Societe Nationale Elf Aquitaine (Production)

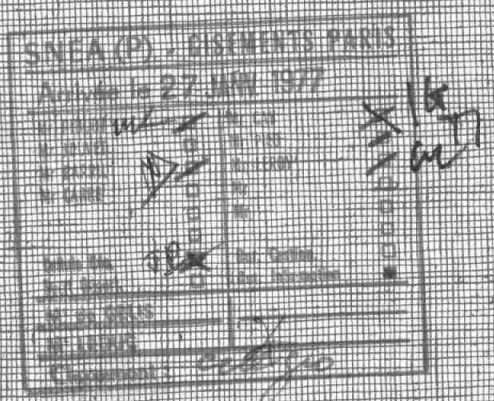
FFG.G.101.9.FRF 011.

elf NORGE

FRIGG FIELD
PRODUCTION FACILITIES

MONTHLY REPORT

DECEMBER 1976



DIRECTION FRIGG

Date : DECEMBER 197

Paris, January 4, 1977

D.G.H.
D.F.G. 4061 N° 7/ 4

FRIGG FIELD

PRODUCTION FACILITIES

MONTHLY REPORT

DECEMBER 1977

Distribution :

Ministry of Industry (Oslo)
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Department of Energy (London)
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C.F.P. (Paris - 6 ex)
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- Dpt. Administration (Mr. Mauguy)
Division Travaux Mer (Mr.Le Rest)
- Dpt. Sea Construction (2 ex)
- Dpt. Hook-up (Mr. Tartera)
Division Production (Mr. Pol)
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The weather conditions on the Frigg Field have been very good this month.

The insert pile operation on the DP2 platform was completed on December 19, 1976.

The two 2" lines from the flare to TP1 were completed, as well as the 24" line.

On CDP1, six systems have received D.N.V. 's approval. All the 18 5/8" casings have been installed on the West cluster.

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° °

I. OFFSHORE OPERATIONS

(For the period ending December 20, 1976)

1.1. Installation of the DP2 jacket

The insert pile operation was completed on December 19, including the removal of the followers. The progress for this reporting month comes to 42%. Detail is as follows :

DM 1		Completion date		
		Drill	Insert	Grout
A-1-1		20/11	25/11	26/11
A-1-3		02/12	07/12	10/12
B-1-1		27/11	01/12	04/12
B-1-3				20/11
	DM2			
A-4-1		03/12	08/12	10/12
A-4-3		21/11	26/11	28/11
B-4-1		09/12	13/12	15/12
B-4-2				21/11
B-4-3		27/11	01/12	03/12

1.2. Installation of the CDP1 platform

1.21 Hook-up operations

The following systems have been approved by D.N.V. :

. Public address system
. Fire detection system
. Gas detection system
. General alarm system
. Smoke detection system
. Start fire station system

The official load test on the MK 60 has been approved.

Two pumps and three risers have been lost on BR 1 and BR2.

A new fire pump system is being installed on the wellhead modules.

The general progress is hampered by the material situation which delays the emergency lighting, the fire lighting system and the grouting of the burner boom.

1.22 Drilling

The installation of the 18 5/8" casing was completed on the 17th. The frequence of installation was two per week for the first two weeks of this reporting month, and only one a week for the last two weeks.

The drilling was slowed down due to the fact that the certificate of fitness had not yet been delivered by D.N.V., without this approval the drilling cannot continue. Therefore, the rig has been working on the east cluster to connect the fire fighting system and to prepare the wellhead module and it is now drilling the slab on slot 23, slot 22 was completed on the 19th.

The Foraky rig was demobilized during the fourth week of November after it had drilled the slab on slots 18,19,20 and 21.

1.3. Installation of the TP1 platform

1.31 Hook-up operations

The general progress is hampered by the material situation which is improving but still critical. The fire water system was commissioned on a temporary basis using the washdown pump since the diesel fire pumps were not ready. The hydrotest on glycol and condensate was stopped due to various incidents.The preparation of the final tests for the cranes is in progress, as well as the pre-commissioning of the life-boats. COMSIP started to work on interface room n° 1.

