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REPORT

ANALYSES OF OPERATIONAL TIMES AND TECHNICAL ASPECTS OF THE DEEP SALTON SEA SCIENTIFIC DRILLING PROJECT

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PREAMBLE

The Deep Salton Sea Scientific Drilling Program (DSSSDP) was conducted in Imperial County of California at the Southeastern edge of the Salton Sea. This was the first major deep drilling project which is a part of the Continental Scientific Drilling Program. Emphasis was on the acquisition of scientific data for the evaluation of the geological environment encountered during the drilling of the well.

The scientific data acquisition activities consisted of coring, running of numerous downhole logs and tools in support of defining the geologic environment and conducting two full scale flow tests primarily to obtain pristine fluid samples. The coring was done by a commercial firm, logs were run by Government Agencies, National Laboratories and commercial loggers and the flow tests were conducted by the prime contractor. In addition, drill cuttings, gases and drilling fluid chemistry measurements were obtained from the drilling fluid returns concurrent with drilling and coring operations.

The well was drilled to 10,564 feet. The methodologies of drilling, coring and completing the well were those commonly practiced in commercial operations and adapted to meet the scientific requirements of the project. The well design was consistent with those of geothermal production wells in the area.

This report describes the field portions of the project and presents an analysis of the time spent on the various activities associated with the normal drilling operations, scientific data gathering operations and the three major downhole problem activities - lost circulation, directional control and fishing. The analyses of this successful milestone project can be used as a basis for the planning of future deep scientific investigations of the earth's crust. The activities encountered during this project are not unique, and are anticipated to be similar on future deep scientific projects.

Since the coring activity was a major scientific requirement, an analysis of the successes and drawbacks of the conventional interval coring as conducted during this project is presented. An analysis of the bit records is also presented. It reflects the additional time required for the normal operations created by using the interval coring technique for scientific data acquisition in this geologic environment of hard, abrasive, fractured, high temperature formations.

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1.Ø INTRODUCTION

The Deep Salton Sea Scientific Drilling Project is the first well drilled primarily for the purposes of science funded by the U. S. Department of Energy in a commercial hydrothermal geologic setting. The well was drilled to 1Ø,564 feet in the Salton Sea Geothermal Field. The well is located on the southeastern shore of the Salton Sea in the Salton Trough which is a fluvial sedimentary basin. The area is one of extraordinary high heat flow with temperatures at 6,ØØØ feet in nearby wells as high as 7ØØ degrees F. Geothermal wells in the area produce primarily from fractured, metamorphosed formations. The produced brines, after flashing to atmospheric conditions, contain up to 36Ø,ØØØ parts per million dissolved solids.

Analyses of the time spent for various operations and of the major technical aspects of the field portions of the project are presented here. The times for the various major activities related to the scientific efforts, normal drilling operations, and problems associated with the operations, which were lost circulation, wellbore directional control and fishing for drilling equipment lost in the hole, are separated into their respective categories. In addition, analyses of the coring operations and drill bits are presented. These analyses, although performed on this project, are not specifically generic to this project but are important considerations for the planning, both technically and financially, of future deep scientific drilling projects.

The project was successful in meeting the the primary scientific goals, i.e. reaching a depth of 10,000 feet, coring approximately 10 percent of the wellbore, conducting two full scale flow tests and obtaining large amounts of other geologic data from wireline logging and analyses of the drilling fluid returns. The success of the project is attributed to the management of the funding agencies and to the primary on-site management team.

There were a number of entities involved in the multi-varied aspects of the institutional, scientific, engineering, management and field operations during the project. The primary on-site personnel represented were:

Scientific - USGS
Management / Engineering - Bechtel National, Inc.
Leaseholder / Institutional - Kennecott
Contractor (DOE) On-Site Technical Representative (COTR) - Well Production Testing, Inc.

Numerous reports are being prepared on the scientific aspects of the project by USGS and other institutions. A primary scientific report will be prepared by Dr. Wilf Elders, project chief scientist, the originator and motivator behind the project.

The Bechtel National, Inc. staff, responsible for the management of on-site activities and cost control will be preparing reports on the operational / management aspects of the project.

2.Ø DESCRIPTION OF THE DOWNHOLE ENVIRONMENT, BOREHOLE AND DOWNHOLE DRILL STRING PROBLEMS

The geological conditions encountered in the well gave rise to complex downhole conditions for drilling, coring and wireline logging. These conditions include: hard, abrasive and fractured formations, unusually high formation temperatures and sub-normal formation pressures. These conditions influenced the well design and program along with the testing requirements, normal drilling operations and scientific operations. The geological conditions also led to the problems with directional control, lost circulation, unusual bit wear, slow coring rates and low total core recovery per core barrel run. These conditions, except for the directional control problems, were anticipated during the planning of the project. It was only unknown where these conditions would occur, their severity and how they would affect the project objectives technically and monetarily.

These conditions also affected the relative amounts of time spent on the various activities as discussed in Section 3.Ø, the coring operations discussed in Section 4.Ø and the bit performance discussed in Section 5.Ø.

2.1 DOWNHOLE ENVIRONMENT

The well was drilled in sedimentary formations. These formations were primarily mudstone, conglomerate, siltstone, sandstone, claystone and shale. The formations contained a high degree of mineralization which changed with depth and was an indicator of thermal regimes. The formations exhibited increased metamorphism becoming hornfelsic and silcified with increasing depth. Two short sections of intrusive were drilled at 9440-50 feet and 9500-30 feet. The cores contained an abundance of both open and mineral filled fractures.

The formations became increasingly abrasive with depth which caused increased outer wear on both drill bits and the core heads. The formation hardness likewise increased with depth resulting in decreased rates of drilling and coring. These conditions changed the relative percentages of time spent on various operations discussed later.

The temperature in the wellbore was a significant factor affecting the time spent on various activities and created difficulties with certain operations. In addition, accurate determination of the formation temperature with depth was one of the major goals of the project which was not achieved due to drilling fluid circulation and the complexities in controlling the formation fluid pressure with the wellbore fluids.

Numerous downhole temperatures were taken primarily by the USGS. However, the geothermal temperature profile was not clearly defined during drilling, or subsequently after the drilling. The complex operations in the wellbore due to circulating drilling fluid, producing the well and injecting into the well both after production tests and during the combating of lost circulation problems caused significant perturbation of the in-situ formation near the wellbore.

Only one wellbore temperature was measured during drilling operations that reasonably represents the formation temperature. That temperature appears to be approximately 300 degrees C at the first production test depth of 6,227 feet. This temperature was measured prior to flow testing December 28, 1985 by a USGS electric log. The temperature logs run by the USGS prior to the flow test are shown on Figure 2.1. This maximum temperature was verified after flow testing on December 31, 1985 by maximum reading that were run with a continuous temperature log which was not definitive.

A series of temperature surveys was run after all rig activities ceased. These temperatures are shown in Figure 2.2. It is apparent that the wellbore has not fully recovered since the temperature at 6,227 feet is still significantly less than those measured on December 28, 1985.

The high wellbore temperatures created difficulties with electric downhole logging, directional surveys of the wellbore, control of lost circulation, maintaining drilling fluid properties and density control of the wellbore fluid for control of the formation fluid pressure. Logging operations were not always successful and had to be re-run leading to increased logging

WELLBORE TEMPERATURE PRIOR TO FIRST FLOW TEST

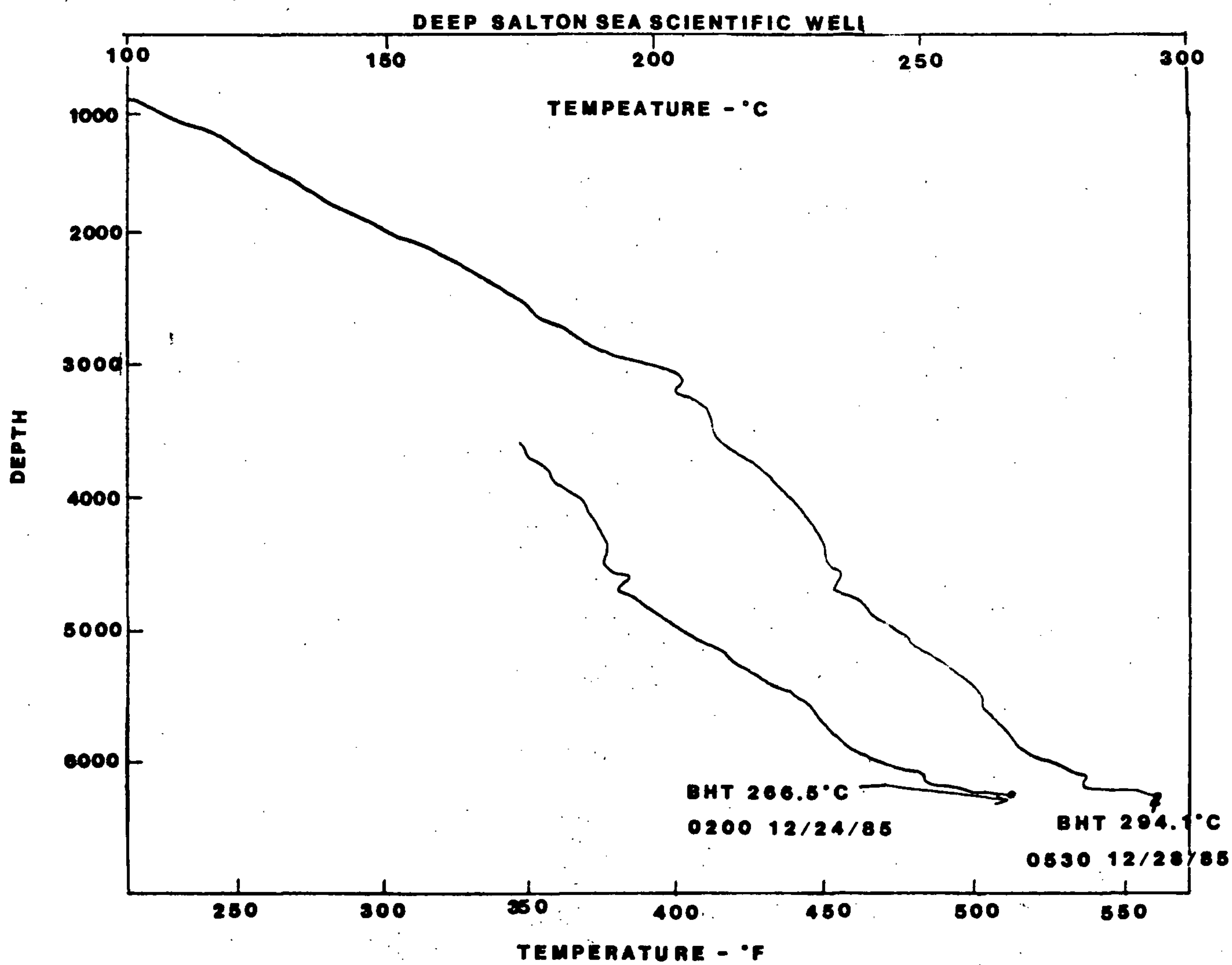

FIGURE 2.1

WELLBORE TEMPERATURE AFTER RIG OPERATION

DEEP SALTON SEA SCIENTIFIC WELL

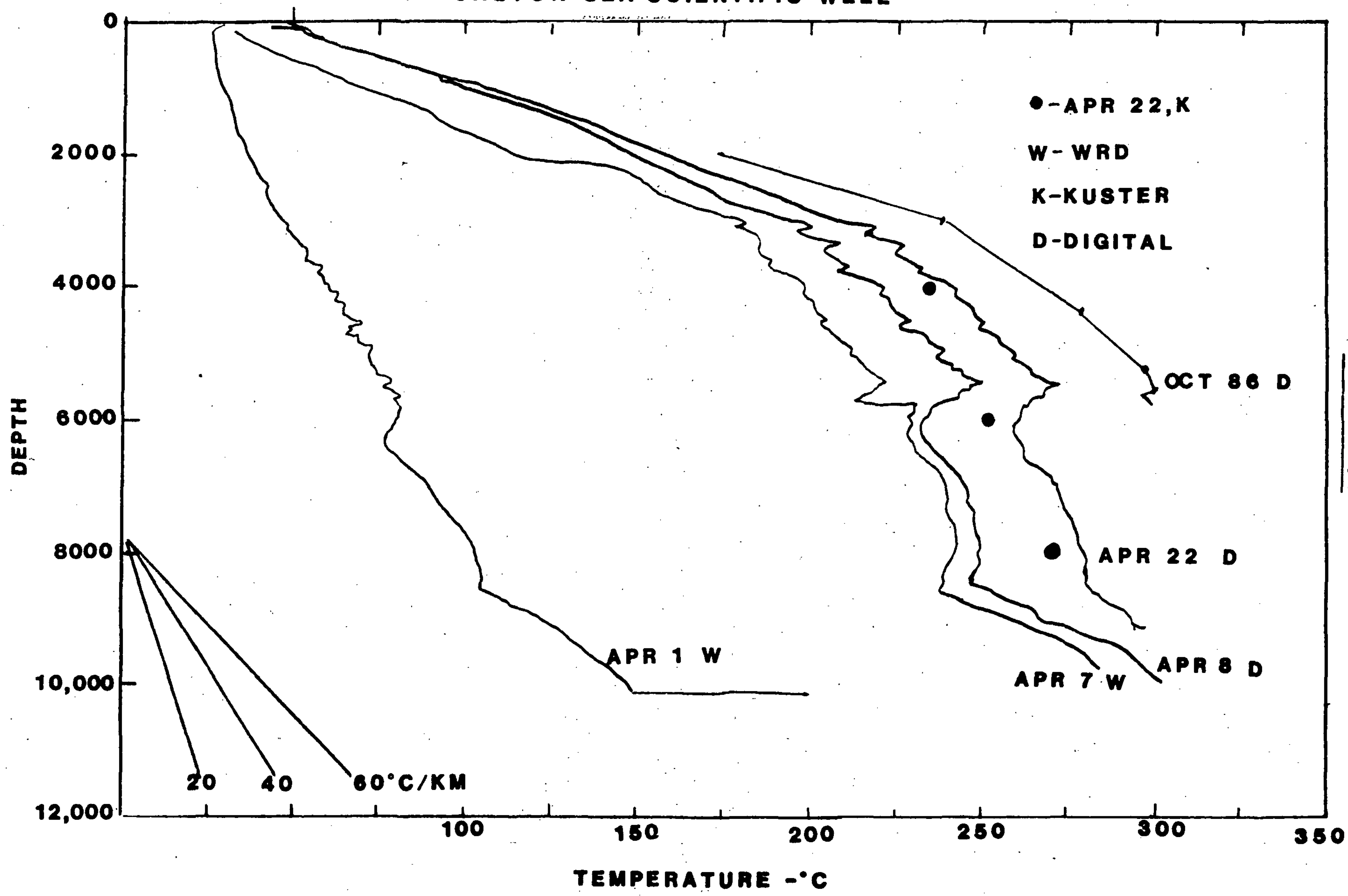

FIGURE 2.2

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time. High temperature gelation of the drilling fluid prevented the logging sondes from going to the bottom of the hole. The drill string then would have to be run into the hole to circulate out the gelled mud and the logs re-run. Although special high temperature logging sondes and electric cables were used, these sometimes malfunctioned.

The high temperature at depth began destroying the film in the directional survey instrument and the last directional survey was at 9,400 feet.

2.2 DESCRIPTION OF THE BOREHOLE

The schematic of the wellbore is shown in Figure 2.3. This figure shows the casing sizes and setting depths *. Also, shown are the diameters of the drill hole, the core heads and the cores. The coring was done in three different diameter holes. The combinations of core heads and boreholes used were based on economic and technical factors.

In the upper 17 1/2" and 12 1/4" drill holes, the core heads were an undersized 9 7/8" which cut 5 1/4" cores. This sizing was primarily economic since the larger coring equipment would have been considerably more expensive. The much larger equipment would have also created handling problems on the rig floor.

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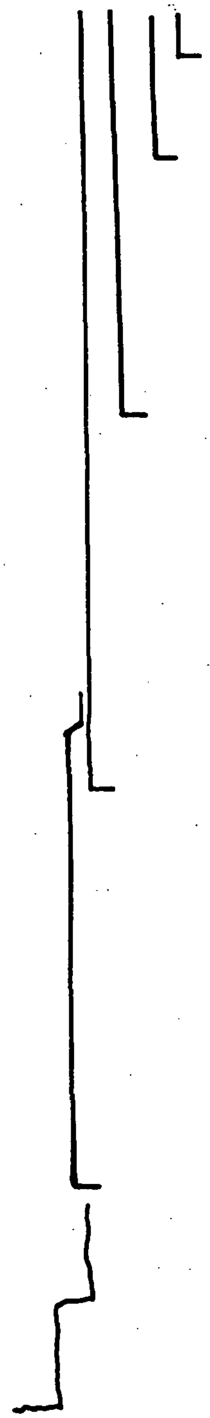
* Unless specified, all depths refer to kelly bushing which was 28.5' above ground level which is about 200' subsea.

FIGURE 2.3

WELL SCHEMATIC



DEPTHS	CASING DIAMETER	BIT SIZE	CORE HEAD SIZE	CORE DIAMETER
150'	30"	42"	—	—
1032'	20"	26"	—	—
3500'	13 3/8"	17 1/2"	9 7/8"	5 1/4"
6000'	9 5/8"	12 1/4"	9 7/8"	5 1/4"
10,136'	7"	8 1/2"	—	—
10,475'	—	8 1/2"	8 1/8" 1- 7 5/8"	4" 3 1/2"
10,565'- TD		6 1/8"	—	—

However, coring a hole diameter of a lesser diameter than the drilled hole did mean that the core hole had to be "reamed" to the diameter of the drill bit before drilling could proceed. This did not present any difficulty in the softer, upper hole. However, as the formations became harder and more abrasive, severe bit wear occured during the reaming.

In the 8 1/2" hole, the core head was 8 1/8". It is common to run a core head of a slightly lesser diameter than that of the drill bit. A full sized core head will often not enter the hole drilled by a drill bit because of the diametrical differences in configuration between the core head and the drill bit. However, this size combination became a problem for two reasons. First, abrasivness of the formation caused excessive gauge wear on the drill bits resulting in a decreased diameter of the hole. The core heads would not go to the bottom of the hole without reaming with the core head. This caused damage to the expensive core heads. Second, the slightly under gauge core hole in the extremely hard formation caused "pinching" of the drill bits. Thus, the core head size in the 8 1/2" hole was changed to 7 5/8" One core was cut with this size equipment.

2.3 MAJOR PROBLEMS

The drilling environment led to three major problem areas: (1) directional control of the wellbore path, (2) lost circulation and, (3) downhole equipment failure. These problems added considerable time to the total operations, especially below 6,ØØØ feet, as will be seen in Section 3.Ø.

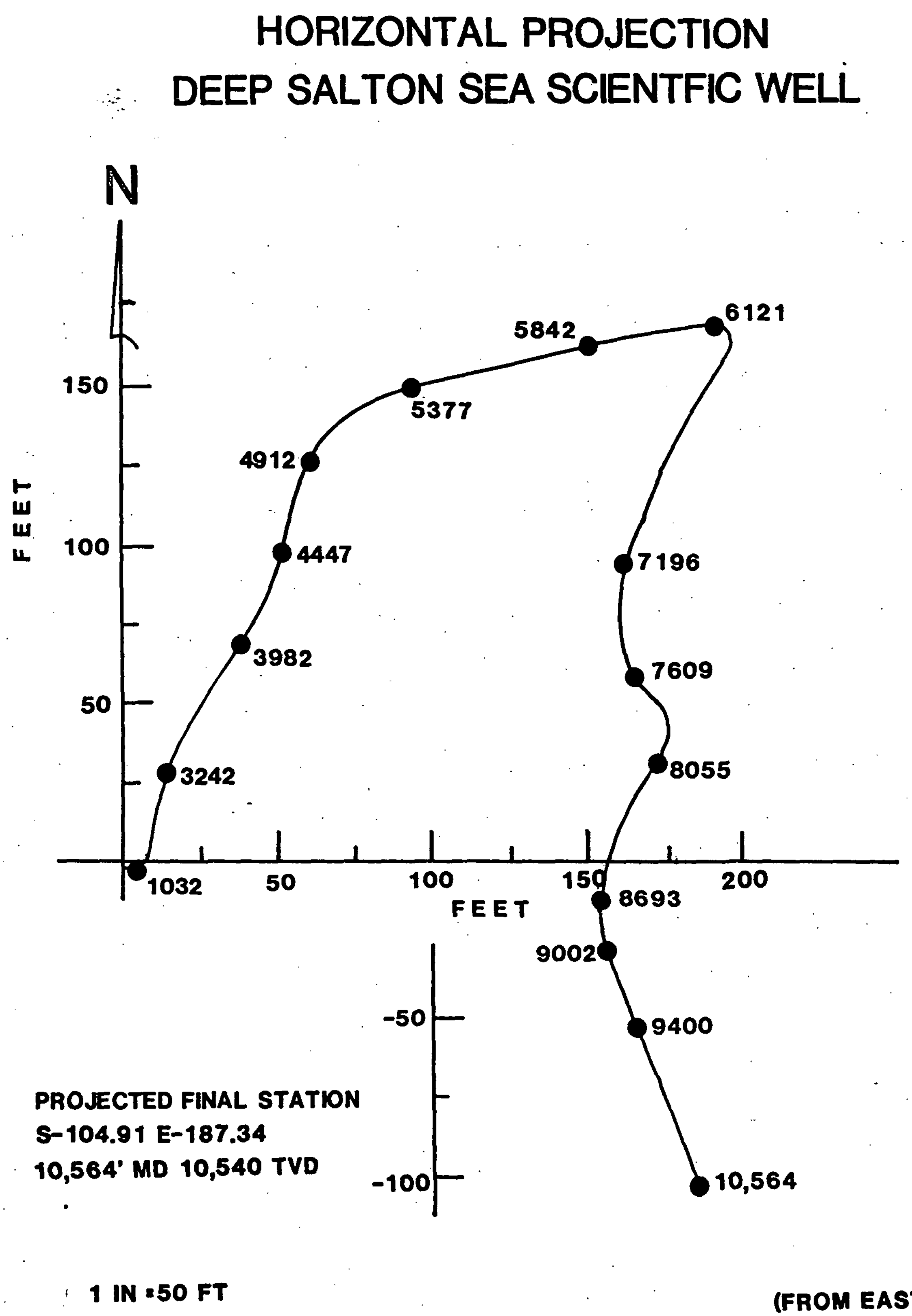
2.3.1 DIRECTIONAL CONTROL

The well was designed and planned as a "straight" hole. All wellbores deviate some, both in angle from the vertical and in azimuth direction as did this wellbore.

Drilling methods using light bit weight and various stabilized bottom hole assemblies were employed in the 17 1/2" and 12 1/4" holes to maintain a low hole angle from the vertical. These drilling techniques were reasonably successful in maintaining a low hole angle. Intentionally controlling the azimuthal deviation tendencies caused by the formations was not anticipated in the planning of the well. However, because of the dip and strike of the formations and fractures, undesirable directional drift occurred toward the eastern lease boundary. This drift tendency increased below the 13 3/8" casing set at 3,500 feet. At low wellbore angles, as were being experienced in these hole sizes, hole direction often tends to change. By using hole angle control methods, it was anticipated that the hole direction would drift away from the lease boundary.

However, the wellbore course persisted toward the eastern lease boundary and the hole angle continued to increase. Eventually, below the 9 5/8" casing set at 6,000 feet, directional controlled drilling techniques had to be used to avoid violating the lease boundary. The horizontal projection of the well is shown in Figure 2.4.

FIGURE 2.4



(FROM EASTMAN)

Two intervals were drilled - 6,Ø46 feet to 6,316 feet and 7,734 feet to 8,133 feet - with direction control to keep the hole away from violating the eastern lease boundary. The directional drilling was done with a downhole turbine motor just above the bit, followed by a "bent sub" and then a non-magnetic drill collar. The turbine supplied rotation to the bit when drilling fluid was circulated through it. The bent sub allowed orientation of the bit and turbine in the desired direction of drilling. The non-magnetic drill collar allowed magnetic surveys of the hole direction.

The first series of turbine runs resulted in turning the hole (as shown in <u>Figure 2.4</u>) and dropping the hole angle. However, below 76ØØ feet the course of the hole again turned toward the eastern lease boundary and the second series of turbine runs were required. A summary of the two series of turbine runs is shown in <u>Table 2.1</u>.

By its very nature, directional drilling operations create "doglegs" in the wellbore. Doglegs lead to drilling and completion problems. The major problems are increased wear of the drill pipe, increased fatigue damage of the drill pipe, increased "drag" on the drill string and wireline, "keyseating" of the drill string and wireline, increased tendencies for "differential" sticking of the drill string and wireline, increased stress on casing in the dogleg area, and poor cementing of the casing. The severity of these problems depends on the depth of the dogleg, the severity of the dogleg and the corrosivity of the wellbore fluids.

During the directional drilling, it was attempted to keep the doglegs to a minimum and still turn the hole sufficiently to avoid the eastern lease boundary. These doglegs eventually

TABLE 2.1

TURBINE RUNS

IN	OUT	FTGE
(First Turn)		
6046	6079	33
6079	6112	33 (1)
6112	6146	34
6146	6166	20
6166	6227	61 (2)
6227	6316	89
(Second Turn)		
7734	7759	25
7759	7794	35
7794	7860	66
7860	7908	48
7908	7935	27
7972	8017	45
8017	8027	10
8126	8133	7

(1) The open hole interval was reamed after this run prior to the next tubine run.
(2) The first flow test was conducted after this run.

contributed to many of the problems mentioned above in the deeper section of the wellbore. The operational times for the various activities were both directly and indirectly affected by directional operations. A summary of the directional surveys and the resulting doglegs in the turbine run intervals is shown in Table 2.2.

TABLE 2.2

SUMMARY OF DIRECTIONAL SURVEYS
IN THE TURBINE RUN INTERVALS
(STATE 2-14)

DEPTH (Ft-RKB)	ANGLE (Deg.)	AZIMUTH	DOGLEG (Deg/1ØØ')
6Ø86	7.25	N83E	1.37
6121	6.25	N89E	3.16
6153	4.5Ø	S87E	5.54
6187	3.5Ø	S75E	5.33
6218	3.25	S54E	3.86
625Ø	3.ØØ	S18E	4.46
6324	4.5Ø	S31W	4.59
6387	4.5Ø	S39W	1.ØØ
6466	5.ØØ	S38W	Ø.14

All doglegs from surveys below 6466' are less than 1.Ø degree per 1ØØ' to 7734'.

DEPTH (Ft-RKB)	ANGLE (Deg.)	AZIMUTH	DOGLEG (Deg/1ØØ')
7754	5.25	S47E	1.ØØ
7785	4.5Ø	S38E	3.45
782Ø	2.3Ø	S38E	5.71
7849	2.25	SØ2W	5.13
788Ø	3.75	SØ5W	4.97
7932	4.75	S13W	2.23
7987	4.25	S23W	1.69
8Ø28	4.25	S4ØW	3.Ø6
8Ø55	4.75	S37W	2.Ø5

Doglegs below 8Ø55' to last survey depth at 9,4ØØ' were less than 1.5 degrees per 1ØØ'.

2.3.2 LOST CIRCULATION

Severe lost circulation was encountered below the 9 5/8" casing set at 6,000 feet. Normally the drilling fluid is pumped down the drill string, through the bit and the fluid returns up the drill string / wellbore annulus to the surface. When the fluid does not return to the surface, it is referred to as "loss of circulation" or "lost circulation". These losses may be "partial", which means some but not all the fluid returns to the surface, or "total" which means none of the fluid returns to the surface. This condition occurs because the pressure the formation can support is less than the pressure exerted by the borehole fluid column. Persistent total lost circulation (severe) also often implies that the formations are highly permeable, such as is the case with highly fractured formations. In geothermal drilling, these zones of severe lost circulation are normally the zones of production if the formation temperatures are sufficiently high.

It was planned to perform a flow test at a shallow production zone prior to setting the 13 3/8" casing string, however no significant lost circulation zones were encountered. A zone of minor lost circulation was encountered between 2,800 feet and 3,000 feet, but at the time the zone was penetrated, it was not considered to have a high enough temperature to test. The zone would have required setting the 13 3/8" casing higher than programmed, and could have presented problems while drilling to the next (9 5/8") casing point, and with adequate cementing of the 9 5/8" primary production string. It was anticipated that another production zone with a higher temperature would be penetrated at a slightly deeper depth. However, no other lost circulation zone was encountered down to a depth of 3,5ØØ feet where the 13 3/8" casing was set. This zone of partial lost circulation created no drilling problems in this section of the hole.

The first major lost circulation zone was encountered at about 6,12Ø feet. This was just below the 9 5/8" casing which was set at 6,ØØØ feet. Drilling continued to 6,227 feet without undo lost circulation problems and the first production test was conducted.

Lost circulation was almost a continual problem throughout the remainder of the drilling. A considerable amount of time was spent directly combating this problem. This problem indirectly hindered almost all other downhole operations. The direct amount of time spent handling the problem is discussed in <u>Section 3.Ø</u>. Indirect problems included: running the drill string slowly into the hole to reduce the "plunger" affect of the drill string, circulating at slow rates, inability to get logging tools down due to thick lost ciculation material in the hole, drilling without returns and not getting cutting samples, differential sticking of the drill string, damage to the core head due to lost circulation at the core head and supply of water and drilling fluid products.

Below about 9,ØØØ feet a problem unique to high temperature wells developed. Whenever pumping down the drill string ceased, the wellbore fluids would heat up and the well would tend to start flowing. This occurred because the borehole fluid density decreased with increased temperature which reduced the bore hole pressure below formation pressure. Operations often had to be interrupted to inject cooler fluid down hole to cool the well bore and increase the density of the borehole fluids to stop the well from flowing. The density of the fluids for drilling could not be increased because the lost circulation problem would be acerbated.

2.3.3 DOWNHOLE DRILLSTRING PROBLEMS

Downhole drill string problems were minor and resulted in consuming a very minor amount of time during operations. There were basically two problem areas: failure of downhole equipment and "differential sticking". A summary of these problems is given in Table 2.3.

