

D.G.H.

NOVEMBER 1st, 1976

D.F.G, 4061 N° 6/1494

FRIGG FIELD

PRODUCTION FACILITIES

MONTHLY REPORT

OCTOBER 1976

Distribution

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General view of the Frigg Field

I. OFFSHORE OPERATIONS

(for the period ending October 20, 1976)

1.1. Installation of the QP platform

The operations relative to the installation of the insert piles was completed on October 17, progress was as follows :

	drilled	inserted	grouted
B2 - 1	22/9	25/9	23/9
A2 - 1	22/9	25/9	28/9
B2 - 2	4/10	9/10	15/10
A2 - 2	10/10	14/10	17/10

The fabrication of the stabbing guides for module B is complete and three stabbing guides have already been installed.

1.2. Installation of the DP2 jacket

The insert pile operations started on September 19, 1976, with the drilling module 1. The drilling started on pile B 12, this operation was complete on September 23. Grouting operations started on the 24th. Preparations were made in order to accomodate the helideck quarters modules. The drilling of pile A4 - 2 started on September 21 and was completed on September 29. The insert started the next day. The drilling of A1 - 4 was commenced on September 30 , only ended in the middle of October, delayed by the bad weather. In the second week of October, the rig Treasure Hunter arrived on the Frigg site and was moored along the jacket. A bridge connecting the two structures has been built.

1.3. Installation of flowlines

Preparations in view of starting hyperbaric welding were made at both ends of the R6 middle spool. On September 23, 1976, the Spar unit was lowered onto the sea bottom, the test coupon was carried out, but due to the bad weather, it was impossible to carry out the hyperbaric weld.



1.4. Installation of CDP1

The gantry crane was completely dismantled on September 19. The western burner boom and the Comex platform were installed the following day.

The ringer crane was skidded to the eastern part of module WHIA on the 22nd, and lifted the eastern burner boom on the 23rd. The ringer crane was dismantled after installing the separator. This operation was completed on October 5 and the Buzichelli crew left the platform the next day.

Modules BR1 and WHIA were skidded into their final location on the 22nd and Comex installed supports for the risers such as the support for the 24" mud outfall and performed some surveys on the fire water for BR1.

Drilling

On the West cluster, the deflatable packers, the shock absorbers and the mechanical reducers are set on eleven wells.

Nothing was installed on well 3, as the drilling of the slab has not yet been completed. Eight conductor pipes were driven to depth of approximately 180 meters. The drilling programme of the West cluster is slightly ahead of schedule.

The Foraky rig was lifted late in September and drilling of the slab on the East cluster should be started rapidly.

Hook-up

The bad weather affected hook-up operations. It was impossible to load or unload material for several days and the shuttle could not fly from West Venture to CDP1.



DP2 platform

Completion of works on October 24, was as follows :

1. EUMECH piping

- fire water system	75%
- air instrument	75%
- shale shaker connections	80%
- gas diverter	} prefabrication in Stavanger
- choke manifold	
- heating ventilation	30%

2. EUMECH electrical

- cable trays	95%
- pull-in cables	40%
- normal lighting	15%
- MCC interconnections	50%
- grounding cables	80%
- emergency lighting	20%

3. COMSIP electrical and instrumentation

- public address	65%
- control room rewiring	45%
- fire and gas detection	65%
- smoke detection	0%
- general alarm	60%
- ESD/DSD alarm	60%
- multitube	100%

4. Labour force onboard (average)

- EUMECH + UIE	165
- COMSIP	60
- SAIPEM	70
- ELF, BROWN & ROOT, vendors	20



TP1 platform

5. Major events

- Commissioning of main air compressors
- Commissioning of generators G9 - G100
- Fire pump erection (after re-installation of wrongly installed risers)
- Injection of inhibitor in the 26" R5 1000" stand-by COMSIP crew (no shuttle between West Venture and CDP1).
- Inspection of process lines. A flushing will be necessary before the start-up of gas.
- Inspection of choke valve (Masoneillan material)

6. Problems

- Lack of material
- Instrumentation will be solved quickly
- Piping : material still being manufactured in G. Yarmouth, Rotterdam and Stavanger.

1.5. Installation of the TP1 platform

Column c : The X-rays of the joints of R5 were taken on September 20 and found to be acceptable. The repairs to R6 were also X-rayed and found to be satisfactory. The second pig and pig trap were removed from the 32" line on September 19.

