RECEIVED
NOV 1 1 1991
Ans'd............

JOINT LITHOSPHERE PANEL-TECTONICS PANEL MEETING
NICOSIA, CYPRUS
9-11 October 1991

EXECUTIVE SUMMARY

2.0 LIAISON REPORTS

2.2 North Atlantic Rifted Margin Detailed Planning Group Report

After reviewing all the proposals for drilling passive margins in the ODP files, the NARM-DPG concurred with PCOM's decision to concentrate rifted margin drilling in the North Atlantic at this time. The DPG report proposing 8 Legs of drilling was generally well received by the Panels.

LITHP and TECP are concerned about the ability to date the volcanic rocks from these margins accurately enough to achieve the desired precision in the proposed spreading rate determination.

2.3 Offset Drilling Working Group Preliminary Report

LITHP and TECP noted a bias in the target areas selected from 22 possible locations by the WG towards fracture zone sites. Fracture zones are their own tectonic environments and do not represent faulted segments of "normal" oceanic crust.

There is a critical need for site surveys. A key site survey goal should be to identify boundaries away from the exposure, so the relation between the exposed section and "normal" crust can be determined.

5.0 DOWNHOLE LOGGING AND SAMPLING

5.1 Fluid Sampling

LITHP and TECP jointly believe that the current inability to sample formation fluids and measure pore pressure, permeability and temperature, including in slim holes, is jeopardizing the success of the program, especially such legs as Cascadia and EPR II. We strongly urge that a group be formed immediately to investigate and resolve this problem using OPCOM money for tool development.

Beyond this immediate crisis, LITHP and TECP strongly feel that an integrated strategy is required to develop the routine ability to make such measurements in the various geologic environments of concern to each of the thematic panels.

5.2 Downhole Logging Measurements

A major lack in downhole measurements is the determination of bulk density. This would require substantial modification of existing tools.

6.0 TECP - LITHP COMMON OBJECTIVES

TECP and LITHP will consider putting out a joint RFP in U.S. and non U.S. publications for proposals that address coupled volcanic-tectonic systems. Another way to encourage proposals that address both Panels' objectives would be ODP-sponsored symposia at AGU, GSA and EGU meetings specifically on drilling for volcanic and tectonic objectives.

At present, LITHP and TECP feel that their interests are well represented on both Panels, and the current liaisons are appropriate.

7.0 PROPOSAL SUBMISSION DEADLINES

TECP and LITHP jointly urge the JOIDES office to set a submission deadline sufficiently in advance of the panel meetings (six weeks?) so as to ensure that all panel members receive copies of appropriate prospectuses and/or proposals in time to read them, and so that panel chairs do not have to routinely resort to expensive express mail and courier services.

8.0 JOINT MEETINGS AND FIELD TRIPS

All members of LITHP and TECP agreed that joint meetings that include a pre-meeting field trip, as this one did, are extremely valuable in enhancing coordination between the panels, improving communication, etc. The panels agreed to try to schedule a joint meeting every year or one and one half years. These joint meetings should be preceded by carefully selected field trips that ideally visit on-land examples of topics of high common interest.

JOINT LITHOSPHERE PANEL-TECTONICS PANEL MEETING
October 9-11, 1991
Nicosia, Cyprus

1.0 INTRODUCTION

Eldridge Moores opened the joint meeting with LITHP, and welcomed the Panels to Nicosia. Moores outlined the history of the meeting, and introduced George Constantinou, Andreas Panayiotou, and Costas Xenophontos, General Director, Exploration Director, and Senior Geologist, respectively of the Geological Survey of Cyprus. Constantinou spoke a few words welcoming the Panels to Cyprus. The Panels jointly passed a motion of thanks to the Geological Survey of Cyprus, and especially to Costas Xenophontos for his invaluable assistance in meeting and field trip arrangements. At the suggestion of Susan Humphris, Chair of LITHP, the Panels passed a motion of thanks to Eldridge Moores, John Malpas, and Alastair Robertson for their work on the field trip.

2.0 LIAISON REPORTS

2.1 PCOM Report (J. Mutter)

Operations of the *JOIDES Resolution* are now determined through Leg 147. Co-Chief Scientists have been selected as far as Leg 146, and staffing has been completed through Leg 144. Leg 140 is currently underway, and Hole 504B was reached about six days ago. On arrival, the FMS was run and several parts of it (an arm, bowspring and two orthogonal pads) were dropped in the Hole. Fishing operations have begun to try to recover the junk.

(M. Storms reported later in the meeting that after five unsuccessful fishing trips, the core barrel and some other junk had been recovered using a tool fabricated on board. Milling operations had begun, and coring was expected to begin on 14 October. The FMS is expected to be repaired and operational for Leg 141.)

The primary business of the Hannover meeting in August was to assemble the North Atlantic prospectus for consideration by the thematic panels at their fall meetings. In addition, PCOM heard that the overall NSF budget will probably increase by 17.5%. The JOI budget of $43.5m is about consistent with the funding requested in the Long-Range Plan. Logistical support for Antarctic research has shifted from NSF to DOD, thus increasing flexibility.

EXCOM has expressed concern about the balance of non-U.S. and U.S. Co-Chief Scientists. The balance is figured over one year, probably too short a time interval, but as it is, the U.S. has too many Co-Chief Scientists. The Memorandum of Understanding is that there be half U.S. and half other partners. Germany is the country in greatest deficit. Decisions concerning Co-Chief Scientists are made by the Science Operator (T. Francis) on the basis of nominations from thematic panels to

PCOM, and recommendations from PCOM. The intention is to involve the advisory structure in the decision-making process, and an effort is made generally to have a proponent as one of the Co-Chief Scientists.

There is a great deal of optimism that the program will be renewed for the next five years, especially now that the USSR has joined. A turning point will come in 1998 when the contract on the *JOIDES Resolution* ends. There is considerable debate concerning appropriate future drilling platforms, especially as Japan is planning a vessel for deep drilling objectives, and the Europeans are also planning a ship and working on better coring techniques. Panel input is needed on what capabilities ODP might require in the future.

The purpose of the December PCOM meeting will be to construct the FY'93 drilling schedule, which will consist of six legs (either six science legs or five science and one engineering leg). Their decision will be based on thematic panel input with guidance from the Site Survey Panel. Consequently, the principal purpose of the thematic panel meetings is to provide advice to PCOM on the FY'93 schedule. Recommendations should be based upon the North Atlantic Prospectus (which is itself based on prior global rankings), and any new, highly ranked proposals. The top two or three proposals in each panel's ranking are all that really count. In dealing with multi-leg projects, each proposed leg is to be ranked. In addition, DPG and WG reports are to be reviewed, not rubber-stamped. Scheduling of one leg of a multi-leg project does not commit to others; however, it will produce a certain momentum for a given area for a given theme, and could act against new proposals in the same thematic areas.

During ranking and voting procedures, PCOM recommends that proponents not be present, and discussions should take place while they are absent. However, a quorum must be present at all times of both U.S. and non-U.S. members. There was considerable discussion of this requirement to the effect that it made the task impossible, and Panels were not sure what to do. This was more of a problem for LITHP than TECP at this meeting because of differences in the number of proponents on the two panels. It was recommended that the Panels devise a scheme that allows for fair discussion of rankings while excluding any proponent influence.

Supplemental science proposals have been discontinued, but single hole proposals, which can be fitted into regular legs during the planning stages, will still be accepted. There are two outstanding supplemental science proposals that the Panels should consider:

a. drilling OSN-2: requires 10 days out of Leg 145
b. logging Hole 801C: requires 3 days out of Leg 144

PCOM needs Panels to determine what drilling <u>in their thematic areas</u> would be worth eliminating in order to accomplish these objectives.

The Performance Evaluation Committee (PEC III) has had three meetings. The principal issues raised concern the balance of Co-Chief Scientists, overcrowding on the *JOIDES Resolution*, and whether decision-making is, or should be, top-down or bottom-up.

OPCOM met once to determine how to use the $2.1m additional money to be provided by NSF. Priorities include:

a. diamond coring system development
b. special tools development (eg. fluid sampling)
c. evaluation of alternative (or additional) platforms
d. a feasibility study for deep drilling (this was added by PCOM at its August meeting)

Fluid sampling is still a serious problem: the Geoprops tool will not be available for Leg 141 (Chile Triple Junction) and it is highly unlikely it will be ready for Leg 146 (Cascadia). During Leg 143 (Atolls and Guyots), a test of shallow water drilling will be conducted at Enewetak.

PCOM has decided to institute a limit to the lifetime of proposals. Those that are inactive for three years will be withdrawn for further consideration. The problem of submission of addenda, and how this affects a proposal's activity record still needs to be resolved.

EXCOM has expressed concern about the perceived lack of focus of the program, and has asked for feedback on the possibility of focussing the program on a few subjects.

2.2 North Atlantic Detailed Planning Group Report (H.C. Larsen and D. Sawyer)
The NARM-DPG was mandated by PCOM to produce a coherent program investigating the processes of continental rifting in two settings:

1) thinned and faulted, non-volcanic margins
2) thick volcanic-rich margins, where the dominant deformation is flexural, and strain rates are about ten times as high as in the thinned and faulted settings.

The DPG reviewed all proposals for passive margins in the ODP files, and concurred with PCOM's decision to concentrate passive margin drilling in the North Atlantic at this time because:

a) the North Atlantic volcanic margins are typical of this type world-wide
b) the North Atlantic is one of the few regions in the world where continental flood basalts can be related to break up
c) the North Atlantic is the only place where a plume originally located beneath the rift axis is still beneath the spreading center--thus the

relationship between breakup, current volcanic activity, and distance from the plume center can be investigated in detail

d) the rifted margin is a good choice because a conjugate margin pair is present. The sediments are not too thick, and complexities, such as salt diapirism, are not present.

After consideration of 12 proposals representing 25 legs of drilling, the NARM-DPG produced an 8-leg program of high priority drilling in two regions--a completely faulted, non-volcanic conjugate margin to the south (Newfoundland Basin and the Iberia Abyssal Plain), and the volcanic-rich region of the East Greenland margin to the north, where there is no evidence for asymmetrical development, and the relations between variations of evolution of the margin in relation to the distance from the hotspot axis can be investigated. The DPG proposes a long-term strategy of drilling, with two legs per year for four years.

For the southern rifted, non-volcanic transect--the Newfoundland Basin and Iberia Abyssal Plain, investigation of a conjugate set is necessary because the margins are not symmetrical, and bulk simple shear is the dominant process. The DPG suggests four legs in priority order:

Leg I — Three holes in the Iberia Abyssal Plain (IAP 4, 2, and 3A) to investigate post and synrift sediments, and to sample the thinned continental crust and oceanic crust, and one hole in Galicia Bank (GAL 1) to sample a suspected peridotite ridge outcrop.

Leg II — A deep hole (2450 m) in the Newfoundland Basin (NB4) to penetrate the sediment cover and sample the synrift sediments and the (thinned continental?) crust beneath.

Leg III — A deep hole (2550 m) in the Iberia Abyssal Plain (IAP 1) to sample a conjugate setting similar to NB4, by penetrating post-rift sediment, breakup unconformity, synrift sediments, and basement.

Leg IV — Holes NB1 and NB7, to sample oldest oceanic crust (NB7) and subsidence and breakup history on the continental margin (NB1).

A series of 4 legs are also proposed for drilling on the East Greenland, volcanic-rich rifted margin. Evidence suggests that a plume developed a few m.y. before breakup, producing a huge sequence of seaward-dipping reflectors. The plume is still present beneath Iceland allowing comparison of original vs. present effects. The proposed legs are:

Leg I — Two sites to begin the East Greenland transect at 63°N, to sample a simple set of seaward reflectors at the distal end of a plume in order, among other objectives, to date the sequence to refine the data on the rate of spreading.

Leg II Site EG63-3 and a site on the Voring margin where there is local structural deformation.

Leg III Continuation of the East Greenland 63°N transect.

Leg IV A transect of the East Greenland margin at 66°N to look at the development of the margin at another location along the plume.

Considerable discussion ensued about the methods of dating volcanic rocks. Many doubts were raised about the ability to date the volcanic rocks accurately enough to achieve the desired precision in the spreading rate determination.