There were only five occurrences of downhole equipment failure. These occurred above 6,112 feet. The only incidence of bit cones being lost occurred in the 17 1/2" hole with a re-tipped bit. The bit probably had undetectable damage prior to being run in the hole. The failure of the stabilizer blades is an unusual failure. It was discovered after the failure that the stabilizers being used were incorrectly manufactured. The two drill collar failures were caused by fatigue, a common problem in this type of hole (see discussion in Section 2.3.1). The bit was lost while turbine drilling occurred because the inner turbine shaft failed, which

TABLE 2.3

SUMMARY OF FISHING OPERATIONS

DEEP SALTON SEA SCIENTIFIC WELL

NO	DEPTH	DATE	CAUSE
1	3,078'	11/08/85	Lost two bit cones
2	4,710'	11/26/85	Lost four stabilizer blades
3	5,422'	12/05/85	Twist off drill collar while reaming
4	6,043'	12/18/85	Twist off drill collar while coring
5	6,112'	12/20/85	Lost bit while turbo drilling
6	9,249'	02/09/86	Differential sticking
7	9,450'	02/11/86	Junk sub - Recover bit inserts
8	9,473'	02/22/86	Differential sticking
9	9,517'	02/24/86	Differential sticking
10	10,212'	03/06/86	Differential sticking

was probably a fatigue failure. All these failures resulted in equipment lost in the hole which were readily solved using normal "fishing" methods.

A program of monitoring rotating hours on the drill string had been established at the beginning of the drilling. Inspections of the bottom hole assembly (drill collars and cross-over subs) were made at 200 rotating hours and inspections of the drill pipe were made after 300 rotating hours. The results of this program are obvious since only two drill string failures occurred although a hot corrosive environment existed in a crooked hole.

Differential sticking occurs because the pressure in the wellbore due to the drilling fluid density is greater than the formation pressure which causes a filter cake of drilling fluid particles to build on the wellbore wall along permeable formations. This pressure acts across the pipe area in contact with the filter cake. When the resulting force due to this differential pressure is great enough, the pipe can be become stuck. This usually occurs in deviated wellbores with thick filter cakes and high differential pressure from the wellbore to formation. These conditions existed in the lower section of the wellbore where differential sticking became a problem. The differential pressure was increasing with depth and the high temperature and permeable fracture zones were causing thick filter cakes in the deviated wellbore.

Sometimes the pipe was pulled free. This occurred frequently resulting in no added time or problems. However, on four occasions diesel was circulated across the differentially stuck drill string freeing the drill string. The diesel was allowed to sit in the drill pipe / hole annulus opposite the stuck region causing dehydration of the filter cake reducing the pressure and frictional forces on the pipe so that the pipe could be pulled free. These operations did add to the operational times.

3.Ø ANALYSES OF THE RIG TIME SPENT ON VARIOUS OPERATIONS

The evaluation of drilling operations usually involves breaking down the operations into categories and accumulating the amount of time spent in each category. These categories may be rotating on bottom, tripping, fishing, circulating, testing, etc. How these categories are set up depends on the nature of the evaluation and the nature of the project. This is done to compare how different drilling operations performed certain tasks and to evaluate how improvements can be made to increase the efficiency of the overall drilling project. These analyses have led to technology and operational improvements and reduced time for drilling of wells with the aim being a better well for lower costs.

Since this drilling project was designed for the acquisition of scientific data and it was the first major deep well drilled for that purpose, a similar type of time analyis was done. These results can be used to compare how future projects perform and to evaluate where improvements can be made to acquire more and better scientific data for the monies spent. This can also be used as a guide for the costing of similar projects since the costs for most drilling activities are time related.

The nature of this project led to five major operational categories: normal drilling, scientific, fishing, directional and lost circulation. The fishing, directional and lost circulation categories could have been combined into one category called problems. However, since directional control and lost circulation will be considerations for many deep scientific projects, it was considered appropriate to catergorize them separately.

The operational times were accumulated for three intervals of the well:

Interval 1 - Ø to 3,515'

Interval 2 - 3,515' to 6,Ø36'

Interval 3 - 6,Ø36' to 1Ø,564'

Interval 1 begins at day zero and goes through the time when drilling below the 13 3/8" casing commences (this is called "drilling out of the 13 3/8 inch casing"). Interval 2 begins at the end of Interval 1 and goes through the drilling out of the 9 5/8" casing. Interval 3 begins at the end of Interval 2 and goes through the final test evaluation logging. The analysis begins at the start of drilling activities on October 24, 1985 and ends after the final flow test logging on March 22, 1986. However, the rig remained operational until the end of March to support logging operations for additional scientific information. This period involves 15Ø project days. This period vs. depth is shown in Figure 3.1.

Table 3.1 is a summary of the amount of time spent performing the various operations and provides a breakdown of the time spent for each specific activity in each operation. It should be noted that the data in the table are in one-half hour increments. Section 3.2 describes the categories, definitions, abbreviations

SUMMARY OF VARIOUS OPERATIONS
DEEP SALTON SEA SCIENTIFIC WELL

TABLE 3.1

INTERVAL 1: 0' TO 3515'
DAY 0 THROUGH DAY 25

OPERATIONS	ACTIVITIES IN 1/2 HOURS																		TOTALS	
	RIH	POH	DRL	REM	BHA	SVY	LOG	CSG	RUC	RUL	RUT	CMT	WOC	WOE	RIG	RRG	CIR	STB	1/2 HRS.	DAYS
NORMAL	16	19	218	55	38	16	4	36	6	1	197	37	8	0	19	2	22	0	694	14.46
FISHING	13	17	17	6	20	0	0	0	0	0	0	0	0	28	3	0	2	0	106	2.21
LOST CIRC.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
SCIENTIFIC	36	38	44	15	36	0	182	0	0	17	2	0	0	0	7	0	23	0	400	8.33
DIRECTIONAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTALS >	65	74	279	76	94	16	186	36	6	18	199	37	8	28	29	2	47	0	1200	25.00

INTERVAL 2: 3,515' TO 6,035'
DAY 26 THROUGH DAY 55

OPERATIONS	ACTIVITIES IN 1/2 HOURS																		TOTALS	
	RIH	POH	DRL	REM	BHA	SVY	LOG	CSG	RUC	RUL	RUT	CMT	WOC	WOE	RIG	RRG	CIR	STB	1/2 HRS.	DAYS
NORMAL	47	19	315	21	28	29	0	35	8	0	56	26	10	0	47	7	28	0	676	14.08
FISHING	21	29	27	0	25	0	0	0	0	0	0	0	0	9	0	0	6	0	117	2.44
LOST CIRC.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
SCIENTIFIC	90	91	91	30	68	0	201	5	0	10	5	0	0	0	4	0	52	0	647	13.48
DIRECTIONAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00
TOTALS >	158	139	433	51	121	29	201	40	8	10	61	26	10	9	51	7	86	0	1440	30.00

INTERVAL 3: 6,036' TO 10,564'
DAY 56 THROUGH DAY 150

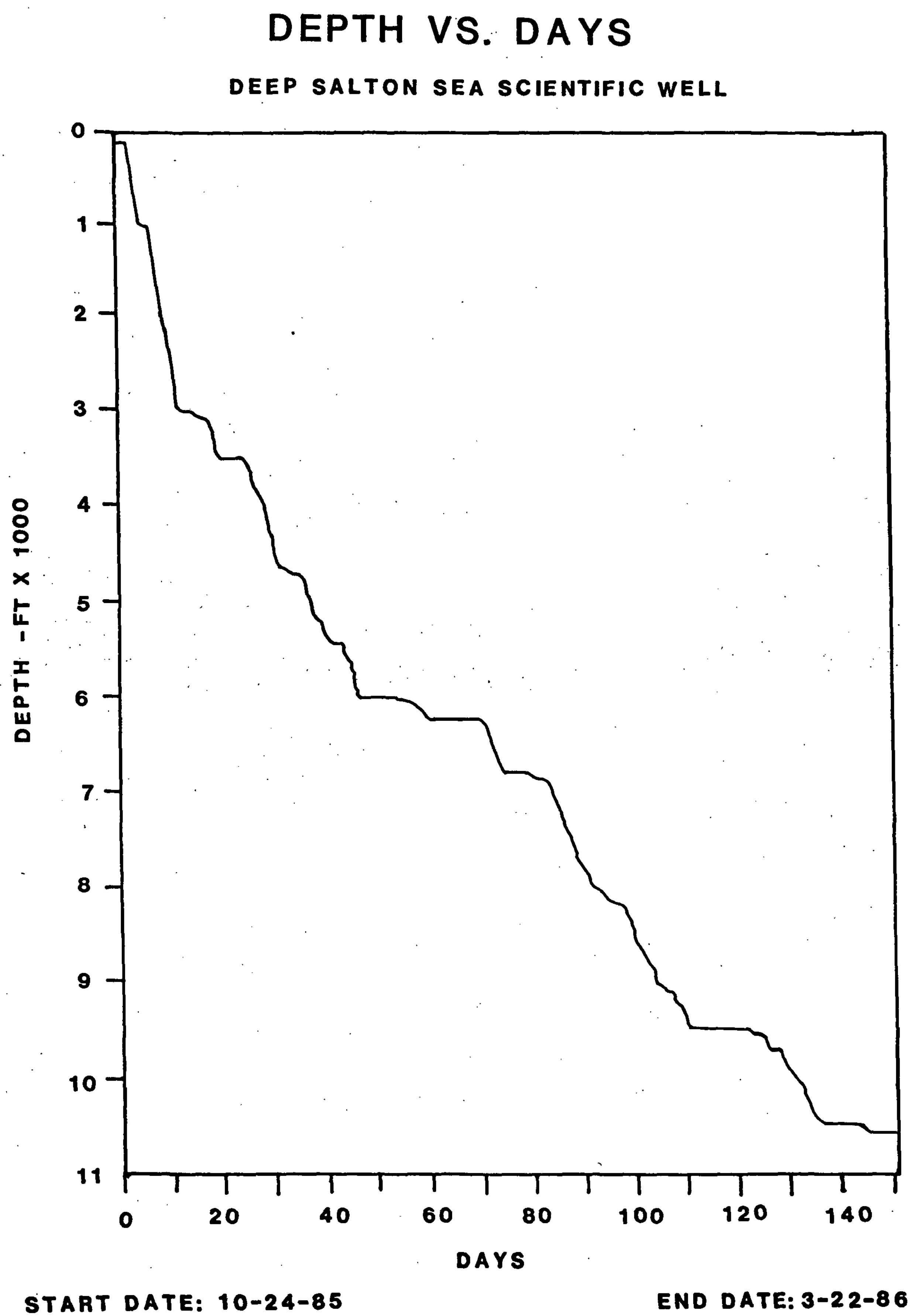
OPERATIONS	ACTIVITIES IN 1/2 HOURS																		TOTALS	
	RIH	POH	DRL	REM	BHA	SVY	LOG	CSG	RUC	RUL	RUT	CMT	WOC	WOE	RIG	RRG	CIR	STB	1/2 HRS.	DAYS
NORMAL	105	56	503	36	21	42	17	24	8	7	64	1	0	12	160	28	102	348	1534	31.96
FISHING	6	13	1	0	7	0	0	0	0	0	0	0	0	5	25	0	39	0	96	2.00
LOST CIRC.	167	185	80	59	53	0	45	0	0	8	0	84	190	0	66	1	215	0	1153	24.02
SCIENTIFIC	220	252	113	34	152	0	149	204	0	16	114	0	0	8	0	0	86	0	1348	28.08
DIRECTIONAL	68	90	134	28	50	40	0	0	0	0	0	0	0	0	0	2	17	0	429	8.94
TOTALS >	566	596	831	157	283	82	211	228	8	31	178	85	190	25	251	31	459	348	4560	95.00

TOTALS FOR DSSSDP WELL

OPERATIONS	ACTIVITIES IN 1/2 HOURS																		TOTALS	
	RIH	POH	DRL	REM	BHA	SVY	LOG	CSG	RUC	RUL	RUT	CMT	WOC	WOE	RIG	RRG	CIR	STB	1/2 HRS.	DAYS
NORMAL	168	94	1036	112	87	87	21	95	22	8	317	64	18	12	226	37	152	348	2904	60.50
FISHING	40	59	45	6	52	0	0	0	0	0	0	0	0	42	28	0	47	0	319	6.64
LOST CIRC.	167	185	80	59	53	0	45	0	0	8	0	84	190	0	66	1	215	0	1153	24.02
SCIENTIFIC	346	381	248	79	256	0	532	209	0	43	121	0	0	8	11	0	161	0	2395	49.90
DIRECTIONAL	68	90	134	28	50	40	0	0	0	0	0	0	0	0	0	2	17	0	429	8.94
TOTALS >	789	809	1543	284	498	127	598	304	22	59	438	148	208	62	331	40	592	348	7200	150.00

NOTES :
1. See Section 3.2 for the description of the activities.
2. For the SCIENTIFIC operations testing time is under the "CSG" activity.

FIGURE 3.1



DEPTH VS. DAYS
DEEP SALTON SEA SCIENTIFIC WELL
DEPTH -FT X 1000
0
1
2
3
4
5
6
7
8
9
10
11
0
20
40
60
80
100
120
140
DAYS
START DATE: 10-24-85
END DATE: 3-22-86

and methodology used to develop this table. Appendix A contains the actual data used in the analyses. That data was extracted from the tour sheets.

Figure 3.2 is a bar graph showing the percentages of time spent on the various operations. About one-third of the rig time was spent in scientific work during Intervals 1 and 3. In the middle interval about 40 percent of the time was spent on scientific endeavors. Thus, it is apparent that considerable amount of the total effort was devoted to meeting the scientific data requirements of the project.

The variations in the percent of time spent on the major activities in the three intervals were dictated by the hole conditions and the scientific objectives of the project. A discussion of those conditions and the activities undertaken to meet the scientific objectives in each interval follows. Section 3.1 presents a summary of the operations for the entire time period analyzed.

INTERVAL 1: Operations proceeded rather smoothly in this interval. The well was drilled to 3,515 feet and the first three strings of casing were run and cemented - the 30" conductor pipe to 150 feet, the 20" surface casing to 1032 feet and the 13 3/8" protective casing to 3,515 feet. Time consuming problems were minimal with only one minor fishing job for bit cones. Lost circulation was not a problem although partial losses did occur

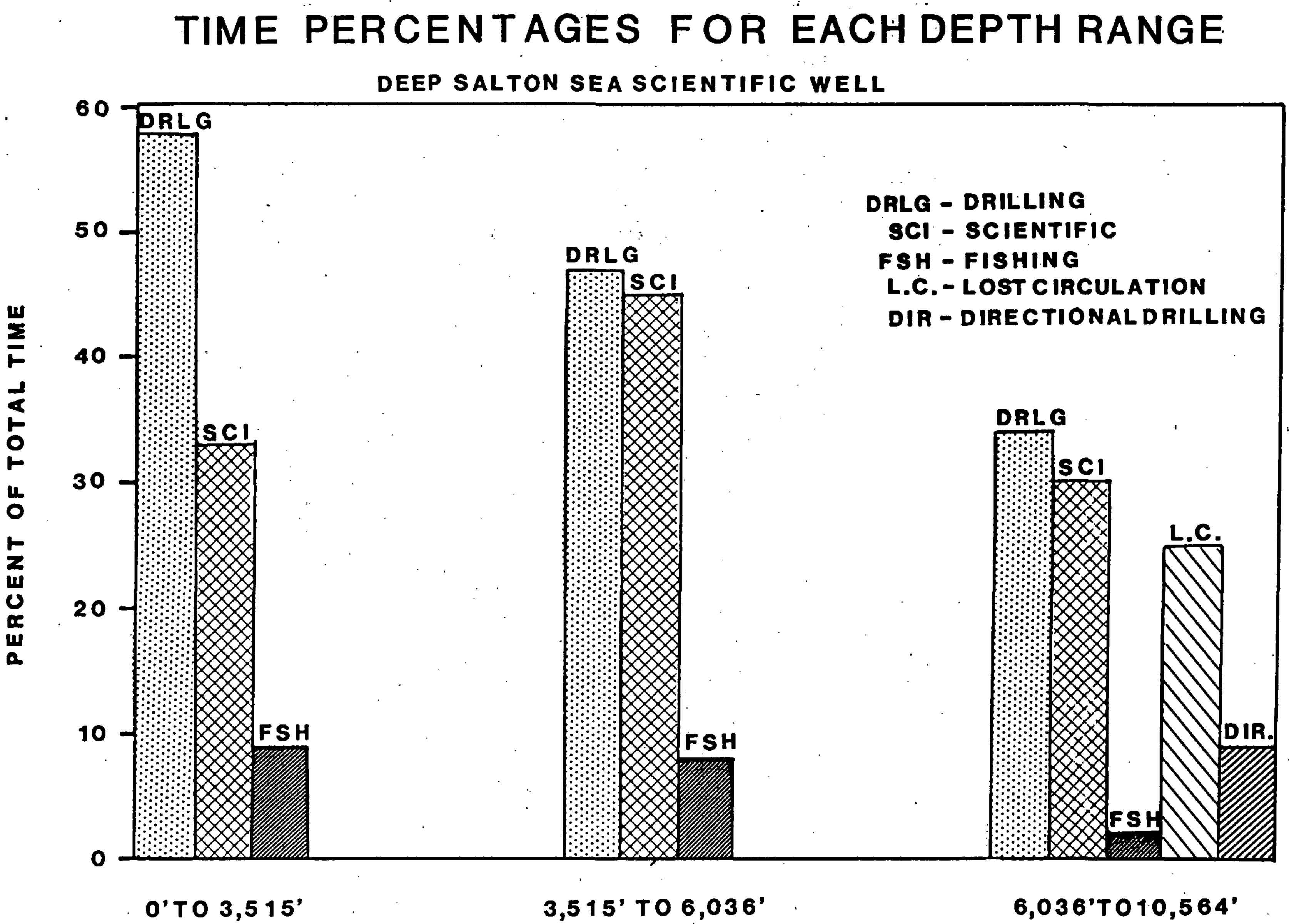

TIME PERCENTAGES FOR EACH DEPTH RANGE
DEEP SALTON SEA SCIENTIFIC WELL
PERCENT OF TOTAL TIME
0
10
20
30
40
50
60
DRLG - DRILLING
SCI - SCIENTIFIC
FSH - FISHING
L.C. - LOST CIRCULATION
DIR - DIRECTIONAL DRILLING
DRLG
SCI
FSH
L.C.
DIR.
0' TO 3,515'
3,515' TO 6,036'
6,036' TO 10,564'

FIGURE 3.2

between 2,800 feet and 3,000 feet. It had been anticipated that a high pressure carbon dioxide zone would be encountered above 1,000 feet. This influenced the setting depth of the 20" casing. However, only insignificant amounts of carbon dioxide were detected in the drilling fluid returns.

Two time consuming scientific data collection activities in this interval involved downhole evaluation using wireline logging and coring operations. Time spent on scientific operations consumed 33 percent of the total time.

A slightly greater amount of time was spent wireline logging in this interval than anticipated because the setting depth of the 13 3/8" casing was changed and because of the uncertainty about the temperature profile of the well. The 13 3/8" casing was programmed to be set at 3,000 feet. However, after reaching 3,000 feet, it was decided by the on-site operational committee to change the setting depth to 3,500 feet (see discussion in Section 2.3.2). The loggers were prepared to log when drilling reached 3,000 feet and they wanted to run their tools for testing and calibration at this shallower depth where the temperatures were not too severe. Thus, both the commercial and the USGS loggers carried out the planned logging program. After reaching 3,515 feet, the commercial loggers logged the additional 515 feet to tie-in with the logs run at 3,000 feet. The USGS ran the continuous temperature surveys at 3,515 feet.

Nine temperature wireline surveys were run in this interval to define the geothermal temperature. Drilling fluid return temperature (which is not a reliable indicator of downhole temperature) did seem to indicate unusually low downhole temperature as compared to the temperature at these depths in other wells in the area.

Six cores were successfully cut in this interval totaling approximately 228 feet.

Normal operations consumed 58 percent of the time. The majority of the time was spent drilling and rigging up surface equipment activities. Only 9 percent of the time was spent on fishing operations. Breakdown of the major activities is shown in Figure 3.3.

INTERVAL 2: Again operations in this interval proceeded rather smoothly. The well was drilled from 3,515 feet to 6,000 feet, the 9 5/8" casing run and cemented and the casing drilled out. The depth at the end of this interval was 6,036 feet. Hole problems were minimal with only two short fishing operations (see Table 2.3). However, a serious problem with the hole deviation was developing that led to major directional drilling operations in the next interval (see Section 2.3.1). A flow test had been planned at the first potential production zone below the 13 3/8" casing at 3,515 feet. However, no potential production zones were encountered prior to reaching 6,000 feet.

OPERATIONS - 0 TO 3,515 FT.

DEEP SALTON SEA SCIENTIFIC WELL

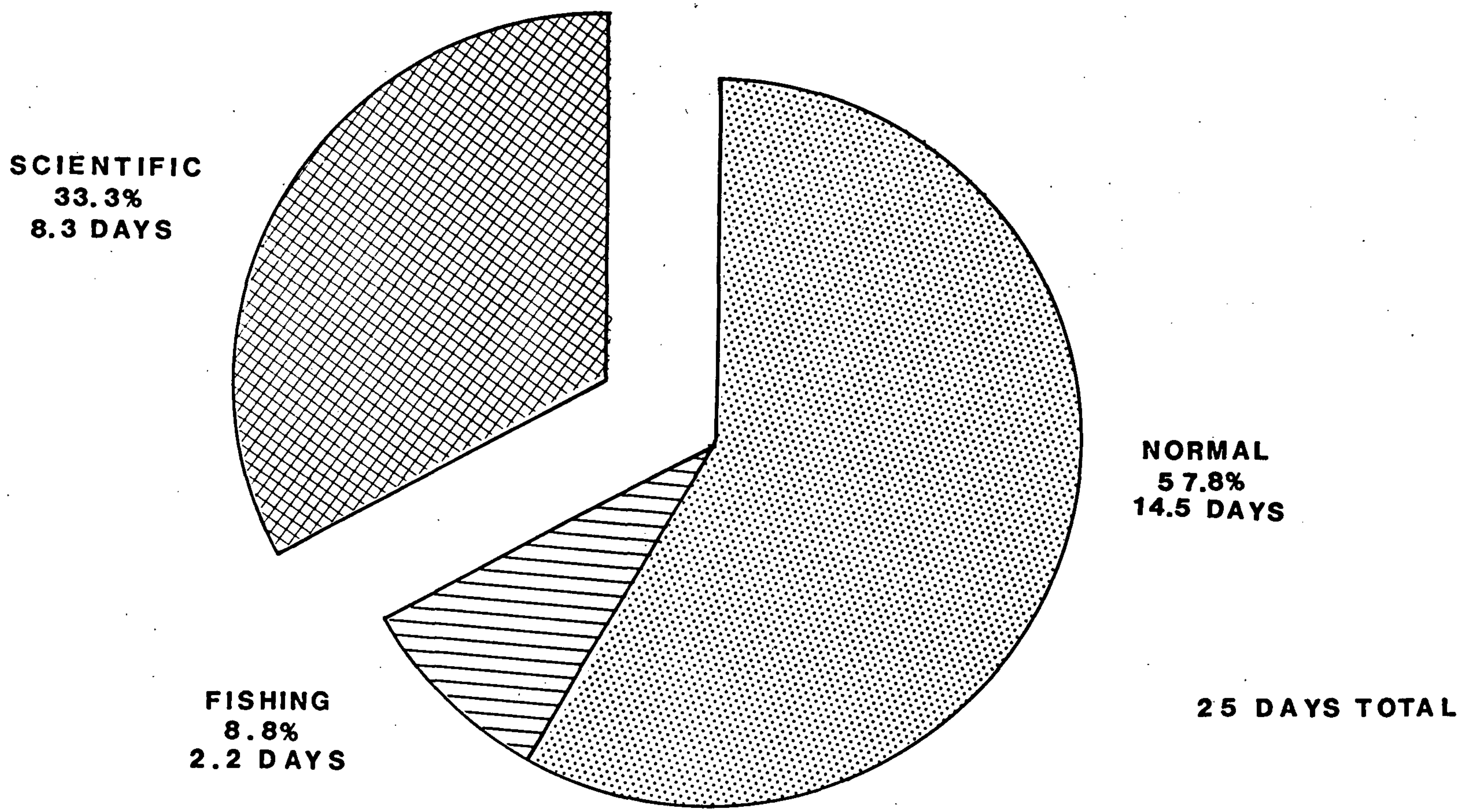


FIGURE 3.3

The primary indicator of a producing zone is lost circulation (see Section 2.3.2). However, production zones have been penetrated in nearby wells without significant lost circulation. Several temperature logs were run to see if any zone(s) were taking drilling fluid (precise drilling fluid inventory is difficult to maintain on a drilling rig and some minor losses to the formations were possible). The temperature logs did not indicate any potential production zones. However, there was still some possibility that a permeable zone may exist that could possibly produce some fluid and there was a strong desire to obtain a pristine fluid sample within this depth interval. Thus, to insure that a potential production zone had not been encountered two injection tests were run.

INJECTION TESTS

DATE	DEPTH	VOL.INJ.	INJ.PRESS.	RATE
11/27/85	4707'	200 BBLS	800 PSI	6.0 BPM
12/04/85	5422'	1000 BBLS	1500 PSI	17.5 BPM

It was concluded from the high injection pressures in these tests that no zones existed which could produce enough fluid to meet the testing objectives of obtaining a pristine fluid sample and satisfying the leaseholder that the well was a potential geothermal production well. A continuous temperature log run after the second test indicated that the fluid was mostly injected into zones near the bottom of the hole confirming that a potential production zone was not apparent. Both tests were conducted by displacing the drilling mud out of the wellbore with 2 percent KCL water and injecting 2 percent KCL water. This treated water was used so as not to "damage" a potential production zone with incompatible fluid. The time spent on these tests totalled only 22 hours and were considered to be part of the scientific activities.

Thirty days were spent in this interval. Thirteen and one-half days were spent on scientific activities, fourteen days were spent on normal operations and the other two and one-half days were spent on fishing. Figure 3.4 shows the percent of time spent on the major operations in this interval.

About two-thirds of the scientific effort in this section of the hole were directed toward coring. Eight cores were cut in this interval totaling 292.1 feet. About one-third of the scientific time was spent on logging with most of the logging effort being geophysical logs after the hole had reached 6,000 feet where the 9 5/8" casing was set.

INTERVAL 3: Operations were complicated in this interval because of the need to re-direct the wellbore and the persistent problems of lost circulation. In addition, two flow tests were conducted. This interval begins at 6,036 feet, after the drilling out of the 9 5/8" casing set at 6,000 feet, and ends with the downhole pressure and temperature surveys after the second and final flow test. The well had been drilled to 10,564 feet. This

OPERATIONS – 3,515 FT TO 6,036 FT

DEEP SALTON SEA SCIENTIFIC WELL

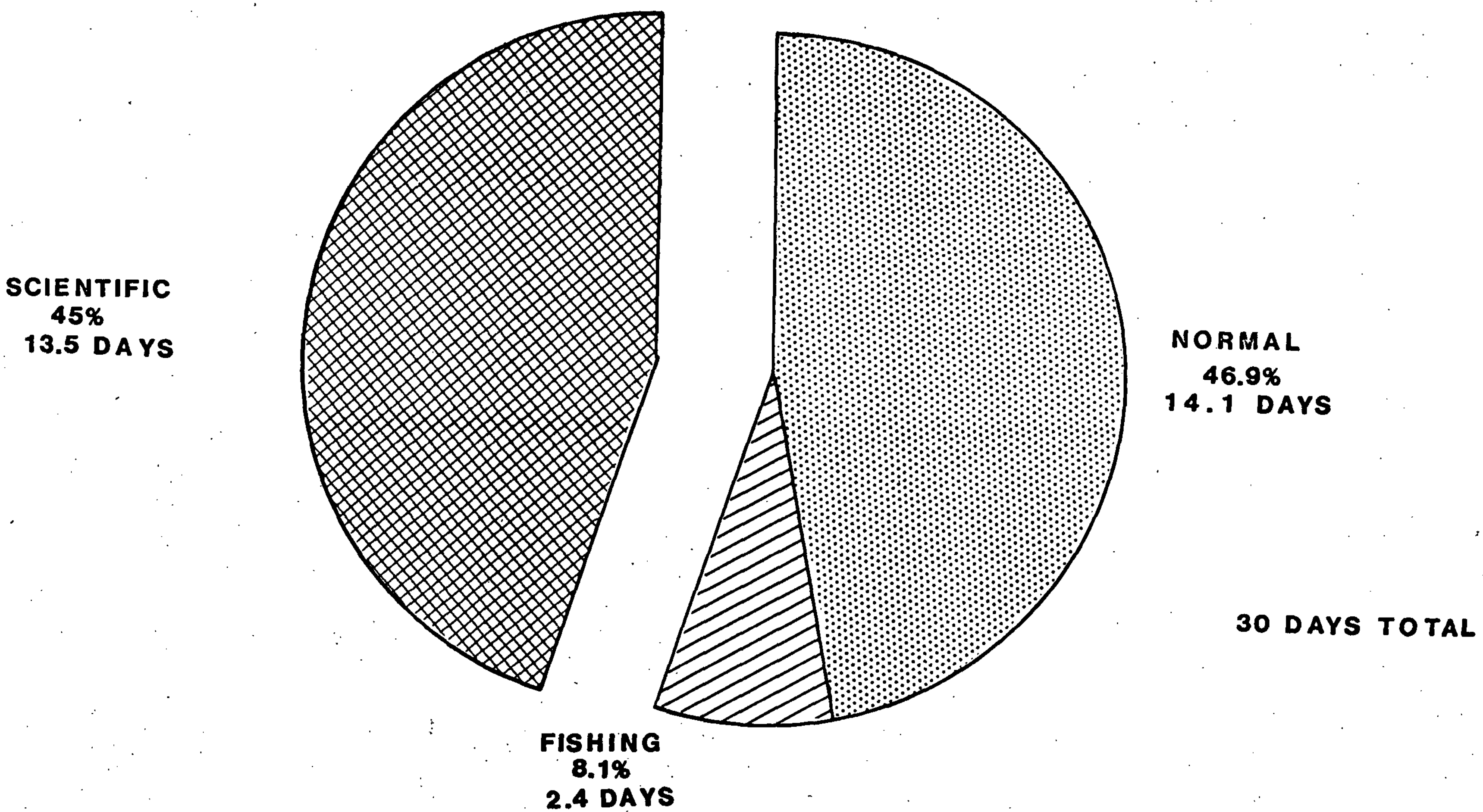


FIGURE 3.4

interval took a total of 95 days out of the 150 days in this time study or about 63 percent of the total time spent on the well.

The three major problem areas, fishing, deviation control and lost circulation accounted for almost one third of the time spent in this interval (see Figure 3.5). Fishing operations, primarily due to differential sticking, accounted for only 6.6 days which was only 2.1 percent of the time. The two series of deviation control operations took almost 9 days (see Section 2.3.1) which was 9.3 percent of the total time in this interval. Direct time spent controlling lost circulation took 24 days which was 25.6 percent of the time. In addition, several sections of hole were drilled without returns which resulted in no cuttings samples being obtained. These intervals taken from the mudlog report are shown in Table 3.2.

It should be noted that in some intervals drilled without returns, cores were cut. This caused excessive core head wear as discussed in Section 4.0.