The capacity of the platform was increased to 158 beds.

The percentages of work progress are as follows :

- Piping : 62%
- Electrical : 55%
- Instrumentation : 31%
- Mechanical : 54%
- H.V.A.C. : 73%

1.4. Installation of the QP platform

The erection of the microwave tower is in progress, two sections have already been completed. The commissioning of the microwave instrumentation system between QP and TP1 has been commenced.

The pedestal for the M 60 crane is in position and ready to be welded. The major part of the stabbing guides and pad-eyes have been removed from the upper deck.

The fire water line tied-in to TP1 and the fuel gas line are ready. Three additional barracks of 12 beds each, have been installed on the stiffleg module.

The percentages of work progress are as follows :

- Mechanical : 64%
- Structural : 5,7%
- Piping : 24%
- Electrical : 17%
- Instrumentation : 56%
- Pre hook-up :100%
- Temporary connections for fire and gas detection systems : 50%

1.5. Manpower on the Frigg site
(status on December 15, 1976)

Management

ELF Frigg Field Division

- Sea Construction	:	20
- Hook-up	:	24
- Operations	:	40
BROWN & ROOT	:	100
OCEANIC	:	9
Sub-total	:	193

Offshore

CDP1	:	320
TP1	:	145
QP	:	162
WEST VENTURE	:	307
TREASURE HUNTER	:	190
ETPM 1601	:	194
Tugs & Supply Vessels	:	200
Sub-total	:	1518

TOTAL : 1711

II. PRODUCTION FACILITIES - PHASE II

3.1. Drilling platform nr. 2

3.11 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 book is in progress. These books will be distributed at the end of January 77.

. 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 Mapegaz valves will be delivered by February 15th.

. Fabrication

Progress of fabrication is as follows :

a) Framing construction : 99,5% (for all modules).

b) Construction of modules on the St. Wandrille yard

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

Module 01 : 98,5%	Module 03 : 91%
Module 02 : 99%	Module 04 : 98%

c) Construction of modules in Norway

The barge Maersk 7 left St. Wandrille on December 16, 1976 for Stavanger.

Modules A and B are at present stored on the deck of the barge 1601 (awaiting favorable conditions to set the modules on the DP2 jacket). Modules C and D remained onboard the Maersk 7 and are expected to arrive in Kristiansand on January 3, 1977, where fabrication work will be continued during the months of January and February 1977.

. Hook-up

a) Engineering

U.I.E. (contract E. 16 - Amendment 28) is at present carrying out specific studies relative to hook-up operations. We think that these studies will be completed at the end of February 1977.

b) Works

Operations have not yet started, as modules A and B have not yet been installed on the jacket.

3.2. TCP2 platform

3.21 Structure

3.211 Management

The main activities of management have concerned discussions which were held with NORCON relative to contractual problems such as :

. Change order claimed by NORCON for additional reinforcement due to change in design criteria.
. Change order for connection between shaft and steel support frame.
. Change order for deck erection.

The ELF and NORCON positions have been cleared, but no agreement has yet been reached.

3.212 Engineering

The main activities have been :

. Preparation of submergence and inclination test.
. Detailed studies of deck mating operation.
. Detailed design of grouting equipment.
. Detailed studies of towing out.

3.213 Construction

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

. Domes 2,4 and 6 have been closed.
. Additional ballasting in star cells.
. Work is nearly completed for the protection against corrosion of NORCON's temporary insert plates.


AMV-CMP
ELF NORCO

b) The following equipment is to be installed on the platform :

. Ballast cylinder : (percentage of completion : 98,7%)

3.214 *Steel support frame*

Fabrication at CMP (Mardyck)

The positioning of the support frame on the VIG barge occured on December 28, 1976. At present, CMP is realising sea-fastening operations. If weather conditions are favorable, the barge will leave Mardyck on January 6, 1977.

NOBEL DENTON are supervising all these operations.

