31.30	69	31.67	79	3153		
40	31.84	50	31.67	60	31.65	70	31.65	80	2820		

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CONSTRUCTION REPORT

DATE March 4, 1987; Wednesday

PROJECT NAME Alligator Alley (SFWMD) PROJECT NO.

CO TRACTOR Drillers Inc. WEATHER clear

ONTRACTOR'S REPRESENTATIVE

IE D REPRESENTATIVE Aimee Barnett

ESCRIPTION OF WORK OBSERVED AND REMARKS:

0930 Tally 2 3/8" tubing, SPECS recorded on 2.24.87

1100 Marty Braun on site

1115 Assemble cement baskets on first joint, Both baskets have an 11" diameter with 7 PVC ribs. First basket placed at bottom of joint the second basket is fastened 4.0' above the first. They are at 2443' & 2447' Both baskets filled with lime rock.

1140 In hole with first joint.
Seals are placed in joint and connections are epoxy coated by driller

1330 Randy Cape on site

1400 Dowell on site

1700 2 3/8" piezometer is in well. Will cut the last joint tomorrow and record a total depth of the tubing

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CONSTRUCTION REPORT

DATE March 3, 1987, Tuesday

OJECT NAME Alligator Alley (SFWMD) PROJECT NO.

N RACTOR Drillers Inc. WEATHER overcast

NTRACTOR'S REPRESENTATIVE

L REPRESENTATIVE Aimee Barrett

SCRIPTION OF WORK OBSERVED AND REMARKS:

C 130 Servicing rig
1100 Begin tripping 7 7/8" bit into hole
530 Tripped in to 2490, no tag
1615 Begin tripping out of hole
745 Out of hole with bit

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CONSTRUCTION REPORT

DATE March 2, 1987; Monday

OJECT NAME Alligator Alley SFWMD PROJECT NO.

ON RACTOR Drillers, Inc. WEATHER overcast & rain

NTRACTOR'S REPRESENTATIVE Duwayne Hickman

EL REPRESENTATIVE Aimee Barnett

SCRIPTION OF WORK OBSERVED AND REMARKS:

830	1 driller on site
1000	Servicing rig
200	Constructing cement baskets
1245	Dowell on site
500	Servicing rig, no work will be done to rig today

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CONSTRUCTION REPORT

DATE March 1, 1987 ; Sunday

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO. _____

CONTRACTOR Drillers Inc WEATHER _____

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0930 On site with 6 collars and 6 joints of drill pipe making a total of 11 collars, a new tally is attached
1000 Load collars on pipe rack
1100 Begin tripping in hole with 12¼" bit
1235 Tag at 909.52' Begin reaming
1405 Ream to 929.06'
1600 Marty Braun on site
1715 The 2 zones in question have been reamed out
1740 Begin trip out of hole from 1300.07' (31 joints)
1945 Out of hole with bit

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CONSTRUCTION REPORT

DATE March 1, 1987; Sunday

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER Overcast & windy

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

Drill pipe tally:

bit sub 1.68

		#	length			
collar 1	31.04	11	31.68	34	31.15	
2	31.17	12	28.87	35	31.42	
3	30.52	13	30.80	36	30.27	
4	31.19	14	30.07	37	31.53	
5	30.83	15	31.60	38	31.80	
6	31.15	16	31.61	39	31.62	
7	30.80	17	31.66	40	29.24	
8	30.80	18	30.90	41	31.06	
9	30.80	19	31.60	42	31.76	
10	31.20	20	31.54		31.33	
11	31.20	21	31.22			
Total	342.38	22	31.24			
#	length	23	31.82			
drill pipe 1	31.27	24	29.99			
2	31.45	25	29.82			
3	31.75	26	31.37			
4	31.64	27	30.88			
5	31.11	28	30.75			
6	30.32	29	30.54			
7	29.61	30	31.37			
8	30.60	31	31.14			
9	30.25	32	31.63			
10	29.95	33	31.55			

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CONSTRUCTION REPORT

DATE February 28, 1987 ; Saturday

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO.

CONTRACTOR Drillers Inc. WEATHER clear & sunny

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

1015 Dowell on site with 2 cement trucks. No other morning activities.

1500 Driller is not going to fabricate a fishing tool but instead will trip drill pipe in hole in attempt to make connection with the pipe down hole

1620 Replaced teeth on tongs and clamp and begin tripping drill pipe in hole, no collars will be used.

1800 25 joints of drill pipe totaling 803.74 feet are in hole. Weight indicator reads 19,000 lbs. Begin fishing for pipe.

1805 Weight indicator increased to 48,000 lbs, Assume the collars are now attached. 25th joint was 20 feet in hole when connection was made.

1820 Begin tripping out of hole.

2015 Out of hole with collars and bit. Bit does not appear to be damaged. The bit was at 920'. Caliper log indicates the first ledge is at this depth.