All welds on R7 and R8 have been completed and accepted. Welding of the 8" line to the anchor flange was completed on October 8. The 24" pig was also removed at the same date.

During the week ending on October 1st, the coating on all the risers was checked with a holiday detector. The results were found to be acceptable. The dewatering pumps were then re-installed in the columns. Installation of the mechanical seals continued on all the tunnels. This operation was completed on October 16, 1976.

All tie-in work on the TP1 platform was completed on October 18, 76 and columns were flooded on this same date.



Hook-up operations

FIELDCO's efficiency is very poor. In order to estimate their efficiency, after a meeting with FIELDCO management, we set a target date for the hook-up of fire work system : Middle of November.

FIELDCO promised to improve the quality of management and solve the problems existing with pipe welding

The performance of the sub-contractor JAMES for electrical and instrumentation hook-up is good.

Time lost during the past week : 6 shifts (2 due to bad weather conditions which affected the shuttle flight; 4 to allow X-ray programme to be carried out).

The following figures show the overall completion of operations on October 24, 1976 :

1. Piping

- firewater	63%
- Utility water	60%
- Sea water	14%
- Diesel oil	63%

As well as a small progress in various commodities lying outside of priority programme.

2. Electrical

- zone 01	90%
- zone 02	90%
- zone 03	85%
- zone 04	80%
- zone 05	90%
- zone 06	0%
- zone 07	35%
- zone 08	25%
- zone 09	50%
- zone 10	50%
- zone 11	0%
- zone 12	0%

3. Instruments

- zone 01	10%
- zone 02	10%
- zone 03	10%
- zone 04	10%
- zone 05	0%
- zone 06	0%
- zone 07	5%
- zone 08	10%
- zone 09	10%
- zone 10	10%
- zone 11	0%
- zone 12	0%

4. Labour onboard

- FIELDCO	220
- WAGLEY	20
- ELF / MDH	20

II. PRODUCTION FACILITIES

2.1. Lines and connections

The hyperbaric pre-production test carried out on the site confirmed the excellent results obtained during qualification tests.

The programme and specifications for the hyperbaric weld qualification of the additional welders for the 1977 season were compared to the results obtained during welding tests carried out in caisson.

Further to the confirmation by the DOE, that they will only request stabilization of lines, the study of this operation will be reviewed replacing the stabilization/protection as required previously.



MODULE A

III. PRODUCTION FACILITIES - PHASE II3.1. Drilling platform nr. 23.11 Production modules. Engineering

The proper engineering progress is at present 100%. Only minor work is outstanding, such as preparing the general files.

The progress is as follows :

- General arrangement	: 100%
- Model construction	: 100%
- Piping arrangement	: 100%
- Isoing	: 100%

The work relative to the job file books is in progress. These books will be distributed at the end of this year.

. Procurement

The main procurement progress is 100%. Only the orders for the spare parts are outstanding.

The percentage of the materials already delivered on site is reaching 96%, including steels. The two 24" x 26" T's from EUROFILCO have been delivered on site.

. Fabrication

The total progress of fabrication is 94,3%.

a) Construction of modules

The total progress for each module, steelwork and installation of equipment, piping, electrical and instrumentation work included is as follows :

Module 01 : 98,5%	Module 03 : 93,0%
Module 02 : 99,0%	Module 04 : 96,0%

b) Miscellaneous

From the middle of October, work has been disturbed on the yard, this will influence progress of work and consequently the foreseen load-out date will have to be postponed. At the present time, it is not yet known when load-out will occur.

The barge Maersk 7, which was to be used for the transportation of these modules is standing-by on the yard. It is not yet known when repair work will be started again. The outstanding repair work could be performed when modules are already on the barge, but before the departure.

Negotiations are still continuing for the discovery of a suitable storage place for the barge with modules, somewhere in Norway, where completion of the modules can be carried out. A decision will be taken at the end of October.

3.2. TCP2 platform3.21 Structure3.211 Management

The main activities of management have concerned discussions which were held with NORCON relative to the following

.../...

contractual problems :

- Determination of contractual delivery date of the platform "ready for submergence and deck erection", this date is to be taken into consideration for the application of the bonus clause for contract E. 10.
- Change order for the stand-by period between October 76 and towing out phase.
- Change order for services to be provided by NORCON to CHRISTIANI & NIELSEN through ELF, between October 1976 and completion of the riser installation.