The downhole scientific returns continued to diminish with increasing depth because of increasing problems with lost circulation and differential sticking. There were 20 successful coring runs in the interval which resulted in 202.3 feet of core. There were some unsuccessful runs where core equipment was run but no core cut. On two occasions the drill string got stuck on the way in the hole with the core barrel. One core run was

OPERATIONS– 6,036 FT TO 10,564 FT

DEEP SALTON SEA SCIENTIFIC WELL

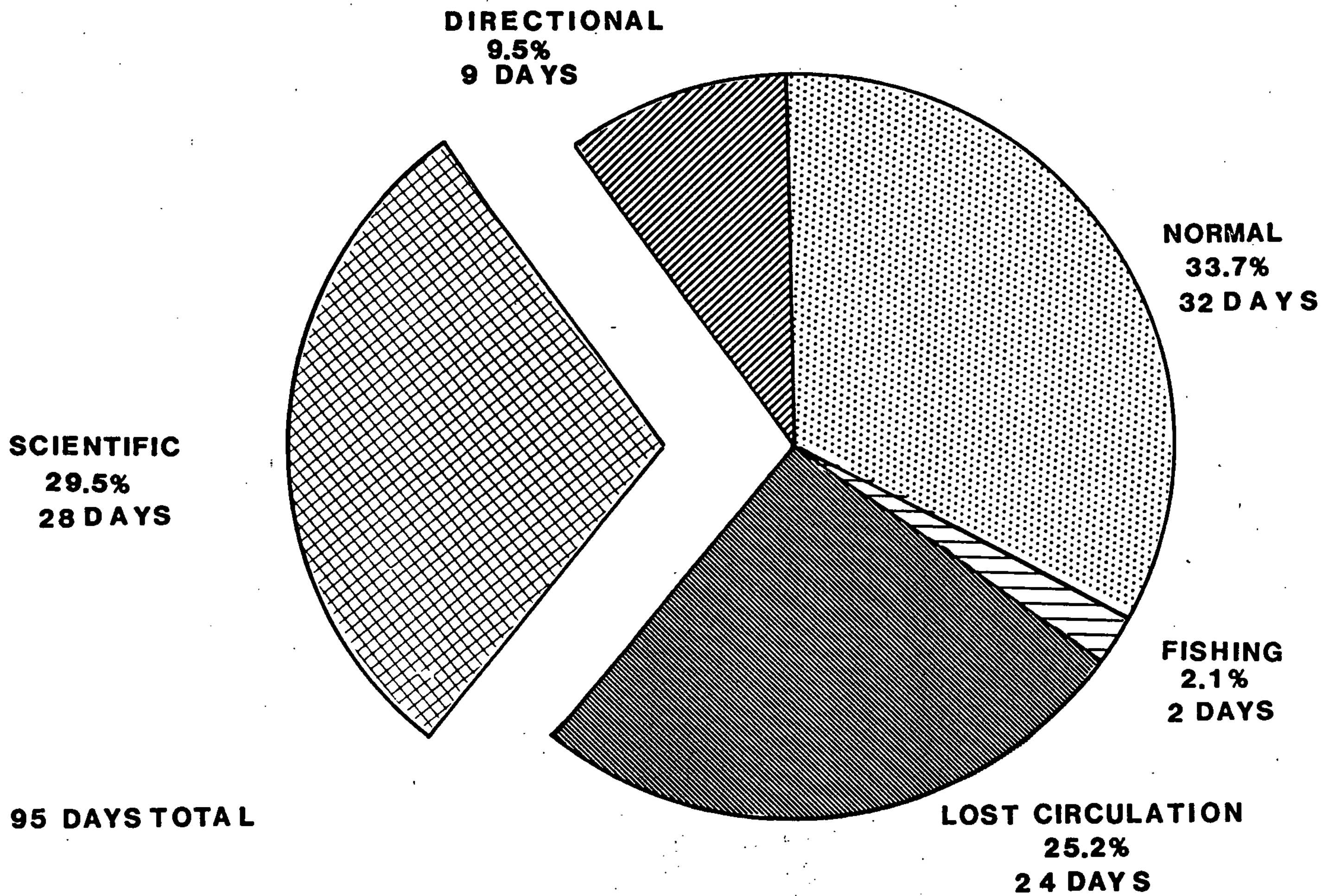


FIGURE 3.5

TABLE 3.2

SUMMARY OF INTERVALS DRILLED WITHOUT CUTTINGS RETURNS

DEEP SALTON SEA SCIENTIFIC WELL

DEPTH		INTERVAL	
From	To	Footage	Notes
6,620'	6,880'	260'	N/A
8,095'	8,163'	68'	Cored 8133-8160 - 100% recovery
8,585'	8,800'	215'	Cored 8585-8604 - 77% recovery
8,948'	9,027'	79'	Cored 9004-9027 - 22% recovery
10,460'	10,564'	104'	6 1/8" hole below 7" liner

aborted because of lost circulation. The last core was obtained from 9,912 feet. There was a strong desire to cut more cores. However, coring operations were discontinued primarily because of the increasing mechanical risk that the lower section of the hole may be lost if the drillstring became stuck while coring. This would have precluded a flow test of the lower section of the wellbore which was a major scientific objective. Also, coring was increasingly expensive because of the hole problems, and budgetary control became important towards the latter stages of the project.

Two flow tests were conducted in this interval, the first after drilling to 6,227 feet and the second after reaching 10,564 feet total depth. Direct time testing (rigging up, flowing, injecting and rigging down) took 6.6 days.

Extensive geophysical logging operations were undertaken at 10,475 feet which was the bottom of the 8 1/2" hole and at total depth.

The time for normal operations involved primarily drilling and two periods of standby during which the rig was inactive. Normal operations accounted for 32 days which was 33.3 percent of the time in this interval.

3.1 OPERATIONS FOR THE ENTIRE WELL

A composite of activities of the operations for the entire well are pictorially shown in Figure 3.6 from the data in Table 3.1. The scientific work took about one-third of the time on the well. That means about 50 days of the 150 days was dedicated to scientific work. Problems - directional, fishing and lost circulation - comprised about 26 percent of the time and normal drilling operations took about 40 percent of the time. A summary of fishing operations is contained in Table 2.3.

OPERATIONS FOR ENTIRE WELL

DEEP SALTON SEA SCIENTIFIC WELL

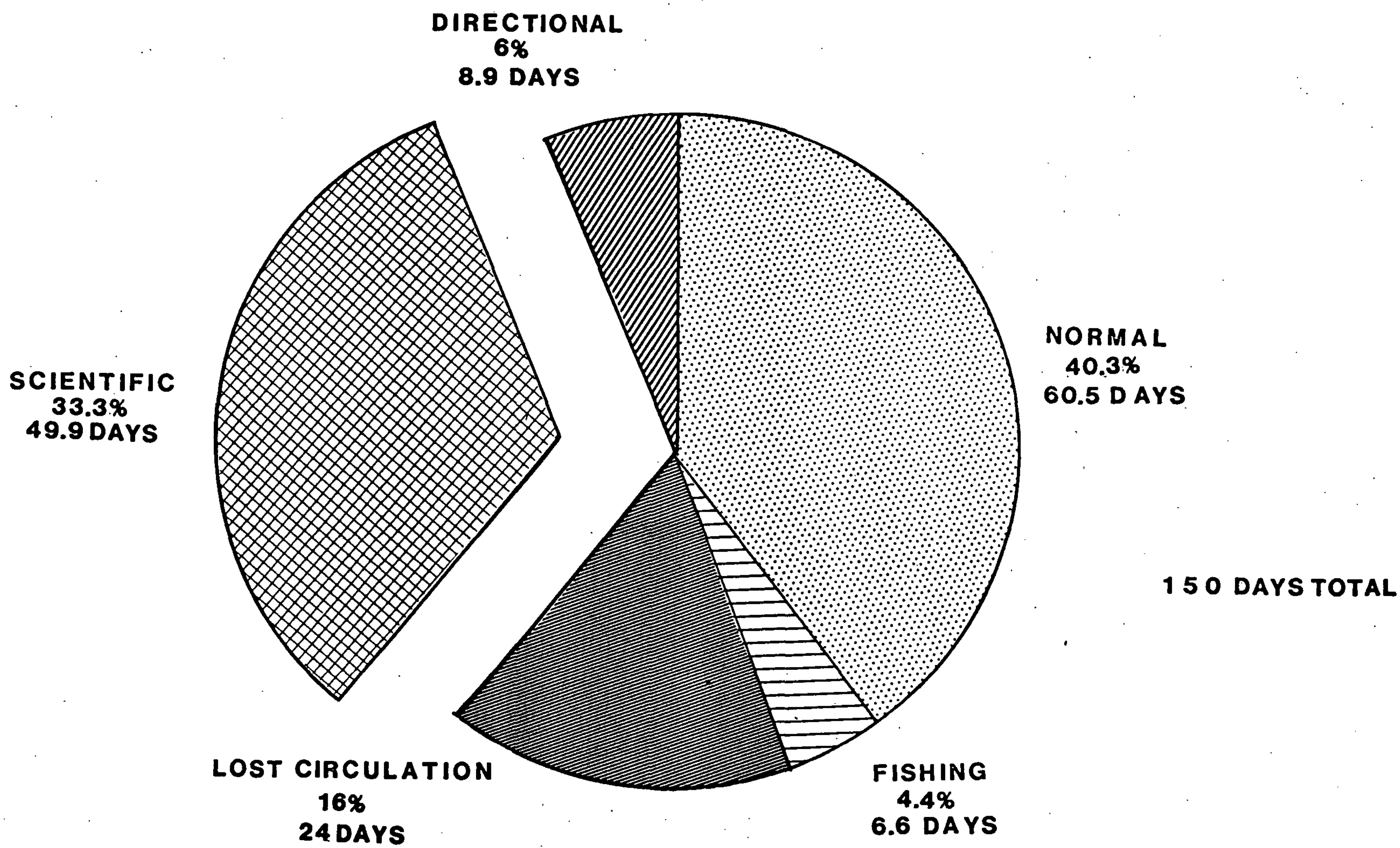


FIGURE 3.6

To evaluate the activities of the scientific operations, groupings of activities were made as shown in the upper section of Table 3.3. The results of these groupings are shown in Figure 3.7. Tripping took the major portion of time. Tripping is heavily attributed to the scientific effort because of the manner in which the tripping activities were allocated. When any operation was interrupted to conduct scientific data collection, all operational time from the interruption until operations were resumed was attributed to scientific operations. For example, when normal drilling stopped for a core run, scientific operational time included: circulating, the trip out of the hole with the drill string, changing the bottom hole assembly, the trip in the hole with the core equipment, coring and circulating, the trip out of the hole with the core equipment,changing the bottom hole assembly, the trip in the hole, any circulating and reaming of the cored interval.

TABLE 3.3

OPERATIONS FOR ENTIRE WELL

DEEP SALTON SEA SCIENTIFIC WELL

Operations for Entire Well (Scientific)

Category	Operations	Percent Time
Tripping	RIH, POH, BHA	41
Logging	LOG, RUL	24
Testing	TST, RUT	14
Coring	DRL	10
Other	RIG, CIR, WOE, REM	11

Operations for Entire Well (Normal Drilling)
(Without Standby)

Category	Operations	Percent Time
Tripping	RIH, POH, BHA	13
Casing	RUC, CMT, WOC, CSG	7
Log	LOG, SVY, RUL	5
Drilling	DRL	41
Reaming, Circulating	REM, CIR	10
Other	RIG, RRG, WOE, RUT	23

SCIENCE OPERATIONS FOR ENTIRE WELL

DEEP SALTON SEA SCIENTIFIC WELL

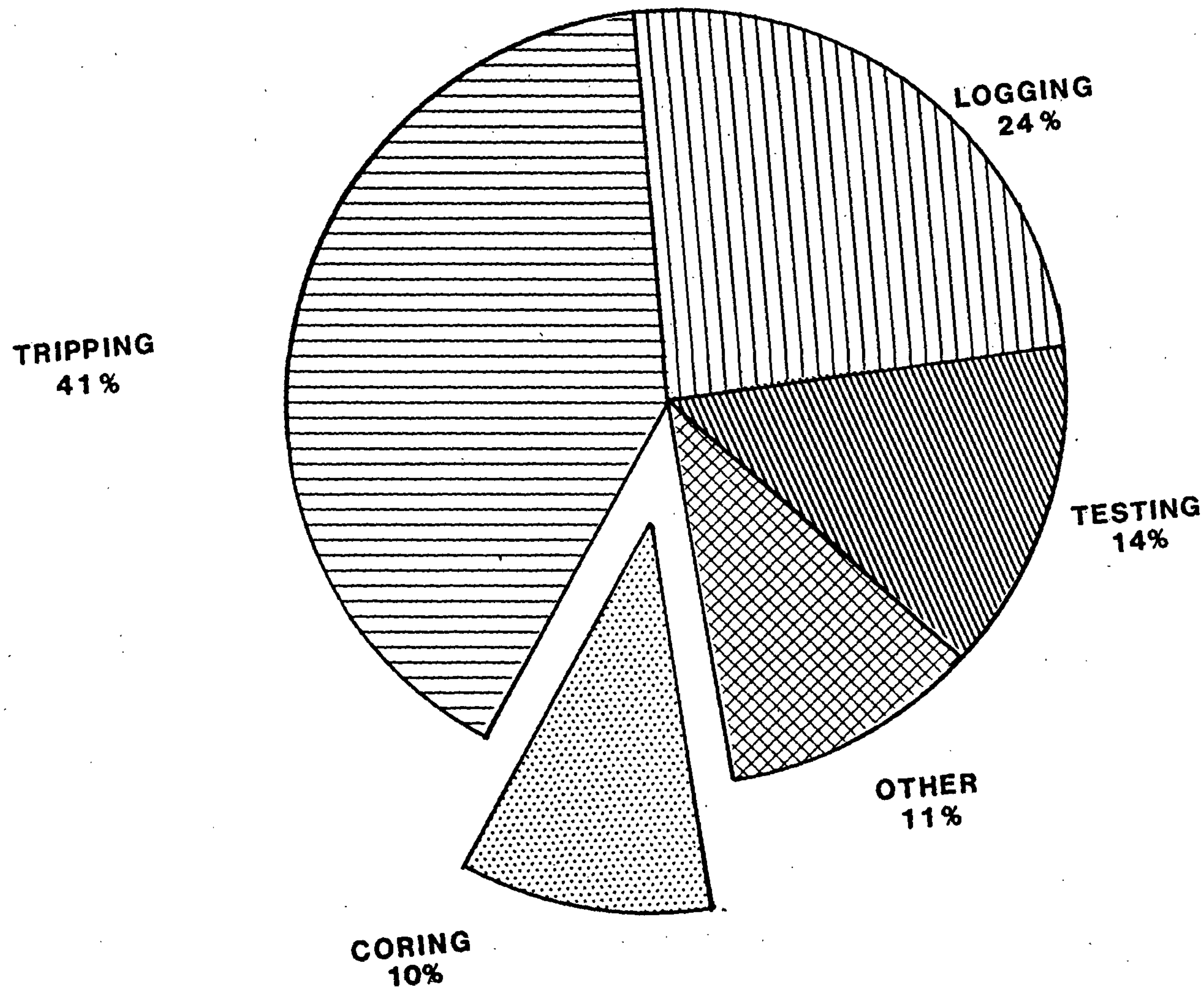


FIGURE 3.7

The percent of time spent coring is based on the actual rotating time on bottom with the core barrel. This time for coring was taken from the tour reports, and reflected 124 hours of rotating. The core driller's report is slightly different and reflected 120.6 hours of rotating. The more accurate rotating time is probably reflected in the core driller's reports.

Total downhole wireline logging evaluations which include geophysical, temperature, pressure and others because of the scientific nature of the well, took about 24 percent of the time required for scientific activities. Normally, wireline logging takes a very small percent of the total time on a well.

A composite of the normal drilling activities for the entire well was created in a manner similar to that for the scientific activities. The data were grouped as shown in the lower section of Table 3.3. The results of these groupings are shown in Figure 3.8.

DRILLING OPERATIONS FOR ENTIRE WELL

DEEP SALTON SEA SCIENTIFIC WELL

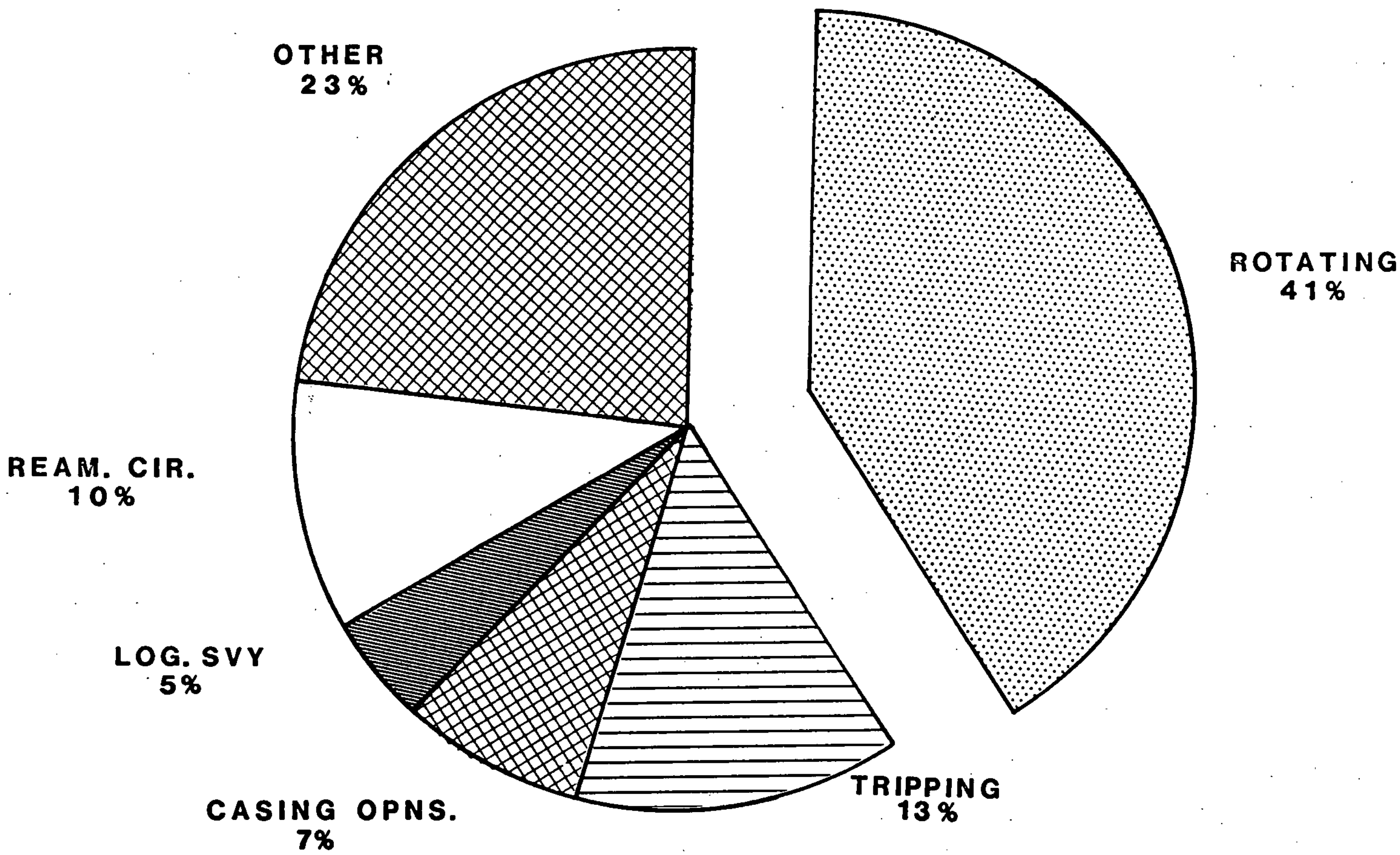


FIGURE 3.8

The majority time for normal drilling operations involved rotating the bit. The order of magnitude of the rotating time may be slightly higher than other wells. This was caused by the directional control problems discussed in Section 2.3.1. The low bit weight used to control the hole angle resulted in less than optimum bit weight for maximum penetration rate.

For this type of well (i.e. an Imperial Valley well with severe lost circulation, deviation control problems and hard drilling) tripping during normal operations would have represented a larger percent of time, probably about 25 percent. However, because of the method for allocating time discussed above, tripping time was primarily allocated to the scientific operations.

Note that the bit records show a total of 768 hours total rotating time and the total rotating time arrived at in this analysis was 772.5 hours which is in very close agreement.

3.2 METHOD FOR ANALYZES OF VARIOUS OPERATIONAL TIMES

Each half hour for operations is categorized by a four letter descriptor. The first letter describes one of the five major operational activities which are categorized as:

1. Normal Drilling,
2. Fishing,
3. Lost Circulation,
4. Scientific, and
5. Directional.

Operations are often difficult to directly place in each of these categories. Some general rules were used to categorize the various operations.

1. Normal drilling - included all operations which would be undertaken if problems or scientific operations were not to be undertaken.
2. Fishing - included all time attributable to removing lost or stuck equipment from the hole. These included times for tripping or deciding that fishing was to take place. The major fishing operations were lost bit cones, broken stabilizer blades, differential sticking and failures of the drill string.
3. Lost circulation - includes time spent directly attributable to battling lost circulation. This includes time spent mixing special lost circulation material (either cements or drilling fluid products), pumping the materials and re-building the drilling fluid system after severe losses. This time does not include the time indirectly attributable to lost circulation control. For example, added time for slow tripping (see Section 2.3.2).
4. Scientific Operations - includes all time from the cessation of an operation to undertake scientific work until another operation begins.
5. Directional - includes only the time to perform all activities necessary to re-direct the hole. Operational times for directional activities, such as surveys or

changing of stabilization, which are necessary for normal drilling are included in the normal drilling category.

The last three letters of the four letter descriptors describe the activities within each of the five major operations. There were 18 various activities. These are:

1. RIH - Tripping (Running) the drill string into the hole includes picking up single drill string joints or running 3-joint stands from the derrick.
2. POH - Tripping (Pulling) the drill string out of the hole. Includes trips for both pulling and laying down each joint or standing back in triples in the derrick.
3. DRL - Actual time rotating. For normal drilling operations this includes all rotating except reaming. In scientific operations this is the time spent rotating the corehead.
4. REM - Time spent reaming.
5. BHA - Time spent picking up, breaking down and making up bottom hole assembly equipment such as drill collars, bits, stabilizers, reamers, downhole motors and cross overs.
6. SVY - Time spent making directional or hole angle surveys.
7. LOG - Time spent logging downhole with either electric line or slickline.
8. CSG / TST - All time spent picking up and running casing. Under the scientific category this is the time

spent for testing or reinjecting.

9. RUC - Time spent rigging up and rigging down for casing operations.
10. RUL - Time spent rigging up and rigging down for logging operations.
11. RUT - Time spent rigging up or rigging down surface equipment such as blowout preventor equipment, wellhead equipment or flow equipment.
12. CMT - Time spent in cementing. Includes circulating to cool with the casing in the hole. Under lost circulation this also includes the time spent mixing and spotting LCM (Lost Circulation Material) plugs.
13. WOC - Time spent waiting on cement after casing or waiting on cement and/or lost circulation material (LCM) after spotting cement or LCM plugs for lost circulation control.
14. WOE - Time spent waiting on equipment with no other major activity going on.
15. RIG - Time spent on non-productive operations such as mixing mud, inspecting the drill string, work stuck drillpipe, etc.
16. RRG - Contractor rig repair time.
17. CIR - Time spent circulating.
18. STB - Rig standby (only for Normal Drilling).

Since no casing operations were conducted under the scientific category, the CSG activity is used for the time attributable to scientific testing by the descriptor STST.

4.Ø CORING OPERATIONS

The coring operation activities consumed a major portion of the time and the funds available for the project. Intermittent interval coring of a production size geothermal wellbore diameter was undertaken for many reasons. One of the primary reasons for the large wellbore was to satisfy the production testing requirements. In addition, continuous coring methods were as yet unproven in this type of complex geologic environment; i.e. anticipated high temperature regime and in formations containing highly corrosive geothermal fluids. Limited conventional coring had been successfully employed in nearby areas at relatively shallower depths.

No attempt has been made to correlate the coring and rock properties in the well. The general geologic characteristics of the cored zones are described here. Later, after a more complete determination of the petrophysical properties of the formations has been done, a more thorough analysis of the coring can be done.

This coring in full size well bores has demonstrated that coring under the conditions which exist in geothermal formations are technically feasible but are extremely difficult, time consuming, costly and can become mechanically risky based on hole conditions. The coring techniques applied in this project used the best available technology from the petroleum industry and some newly improved developments. Efforts to improve recovery and efficiency were made by varying coring methods by changing: (a) core head types and sizes, (b) barrel types and catcher types, (c) rotary speeds, (d) weight on core head and (e) circulation rates. The success of these efforts varied. Primary problems limiting the coring operations were core "jamming" in the barrel and in the catcher and slow penetration rates.

The interval coring method created conditions affecting both the success of coring and the normal drilling operations. These conditions are a result of variations in hole diameter made by the drill bit and the core heads. These conditions and the resulting problems are discussed in Section 4.4.

Complete listings of the conventional cores taken in the well are contained in Table 4.1. Two unconventional cores are recorded by the scientists on the SSSDP. These cores were taken while fishing with core "baskets".

4.1 CORING RESULTS WITH DEPTH

The footage of core recovered for each core barrel run is shown in Figures 4.1 and 4.2. In the upper section of the wellbore the cores filled the length of the core barrel which was run. However, as the formations became harder, more fractured and hole problems increased due to lost circulation and directional control, the amount of core recovered per barrel run dramatically decreased. Attempts to improve this recovery by changing conventional coring equipment as described below had only limited success.

TABLE 4.1

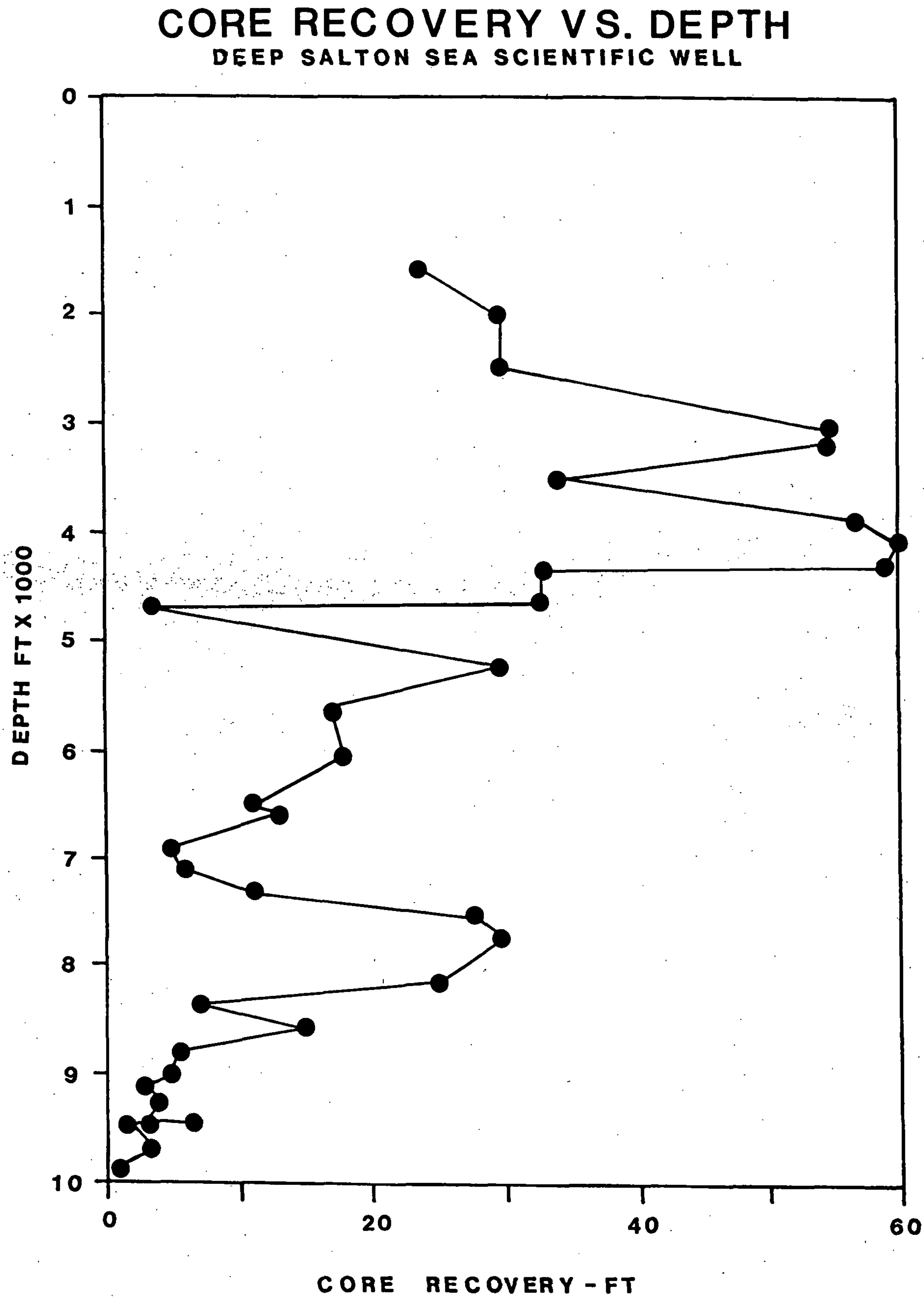
SUMMARY OF CORING OPERATIONS IN THE SALTON SEA SCIENTIFIC DRILLING PROJECT

CORE NO.	DEPTH OUT (FT.)	HOLE DIA. (IN.)	EST. TEMP. (F)	HOLE ANGLE (DEG)	COR HD DIA (IN.)	HEAD TYPE -NO.	WEIGHT X1000 (LBS.)	ROT. (RPM)	CIRC. RATE (GPM)	ROTATE TIME (HRS)	FTGE CUT (FT.)	CORE RATE (FPH)	DRLG. RATE (FPH)	CORE REC'Y (FT.)	CORE REC'Y (%)	CORE HEAD COND
1	1577	17.50	270	1.00	9.875	RC476-1	10/15	70/80	171	3.00	24	8.0	31.0	24.0	100.0	G
2	2013	17.50	315	1.00	9.875	RC476-1	15/20	70/80	171	4.00	30	7.5	27.0	30.0	100.0	G
3	2477	17.50	365	1.25	9.875	RC476-1	10	70	171	3.50	30	8.5	28.0	30.0	100.0	G
4	3030	17.50	420	2.50	9.875	RC476-1	10	50	214	3.00	60	20.0	28.0	55.0	95.0	G
5	3167	17.50	429	3.00	9.875	RC476-1	8/10	70	214	2.50	60	24.0	40.0	54.7	92.0	SW
6	3505	17.50	447	3.75	9.875	RC476-1	8/10	70	214	5.50	35	6.3	19.5	34.0	97.0	WO
7	3850	12.25	465	3.75	9.875	RC476-2	10/15	65	257	5.50	60	10.9	22.4	56.6	94.0	G
8	4067	12.25	477	3.75	9.875	RC476-2	10/20	60	257	5.00	60	12.0	19.3	60.0	100.0	G
9	4301	12.25	489	3.75	9.875	RC476-2	10/20	70	214	3.50	60	17.1	19.3	59.0	98.0	SW
10	4334	12.25	491	3.75	9.875	RC476-2	10/20	60	214	3.50	33	9.4	13.9	33.0	100.0	GWO
11	4643	12.25	508	3.75	9.875	MC201-3	10/15	60	214	3.50	33	9.4	11.9	33.0	100.0	G
12	4682	12.25	510	4.00	9.875	MC201-3	12/15	60	257	2.00	6	3.0	13.9	3.5	59.0	BW
13	5218	12.25	538	4.75	9.875	MC201-3	10/18	55	257	8.50	30	3.5	10.8	30.0	100.0	G
14	5591	12.25	550	7.25	9.875	MC201-3	10/20	45/60	300	6.50	17	2.6	16.0	17.0	100.0	G
15	6044	8.50	572	7.25	8.500	SCP-4	20/25	50	385	11.00	18	1.6	7.4	18.0	100.0	D
16	6517	8.50	585	5.50	8.500	RC476-5	10/15	60	385	1.50	11	7.3	27.0	11.0	100.0	G
17	6571	8.50	586	5.50	8.500	RC476-5	10/15	50	385	0.80	13	16.2	36.0	13.0	100.0	D
18	6889	8.50	594	5.00	8.500	RC476-5	10/15	70	340	0.50	9	18.0	21.0	5.0	56.0	G
19	7109	8.50	599	5.00	8.500	RC476-5	6/7	45	340	1.00	9	9.0	19.0	6.0	66.0	G
20	7313	8.50	605	5.00	8.500	SC226-6	10/12	45	340	2.00	13	6.5	11.0	11.0	85.0	G
21	7547	8.50	610	5.00	8.500	SC226-6	10/15	65	340	3.00	30	10.0	10.0	28.0	92.0	G
22	7734	8.50	614	5.00	8.500	SC226-6	15/20	60	340	2.50	30	11.3	21.0	30.0	100.0	G
23	8158	8.50	625	5.00	8.500	SC226-6	10/15	60	340	4.50	25	5.6	11.6	25.0	100.0	G
24	8395	8.50	631	4.25	8.500	SC226-6	10/12	60	350	2.70	7	2.6	26.0	7.0	100.0	G
25	8604	8.50	636	3.75	8.500	SC226-6	10/18	60	252	0.30	19	5.7	26.1	15.0	77.0	G
26	8807	8.50	641	3.75	8.500	SC226-6	15/18	60	252	2.00	7	3.5	21.7	5.5	78.5	G
27	9027	8.50	646	2.75	8.500	SC226-6	18/20	60	342	4.50	23	5.1	15.0	5.0	21.0	G
28	9098	8.50	648	4.00	8.500	SC226-6	12/15	40	342	2.00	3	1.5	15.7	3.0	100.0	D
29	9253	8.50	652	2.75	8.500	SC226-6	12/15	40	342	3.50	5	1.4	11.0	4.0	80.0	D
30	9458	8.50	657		8.500	SC226-6	12/18	50	190	4.50	5	1.1	6.0	3.0	60.0	WO
31	9473	8.50	657		8.500	SC226-7	8/15	55	190	3.50	15	4.3	8.9	6.5	43.0	WO
32	9476	8.50	657		8.500	SC226-8	10/20	60	190	0.80	3	4.0	20.5	2.0	67.0	G
33	9698	8.50	662		8.500	C201-9	5/10	50	257	2.00	4	2.0	21.0	3.5	87.5	W
34	9912	8.50	668		7.625	C201-10	20	45	300	8.50	5	0.6	8.0	0.8	15.0	W
									TOTAL	120.6			TOTAL	722.1		