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CONSTRUCTION REPORT

DATE February 27, 1987

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO.

CONTRACTOR Drillers Inc. WEATHER overcast

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0900 Servicing rig

1030 10" valve has been open and well is flowing

1200 Tripping into hole with 12¼" bit, pipe tally on next page.

1400 Tag has been made at 1022.18', tag is deeper than expected.

1415 Begin reaming with 6 collars and 27 jts of drill pipe.

1500 Marty Braun on site

1530 Reaming is very slow, 1 foot per hour.

1830 Reamed to a depth of 1034'. This is 12 feet in 4 hours.

1845 The formation at this depth should not be so hard to drill, there is a possibility that the bit is worn or even disconnected.

1850 Mounting lights on rig

1900 Begin tripping out of hole to find out why the drilling is so slow.

2130 Tripped 27 jts of drill pipe and 2 collars out of hole. 4 collars and the bit are somewhere down the hole. It appears that the fourth collar must have come unscrewed while tripping into the hole, thus the drillers were reaming with a drill collar. This also explains why the tag was so deep. Will attempt to fish the pipe out of hole tomorrow. 4 collars and bit sub are 125.60 feet in length. There is a chance that the top of the fourth collar is inside the casing. This would make it much less difficult in retreiving the pipe.

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CONSTRUCTION REPORT

DATE February 27, 1987

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

Drill pipe tally:

	Feet
Bit sub	1.68
C 1	31.04
C 2	31.17
C 3	30.52
C 4	31.19
C 5	31.21
C 6	30.85
	187.66

#	Feet
D.P.	31.27
2	31.45
3	31.75
4	31.64
5	31.11
6	30.32
7	29.61
8	30.60
9	30.25
10	29.95
11	31.68
12	28.87
13	30.80
14	30.07
15	31.60
16	31.61
17	31.66
18	30.90
19	31.60
20	31.54
21	31.22
22	31.24
23	31.82
24	29.99

#	Feet
25	29.82
26	31.37
27	30.78
28	30.75
29	30.54
30	31.37
31	31.14
32	31.63

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CONSTRUCTION REPORT

DATE February 25 & 26, 1987

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER _____

CONTRACTOR'S REPRESENTATIVE _____

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

Wednesday; February 25, 1987

1000 Fill mud tank with mud from well through 2" hose. Completely full. Mud is thin and does not have much weight to it. No drilling to be done today.

1200 Valve on well head closed, mud tank full

Delivery to site

- 80 bags of Baroid barite at 100 lbs each
- tremie pipe; 95 jts @ 31' lengths; 2 3/8" diameter
- 10" pvc elbow for discharge line (1)

Thursday; February 26, 1987

0930 Rigging derrick, preparing rig and discharge pipe, etc.

1430 Delivery of gravel and sand to site:

1 pile river bed gravel	8' x 8' x 3.5'
1 pile quartz sand	6' x 6' x 3'
1 pile lime rock	15' x 15' x 4.5'

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CONSTRUCTION REPORT

DATE 2-23-87 & 2-24-87

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER overcast

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE _____

DESCRIPTION OF WORK OBSERVED AND REMARKS:

Activities include

Removal of inner gate to allow rig on location, Prepare rig for drilling, tubing for piezometers has not arrived yet. No drilling today

Well is alive and sealed off

Equipment on site since last inventory:

Apachee Walker Neer top head drive drilling rig with doghouse

drill pipe; 8 jts and 6 collars 30' lengths with 7 7/8" diameter

mud tank 1

small pump; Kohler (1)

small pump; Kubota (1)

cement silo; Dowell (1)

Tuesday; February 24, 1987

1 Driller on site, preparing rig

Piezometer tubing arrived on site:

74 jts of 2 3/8" EUE 8RD New R-2D & T 7000 PSI Seal Tite PVC lining with threaded ends; 30' lengths & epoxy coated

74 seals Seal tite seals w/ O ring at each end; plastic

114 jts of 1" NUE 10 RD New D & T 7000 PSI Seal Tite PVC lining with threaded ends; 20' lengths & epoxy coated

14 ... of 1" steel slotted screen @ 10' lengths, threaded ends

114 seals Seal tite seals w/ O ring at each end; plastic

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CONSTRUCTION REPORT

DATE February 12, 1987

PROJECT NAME _____ PROJECT NO. _____

CONTRACTOR _____ WEATHER clear

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE Aimee Bonnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

0900	Circulating Superben in tanker through the pump
1000	Remove 6" valve from well head
1130	Adding barite to superbar mixture in tanker. Viscosity 45.
1330	Mud weight is 10.4, 65 bags of Barite have been added.
1445	A total of 80 bags have been added of Barite with an avg. weight of 10.6 in the tanker
1500	Marty Braun on site
1504	Begin pumping mud into wellhead through a 4" hose.
1514	Stop pumping. Mud approximately 15 ft. BTOC.
1517	Resume pumping.
1524	Stop pumping. Approximately 5500 gallons of mud has been pumped. The weight of the mud is 10.5.
1600	Welding 14" tee to wellhead. A total of 80 bags of barite and 7 bags of mica were added.