2.3 Offset Drilling Working Group Preliminary Report (F. Vine)

This Working Group met for the first time in August. Five principal guidelines resulted from the initial discussion:

1) The first phase of drilling should be restricted to target areas within the main ocean basins, with the aim of establishing the crustal section and crustal processes associated with mature, mid-ocean ridges.

2) The emphasis should be on siting holes which start at a stratigraphic level within the lower part of Layer 2 or below.

3) Holes drilled within an offset drilling strategy would by 1000 ± 500 m in depth; hence, they do not represent deep drilling.

4) A program of 8-10 years should be devised, involving 10-12 2-month legs and 15-18 holes with the following estimates:

a) Layer 2/3 boundary	2 legs
b) Layer 3 long sections	2 legs
c) Layer 3/4 boundary (Moho)	4 legs
d) Layer 4 long sections	2 legs
e) Active transform fault	1 leg
f) Median Valley master fault	1 leg

5) A two-phase program is envisaged. Phase I (2-3 years) would involve drilling at sites which can be identified on the basis of existing site survey information and are good prospects for the second phase of drilling. Phase II would focus on a limited number of locations.

The WG identified 22 potential target areas as follows:

A. Slow-spreading ridges

(i) Sections exposed on transverse ridges formed within the inside or transform corner of ridge-transform intersections

1. Atlantis II F.Z. (SW Indian Ocean Ridge)
2. Vema F.Z. (Atlantic Ocean)
3. Kane F.Z. (Atlantic Ocean)
4. Hayes F.Z. (Atlantic Ocean)
5. Oceanographer F.Z. (Atlantic Ocean)
6. Kurchatov F.Z. (Atlantic Ocean)

(ii) Sites within the median valley

7. 15°20'N (Atlantic Ocean)
8. MARK area (Atlantic Ocean)
9. 45°N (Atlantic Ocean)

(iii) Section exposed by extension of pre-existing crust

10. Kings Trough (Atlantic Ocean)

(iv) Section exposed by thrusting of pre-existing crust

11. Gorringe Bank (near Gibraltar), a complex tectonic scenario, now compressive, formerly strike-slip.

B. Fast-spreading ridges

(i) Exposures associated with fracture zones

12. Blanco F.Z. (NE Pacific)
13. Siqueiros F.Z. (E. central Pacific)
14. Garrett F.Z. (E. central Pacific)
15. Eltanin F.Z. (South Pacific)
16. Nova Trough (8 km deep at west end of Clipperton F.Z.)
17. Udintsev F.Z. (South Pacific)

(ii) Sections exposed by crustal extension ahead of propagating ridges

18. Hess Deep (beyond Galapagos ridge)
19. Pito Deep (margin of Easter microplate)
20. Endeavour Deep (margin of Juan Fernandez microplate)

(iii) Section exposed by late-stage extension on an abandoned ridge crest

21. Mathematicians Ridge (E. central Pacific)

(iv) Section exposed by thrusting of pre-existing crust

22. Mussau Trough (east margin of Carolinas plate, in a tectonic setting apparently similar to Gorringe Bank) (W. Pacific)

The WG then constructed a matrix of the 22 potential target areas against 20 objectives of offset drilling. This resulted in the following rankings:

6 highly ranked areas	Watchdogs	6 promising areas	Watchdogs
*Atlantis II F.Z.	H. Dick	Pito Deep	B. Taylor
*Vema F.Z.	C. Mevel	Endeavor Deep	J. Phipps-Morgan
*15°20'N	H. Dick	Garrett F.Z.	J. Fox
*MARK	C. Mevel	Siqueiros F.Z.	J. Casey
Kings Trough	J. Cann	*Blanco F.Z.	P. Robinson
*Hess Deep	J. Natland	Oceanographer F.Z.	J. Fox

*Areas that might feature in Phase I of an offset drilling program.

There is a critical need for site surveys. The drilling is not as dependent on development of the DCS as previously feared--much can be achieved within the current drilling capabilities.

Comments from the Panels included the bias in the target areas towards F.Z. sites which are anomalous. Fracture zones are their own tectonic environments and do not represent faulted segments of "normal" oceanic crust. A key site survey goal should be to identify boundaries on exposed walls and trace them into seismic boundaries away from the exposure. It is possible that porosity plays a more important role in such seismic entities than petrologic differences.

3.0 REPORTS ON RECENT AND UPCOMING LEGS

3.1 Leg 136 (M. Storms)

During drilling of OSN-1, a new PDC core bit was tested. Developed by AMOCO, this artificial diamond bit has been successfully used in shales, cherts and carbonate sequences. It has been proven to work well in formations of a consistent lithology and type, but not in alternating sequences. During Leg 136, the drilling rate was good (4-5 m/hr penetration), but core recovery was very poor. AMOCO has since discovered a design deficiency in the placement of the PDC cutters, which has now been changed. The PDC core bit will be tried again at Hole 504B.

3.2 Leg 137 (M. Storms)

A positive displacement mud motor can now be connected to the core barrel, and this system was tested on Leg 137. This assembly is wireline non-retrievable, so has to be tripped for every core. This was not a problem at Hole 504B because the bit had to be changed as often anyway, requiring tripping the entire drillstring. During the test, there was a failure in the connection between the downhole motor and the core barrel, resulting in the core barrel being left in the Hole.

3.3 Leg 138 (J. Allan)

The E. Equatorial Pacific Leg was not of great scientific interest to either Panel; however, it heralded the introduction of Macintosh computers with graphics packages. Barrel sheets and stratigraphic summary sheets are now computerized, and thus will increase the efficiency of publication of the reports.

ODP also has openings for two Staff Scientists: a geochemist and one other of unspecified specialty.

3.4 Leg 139--Scientific Results (J. Franklin)

The objective of Leg 139 (Sedimented Ridges I) was to attempt to document the three-dimensional structure of the hydrothermal field in Middle Valley, the sedimented rift valley of the northern, Juan de Fuca Ridge. Site 855 consisted of a transect across the hanging wall block along the normal fault that forms the eastern topographic boundary of the sedimented rift valley. The objectives of this transect were to define the geometry and hydrologic nature of this fault, and to determine the nature and rate of fluid flow along the fault, which may represent a downwelling recharge zone. Volcanic basement was encountered at 90-120 m and was characterized as normal MORBs. Pore water samples indicated seawater in the volcanic basement and, together with the low heat flow, suggested seawater is being drawn down into the basalt--a process that may be occurring over the extent of the valley.

Site 856 was situated over a small hill in the eastern part of Middle Valley. These features are characteristic of this and other sedimented ridges, and have been suggested to form by uplift of the sediment section, with associated hydrothermal massive sulfide mineralization. 96 m of massive sulfides were drilled, with about 20% recovery, and consisted of pyrite and pyrrhotite with small amounts of chalcopyrite and sphalerite. In addition, sills of essentially picritic composition (600-800 ppm Cr) were penetrated within the mound.

Site 857 was located 5.2 km west of the normal fault scarp that forms the eastern boundary of Middle Valley, in an area of a major ($\sim 1 W/m^2$) thermal anomaly. Hydrothermally altered sills were drilled beginning at 471 mbsf, with the dominant alteration assemblage being chlorite, epidote and actinolite. A reentry cone with grouted-in casing was set at Hole 857D, which was left to reequilibrate thermally while operations began at Site 858. On returning to Hole 857D, it was deepened to a total depth of 936 mbsf through a sequence of interbedded sills and sediment. Logging was conducted, and a packer/flow meter experiment successfully completed, providing constraints on the hydrologic regime in this Hole. Formation pressures rose little, even at the maximum rate of injection the ship's pumps could supply (3000 L/min); flow rates of nearly 10,000 L/min were estimated, with the majority of this flow going into a permeable zone at 614 mbsf. Finally, an instrumented CORK (Circulation Obviation Retrofit Kit), which included a 300 m long, ten thermistor string, a pressure sensor, and plumbing for fluid sampling was installed in the Hole.

Site 858 was located in an active hydrothermal vent field. Four holes were drilled in an array crossing the field, and three holes were drilled approximately in the center of the vent field. Sections of hydrothermally altered sediment were recovered in all holes, with the degree of alteration varying laterally and with depth in a way consistent with the thermal structure. Basalt was recovered from Holes 858F and

858G, and was highly altered and very permeable. However, the vein mineral assemblages showed little indication of the passage of high temperature fluids. This Hole was also sucking water at a great rate. An instrumented CORK was installed to obviate downhole circulation and to monitor temperature and pressure as the formation returns to equilibrium.

Since the cruise, both CORK systems have been visited by Alvin and are still in place. Data were dumped and the fluid ports were successfully tied into for sampling; however, no fluid samples were obtained and both holes were under pressured. (Operation highlights of Leg 139 and the follow-up cruise are summarized in Appendix I.)

3.5 Leg 142 (M. Storms)

The DCS II system will next be deployed during the engineering leg on the East Pacific Rise. The primary goals include maximizing coring time, achieving a minimum penetration of 100 m in basalt with greater than 50% recovery, deploying the new 3-leg/hex-sided hard rock guidebase, using a new piloted reaming bit to determine the feasibility of reaming the 3.96" DCS hole out to 7-1/4", and evaluating the second stage drill-in bottom hole assembly with 7-1/4" bit. The diamond core barrel may also be tested. Operations will be conducted on a ponded lava lake. (The operating schedule, engineering goals, and basic operations plan are attached as Appendix II.)

4.0 ENGINEERING STATUS REPORT (M. Storms)

The slingshot testing of the DCS II system has been successfully completed. Testing of the complete system, including the secondary heave compensator is scheduled for the next few weeks, once the hardware and software have been delivered.

Other improvements have been made based on the Leg 132 results. A number of new core catchers, including a finger-type that can be used in conjunction with the collet-type will be available on Leg 142. In addition, the mini hard rock guide base has been redesigned with 3 legs, hexagonal sides, and a new ballast system composed mostly of steel pipes. This should allow its deployment on slopes up to 25°.

Another problem that has been addressed is the difficulty of drilling through unstable zones. The drill-in casing system has been redesigned to make a nested system that will allow deployment of a second stage drill-in bottom hole assembly in order to isolate a rubble zone.

Feasibility studies for the DCS Phase III system have now been completed on two concepts: a bottom-mounted slip joint concept and an integral riser-tension concept, both of which are complex and costly. TEDCOM has suggested that the need for the guide horn beneath the ship should be reevaluated since this adds complexity to the DCS Phase III concept. Given its current status, it is highly unlikely that DCS Phase III will be ready for use on Leg 147 as tentatively scheduled. (Schematics of DCS Phase II system and the status of DCS Phase III are attached as Appendix III.)

5.0 DOWNHOLE LOGGING AND SAMPLING

5.1 Fluid Sampling (D. Moos)

A general review of the availability of tools to sample fluids and measure hydrologic properties downhole suggests there is currently no satisfactory method to sample formation fluids or measure *in situ* permeability, pore pressures, etc. Given the failure of the wireline packer and the uncertainty of the further development of Geoprops, this has become a critical issue. In addition, SGPP had attached the highest priority to fluid sampling and property measurement for expenditure of the OPCOM funds.

A number of suggestions have been made concerning possible directions for tool development to address the problem:

1) use the wireline fluid sampler without packers
2) use the wireline fluid sampler with drillstem packers to isolate a borehole interval
3) design a self-boring sampler
4) use a drillstem straddle packer with gas lift
5) use an industry formation tester with side-entry sub.

Other ideas include installing casing, which can then be perforated for sampling, or use a wireline packer below the pipe.

LITHP and TECP are concerned that adequate capability for formation fluid sampling and *in situ* hydrologic property measurements be available on critical legs, such as Cascadia (Leg 146). They make the following recommendation:

LITHP and TECP jointly believe that the current inability to sample formation fluids and measure pore pressure, permeability and temperature, including in slim holes, is jeopardizing the success of the program, especially such legs as Cascadia and EPR II. We strongly urge that a group be formed immediately to investigate and resolve this problem using OPCOM money for tool development.

Beyond this immediate crisis, LITHP and TECP strongly feel that an integrated strategy is required to develop the routine ability to make such measurements in the various geologic environments of concern to each of the thematic panels.