NOTES :

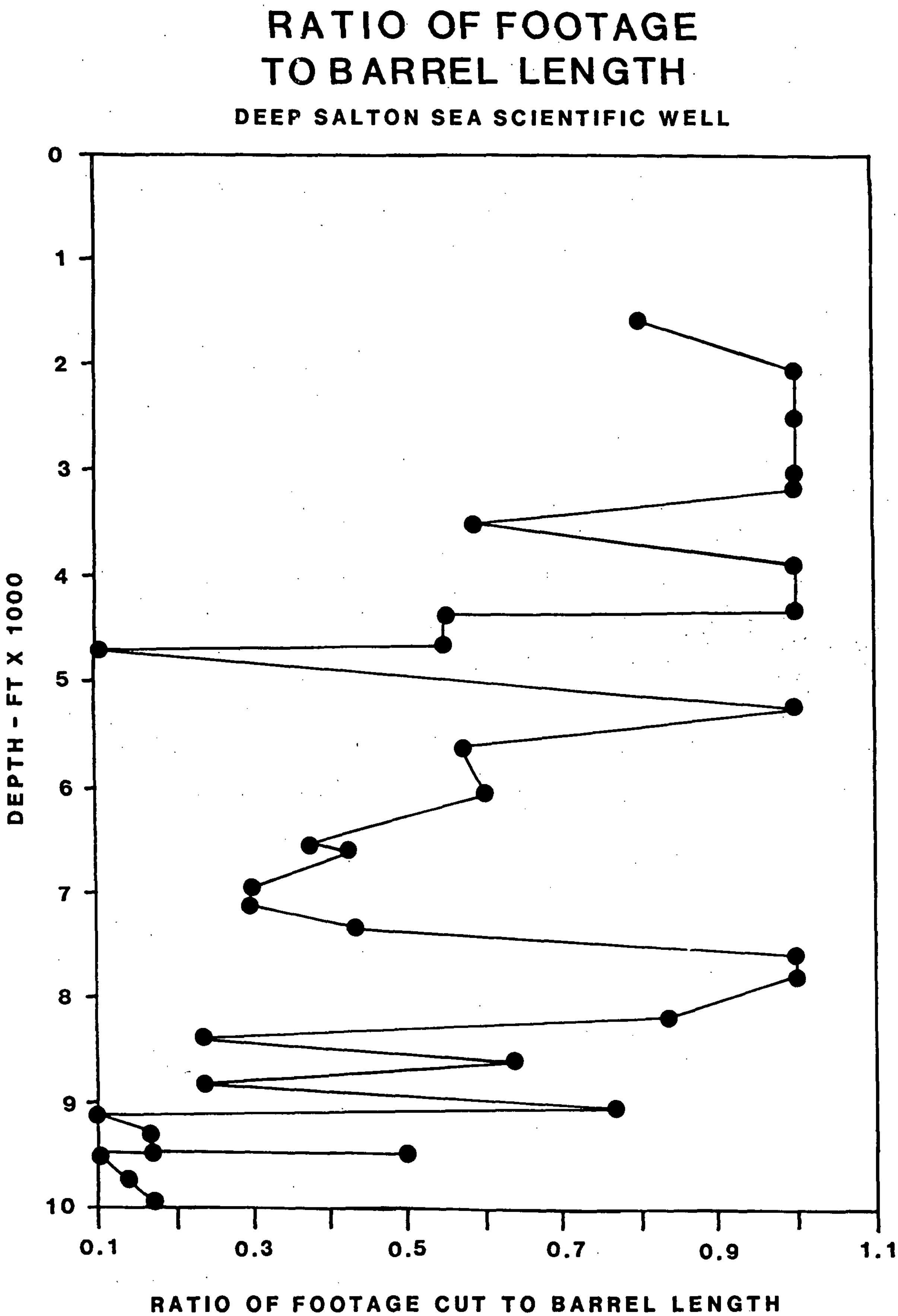
1. Equilibrated geothermal temperature data in process of being obtained.
2. Sixty (60') foot core barrels were run on cores NOs. 4 through 12. All other barrels were 30'. 5 1/4" O.D. cores were cut with the 9.875" core heads, 4" cores were cut with the 8.5" core heads, and a 3 1/4" core was cut with the 7.625" core head.
3. Core head condition: G - good condition; SW - slightly worn; WO - worn out; BW - badly worn; GWO - gauge worn out; D - dull.
4. Core recovery footage was taken from the core engineer reports. Footage measured by the geologists will be different.

FIGURE 4.1



CORE RECOVERY VS. DEPTH
DEEP SALTON SEA SCIENTIFIC WELL
0
1
2
3
4
5
6
7
8
9
10
DEPTH FT X 1000
0
20
40
60
CORE RECOVERY - FT

FIGURE 4.2


RATIO OF FOOTAGE
TO BARREL LENGTH
DEEP SALTON SEA SCIENTIFIC WELL
0
1
2
3
4
5
6
7
8
9
10
DEPTH - FT X 1000
0.1
0.3
0.5
0.7
0.9
1.1
RATIO OF FOOTAGE CUT TO BARREL LENGTH

The rate of penetration of the core heads also dramatically decreased with depth as shown in Figure 4.3. The actual drilling rate with conventional bits also decreased with depth. However, the ratio of coring rate to the drilling rate was also greatly decreasing as shown in Figure 4.4.

The coring in the upper 4,600 feet of the hole was very successful. The first three cores were cut with a 30 foot barrel. Cores 4 through 12 were cut with a 60 foot barrel with a full 60 feet being cut for five of the cores. Drillpipe connections were made successfully on all these cores. The core catcher jammed on core No. 6 after a connection. On core Nos. 10 and 11 the core jammed on a connection. Core No. 12 jammed in the catcher. After core No. 12 only 30 foot barrels were used for all successive cores.

4.2 CORE HEADS

Four types of core heads (bits) were used. All the core heads and coring equipment were made by the same company. The RC476 had polycrystalline diamond (stud mounted) cutters with natural diamonds on the O.D. and I.D. gauge. Two 9 7/8" and one 8 1/2" RC476 core heads were used. These performed well in the soft and medium soft formations. Penetration rates were often comparable to drill bit rates. Cutter wear and breakage of the polycrystalline diamond became a problem as the formations became harder and more fractured. A hard, abrasive formation head, the SC226, which had small, densely set, synthetic

FIGURE 4.3

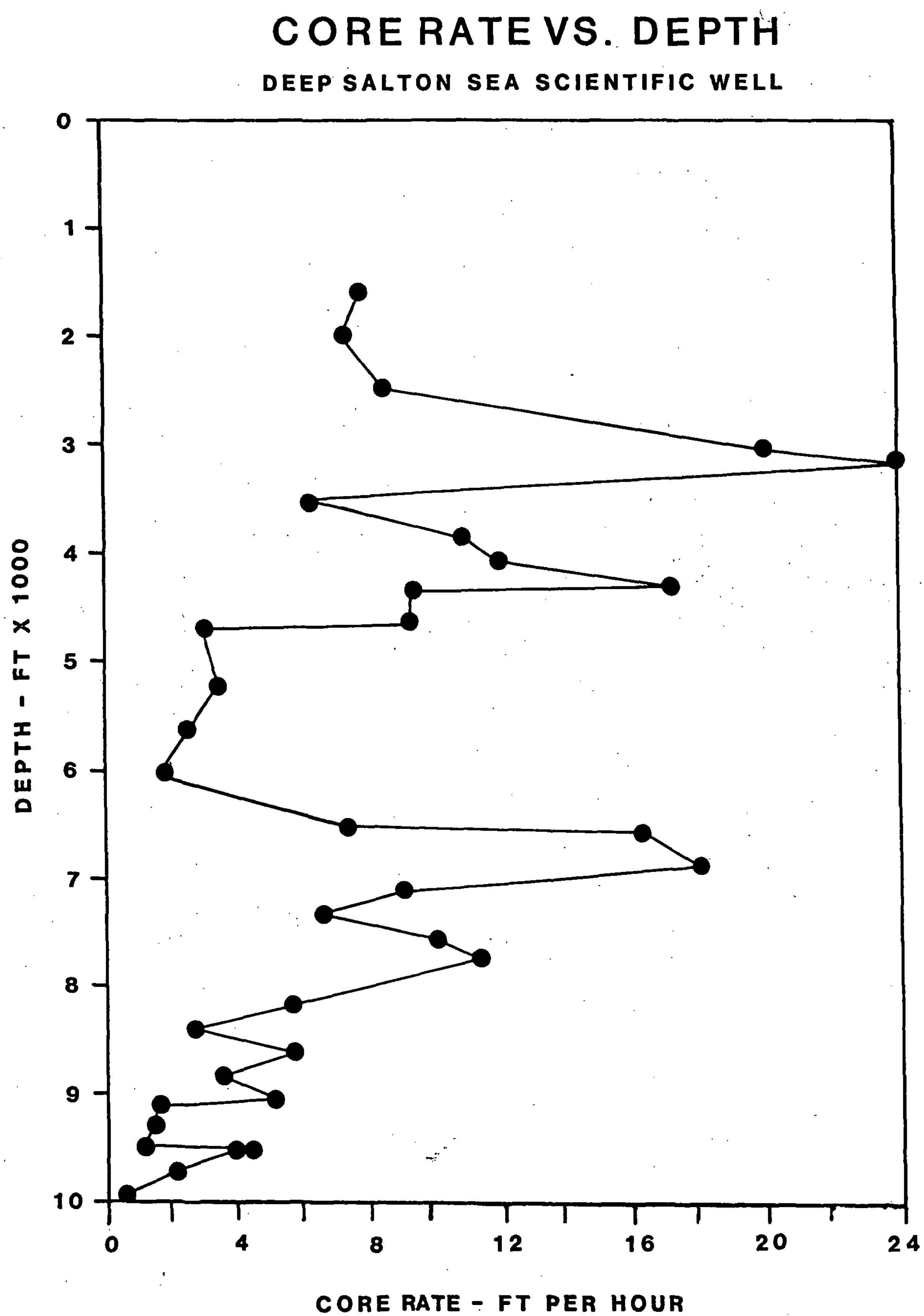
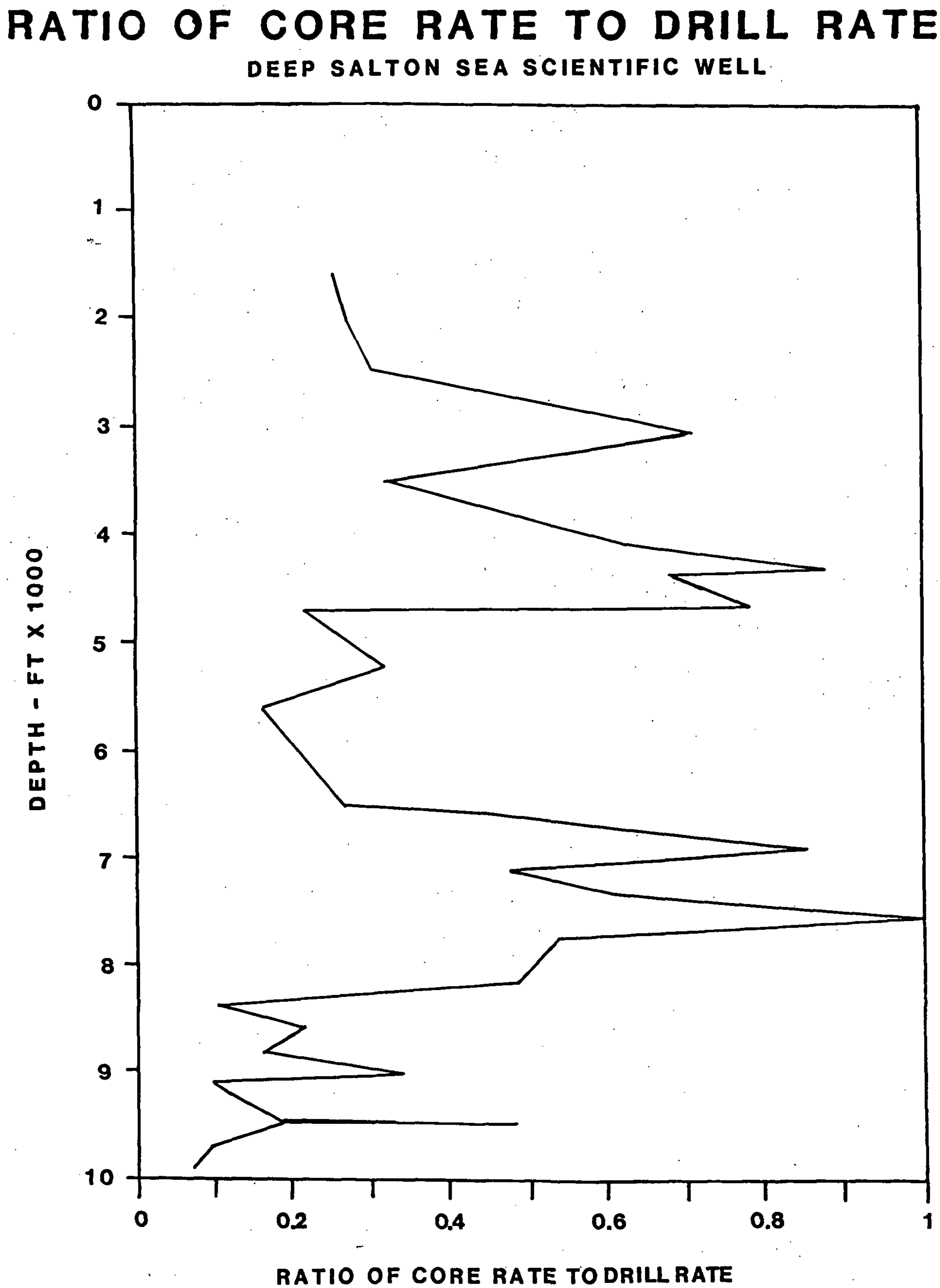

CORE RATE VS. DEPTH
DEEP SALTON SEA SCIENTIFIC WELL
DEPTH - FT X 1000
0
1
2
3
4
5
6
7
8
9
10
0
4
8
12
16
20
24
CORE RATE - FT PER HOUR

FIGURE 4.4


RATIO OF CORE RATE TO DRILL RATE
DEEP SALTON SEA SCIENTIFIC WELL
DEPTH - FT X 1000
0
1
2
3
4
5
6
7
8
9
10
0
0.2
0.4
0.6
0.8
1
RATIO OF CORE RATE TO DRILL RATE

polycrystalline diamond cutters with natural diamond O.D. and I.D. cutters was used in the harder, fractured formations. The penetration rates were generally very slow with these bits varying from 1/10 to 1/2 the drill bit rates. The C201 was a harder formation version of the SC226 and cut very slowly.

4.3 BARRELS AND CATCHERS

Barrel and catcher jamming limited the footage of core cut per core run with increasing depth. Standard steel barrels with slip type core catchers were used on the first 12 coring runs. Aluminum barrels with slip and dog catchers were used on runs Nos. 13 through 19. These initially performed well and helped reduce the barrel and catcher jamming problems. A steel barrel with a chromed inner surface had been ordered when the barrel jamming problem started occuring. It was used along with a slip and knife catcher on runs Nos. 20 through 33. A steel barrel with a slip and knife catcher were used on core run No. 34.

The barrel and catcher jamming problems were attributed to the breaking up of the core due to natural fractures or induced fractures. Induced fractures of the core were caused by stress changes in the core from pressure or temperature reduction, undetected malfunction of equipment downhole while coring, core head "wobble" and/or barrel "whip" from bending of the core barrel due to lack of stabilization created by hole diameter variations. There was no direct evidence for the cause of any particular core jam.

4.4 HOLE DIAMETER VARIATIONS

The hole diameter variations between the drill bit and the core head caused problems with both coring and drilling. These variations were due to (a) selection of a core head diameter of lessor diameter than the drill bit in each interval of the wellbore, and (b) reduction in the diameter of the drill bit due to wear caused by abrasive formations (i.e. drilling a tapered hole by the drill bit).

The primary problem attributed to cutting cores of lesser diameter than the drilled hole was barrel stabilization. This was suspected to have caused breaking up of the core at the core head due to "wobble" of the core head and/or breaking up of the core in the barrel due to whip of the barrel above the core hole. The diameter of the core barrel stabilizer had to be no greater than the diameter of the core head. Thus, the core barrel was never fully stabilized until the full length of the core barrel had been cut. This was not a problem in the softer upper portion of the well which was relatively straighter than the deeper sections.

Below about 9,400 feet, the hard abrasive formations led to a tapering of the drill hole which was caused by wear of the outer bit diameter, i.e. "gauge wear". This meant that reaming with the core head was necessary to get the core head to the bottom of the hole before starting to core. This led to damage to the gauge cutters on the core head on run No. 33. Thus, on run No. 34 a

7 5/8" corehead and smaller barrel was used. The 7 5/8" size was selected to give a sufficient shoulder for reaming to 8 1/2" to help alleviate pinching of the drill bit which was also becoming a problem.

Normal drilling operations were affected by the coring of a lessor diameter hole than the drill bit because the cored section had to be reamed to the drill bit diameter. This led to uneven wear of the drill bit on the outer diameter bit inserts. Many of the outer inserts were actually broken while reaming in the harder formations. In the 8 1/2" hole where the core hole diameter was only three-eighths inch diameter less than the drill bit, "pinching" of the drill bit occurred during reaming leading to premature bit failure. This was caused by a combination of the narrow shoulder for the bit to ream and the hard formations. Increasing the shoulder width to reduce the potential of pinching the bit during reaming was another reason for going to the smaller sized 7 5/8" core head.

4.5 CORING SUMMARY

Thirty four core runs were made in the Salton Sea well where 792 feet of hole was cored with 722.1 feet recovered (91 percent overall). Potential core was 1,290 feet with the lengths of core barrels run. Thus, only 56 percent of potential core was recovered. The coring was characterized by:

1. Core rates being comparable to drill rates in the upper section of the hole.

2. Core rates comparable to drill rates decreasing rapidly with depth.
3. High percentage of core recovery of core from all cored intervals.
4. High percentage of core cut relative to barrel length in the upper section of the hole.
5. Percentage of core cut relative to barrel length dramatically decreasing with depth.
6. Core diameters under bit diameter led to difficult reaming, bit damage and reduced life of bits following core runs.
7. Interval coring becoming increasingly time consuming (i.e. costly) with increasing depth.

In this particular well, hole problems led to difficulty with successful interval coring. The primary hole conditions hindering coring were:

1. Formation "hardness" (i.e. ability to drill with conventional diamond core heads) leading to slow penetration rate.
2. Fractured formations causing core catcher or barrel jamming.
3. Induced fracturing of the core causing core catcher or barrel jamming.
4. Lost circulation leading to decreased core head life and stuck core barrels.

5.Ø DRILLING BITS

A complete listing of the bit record for the entire well is contained in Table 5.1. Very few bit runs were made which could be considered "normal" because of interruptions in drilling for the scientific activities and because of hole problems. Thus, normal analyses of the bit record for affects of bit weight, rotary speed and hole depth on rate of penetration and bit life are not warranted. The bit record is significant in that it summarizes the sequence of operations and provides an insight to the formation characteristics.

5.1 NORMAL DRILLING

There are some trends that do stand out in the bit record. One is the gauge wear. This is reported under "Dull Code" as "G" which is a measure of the outer diameter wear in eighths of an inch. It can be noted from Table 5.1 that bit gauge wear increased with depth as the formations became harder and more abrasive. This gauge wear became a significant problem.

The 8 1/8" core heads could not follow a 8 1/2" bit run. This led to reducing the corehead to 7 5/8" on the last run. This size would have continued to be used if the 8 1/2" hole could have been drilled deeper. Gauge wear also caused "pinching" of the bits and reaming when a new bit followed a severely gauge worn bit. Additional bit runs became necessary to ream undergauged hole in preparation for coring.

TABLE 5.1

BIT RECORD
DEEP SALTON SEA SCIENTIFIC WELL

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/ HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL CODE T	B	G	COMMENTS
1	17 1/2	SMTH		16-16-16	150	150	6.00	6.00	25.00	5/10	120	---	100	484	8.8	51	1	1	I	W/26 HOLE-OPENER
1	26	SPS	H/O	20-20-20	150	150	6.00	6.00	25.00	5/10	120	---	100	484	8.8	51	1	1	I	PILOT HOLE
1RR	17 1/2	SMITH		16-16-16	150	150	7.00	13.00	21.40	5/10	120	---	100	484	8.8	51	1	1	I	PILOT BIT
2	42	SPS	H/O	----	150	150	7.00	13.00	21.40	5/10	120	---	100	484	8.8	51	1	1	I	CASING POINT 30"
2	17 1/2	REED	Y-11	16-16-16	1000	850	16.50	29.50	51.50	5/10	120	0.25	700	571	9.7	54	1	1	I	CASING POINT 20"
1RR	17 1/2	SMITH		16-16-16	1032	882	19.75	49.25	44.60	10/15	120	---	200	571	9.7	48	1	1	I	PILOT BIT
1RR	26	SPS	H/O	20-20-20	1032	882	19.75	49.25	44.60	10/15	120	0.25	200	571	9.7	48	1	1	I	OPEN T6 CASING 26"
2RR	17 1/2	REED	Y-11	16-16-16	1553	521	9.50	59.25	54.80	10/15	120	0.25	850	450	9.7	45	2	4	I	C.O.
C1	9 7/8	N/C	RC476	TFA 1.0	1577	24	3.00	62.25	8.00	10/15	75	---	100	173	9.9	48	-	-	-	CORED 100% REC
3	17 1/2	REED	Y-11	14-14-18	1983	406	13.00	75.25	31.20	10/20	120	---	1000	433	9.6	44	1	1	I	
C1R	9 7/8	N/C	RC476	TFA 1.0	2013	30	4.00	79.25	7.50	15/20	75	---	100	173	9.6	44	-	-	-	CORED 100% REC
3RR	17 1/2	REED	Y-11	14-14-18	2447	434	16.00	95.25	27.10	10/20	120	1.75	1000	433	9.6	44	2	2	I	C.O.
C1R	9 7/8	N/C	RC476	TFA 1.0	2477	30	3.50	98.50	8.50	10	70	---	350	216	9.6	42	-	-	-	CORED 100% REC
4	17 1/2	HTC	3AJ	18-20-20	2970	493	17.50	116.00	28.10	10/20	120	2.25	1200	588	9.4	37	1	1	I	C.O.
C1R	9 7/8	N/C	RC476	TFA 1.0	3030	60	3.00	119.00	20.00	10	50	---	400	216	9.4	38	-	-	-	CORED 95% REC
4RR	17 1/2	HTC	3AJ	18-20-20	3000	0	1.50	120.50	20.00	10/20	120	---	1200	588	9.4	38	1	3	I	CASING POINT (CHG)
4RR	17 1/2	HTC	3AJ	18-20-20	3078	78	5.50	126.00	14.10	15/20	120	---	1200	484	9.4	35	7	8	0	LC=2
-	11 3/4	N.L.	MGNT	---	3078	---	0.25	---	---					0						FISH F/CONES
-	17 1/2	N.L.	MILL	---	3080	2	4.00	130.00	0.50	6/8	50	---	700	692	9.3	38				MILL ON CONES-RINGED
-	14 3/4	N.L.	BSKT	---	3087	7	4.00	134.00	1.75	6/8	50	---	700	692	9.3	38				REC. 1/2 AND 1/4 OF
5	17 1/2	SEC	S-35J	18-18-18	3107	20	0.50	134.50	40.00	15/20	120	3.0	1300	588	9.3	40	INC			PULL T/CORE
5RR	9 7/8	N/C	R476	TFA 1.0	3167	60	2.50	139.00	24.00	25	70	---	400	199	9.3	36				RECOVERED 54.7=91%
5RR	17 1/2	SEC	S-35J	18-18-18	3431	264	13.00	150.00	20.30	25	120	3.0	1300	588	9.3	40	5	6	1	
6	17 1/2	SEC	S4TJ	18-18-18	3470	39	2.00	152.00	19.50	25	120	3.50	1300	588	9.3	40	INC			
C1R	9 7/8	N/C	RC476	TFA 1.0	3505	35	5.50	157.50	6.30	25	70	---	400	199	9.3	40				
6RR	17 1/2	SEC	S4TJ	18-18-18	3515	10	1.50	159.00	6.60	25	120	3.75	1300	588	9.3	40	3	4	0	13 3/8" CSG PT
7	12 1/4	SEC	FDT	12-12-13	3530	15	0.50	159.50	30.00	10	120	---	1100	433	9.2	32	7	4	1	PULL F/CBL
8	12 1/4	VRL	L-114	11-12-12	3790	260	14.50	174.00	17.90	20/25	120	3.50	1500	346	9.4	40	6	6	I	
C2	9 7/8	N/C	RC-476	TFA 1.0	3850	60	5.50	179.50	10.90	10/15	60	---	375	173	9.3	37				RECOVERED 56.6=94%
9	12 1/4	VRL	L-114	11-11-12	4007	157	7.00	186.50	22.40	20/25	120	3.75	1250	415	9.4	37	4	4	I	PULL T/CORE
C2R	9 7/8	N/C	RC-476	TFA 1.0	4067	60	5.00	191.50	12.00	10/15	60	3.75	375	173	9.4	37	0			RECOVERED 60'
10	12 1/4	REED	11J	11-12-16	4241	174	9.00	200.50	19.30	20/25	120	3.75	1250	415	9.4	37	5	7	0	PULL FOR CORE
C2R	9 7/8	N/C	RC-476	TFA 1.0	4334	93	7.50	208.00	12.40	10/15	60	0.00	375	173	9.4	35				97% REC'Y
11	12 1/4	VRL	V517	12-12-12	4641	307	22.00	230.00	13.90	25/35	50/6	-	1400	346	9.3	38	8	3	1	BRKN GAGE INS.
12	12 1/4	VRL	L126	12-12-12	4643	2	8.00	230.00	0.00	15/20	50/6	-	1400	346	9.3	38	5	4	0	REAMED 365'- DRL 2'
C3	9 7/8	N/C	MC201	TFA 1.6	4686	43	5.50	235.50	8.20	15/20	60	-	400	173	9.2	38				REC'D 43'
13	12 1/4	VRL	L-126	12-12-12	4710	24	1.50	237.00	16.00	10/15	120	-	1600	424	9.2	34	5	1	1	LOST 4 STAB BLADES
12RR	12 1/4	VRL	L-126	OUT	4710	0	0.00	237.00	0.00	0	0	-	0		9.2	34				REAM
	11 3/4	N.L.	BSKT	N/A	4710	0	0.00	237.00	0.00	0	0	-	0		9.2	34				
M123	12 1/4	N.L.	MILL	N/A	4722	12	10.50	247.50	0.00	5	70/8	-	400	346	9.1	42				MILL ON STAB BLDS.
14	12 1/4	N.L.	S-44G	12-12-12	4943	221	18.50	266.00	11.90	35	50/6	4.25	1500	433	8.9	42	8	4	2	
15	12 1/4	VRL	V-517	13-13-13	5188	245	22.50	288.50	10.80	35	50/6	3.75	1600	433	9	42	2	2	0	PULL TO CORE
C3R	9 7/8	N/C	MC201	TFA 1.6	5218	30	9.00	297.50	3.30	10	80	-	1500	346	9	44				100% REC'Y
15RR	12 1/4	VRL	V517	13-13-13	5381	163	9.50	307.00	17.10	20	85	6.25	1500	346	9	44	2	2	0	
17	12 1/4	SEC	S-33	13-13-13	5422	41	6.50	313.50	6.30	20	85	7.50	1300	433	9	44	4	4	0	
17	12 1/4	SEC	S-33	3-13	5422				0.00					0	9	44				CLEAN OUT

