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Paris, May 7th, 1986

REPORT OF THE 2nd TEDCOM MEETING
held in Marseilles (France)
FEBRUARY 17-20, 1986

I. List of attendees

1.1. TEDCOM members

B. Dennis	Los Alamos National Laboratories
C. Hocott	University of Texas
J. Jarry	IFREMER, Chairman
J. Kasahara	University of Tokyo
J.C. Lamb	B. P.
K. Manchester	Bedford Institute
C. Marx	University of Clausthall
F. Schuh	ARCO

Absentees :

W. Bingman	Shell
T. Gardner	Exxon
M. Newsom	Sandia

1.2. Permanent Observers

J. Delacour	IFP
T. Francis	PLA COM
C. Grassick	Alternate for J.C. Lamb
D. Hammett	SEDCO
B. Harding	TAMU
R. Larson	PLACOM chairman
J. Legrand	IFREMER
A. Sutherland	NSF

1.3. Part-time attendees

G. Baron	IFP
M. Dorel	IFP
C. Mabile	IFP
P. Odru	IFP
J.C. Schawann	ELF
C. Sparks	IFP

II. Agenda

Monday	feb. 17	Afternoon	General session
Tuesday	Feb. 18	Morning	Hot rock drilling session
		Afternoon	Visit of JOIDES RESOLUTION
Wednesday	Feb.19	Morning	Riser drilling session
		Afternoon	Presentation of the French equipment manufacturing industry
Thursday	Feb. 20	Morning	Closed session.

III. General session

3.1. Jean JARRY introduced the meeting by welcoming everybody and announcing the agenda. Then he talked about the goals of TEDCOM as he felt them and as he had listed them in a letter to the members :

<< TEDCOM must be a bridge between Science and Industry. TEDCOM has three main objectives :

. To ensure that engineering and science are properly coordinated, which means that the engineering priorities be coherent with the science priorities, but which means also that the science priorities be compatible with the engineering and budget capabilities.

. To be sure that the project make use of any relevant experience.

. To ensure that the technological aspects of the project be conducted in the best way compatible with the actual budget and that the R & D priorities be sound.

ODP is also an international program in which money, science and technology are to be shared. It is the reason why TEDCOM has a fourth objective :

. To assure that, for each large contract concerning either a purchase of equipment or a development study, consultations are done on a worldwide basis, and that the best technology available from the member countries is used whenever possible.

TEDCOM's role is to help TAMU by bringing the expertise and the knowledge of its members. >>

Then Jean thanked Frank SCHUH who had written a letter in which he gave his views on the ODP engineering approach : "there are two possibilities : this approach is either an aggressive engineering approach, or a field oriented trial and error process. If ODP chooses the second way, TEDCOM's role will become difficult and TEDCOM members will not receive anything in return". Frank explained that the oil companies are interested to participate to TEDCOM because they hope some return. Some companies would be even ready to give some funding. Their experience is enormous and can be very useful to the program, specially in riser drilling. Besides, if TAMU launches large R & D programs using computer analysis, writing softwares or using them can interest different departments of the oil companies.

Alex SUTHERLAND remarked that some other companies could also be interested, for example some contractors and that they would be welcome to make proposals : they could give advice to TAMU, they could push to develop new tools. It was suggested that we publicize more on our requirements, in order to increase the probability of finding people interested and able to solve them. That approach could even trigger proposals and, perhaps, funding. B. HARDING said that he already maintains a very visible profile. Anyway, he always appreciates help from anybody.

3.2. "JOIDES RESOLUTION" first year operations

B. HARDING reported on the first seven legs of ODP (the legs are listed in JOIDES journal) and described the problems encountered.

On leg 106, a hard rock guide base (HRB) was used for the first time, on the mid-atlantic ridge. A series of 10 spud tests was punched, then a hole was drilled at a very low speed : 34 meters drilled in 3 weeks. The drilling was done on the slope of a volcano, 56 meters above the rift Valley and had to be abandoned because the instability of the hole. It is anticipated that, at a greater depth, rock would probably be less fractured.

There were also problems of cuttings staying around the hole, due to its large diameter. When the ship comes back for leg 109, it is proposed to drill using a smaller diameter bit.

3.3. Then Barry described the Engineering Development and Operation Team (EDO) which he manages in the ODP organization. EDO has five engineers (see figure 1) and requires at least one more. When Claude MABILE leaves for FRANCE next summer, two new engineers will be needed :

- a drilling engineer with a mechanical background
- an electronic systems engineer.

It is expected that ODP, with additional money coming from new member-countries fees, will allow E.D.O. to hire a full-time new engineer. The second one could be sent by a member-country (Canada ? Germany ? France again ?...).