5.2 Downhole Logging Measurements - A Primer (J. McClain and D. Moos)

(This session was designed to educate both TECP and LITHP about the capabilities and current status of downhole logging measurements. Details of the ODP logging program and tools are presented in a manual available from the LDGO Borehole Research Group.)

Logging is important for a number of reasons:

1) Core recovery is incomplete, while logs can be continuous

2) Physical properties measurements on cores are inaccurate, whereas logging measures properties *in situ*

3) A core is a one-dimensional sample, whereas logs can "see" away from the hole

4) The scale of log measurements is more compatible with that of surface geophysical measurements (i.e. the scale over which logs make measurements is larger than that for measurements made on core samples).

Wireline logging measurements are made at specific locations along the 70' length of the tool. In addition, some logging measurements cannot be done at the bottom of the Hole because of the deployment of a combination of logging tools. This, together with the fact that it is often necessary to drill past the point of interest, should be taken into consideration by panels when evaluating proposals to drill and sample basement. Most measurements must be made in an open hole, but ODP holes often are open only when the pipe is in the hole. A side-entry sub (see attached schematic) allows both the wireline and drillpipe to be present simultaneously, so the pipe can clear the hole. This technique improves information recovery significantly.

Logging tools are typically run in combination as strings--examples are listed in Appendix IV. Standard logging tools include gamma-ray (determines concentrations of U, Th and K), sonic (measures compressional wave velocity along the wall), neutron porosity, lithodensity (determines density and measures long dimension of the hole), and resistivity. Other tools permit measurements of seismic properties away from the hole (e.g. well seismic tool), and analyses of other elements (e.g. aluminum activation tool). The borehole televiewer, which is an analog tool, is available and is used to get a picture of the borehole. A digital version from Germany is now on board and is producing excellent data. The dual lateral logs of electrical resistivity operate by driving current into the formation, and are used for formations such as basalts and diabases. Recording of measurement configuration can give horizontal and vertical anisotiropy.

A number of other techniques are available outside of ODP. The enhanced resolution tool (ERT) for geochemical measurements has enhanced spectral resolution (see Appendix IV) but requires increased time due to lower counting efficiency. Sulfide and other related compounds are measured in the mining industry using an induced polarization tool. Other tools include complex resistivity, magnetic susceptibility, a 3-axis magnetometer, borehole radar, and *in situ* gravity, which can be measured in hole and inverted as a function of depth to give precise measurements of density.

A major lack in downhole measurements is the determination of bulk density. This would require substantial modification of existing tools.

6.0 TECP-LITHP COMMON OBJECTIVES (E. Moores)

The major themes of joint TECP-LITHP interest can be summarized as follows:

a) Mid-ocean ridge (spreading center) processes
- Combined lithologic, tectonic and hydrothermal processes
- Differences between structure at fast and slow spreading ridges bear on the relationship between tectonic and magmatic activity
- Sulfide deposits clearly are linked to structurally-produced plumbing conduits.

b) Tectonics of rifted continental margins
- Evolution of both volcanic and non-volcanic margins
- Exposure of peridotites (e.g. Galicia Bank) of petrologic and tectonic interest. Textures in mantle rocks record the processes of tectonic flow in the mantle.

c) Fracture zones
- Volcanism within F.Z. is a lithosphere objective, but distribution is a tectonic question
- Exposure of deeper layers result from tectonism
- Relation of these to "normal" oceanic crust of lithospheric interest.

d) Intraplate volcanism
- Tectonic questions concern their relationship to superswells--major mantle convective systems, and their use in defining plate kinematics
- Lithospheric questions relate to magma source and evolution

e) Convergent margins
- Magmatism and hydrothermal processes and their distribution are most likely controlled by tectonic activity
- Tectonic objectives also involve tectonics of accretionary prisms, especially interplay of fluid in tectonic activity.

There is clearly a need to encourage proposals to address these joint objectives, since most proposals received have a tendency to concentrate on either lithospheric or tectonic goals. This often results in proposals being highly ranked by one panel and poorly ranked by the other when, in fact, more attention to both panels' interests would result in a much stronger proposal with high endorsements from both panels.

TECP and LITHP will consider putting out a joint RFP in U.S. and non U.S. publications for proposals that address coupled tectonic-volcanic systems. An example might be using an offset drilling strategy to answer questions related to the interaction of magmatic, volcanic and tectonic processes at mid-ocean ridges. Another possibility would be ODP-sponsored symposia at AGU, GSA, EGU meetings specifically on drilling and volcanic-tectonic systems.

Careful attention should also be paid to the common objectives when staffing of both panels is under consideration. At present, both LITHP and TECP feel that their interests are well represented on both Panels, and the liaisons (J. Karson from TECP to LITHP, and S. Cloetingh from LITHP to TECP) are appropriate.

7.0 PROPOSAL SUBMISSION DEADLINES

Several people did not receive the prospectus or, in the case of TECP, the second mailing of proposals because of mail delays or because they were already travelling by the time that materials were sent out. The short lead time between panel chairs' receipt of proposals and the date of the meeting also necessitated the use of expensive courier and overnight mail services, thereby more than exhausting panel chairs' budget.

TECP and LITHP jointly urge the JOIDES office to set a submission deadline sufficiently in advance of the panel meetings (six weeks?) so as to ensure that all panel members receive copies of appropriate prospectuses and/or proposals in time to read them, and so that panel chairs do not have to routinely resort to expensive express mail and courier services.

8.0 JOINT MEETING AND FIELD TRIPS

All members of LITHP and TECP agreed that joint meetings that include a pre-meeting field trip, as this one did, are extremely valuable in enhancing coordination between the panels, improving communication, etc. The panels agreed to try to schedule a joint meeting every year or one and one half years. These joint meetings should be preceded by carefully selected field trips that ideally visit on-land examples of topics of high common interest. John Mutter commented that PCOM generally is in favor of common meetings, especially if it results in a common voice on issues of common concern, such as offset drilling.

OPERATIONAL HIGHLIGHTS
LEG 139

- This leg was an ambitious program of investigating hydrogeologic circulation and its effects on the sediments and underlying rocks in the environment of a sedimented seafloor-spreading ridge.
- A total of 22 holes were examined at four sites.
- Drilling/logging/coring operations were carried out in the highest downhole temperatures for ODP/DSDP(est 300 to 350C)
- Nearly 160 meters of massive sulfide deposits were cored in two holes.
- The first operational deployment (twice) of the CORK with installed instrumentation.
- The first operational deployment of the Pressure Core Sampler.

LITHTECP MTG
NICOSIA, CYPRUS
OCT 9-11, 1991

POST LEG 139 ATLANTIS CRUISE

* DR. EARL DAVIS AND DR. KEIR BECKER (WITH ODP ENGINEER TOM PETTIGREW)

* RETURNED TO LEG 139 SITES 857 AND 858 TO INSPECT "CORK" EMPLACEMENTS

* ALL CORK HARDWARE IN PLACE AS DESIRED

* SUCCESSFULLY INTERROGATED DATA LOGGERS AT BOTH SITES

    * THERMISTOR STRINGS

    * BORE HOLE PRESSURE DATA

* SUCCESSFULLY DUMPED DATA AND REPROGRAMMED SAMPLE RATE FROM EVERY TEN MINUTES TO ONCE PER HOUR

* SUCCESSFULLY ATTACHED TO BOTH FLUID SAMPLER PORTS

* NO FLUID SAMPLES OBTAINED - BOTH HOLES UNDER PRESSURED (858G - 50 PSI, 857B - 80 PSI)

* HOLE 858B APPEARS TO HAVE TURNED INTO A BLACK SMOKER

* HOLE 858F (EXPLORATORY HOLE) APPEARS TO BE TAKING SEA WATER EVEN THOUGH ATTEMPTS WERE MADE TO PLUG IT WITH CEMENT

* AN ATTEMPT TO COVER HOLE WITH 4 X 4 PLATE WAS UNSUCCESSFUL - PLATE APPARENTLY FELL IN HOLE SIDEWAYS

LITHTECP MTG
NICOSIA, CYPRUS
OCTOBER 9-11, 1991

LEG 142 EAST PACIFIC RISE - OPERATING SCHEDULE

IN PORT VALPARAISO, CHILE	JANUARY 13-17, 1992
DEPART VALPARAISO, CHILE	JANUARY 18, 1992
TRANSIT TO EPR-2	12.5 DAYS (@ 10.5 KTS)
OPERATIONS ON SITE EPR-1	35.9 DAYS
9° 30.8' NORTH LATITUDE 104° 14.6' WEST LONGITUDE	
TRANSIT TO HONOLULU, HAWAII	12.6 DAYS (@10.5 KTS)
ARRIVE HONOLULU, HAWAII	MARCH 19, 1992

TOTAL DAYS IN PORT	5.0
TOTAL TRANSIT DAYS	25.1
TOTAL DAYS ON-SITE	35.9
TOTAL DAYS ON LEG	66.0

LITHTECP MTG
NICOSIA, CYPRUS
OCTOBER 9-11, 1991

LEG 142 EAST PACIFIC RISE - PRIMARY ENGINEERING GOALS

* MAXIMIZE CORING TIME WITH THE DIAMOND CORING SYSTEM
* ACHIEVE MINIMUM PENETRATION OF 100 MBSF
* ACHIEVE GREATER THAN 50% RECOVERY OF FRACTURED ROCK
* DEPLOY NEW 3-LEG/HEX SIDED HARD ROCK GUIDE BASE
* DEPLOY A NEW PILOTED REAMING BIT TO EVALUATE THE FEASIBILITY OF REAMING A 3.96" DCS HOLE OUT TO 7-1/4"
* EVALUATE 2ND STAGE DI-BHA SYSTEM WITH 7-1/4" DIA BIT

LITHTECP MTG
NICOSIA, CYPRUS
OCTOBER 9-11, 1991

LEG 142 EAST PACIFIC RISE - SECONDARY ENGINEERING GOALS

* EVALUATE SLIM HOLE LOGGING CAPABILITY AND PLATFORM DEPLOYMENT TECHNIQUES (TEMPERATURE/CALIPER)

* IF POSSIBLE CONDUCT STANDARD LOGGING IN REAMED HOLE TO VALIDATE/COMPARE WITH SLIM HOLE RESULTS

* EVALUATE EFFECTIVENESS OF DIAMOND CORE BARREL (DCB) 7-1/4" CORING SYSTEM IN FRACTURED ROCK
    * DIAMOND BIT LIFE AND PENETRATION RATE
    * HOLE STABILITY
    * 6-3/4" DRILL COLLAR PERFORMANCE

NOTE:

A 2ND HRB MAY BE DEPLOYED
BUT UNDER THE FOLLOWING CONDITIONS:

(1) INITIAL HRB/HOLE IS LOST AND UNRECOVERABLE

(2) TEMPERATURE GRADIENT PREVENTS CONTINUED CORING IN INITIAL HOLE

(3) DCS CORING IS AHEAD OF SCHEDULE AND CANNOT CONTINUE DUE TO OTHER CONSTRAINTS SUCH AS DRILL ROD SHORTAGE, OR MECHANICAL MALFUNCTION.