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CONSTRUCTION REPORT

DATE Feb 11, 1987

PROJECT NAME Alligator Alley Well (SFWMD) PROJECT NO.

CONTRACTOR Drillers Inc. WEATHER clear

CONTRACTOR'S REPRESENTATIVE Dwayne Hickman

FIELD REPRESENTATIVE Aimee Barnett

DESCRIPTION OF WORK OBSERVED AND REMARKS:

Equipment and supplies on site:

- Lister pump (1) Max: 80 psi
- Tanker truck (9000 gallon capacity)
- Lincoln arc welder (1)
- Baroid barite 160 bags at 100 lbs each
- Superben (high viscousity) 70 bags at 100 lbs each
- Pels caustic soda beads 5 bags at 50 lbs.
- Mica (fine) 15 bags
- Lime 2 bags
- Steel 14" tee (1)
- Steel 14" nipple (1) 2 ft. long
- Steel flange converter 14" to 10" (1)

Tanker truck has approx. 5000 gal. fresh H_2O. Workers are mixing 30 bags of Superben in tanker. No other work was done other than welding the flange to the tee. Nothing was done to the wellhead

1330 Les from SFWMD on site

1345 Marty Braun from SFWMD on site.

1500 Randy Cape on site

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DOWELL SCHLUMBERGER INCORPORATED

STAGE 1 | DS DISTRICT Jacksonville, FL

WELL NAME AND NO. Monitor Well | LOCATION (LEGAL) Mile Marker 54, SR 84 | FIELD-POOL | FORMATION

COUNTY/PARISH Brevard Co | STATE Florida | API. NO.

COMPANY Drillers Inc.

CONTRACTOR

ADDRESS Houston Texas | ZIP CODE

RIG NAME: Drillers Inc.

SPECIAL INSTRUCTIONS

WELL DATA:	BOTTOM	TOP
BIT SIZE 7 7/8	CSG/Liner Size 2423	
TOTAL DEPTH	WEIGHT	
☒ ROT ☐ CABLE	FOOTAGE	
MUD TYPE FW	GRADE	
☐ BHST ☐ BHCT	THREAD	
MUD DENSITY FW	LESS FOOTAGE SHOE JOINT(S)	TOTAL
MUD VISC. 28	Disp. Capacity	

NOTE: Include Footage From Ground Level To Head In Disp. Capacity

Float SHOE	TYPE		Stage Tool	TYPE	
	DEPTH	N/A		DEPTH	N/A
	TYPE			TYPE	
	DEPTH	N/A		DEPTH	N/A

Head & Plugs	☒ TBG ☐ D.P.	SQUEEZE JOB	
☐ Double	SIZE 2 3/8	TOOL TYPE	
☐ Single	☐ WEIGHT	DEPTH	N/A
☐ Swage	☐ GRADE A 193	TAIL PIPE: SIZE	DEPTH
☒ Knockoff	☒ THREAD	TUBING VOLUME	Bbls
TOP ☐ R ☐ W	☐ NEW ☒ USED	CASING VOL. BELOW TOOL	Bbls
BOT ☐ R ☐ W	DEPTH 2386	TOTAL N/A	Bbls
		ANNUAL VOLUME	Bbls

PRESSURE LIMIT 10000 PSI | BUMP PLUG TO — PSI

ROTATE RPM | RECIPROCATE FT | No. of Centralizers

JOB SCHEDULED FOR TIME: N/C DATE: | ARRIVE ON LOCATION TIME: 0800 DATE: 3-6-86 | LEFT LOCATION TIME: 1700 DATE: 3-4-87

TIME 0001 to 2400	PRESSURE TBG OR D.P.	PRESSURE CASING	VOLUME PUMPED BBL INCREMENT	VOLUME PUMPED BBL CUM	INJECT RATE	FLUID TYPE	FLUID DENSITY	SERVICE LOG DETAIL
0700								PRE-JOB SAFETY MEETING Held w/ Crew & Customer
0720						FW	8.3	START Pumping Fwater Pad
0723			5	5	2.5	FW	8.3	Fwater Pad Ahead START Cement - Neat -
0726			5.5	10.5	2.5	Neat	15.3	25 SKS Cement Pumped, START Flush
0729			9	19.5	3	FW	8.3	Flush in, Shut down, pull Tubing
0748			5	24.5	2.	FW	8.3	ReFlush Tubing w/ Fwater, 1st STAGE Complete
1400			-	-		2nd STAGE		3-7-86 Tag 2359' Tubing 2350
1500			5	-		FW	8.3	START Fwater Pad
1552			5.5	30	2.5	FW	8.3	Fwater Pad Ahead START Cement - 12% -
1557			15	45	3	12%	12.3	37 sks Cement Pumped START Flush
1600			9	54	3	FW	8.3	Flush in pull Tubing
1615			5	59	2.	FW	8.3	ReFlush Tubing w/ Fwater 2nd STAGE Complete
			-	-		3rd STAGE		3-7-86 Tag 2225' Tubing
1705					2	FW	8.3	START Fwater Pad
1707			5	64	2	FW	8.3	Fwater Pad Ahead START Cement
1710			40	104	3.3	12%	12.3	90 SKS Cement Mixed START Flush
1711			1	105	1	FW	8.3	Flush in Pull 7 Joint Tubing