3.4. To increase the efficiency of E.D.O., the possibility of hiring consultants or experts for a given period of time was discussed. It could also be useful to have somebody from the industry participating on 1 or 2 legs. AMOCO has already sent a drilling engineer aboard the JOIDES RESOLUTION for one leg ; he gave good advice. However, there is a risk that such people propose too much sophistication.

3.5. Scientific and Technical priorities

Roger LARSON, Planning Committee Chairman, showed on a map the next legs of the ship, as planned. It is a circumnavigation around the world with excursions in latitude from the Arctic to the Antarctic.

The areas planned until 1991 include many different technical problems yet to be solved, such as high temperatures up to 160°C and overpressure zones with risks of collapse.

Roger said that scientists need improvements in coring, mostly in fractured rocks where core catcher jamming can occur. On the other hand, it is sometimes more important to have good logging than good cores (Mid-atlantic ridge).
According to Roger, the question frenquently asked by the science community to TEDCOM is "what can we reasonably get for our money ?"

In order to establish more precisely the technical priorities corresponding to science needs, a technical workshop was held last september in College Station. Unfortunately too few panel chairmen attended. During the meeting, E.D.O. people described the different tools, equipment, systems, as well as the problems met, and the R&D undertaken. At the end of the workshop, a form was given to the attendees. Out of 15 forms distributed, 8 came back filled up, allowing B. HARDING to establish a list of high and medium priorities (table 2). People must be aware that a delay of at least 12 to 18 months is necessary for E.D.O. engineers to designe and built a new tool or new equipment.

3.6. Technical problems review

3.6.1. Bit development

E.D.O. has been in touch with many manufacturers and up until now, R.B.I. has done the best job.

R&D in bit development necessitates active participation of the manufacturer, and the problem is that TAMU is not an important customer, although it can be a regular customer. SMITH and CHRISTENSEN have shown signs of interest. F. SCHUH suggested that an experimental program take place : that could interest manufacturers who might contribute.

Meanwhile, from a practical point of view, TAMU must try as many different bits as possible.

3.6.2. Pressure Core barrel

It must to be redesigned.

3.6.3. Hard rock spudding and drilling

The HRB has been quite successfull and will be used intensively at least until 1988. During leg 109, the goal will be to deepen holes 395 A and 648 B. Drilling in hydrothermal areas will also be tried.

In the case of hard rock drilling, B. DENNIS proposes to use SMITH tungsten carbide bits, which would allow a speed of 11 feet/hour if enough weight were put on the bit. But the problem is that it is not possible to put such weight during the first several decameters of the hole.

3.6.4. Hole problems

In fractured zones with high risk of hole collapses, 9 1/2'' collars are used. More generally the drillstring must always be rotated in order to avoid the string getting stuck. A solution could be to cement but it has to be experimented first.

3.6.5. Hole stability problems

With no riser, normal drilling fluid is water. Sometimes a gel flush is used, but in an open loop situation, there is no recycling and on board the supply is limited. There is no way of knowing the volume of the well and whether the gel has filled it up or not. If swelling occurs, nothing can be done (this happens when formations are saltier than seawater).

3.6.6. T.V.

There are good reports on the high resolution reentry TV, which is used now on a routine basis. Images are so good that it is proposed to use the TV system while drilling. Coupling this TV with an ROV would allow observation of a larger area around the well. E.D.O. will study these possibilities.

3.6.7. Safety

Safety was also discussed. To monitor the methane rate a computer terminal will be placed in the superintendant's office.

3.7. Miscelleanous

3.7.1.
The Continental Drilling Program in the U.S. has some problems similar to ODP's. Contacts could be made in two ways : Firstly, F. SCHUH is already chairman of the Drilling advisory panel for Continental Drilling. Secondly, DOSSEC people could be invited to TEDCOM meetings.

3.7.2.
A. SUTHERLAND underlined the need for more crisscross information between ODP principal investigators and TEDCOM. Technical workshops like the one of september 85 must be encouraged, but would have to be prepared and focused on specific technical problem (see VII. Conclusions).

3.7.3.
A workshop on sampling was proposed, which could deal with core, fluid, and gas sampling.

IV. High temperature drilling session

4.1. LANL experience

Bert DENNIS presented the experience of Los Alamos National Laboratories (LANL) in geothermal drilling, gained through the hot dry rock geothermal energy development program.

Experimental drilling was conducted at Fenton Hill, to a depth of 4752 m where temperature is 320°C (610°F). Two bore holes, inclined at 35° from the vertical were drilled at a distance of 450 m from each other. Hydraulic fracturation created connection between the two holes, permitting fluid circulation which was used to recover rock heat.

During drilling operations, the temperature of the bit was lowered by water circulation : the temperature drop obtained was about 40 %. There was no bit problem due to the temperature.