TABLE 5.1 (continued)

BIT RECORD
DEEP SALTON SEA SCIENTIFIC WELL

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/ HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL CODE T	B	G	COMMENTS
18	12 1/4	VARELV-627		3-13	5424	2	0.25	313.75	8.00	35	70		1500	433	8.9	37				PINCHED BY JARS
19	12 1/4	VARELV-517		3-13	5574	150	7.00	320.75	21.40	30	60	7.30	1500	433	8.9	34	1	1	0	PULL T/CORE
C3R	9 7/8	N.C.	MC201	TFA1.55	5591	17	7.00	327.75	2.40	30	60		800	260	8.9	34				100% REC
16RR	12 1/4	VARELL-114		3-12	5642	51	4.50	332.25	11.30	35	60/7	7.45	1300	389	9	36	4	8	0	1 CONE LOCKED
19RR	12 1/4	VARELV-517		3-13	6000	508	29.00	361.25	17.50	35	60/7	8.15	1300	398	9.1	34	3	7	1	9 5/8" CSG.PT
19RR	12 1/4	VARELL-517		3-13	6000									0						RAN 9 5/8" CSG. CLEA
20	8 1/2	VARELL-126		3-16	6026	26	3.50	364.75	7.40	30	80		400	284	8.9	38	8	1	1	DRILLED OUT DV FLOAT
C4	8 1/8	N.C.		TFA.45	6044	18	11.00	375.75	1.50	30	60		1400	284	8.7	34				100% REC
21	8 1/2	SEC	M44N	OUT	6046	2	4.00	379.75	0.50	5/10	T.D.		1700	598	8.7	32	1	1	0	TURBO STALLED
22	8 1/2	VARELV-527		OUT	6079	33	6.00	385.75	5.50	5/10	T.D.		1700	598	8.7	32	7	8	4	TURBO
23	8 1/2	VARELV-527		OUT	6112	33	3.50	389.25	9.4	5	T.D.		1700	598	8.7	38	7	7	4	TURBO
21RR	8 1/2	SEC	M44N		6112	0								0						
24	8 1/2	VARELV-527			6146	34	4.50	393.75	8	5	T.D.	6.15	1800	628	8.7	34	6	7	3	TURBO
25	8 1/2	VARELV-527			6166	20	3.50	397.25	5.7	5	T.D.	4.5	1800	628	8.7	34	6	7	4	TURBO
26	8 1/2	SEC	M44N	3-13	6166									0						REAM TURBO HOLE
27	8 1/2	VARELV-617		OUT	6227	61	4.5	401.75	13.5	5	T.D.	3.5	1700	598	8.7	34	7	7	2	TORBO
26RR	8 1/2	SEC	M44N	3-13	6227	REAM	TURBO	HOLE						0						FLOWTEST WELL
28	8 1/2	SEC	M44N	3-13	6227	REAM	AFTER	FLOW	TEST					0						
29	8 1/2	REED	FP51	OUT	6316	89	5.5	407.25	16.1	10	T.D.	3	1600	284	8.7	40	7	7	0	TURBO
30	8 1/2	HTC	J-22	3-13	6506	190	7	414.25	27.1	25	60	5	700	252	8.6	34	2	2	0	PULLED F/CORE
31	8 1/2	VARELV-527		3-13	6758	241	10.5	424.75	22.9	25	80		600	252	H2O		2	4	1	LOST CIRC.
C5	8 1/8	N.C.	RC476	TFA-60	6772	14	0.5	425.25	7	25	80		600	252	H2O					CORE 50% REC
32	8 1/2	VARELV-627		3-13	6880	108	3	428.25	36	25	50/60		600	346	8.9	27	3	4	1	PULLED T/CORE
C5R	8 1/8	N.C.	RC476	TFA-60	6889	9	1	429.25	9	10/15	40		600	252	H2O					CORE 44% REC
33	8 1/2	VARELV-527		OUT	7100	211	10	439.25	21.1	20/25	60		500	346	8.8	26				PULLED T/CORE
C5R	8 1/8	N.C.	RC476	TFA-60	7109	9	1	440.25	9	20	40		600	252	8.8	26				CORE 66% REC
33RR	8 1/2	VARELV-527		OUT	7300	191	10	450.25	19.1	20	90		1800	433	8.7	30	2	5	0	PULLED T/CORE
C6	8 1/8	N.C.	SC226		7313	13	2	452.25	6.5	20	50		600	252	8.7	30				CORE 85% REC
34	8 1/2	N.C.	R-419	TFA-04	7349	36	4.5	456.75	8	20/30	90		1800	433	8.7	30	1		0	N/CHRG BY N.C. STRAT
35	8 1/2	VARELV-527		3-16	7547	191	9	465.75	21.2	40	60/7	5	1500	450	8.7	46	3	3	0	PULLED T/CORE
C6R	8 1/8	NC	SC226		7577	36	3.5	469.25	8.5	20	40		900	346	8.7	40				CORE 92% REC
35RR	8 1/2	VARELV-527		3-16	7704	127	6	475.25	21.1	40	60	6.25	1600	484	8.8	33	4	4	0	PULLED T/CORE
C6R	8 1/8	NC	SC226		7734	30	3	478.25	10	20	40		900	346	8.8	33				CORE 100% REC
36	8 1/2	VARELV-527		OUT	7759	25	3	481.25	8.3	15/20			2200	628	9	35	8	5	1	TURBO DRILL
37	8 1/2	VARELV-627		OUT	7794	35	3	484.25	11.6	15/26			2200	628	9	35	4	7	1	TURBO DRILL
38	8 1/2	VARELV-737		OUT	7860	66	7.5	487.75	18.8	15/20		4.5	2300	597	9	40	8	8	4	TURBO DRILL
39	8 1/2	VARELV-627		OUT	7908	118	3	490.75	16	10/15		2.25	2300	610	9	40	8	7	4	TURBO DRILL
40	8 1/2	VARELV-627		OUT	7935	27	2	490.75	12.5	10/15		3.75	2300	610	9	39	6	7	3	TURBO DRILL
41	8 1/2	SEC	M44N	3-16	7972	37	3.5	496.25	15.5	25	80	4.75	1600	346	9	39	3	4	0	REAM TURBO?&DRILLED
42	8 1/2	VARELV-527		OUT	8017	45	3	499.75	15	10/15		4.25	2300	610	8.9	40	7	8	3	TURBO DRILL
43	8 1/2	VARELV-527		OUT	8027	10	2	509.25	5	10/15			2300	610	8.9	40	7	8	0	TURBO DRILL
34RR	8 1/2	NC	R-419	TFA-04	8070	43	10	519.25	4.3	20	60	4.25	1500	458	8.9	38	GOOD			STRATAPAX &TURBO DRI
41RR	8 1/2	SEC	M44N	3-16	8126	56	7	526.25	8	20/25	80	5	1500	346	8.9	38	7	5	0	REAM TUBRO HOLE DRL
44	8 1/2	SEC	S-86-FOUT		8133	7	2.5	528.75	2.8	15/20			1500	610	8.9	38	8	7	2	TURBO DRILL
C6R	8 1/8	NC	SC226		8161	28	5	533.75	5.6	15/20	45		1000	258	8.3	H2O				CORE 100%

BIT RECORD
DEEP SALTON SEA SCIENTIFIC WELL

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/ HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL T	CODE B	G	COMMENTS
45	8 1/2	SEC	M44N	OUT	8161	REAM								0						REAM TURBO & CORE HO
46	8 1/2	VAREL	V-627	3-13	8395	234	14	547.75	16.7	25/35	80	4.25	1000	346	8.7	30	4	7	0	PULLED TO CORE
C6R	8 1/8	NC	SC-226		8402	7	2	549.75	3.5	25	40		1000	252	8.7	30				CORE 90%
47	8 1/2	VAREL	V-627	3-13	8585	183	7	556.75	26.1	35	80	4.25	1300	407	8.6	26	4	4	1	PULLED TO CORE
C6R	8 1/8	NC	SC-226		8604	19	2.5	559.25	7.6	25	40		1000	252	8.6	H2O				CORE 76%
48	8 1/2	HTC	J-44	12-13-14	8800	196	9	568.25	21.7	35	80	3.5	1000	239	8.4	26	7	5	0	PULLED TO CORE
C6R	8 1/8	NC	SC-226		8807	7	2	570.25	3.5	25	40		1000	239	8.7	29				CORE 60%
49	8 1/2	VAREL	V-527	3-15	9004	197	7	577.25	28.1	35	80	3.75	1000	346	9.7	29	5	6	0	PULLED TO CORE
C6R	8 1/8	NC	SC-226		9027	23	4.5	581.75	5.1	25	40		1000	346	8.4	26				CORE 26%
50	8 1/2	SMITH	F-4	3-16	9095	68	4.5	586.25	15	25	80		1000	346	8.7	31				PULLED TO CORE
C6R	8 1/8	NC	SC-226		9098	3	2.5	589.25	1	25	40		1000	346	8.7	31				CORE #30 100%
50RR	8 1/2	SMITH	F-4	3-16	9248	150	9.5	598.75	15.7	30/35	70	4	900	346	8.7	36	8	7	1	
C6R	8 1/8	NC			9254	6	4	602.75	1.5	25	40		1100	329	8.7	31				CORE #31 58%
51	8 1/2	VAREL	V-527	3-15	9450	196	11	620.5	11	30/35	50/6	2.75	800	334	8.6	27	8	6	3	
52	8 1/2	VAREL	V-527		9453	3	0.5	621	6	30/35	50/60		800	334	8.6	27				PINCHED
C6R	8 1/8	NC	SC226		9458	5	3.5	624.5	1.5	20	50/60		500	221	8.5	32				CORE #32 REC 48%
C7	8 1/8	NC	SC226		9473	15	2.5	627	6	20	50/60		600	202	8.5	29				CORE #33 REC 35%
53	8 1/2	SEC	S86F		CLEAN	OUT	CEMENT							0						
52	8 1/2	VARELRR			CLEAN	OUT	CEMENT							0						
C8	8 1/2	NC	MC201		9477	4	0.5	627.5	8	20	40/50		400	208	8.6	40				CORE *34 REC
54	8 1/2	VAREL	V737		9517	40	5.5	633	7.2	15/25	55/60		400	363	8.7	34				
C8R	8 1/8	NC					STUCK, SPOT OIL, POH							0						
55	8 1/2	VAREL	V627		9694	177	20.5	653.5	8.9	5/10	70/80		500	334	8.7	39	2	2	1	
56	8 1/2	VAREL	V527				REAMED FOR CORE							0						
C9	8 1/8	NC	MC201		9698	4	2	655.5	2	20	40/50		600	277	8.6	34				CORE #35 REC
56	8 1/2	VAREL	V-527		9907	209	21	676.5	10	25	50		500	346	8.6	36	8	8	2	
C10	7 5/8	NC	C201		9912	5	8.5	685	0.5	20	40/50		1100	311	8.4	36				CORE #36 REC 15%
57	8 1/2	VAREL	V627		10061	149	20.5	705.5	7.7	25	50		500	311	8.8	37	6	6	1	
58	8 1/2	VAREL	V527		10212	151	18.25	723.75	8.3	25	50		600	311	8.9	36	6	6	1	
59	8 1/2	SEC	S84F		10350	138	17	740.75	8.1	25	55/60		600	346	8.7	38	6	8	3	
60	8 1/2	VAREL	V627		10475	125	17.75	758.5	7	25	55/60		600	346	8.9	36	6	6	1	LOST CIRC.
61	6 1/8	SEC	S-84-F	OUT	10564	89	9.5	768	9.3	10	45/50		1600	302	8.4	H20				T.D.

NOTES :

1. In the BIT NO. column an "R" or "RR" after a number means the bit is being re-run, a "C" in front of the number means a core bit.
2. Bit jet sizes are in 1/32 ins. diameter. There are three jets per bit.
3. Dull Codes are in 1/8's wear i.e T 1-teeth are worn 1/8, T 8-teeth are worn out, same for bearing wear. These measurements are relative to the new bit condition and have no units. Gauge wear is in 1/8 ins. under new bit diameter; i.e. I or 0-bit is in gauge; 3-bit is under gauge by 3/8 ins.

This severe gauge wear was an unanticipated problem and may have been reduced by addition of special gauge protection tungsten carbide insert pads to the bit legs. This has worked very successfully in abrasive granites. However, the long lead time to obtain this modification prohibited installation of the gauge protection on the bits for this project once this gauge wear became a significant problem.

There were only a few bits run under what would be considered normal conditions. These bits runs were extracted from Table 5.1 and are shown in Tables 5.2 and 5.3.

Table 5.2 contains the "normal" 12 1/4" bit runs. In this shallower section of the hole, gauge wear was not significant. Most of the wear was tooth wear. The drilling rate was about 16 feet per hour average. It should be noted that relatively light bit weights (instead of 45,000 to 60,000 lbs which would normally be used with 12 1/4" bits) were used to control deviation which gave rise to the low penetration rates.

Table 5.3 contains the "normal" 8 1/2" bit runs. With depth, formations increased in hardness and abrasiveness and gauge wear increased. The penetration rates decreased below 9,500 feet. Here, bit weights were lower than in the upper part of the 8 1/2" hole since minimum stabilization was being used because of hole conditions. Also, the bit hydraulics were not as efficient because the bit jets were removed so that lost circulation material could be pumped through the bit.

DSSSDP - BIT RECORD

BIT RECORD - 12 1/4" BITS
DEEP SALTON SEA SCIENTIFIC WELL

BIT NO.	BIT SIZE	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/ HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL T	B	CODE G	COMMENTS
7	12 1/4	FDT	12-12-13	-3530	15	0.50	159.50	30.00	10	120	---	1100	433	9.2	32	7	4	1	PULL F/CBL
8	12 1/4	L-114	11-12-12	-3790	260	14.50	174.00	17.90	20/25	120	3.50	1500	346	9.4	40	6	6	I	
9	12 1/4	L-114	11-11-12	-4007	157	7.00	186.50	22.40	20/25	120	3.75	1250	415	9.4	37	4	4	I	PULL T/CORE
10	12 1/4	11J	11-12-16	-4241	174	9.00	200.50	19.30	20/25	120	3.75	1250	415	9.4	37	5	7	0	PULL FOR CORE
11	12 1/4	V517	12-12-12	-4641	307	22.00	230.00	13.90	25/35	50/6	-	1400	346	9.3	38	8	3	1	BRKN GAGE INS.
13	12 1/4	L-126	12-12-12	-4710	24	1.50	237.00	16.00	10/15	120	-	1600	424	9.2	34	5	1	1	LOST 4 STAB BLADES
14	12 1/4	S-44G	12-12-12	-4943	221	18.50	266.00	11.90	35	50/6	4.25	1500	433	8.9	42	8	4	2	
15	12 1/4	V-517	13-13-13	-5188	245	22.50	288.50	10.80	35	50/6	3.75	1600	433	9	42	2	2	0	PULL TO CORE
15RR	12 1/4	V517	13-13-13	-5381	163	9.50	307.00	17.10	20	85	6.25	1500	346	9	44	2	2	0	
17	12 1/4	S-33	13-13-13	-5422	41	6.50	313.50	6.30	20	85	7.50	1300	433	9	44	4	4	0	
18	12 1/4	V-627	3-13	-5424	2	0.25	313.75	8.00	35	70		1500	433	8.9	37				PINCHED BY JARS
19	12 1/4	V-517	3-13	-5574	150	7.00	320.75	21.40	30	60	7.30	1500	433	8.9	34	1	1	0	PULL T/CORE
16RR	12 1/4	L-114	3-12	-5642	51	4.50	332.25	11.30	35	60/7	7.45	1300	389	9	36	4	8	0	1 CONE LOCKED
19RR	12 1/4	V-517	3-13	-6000	508	29.00	361.25	17.50	35	60/7	8.15	1300	398	9.1	34	3	7	1	9 5/8" CSG.PT
								15.98											

TABLE 5.2

DSSSDP - BIT RECORD

BIT RECORD - 8 1/2" BITS
DEEP SALTON SEA SCIENTIFIC WELL

TABLE 5.3

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL CODE T	B	G	COMMENTS
20	8 1/2	VAREL	L-126	3-16	-6026	26	3.50	364.75	7.40	30	80		400	284	8.9	38	8	1	1	DRILLED OUT DV FLOAT
30	8 1/2	HTC	J-22	3-13	-6506	190	7.00	414.25	27.10	25	60	5.00	700	252	8.6	34	2	2	0	PULLED F/CORE
31	8 1/2	VAREL	V-527	3-13	-6758	241	10.50	424.75	22.90	25	80		600	252	H2O		2	4	1	LOST CIRC.
32	8 1/2	VAREL	V-627	3-13	-6880	108	3.00	428.25	36.00	25	50/60		600	346	8.9	27	3	4	1	PULLED T/CORE
33	8 1/2	VAREL	V-527	OUT	-7100	211	10.00	439.25	21.10	20/25	60		500	346	8.8	26				PULLED T/CORE
33RR	8 1/2	VAREL	V-527	OUT	-7300	191	10.00	450.25	19.10	20	90		1800	433	8.7	30	2	5	0	PULLED T/CORE
35	8 1/2	VAREL	V-527	3-16	-7547	191	9.00	465.75	21.20	40	60/70	5.00	1500	450	8.7	46	3	3	0	PULLED T/CORE
35RR	8 1/2	VAREL	V-527	3-16	-7704	127	6.00	475.25	21.10	40	60	6.25	1600	484	8.8	33	4	4	0	PULLED T/CORE
46	8 1/2	VAREL	V-627	3-13	-8395	234	14.00	547.75	16.70	25/35	80	4.25	1000	346	8.7	30	4	7	0	PULLED TO CORE
47	8 1/2	VAREL	V-627	3-13	-8585	183	7.00	556.75	26.10	35	80	4.25	1300	407	8.6	26	4	4	1	PULLED TO CORE
48	8 1/2	HTC	J-44	12-13-14	-8800	196	9.00	568.25	21.70	35	80	3.50	1000	239	8.4	26	7	5	0	PULLED TO CORE
49	8 1/2	VAREL	V-527	3-15	-9004	197	7.00	577.25	28.10	35	80	3.75	1000	346	9.7	29	5	6	0	PULLED TO CORE
50	8 1/2	SMITH	F-4	3-16	-9095	68	4.50	586.25	15.00	25	80		1000	346	8.7	31				PULLED TO CORE
50RR	8 1/2	SMITH	F-4	3-16	-9248	150	9.50	598.75	15.70	30/35	70	4.00	900	346	8.7	36	8	7	1	
51	8 1/2	VAREL	V-527	3-15	-9450	196	11.00	620.5	11.00	30/35	50/60	2.75	800	334	8.6	27	8	6	3	
54	8 1/2	VAREL	V737		-9517	40	5.50	633	7.20	15/25	55/60		400	363	8.7	34				
55	8 1/2	VAREL	V627		-9694	177	20.50	653.5	8.90	5/10	70/80		500	334	8.7	39	2	2	1	
56	8 1/2	VAREL	V-527		-9907	209	21.00	676.5	10.00	25	50		500	346	8.6	36	8	8	2	
57	8 1/2	VAREL	V627		-10061	149	20.50	705.5	7.70	25	50		500	311	8.8	37	6	6	1	
58	8 1/2	VAREL	V527		-10212	151	18.25	723.75	8.30	25	50		600	311	8.9	36	6	6	1	
59	8 1/2	SEC	S84F		-10350	138	17.00	740.75	8.10	25	55/60		600	346	8.7	38	6	8	3	
60	8 1/2	VAREL	V627		-10475	125	17.75	758.5	7.00	25	55/60		600	346	8.9	36	6	6	1	LOST CIRC.
61	6 1/8	SEC	S-84-F	OUT	-10564	89	9.50	768	9.30	10	45/50		1600	302	8.4	H2O				T.D.
									16.37											

Thus, hole problems interferred with applying optimum drilling practices in almost all sections of the hole.

5.2 DIRECTIONAL TURBINE DRILLING

Two series of downhole motor runs were made to turn the well away from the eastern lease boundary. These turbine runs were extracted from Table 5.1 and are shown in Table 5.4. A total of 648 feet was drilled with the downhole motors. The rotary bits failed rather rapidly on the motors and the gauge wear was severe as would be expected in the hard formations with the bent subs above the motors applying high side loads for directional drilling. Turbines were used because of the high downhole temperature. The preferred slower rotating moineau motor rubber stator would have been destroyed. The high bit rotation of the turbines led to rapid bearing wear as seen in Table 5.4.

One stratapax bit was run on a turbine. This bit was run twice as long as the tri-cone bits and with slightly more weight on the bit. However, the penetration rate was very slow in the hard formations.

DSSSDP - BIT RECORD

TABLE 5.4

TURBINE RUNS
DEEP SALTON SEA SCIENTIFIC WELL

BIT NO.	BIT SIZE	BIT MFGR	BIT TYPE	JETS OR TFA	DEPTH OUT	FTGE	HOURS RUN	ACC HOURS	FT/ HR	WT. 1000	ROT RPM	VERT. DEV.	PUMP PRESS	FLOW GPM	MUD WT	MUD VIS	DULL CODE T	B	G	COMMENTS
21	8 1/2	SEC	M44N	OUT	-6046	2	4.0	379.75	0.50	5/10	T.D.		1700	598	8.7	32	1	1	0	TURBO STALLED
22	8 1/2	VAREL	V-527	OUT	-6079	33	6.0	385.75	5.50	5/10	T.D.		1700	598	8.7	32	7	8	4	TURBO
23	8 1/2	VAREL	V-527	OUT	-6112	33	3.5	389.25	9.40	5	T.D.		1700	598	8.7	38	7	7	4	TURBO
24	8 1/2	VAREL	V-527		-6146	34	4.5	393.75	8.00	5	T.D.	6.15	1800	628	8.7	34	6	7	3	TURBO
25	8 1/2	VAREL	V-527		-6166	20	3.5	397.25	5.70	5	T.D.	4.50	1800	628	8.7	34	6	7	4	TURBO
27	8 1/2	VAREL	V-617	OUT	-6227	61	4.5	401.75	13.50	5	T.D.	3.50	1700	598	8.7	34	7	7	2	TORBO
29	8 1/2	REED	FP51	OUT	-6316	89	5.5	407.25	16.10	10	T.D.	3.00	1600	284	8.7	40	7	7	0	TURBO
36	8 1/2	VAREL	V-527	OUT	-7759	25	3.0	481.25	8.30	15/20			2200	628	9.0	35	8	5	1	TURBO DRILL
37	8 1/2	VAREL	V-627	OUT	-7794	35	3.0	484.25	11.60	15/26			2200	628	9.0	35	4	7	1	TURBO DRILL
38	8 1/2	VAREL	V-737	OUT	-7860	66	7.5	487.75	18.80	15/20		4.50	2300	597	9.0	40	8	8	4	TURBO DRILL
39	8 1/2	VAREL	V-627	OUT	-7908	118	3.0	490.75	16.00	10/15		2.25	2300	610	9.0	40	8	7	4	TURBO DRILL
40	8 1/2	VAREL	V-627	OUT	-7935	27	2.0	490.75	12.50	10/15		3.75	2300	610	9.0	39	6	7	3	TURBO DRILL
42	8 1/2	VAREL	V-527	OUT	-8017	45	3.0	499.75	15.00	10/15		4.25	2300	610	8.9	40	7	8	3	TURBO DRILL
43	8 1/2	VAREL	V-527	OUT	-8027	10	2.0	509.25	5.00	10/15			2300	610	8.9	40	7	8	0	TURBO DRILL
34RR	8 1/2	NC	R-419	TFA-O4	-8070	43	10.0	519.25	4.30	20	60	4.25	1500	458	8.9	38	GOOD			STRATAPAX &TURBO DRI
44	8 1/2	SEC	S-86-F	OUT	-8133	7	2.5	528.75	2.80	15/20			1500	610	8.9	38	8	7	2	TURBO DRILL

6.Ø CONCLUSIONS AND RECOMMENDATIONS

The major objectives of the project were achieved within a very complex downhole environment. These included: attempting to core ten percent of the borehole and obtaining 722.1 feet of core, successfully conducting two flow tests, successfully obtaining considerable downhole geophysical data from logging, and successfully testing new downhole wireline tools. The first flow test was very successful in that formation fluid was produced from essentially one zone with little contamination of the produced fluids by the drilling operation. The second flow test was, unfortunately, not as successful, in that several zones produced fluids which were contaminated by drilling fluid lost to the formations. However, both tests indicated that the reservoir had commercial potential. The borehole was drilled to 1Ø,564 feet measured depth which slightly exceeded the goal of 1Ø,ØØØ feet. The on-site team headed by the Bechtel Staff can be credited with reaching those objectives.

The major conclusions from analyzing the various aspects of this project are:

1. The adaptation of common commercial drilling methods for scientific data collection objectives worked reasonably well. The major objectives of the project were met with 33 percent of the time spent on the field portions of the project acquiring scientific data.
2. Although unusual hole conditions presented difficult technical problems, these were effectively overcome and

the major project objectives were met.

3. As the hole problems increased at depth, the amount of time spent on scientific data collection efforts diminished.
4. Budgetary concerns unfortunately limited scientific efforts at various times and especially towards the end of the project.
5. Spot coring operations were very successful in the upper section of the hole.
6. Core footage recovery and efficiency diminished drastically with depth and hole problems.
7. Handling the major hole problems, which were lost circulation, directional control and fishing, consumed about 26 percent of the overall project time. These problems consumed 38 percent of the time below the 9 5/8" casing. They also contributed to limiting the amount of scientific data acquired.
8. The high temperature contributed directly and indirectly to difficulties in acquiring scientific data, conducting normal drilling operations and handling hole problems.
9. The final well test did not provide pristine fluid samples or valid reservoir data because the well completion was insufficient to isolate a single uncontaminated zone.
10. The need to control natural deviation of the wellbore towards the eastern lease boundary which was 230 feet from the surface location significantly increased the time on the project and downhole difficulties.

11. The hardness and abrasivness of the formations below 9,000 feet became a major problem - especially coring with essentially full sized core heads.

6.1 RECOMMENDATIONS

For future scientific drilling activities several recommendations can be made based on the results of this endeavor:

1. Close coordination should be established early in the planning of the project between the operational, scientific, institutional and funding agencies.
2. Integrated well planning between scientists and engineers should be undertaken to establish specific project goals.
3. Development of improved coring systems for continuous coring in full sized wellbores will greatly enhance future similar scientific boreholes.
4. Improved core heads (greater penetration rate and longer life) for very hard formations need to be developed.
5. Techniques and equipment for successful coring of hot, complex fractured formations normally encountered in deep active geologic areas need to be developed for future operations to enhance the scientific return for the monies spent.
6. Improved directional control must be employed for drilling effectively to great depths.

For future scientific drilling programs, research on improved coring and drilling technology will have a many-fold payback both monetarily and with improved scientific returns. Although this project was successful, it is apparent that improvements are needed to economically and successfully drill (core) to even greater depths of 50,000 feet through formations which are hard, abrasive and fractured. Problems similar to those encountered here with extremely high borehole temperatures, deviation control, lost circulation and fishing for downhole equipment will be encountered and become more difficult to overcome at great depth.