And the preparation of discussions to be held with NORCON relative to the pending claims by NORCON, mainly :

- Modification of the contractual delivery date claimed by NORCON, due to additional works.
- Compensation for impediment caused by BROWN & ROOT activities.
- Compensation for construction of deck-columns connections.

3.212 Engineering

The main activities have been :

- Preliminary study of additional condensate facilities in the cells.
- Follow-up study by NORCON relative to temporary facilities during towing out phase.
- Follow-up studies concerning towing out and installation phases.

3.213 Construction

- a) The progress of the work being performed on the structure is as follows :

- . Closure of access to ballast cylinder : 100%
- . Closure of access to column 1, 3 and 5 : 30%
- . Concrete bend for casing of exhaust pump : 35%
- . Civil work for installation of CV 13 : 90%
- . Prestressing of cables in columns : 95%

b) Equipments to be installed on the platform

The ballast cylinder is completed at 98%

The commissioning has been carried out but had not yet been completely accepted.

The installation of the platform to accommodate the SYMINEX equipment is completed at 40%.

3.214 Steel support frame

Fabrication at CMP and sub-contractor's

The fabrication at ACB's is finished. The fabrication and assembly in Mardyck, by SOCOMET and JULIN (with CMM and MUNCH) is progressing satisfactorily, respecting the present schedule.

The blue elements (SOCOMET) have been loaded on barge on October 26, 1976 and the first chord of truss C has arrived on the yard in Rarville (JULIN fabrication), also on October 26, 1976.

Fabrication in Stord

Fabrication in Stord is progressing with a slight delay for the third priority. Aker promised to catch up this delay, the last truss could be delivered on the final assembly yard during week 47/48, at the latest.

The second priority has been delivered in October.

Final assembly

The decision relative to the choice of contractor to carry out the final assembly of the support frame should be taken at the end of this month.

Engineering

KVAERNER is designing the secondary elements (insert plates, attachments, temporary platforms, etc...) which will be fastened onto the support frame.

Most of these elements will be completely defined and designed at the end of October 1976.

Some additional studies and checks are also made by KVAERNER concerning skidding, load-out and transportation of the support frame.

3.215 TCP2 riser installation

a) Coating of risers

The coal tar epoxy coating for internal and external risers has been approved by DNV and NPD.

The Norwegian Authorities are still contemplating the request by ELF to use fiber glass epoxy coating in the splash zone.

b) Procurement

The wall seals have been manufactured and should be delivered on the site next week.

c) Engineering

The design of protections against corrosion and abrasion of the pipes inside the tunnels of column 3 is nearing completion.

A draft of the specifications for the tie-in line has been prepared.

d) PrefabricationInternal risers

The loading out of the riser spools for columns 3 and 5 has been completed.

The progress of the stripping of the internal riser (removal of tideguard coating) and of the recoating operations is as follows :

	stripping	recoating
column 3	100%	15%
" 5	100%	0%

External risers

The percentage of work completion for coating and welding of the external risers is as follows :

	coating	welding
R1	60	70
R2	80	75
R3	20	50
R4	90	80
R5	90	75
R6	50	70
R7	80	50

e) InstallationExternal risers

	Vertical spool	Horizontal spool
R1	100%	0%
R2	100%	0%
R3	100%	5%
R4	100%	5%

Column 3

The installation of the J-tube and support for riser is completed up to level 104 meters.

Column 5

The percentage of installation progress for the following equipment is as follows :

- | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> - Installation of J-tube : 75% - Installation of riser support : 75% - Installation of condensate pipes : 50% |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Column 1

The installation progress of CV 13 is 15%

3.216 TCP2 Temporary facilitiesa) Management

The amendment 5 to contract E. 58 with H.D.W. for the construction of modules 42 and 43 has been prepared.