The problems which LANL had to solve were mostly related to cementing and to motor dynamic seals.

From their experience, LANL engineers have learnt that :

. three types of insulation materials can be used for the logging cable :

TELFZEL	with a max. temp. of		220°C
PFA	-	-	260°C
TFE	-	-	350°C
MgO sheath	-	- up to	800°C

. One of the most critical components of the downhole instrument package is the cable head which provides the downhole termination of the EM cable (7 conductors).

. The maximum temperature for electronics is 300°C with no cooling, but only if special components are used.

. a variety of high temperature instruments has been developped by LANL, USGS, LBL and JAPEX. Their properties are shown in a document distributed at the meeting by K. MANCHESTER and enclosed in appendix to this report.

4.2. IFP experience

Guy BARON (IFP) presented his experience in geothermal drilling, gained at SAN VITO (Italy). The depth was 2500 m and the max. temperature 419°C. Forced water circulation was used to lower temperature and allow logging. When the circulation was stopped, the temperature rose slowly as a function of time (283°C after 10 hours and 300°C after 42 hours). With forced circulation it was possible to log with standard instruments, but high temperature mud was needed.
Then G. BARON described the SIMPHOR system which is an horizontal well logging system.
Progress has to be made in cementing and in thermal protection of tools and instruments.

4.3. What are the ODP problems ?

They are well described in a paper from A. Mc LERRAN. In fact, in hole 504 B, the max. temperature was 180°C. If drilling in basalt were successful enough to reach 500 meters, the temperature would be 230°C. In the East Pacific, it is possible to meet temperatures of 400 to 500°C.

4.4. Discussion was then focused on all the problems listed in A. Mc LERRAN report.

. Core liners
No problem if they are made out of steel.

. Tool joints
Space industry is knowledgeable and TAMU has to contact them.

. SH_2 corrosive effects
B. DENNIS will investigate the best dynamic seals.

. Bits
No problem for drilling, but for coring, R&D on adapted bits is necessary.

. Stress and hole convergence
Do not appear to be affected by temperature

. Vapor blow out
To assess the probability of such an event, the best way will be to use a computer modele of the heat transfer processes.

In the interest of the program, a list of the components used with their temperature limits has to be established.

V. Visit of the ship "JOIDES RESOLUTION"

After visiting the drill ship, the general feeling of TEDCOM members is that she is "perfect". As far as the design and construction of the ship and the drilling equipment are concerned, it is difficult to envisage any major improvement. Drilling is as robotized as possible and everything looks better and works faster than on the GLOMAR CHALLENGER.

The staff looks very knowledgeable. Ship labour is mainly composed of TCN (Third World Countries Nationals), who are as skilled as any others.

However, as far as the laboratories are concerned, efficiency could still be improved, especially XRF (X-RAY fluorescence meter) and XRD (X-Ray diffractometer). The SCM (Supra Conductivity Magnetometer) is now working, but with some liquid nitrogen consumption problems.

Maintening ship's paintwork costs $ 10,000 a month.

To minimize the consequences of component failures, SEDCO is making a study to know which ones should be stocked on the ship. Another study, of the probability of pipe failure (drill string pipe), is in progress.

BHA (Bottom Hole Assemblies) are controlled regularly to make sure that there are no cracks.

VI. Riser drilling session

Roger LARSON introduced the session by trying to identify the actual problems to be solved. Indeed what are the ODP priorities ? They are different, according to each participating nation and to each group of scientists. Everyone is concerned by the time spent by others on other priorities. If riser drilling is technically and financially possible on some sites corresponding to defined scientific or national priorities, the time needed for such operation could be unacceptable for the other groups if it is too long. Thus, Roger asked TEDCOM to define the boundary time conditions for riser drilling in specific situations (technical, geological, etc.) ?

Then three papers were presented by French oil industry engineers who had participated in the Deep Drilling Program in the Mediterranean Sea (5 700 fsw) in 1982-1983.

6.1. Presentation by Ch. SPARKS (IFP) "Riser Problems"

Charles SPARKS explained that deepwater riser problems can be separated into three groups, depending on whether the riser is connected, in the process of disconnection or hung off the drillship.

Problems associated with the connected riser are the simplest to understand. As water depth increases, static circumferential stresses in the lower riser increase due to differential pressure induced by mud weight. Likewise the top tension, required to maintain the riser profile close to the vertical and to compensate for riser mud weight, increases. This means increased tensioner capacity must be provided. Since tensioners have internal stiffness which is non-negligible, ship heave induces fluctuating axial tension in a riser, which is the principal source of fatigue damage.