APPENDIX A

DATA FROM TOUR SHEETS FOR

OPERATIONAL TIME STUDY

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 1)

DATE	10-24-85	10-25-85	10-26-85	10-27-85	10-28-85	10-29-85	10-30-85	10-31-85	11-01-85	11-02-85	11-03-85	11-04-85	11-05-85
DEPTH	0	150	150	727	1000	1032	1032	1553	1908	2238	2447	2970	3030
DAYS	1	2	3	4	5	6	7	8	9	10	11	12	13
0000-0030	NBHA	NCMT	NRUT	NDRL	NREM	NWOC	NRUT	SBHA	NDRL	NDRL	SRIH	SBHA	SLOG
0030-0100	NDRL	NCMT	NRUT	NDRL	NREM	NWOC	NRUT	SBHA	NDRL	NDRL	SRIH	SBHA	SLOG
0100-0130	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SBHA	NDRL	NDRL	SREM	SBHA	SLOG
0130-0200	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SBHA	NDRL	NDRL	SREM	SBHA	SLOG
0200-0230	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SBHA	SCIR	NDRL	NDRL	SRIH	SLOG
0230-0300	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SBHA	SCIR	NDRL	NDRL	SRIH	SLOG
0300-0330	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SRIH	SPOH	NSVY	NDRL	SRIH	SLOG
0330-0400	NDRL	NCMT	NRUT	NDRL	NDRL	NWOC	NRUT	SRIH	SPOH	SREM	NDRL	SCIR	SLOG
0400-0430	NDRL	NCMT	NRUT	NDRL	NDRL	NRUT	NRUT	SCIR	SBHA	NREM	NDRL	SDRL	SLOG
0430-0500	NDRL	NRUT	NRUT	NDRL	NDRL	NRUT	NRUT	SDRL	SBHA	NDRL	NDRL	SDRL	SLOG
0500-0530	NDRL	NRUT	NRUT	NSVY	NDRL	NRUT	NRIG	SDRL	SRIH	NDRL	NDRL	SDRL	SLOG
0530-0600	NDRL	NRUT	NRUT	NPOH	NDRL	NRUT	NBHA	SDRL	SRIH	NDRL	NDRL	SDRL	SLOG
0600-0630	NDRL	NRUT	NRUT	NPOH	NREM	NRUT	NBHA	SDRL	SRIH	NDRL	NDRL	SDRL	SLOG
0630-0700	NDRL	NRUT	NRUT	NPOH	NCIR	NRUT	NBHA	SDRL	SDRL	NDRL	NDRL	SDRL	SLOG
0700-0730	NBHA	NRUT	NRUT	NPOH	NREM	NRUT	NBHA	SDRL	SDRL	NDRL	NDRL	SPOH	SLOG
0730-0800	NBHA	NRUT	NRUT	NBHA	NCIR	NRUT	NBHA	SPOH	SDRL	NDRL	NDRL	SPOH	SLOG
0800-0830	NBHA	NRUT	NRUT	NBHA	NCIR	NRUT	NRIH	SPOH	SDRL	NDRL	NDRL	SPOH	SRUL
0830-0900	NBHA	NRUT	NRUT	NBHA	NCIR	NRUT	NRIH	SPOH	SDRL	NDRL	NDRL	SPOH	SRUL
0900-0930	NBHA	NRUT	NRUT	NBHA	NPOH	NRUT	NRUT	SBHA	SDRL	NDRL	NDRL	SBHA	SLOG
0930-1000	NBHA	NRUT	NRUT	NBHA	NSVY	NRUT	NRUT	SBHA	SDRL	NDRL	NDRL	SBHA	SLOG
1000-1030	NBHA	NRUT	NBHA	NREM	NPOH	NRUT	NDRL	SRIH	SDRL	NDRL	NDRL	SRIH	SLOG
1030-1100	NBHA	NRUT	NBHA	NREM	NPOH	NRUT	NDRL	SRIH	SPOH	SCIR	NDRL	SRIH	SLOG
1100-1130	NREM	NRUT	NDRL	NREM	NRUC	NRUT	NCIR	SRIH	SPOH	SCIR	NDRL	SRIH	SLOG
1130-1200	NREM	NRUT	NDRL	NREM	NRUC	NRUT	NDRL	SREM	SPOH	NSVY	NDRL	SREM	SLOG
1200-1230	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SPOH	SPOH	NSVY	SREM	SLOG
1230-1300	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SBHA	SPOH	NDRL	SDRL	SLOG
1300-1330	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SBHA	SPOH	NDRL	SCIR	SLOG
1330-1400	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SBHA	SPOH	NDRL	SCIR	SRUL
1400-1430	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SRIH	SBHA	NDRL	SCIR	SRIH
1430-1500	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SRIH	SBHA	SCIR	SPOH	SRIH
1500-1530	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NSVY	SRIH	SRIH	SCIR	SPOH	SCIR
1530-1600	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SREM	SRIH	NDRL	SPOH	SCIR
1600-1630	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	SREM	SRIH	NDRL	SRUL	SCIR
1630-1700	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NDRL	NDRL	NDRL	SRIH	NDRL	SRUL	SCIR
1700-1730	NREM	NRUT	NDRL	NREM	NCSG	NRUT	NSVY	NDRL	NDRL	SDRL	NDRL	SLOG	SPOH
1730-1800	NREM	NRUT	NSVY	NREM	NCSG	NRUT	NDRL	NDRL	NSVY	SDRL	NDRL	SLOG	SPOH
1800-1830	NCIR	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SDRL	NDRL	SLOG	SBHA
1830-1900	NBHA	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SDRL	NDRL	SLOG	SRUL
1900-1930	NRUC	NRUT	NDRL	NREM	NCMT	NRUT	NREM	NDRL	NDRL	SDRL	NDRL	SLOG	SRUL
1930-2000	NRUC	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SDRL	NDRL	SLOG	SLOG
2000-2030	NCSG	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SDRL	NDRL	SLOG	SLOG
2030-2100	NCSG	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SPOH	NDRL	SLOG	SLOG
2100-2130	NCSG	NRUT	NDRL	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SPOH	SCIR	SLOG	SLOG
2130-2200	NCSG	NRUT	NREM	NREM	NCMT	NRUT	NDRL	NDRL	NDRL	SBHA	SCIR	SLOG	SLOG
2200-2230	NCSG	NRUT	NREM	NREM	NCMT	NRUT	SCIR	NREM	NDRL	SBHA	NSVY	SLOG	SLOG
2230-2300	NCSG	NRUT	NRDL	NREM	NCMT	NRUT	SCIR	NDRL	NDRL	SBHA	SPOH	SLOG	SLOG
2300-2330	NCSG	NRUT	NDRL	NREM	NCMT	NRUT	SPOH	NDRL	NDRL	SBHA	SPOH	SLOG	SLOG
2330-2400	NCMT	NRUT	NDRL	NREM	NCMT	NRUT	SPOH	NDRL	NDRL	SBHA	SPOH	SLOG	SLOG

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 2)

DATE	11-06-85	11-07-85	11-08-85	11-09-85	11-10-85	11-11-85	11-12-85	11-13-85	11-14-85	11-15-85	11-16-85	11-17-85*	11-18-85
DEPTH	3030	3030	3078	3078	3083	3167	3431	3505	3515	3515	3515	3515	3547
DAYS	14	15	16	17	18	19	20	21	22	23	24	25	26
0000-0030	SLOG	SLOG	NDRL	FWOE	FRIH	SLOG	NBHA	SLOG	SLOG	NCMT	NRUT	NRIG	NDRL
0030-0100	SLOG	SLOG	NDRL	FWOE	FRIH	SLOG	NRIH	SBHA	SLOG	NCMT	NRUT	NBHA	NDRL
0100-0130	SLOG	SLOG	NCIR	FWOE	FDRL	SLOG	NRIH	SRIH	SLOG	NCMT	NRUT	NBHA	NDRL
0130-0200	SLOG	SLOG	NPOH	FWOE	FDRL	SLOG	NRIH	SRIH	SLOG	NCMT	NRUT	NRIH	NDRL
0200-0230	SLOG	SLOG	FBHA	FWOE	FDRL	SLOG	NREM	SRIH	SLOG	NCMT	NRUT	NRIH	NDRL
0230-0300	SLOG	SLOG	FBHA	FRIG	FDRL	SLOG	NDRL	SREM	SLOG	NCMT	NRUT	NCIR	NDRL
0300-0330	SLOG	SLOG	FWOE	FBHA	FPOH	SLOG	NDRL	SREM	SLOG	NCMT	NRUT	NCIR	NDRL
0330-0400	SLOG	SLOG	FWOE	FBHA	FPOH	SRUL	NDRL	SREM	SLOG	NCMT	NRUT	NRUT	NDRL
0400-0430	SLOG	SLOG	FWOE	FRIH	FPOH	NBHA	NDRL	SREM	SLOG	NCMT	NRUT	NDRL	NDRL
0430-0500	SLOG	SLOG	FWOE	FRIH	FPOH	NRIH	NCIR	NDRL	SLOG	NCMT	NRUT	NDRL	NDRL
0500-0530	SLOG	SLOG	FWOE	FRIH	FBHA	NRIH	NCIR	NDRL	SLOG	NCMT	NRUT	NDRL	NDRL
0530-0600	SLOG	SLOG	FWOE	FRIH	FBHA	NRIH	NCIR	NDRL	SRIH	NCMT	NRUT	NCIR	NDRL
0600-0630	SLOG	SLOG	FWOE	NRRG	FRIG	SREM	NSVY	SCIR	SRIH	NRUT	NRUT	NCIR	NDRL
0630-0700	SLOG	SLOG	FWOE	NRRG	FRIG	SREM	SPOH	SCIR	SRIH	NRUT	NRUT	NCIR	NDRL
0700-0730	SLOG	SLOG	FWOE	FREM	FBHA	SREM	SPOH	SCIR	NCIR	NRUT	NRUT	NPOH	NDRL
0730-0800	SLOG	SLOG	FWOE	FREM	FBHA	NDRL	SPOH	SCIR	NCIR	NRUT	NRUT	NPOH	NDRL
0800-0830	SLOG	SLOG	SRUL	FREM	FBHA	NDRL	SBHA	NSVY	NCIR	NRUT	NRUT	NRIG	NSVY
0830-0900	SLOG	SLOG	SLOG	FREM	NBHA	NDRL	SBHA	NPOH	NCIR	NRUT	NRUT	NRIG	NDRL
0900-0930	SLOG	SLOG	SLOG	FDRL	NRIG	NDRL	SRIH	NPOH	NCIR	NRUT	NRUT	NRIG	NDRL
0930-1000	SLOG	SLOG	SLOG	FDRL	NRIG	NDRL	SRIH	NPOH	NPOH	NRUT	NRUT	NRIG	NDRL
1000-1030	SLOG	SLOG	SLOG	FDRL	FRIH	NSVY	SRIH	SRUL	NPOH	NRUT	NRUT	NRIG	NDRL
1030-1100	SLOG	SLOG	SLOG	FDRL	FRIH	NDRL	SRIH	SRUL	NPOH	NRUT	NRUT	NRIG	NDRL
1100-1130	SLOG	SLOG	FBHA	FDRL	FREM	NDRL	SDRL	SLOG	NSVY	NRUT	NRUT	NRIG	NDRL
1130-1200	SLOG	SLOG	FRIH	FDRL	FREM	NDRL	SDRL	SLOG	NSVY	NRUT	NRUT	NRIG	NDRL
1200-1230	SLOG	SLOG	FRIH	FDRL	FDRL	NDRL	SDRL	SLOG	NBHA	NRUT	NRUT	NRIG	NDRL
1230-1300	SLOG	SLOG	FRIH	FDRL	FCIR	NDRL	SDRL	SLOG	NRUC	NRUT	NRUT	NRIG	NDRL
1300-1330	SLOG	SLOG	FPOH	FPOH	FCIR	NDRL	SDRL	SLOG	NRUC	NRUT	NRUT	NRIG	NDRL
1330-1400	SLOG	SLOG	FPOH	FPOH	FPOH	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NRIG	NCIR
1400-1430	SLOG	SLOG	FPOH	FBHA	FPOH	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NRIG	NCIR
1430-1500	SLOG	SRIG	FPOH	FBHA	FPOH	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NRIG	NDRL
1500-1530	SLOG	NBHA	SRUL	FBHA	SBHA	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NRIG	NCIR
1530-1600	SLOG	NBHA	SLOG	FBHA	SBHA	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NRUL	NCIR
1600-1630	SLOG	NRIH	SLOG	FBHA	SRIH	NDRL	SDRL	SLOG	NCSG	NRUT	NRUT	NLOG	NSVY
1630-1700	SLOG	NRIH	SLOG	FRIH	SROJ	NDRL	SPOH	SLOG	NCSG	NRUT	NRUT	NLOG	SPOH
1700-1730	SLOG	NCIR	SRUL	FRIH	SDRL	NDRL	SPOH	SLOG	NCSG	NRUT	NRUT	NLOG	SPOH
1730-1800	SLOG	NCIR	FWOE	FDRL	SDRL	NDRL	SPOH	SLOG	NCSG	NRUT	NRUT	NLOG	SBHA
1800-1830	SLOG	NREM	FWOE	FDRL	SDRL	NSVY	SBHA	SLOG	NCSG	NRUT	NRUT	NBHA	SRUL
1830-1900	SLOG	NREM	FWOE	FDRL	SDRL	NDRL	SBHA	SLOG	NCSG	NRUT	NRUT	NBHA	SLOG
1900-1930	SLOG	NREM	FWOE	FDRL	SDRL	NDRL	SRUL	SLOG	NCSG	NRUT	NRUT	NBHA	SLOG
1930-2000	SLOG	NDRL	FWOE	FPOH	SPOH	NDRL	SRUL	SLOG	NCSG	NRUT	NRUT	NBHA	SLOG
2000-2030	SLOG	NDRL	FWOE	FPOH	SPOH	NDRL	SLOG	SLOG	NCSG	NRUT	NRUT	NBHA	SLOG
2030-2100	SLOG	NDRL	FWOE	FPOH	SPOH	NDRL	SLOG	SLOG	NCSG	NRUT	NRUT	NBHA	SLOG
2100-2130	SLOG	NDRL	FWOE	FPOH	SBHA	NDRL	SLOG	SLOG	NCSG	NRUT	NRUT	NRIH	SLOG
2130-2200	SLOG	NDRL	FWOE	FBHA	SBHA	NPOH	SLOG	SLOG	NCSG	NRUT	NRUT	NRIH	SLOG
2200-2230	SLOG	NDRL	FWOE	FBHA	SRUL	NPOH	SLOG	SLOG	NRUT	NRUT	NRUT	NRIH	SLOG
2230-2300	SLOG	NDRL	FWOE	FBHA	SRUL	NPOH	SLOG	SLOG	NCMT	NRUT	NRUT	NRIH	SLOG
2300-2330	SLOG	NDRL	FWOE	FBHA	SLOG	NBHA	SLOG	SRUT	NCMT	NRUT	NRUT	NDRL	SLOG
2330-2400	SLOG	NDRL	FWOE	FBHA	SLOG	NBHA	SLOG	SRUT	NCMT	NRUT	NRUT	NDRL	SLOG

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 3)

DATE	11-19-85	11-20-85	11-21-85	11-22-85	11-23-85	11-24-85	11-25-85	11-26-85	11-27-85	11-28-85	11-29-85	11-30-85	12-01-85
DEPTH	3790	3921	4070	4241	4511	4641	4643	4697	4710	4718	4789	4973	5167
DAYS	27	28	29	30	31	32	33	34	35	36	37	38	39
0000-0030	SLOG	NDRL	NDRL	SDRL	NDRL	NRIH	SLOG	NDRL	FDRL	FRIH	NDRL	NDRL	NDRL
0030-0100	SLOG	NDRL	NDRL	SDRL	NDRL	NRIH	SLOG	NDRL	FDRL	FRIH	NSVY	NDRL	NDRL
0100-0130	SLOG	NDRL	NSVY	SDRL	NDRL	NRIH	SLOG	NDRL	FDRL	FDRL	NDRL	NDRL	NDRL
0130-0200	SLOG	NDRL	NDRL	SDRL	NDRL	NREM	SLOG	NDRL	FDRL	FDRL	NDRL	NDRL	SCIR
0200-0230	SLOG	NDRL	NDRL	SDRL	NDRL	NREM	SLOG	NDRL	FPOH	FPOH	NDRL	NDRL	SCIR
0230-0300	SLOG	NDRL	NDRL	SPOH	NDRL	NREM	SLOG	FPOH	FPOH	FPOH	NDRL	NDRL	NSVY
0300-0330	SLOG	NDRL	NDRL	SPOH	NDRL	NREM	SLOG	FPOH	FPOH	FBHA	NDRL	NDRL	SPOH
0330-0400	SLOG	NDRL	NDRL	SPOH	NDRL	NREM	SLOG	FPOH	FBHA	FBHA	NDRL	NDRL	SPOH
0400-0430	SLOG	SCIR	NDRL	SPOH	NDRL	NREM	SLOG	FBHA	FBHA	FBHA	NDRL	NDRL	SPOH
0430-0500	SLOG	SCIR	NDRL	SBHA	NDRL	NREM	SLOG	FBHA	FBHA	FBHA	NDRL	NDRL	SPOH
0500-0530	SLOG	SCIR	NDRL	SBHA	NDRL	NREM	SLOG	FBHA	FRIH	FBHA	NDRL	NDRL	SBHA
0530-0600	SLOG	SPOH	NDRL	SBHA	NDRL	NREM	SLOG	FBHA	FRIH	FBHA	NDRL	NSVY	SBHA
0600-0630	SBHA	SPOH	NDRL	SBHA	NDRL	NREM	SLOG	SBHA	FRIH	FRIH	NDRL	NPOH	SBHA
0630-0700	SBHA	SPOH	NDRL	SRIH	NDRL	NREM	SLOG	SBHA	FDRL	FRIH	NDRL	NPOH	SBHA
0700-0730	SRIH	SBHA	NDRL	SRIH	NDRL	NREM	SLOG	SRIH	FDRL	FRIH	NDRL	NPOH	SRIH
0730-0800	SRIH	SBHA	NDRL	SREM	NDRL	NREM	SLOG	SRIH	FDRL	FRIH	NDRL	NPOH	SRIH
0800-0830	SRIH	SRIH	NDRL	SREM	NSVY	NREM	SLOG	SRIH	FDRL	FRIH	NDRL	NPOH	SRIH
0830-0900	SDRL	SRIH	NDRL	SREM	NDRL	NREM	SLOG	SRIH	FDRL	FDRL	NDRL	NPOH	SRIH
0900-0930	SDRL	SRIH	NDRL	SREM	NDRL	NREM	SLOG	SRIH	FDRL	FCIR	NDRL	NBHA	SDRL
0930-1000	SDRL	SRIH	SCIR	SREM	NDRL	SCIR	SLOG	SRIH	FDRL	FCIR	NDRL	NBHA	SDRL
1000-1030	SDRL	SDRL	SCIR	SREM	NDRL	SCIR	SLOG	SCIR	FDRL	FCIR	NSVY	NBHA	SDRL
1030-1100	SDRL	SDRL	SPOH	SREM	NDRL	SPOH	SLOG	SCIR	FDRL	FPOH	NDRL	NRIH	SDRL
1100-1130	SDRL	SDRL	SPOH	SREM	NDRL	SPOH	SLOG	SCIR	FDRL	FPOH	NDRL	NRIH	SDRL
1130-1200	SDRL	SDRL	SBHA	SREM	SCIR	SPOH	SBHA	SPOH	FCIR	FPOH	NDRL	NRIH	SDRL
1200-1230	SDRL	SDRL	SBHA	SREM	SCIR	SBHA	SRIH	SCIR	FPOH	FPOH	NDRL	NREM	SDRL
1230-1300	SDRL	SDRL	SBHA	NDRL	SPOH	SBHA	SRIH	SCIR	FPOH	FPOH	NDRL	NDRL	SDRL
1300-1330	SDRL	SDRL	SRIH	NDRL	SPOH	SBHA	SRIH	SRIH	FPOH	FBHA	NDRL	NDRL	SDRL
1330-1400	SDRL	SDRL	SRIH	NDRL	SPOH	SBHA	SCIR	SCIR	FPOH	FBHA	NDRL	NDRL	SDRL
1400-1430	SPOH	SDRL	SRIH	NDRL	SBHA	SRIH	SDRL	SCIR	FBHA	NRIH	NDRL	NDRL	SDRL
1430-1500	SPOH	SDRL	SDRL	NDRL	NRRG	SRIH	SDRL	SCIR	FRIH	NRIH	NDRL	NDRL	SDRL
1500-1530	SPOH	SPOH	SDRL	NDRL	NRRG	SRIH	SDRL	SPOH	FRIH	NRIH	NCIR	NDRL	SDRL
1530-1600	SPOH	SPOH	SDRL	NDRL	NRRG	SDRL	SCIR	SPOH	FRIH	NRIH	NPOH	NDRL	SDRL
1600-1630	SBHA	SPOH	SDRL	NDRL	NRRG	SDRL	SPOH	SPOH	FDRL	NBHA	NPOH	NDRL	SDRL
1630-1700	SBHA	SPOH	SDRL	NDRL	NRRG	SDRL	SPOH	SPOH	FDRL	FRIH	NPOH	NDRL	SDRL
1700-1730	SBHA	SPOH	SDRL	NDRL	NRIG	SDRL	SPOH	FWOE	FDRL	NRIH	NBHA	NDRL	SDRL
1730-1800	SRIH	SPOH	SDRL	NSVY	NRIG	SDRL	SPOH	FWOE	FDRL	FCIR	NBHA	NDRL	SDRL
1800-1830	SRIH	SBHA	SDRL	NDRL	SRUL	SDRL	SBHA	FWOE	FDRL	NREM	NRIH	NSVY	SPOH
1830-1900	SRIH	SBHA	SDRL	NDRL	SRUL	SDRL	SBHA	FWOE	FDRL	NREM	NRIH	NDRL	SPOH
1900-1930	SRIH	SBHA	SPOH	NDRL	SLOG	SDRL	SBHA	FWOE	FDRL	NRIH	NCIR	NDRL	SPOH
1930-2000	SREM	SBHA	SPOH	NDRL	SLOG	SPOH	SRIH	FWOE	FDRL	NDRL	NDRL	NDRL	SPOH
2000-2030	SREM	SRIH	SPOH	NDRL	SLOG	SPOH	SRIH	FWOE	FDRL	NDRL	NDRL	NDRL	SBHA
2030-2100	NDRL	SRIH	SPOH	NDRL	SLOG	SPOH	SRIH	FWOE	FPOH	NDRL	NDRL	NDRL	SBHA
2100-2130	NDRL	SRIH	SBHA	NDRL	SLOG	SBHA	SRIH	FWOE	FPOH	NDRL	NDRL	NDRL	SBHA
2130-2200	NDRL	SRIH	SBHA	NDRL	SLOG	SBHA	SRIH	FBHA	FPOH	NDRL	NDRL	NDRL	SBHA
2200-2230	NDRL	SRIH	SRIH	NDRL	NBHA	SRUL	SRIH	FBHA	FPOH	NDRL	NDRL	NDRL	SRIH
2230-2300	NDRL	SREM	SRIH	NDRL	NBHA	SRUL	SREM	FRIH	FBHA	NDRL	NDRL	NDRL	SRIH
2300-2330	NDRL	SREM	SRIH	NDRL	NRIH	SLOG	SREM	FRIH	FBHA	NDRL	NDRL	NDRL	SREM
2330-2400	NSVY	NDRL	SDRL	NDRL	NRIH	SLOG	NDRL	FCIR	FRIH	NDRL	NDRL	NDRL	SREM

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 4)

DATE	12-02-85	12-03-85	12-04-85	12-05-85	12-06-85	12-07-85	12-08-85	12-09-85	12-10-85	12-11-85
DEPTH	5218	5381	5422	5422	5424	5580	5658	6000	6000	6000
DAYS	40	41	42	43	44	45	46	47	48	49
0000-0030	SREM	NREM	SRUT	SREM	NRIG	SDRL	NDRL	NCIR	SLOG	SLOG
0030-0100	SREM	NREM	SRUT	SREM	NRIG	SDRL	NDRL	NRIH	SLOG	SLOG
0100-0130	SREM	NDRL	STST	SREM	NBHA	SDRL	NSVY	NPOH	SLOG	SLOG
0130-0200	SCIR	NDRL	NRRG	NDRL	NBHA	SDRL	NSVY	NCIR	SLOG	SLOG
0200-0230	SCIR	NDRL	SRUT	FPOH	NBHA	SDRL	NDRL	NCIR	SLOG	SLOG
0230-0300	SPOH	NDRL	SRUT	FPOH	NBHA	SDRL	NDRL	NSVY	SLOG	SLOG
0300-0330	SPOH	NDRL	SLOG	FPOH	NRIH	SDRL	NDRL	SPOH	SRIH	SLOG
0330-0400	SBHA	NDRL	SLOG	FBHA	NRIH	SDRL	NDRL	SPOH	SRIH	SLOG
0400-0430	SBHA	NDRL	SLOG	FBHA	NRIH	SDRL	NDRL	SPOH	SRIH	SLOG
0430-0500	SRIH	NDRL	SLOG	FBHA	NRIH	SPOH	NDRL	SPOH	SRIH	SLOG
0500-0530	SRIH	NDRL	SLOG	FRIH	NRIH	SPOH	NDRL	SPOH	SRIH	SLOG
0530-0600	SRIH	NDRL	SLOG	FRIH	NDRL	SPOH	NDRL	SPOH	SRIH	SLOG
0600-0630	SRIH	SCIR	SLOG	FRIH	NDRL	SPOH	NDRL	SRUL	SCIR	SLOG
0630-0700	SREM	SCIR	SLOG	FRIH	NDRL	SPOH	NDRL	SLOG	SCIR	SLOG
0700-0730	NDRL	SCIR	SLOG	FDRL	NDRL	SBHA	NDRL	SLOG	SCIR	SLOG
0730-0800	NDRL	NDRL	SLOG	FPOH	NDRL	SBHA	NDRL	SLOG	SCIR	SLOG
0800-0830	NDRL	NDRL	SLOG	FPOH	NDRL	SBHA	NDRL	SLOG	SCIR	SLOG
0830-0900	NDRL	NDRL	SLOG	FPOH	NDRL	SBHA	NDRL	SLOG	SCIR	SLOG
0900-0930	NDRL	NSVY	SLOG	FPOH	NSVY	SRIH	NSVY	SLOG	SCIR	SLOG
0930-1000	NDRL	SPOH	SLOG	FPOH	NDRL	SRIH	NDRL	SLOG	SPOH	SLOG
1000-1030	NDRL	SPOH	SLOG	FBHA	NDRL	SREM	NDRL	SLOG	SPOH	SLOG
1030-1100	NDRL	STST	SLOG	FBHA	NDRL	SREM	NDRL	SLOG	SPOH	SLOG
1100-1130	NSVY	STST	SLOG	NRIG	NDRL	NDRL	NRRG	SLOG	SPOH	SLOG
1130-1200	NDRL	STST	SLOG	NRIG	NDRL	NDRL	NDRL	SLOG	SPOH	SLOG
1200-1230	NDRL	STST	SLOG	NRIG	NDRL	NDRL	NDRL	SLOG	SLOG	SLOG
1230-1300	NDRL	STST	SLOG	NRIG	NDRL	NDRL	NDRL	SLOG	SLOG	SLOG
1300-1330	NDRL	SRIH	SRUT	NRIG	NDRL	NDRL	NDRL	SLOG	SLOG	SLOG
1330-1400	NDRL	SRIH	SRIH	NRIG	NDRL	NDRL	NDRL	SLOG	SLOG	SLOG
1400-1430	NDRL	SPOH	SRIH	NRIG	NCIR	NDRL	NDRL	SLOG	SLOG	SLOG
1430-1500	NDRL	SPOH	SRIH	NRIG	NSVY	NDRL	NDRL	SLOG	SLOG	SLOG
1500-1530	NDRL	SPOH	SCIR	NRIG	SPOH	NDRL	NDRL	SLOG	SLOG	SLOG
1530-1600	NDRL	SPOH	SCIR	NRIG	SPOH	NCIR	NSVY	SLOG	SLOG	SLOG
1600-1630	NDRL	SBHA	SCIR	NRIG	SPOH	NCIR	NDRL	SLOG	SLOG	SLOG
1630-1700	NDRL	SBHA	SCIR	NRIG	SPOH	NCIR	NDRL	SLOG	SLOG	SLOG
1700-1730	NDRL	SBHA	SPOH	NRIG	SBHA	NPOH	NDRL	SLOG	SLOG	SLOG
1730-1800	NDRL	SRIH	SPOH	NRIG	SBHA	NPOH	NDRL	SLOG	SLOG	SLOG
1800-1830	NSVY	SRIH	SBHA	NRIG	SBHA	NPOH	NDRL	SLOG	SLOG	SLOG
1830-1900	NDRL	SRIH	SBHA	NRIG	SBHA	NPOH	NDRL	SRUL	SLOG	SLOG
1900-1930	NPOH	SCIR	SBHA	NRIG	SRIH	NBHA	NDRL	SLOG	SLOG	SLOG
1930-2000	NPOH	SCIR	SBHA	NRIG	SRIH	NBHA	NDRL	SRUL	SLOG	SLOG
2000-2030	NPOH	SCIR	SBHA	NRIG	SRIH	NBHA	NDRL	SLOG	SLOG	SLOG
2030-2100	NPOH	SCIR	SBHA	NRIG	SRIH	NBHA	NDRL	SLOG	SLOG	SLOG
2100-2130	NBHA	SCIR	SRIH	NRIG	SRIH	NRIH	NDRL	SLOG	SLOG	SLOG
2130-2200	NBHA	SCIR	SRIH	NRIG	SDRL	NRIH	NDRL	SLOG	SLOG	SLOG
2200-2230	NBHA	SPOH	SRIH	NRIG	SDRL	NRIH	NDRL	SLOG	SLOG	SLOG
2230-2300	NBHA	SPOH	SREM	NRIG	SDRL	NDRL	NDRL	SLOG	SLOG	SLOG
2300-2330	NRIH	SPOH	SREM	NRIG	SDRL	NDRL	NDRL	SLOG	SLOG	SLOG
2330-2400	NRIH	SPOH	SREM	NRIG	SDRL	NDRL	NCIR	SLOG	SLOG	SLOG

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 5)