Operations on the Cherbourg yard

U.I.E. is at present assembling the green elements (prefabricated in Ranville) and the white elements (prefabricated in Stord). This work will be completed on January 1, 1977. The load-out of the CMP square part is anticipated to occur on January 17, 1977. The final assembly of the three parts of the support frame will commence after this date, as soon as completed parts will be delivered and steadied.

Transportation between Cherbourg and Andalsnes

All studies relative to transportation made by KVAERNER ENGINEERING will be completed on January 7, 1977.

The fabrication of the supports for the sea-pontoon can be started in January.

Engineering

Additional studies are nearing completion at the end of December 1976.

KVAERNER is at present studying the reinforcement of the support frame in view of the new loads of the compression facilities.

As a rule, the study will be completed on January 7, 1977.

Work relative to these reinforcement could be started on the U.I.E. yard in Cherbourg during the second week of January 1977.

3.215 TCP2 riser installation

a) Internal risers

Risers are installed and welded up to level 116 m in columns 3 and 5.

b) External risers

. Immersed spools are completed.
. Horizontal spools :
  - riser welds are completed
  - welding clamps-tripods : 5%
  - grouting tripod bases :40%

c) External casings (percentage of completion)

	Support	Guide	Casing
Column 1	95	95	75
" 3	90	90	75
" 5	80	90	0

.../...

d) Work is on schedule according to the new schedule approved on December 16. Completion is expected for the end of week 6.

3.216 TCP2 temporary facilities

a) Management

Discussions have been held with the contractor in order to improve the schedule to maintain the completion date in spite of delays in engineering and procurement.

b) Procurement

All enquiries and purchase orders are nearly completed.

c) Engineering

. The report relative to safety aspect has been discussed with ELF Stavanger and NPD, NPD did not raise any objections and a formal approval is expected.

. ELF has abandonned the request made to the NPD to have accomodations and service modules classified for later use, after start-up.

. The main activity is at present concentrated on piping, electrical and fire and safety equipment.

HDW yard

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

Module	64	67	68	69	72	41	42	43	Total
Scheduled %	49.3	67.5	50	100	44.5	81	58	73	44
Actual %	45.7	57.4	46.5	100	30.9	45.8	43.3	70.2	41.03

HDW increased the labor force and the delay as compared to the schedule has been reduced. The completion date of March 1st has been maintained.

FRANCE ENTREPRISE yard

Module 62 is nearing completion and is expected to be shipped to Cherbourg about January 15th.

The walkways whcih were originally being built by ACTIME have been transferred for completion to FRANCE ENTREPRISE as ACTIME stopped their activities.

3.217 Hook-up

a) A description of the temporary facilities for the tender of offshore hook-up operations has been prepared.

b) A description of the work to be carried out in CHERBOURG and Andalsnes for the hook-up of the temporary facilities has been prepared.

c) The design of the temporary networks for the supply of compressed air and electrical power for hook-up is completed.

3.22 TCP2 treatment modules

3.221 Structural design of modules and pancakes (job 2177)

The main activities consisted of :

. Preparation of lifting charts for modules and pancakes for different barges (operations in Andalsnes).
. Preparation of the load out and sea-fastening of the pancakes 06, 07 of the cellar deck equipment and associated piping spools at Orkanger on the barge DINO I.

. In cooperation with U.I.E. (Cherbourg), studies concerning the off-loading of same barge and lifting of equipment onto the support frame.
. Revision of the hook-up scope of work at Cherbourg considering the as-built status of the loaded equipment.
. Preparation of procedures and specifications for weighing the modules and pancakes at Orkanger by means of Testut Aequitas load cells (06 and 07 have been weighed with the jacks available on site).
. The principles of the mounting blocks arrangement for attachement of the modules to the support frame was discussed with DNV and KVAERNER ENGINEERING on December 17, 1976.

3.222 Design of the bridge between TP1 and TCP2

. The alternate solution proposed by McDERMOTT to save time on the construction was examined by McDERMOTT and MBO at a meeting in Paris on November 30.

The three parties agreed upon the fact that the solution was indeed time-saving. MBO were requested to produce an extra cost estimate and a schedule by the middle of December.