REMARKS

STAGE NUMBER	NO. OF SACKS	YIELD CU. FT/SK	COMPOSITION OF CEMENTING SYSTEMS	SLURRY MIXED BBLS	SLURRY MIXED DENSITY
1.	360	2.50	Astm Type II Cement w/ 12% D20-10# KOL2 #/S .50# D07 PIS and 2% CaCl2 (900 FT3)	160	12.3
2.					
3.					
4.	92	1.26	Astm Type II Cement w/ 2% CaCl2 .50# D29 #/S (116 FT3)	20.6	15.3
5.					
6.					

BREAKDOWN FLUID TYPE | VOLUME | DENSITY

CIRCULATION SQ. N/A ☐ RUNNING SQ. | CIRCULATION LOST ☒ YES ☐ NO

BREAKDOWN PSI FINAL PSI | DISPLACEMENT VOL. — Bbls

Shot Thru Perfs ☐ YES ☐ NO | TO FT | MEASURED DISPLACEMENT ☒ ☐ WIRELINE

PERFORATIONS N/A TO TO

CUSTOMER REPRESENTATIVE Randy Cope

PRESSURE MAX. MIN:

Cement Circulated To Surf. ☐ YES ☒ NO Bbls.

TYPE OF WELL ☐ OIL ☐ GAS ☒ ~~STORAGE~~ Monitor Well ☐ INJECTION ☐ BRINE WATER ☐ WILDCAT

DS SUPERVISOR W. L. Nakinz

SERVICE REPORT
LOG
D IN U.S.A.

DATE 3-14-87

WELL NAME AND NUMBER nitor Well | LOCATION (LEGAL) Mile Marker 54 START 84 | DOWELL LOCATION Jacksonville FL | TREATMENT NUMBER 0124 2044 | PAGE 2 OF 3 PAGES

Drillers Inc

TIME 0001 to 2400	PRESSURE TBG OR D.P.	PRESSURE CASING	VOLUME PUMPED BBL INCREMENT	VOLUME PUMPED BBL CUM	INJECT RATE	FLUID TYPE	FLUID DENSITY	SERVICE LOG DETAIL
10				105	1	12%	12.3	W/ no F/water Pad, START Cement (12%)
922			35	140	2½	12%	12.3	79 sks Cement Pumped, START Flush
25			8	148	2½	F/W	8.3	Flush in, pull Tubing
935			5	153	2	F/W	8.3	Re flush Tubing w/ F/water
30						4th	STAGE	3-8-87 Tag 1952'
932						F/W	8.3	START F/water Pad
35			5	158	2	F/W	8.3	F/water pad Ahead, START Cement (12%)
947			34	192	3½	12%	12.3	76.3 SKs Cement Pumped, START Flush
50			7	199	2½	F/W	8.3	Flush in, shut down, pull Tubing
58			5	204	2	F/W	8.3	Re flush Tubing w F/water.
730						5th	STAGE	3-9-87 TAG 1754'
32						F/W	8.3	START pumping F/water Pad
335			5	209	2	F/W	8.3	F/water Pad ahead, START Cement (12%)
38			3.5	212.5	2	12%	12.3	7.8 SKs Cement pumped, START F/ush
341			6.5	219	2	F/W	8.3	Flush in shut down, pull Tubing.
50			4	223	2	F/W	8.3	Re flush Tubing w/ F/water
500						6th	STAGE	3-9-87 TAG 1748'
5						F/W	8.3	START pumping F/water Pad
7			5	228	2½	F/W	8.3	F/water Pad Ahead START Cement (12%)
09			2.5	230.5	2	12%	12.3	5.6 SKs Cement Mixed, START Flush
2			6.5	237	2½	F/W	8.3	Flush in, shut down, pull Tubing
20			4	241	2	F/W	8.3	Re flush Tubing w F/water
0						7th	STAGE	3-10-87 TAG 1603'
15						F/W	8.3	START Pumping F/water Pad
17			5	246	1	F/W	8.3	F/water Pad Ahead, START Cement, (Neat)
20			5	251	2½	Neat	15.3	22.2 SKs Cement pumped, START Flush
22			6	257	2½	F/W	8.3	Flush in shut down pull Tubing
30			3	260	2	F/W	8.3	Re-flush Tubing w/ F/water
45						8th	STAGE	3-11-87 TAG 1405'
50						F/W	8.3	START F/water Pad
52			1	261	1	F/W	8.3	F/water pad Ahead START Cement (12%)
55			9	270	2	12%	12.3	20.2 SKs Cement Pumped, START Flush
58			5	275	2	F/W	8.3	Flush in. shut down, Pull Tubing
05			2	277	2	F/W	8.3	Re-flush Tubing w/ F/water

SERVICE REPORT
NT LOG
TED IN U.S.A.