DATE	12-12-85	12-13-85	12-14-85	12-15-85	12-16-85	12-17-85*	12-18-85	12-19-85	12-20-85	12-21-85	12-22-85	12-23-85	12-24-85
DEPTH	6000	6000	6150	6000	6000	6000	6036	6043	6056	6112	6151	6227	6227
DAYS	50	51	52	53	54	55	56	57	58	59	60	61	62
0000-0030	SLOG	NCIR	NCSG	NRUT	NBHA	NRIH	SDRL	FBHA	DDRL	FBHA	DDRL	DPOH	SLOG
0030-0100	SLOG	NCIR	NCSG	NRUT	NRIH	NRIH	SDRL	FBHA	DDRL	FBHA	DDRL	DPOH	SLOG
0100-0130	SLOG	NSVY	NCSG	NRUT	NRIH	NRIH	SDRL	SBHA	DDRL	FBHA	DDRL	DPOH	SLOG
0130-0200	SLOG	NSVY	NCSG	NRUT	NRUT	NRIH	SDRL	SBHA	DSVY	FBHA	DDRL	DPOH	SLOG
0200-0230	SRIH	NSVY	NCSG	NRUT	NDRL	NRIH	SDRL	SBHA	DDRL	DBHA	DDRL	DBHA	SLOG
0230-0300	SRIH	NSVY	NCSG	NRUT	NDRL	NRUT	SDRL	SBHA	DDRL	DBHA	DSVY	DBHA	SLOG
0300-0330	SRIH	NSVY	NCMT	NRUT	NDRL	NDRL	SDRL	NRIG	DDRL	DRIH	DPOH	NBHA	NSTB
0330-0400	SRIH	NSVY	NCMT	NRUT	NRUT	NDRL	SDRL	NRIG	DPOH	DRIH	DPOH	NBHA	NSTB
0400-0430	SRIH	NSVY	NCMT	NRUT	NRIH	NDRL	SDRL	NRIG	DPOH	DRIH	DPOH	NRIH	NSTB
0430-0500	SCIR	NSVY	NCMT	NRUT	NCIR	NDRL	SPOH	NRIG	DPOH	DRIH	DPOH	NRIH	NSTB
0500-0530	SCIR	NPOH	NCMT	NRUT	NCIR	NDRL	SPOH	DBHA	DBHA	DREM	NBHA	NREM	NSTB
0530-0600	SCIR	NRUC	NCMT	NRUT	NCIR	NDRL	SPOH	DBHA	DBHA	DREM	NRIH	NREM	NSTB
0600-0630	SCIR	NRUC	NCMT	NRUT	NCIR	NDRL	SBHA	DRIH	DRIH	DREM	NRIH	NREM	NSTB
0630-0700	SCIR	NRUC	NCMT	NRUT	NRIG	NDRL	SBHA	DRIH	DRIH	DREM	NRIH	NCIR	NSTB
0700-0730	SCIR	NRUC	NCMT	NRUT	NRIG	NDRL	NRUL	DCIR	DRIH	DREM	NRIH	NCIR	NSTB
0730-0800	SCIR	NRUC	NCMT	NRUT	NRIG	NDRL	NRUL	DCIR	DRIH	DCIR	NRIH	NCIR	NSTB
0800-0830	SCIR	NRUC	NCMT	NRUT	NRIG	NDRL	NRUL	DCIR	DREM	DSVY	NRIH	NSVY	NSTB
0830-0900	SPOH	NRUC	NCMT	NRUT	NRIG	NDRL	NRUL	DSVY	DREM	DPOH	NRIH	SCIR	NSTB
0900-0930	SPOH	NRUC	NCMT	NRUT	NRIG	NDRL	NLOG	DDRL	DSVY	DPOH	NRIH	SCIR	NSTB
0930-1000	SPOH	NCSG	NCMT	NRUT	NRIG	NDRL	NLOG	DDRL	DDRL	DPOH	NREM	SCIR	NSTB
1000-1030	SPOH	NCSG	NCMT	NRUT	NRIG	SPOH	NLOG	DDRL	DDRL	DBHA	NREM	SCIR	NSTB
1030-1100	SPOH	NCSG	NCMT	NRUT	NRIG	SPOH	NLOG	DDRL	DDRL	DBHA	NREM	SPOH	NSTB
1100-1130	SLOG	NCSG	NCMT	NRUT	NRUT	SPOH	NLOG	DDRL	DDRL	DRIH	NCIR	SPOH	NSTB
1130-1200	SRUL	NCSG	NCMT	NRUT	NRUT	SPOH	NLOG	DDRL	DDRL	DRIH	NCIR	SPOH	NSTB
1200-1230	SLOG	NCSG	NCMT	NRUT	NRUT	SBHA	NLOG	DDRL	DDRL	DRIH	NSVY	SRUT	NSTB
1230-1300	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DDRL	DSVY	DSVY	NSVY	SRUT	NSTB
1300-1330	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DPOH	DDRL	DDRL	NSVY	SRUT	NSTB
1330-1400	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DPOH	DPOH	DDRL	DPOH	SRUT	NSTB
1400-1430	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DPOH	DPOH	DDRL	DPOH	SRUT	NSTB
1430-1500	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DPOH	DPOH	DDRL	DPOH	SRUT	NSTB
1500-1530	SLOG	NCSG	NCMT	NRUT	NRIG	SBHA	NLOG	DBHA	DBHA	DDRL	DPOH	SRUT	NSTB
1530-1600	SLOG	NCSG	NCMT	NRUT	NRIG	SRIH	NLOG	DBHA	DBHA	DSVY	DPOH	SRUT	NSTB
1600-1630	SLOG	NCSG	NWOC	NRUT	NRIG	SRIH	NLOG	DBHA	FWOE	DDRL	DRIH	SRUT	NSTB
1630-1700	SLOG	NCSG	NWOC	NRUT	NBHA	SRIH	NLOG	DRIH	FWOE	DDRL	DRIH	SRUT	NSTB
1700-1730	SLOG	NCSG	NWOC	NRUT	NBHA	SRIH	NLOG	NRIG	FWOE	DDRL	DRIH	SRUT	NSTB
1730-1800	SRUL	NCSG	NWOC	NRUT	NBHA	SCIR	NRUL	NRIG	FWOE	DDRL	DCIR	SRUT	NSTB
1800-1830	SRIH	NCSG	NWOC	NRUT	NRIH	SDRL	FRIH	DRIH	FRIG	DPOH	DSVY	SRUT	NSTB
1830-1900	SRIH	NCSG	NWOC	NRUT	NRIH	SDRL	FRIH	DRIH	FBHA	DPOH	DDRL	SRUT	NSTB
1900-1930	SRIH	NCSG	NWOC	NRUT	NRIH	SDRL	FCIR	DRIH	FRIH	DPOH	DDRL	SRUT	NSTB
1930-2000	SRIH	NCSG	NWOC	NRUT	NRIH	SDRL	FCIR	DREM	FRIH	DBHA	DDRL	SRUT	NSTB
2000-2030	NCIR	NCSG	NWOC	NRUT	NRIH	SDRL	FPOH	DREM	FRIH	DRIH	DDRL	SRUT	NSTB
2030-2100	NCIR	NCSG	NWOC	NRUT	NRIH	SDRL	FPOH	DSVY	FRIH	DRIH	DSVY	SRUT	NSTB
2100-2130	NCIR	NCSG	NRUT	NRUT	NRIH	SDRL	FPOH	DDRL	FDRL	DRIH	DDRL	SRUT	NSTB
2130-2200	NCIR	NCSG	NRUT	NRUT	NRIH	SDRL	FPOH	DDRL	FPOH	DCIR	DDRL	SRUT	NSTB
2200-2230	NCIR	NCSG	NRUT	NBHA	NRIH	SDRL	FPOH	DDRL	FPOH	DSVY	DDRL	SRUT	NSTB
2230-2300	NCIR	NCSG	NRUT	NBHA	NRIH	SDRL	FPOH	DDRL	FPOH	DREM	DDRL	SRUT	NSTB
2300-2330	NCIR	NCSG	NRUT	NBHA	NRIH	SDRL	FPOH	DDRL	FPOH	DDRL	DDRL	SRUT	NSTB
2330-2400	NCIR	NCSG	NRUT	NBHA	NRIH	SDRL	FPOH	DDRL	FPOH	DDRL	DSVY	SRUT	NSTB

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 6)

DATE	12-25-85	12-26-85	12-27-85	12-28-85	12-29-85	12-30-85	12-31-85	01-01-86	01-02-86	01-03-86	01-04-86	01-05-86	01-06-86
DEPTH	6227	6227	6227	6227	6227	6227	6227	6227	6227	6316	6506	6637	6771
DAYS	63	64	65	66	67	68	69	70	71	72	73	74	75
0000-0030	NSTB	NSTB	NSTB	SRUL	STST	SRUT	SLOG	STST	SRUT	DPOH	SDRL	LCIR	SBHA
0030-0100	NSTB	NSTB	NSTB	SRUL	STST	SRUT	SLOG	STST	SRUT	DPOH	SDRL	LCIR	SBHA
0100-0130	NSTB	NSTB	NSTB	SLOG	STST	STST	SRUT	STST	SRUT	DBHA	SDRL	LRIH	LRIH
0130-0200	NSTB	NSTB	NSTB	SLOG	STST	STST	SRUT	STST	SRUT	DBHA	SDRL	LCIR	LRIH
0200-0230	NSTB	NSTB	NSTB	SLOG	STST	STST	SRUT	STST	SRUT	NBHA	SPOH	LPOH	LRIH
0230-0300	NSTB	NSTB	NSTB	SLOG	STST	STST	SRUT	STST	SRUT	NRIH	SPOH	LWOC	LRIH
0300-0330	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SBHA	NRIH	SPOH	LWOC	LRIH
0330-0400	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SRIH	NRIH	SPOH	LWOC	LRIH
0400-0430	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SRIH	NRIH	SPOH	LCIR	SCIR
0430-0500	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SCIR	NRIH	SPOH	LRIH	LCMT
0500-0530	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SRIH	NRIH	SBHA	LDRL	LCMT
0530-0600	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SREM	NREM	SBHA	LDRL	LPOH
0600-0630	NSTB	NSTB	NSTB	SRUL	STST	STST	SRUT	STST	SREM	NREM	SBHA	LDRL	LCIR
0630-0700	NSTB	NSTB	NSTB	SRUL	STST	STST	SRUT	STST	SCIR	NREM	SBHA	LDRL	LCMT
0700-0730	NSTB	NSTB	NSTB	SRUL	STST	STST	SRUT	STST	SCIR	NDRL	SBHA	LDRL	LCMT
0730-0800	NSTB	NSTB	NSTB	SRUL	STST	STST	SRUT	STST	SCIR	NDRL	SBHA	LDRL	LPOH
0800-0830	NSTB	NSTB	NSTB	SRUL	STST	STST	SLOG	STST	SCIR	NDRL	SRIH	LDRL	LCIR
0830-0900	NSTB	NSTB	NSTB	SRUL	STST	STST	SLOG	STST	SPOH	NDRL	SRIH	LDRL	LCMT
0900-0930	NSTB	NSTB	NSTB	SRUL	STST	STST	SLOG	STST	SRIH	NSVY	SRIH	LDRL	LPOH
0930-1000	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	NSVY	NCIR	SREM	LDRL	LPOH
1000-1030	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SPOH	NDRL	NDRL	LCIR	LPOH
1030-1100	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SPOH	NDRL	NDRL	LCIR	LPOH
1100-1130	NSTB	NSTB	NSTB	SLOG	STST	STST	SLOG	STST	SPOH	NDRL	NDRL	SPOH	LPOH
1130-1200	NSTB	NSTB	NSTB	SLOG	STST	STST	SRUT	STST	SPOH	NDRL	NDRL	SPOH	LPOH
1200-1230	NSTB	NSTB	NSTB	SLOG	STST	STST	SWOE	STST	DBHA	NCIR	NSVY	SPOH	LPOH
1230-1300	NSTB	NSTB	NSTB	SLOG	STST	STST	SWOE	STST	DBHA	NSVY	NDRL	SPOH	LPOH
1300-1330	NSTB	NSTB	NSTB	SRUL	STST	STST	SWOE	STST	DRIH	NDRL	NDRL	SBHA	LPOH
1330-1400	NSTB	NSTB	NSTB	STST	STST	STST	SWOE	STST	DRIH	NDRL	NDRL	SBHA	LPOH
1400-1430	NSTB	NSTB	NSTB	STST	STST	STST	SWOE	SRUT	DRIH	NDRL	NDRL	SBHA	LPOH
1430-1500	NSTB	NSTB	NSTB	STST	STST	STST	SWOE	SRUT	DCIR	NDRL	NDRL	SBHA	LPOH
1500-1530	NSTB	NSTB	NSTB	STST	STST	STST	SWOE	SRUT	DSVY	NDRL	NDRL	SBHA	NSTB
1530-1600	NSTB	NSTB	NSTB	STST	STST	STST	SWOE	SRUT	DDRL	NDRL	NSVY	SBHA	NSTB
1600-1630	NSTB	NSTB	NSTB	STST	STST	STST	SRUT	SRUT	DDRL	NCIR	NDRL	SBHA	NSTB
1630-1700	NSTB	NSTB	NSTB	STST	STST	STST	SRUT	SRUT	DDRL	NSVY	LPOH	SBHA	NSTB
1700-1730	NSTB	NSTB	NSTB	STST	STST	STST	SLOG	SRUT	DSVY	SPOH	LCIR	SRIH	NSTB
1730-1800	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DSVY	SPOH	LRIH	SCIR	NSTB
1800-1830	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	SPOH	LCIR	SRIH	NSTB
1830-1900	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	SPOH	LWOC	SRIH	NSTB
1900-1930	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	SPOH	LWOC	SRIH	NSTB
1930-2000	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DSVY	SPOH	LWOC	SCIR	NSTB
2000-2030	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	NRIG	LRIH	SDRL	NSTB
2030-2100	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	SBHA	LCIR	SPOH	NSTB
2100-2130	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DDRL	SRIH	LPOH	SPOH	NSTB
2130-2200	NSTB	NSTB	NSTB	STST	STST	SLOG	SLOG	SRUT	DSVY	SRIH	LWOC	SPOH	NSTB
2200-2230	NSTB	NSTB	NSTB	STST	STST	SLOG	SRUL	SRUT	DDRL	SRIH	LWOC	SPOH	NSTB
2230-2300	NSTB	NSTB	NSTB	STST	STST	SLOG	SRUT	SRUT	DDRL	SRIH	LWOC	SPOH	NSTB
2300-2330	NSTB	NSTB	NSTB	STST	STST	SLOG	STST	SRUT	DDRL	SRIH	LWOC	SBHA	NSTB
2330-2400	NSTB	NSTB	NSTB	STST	STST	SLOG	STST	SRUT	DPOH	SCIR	LCIR	SBHA	NSTB

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 7)

DATE	01-07-86	01-08-86	01-09-86	01-10-86	01-11-86	01-12-86	01-13-86	01-14-86	01-15-86	01-16-86	01-17-86	01-18-86	01-19-86
DEPTH	6771	6771	6771	6771	6772	6818	6850	6850	6889	6973	7163	7313	7432
DAYS	76	77	78	79	80	81	82	83	84	85	86	87	88
0000-0030	NSTB	NSTB	NSTB	NRIG	NRUT	LCIR	LPOH	LBHA	SBHA	NDRL	NDRL	SRIH	NRIH
0030-0100	NSTB	NSTB	NSTB	NRIG	NRUT	LWOC	LPOH	LBHA	LRIH	NDRL	NDRL	SRIH	NRIH
0100-0130	NSTB	NSTB	NSTB	NRUT	NRUT	LCIR	LPOH	LBHA	LRIH	NDRL	NDRL	SREM	NCIR
0130-0200	NSTB	NSTB	NSTB	NRUT	NRUT	LCIR	LBHA	LBHA	LRIH	NDRL	NDRL	NDRL	NDRL
0200-0230	NSTB	NSTB	NSTB	NWOE	NRUT	LCIR	LBHA	LRIH	LRIH	NDRL	NDRL	NDRL	NSVY
0230-0300	NSTB	NSTB	NSTB	NWOE	NRUT	LCIR	LBHA	LRIH	LCIR	NDRL	NDRL	NDRL	NDRL
0300-0330	NSTB	NSTB	NSTB	NWOE	NRUT	LRIH	LRIH	LDRL	LCIR	NDRL	NDRL	NDRL	NDRL
0330-0400	NSTB	NSTB	NSTB	NWOE	NRUT	LRIH	LCIR	LDRL	LCMT	NDRL	NDRL	NDRL	NDRL
0400-0430	NSTB	NSTB	NSTB	NWOE	LBHA	NDRL	LRIH	LDRL	LPOH	NDRL	NDRL	NDRL	NDRL
0430-0500	NSTB	NSTB	NSTB	NWOE	LBHA	NDRL	NRIG	LDRL	LCIR	NDRL	NDRL	NDRL	NSVY
0500-0530	NSTB	NSTB	NSTB	NWOE	LRIH	LCIR	NRIG	LDRL	LWOC	NDRL	NSVY	NDRL	NDRL
0530-0600	NSTB	NSTB	NSTB	NWOE	LRIH	LCIR	NRIG	LDRL	LWOC	NCIR	NDRL	NDRL	NDRL
0600-0630	NSTB	NSTB	NSTB	NWOE	LRIH	LPOH	LCIR	LDRL	LWOC	SPOH	NDRL	NDRL	NDRL
0630-0700	NSTB	NSTB	NSTB	NWOE	LCIR	LWOC	LDRL	LDRL	LWOC	SPOH	NDRL	NDRL	NCIR
0700-0730	NSTB	NSTB	NSTB	NWOE	LDRL	LCIR	LDRL	LDRL	LWOC	SBHA	NCIR	NDRL	SPOH
0730-0800	NSTB	NSTB	NSTB	NWOE	LDRL	LCIR	LDRL	LDRL	LWOC	SBHA	NDRL	NPOH	SPOH
0800-0830	NSTB	NSTB	NSTB	LBHA	LDRL	LPOH	LDRL	LDRL	LWOC	SBHA	NCIR	NPOH	SPOH
0830-0900	NSTB	NSTB	NSTB	LBHA	LDRL	LPOH	LDRL	LDRL	LWOC	SBHA	SPOH	NPOH	SPOH
0900-0930	NSTB	NSTB	NSTB	LRIH	LDRL	LPOH	LDRL	LDRL	LWOC	SRIH	SPOH	NPOH	SBHA
0930-1000	NSTB	NSTB	NSTB	LCIR	LDRL	LPOH	LDRL	LDRL	LWOC	SRIH	SPOH	NPOH	SBHA
1000-1030	NSTB	NSTB	NSTB	LRIH	LDRL	LBHA	LDRL	LDRL	LWOC	SRIH	SPOH	NBHA	SBHA
1030-1100	NSTB	NSTB	NSTB	LRIH	LDRL	LBHA	LDRL	LDRL	LWOC	SCIR	SBHA	NBHA	SRIH
1100-1130	NSTB	NSTB	NSTB	LCIR	LDRL	LRIH	LDRL	LDRL	LWOC	LCIR	SRIH	NRIH	SRIH
1130-1200	NSTB	NSTB	NSTB	LCIR	LDRL	LRIH	LDRL	LDRL	LWOC	LCIR	SRIH	NRIH	SRIH
1200-1230	NSTB	NSTB	NSTB	LCIR	LDRL	LRIH	LDRL	LREM	LWOC	SRIH	NRRG	NRIH	SRIH
1230-1300	NSTB	NSTB	NSTB	LCIR	NDRL	LCMT	LDRL	LCIR	LPOH	SDRL	NRRG	NRIH	SRIH
1300-1330	NSTB	NSTB	NSTB	LCIR	NDRL	LCMT	LDRL	SPOH	LPOH	SDRL	SRIH	NRIH	SDRL
1330-1400	NSTB	NSTB	NSTB	LPOH	NDRL	LCMT	LDRL	SPOH	LPOH	SDRL	SRIH	NCIR	SDRL
1400-1430	NSTB	NSTB	NSTB	LPOH	NDRL	LWOC	LDRL	SBHA	LBHA	SPOH	SRIH	NDRL	SDRL
1430-1500	NSTB	NSTB	NSTB	LPOH	NDRL	LPOH	LDRL	SBHA	LBHA	SPOH	SCIR	NDRL	SDRL
1500-1530	NSTB	NSTB	NSTB	LPOH	LPOH	LPOH	LPOH	SBHA	LBHA	SPOH	SRIH	NDRL	SDRL
1530-1600	NSTB	NSTB	NSTB	LPOH	LCIR	LPOH	LPOH	SBHA	LBHA	SPOH	SDRL	NCIR	SDRL
1600-1630	NSTB	NSTB	NSTB	NRUT	LCIR	LPOH	LPOH	SRIH	LRIH	SPOH	SDRL	NCIR	SDRL
1630-1700	NSTB	NSTB	NSTB	NRUT	LCIR	LBHA	LPOH	SRIH	LRIH	SPOH	SDRL	NCIR	SPOH
1700-1730	NSTB	NSTB	NSTB	NRUT	LCIR	LPOH	LBHA	SRIH	LRIH	SBHA	SDRL	NDRL	SPOH
1730-1800	NSTB	NSTB	NSTB	NRUT	LCIR	LPOH	LBHA	SRIH	LRIH	SBHA	SPOH	NDRL	SPOH
1800-1830	NSTB	NSTB	NSTB	NRUT	LWOC	LRIH	LBHA	SREM	LRIH	SBHA	SPOH	NDRL	SPOH
1830-1900	NSTB	NSTB	NSTB	NRUT	LWOC	LRIH	LBHA	SDRL	LREM	SBHA	SPOH	NDRL	SPOH
1900-1930	NSTB	NSTB	NSTB	NRUT	LCIR	LRIH	LBHA	SDRL	LREM	SRIH	SPOH	NPOH	SPOH
1930-2000	NSTB	NSTB	NSTB	NRUT	LCIR	LRIH	LBHA	SPOH	NDRL	SRIH	SPOH	NPOH	SPOH
2000-2030	NSTB	NSTB	NSTB	NRUT	LCIR	LRIH	LRIH	SPOH	NDRL	SREM	SBHA	NPOH	SBHA
2030-2100	NSTB	NSTB	NSTB	NRUT	LCIR	LCIR	LRIH	SPOH	NDRL	SREM	SBHA	NPOH	SBHA
2100-2130	NSTB	NSTB	NSTB	NRUT	LCIR	LCIR	NCIR	SPOH	NDRL	NDRL	SBHA	NPOH	SBHA
2130-2200	NSTB	NSTB	NSTB	NRUT	LCIR	LCIR	NPOH	SPOH	NDRL	NDRL	SBHA	NPOH	SBHA
2200-2230	NSTB	NSTB	NSTB	NRUT	LCIR	LCMT	NPOH	SPOH	NDRL	NDRL	SRIH	NPOH	SRIH
2230-2300	NSTB	NSTB	NSTB	NRUT	LCIR	LPOH	NPOH	SPOH	NDRL	NDRL	SRIH	NRIH	SRIH
2300-2330	NSTB	NSTB	NSTB	NRUT	LWOC	LCIR	NPOH	SBHA	NDRL	NSVY	SRIH	NRIH	SRIH
2330-2400	NSTB	NSTB	NSTB	NRUT	LWOC	LPOH	NPOH	SBHA	NDRL	NDRL	SRIH	NRIH	SRIH

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 8)

DATE	01-20-86	01-21-86	01-22-86	01-23-86	01-24-86	01-25-86	01-26-86	01-27-86	01-28-86
DEPTH	7577	7734	7789	7907	7972	8027	8070	8126	8133
DAYS	89	90	91	92	93	94	95	96	97
0000-0030	SREM	DRIH	DDRL	DPOH	DPOH	DBHA	NRIH	NRIG	SCIR
0030-0100	NSVY	DRIH	DPOH	DPOH	DPOH	DBHA	NRIH	NRIG	SCIR
0100-0130	NDRL	DRIH	DPOH	DBHA	DPOH	DBHA	DREM	DBHA	LCIR
0130-0200	NDRL	DRIH	DPOH	DBHA	DPOH	DRIH	DREM	DBHA	LCIR
0200-0230	NDRL	DCIR	DPOH	DBHA	DBHA	DRIH	DREM	NRIG	SRIH
0230-0300	NDRL	DCIR	DPOH	DBHA	DBHA	DRIH	DREM	NRIG	SRIH
0300-0330	NDRL	DRIH	DBHA	DRIH	DBHA	DRIH	DREM	NRIG	SREM
0330-0400	NSVY	DRIH	DBHA	DRIH	DRIH	DRIH	NDRL	NRIG	SDRL
0400-0430	NSVY	DREM	DBHA	DRRG	DRIH	DREM	NDRL	LRIH	SDRL
0430-0500	NDRL	DREM	DRIH	DRRG	DRIH	DDRL	NDRL	LRIH	SDRL
0500-0530	NDRL	DREM	DRIH	DRIH	DRIH	DDRL	NRRG	LRIH	SDRL
0530-0600	NDRL	DREM	DRIH	DRIH	NRRG	DDRL	NDRL	LRIH	SDRL
0600-0630	NDRL	DDRL	DRIH	DREM	DRIH	DDRL	NDRL	LCIR	SDRL
0630-0700	NDRL	DDRL	DRIH	DREM	DRIH	DDRL	NDRL	LRIH	SDRL
0700-0730	NDRL	NRRG	DREM	DSVY	DREM	DDRL	NDRL	LRIH	SDRL
0730-0800	NDRL	NRRG	DSVY	DDRL	DREM	DDRL	NDRL	LCIR	SDRL
0800-0830	NSVY	NRRG	DSVY	DDRL	DSVY	DDRL	NSVY	DSVY	SDRL
0830-0900	SPOH	NRRG	DDRL	DSVY	DDRL	DDRL	LCIR	DCIR	SPOH
0900-0930	SPOH	NRRG	DDRL	DDRL	DDRL	DDRL	NDRL	DCIR	SPOH
0930-1000	SPOH	NRRG	DSVY	DDRL	DDRL	DDRL	NDRL	DDRL	SPOH
1000-1030	SBHA	NRRG	DDRL	DPOH	DSVY	DDRL	NDRL	DDRL	SPOH
1030-1100	SBHA	DSVY	DDRL	DPOH	DDRL	DDRL	NDRL	DDRL	SPOH
1100-1130	SBHA	DSVY	DSVY	DPOH	DDRL	DDRL	NDRL	DDRL	SPOH
1130-1200	NRRG	DDRL	DDRL	DPOH	DDRL	DDRL	NDRL	DDRL	SPOH
1200-1230	SRIH	DDRL	DDRL	DPOH	DPOH	DDRL	LDRL	DCIR	SBHA
1230-1300	SRIH	DDRL	DDRL	DPOH	DPOH	DDRL	NSVY	DCIR	SBHA
1300-1330	SRIH	DDRL	DPOH	DBHA	DPOH	DDRL	LCIR	DCIR	SBHA
1330-1400	SCIR	DDRL	DPOH	DBHA	DPOH	DDRL	LPOH	DCIR	SBHA
1400-1430	SRIH	DDRL	DPOH	NRIH	DPOH	DDRL	LPOH	DPOH	SRIH
1430-1500	SRIH	DDRL	DPOH	NRIH	DBHA	DDRL	LPOH	DPOH	SRIH
1500-1530	SDRL	DPOH	DBHA	NRIH	DRIH	DSVY	LPOH	DPOH	SRIH
1530-1600	SDRL	DPOH	DBHA	NRIH	DRIH	DSVY	LPOH	DPOH	SRIH
1600-1630	SDRL	DPOH	DRIH	NRIH	DRIH	NRRG	LPOH	DPOH	LCIR
1630-1700	SDRL	DPOH	DRIH	NRIH	DRIH	NRRG	LPOH	DPOH	LCIR
1700-1730	SDRL	DBHA	DRIH	NREM	DRIH	DDRL	NRIG	DPOH	LCMT
1730-1800	SDRL	DBHA	DRIH	NREM	DREM	DDRL	NRIG	DBHA	LCMT
1800-1830	SPOH	DRIH	DREM	NREM	DSVY	DPOH	NRIG	LBHA	LCMT
1830-1900	SPOH	DRIH	DSVY	NREM	DSVY	DPOH	NRIG	LBHA	LPOH
1900-1930	SPOH	DRIH	DSVY	NREM	DDRL	DPOH	NRIG	LRIH	LWOC
1930-2000	SPOH	DRIH	DDRL	NDRL	DDRL	DPOH	NRIG	LCIR	LWOC
2000-2030	SPOH	DRIH	DDRL	NDRL	DDRL	DPOH	NRIG	LCIR	LWOC
2030-2100	SPOH	DREM	DDRL	NDRL	DDRL	DBHA	NRIG	LPOH	LWOC
2100-2130	SBHA	DSVY	DSVY	NDRL	DPOH	DBHA	NRIG	SBHA	LWOC
2130-2200	SBHA	DDRL	DSVY	NDRL	DPOH	DBHA	NRIG	SBHA	LWOC
2200-2230	DBHA	DDRL	DDRL	NDRL	DPOH	NRIH	NRIG	SBHA	LWOC
2230-2300	DBHA	DDRL	DDRL	NDRL	DPOH	NRIH	NRIG	SBHA	LWOC
2300-2330	DRIH	DDRL	DDRL	NSVY	DPOH	NRIH	NRIG	SBHA	LWOC
2330-2400	DRIH	DDRL	DPOH	DPOH	DBHA	NCIR	DBHA	SCIR	LWOC

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 9)

DATE	01-29-86	01-30-86	01-31-86	02-01-86	02-02-86	02-03-86	02-04-86	02-05-86	02-06-86	02-07-86	02-08-86	02-09-86	02-10-86
DEPTH	8161	8166	8395	8585	8635	8723	8807	9015	9027	9098	9098	9248	9254
DAYS	98	99	100	101	102	103	104	105	106	107	108	109	110
0000-0030	LWOC	NDRL	SRIH	SPOH	NDRL	NSVY	LCIR	SDRL	LRIG	SPOH	LPOH	SRIH	NDRL
0030-0100	LWOC	NDRL	SRIH	SPOH	NCIR	LDRL	SRIH	SDRL	LRIG	SPOH	LPOH	FRIG	NDRL
0100-0130	LWOC	NDRL	SCIR	SPOH	NSVY	LDRL	NRIH	SDRL	LRIG	SPOH	LPOH	FRIG	NDRL
0130-0200	LWOC	NDRL	SRIH	SPOH	LCMT	LDRL	SREM	SDRL	LRIG	SPOH	LPOH	FRIG	NDRL
0200-0230	LWOC	NDRL	SRIH	SPOH	LPOH	LDRL	NDRL	SDRL	LRIH	SPOH	LCIR	FRIG	NDRL
0230-0300	LWOC	NDRL	SCIR	SPOH	LPOH	LDRL	NDRL	SPOH	LREM	SPOH	LRIH	FRIG	NDRL
0300-0330	LRIH	NDRL	SDRL	SBHA	LWOC	LDRL	NDRL	SPOH	NDRL	SBHA	LCIR	FRIG	NDRL
0330-0400	LCMT	NDRL	SDRL	SBHA	LWOC	LDRL	NSVY	SPOH	NDRL	SBHA	LRIH	FRIG	NDRL
0400-0430	LCIR	NDRL	SDRL	SBHA	LWOC	LCIR	NDRL	SPOH	NDRL	SBHA	LRIH	FRIG	NDRL
0430-0500	LCIR	NSVY	SDRL	SBHA	LWOC	NSVY	NDRL	SPOH	NDRL	SRIH	LRIH	FRIG	NDRL
0500-0530	LPOH	NSVY	SCIR	SRIH	LWOC	LDRL	NDRL	SPOH	NDRL	SRIH	LRIH	FRIG	NDRL
0530-0600	LWOC	NDRL	SPOH	SRIH	LWOC	LCIR	NDRL	SBHA	NDRL	SRIH	LREM	FCIR	NDRL
0600-0630	LWOC	NDRL	SPOH	SRIH	LCIR	LCMT	NCIR	SBHA	NDRL	SRIH	LREM	FRIG	NDRL
0630-0700	LWOC	NDRL	SPOH	SRIH	LCIR	SPOH	NSVY	SBHA	LCIR	SCIR	LREM	SCIR	NDRL
0700-0730	LWOC	NDRL	SPOH	SRIH	LCIR	SPOH	NDRL	SRIH	LCIR	SRIH	NDRL	SDRL	NDRL
0730-0800	LWOC	NDRL	SPOH	LCIR	LCIR	SPOH	NDRL	SRIH	LCMT	SRIH	NDRL	SDRL	NDRL
0800-0830	LWOC	NDRL	SBHA	LCIR	LCIR	SPOH	NDRL	SRIH	LPOH	LCIR	NDRL	SDRL	NDRL
0830-0900	LWOC	NDRL	SBHA	SRIH	LCIR	SPOH	NDRL	SRIH	LWOC	LCIR	NDRL	SDRL	NDRL
0900-0930	LWOC	NDRL	SBHA	LCIR	LRIH	SBHA	NDRL	SRIH	LWOC	LRIG	NDRL	SDRL	NDRL
0930-1000	LWOC	NDRL	SBHA	LCIR	LRIH	SBHA	NDRL	SCIR	LWOC	LRIG	NDRL	SDRL	NDRL
1000-1030	LWOC	NDRL	SBHA	SDRL	LCMT	SBHA	NDRL	SRIH	LRIH	LCMT	NDRL	SDRL	NDRL
1030-1100	LWOC	NDRL	SBHA	SDRL	LCMT	SBHA	NCIR	SREM	LCMT	LPOH	NDRL	SDRL	NDRL
1100-1130	LWOC	NDRL	SRIH	SDRL	LDRL	SRIH	LDIR	LCIR	NDRL	LWOC	NDRL	SPOH	NDRL
1130-1200	LWOC	NDRL	SCIR	SDRL	LDRL	SRIH	LDIR	LCIR	NDRL	LWOC	NDRL	SPOH	NDRL
1200-1230	LCIR	NDRL	SRIH	SDRL	LDRL	SRIH	LDIR	LCMT	NSVY	LWOC	NDRL	SPOH	NDRL
1230-1300	LRIH	NDRL	SREM	SPOH	LDRL	SCIR	LDIR	LPOH	NSVY	LWOC	NDRL	SCIR	NDRL
1300-1330	LRIH	NDRL	NDRL	SPOH	LCMT	SRIH	NSVY	LPOH	LCMT	LRIG	NDRL	SPOH	NDRL
1330-1400	LCIR	NDRL	NDRL	SPOH	LCMT	LCIR	NSVY	LWOC	SPOH	LRIH	NDRL	SCIR	NDRL
1400-1430	LCIR	NDRL	NDRL	SPOH	LPOH	SDRL	SPOH	LWOC	SPOH	LRIG	NDRL	SPOH	NDRL
1430-1500	LCMT	NDRL	NDRL	SPOH	LPOH	SDRL	SPOH	LWOC	SPOH	LCMT	NDRL	SPOH	NDRL
1500-1530	LCMT	NDRL	NSVY	SPOH	LWOC	SDRL	SPOH	LWOC	SPOH	LPOH	NDRL	SPOH	NDRL
1530-1600	LPOH	NDRL	NSVY	SBHA	LWOC	SDRL	SPOH	LWOC	SPOH	LPOH	NDRL	SPOH	NDRL
1600-1630	LPOH	NDRL	NDRL	SBHA	LWOC	SPOH	SBHA	LWOC	SPOH	LWOC	NDRL	SBHA	NDRL
1630-1700	LPOH	NDRL	NDRL	SBHA	LWOC	SPOH	SBHA	LPOH	SBHA	LWOC	NSVY	SBHA	NDRL
1700-1730	LBHA	NCIR	NDRL	SBHA	LWOC	SPOH	SBHA	LPOH	SBHA	LWOC	SPOH	SBHA	NDRL
1730-1800	LBHA	NSVY	NDRL	SBHA	LWOC	SPOH	SBHA	LPOH	SRIH	LWOC	SPOH	SBHA	NSVY
1800-1830	LBHA	NSVY	NSVY	SRIH	LWOC	SPOH	NRIG	LBHA	SRIH	LWOC	SPOH	SRIH	NSVY
1830-1900	LBHA	SPOH	NSVY	SRIH	LWOC	SPOH	NRIG	LBHA	SRIH	LWOC	SBHA	SRIH	NPOH
1900-1930	LBHA	SPOH	NDRL	SRIH	LWOC	SBHA	SRIH	LRIH	SCIR	LWOC	SBHA	SRIH	NPOH
1930-2000	LRIH	SPOH	NDRL	SRIH	LWOC	SBHA	SRIH	LRIH	SCIR	LWOC	SBHA	SRIH	NPOH
2000-2030	LRIH	SPOH	NDRL	NCIR	LCIR	SBHA	SRIH	LRIG	SCIR	LWOC	SBHA	SCIR	NRIG
2030-2100	LRIH	SPOH	NDRL	NRIG	LCIR	SBHA	SRIH	LRIG	SRIH	LWOC	SBHA	SCIR	NPOH
2100-2130	LCIR	SBHA	NCIR	SRIH	LRIH	SBHA	SRIH	LRIG	SRIH	LWOC	SRIH	SRIH	NPOH
2130-2200	LRIH	SBHA	NDRL	SRIH	LREM	SBHA	SRIH	LRIG	SCIR	LWOC	SRIH	SRIH	NPOH
2200-2230	LRIH	SBHA	NDRL	SREM	NDRL	SRIH	SDRL	LRIG	SDRL	LRIH	SRIH	SRIH	NBHA
2230-2300	LREM	SBHA	LCIR	LDRL	NDRL	SRIH	SDRL	LRIG	SDRL	LRIH	SCIR	SRIH	NBHA
2300-2330	LREM	SRIH	LCIR	LCIR	NDRL	SRIH	SDRL	LRIG	SDRL	LPOH	SCIR	SRIH	NBHA
2330-2400	NDRL	SRIH	NSVY	NDRL	NCIR	SRIH	SDRL	LRIG	SDRL	LPOH	SRIH	SREM	NBHA