Disconnecting a mud-filled riser can be dangerous as the riser accelerates upwards under the effect of the top tension. Recoil preventers have been developed to control this. In the FMP 3000 study, it was proposed to fit the riser with a value at its lower end to control the mud escaping from the disconnected riser and thus limit vertical acceleration.

When a riser is suspended from a drillship, the principal problems are relative angular movement with possible contact between the ship and riser, longitudinal resonance and axial dynamic stresses. To design a system to prevent contact between the riser and moonpool, as SHELL did on the SEVEN SEAS for their world record drillings in 83-84, is complicated and expensive. In the FMP 3000 study, it was calculated that the risk was small and acceptable, in Mediterranean conditions.

It is not clear at what period axial resonance becomes a real problem. This depends largely on the drillship heave transfer function at short periods and on the natural damping in the riser system. Studies carried out by IFP in 1980-81 suggested that risers of up to 3,000 m long, with natural periods of 5 seconds or less, should not resonate when hung off large drillships. It was not possible to say at what period resonance would begin to be a serious problem.

When a long riser is hung off a drillship in storm conditions, axial dynamic stresses are real and large. Fluctuations of 130-380 tonnes were measured in the deep water Mediterranean campaign when 1,200 m of riser were hung off in a storm. Such dynamic loads can be reduced and natural periods shortened by reducing the mass of the riser. This can be done by using new, lightweight materials.

One serious further problem for deepwater risers is that of storage on the deck of the drillship. It is clear that there is no room to store a drilling riser on the "Joides Resolution" in her present state.

6.2. Presentation by P. ODRU (IFP) : "Light materials for risers"

New composite materials bring interesting prospects. A riser entirely made of FRP (fiber reinforced plastics) is not feasible yet, but FRP Choke and Kill lines exist already and the gain in weight is significant (600 tons with a steel riser and composite lines compared to the same riser with steel lines for a 2000 meters drilling capability). For a constant weight, drilling capability can be increased from 2000 to 2500 meters. Use of titanium can also be considered and the figures are shown on this table :

Kill and Choke lines	Riser	Weight in tons
steel	steel	2200
composite	steel	1600
titanium	titanium	700
composite	titanium	650

6.3. Presentation by A. SCHAWANN (ELF) : "Riser instrumentation"

During the two deep drilling operations (1982-1983), risers have been instrumented and data recorded. From the 60 hours of data which have been processed, it is possible to know the typical bending moment distribution and the extreme top tension distribution.

The first conclusions are that the behaviour of the tensioners can be critical and that it is necessary to precisely characterize the transfer function of the riser.

6.4. Why a riser ?

The discussion came back to the very reason of riser drilling in ODP. ODP goal is not to get oil, and everything is done to avoid such eventuality. Blow-out risks are very low, since drilling is stopped as soon as methane traces are noticed. But in many instances, it is necessary to be able to control an upward flow. In other instances, it would be useful to increase the pressure, specially in very deep holes (problems of hole stability).

In these cases, mud drilling will be the only answer, and the question will be "how to use mud without a riser ?" Several solutions are proposed :

a) To use mud stored on the seafloor in an underwater "pillow" tank, and to use also a double-walled "concord" pipe, to minimize the quantity of mud : mud is used for its weight and cuttings are removed through the water flow inside the two-walled pipe. Concord pipes have been used for 20 years in the large diameter wells of the nuclear test sites to reduce the pipe weight ; steel could be used outside and FRP inside.

b) To use a flexible "on the shelf" mud hose

6.5. If using a riser looks necessary in some areas, and that the time needed for riser operation is not compatible with ODP general schedule, B. HARDING suggests to use a second ship, in charge of launching and retrieving the riser (two time-consuming operations). JOIDES RESOLUTION crew would have only to connect and disconnect the riser. Problems related to available space on board would be solved at the same time.

6.6. Roger LARSON thought that the program needed more the TEDCOM members to find new and specific solutions, rather than to propose the heavy oil industry "grocery" used in riser drilling.

VII. CONCLUSIONS

What is the time frame ? And what are the steps ?

In any event, the JOIDES RESOLUTION agenda is already fixed until 1990 ; thus 1991 is the earliest that high temperature drilling and riser drilling may be needed. But planning of the 1990's will take place before, and the planners need to know what will be the possible solutions.

In 1987, a second COSOD conference will take place, in which scientists will discuss the priorities of the next decade. It is necessary to know, for this conference, the answers to the following questions, regarding high temperature and riser drilling technologies.

1) What would be possible, using the state of the art and the "on the shelf" equipment ?

2) What would be possible using modified "on the shelf" technology, assuming that the program is not able to fund R&D for entirely new drilling technology.

3) What would be the operational aspects (time needed for drilling, etc).

To answer these questions, the following is proposed :

a) at its next meeting (fall 1986), TEDCOM will organize itself to prepare three papers (or more) on :

. weight and volume involved in each solution using mud drilling.