These documents are being examined by McDERMOTT.

. In parallel, ELF NORGE have sub-contracted another design study of the bridge in order to save time on construction. That study was handed over to McDERMOTT for comments on December 30.

3.223 Process design (job 2169)

a) Process, mechanical and piping

. Two process studies were submitted to ELF NORGE for approval and/or comments :

- Design of condensate, water and fuel gas piping to the condensate burners.
- Design of gas feed to TP1 from DP2 via an 8" by-pass loop attached to the TCP2 support frame.

These two studies have been returned with major comments to McDERMOTT and are being re-written.

. Engineering is proceeding on the new coalescer CV4B and associated pump CP2C.
. The test and commissioning manual is in preparation.
. Enquiries have been issued for the second coalescer and pump.
. An important volume of work concerns the coordination with BROWN & ROOT and NORCON for the preparation of the temporary installations.

b) Electrical

Work is proceeding on the conversion of the Kongsberg turbines to dual fuel to be carried on at Orkanger. An additional 5,5 kv circuit breaker is needed to provide the temporary quarters from the treatment turbines when their power generator is removed.

All air conditioning flow diagrams have been approved by ELF and issued AFC.

Work is proceeding on the studies for the temporary public address and navigation aids systems.

McDERMOTT issued a study to connect the essential supplies required before tow-out to the permanent MCC in Andalsnes.

c) Instrument

Work is progressing normally

A meeting was held in December between McDERMOTT, ELF NORGE, ELF AQUITAINE, NORSK HYDRO, NPD, DOE (Petroleum Branch and Gas Standard Branch) during which copies of the draft report for sales gas and condensate metering were handed over to all parties.

The estimated percentage of completion on December 15, 1976, is as follows :

. Structural design and engineering	: 64%
. Process design and engineering	: 74%
. Project management	: 44%
. Hook-up	: 20%
. Coordination with BROWN & ROOT	: 12%

3.224 Construction of the TCP2 treatment modules

The percentage of completion for the week ending December 19, is as follows :

	Work completed	Work anticipated on SBV schedule
Structure	79%	Not available at the date of this report
Piping	94%	
Equipment	88%	
Electrical	49%	
Instrumentation	19%	
Total	78%	

These 78% represent the part of the scope of work of the basic contract which has been completed. The additional work performed under approved change orders has not yet been reported to the Paris office this month.

Manpower on site	
SBV	409 (incl. 43 staff)
Sub-contractors	12
TOTAL	421

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Pancakes 06, 07, 61, 63 and 65, the pipe support frames 3, 4, 5 and 6 will be associated loose items (spools, supports....)left the Orkanger construction site on the barge DINO I on December 21, and arrived in Cherbourg on December 28.

The ready for load out dates the contractor is working up to are as follows :

February 15, 1977 : Panckaes 05, 11, 12, 13, PSF 1, PSF 2
March 1, 1977 : Pancakes 08, 09, 13
March 12, 1977 : Modules 01, 02, 03 and 04.

3.225 Construction of the bridge between TP1 and TCP2
(Motherwell Bridge Ltd.,)

After two unsuccessful attempts the last welding procedure was finally qualified on December 20.

Therefore the angled bracing to can procedure was found acceptable and welding could commence.

But the production welding could not start due to jigs not completed and triangles having not been set up. The work could not start before Christmas Holidays. Work will commence January 6, 1977.

The management of MBO were asked to attend a meeting in Paris on December 30, they were informed of our dissatisfaction with the progress of the work.

They tabled several measures they are going to implement starting on January 6, 1977, to keep the previously agreed upon date for the completion of the two end sections (TP1 and TCP2) : May 6, 1977.

A meeting is scheduled on January 12, 1977, on the site with McDERMOTT and ELF, in order to check on the progress.

3.226 Construction of the metering modules

The contract for the construction of these two modules to be installed on top of modules 02 and 03 has been awarded to AKER and the fabrication has started on their VERDAL plant.

The completion date to be met by the Contractor is June 1, 1977 for the installation in Andalsnes.