DATE 3-14-87

WELL NAME AND NUMBER Monitor Well | LOCATION (LEGAL) Mile Marker 54 ST RT 84 | DOWELL LOCATION Jacksonville FL | TREATMENT NUMBER 0139 2040 | PAGE 3 OF 3 PAGES

Drillers Inc.

TIME (00 to 2400)	PRESSURE TBG OR D.P.	PRESSURE CASING	VOLUME PUMPED BBL INCREMENT	VOLUME PUMPED BBL CUM	INJECT RATE	FLUID TYPE	FLUID DENSITY	SERVICE LOG DETAIL
0745				277		9th STAGE		3-12-87 TAG 1215'
0250					1	FW	8.3	START Pumping F/water Pad
0252			4	381	2	FW	8.3	F/water Pad ahead START Cement (12%)
0258			11	392	3	12%	12.3	247 SKS Cement Pumped START Flush
0300			4.5	396.5	2	FW	8.3	Flush in, shut down, Pull Tubing
0803			3.	399.5	2	mud	10	Re flush Tubing w/ F/water Mud
1230						10th STAGE		3-12-87 TAG 1205'
1935					1	FW	8.3	START Pumping, F/water Pad
1937			3	402.5	2	FW	8.3	F/water pad ahead, START Cement (12%)
1941			8.5	411	3	12%	12.3	19. SKS Cement Pumped START Flush
1945			4.5	415.5	2	FW	8.3	Flush in shut down pull Tubing
1947			3	418.5	2	FW	8.3	Reflush Tubing w F/water
2100						11th STAGE		3-13-87 Tag 10-
2326					1	FW	8.3	START pumping F/water Pad
2330			5	423.5	2	FW	8.3	F/water pad ahead START Cement (Neat)
2332			10	433.5	3½	Neat	15.3	449 SKS Cement Mixed, START Flush
2337			4	437.5	2	F/W	8.3	Flush in, shut down, Pull Tubing
2338			3	440.5	2	F/W	8.3	Re-flush Tubing w/ F/water

Monitor Well Cemented.

Job Completed.

CEMENT DENSITY RECORDING

DS—663

DOWELL SCHLUMBERGER INCORPORATED

DATE: 3-14-87

CUSTOMER	WELL NAME AND NUMBER	
Drillers Inc.	Monitor Well	
LOCATION/FIELD	COUNTY STATE	API NO.
St. Pt 84	Broward Co, FL	
DEPTH	LOCATION	TREATMENT NO.
2425	Mile Marker #54	0124 2049
TYPE JOB	CASING/HOLE SIZE	
Grout	12¼" + 7⅞" OH	
LEAD SLURRY		

360 SKS Astm type II Cement w/ 12% D-20
10# Kolite P/S .50# D29 P/S + 2% CaCl2
TAIL SLURRY

92 SKS Astm type II Cement w 2% CaCl2 + .50# D29 P/S
REMARKS

Chart Speed 5 min

CEMENTING ENGINEER: M. C. Nolan

POUNDS PER U.S. GALLON

8 9 10 11 12 13 14 15 16 17 18

Flush up F/water

Pump 10 BBL Neat Cement

11th Stage clear casing

← POUNDS PER U.S. GALLON

8 17 16 15 14 13 12 11 10 9 8

17806

Pump 8.5 BBL Cement

10 Stage

← PS X 1000

10 9 8 7 6 5 4 3 2 1 0
0 1 2 3 4 5 6 7 8 9 10

17805

← BPM INCREASE →

Mix Mud

← POUNDS PER U.S. GALLON

8 17 16 15 14 13 12 11 10 9 8

17804

G 26 8850

Chart No. 202349

Chart not Working on
6th tour Gallop.