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 10)

DATE	02-11-86	02-12-86	02-13-86	02-14-86	02-15-86	02-16-86	02-17-86	02-18-86	02-19-86	02-20-86	02-21-86	02-22-86	02-23-86
DEPTH	9450	9453	9458	9473	9473	9473	9473	9473	9473	9473	9473	9473	9473
DAYS	111	112	113	114	115	116	117	118	119	120	121	122	123
0000-0030	NRIG	LWOC	SDRL	NRIG	SRIH	LRIG	LPOH	SPOH	LRUL	LRIH	LCMT	LREM	FCIR
0030-0100	NBHA	LWOC	SPOH	NRIG	SRIH	LRIG	LPOH	SPOH	LLOG	LCMT	LPOH	LREM	FCIR
0100-0130	NRIH	LWOC	SPOH	NRIG	SRIH	LRIG	LBHA	SPOH	LLOG	LPOH	LWOC	LREM	FWOE
0130-0200	NRIH	LWOC	SPOH	NRIG	LCIR	LCIR	LBHA	SPOH	LLOG	LWOC	LWOC	LREM	FCIR
0200-0230	NRIH	LWOC	SPOH	NRIG	SRIH	LBHA	LBHA	SPOH	LLOG	LWOC	LWOC	LREM	FCIR
0230-0300	NCIR	LCIR	SPOH	NRIG	SRIH	LBHA	LBHA	SPOH	LLOG	LWOC	LWOC	LREM	FCIR
0300-0330	NRIH	LRIH	SPOH	NRIG	SRIH	LRIH	LBHA	SPOH	LLOG	LWOC	LWOC	LREM	SPOH
0330-0400	NRIH	LRIH	SBHA	NBHA	SRIH	LRIH	LRIH	SPOH	LLOG	LCMT	LWOC	LREM	SPOH
0400-0430	NREM	LCIR	SBHA	NRIG	SREM	LRIG	LRIH	SPOH	LLOG	LCMT	LWOC	LREM	SPOH
0430-0500	NDRL	LCIR	SBHA	NRIG	SREM	LRIG	LRIH	SPOH	LLOG	LPOH	LWOC	LRIH	SPOH
0500-0530	LCIR	LRIH	SBHA	NRIG	SREM	LRIG	LRIH	SBHA	LLOG	LPOH	LPOH	LRIH	SPOH
0530-0600	LCMT	LRIH	SRIH	NRIG	SREM	LRIG	LRIH	SBHA	LBHA	LWOC	LPOH	LREM	SPOH
0600-0630	LPOH	LRIH	SRIH	NRIG	LPOH	LRIH	LCIR	SRIH	LBHA	LWOC	LPOH	LREM	SPOH
0630-0700	LPOH	LREM	SRIH	NRIG	LPOH	LRIH	LCIR	SRIH	LBHA	LRIH	LPOH	LREM	SPOH
0700-0730	LCIR	LCIR	LCIR	NRIG	LPOH	LRIG	LPOH	SRIH	LBHA	LWOC	LBHA	LREM	SBHA
0730-0800	LPOH	LCIR	LCIR	NRIG	LPOH	LRIG	LPOH	NRIG	LBHA	LWOC	LBHA	LREM	SBHA
0800-0830	LPOH	LCIR	LRRG	NRIG	LPOH	LCMT	LPOH	SRIH	LRIH	LWOC	LRIH	LREM	SBHA
0830-0900	LPOH	LCIR	LCMT	NRIG	LPOH	LCMT	LBHA	SRIH	LRIH	LCMT	LRIH	LREM	SBHA
0900-0930	LBHA	LCIR	LWOC	NRIG	LPOH	LPOH	LBHA	SRIH	LCIR	LCMT	LRIH	LREM	SRIH
0930-1000	LBHA	LCIR	LWOC	NRIG	LRUL	LPOH	LBHA	SRIH	LRIH	LPOH	LRIH	LREM	SRIH
1000-1030	LRIH	LCIR	SRIH	NRIG	LLOG	LPOH	LRIH	LRIG	LCIR	LWOC	LREM	LREM	SRIH
1030-1100	LRIH	SPOH	SRIH	NRIG	LLOG	LCMT	LRIH	LRIG	LCIR	LWOC	LREM	LREM	SRIH
1100-1130	LRIH	SPOH	SRIH	NRIG	LLOG	LCMT	LRIH	LRIG	LCIR	LWOC	LREM	LCIR	SRIH
1130-1200	LRIH	SPOH	SRIH	NRIG	LLOG	LCMT	LCIR	LRIG	LCMT	LWOC	LRIH	LCIR	SRIH
1200-1230	LCIR	SPOH	SDRL	NRIG	LLOG	LWOC	LRIH	LRIG	LPOH	LPOH	LREM	SPOH	SRIH
1230-1300	LCIR	SPOH	SDRL	NRIG	LLOG	LWOC	LCIR	LRIG	LPOH	LPOH	LREM	SPOH	SRIH
1300-1330	LCIR	SPOH	SDRL	NRIG	LLOG	LWOC	LCIR	LRIG	LRIH	LPOH	LREM	SPOH	LCIR
1330-1400	LRIH	SBHA	SDRL	NRIG	LLOG	LWOC	LCIR	LRIG	LCMT	LPOH	LREM	SPOH	LCIR
1400-1430	LRIH	SBHA	SDRL	NRIG	LLOG	LWOC	LCIR	LRIG	LCMT	LRIH	LRIH	SPOH	LCIR
1430-1500	LRIH	SBHA	SBHA	NRIG	LLOG	LWOC	LCIR	LRIG	LPOH	LRIH	LRIH	SPOH	LCIR
1500-1530	LRIH	SBHA	LCIR	NRIG	LLOG	LWOC	LCIR	LRIG	LPOH	LRIH	LREM	SBHA	LCIR
1530-1600	LCIR	SBHA	SPOH	NRIG	LLOG	LWOC	LCIR	LRIG	LCIR	LRIH	LREM	SBHA	LCIR
1600-1630	LPOH	SRIH	SPOH	NRIG	LLOG	LWOC	LRIH	LCIR	LCIR	LREM	LREM	SBHA	LCIR
1630-1700	LRIG	SRIH	SPOH	NRIG	LLOG	LWOC	LRIH	SRIH	LCIR	LREM	LRIH	SBHA	LCIR
1700-1730	LCMT	SRIH	SPOH	NRIG	LLOG	LWOC	LRIH	SRIH	LCMT	LREM	LREM	SRIH	SRIH
1730-1800	LPOH	SRIH	SPOH	NRIG	LLOG	LWOC	LCIR	SRIH	LRIH	LCIR	LREM	SRIH	SRIH
1800-1830	LPOH	SRIH	SPOH	NRIG	LLOG	LRIH	LCIR	LCIR	LPOH	LCIR	LREM	SRIH	NDRL
1830-1900	LWOC	SRIH	SBHA	NRIG	LLOG	LRIH	LCIR	LPOH	LCMT	LPOH	LREM	SRIH	NDRL
1900-1930	LWOC	SRIH	NRIG	NRIG	LLOG	LRIH	LCIR	LPOH	LCMT	LPOH	LCIR	SRIH	NDRL
1930-2000	LWOC	SRIH	NRIG	NRIG	LLOG	LPOH	LRIH	LPOH	LPOH	LPOH	LCIR	NRIG	NDRL
2000-2030	LWOC	SCIR	NRIG	NRIG	LCIR	LPOH	LCIR	LPOH	LWOC	LPOH	LREM	NRIG	NDRL
2030-2100	LWOC	SCIR	NRIG	NRIG	LCIR	LPOH	LCIR	LCIR	LWOC	LRIH	LREM	NRIG	NDRL
2100-2130	LWOC	SDRL	NRIG	LCIR	LCIR	LPOH	LRIH	LPOH	LWOC	LRIH	LREM	SRIH	NDRL
2130-2200	LWOC	SDRL	NRIG	LCIR	LBHA	LPOH	LREM	LPOH	LWOC	LRIH	LREM	SRIH	NDRL
2200-2230	LWOC	SDRL	NRIG	LPOH	LCIR	LPOH	LREM	SBHA	LWOC	LRIH	LREM	FCIR	NDRL
2230-2300	LWOC	SDRL	NRIG	LPOH	LCIR	LCIR	LREM	SBHA	LWOC	LRIH	LREM	FCIR	NDRL
2300-2330	LWOC	SDRL	NRIG	LCIR	LRIG	LPOH	LCIR	LRUL	LWOC	LRIH	LREM	FCIR	NDRL
2330-2400	LCIR	SDRL	NRIG	LCIR	LRIG	LPOH	LCIR	LRUL	LWOC	LCMT	LREM	FCIR	SCIR

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 11)

DATE	02-24-86	02-25-86	02-26-86	02-27-86	02-28-86	03-01-86	03-02-86	03-03-86	03-04-86	03-05-86	03-06-86	03-07-86	03-08-86
DEPTH	9517	9517	9556	9694	9694	9698	9907	9912	10009	10076	10212	10306	10374
DAYS	124	125	126	127	128	129	130	131	132	133	134	135	136
0000-0030	SCIR	SBHA	NDRL	NCIR	SREM	NDRL	SPOH	SPOH	NDRL	NDRL	NRIH	NDRL	NDRL
0030-0100	SPOH	SBHA	NDRL	NRIH	SREM	NDRL	SPOH	SPOH	NDRL	NDRL	NRIH	NDRL	NDRL
0100-0130	SPOH	SRIH	NDRL	NCIR	SREM	NDRL	SPOH	SPOH	NRRG	NDRL	NREM	NDRL	NDRL
0130-0200	SPOH	SRIH	NDRL	NRIH	SREM	NDRL	SPOH	SBHA	NRRG	NDRL	FRIG	NDRL	NDRL
0200-0230	SPOH	NRIG	NDRL	NCIR	SREM	NDRL	SBHA	SBHA	NDRL	NDRL	FRIG	NDRL	NDRL
0230-0300	SPOH	NRIG	NDRL	NRIH	SREM	NDRL	SBHA	SBHA	NDRL	NDRL	FRIG	NDRL	NDRL
0300-0330	SBHA	NPOH	NDRL	NREM	SDRL	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	NDRL	NDRL
0330-0400	SBHA	NPOH	NDRL	NREM	SDRL	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	NDRL	NDRL
0400-0430	SRIH	NPOH	NDRL	NREM	SDRL	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	NDRL	NDRL
0430-0500	SRIH	NPOH	NDRL	NREM	SDRL	NDRL	NRRG	SRIH	NDRL	NDRL	FRIG	NDRL	NDRL
0500-0530	SRIH	NPOH	NDRL	NREM	SPOH	NDRL	NRRG	SCIR	NDRL	NDRL	FRIG	NDRL	NDRL
0530-0600	SRIH	NPOH	NDRL	NCIR	SPOH	NDRL	SRIH	SCIR	NDRL	NDRL	FRIG	NDRL	NDRL
0600-0630	SCIR	NPOH	NDRL	NPOH	SPOH	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	DCIR	NDRL
0630-0700	SCIR	NPOH	NDRL	NPOH	SPOH	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	DCIR	NDRL
0700-0730	SCIR	SRIH	NDRL	SCIR	SPOH	NDRL	SRIH	SRIH	NDRL	NDRL	FRIG	DPOH	NDRL
0730-0800	SCIR	SRIH	NDRL	SCIR	SPOH	NDRL	SRIH	SCIR	NCIR	NDRL	FRIG	DPOH	NDRL
0800-0830	SRIH	SRIH	NDRL	SPOH	SPOH	NDRL	SRIH	SRIH	NCIR	NDRL	FCIR	NCIR	NDRL
0830-0900	SRIH	LCIR	NDRL	SPOH	SPOH	NDRL	SRIH	SRIH	NCIR	NDRL	FCIR	NCIR	NDRL
0900-0930	FCIR	LCIR	NDRL	SCIR	SPOH	NDRL	SCIR	SRIH	NPOH	NDRL	FCIR	NCIR	NDRL
0930-1000	FCIR	SRIH	NDRL	SPOH	SBHA	NDRL	SDRL	SREM	NPOH	NDRL	FCIR	DSVY	NDRL
1000-1030	FCIR	SRIH	NDRL	SCIR	NCIR	NDRL	SDRL	NDRL	NCIR	NDRL	FCIR	DPOH	NDRL
1030-1100	FCIR	NCIR	NDRL	SCIR	NCIR	NDRL	SDRL	NDRL	NCIR	NDRL	FCIR	DPOH	NDRL
1100-1130	FCIR	NPOH	NDRL	SCIR	NCIR	NDRL	SDRL	NDRL	NCIR	NDRL	FCIR	DSVY	NDRL
1130-1200	FCIR	NPOH	NDRL	SPOH	NBHA	NDRL	SDRL	NDRL	NPOH	NDRL	NREM	NPOH	NDRL
1200-1230	FCIR	NPOH	NDRL	SPOH	NRIH	NDRL	SDRL	NDRL	NPOH	NDRL	NREM	NPOH	NDRL
1230-1300	FCIR	NPOH	NDRL	SPOH	NRIH	NDRL	SDRL	NDRL	NBHA	NDRL	NDRL	NPOH	NDRL
1300-1330	FCIR	NPOH	NDRL	SBHA	NRIH	NDRL	SDRL	NDRL	NRIH	NDRL	NDRL	NPOH	LCMT
1330-1400	FCIR	NPOH	NDRL	SBHA	NRIH	NDRL	SDRL	NDRL	NRIH	NDRL	NDRL	NBHA	LCMT
1400-1430	FCIR	NCIR	NDRL	NRIG	NRIH	NDRL	SDRL	NDRL	NRIH	NDRL	NDRL	NBHA	LPOH
1430-1500	FCIR	NRIH	NDRL	NRIG	NCIR	NDRL	SDRL	NDRL	NCIR	NDRL	NDRL	NRIH	LPOH
1500-1530	FCIR	NRIH	NDRL	NRRG	NCIR	NDRL	SDRL	NDRL	NCIR	NDRL	NDRL	NRIH	LPOH
1530-1600	FCIR	NRIH	NCIR	NRRG	NRRG	NDRL	SDRL	NDRL	NCMT	NDRL	NDRL	NRIH	LPOH
1600-1630	FCIR	NRIH	NCIR	NRRG	NRRG	NDRL	SDRL	NDRL	NRUT	NCIR	NDRL	NCIR	NRIG
1630-1700	FCIR	NRIH	NPOH	SRIH	NRRG	NDRL	SDRL	NDRL	NRUT	NPOH	NDRL	NRIH	LRIG
1700-1730	FCIR	NCIR	NPOH	SRIH	NRRG	NDRL	SDRL	NDRL	NRUT	NPOH	NDRL	NRIH	LRIG
1730-1800	FCIR	NREM	NPOH	SRIH	NRRG	NDRL	SDRL	NDRL	NRUT	NPOH	NDRL	NREM	LRIG
1800-1830	FCIR	NREM	NPOH	SCIR	NRRG	NDRL	SPOH	NDRL	NRUT	NPOH	NDRL	NREM	LPOH
1830-1900	FCIR	NREM	NPOH	SRIH	NRRG	NDRL	SPOH	NDRL	NRUT	NBHA	NDRL	NREM	LPOH
1900-1930	SREM	NDRL	NBHA	SCIR	NRIH	NDRL	SPOH	NDRL	NRUT	NBHA	NDRL	NREM	LPOH
1930-2000	SREM	NDRL	NBHA	SRIH	NRIH	NDRL	SPOH	NDRL	NRUT	NBHA	NDRL	NDRL	LPOH
2000-2030	SCIR	NDRL	NRIH	SCIR	NRIH	NDRL	SCIR	NDRL	NRUT	NRIH	NDRL	NDRL	LRUL
2030-2100	SCIR	NDRL	NRIH	SRIH	NRIH	NDRL	SCIR	NDRL	NRIH	NRUT	NDRL	NDRL	LRUL
2100-2130	SPOH	NDRL	NRIH	SCIR	NRIH	SCIR	SCIR	NDRL	NRIH	NRIH	NDRL	NDRL	LLOG
2130-2200	SPOH	NDRL	NRIH	SRIH	NRIH	SCIR	SCIR	NDRL	NDRL	NRIH	NDRL	NDRL	LLOG
2200-2230	SPOH	NDRL	NRIH	SREM	NRIH	SPOH	SCIR	NDRL	NDRL	NRIH	NDRL	NDRL	LLOG
2230-2300	SPOH	NDRL	NRIH	SREM	NRIH	SPOH	SCIR	NDRL	NDRL	NRIH	NDRL	NDRL	LLOG
2300-2330	SPOH	NDRL	NRIH	SREM	SREM	SPOH	SPOH	NDRL	NDRL	NRIH	NDRL	NDRL	LLOG
2330-2400	SPOH	NDRL	NRIH	SREM	SREM	SPOH	SPOH	NDRL	NDRL	NRIH	NDRL	NDRL	LLOG

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 12)

DATE	03-09-86	03-10-86	03-11-86	03-12-86	03-13-86	03-14-86	03-15-86	03-16-86	03-17-86	03-18-86	03-19-86	03-20-86	03-21-86
DEPTH	10475	10475	10475	10475	10475	10475	10475	10475	10475	10564	10564	10564	10564
DAYS	137	138	139	140	141	142	143	144	145	146	147	148	149
0000-0030	LLOG	LCMT	SCIR	LCMT	LCIR	SLOG	LPOH	NCSG	NRIH	NRIG	NRUT	SRUT	STST
0030-0100	LLOG	LCMT	SCIR	LPOH	LRIH	SLOG	LPOH	NCSG	NRIH	NRIG	NRUT	SRUT	STST
0100-0130	LLOG	LCMT	SCIR	LCIR	LRIH	LRIG	LPOH	NCSG	NRIH	NRIG	NRUT	SRUT	STST
0130-0200	LLOG	LCMT	SCIR	LCIR	LRIH	LRIG	LRIG	NCSG	NRIH	NRIG	NRUT	SRUT	STST
0200-0230	LLOG	LCMT	SCIR	LCIR	LCIR	NRIG	LCMT	NCSG	NCIR	NRIG	SRUT	SRUT	STST
0230-0300	LLOG	LCMT	SCIR	LCIR	LCIR	NRIG	LCMT	NCSG	NREM	NRIG	SRUT	SRUT	STST
0300-0330	LLOG	LCMT	SCIR	LRIH	LRIG	NCIR	LWOC	NCSG	NREM	NRIG	SRUT	NRIG	STST
0330-0400	LLOG	LCMT	SCIR	LPOH	LRIG	NRIH	LWOC	NCSG	NREM	NRIG	SRUT	NRIG	STST
0400-0430	LLOG	LCMT	SPOH	LPOH	LCMT	NRIH	LWOC	NCSG	NREM	NRIG	SRUT	NRIG	STST
0430-0500	LRUL	LRIH	SPOH	LPOH	LPOH	NRIH	LWOC	NCSG	NREM	NRIG	SRUT	NRIG	STST
0500-0530	LRIG	LCIR	SPOH	LPOH	LWOC	NRIH	LWOC	NCSG	NREM	NRIG	SRUT	NRIG	STST
0530-0600	LRIG	LRIH	SPOH	LPOH	LWOC	NRIH	LWOC	NCSG	LRIG	NRIG	SRUT	NRIG	STST
0600-0630	LRIH	LCMT	SPOH	LPOH	LRIG	NCIR	LWOC	NCSG	LRIG	NCIR	SRUT	NRUT	STST
0630-0700	LRIH	LPOH	SPOH	LPOH	LCMT	NCIR	LWOC	NCSG	LCMT	NCIR	SRUT	NRUT	STST
0700-0730	LCIR	LPOH	SPOH	LPOH	LCMT	NCIR	LWOC	NCSG	LWOC	NCIR	SRUT	NRUT	STST
0730-0800	LCIR	LPOH	LRIH	LPOH	LPOH	NCIR	LWOC	NCSG	LWOC	NCIR	SRUT	NRUT	STST
0800-0830	LCIR	LWOC	LRIH	LPOH	LPOH	NCIR	LWOC	NRIG	LWOC	NCIR	SRUT	NRUT	STST
0830-0900	LCIR	LWOC	LRIH	LPOH	LRIG	NCIR	LWOC	NRIG	LWOC	NCIR	SRUT	NRUT	STST
0900-0930	LRIH	LWOC	LRIH	LPOH	LRIG	NCIR	LWOC	NRIH	LWOC	NRIG	SRUT	NRUT	STST
0930-1000	LRIH	LWOC	LRIH	LPOH	LRIG	NCIR	LWOC	NRIH	LWOC	NCIR	SRUT	NRUT	STST
1000-1030	LRIH	SPOH	LCIR	LPOH	LRIG	NCIR	LWOC	NCIR	NRIH	NCIR	SRUT	STST	STST
1030-1100	LRIH	SPOH	LCIR	LRUL	LRIG	NCIR	LWOC	NCIR	LDRL	NRIG	SRUT	STST	STST
1100-1130	LCIR	SPOH	LCIR	SLOG	LCIR	NRIH	LRIH	NCIR	LDRL	NCIR	SRUT	STST	STST
1130-1200	LCIR	SPOH	LRIG	SLOG	LRIH	NCIR	LCMT	NCIR	LDRL	NCIR	SRUT	STST	STST
1200-1230	LRIH	SRUL	LCMT	SLOG	LRIH	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1230-1300	LRIH	SRUL	LPOH	SLOG	LRIH	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1300-1330	LRIH	SLOG	LCIR	SLOG	LRIH	NRIH	LPOH	NRIG	LDRL	NRIG	SRUT	STST	STST
1330-1400	LCIR	SLOG	LCIR	SLOG	LCMT	NCIR	LPOH	NRIG	LDRL	NRIG	SRUT	STST	STST
1400-1430	LCIR	SLOG	LCIR	SLOG	LPOH	NCIR	LRIG	NRIG	LDRL	NRIG	SRUT	STST	STST
1430-1500	LCIR	SLOG	LCIR	SLOG	LPOH	NCIR	LRIG	NRIG	LDRL	NRIG	SRUT	STST	STST
1500-1530	LRIH	SRUL	LCIR	SLOG	LPOH	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1530-1600	LRIH	SRUL	LCIR	SLOG	LRIG	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1600-1630	LCIR	SRIH	LCIR	SLOG	SPOH	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1630-1700	LCIR	SRIH	LCIR	SLOG	SPOH	NCIR	LCMT	NRIG	LDRL	NRIG	SRUT	STST	STST
1700-1730	LCMT	SCIR	LCIR	SLOG	SPOH	NCIR	LCMT	NRUT	LDRL	NRIG	SRUT	STST	STST
1730-1800	LWOC	SCIR	LCIR	SLOG	SPOH	NCIR	LPOH	NRUT	LDRL	NRIG	SRUT	STST	STST
1800-1830	LWOC	SRIH	LRIH	SLOG	SPOH	NCIR	LPOH	NRIG	LDRL	NRUT	SRUT	STST	STST
1830-1900	LCIR	SRIH	LCIR	SLOG	SRUL	NCIR	LPOH	NRIG	LDRL	NRUT	SRUT	STST	STST
1900-1930	LCIR	SCIR	LCIR	SLOG	SLOG	NCIR	NRUL	NRIG	LDRL	NRUT	SRUT	STST	STST
1930-2000	LCIR	SCIR	LCIR	SLOG	SLOG	NCIR	NRUL	NRIG	LDRL	NRUT	SRUT	STST	STST
2000-2030	LRIG	SRIH	LCIR	SLOG	SLOG	NCIR	NCSG	NRIG	NRUT	NRUT	SRUT	STST	STST
2030-2100	LRIG	SREM	LCIR	SLOG	SLOG	NCIR	NCSG	NRIG	NRUT	NRUT	SRUT	STST	STST
2100-2130	LRIH	SRIH	LCIR	LRIH	SLOG	NCIR	NCSG	NRIG	NRIG	NRUT	SRUT	STST	STST
2130-2200	LCMT	SRIH	LCIR	LRIH	SLOG	NCIR	NCSG	NRIG	NRIG	NRUT	SRUT	STST	STST
2200-2230	LPOH	SCIR	LCIR	LRIH	SLOG	NCIR	NCSG	NRIG	NRIG	NRUT	SRUT	STST	SLOG
2230-2300	LPOH	SCIR	LCMT	LRIH	SLOG	NCIR	NCSG	NRIG	NRIG	NRUT	SRUT	STST	SLOG
2300-2330	LPOH	SCIR	LCMT	LRIH	SLOG	LRIG	NCSG	NRIG	NRIG	NRUT	SRUT	STST	SLOG
2330-2400	LRIG	SCIR	LCMT	LRIH	SLOG	LCMT	NCSG	NRIG	NRIG	NRUT	SRUT	STST	SLOG

OPERATIONS PER HALF-HOUR FOR THE DSSSDP (SHEET 13)

DATE	03-22-86	03-23-86
DEPTH	10564	10564
DAYS	150	151
0000-0030	SLOG	SLOG
0030-0100	SLOG	SLOG
0100-0130	SLOG	SLOG
0130-0200	SLOG	SLOG
0200-0230	SLOG	SLOG
0230-0300	SLOG	SLOG
0300-0330	SLOG	SLOG
0330-0400	SLOG	SLOG
0400-0430	SLOG	SLOG
0430-0500	SLOG	SLOG
0500-0530	SLOG	SLOG
0530-0600	SLOG	SLOG
0600-0630	SLOG	SLOG
0630-0700	SLOG	SLOG
0700-0730	SLOG	SLOG
0730-0800	SLOG	SLOG
0800-0830	SLOG	SLOG
0830-0900	SLOG	SLOG
0900-0930	SLOG	SLOG
0930-1000	SLOG	SLOG
1000-1030	SLOG	SLOG
1030-1100	SLOG	SLOG
1100-1130	SLOG	SLOG
1130-1200	SLOG	SLOG
1200-1230	SLOG	SLOG
1230-1300	SLOG	SLOG
1300-1330	SLOG	SLOG
1330-1400	SLOG	SLOG
1400-1430	SLOG	SLOG
1430-1500	SLOG	SLOG
1500-1530	SLOG	SLOG
1530-1600	SLOG	SLOG
1600-1630	SLOG	SLOG
1630-1700	SLOG	SLOG
1700-1730	SLOG	SLOG
1730-1800	SLOG	SLOG
1800-1830	SLOG	SLOG
1830-1900	SLOG	SLOG
1900-1930	SLOG	SLOG
1930-2000	SLOG	SLOG
2000-2030	SLOG	SLOG
2030-2100	SLOG	SLOG
2100-2130	SLOG	SLOG
2130-2200	SLOG	SLOG
2200-2230	SLOG	SLOG
2230-2300	SLOG	SLOG
2300-2330	SLOG	SLOG
2330-2400	SLOG	SLOG