(4) REQUIRED TO EVALUATE DIAMOND CORE BARREL (DCB)

LITHTECP MTG
NICOSIA, CYPRUS
OCTOBER 9-11, 1991

LEG 142 EAST PACIFIC RISE - BASIC OPERATIONS PLAN

- DEPLOY MINI HARD ROCK GUIDE BASE ON PONDED LAVA LAKE
- DRILL-IN 1ST STAGE OF DI-BHA 4-5 METERS INTO SEA FLOOR
- CONDUCT SLIM HOLE DIAMOND CORING OPERATIONS TO 100+ MBSF (ASSUMING ACCEPTABLE TEMPERATURE GRADIENT)
    - DETERMINE ACTUAL DEPTH OF LOW VELOCITY "RUBBLE" ZONE ESTIMATED AT 40-60 MBSF

    [HOLE SIZE 3.96", CORE SIZE 2.20" X 10']
- ATTEMPT SLIMHOLE TEMP/GAMMA/CALIPER LOGGING
- ATTEMPT REAMING 3.96" HOLE OUT TO 7.25"
- IF STABLE HOLE THEN CONDUCT STD LOGGING OPS
    - SUITE 1 - RESISTIVITY/DENSITY/CALIPER
    - SUITE 2 - VELOCITY/GAMMA
    - SUITE 3 - EITHER FMS OR BHTV
- DEPLOY 2ND STAGE DI-BHA TO ISOLATE "RUBBLE" ZONE.
- IF TIME/TEMPERATURE GRADIENT PERMITS THEN:
    - RESUME DCS CORING OPERATIONS

    <u>OR</u> * DEPLOY 2ND HRB AND EVALUATE DIA CORE BARREL

    [HOLE SIZE 7.25", CORE SIZE 2.31" X 30.0']

APPENDIX III

LITHTECP MTG
NICOSIA, CYPRUS
OCT 9-11, 1991

PHASE IIB - DIAMOND CORING SYSTEM STATUS

* SLINGSHOT TESTING SUCCESSFULLY COMPLETED
* HYDRAULIC SYSTEMS NEARLY COMPLETE
* ELECTRICAL SYSTEMS IN PROGRESS WEEK OF SEPT 30TH
* SECONDARY HEAVE COMPENSATOR HARDWARE/SOFTWARE MODS IN PROGRESS
* SECONDARY HC INSTALLATION AND TESTING SCHEDULED FOR WEEK OF OCTOBER 7TH
* DRILLING, SECONDARY HC, AND OTHER SYSTEM TESTING SCHEDULED TO CONTINUE THROUGH MONTH OF OCTOBER
* RIG DOWN AND PREPARATION FOR SHIPPING TO VALPARAISO SCHEDULED FOR EARLY NOVEMBER

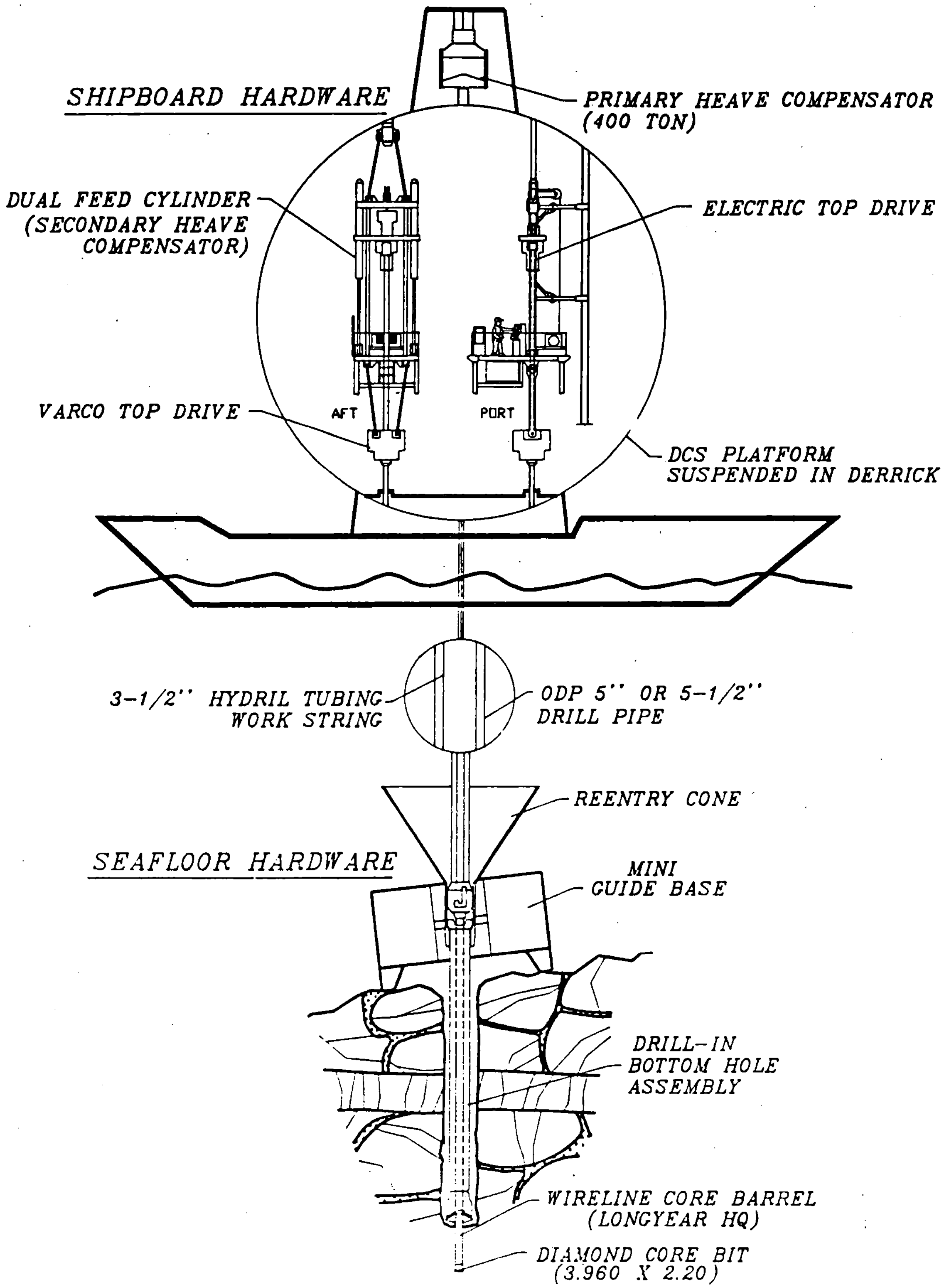


Figure A1

DIAMOND CORING SYSTEM
PHASE II - 4500 METER

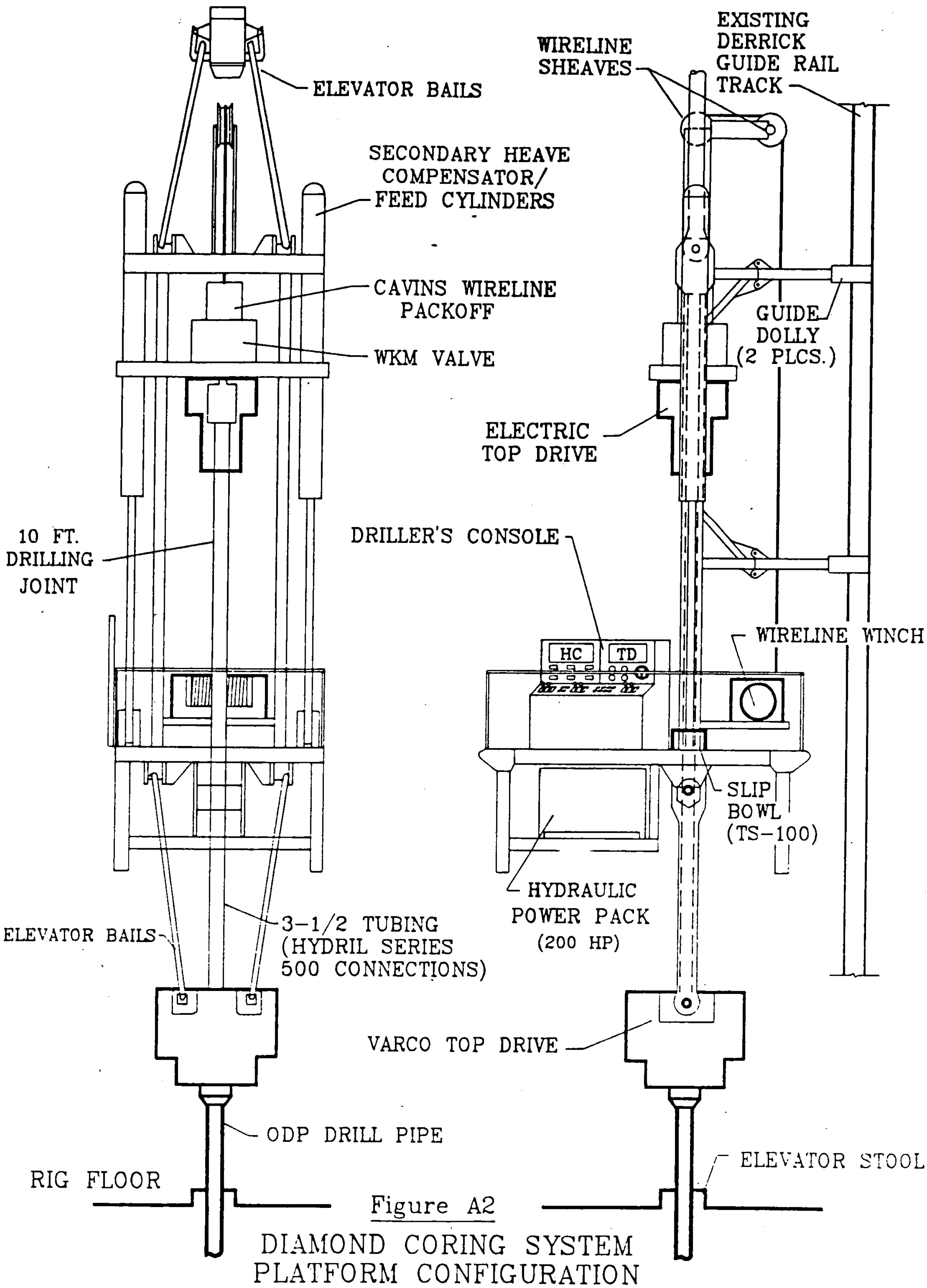
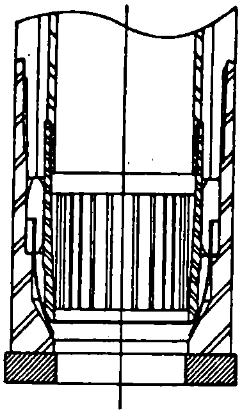
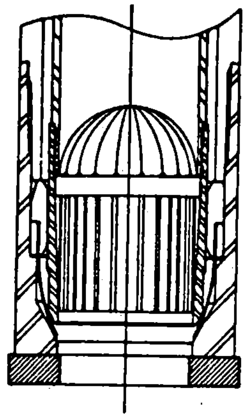


Figure A2

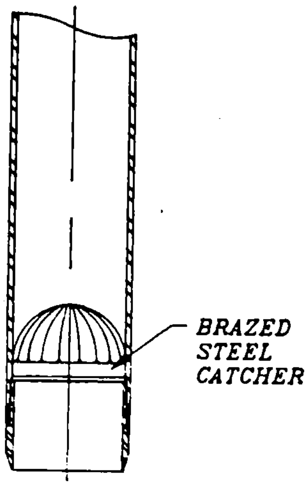
DIAMOND CORING SYSTEM
PLATFORM CONFIGURATION
PHASE II - 4500 METER DEPTH CAPACITY



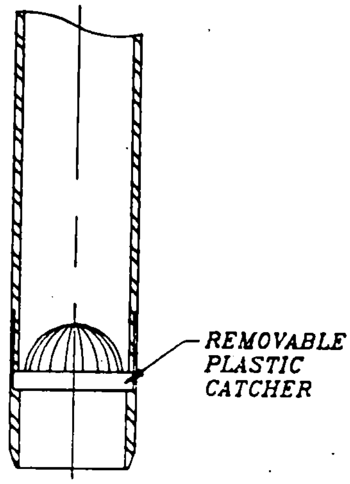
CORE BARREL
COLLET TYPE CATCHER



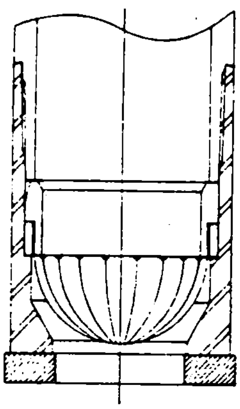
CORE BARREL
COLLET TYPE W/BASKET CATCHER



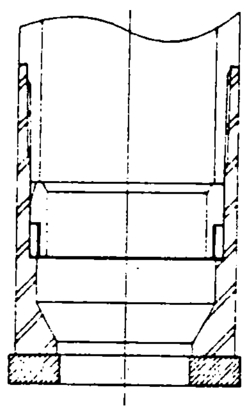
SHELBY TUBE
BASKET CATCHER



SPLIT SPOON
BASKET CATCHER



CORE BARREL
FLOAT VALVE



CORE BARREL
W/O FLOAT VALVE

Figure B2

DCS PHASE IIB
CORE CATCHER/FLOAT VALVE
ASSEMBLY OPTIONS
(LEG 142/EPR)