. duration of drilling operations.

. R&D required and money involved.

b) These papers will be presented, four months later, at a technical workshop, to a large mumber of concerned scientists, to inform them about the possibilities, the consequences on the general schedule, the risks and the costs involved.

VIII. Closed session

Mr DENNIS
Mr HOCOTT
Mr JARRY
Mr KASAHARA
Mr LAMB
Mr MANCHESTER
Mr MARX
Mr SCHUH

In this 2 hours session, TEDCOM members tried to establish the conclusions of the open meeting.

8.1. TEDCOM goals

Members think that TEDCOM main goal is to help TAMU Engineering and Drilling Operations (EDO) group to fulfill the ODP science objectives.

Since these objectives have to be translated in engineering terms, which is EDO job, and since they are to be dealt with in a time and money frame, a secondary goal of TEDCOM is to bring back to PLACOM and NSF, information about the feasibility of these science objectives and what are the trade-off if any. In other words, TEDCOM secondary goal would be to help PLACOM to redefine some science objectives when it appears that they are not reachable without major alterations of the planning or major budget increases.

8.2. TEDCOM methodology

Most TEDCOM members have a large experience in marine or land drilling, marine engineering, and they know well the drilling industry and services industry. They will bring all this knowledge and know-how to be shared by the EDO group. However, ODP uses specific drilling for which oil drilling equipments and methods are not always usable "as is".

Consequently, TEDCOM members think that the best way to implement their goals is to hold meetings in which EDO engineers participate.

Problems will be presented, shared, and fruitful exchanges will take place. But it is reminded that it is not TEDCOM's role to do EDO's job. A periodicity of 8 months looks quite reasonable for such meetings.

But to act efficiently, TEDCOM members need inputs. They ask to get, on a routine basis after each leg, the operational report. In fact, an abstract of these reports would be enough, but to save time and get faster this information, the operational report will be sent as is. TEDCOM members will understand better the problems and will be able to prepare the next meeting in a better way.

During the meetings, EDO will present the science objectives, the problems encountered, the approach to solve them. TEDCOM members will help, trying also to pinpoint the best world equipments, companies and experts needed for such or such particular item.

For the scientists information, the workshop procedure looks good. At the next TEDCOM meeting, TEDCOM will help EDO to preprare such a workshop on riser drilling which could take place in early 1987 during the annual Panel Chairmen meeting.

8.3. EDO tasks and budgets

Engineering Development tasks undertaken by EDO group are numerous, although quite diverse in volume and importance. Although EDO engineers do a very good job, it seems to TEDCOM members that their number is small, if we take into account that they spend significant time at sea, which is excellent for them to keep in touch with the actual problems.

On the other hand, R&D budget lines look very small in relation to the improvements needed on such or such tool or equipment.

All in all, it is the feeling of TEDCOM that the EDO funding (salaries + outside expenses) is inadequate, with respect to the ambitious technology goals of the Ocean Drilling Program.

8.4. Membership

Members who did not attend the Marseilles meeting will be asked if they can afford to attend the next meeting or if they want to resign and have somebody else to recommend.

Present members think that major oil companies must be represented ; EXXON, SHELL are already there.

AMOCO will be contacted. Mr SILCOX from CHEVRON has retired, but the person he has recommended has to be contacted. Mr HOCOTT wants to present a successor he has to contact first. Mr LAMB (UK) is from BP.

Mr SPARKS (IFP) who participated to the meeting would be welcome as a full member.

As soon as he gets more information about contacts taken as listed above, TEDCOM chairman will present a new membership list to PLACOM for agreement.