The previously anticipated offshore lifting of these metering modules would raise many problems and for that reason this operation must be avoided.

A study is presently undertaken concerning the possibility of lifting that metering system offshore. The preliminary conclusions show that the installation of several items on module 4, which could at present be carried out in Orkanger, must be held pending knowing wether lifting operations will be performed offshore or not and wether the design of the metering module would possibly have to be modified.

3.23 Lines and connections

IV. TCP2 COMPRESSION - Phase III

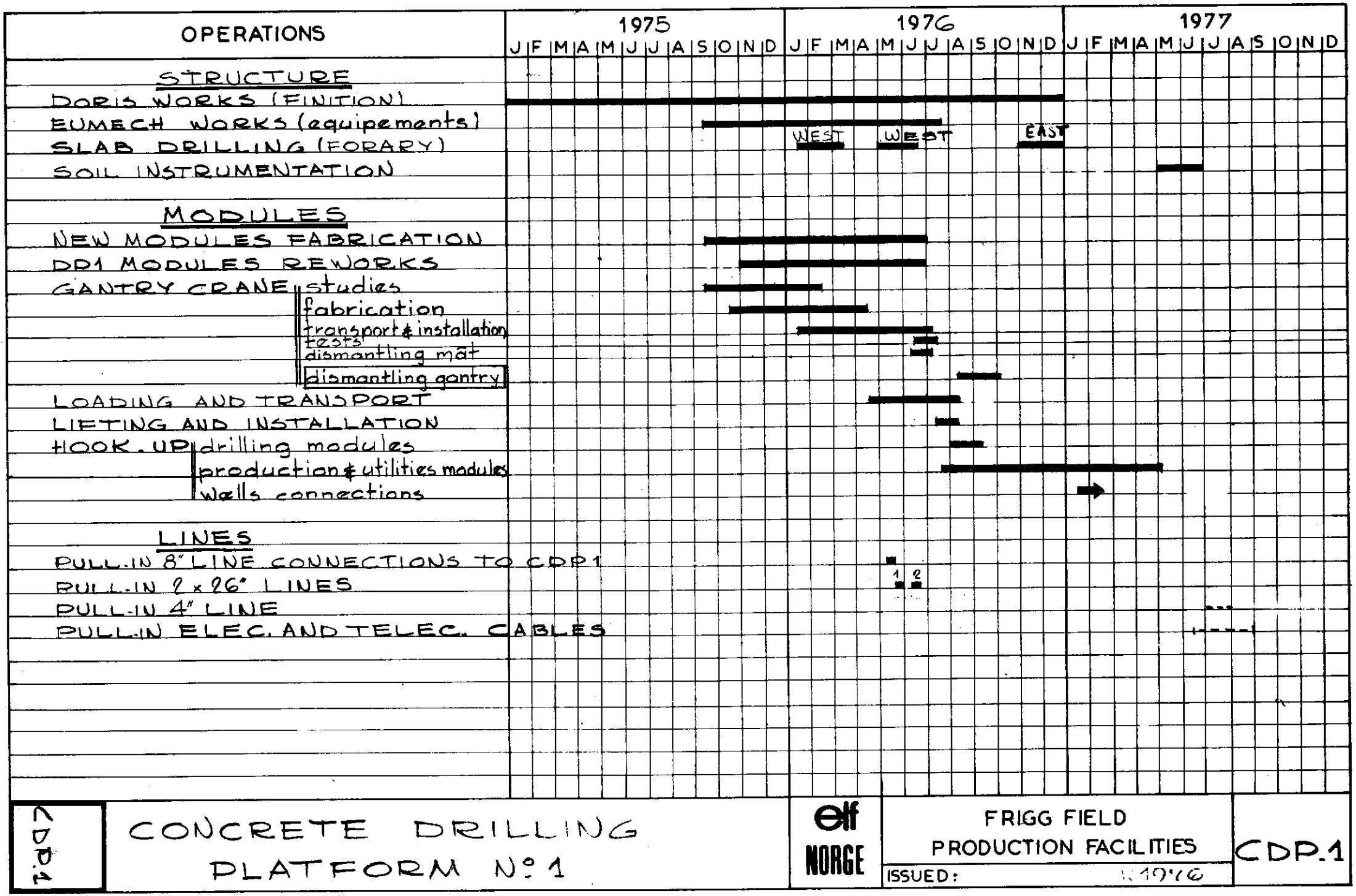
A technical meeting has been held with our partners on December 14, 1976, to evaluate the technical aspects of the offers received for compressors and turbines. At this meeting, the problem relative to the weight of the compression modules has been raised, it is exceeding the acceptable weight that can be born by the support frame. Reinforcements will be necessary. KVAERNER ENGINEERING has been asked to study these reinforcements.