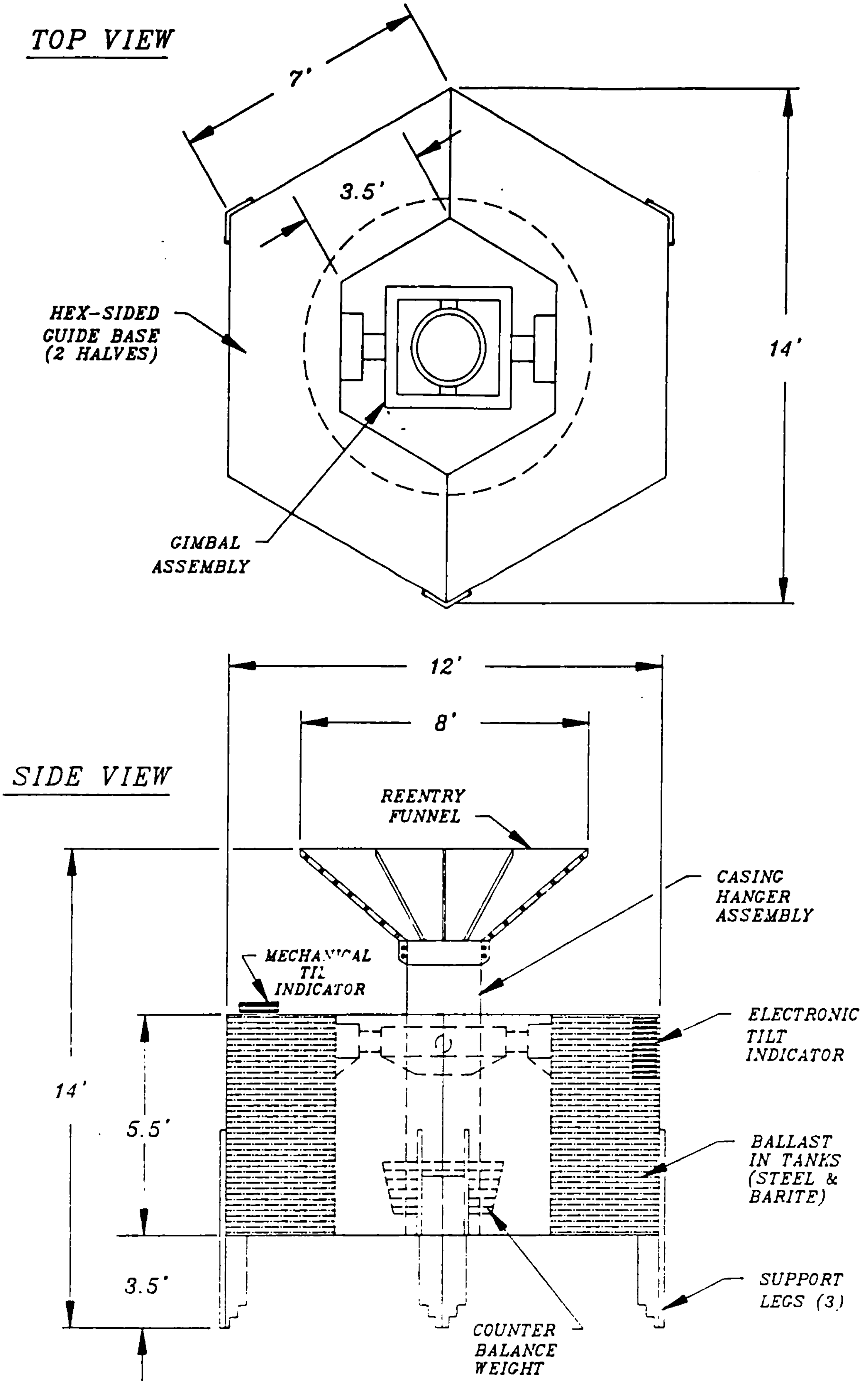
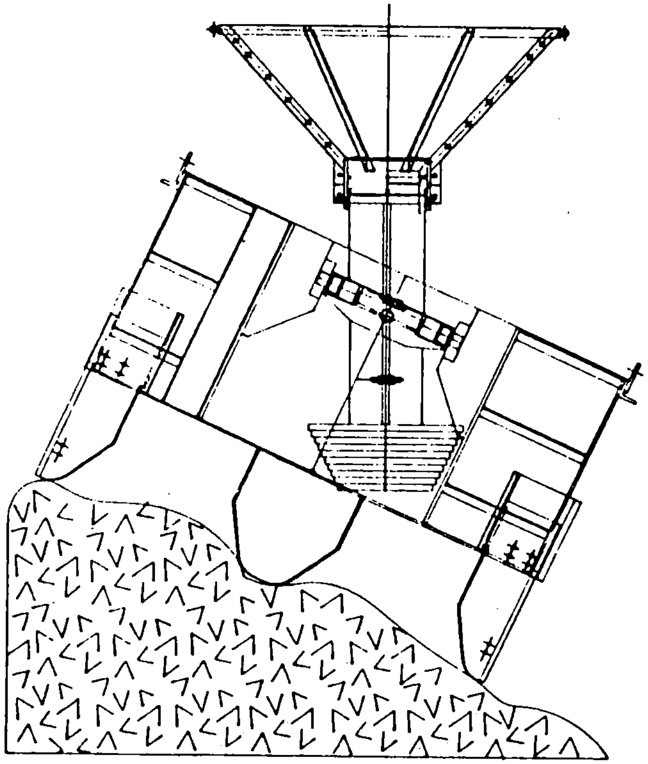


Figure C1

MINI HARD ROCK GUIDE BASE (HRB)
HEXAGONAL DESIGN SCHEMATIC

MINI HRB SPECIFICATIONS



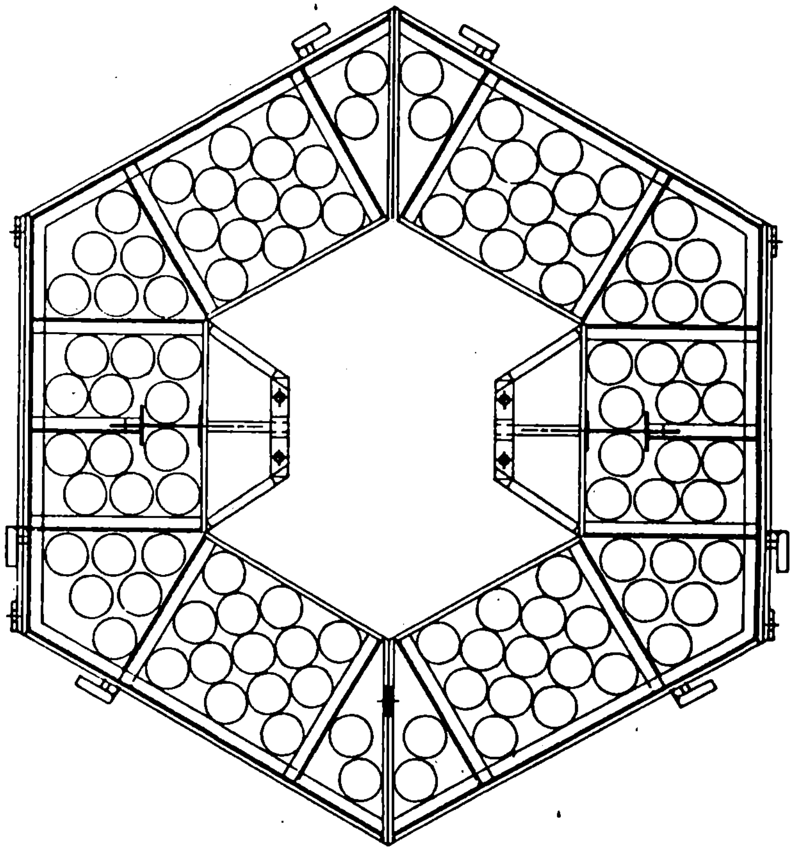
DESIGN REQUIREMENTS

BASE BOLTS – 1 IN. A 372 (18 TOTAL)
LEG BOLTS – 7/8 IN. A 372 (8 PER LEG)
S.F. FOR UPRIGHTING MOMENT – 2.5
S.F. OF BASE BOLTS AGAINST SHEAR – 19:1
MAX TILT (INTO SIDE) – 25° (INTO CORNER) – 30°

DRY BASE COMPONENT WEIGHTS

BASE SECTIONS(2) –	26,500 LBS.	CONE –	1,600 LBS.
GIMBAL –	1,075 LBS.	COUNTERWEIGHT –	6,350 LBS.
CASING HANGER –	4,250 LBS.	LANDING SEAT –	375 LBS.
LEGS (3) –	2,250 LBS.		
		TOTAL	41,400 LBS.

MINI HRB BALLAST FOR LEG 142



BALLAST

STEEL PIPE: 8.62" (21.9 cm) X 8.22" (20.9cm) X 5.58' (1.7 m)

TOTAL WEIGHT PER PIPE 770–792 LBS. (350–360 KG.)

MAXIMUM ALLOWABLE PIPES PER BASE: 108 PIPES

TANK VOLUME: 493 $FT.^3$

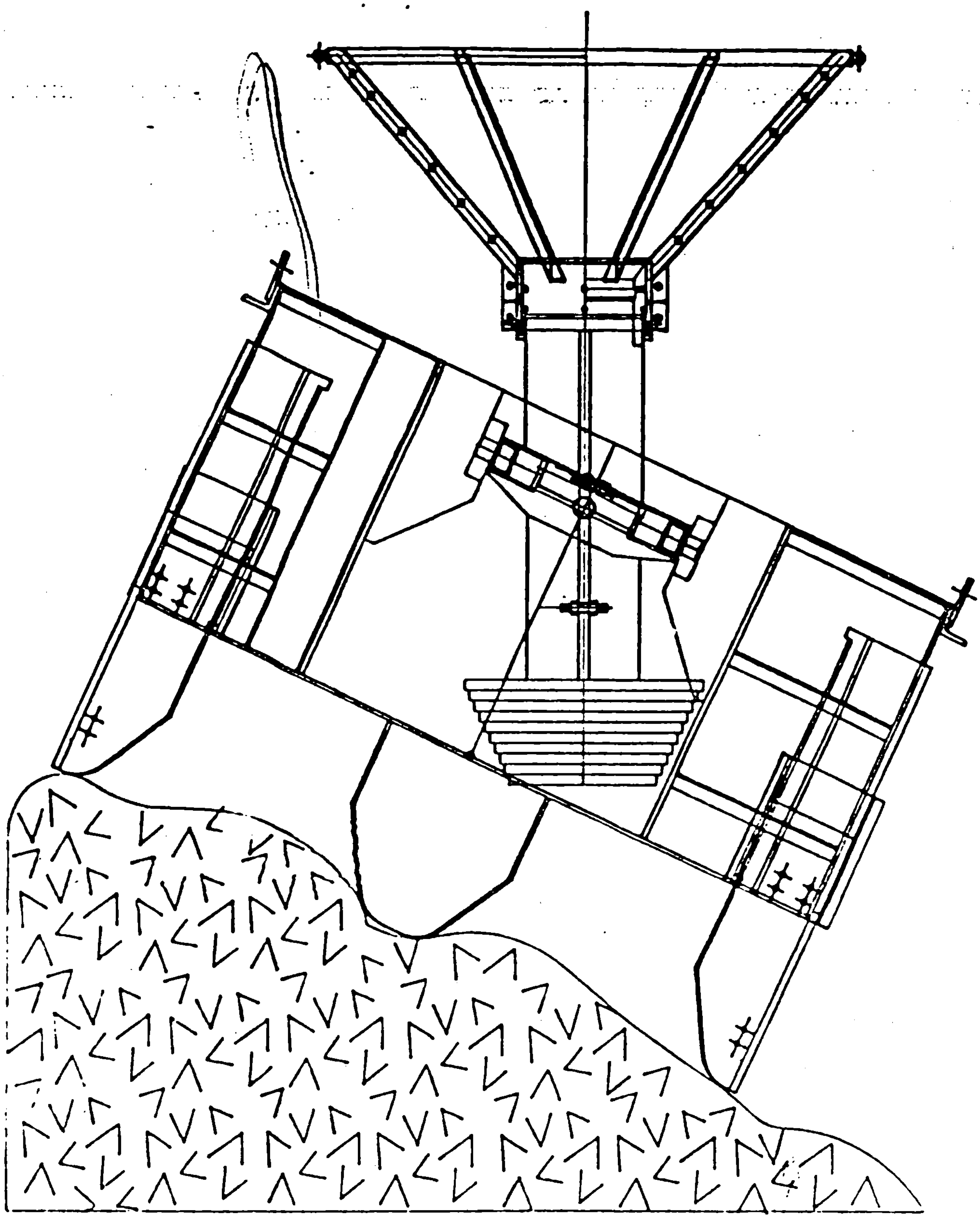
DRY WEIGHT

STEEL PIPES –	83,160 LBS.
CEMENT –	29,500
BASE –	41,400
TOTAL –	154,060 LBS.