← PSI × 1000

10 9 8 7 6 5 4 3 2 1 0
0 1 2 3 4 5 6 7 8 9 10

17605

BPM INCREASE →

← POUNDS PER U.S. GALLON

18 17 16 15 14 13 12 11 10 9 8

17606

Mix Mud

← PSI × 1000

10 9 8 7 6 5 4 3 2 1 0
0 1 2 3 4 5 6 7 8 9 10

17605

BPM INCREASE →

Mix mud

← POUNDS PER U.S. GALLON

8 17 16 15 14 13 12 11 10 9 8

17606

Chart

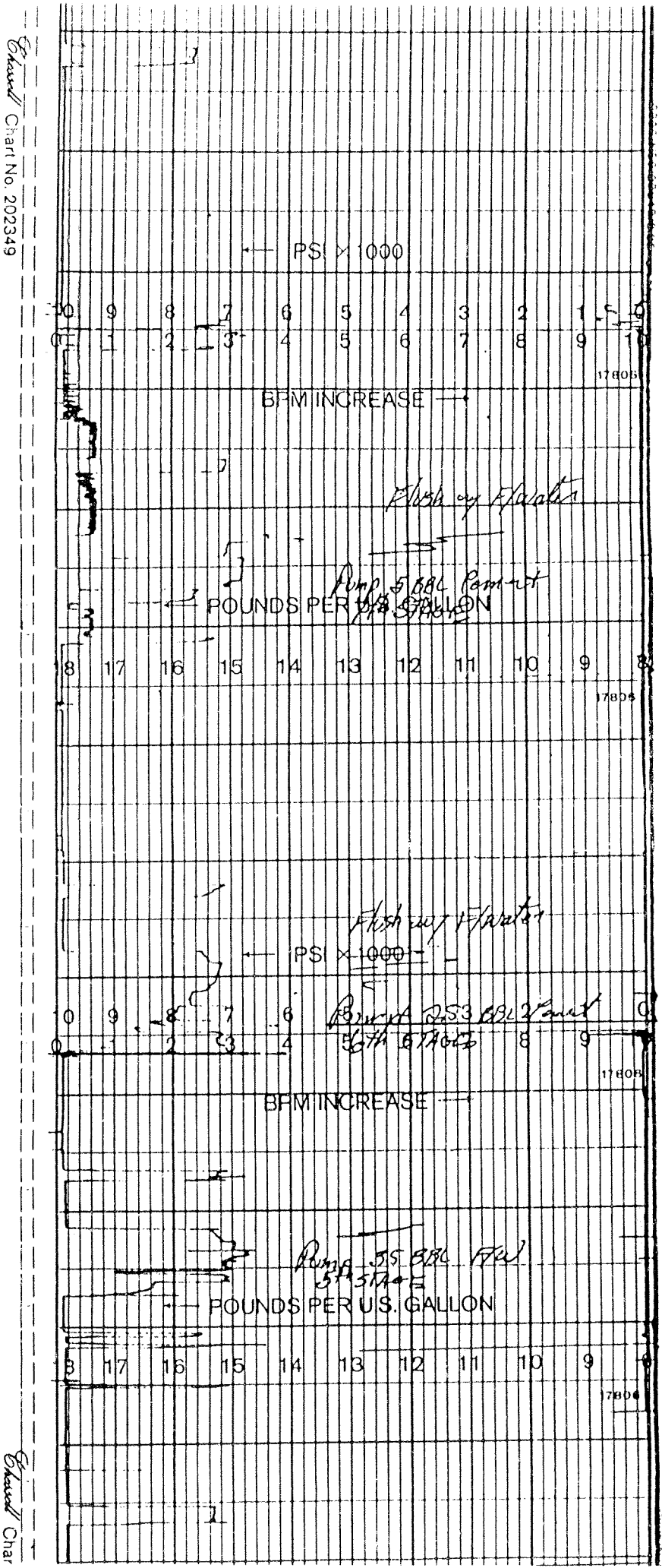
Chart No. 202349
PSI × 1000
BPM INCREASE
Flush w/ Plasatic
Pump 5 BBL Pam-ot
POUNDS PER U.S. GALLON
Flush w/ Plastic
PSI × 1000
Pump 25 BBL 2% KCL
BPM INCREASE
Pump 35 BBL Fluid
POUNDS PER U.S. GALLON