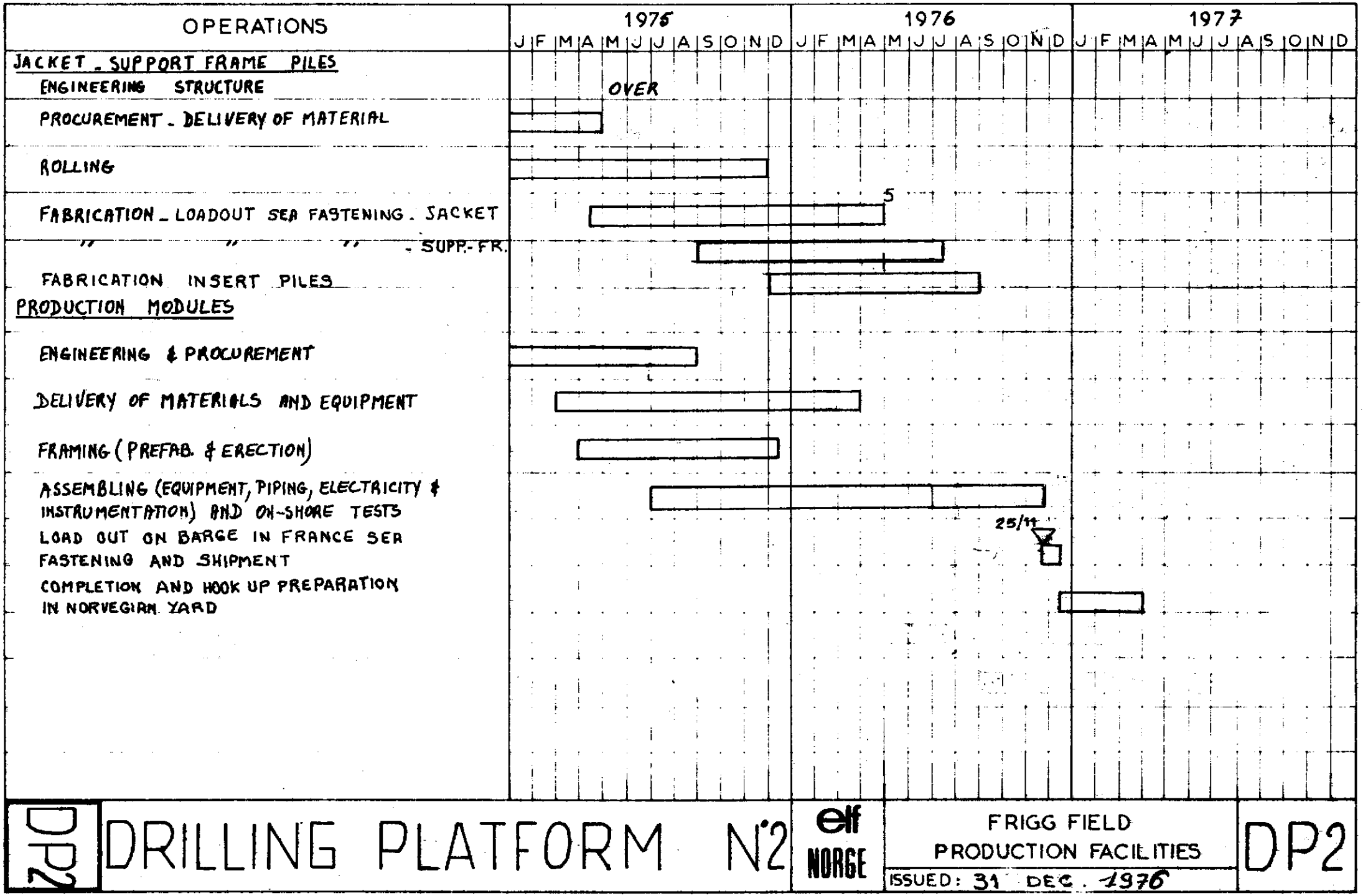
Calls for tenders have been sent out for the following equipment :