SUBMERGED WEIGHT

STEEL PIPES –	72,350 LBS.
CEMENT –	13,500
BASE –	36,020
TOTAL –	121,870 LBS.

Figure C2



MINI HEX–BASE POSITIONED AT 25° MAXIMUM TILT

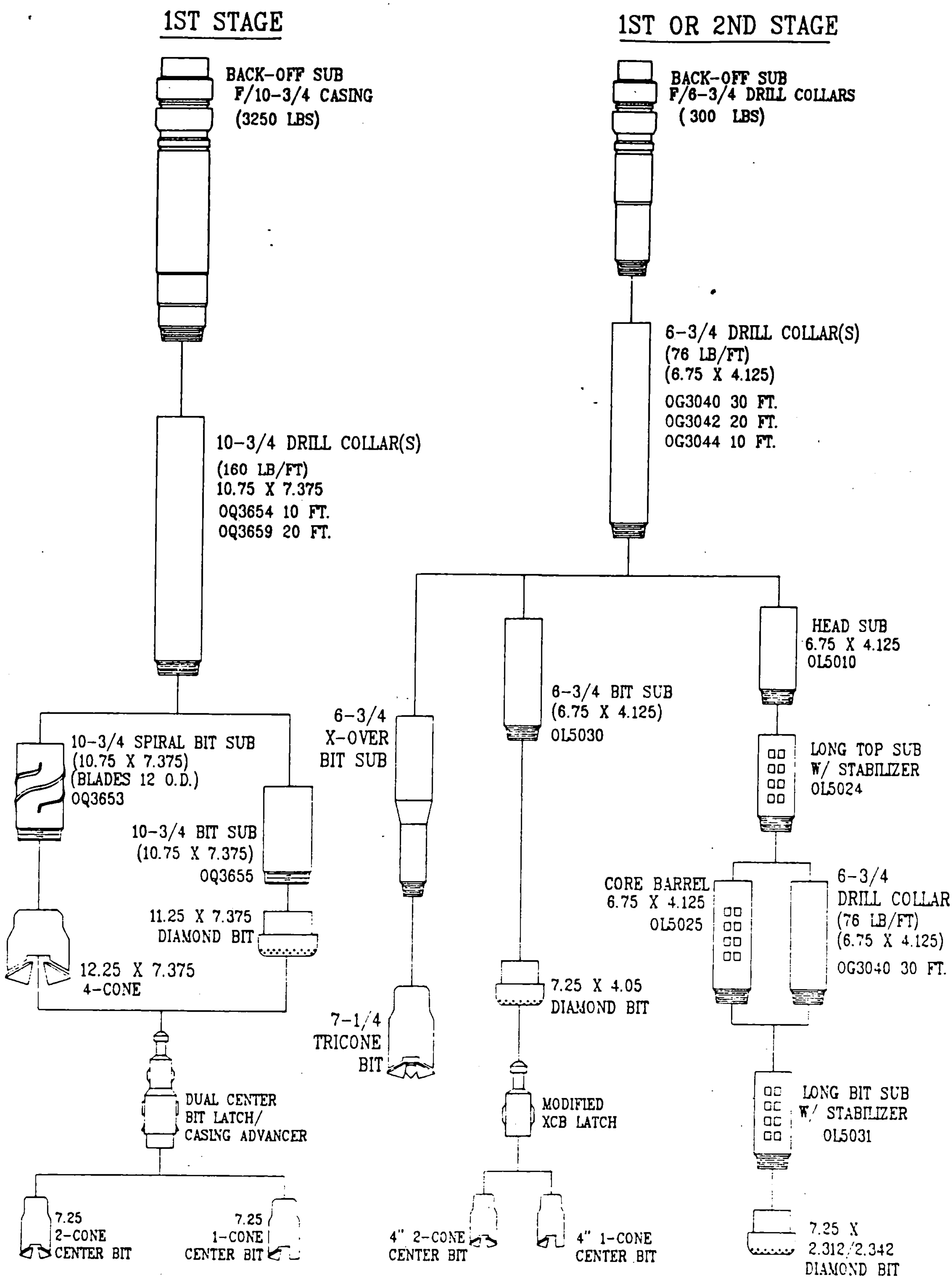


Figure D6

NESTED DRILL-IN CASING SYSTEM

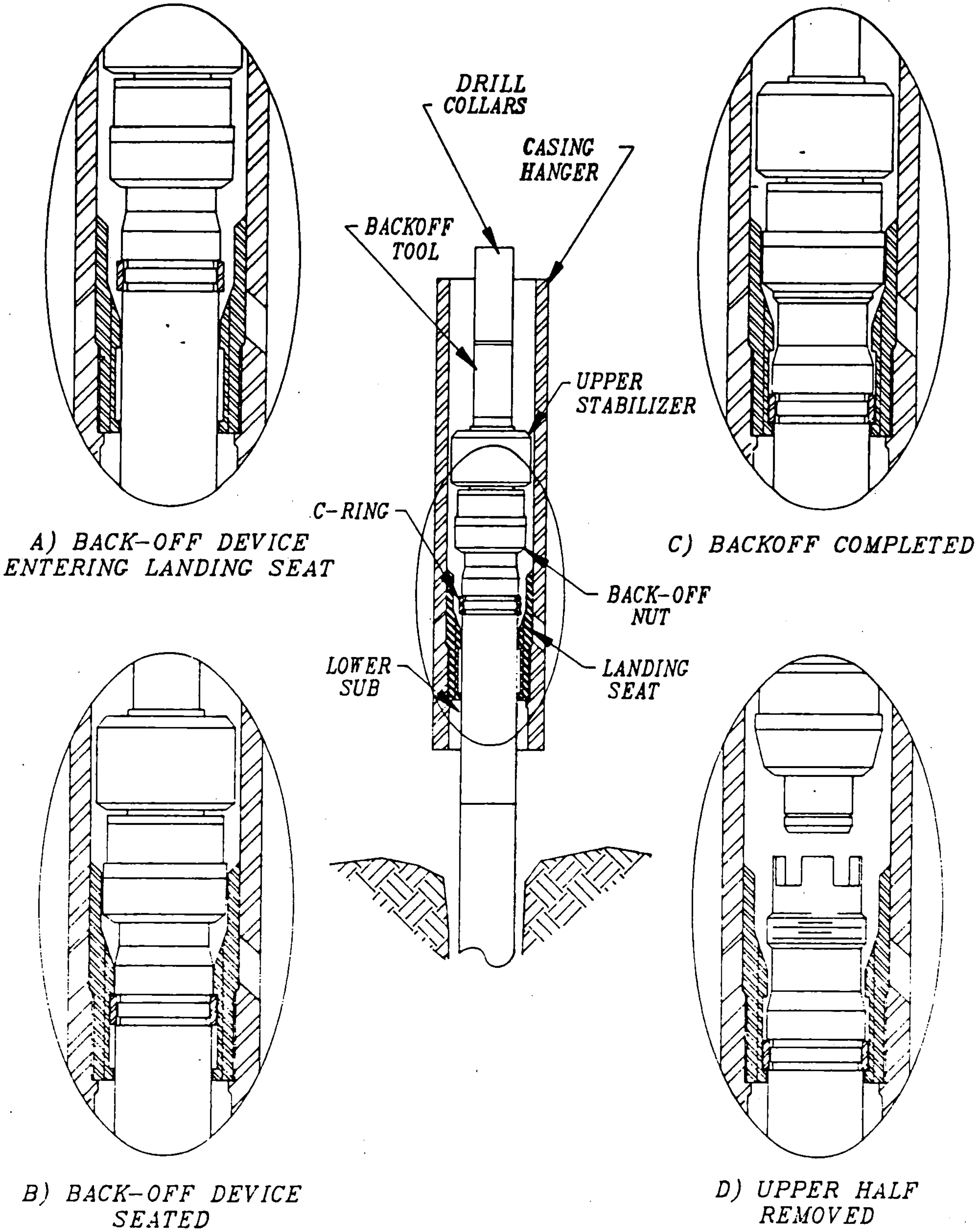


Figure D1

DEPLOYMENT SCHEME FOR MECHANICAL BACK-OFF DEVICE
(SEAFLOOR TEMPLATE NOT SHOWN FOR CLARITY)