H.D.W sent in a claim in order to obtain compensation for the extra effort which is to be made in order to keep the contractual delivery date, due to the delays in procurement and engineering (BROWN & ROOT). This claim is being examined.

b) Procurement

The situation of procurement is as follows :

Equipment	situation
. Diesel generator	ordered
. Main sea water pumps	"
. fire pump, potable water pumps and sea water transfer pumps	"
. Lifeboats and Davitts	"
. Desalination plant	"
. Heating, ventilation and air conditioning system	"
. Life jackets and life rafts	"
. Switch boards	"
. Structure for modules 42 & 43	"
. Pancake 62	"
. Walkways	"
. Radio room	"
. Sea water filter	"
. radion communication	inquiry
. Internal communications system	Bid tabulation being prepared
. Wind direction indicator for helideck	"

c) Engineering

The preliminary examination for the modifications of the OP and DP2 accommodation modules has been carried out.

The report relative to classification of the accommodation modules 08 and 72 is being prepared.

The report relative to the calculations of the structural design have been sent out to DNV for examination.

The drawings for the piping are nearing completion. Flow-sheets have been finalized.

d) Construction

H.D.W. YARD : Owing to the increase in the Manpower, (two shifts instead of one shift), the contractor is now on schedule for the structural work. However, delays could occur later on, if BROWN & ROOT does not deliver the approved for construction drawings and materials on time.

The percentage of work progress for each module is as follows :

Module	% of completion		Remarks
	scheduled	actual	
64	14,1	13,0	Structural base completed
67	15,9	15,5	" " "
68	6,0	5,9	" " "
69	92,0	91,0	
72	5,7	5,2	Started steel cutting
41	1,1	0,6	" " "
42	0	0	Steel ordered
43	0	0	" "

Boat service yard : The cabin units are nearly completed and are scheduled to be leaving for Hamburg at the end of October.

3.22 TCP2 Treatment modules

3.221 Structural design (job 2177)

, Sales gas metering : The scope of works and drawings have been issued and a call for tender for the fabrication of the

sales gas metering system has been handed over to the bidders on October 22, 1976. Proposals from the contractors are expected at the beginning of November.

. MacDermott-Hudson have forwarded to ELF NORGE the requested list of equipment to be installed on the support frame before assembly.

. The stiffening of the underdeck is complete on modules 1 to 4.

. The frames of pipe supports 3,4,5 and 6 of the steel deck area are being designed and drafted.

. The following studies are also in progress at the present time :

- Skidding at Orkanger and load-out
- Weighing of the modules at Orkanger
- Design of the barge modifications for load-out and sea-fastening.
- Temporary sea-fastening on support frame for tow-out.
- Lifting (pad-eyes, slings, shackles ...)
- Jacking and levelling of the modules
- Skidding on the support frame

. Bridge : A meeting was held on October 20, between MacDermott-Hudson, ELF and Motherwell Bridge, at this meeting MDH proposed an alternate solution, which would allow to save time in the final construction, length adjustment of the bridge. Motherwell will supply their comments within one month and in the meantime, MDH will further investigate this solution.

3,222 Process design (Job 2169

a) Process, mechanical and piping

The last issue of the P & I d's is scheduled for the end of October.

The extension of the firewater sprinkler system required by NPD is being drafted at Orkanger by McDERMOTT. ELF NORGE is reviewing the McDERMOTT proposal for the HP vent stack. Comments have not yet been forwarded to McDERMOTT. Requisitions have been sent out by McDERMOTT.

The problems relative to the BROWN & ROOT supplied materials are being solved.

McDERMOTT will send ELF NORGE the documents required to issue the call for tender for the hook-up phase, at the end of October.

Work is progressing on the stress studies for the riser pipes in view of reducing the moments at the anchor flange platform level.

b) Electrical

ELF NORGE have expressed their dissatisfaction to McDERMOTT relative to management of their sub-contractor PARSONS PEEBLES. ELF NORGE have asked McDERMOTT to press PARSONS PEEBLES in order that they produce the drawings so as to not delay the fabrication of the generator package.

c) Instrument

COMSIP's work is progressing satisfactorily.

McDERMOTT's work concerns :

- . rectification by BSB of the glycol reboiler units.
- . Discussion with NEL/DOE about condensate metering.
- . Finalization of NPD requirements for heating and ventilation systems.
- . Coordination with BROWN & ROOT relative to some instrumentation between the temporary quarters and permanent facilities (fire and gas detection, public address system...)

Estimated percentages of completion on October 15th	
Structural design and engineering	: 68%
Process design and	: 73%
Project management	: 44%

The manhours required to complete the job have been handed over to ELF NORGE. The document estimated the manhours, case by case, for all change orders known at the end of September. These estimates were received on October 20, and are presently being examined by ELF NORGE.