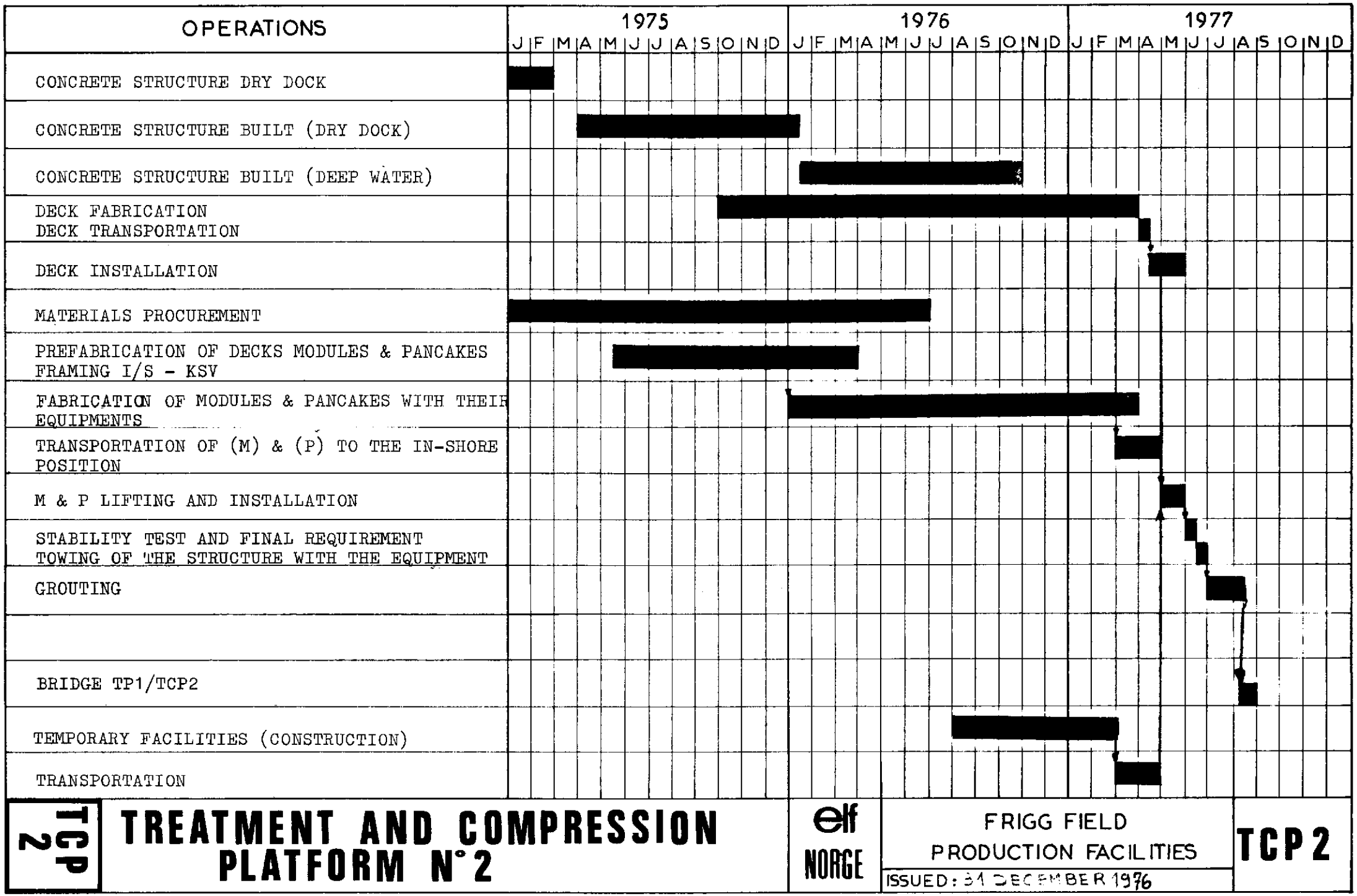
- Sea water pumps
- Fresh water pumps
- Carbon steel vessels
- Heat exchangers
- Sea water chlorination
- Fresh water maker