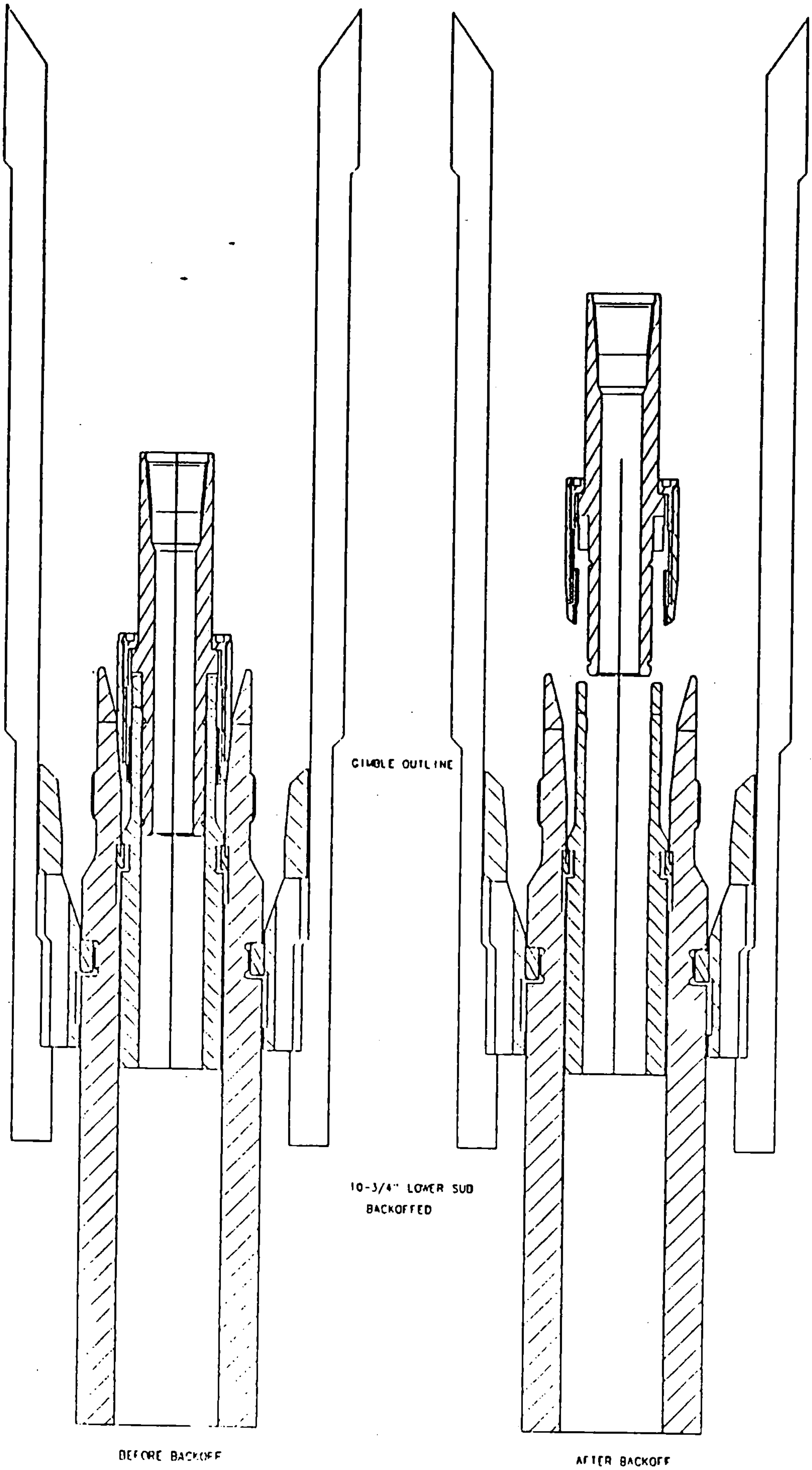
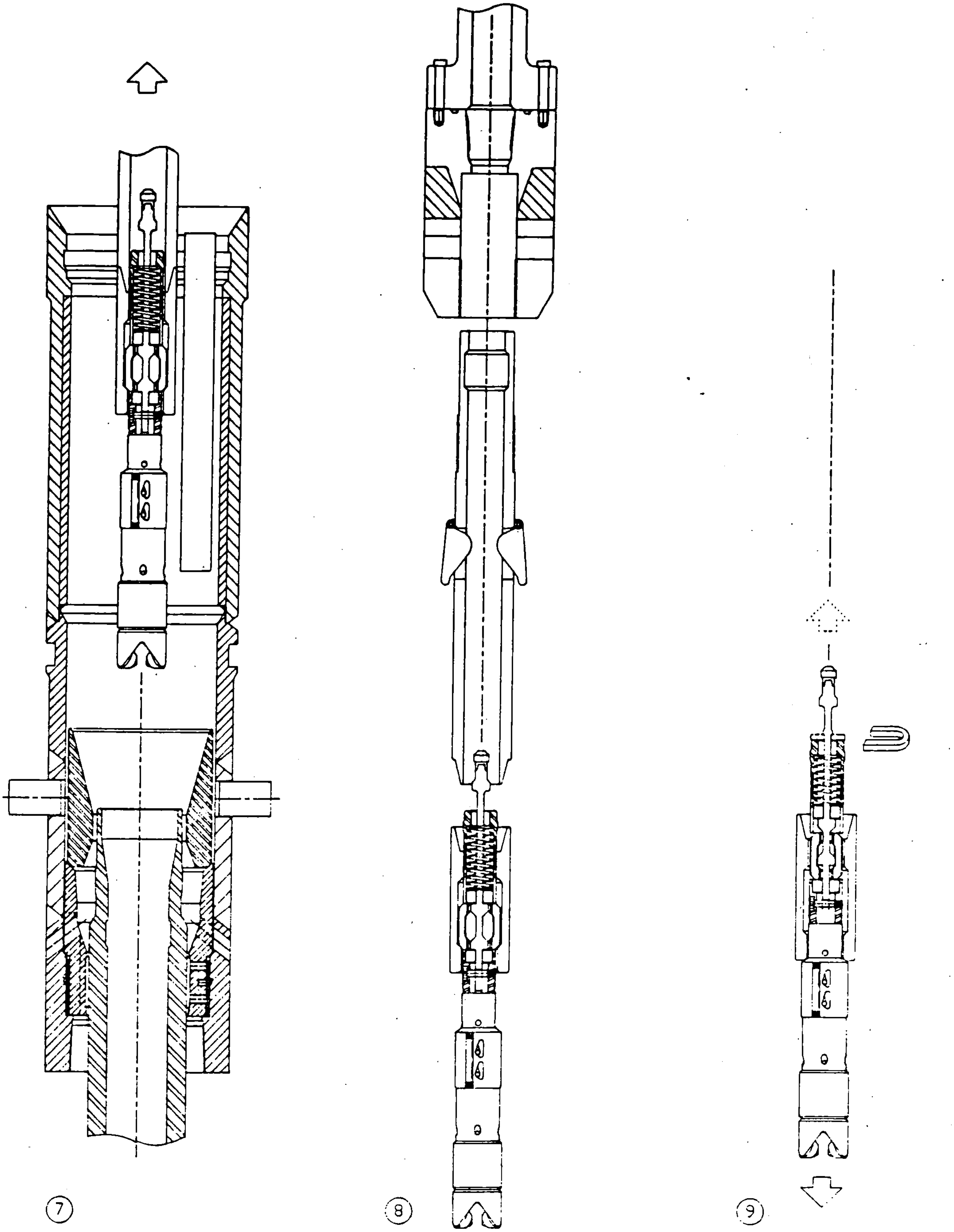


Figure D4

INTERMEDIATE BACK-OFF SUB



(7) UN-J AND RETRIEVE TENSIONING TOOL

(8) REMOVE LOWER SUBS FROM TENSIONING TOOL

(9) RETRACT XCB LATCH W/C-RING CLAMP BEFORE PUSHING CENTER BIT ASSEMBLY THROUGH LOWER SUB

Figure E6

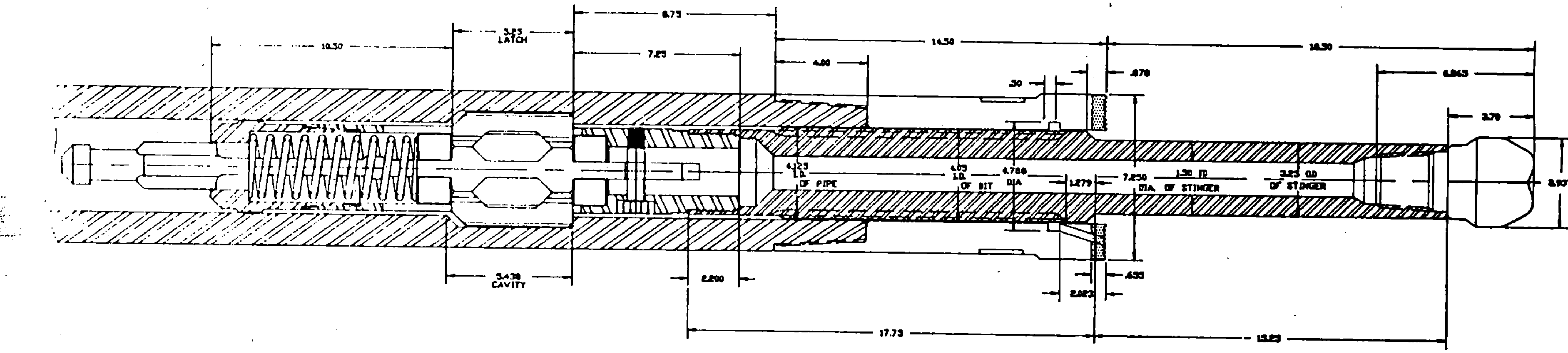


Figure F3

REAMING BIT SPACE OUT

W/ STINGER & LATCH ATTACHMENTS

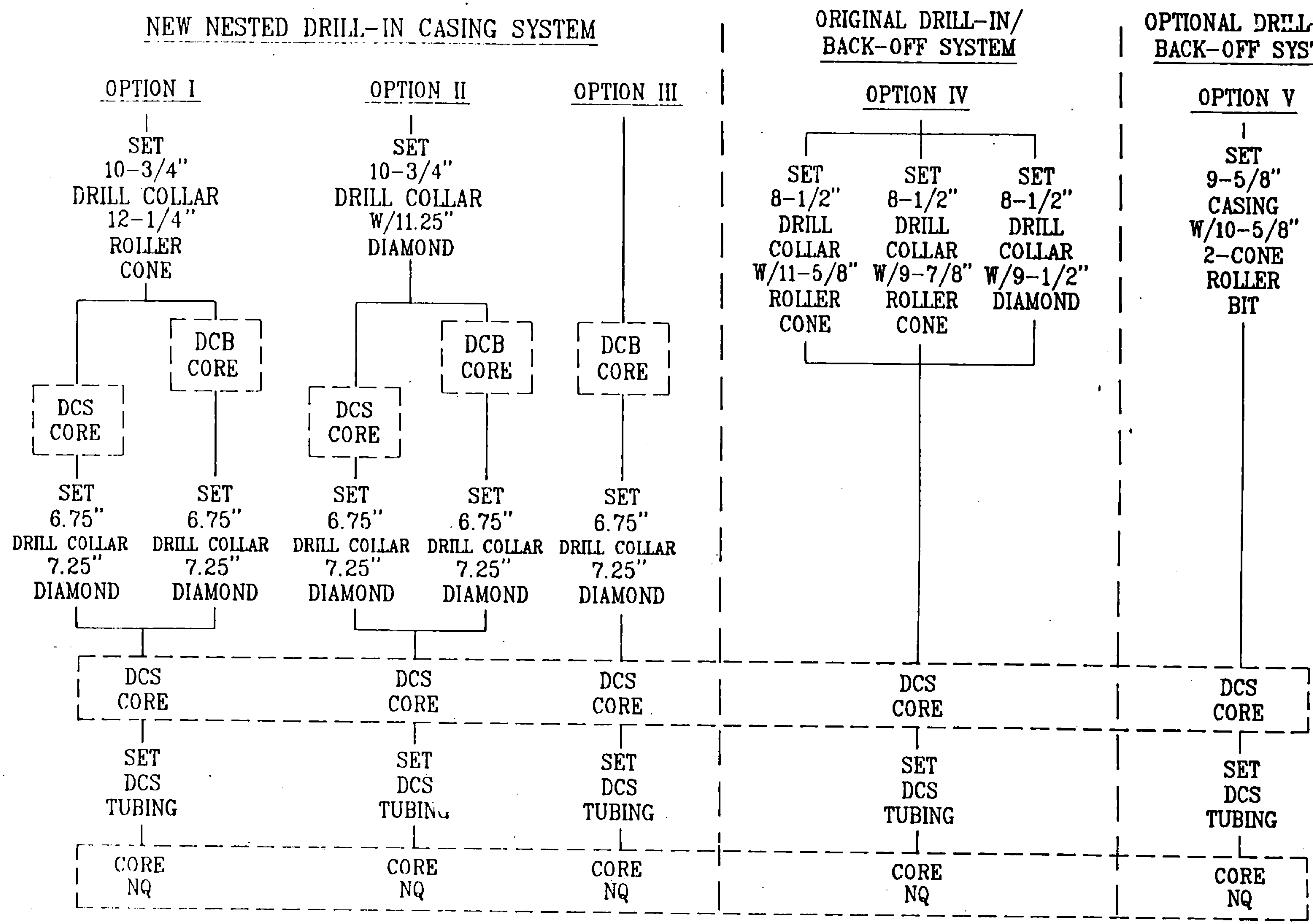


Figure D2

SEAFLOOR SPUDDING OPTIONS

FOR HARD ROCK LOCATIONS

NOTE: NQ CORE N[illegible] AVAILABLE FOR LEG 142

LITHTECP MTG
NICOSIA, CYPRUS
OCT 9-11, 1991

DCS PHASE III STATUS

- FEASIBILITY STUDIES COMPLETED ON 2 CONCEPTS
  - BOTTOM MOUNTED SLIP JOINT CONCEPT
  - INTEGRAL RISER TENSIONER CONCEPT
- PRELIMINARY INFORMATION HAS BEEN PRESENTED TO TEDCOM
- BOTH CONCEPTS COMPLEX AND COSTLY
- TEDCOM SUGGESTED NEW EVALUATION OF THE NEED FOR THE GUIDE HORN SINCE THIS ADDS COMPLEXITY AND EXPENSE TO THE DCS PHASE III TENSIONER CONCEPT
- DCS PHASE III SYSTEM WILL NOT BE AVAILABLE FOR USE ON LEG 147 (EPR 2) AS TENTATIVELY SCHEDULED

APPENDIX IV

Examples of Standard Logging Tool Strings

Quad Combo
- Natural Gamma Spectral
- Long Spacing Digital Sonic
- Neutron Porosity
- Lithodensity Caliper
- Phasor Induction - Resistivity