oOo

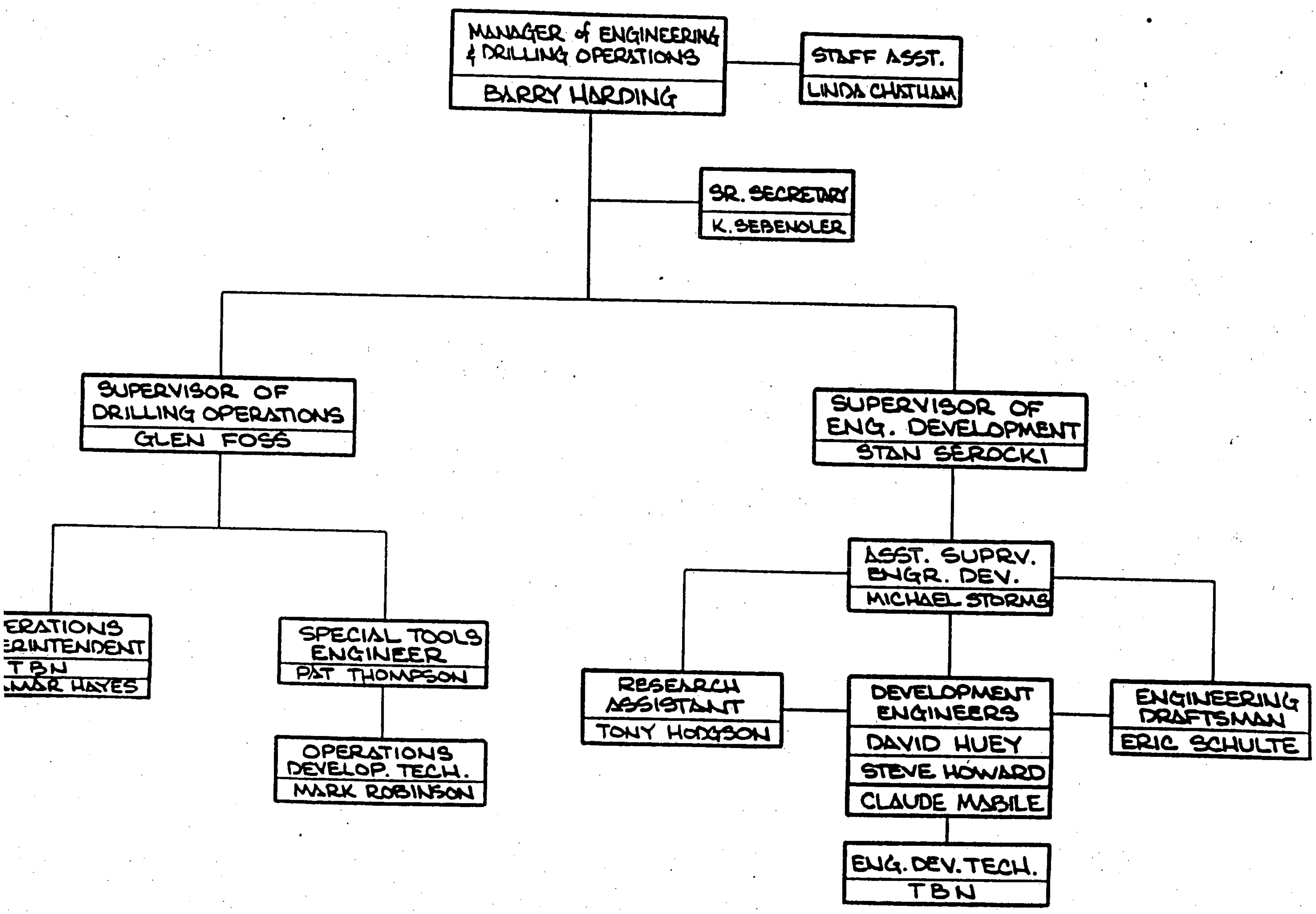

MANAGER of ENGINEERING & DRILLING OPERATIONS
BARRY HARDING
STAFF ASST.
LINDA CHATHAM
SR. SECRETARY
K. SEBENOLER
SUPERVISOR OF DRILLING OPERATIONS
GLEN FOSS
ERATIONS
ERINTENDENT
TBN
SPECIAL TOOLS ENGINEER
PAT THOMPSON
OPERATIONS DEVELOP. TECH.
MARK ROBINSON
SUPERVISOR OF ENG. DEVELOPMENT
STAN SEROCKI
ASST. SUPRV. ENGR. DEV.
MICHAEL STORMS
RESEARCH ASSISTANT
TONY HODGSON
DEVELOPMENT ENGINEERS
DAVID HUEY
STEVE HOWARD
CLAUDE MABILE
ENGINEERING DRAFTSMAN
ERIC SCHULTE
ENG. DEV. TECH.
TBN

Figure 1

TABLE 2

PRIORITIES ESTABLISHED AFTER THE ENGINEERING WORKSHOP
(College Station, Sept. 1985)

GROUP 1 — <u>HIGHER PRIORITY</u>

- Bit development
- Heave compensation compatibility for piston coring
- Hard rock spud system
- High temperature drilling (coring adaptations)