3.223 Construction of TCP2 treatment modules

1. Fabrication at Orkanger

The percentage of completion for week ending October 24, is as follows :

	work completed	work anticipated SBV schedule
Structure	69%	90%
Piping	87%	92%
Equipment	74%	88%
Electrical	32%	75%
Instrumentation	5,3%	48%
Total	68%	84%

These 68% represent the part of the scope of works of the basic contract which has been completed. It must be pointed out, that during the same time and up until week 112 (October 24, 1976), the additional work and change orders completed represent a total amount of 15 millions N.Kr.

Manpower on site : 374

All sub-contracted work at Egersund and Karmoy Stalindustri is now complete. The last shipment is scheduled to leave Karmoy on October 21, 1976.

3.23 Lines and connections

The choice relative to a more important thickness of concrete to be applied to the 26" pipes (thus 1") has not yet been made.

IV. TCP2 COMPRESSION - PHASE III

4.1. Management

A delay of about two months is to be reckoned with, in comparison with the schedule. It is caused by the numerous studies and discussions related to the proposals sent in for turbines and compressors.

4.2. Engineering

The technical comparison charts between the various proposals for turbines and compressors have been issued by KVAERNER/TECHNIP.

The weight estimates have been reviewed.

The work is progressing normally on the electrical inter-connection and various drawings have been issued.

Preliminary calculations related to the flexibility of the gas piping have been carried out.

4.3. Drafting

A preliminary lay-out of the compression modules has been issued. Two possibilities have been assumed :

- . jet turbines
- . Heavy duty turbines

4.4. Procurement

Different calls for bid have been prepared by KVAERNER TECHNIP, but will only be sent out when ELF NORGE issues orders to this effect.

A request for an additional study relative to the sea-water rejections has been sent to the Laboratoire d'hydraulique de France.

CDD.1

OPERATIONS	1975												1976												1977															
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D				
<u>STRUCTURE</u>																																								
DORIS WORKS (FINITION)																																								
EUMECH WORKS (equipements)																																								
SLAB DRILLING (FORARY)																																								
SOIL INSTRUMENTATION																																								
<u>MODULES</u>																																								
NEW MODULES FABRICATION																																								
DD1 MODULES REWORKS																																								
GANTRY CRANE studies																																								
fabrication																																								
transport & installation																																								
tests																																								
dismantling mat																																								
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LOADING AND TRANSPORT																																								
LIFTING AND INSTALLATION																																								
HOOB UP drilling modules																																								
production & utilities modules																																								
wells connections																																								
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PULL-IN 8" LINE CONNECTIONS TO CDP1																																								
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PULL-IN ELEC. AND TELEC. CABLES																																								