Seismic/Stratigraphic
- Digital Sonic
- Lithodensity Caliper
- Natural Gamma Spectral
- Phasor Induction

Litho/Porosity
- Natural Gamma Spectral
- Neutron Porosity
- Lithodensity Caliper

Geochemistry
- Natural Gamma Spectral
- Neutron Porosity
- Aluminum Activation
- Induced Gamma Spectral

Formation Microscanner
- Natural Gamma Spectral
- General Purpose Inclinometer
- Formation Microscanner Dipmeter

SIDE ENTRY SUB

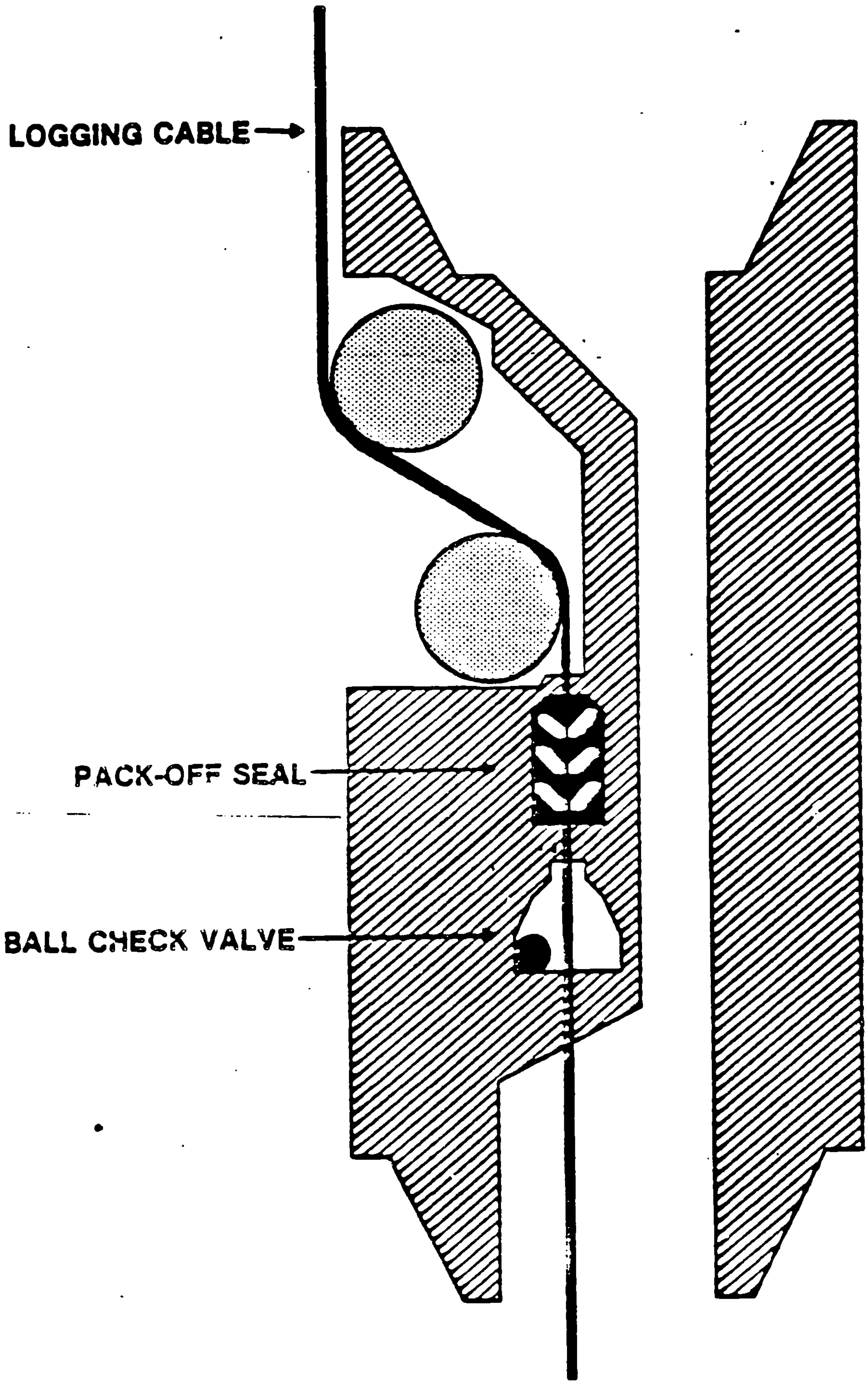
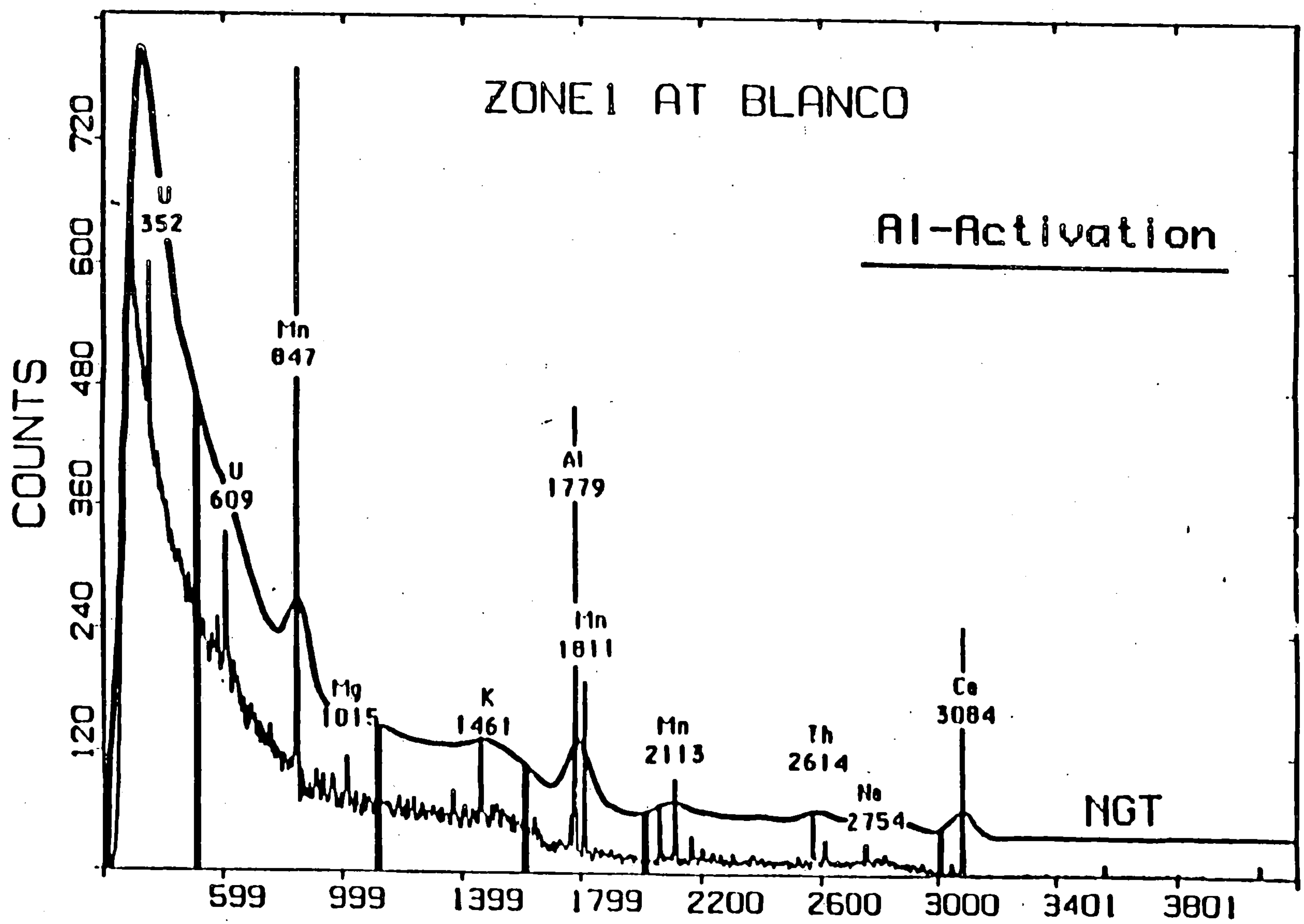


Figure 3

COMPARISON OF NGT AND ERT ACTIVATION SPECTRA



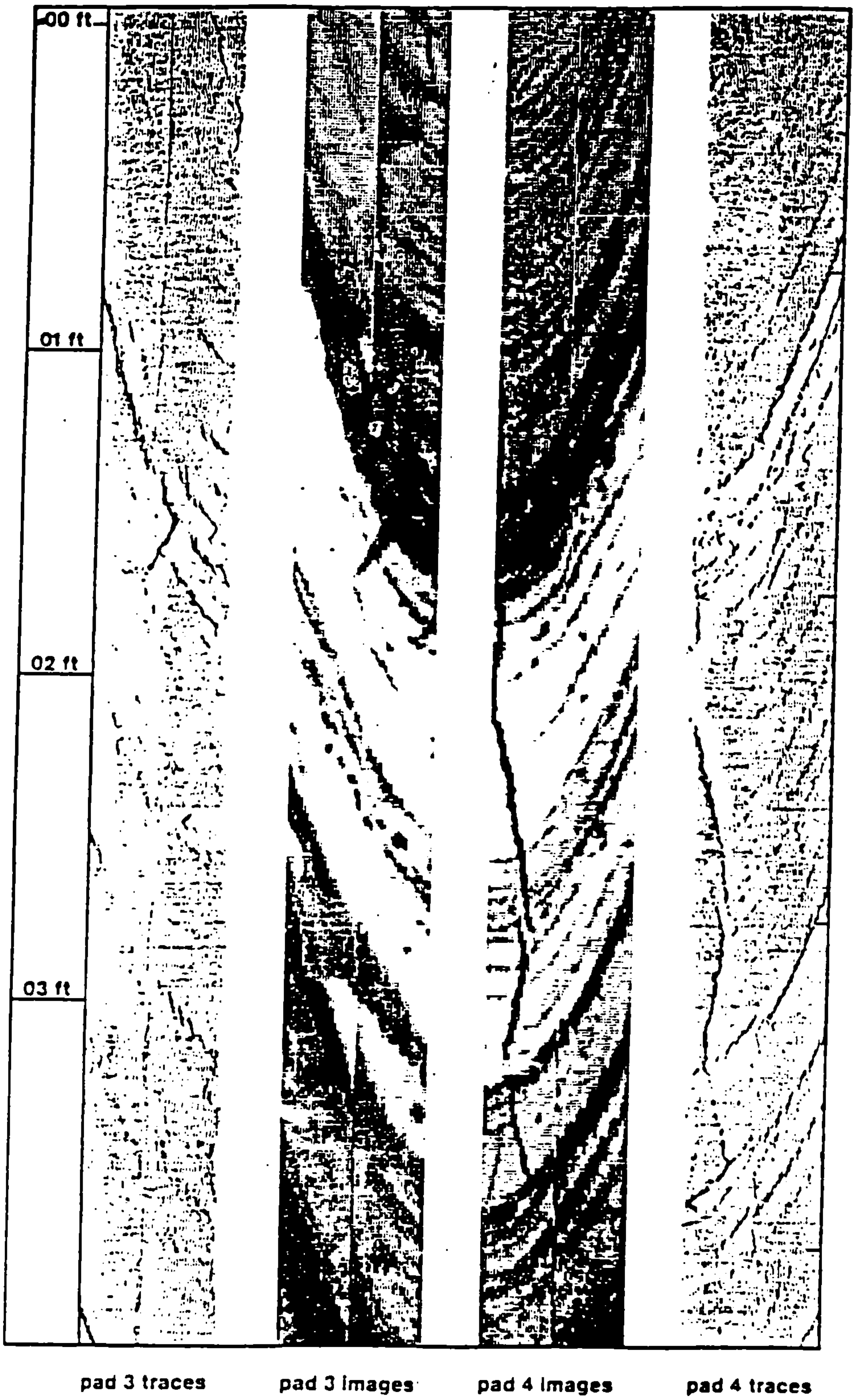


Figure 11. Fractures, High Dips and Vuggy Porosity in the Monterey Formation.