At present ELF is examining a document issued by KVAERNER TECHNIP relative to Safety Concept.

CDP.1


OPERATIONS
1975
J F M A M J J A S O N D
1976
J F M A M J J A S O N D
1977
J F M A M J J A S O N D
STRUCTURE
DORIS WORKS (FINITION)
EUMECH WORKS (equipements)
SLAB DRILLING (FORARY)
SOIL INSTRUMENTATION
WEST
WEST
EAST
MODULES
NEW MODULES FABRICATION
DP1 MODULES REWORKS
GANTRY CRANE studies
fabrication
transport & installation
tests
dismantling mat
dismantling gantry
LOADING AND TRANSPORT
LIFTING AND INSTALLATION
HOOK-UP drilling modules
production & utilities modules
wells connections
LINES
PULL-IN 8" LINE CONNECTIONS TO CDP1
PULL-IN 2 x 26" LINES
PULL-IN 4" LINE
PULL-IN ELEC. AND TELEC. CABLES
1
2
CDP.1
CONCRETE DRILLING PLATFORM N° 1
elf NORGE
FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 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
JACKET . SUPPORT FRAME PILES
ENGINEERING STRUCTURE
OVER
PROCUREMENT . DELIVERY OF MATERIAL
ROLLING
FABRICATION . LOADOUT SEA FASTENING . SACKET
" " " . SUPP.-FR.
FABRICATION INSERT PILES
PRODUCTION MODULES
ENGINEERING & PROCUREMENT
DELIVERY OF MATERIALS AND EQUIPMENT
FRAMING (PREFAB. & ERECTION)
ASSEMBLING (EQUIPMENT, PIPING, ELECTRICITY & INSTRUMENTATION) AND ON-SHORE TESTS
LOAD OUT ON BARGE IN FRANCE SEA FASTENING AND SHIPMENT
COMPLETION AND HOOK UP PREPARATION IN NORVEGIAN YARD
25/11
DRILLING PLATFORM N°2
elf NORGE
FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 31 DEC. 1976
DP2


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
TCP 2
TREATMENT AND COMPRESSION PLATFORM N°2
elf NORGE
FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 31 DECEMBER 1976
TCP 2


PLATFORMS
1975
1976
1977
1978
1979
J F M A M J J A S O N D
CDP 1
TP 1
DP 2
QP
TCP 2
FLARE
FLOW - LINES & CABLES
WELLS COMPLETED
GAS DELIVERY
HOOK-UP
COMMISSION
START-UP
WEST CLUSTER
EAST CLUSTER
3
4
6
10
10 + 3 DP2
15 + 3 DP2
15 + 9
20 + 9 DP2
20
+
12 DP2
10 + 24
12 + 24
24 + 24
▶ GAS - IN
Basic hypothesis
On CDP 1 - drilling & production simultaneously
On DP 2 - Production on one cluster while drilling on another cluster
- Hook-up & drilling simultaneously
elf norge a/s p.o.box 168 — 4001 Stavanger
date: 8.10.76
drawn by: HLa
checked by: GR/BP
appr. by: PHM
size: -
OVERALL
FRIGG FIELD
SCHEDULE
elf
draw. no.: FF.000.100.036
scale: -
rev.: 3