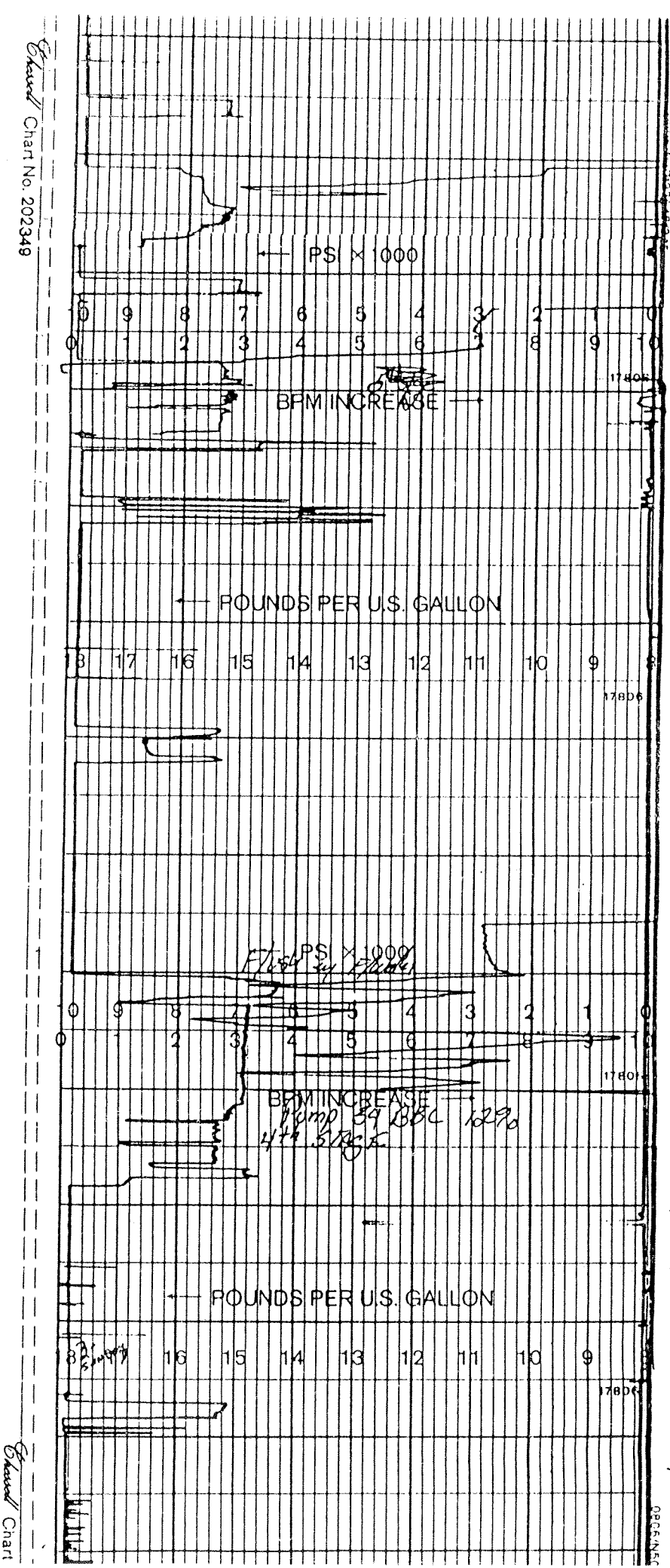
Chart No. 202349
PSI X 1000
BPM INCREASE
POUNDS PER U.S. GALLON
PSI X 1000
BPM INCREASE
POUNDS PER U.S. GALLON
Chart