✓ D.D. 1

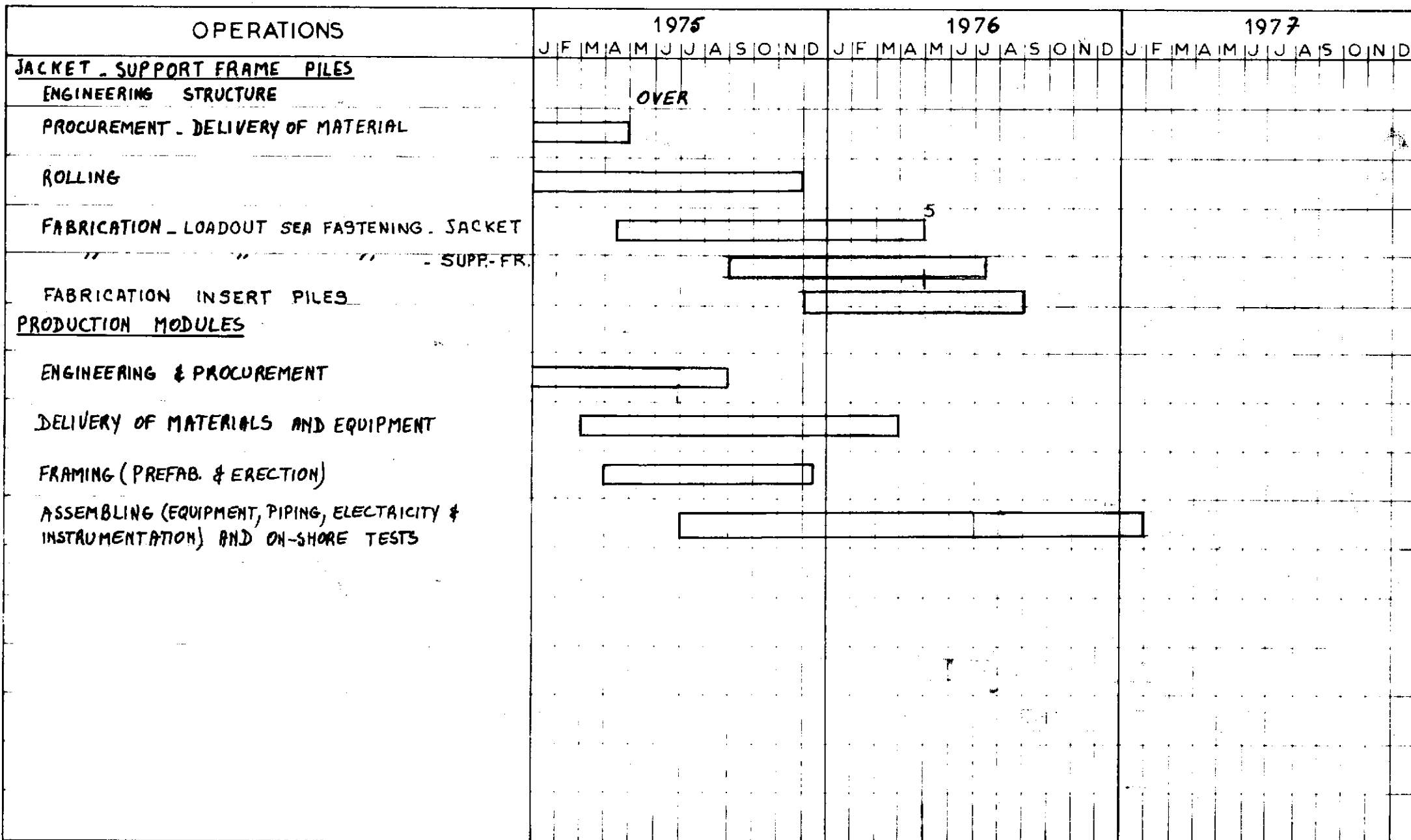
CONCRETE DRILLING PLATFORM N°1

elf
NORGE

FRIGG FIELD
PRODUCTION FACILITIES

ISSUED: October 31st, 1976

CDP.1



OPERATIONS	1975												1976												1977													
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D		
CONCRETE STRUCTURE DRY DOCK	■	■																																				
CONCRETE STRUCTURE BUILT (DRY DOCK)					■	■	■	■	■	■	■	■																										
CONCRETE STRUCTURE BUILT (DEEP WATER)													■	■	■	■	■	■	■	■	■	■	■															
DECK FABRICATION DECK TRANSPORTATION										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
DECK INSTALLATION																																						
MATERIALS PROCUREMENT	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■														
PREFABRICATION OF DECKS MODULES & PANCAKES FRAMING I/S - KSV						■	■	■	■	■	■	■																										
FABRICATION OF MODULES & PANCAKES WITH THEIR EQUIPMENTS													■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
TRANSPORTATION OF (M) & (P) TO THE IN-SHORE POSITION																										■	■	■	■	■	■	■	■	■	■	■	■	■
M & P LIFTING AND INSTALLATION																											■	■	■	■	■	■	■	■	■	■	■	■
STABILITY TEST AND FINAL REQUIREMENT TOWING OF THE STRUCTURE WITH THE EQUIPMENT																												■	■	■	■	■	■	■	■	■	■	■
GROUTING																																						
BRIDGE TP1/TCP2																																						
TEMPORARY FACILITIES (CONSTRUCTION)																																						
TRANSPORTATION																																						



**TREATMENT AND COMPRESSION
PLATFORM N°2**

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NORGE**

**FRIGG FIELD
PRODUCTION FACILITIES**
ISSUED: 31 OCTOBER 1976

TCP 2

elf norge a/s

p.o.box 168 – 4001 Stavanger

date:

8.10.78

drawn by:

HLS

checked by:

GR/BP

appr. by:

PHM

size:

-

OVERALL

FRIGG FIELD

SCHEDULE

draw.no.:

FF.000.100.036

scale:

-

rev.:

3