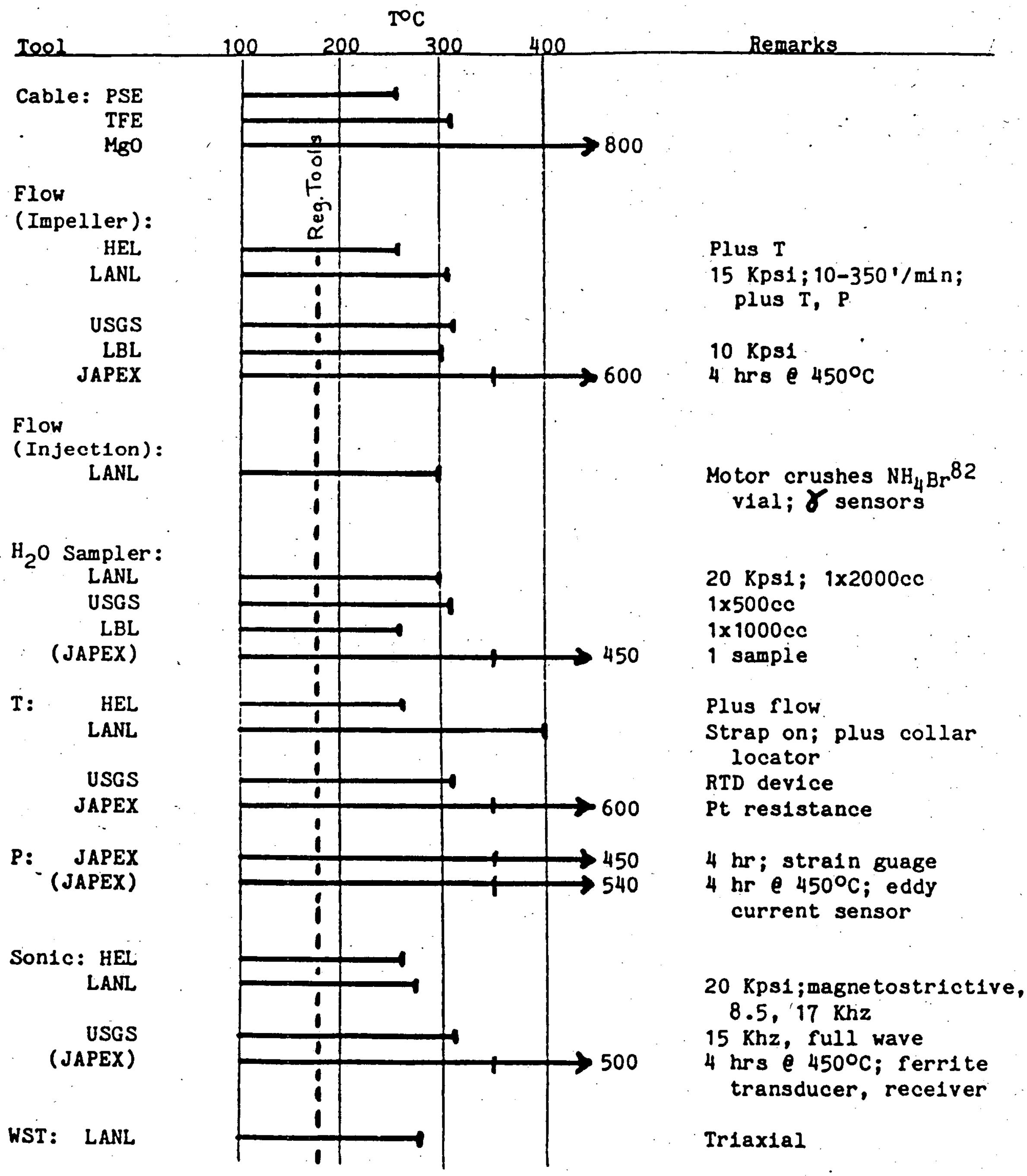
GROUP 2 — <u>MEDIUM PRIORITY</u>

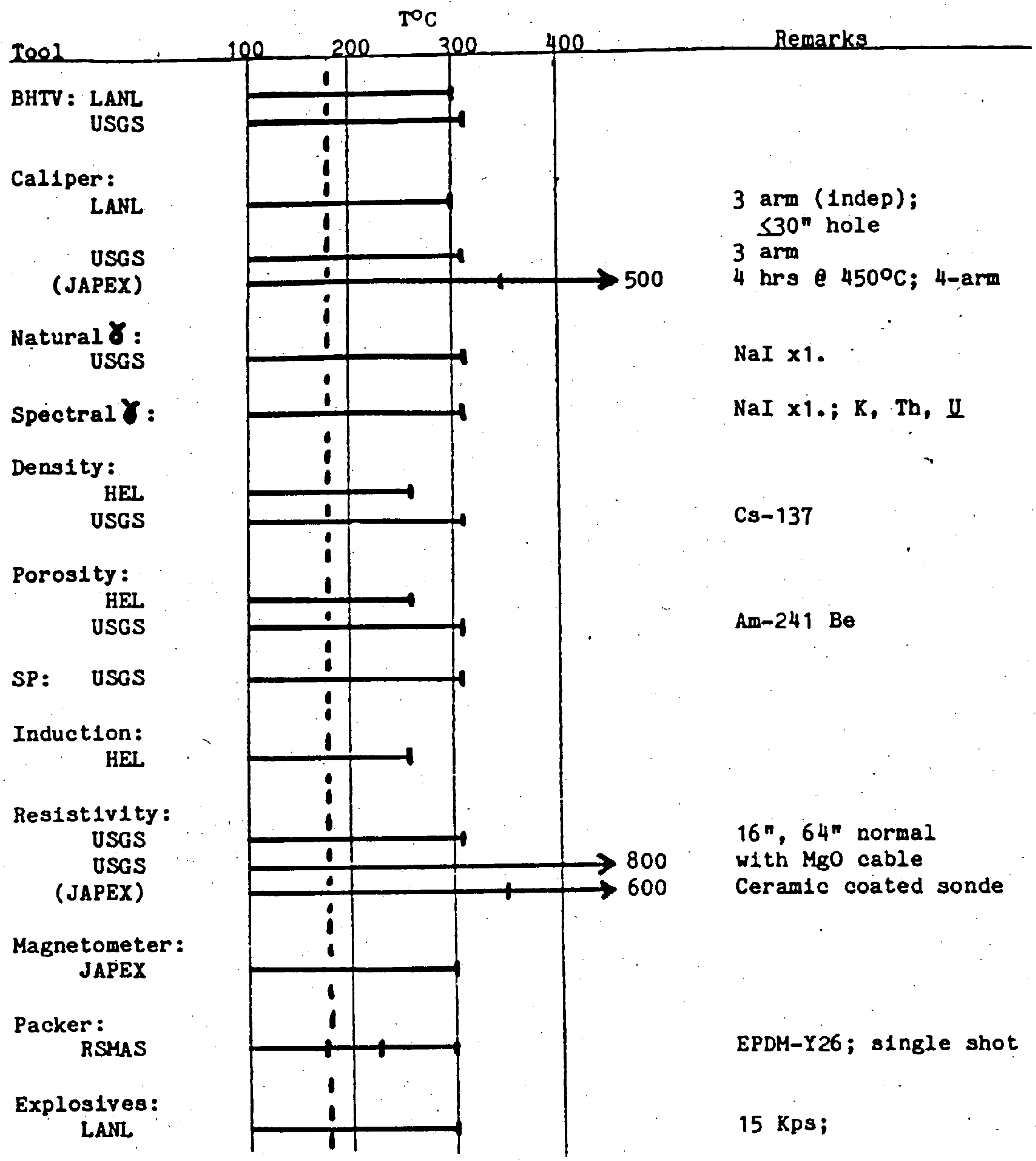
- Lockable flapper (flow valve)
- Drill-in casing (compatible with reentry)
- Pressure core barrels (in-situ samplers)
- Drill string dynamics
- Upgrade hydraulic bit release
- Core liner improvements.

APPENDIX 3

OPERATIONAL HIGH TEMPERATURE TOOLS

$d \leq$ 3-1/2", $P \geq$ 7500 psi




T°C
Tool
100
200
300
400
Remarks
BHTV: LANL
USGS
Caliper:
LANL
3 arm (indep);
≤30" hole
USGS
3 arm
(JAPEX)
500
4 hrs @ 450°C; 4-arm
Natural γ:
USGS
NaI x1.
Spectral γ:
NaI x1.; K, Th, U
Density:
HEL
USGS
Cs-137
Porosity:
HEL
USGS
Am-241 Be
SP: USGS
Induction:
HEL
Resistivity:
USGS
16", 64" normal
USGS
800
with MgO cable
(JAPEX)
600
Ceramic coated sonde
Magnetometer:
JAPEX
Packer:
RSMAS
EPDM-Y26; single shot
Explosives:
LANL
15 Kps;

DIT/ISM1 N° 86.21

Paris, March 15, 1986

2nd TEDCOM MEETING (MARSEILLES - FEB 17-20, 1986

REPORT OF THE CLOSED SESSION

Mr DENNIS
Mr HOCOTT
Mr JARRY
Mr KASAHARA
Mr LAMB
Mr MANCHESTER
Mr MARX
Mr SCHUH

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4. MEMBERSHIP

Members who did not attend the Marseilles meeting will be asked if they can afford to attend the next meeting or if they want to resign and have somebody else to recommend.

Present members think that major oil companies must be represented ; EXXON, SHELL are already there.

AMOCO will be contacted. Mr SILCOX from CHEVRON has retired, but the person he has recommended has to be contacted. Mr HOCOTT wants to present a successor he has to contact first. Mr LAMB (UK) is from BP.

Mr SPARKS (IFP) who participated to the meeting would be welcome as a full member.

As soon as he gets more information about contacts taken as listed above, TEDCOM chairman will present a new membership list to PLACOM for agreement.

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