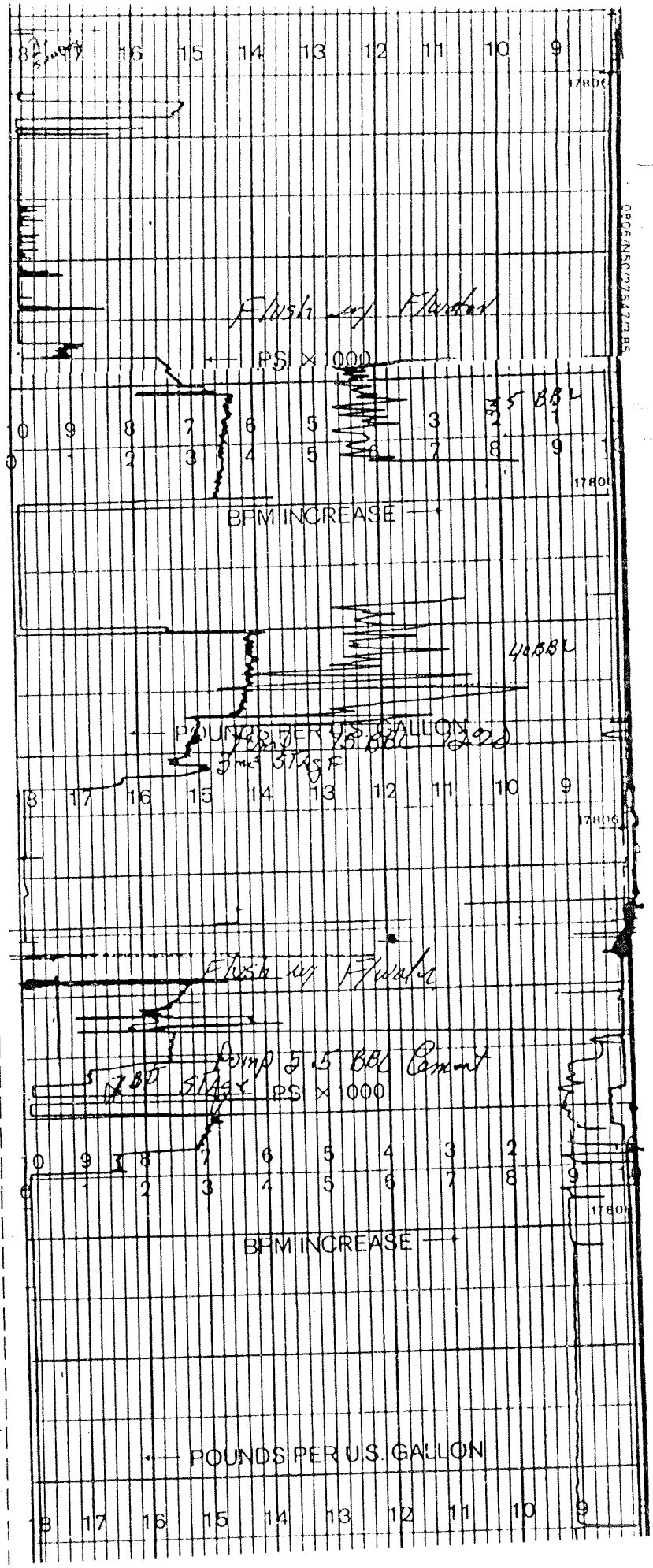

Chart Chart No. 202349

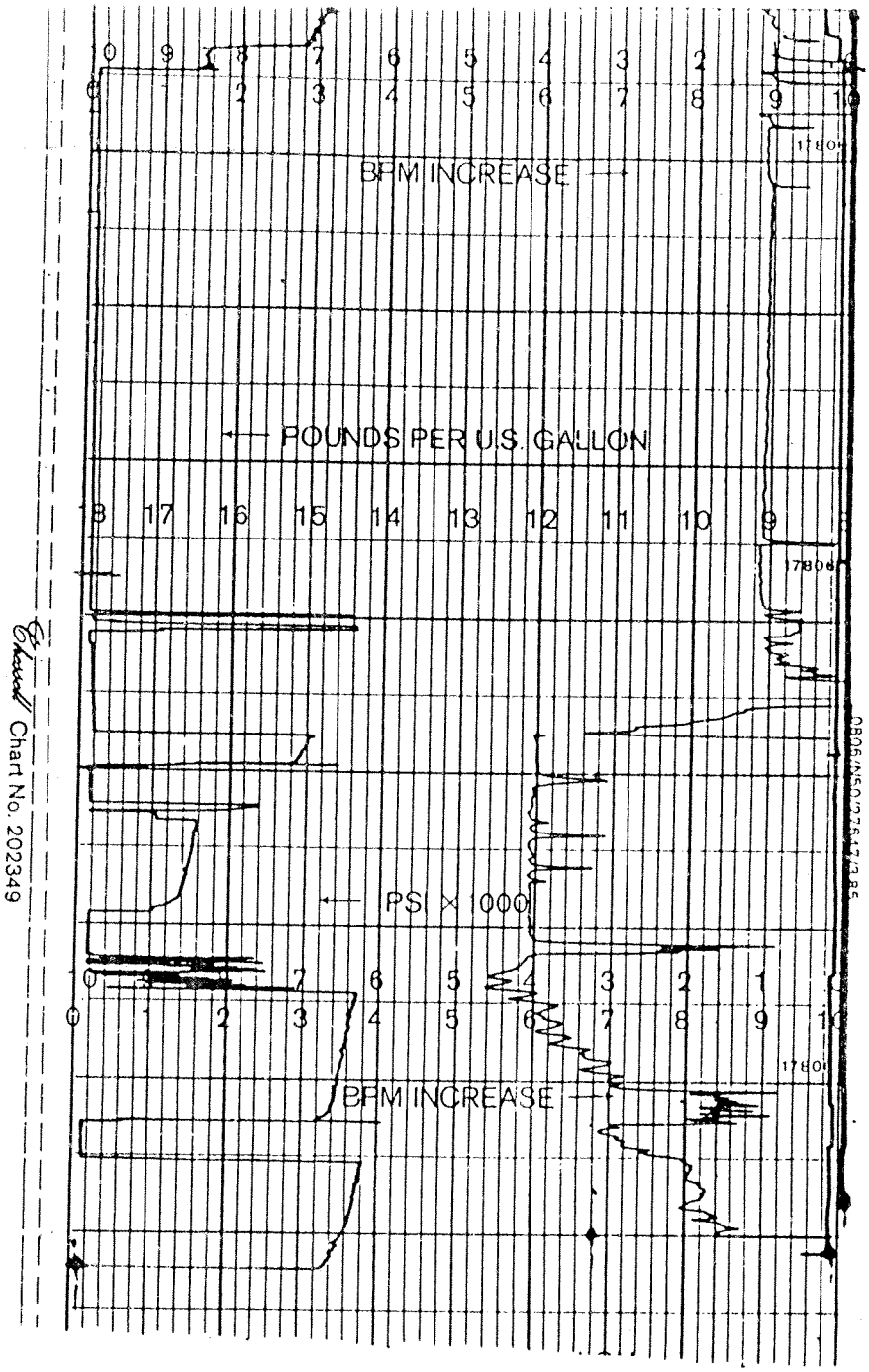

Chart No. 202349