



ENTREPRISE DE RECHERCHES ET D'ACTIVITES PETROLIERES

FFG-G-101-9-FRFOO7

elf NORGE

**FRIGG FIELD
PRODUCTION FACILITIES**

MONTHLY REPORT

JULY 1976

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Arrivée le 13 AOUT 1976	
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FRIGG FIELD

PRODUCTION FACILITIES

MONTHLY REPORT

JULY 1976

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Work on the Frigg site progressed favorably during the month of July.

On CDP1, the installation of the gantry crane and testing was completed. Eight modules, including the main ones, were lifted on the platform at the end of the month.

The main eleven piles of the platform DP2 were driven and grouted. On QP, four insert piles were installed. The DP2 support frame was loaded on barge in ST. WANDRILLE on July 22, 1976 and is at the present time on the Frigg site ready to be installed.

On TP1, the pancakes were installed. At the end of the month, the columns and the tunnels were ready for the pull-in of the 24", 26" lines and the 32" pipe. The production modules nearing completion in ANIWERP, have been loaded on barges and are ready to depart.

The 8" line between CDP1 and TP1 is completed.

The construction of the TCP2 structure and that of the production modules is progressing according to schedule. The construction work of the support frame has been distributed within a joint venture AKER/CMP. The delivery date will probably be delayed until March 77.



I. OFFSHORE OPERATIONS

(for the period ending July 20)

1.1. Summary of major events

- . The gantry crane was tested on July 13 and 14, with an 800 ton lift.
- . The 8" line was pulled into TP1 and connected to the 8" CDP1 line.
- . The helideck on TP1 was relocated in position and the pancakes 7, 8, 9, 10 and 11 lifted.
- . All primary piles for DP2 were driven and grouted, the last pile was completed on July 15.

1.2. QP installation

Holes A 1-1, B 1-1 were drilled to total depth. The insert pile A 1-1 was installed at less than design penetration, such depth having been accepted by ELF after consultation between OCEANIC and ELF representatives, both on the field and in STAVANGER.

Pile A 1-1 was then grouted in two stages.

The insert pile B 1-1 was also installed and grouted in two stages. The drilling of the hole A 1-2 is complete and inserting is in progress.

During the next month, the main operation will be the turning of the drilling module and stiffleg.

1.3. DP2 jacket installation

The temporary work deck was lifted on June 21, however the ringer mat was not set on top due to the fact that the driving of the primary piles was progressing faster than expected.



This temporary work deck will have to be removed before July 27 at which date the support frame is expected to arrive.

On July 2, all 62" buoyancy tanks had been removed.

The eighteen remaining primary piles were driven and grouted within 21 days. This operation was completed on July 15.

The preparation work for the removal of the temporary work deck as well as the removal of the 100" and 144" buoyancy tanks has been completed. The removal itself will occur as soon as weather permits.

1.4. Line installation

The pull-in of the 8" line into TP1 commenced on June 26. Fabrication of the field fit spool started on June 27 and was completed on July 1. The spool was lowered on the bottom and fitted on July 3. Tightening of the flanges and wrapping was terminated on the following day and the final installation was finished on July 5.

1.5. CDP1 installation

During this month, the work progressed as had been expected.

- . The Foraky rig was demobilized at the end of June. However one well of the western cluster was not drilled. This will be performed with the Saipem rig.
- . Installation of the skid beams is nearing completion.
- . The tie-in of the 26th riser was finished on July 13.
- . From June 25 to July 9 : Installation of mooring set up including buoys, the three Yokohama fenders , winches and mooring lines.
- . The dismantling of the Buzichelli mast was finished on July 10.



- . The gantry crane was tested on July 13 and 14 and it then lifted the core cap, PH 1 and SD 1.

It took six months to entirely install the gantry crane (its installation started around January 15).

- . Three living quarters were demobilized, this reduced the number of beds available to 160.
- . If weather permits, next month, we expect to lift all modules onto the structure.

1.6. Treatment platform nr. 1 - TP1

Grouting of the structure was completed on June 27. Ballasting was completed on July 5, the grouting module was then offloaded.

Progress of foam removal in column C1 : 55%

Progress of foam removal in column C2 : 100%

The preparation of the columns for pull-in operations is in progress. Column C1 should be ready on July 23 for the pull-in of the 26" line. Column C2 should be ready by August 1.

The barge ETPM 1601 moved the helideck on July 6. The various lifting operations on the platform TP1 were scheduled to be realised with this barge, however it broke down on July 10. Pancakes 7,8,9,10 and 11 were lifted by the barge LB MEADERS.

The main operations for the coming month on TP1 will be the lift of the permanent modules and the pull-in of the lines.

1.7. Weather

Conditions on the Frigg Field during the month of July were better than average. Only one day was the wave height above 3 meters and only during three days did we have wind speeds over 30 knots.

II. PRODUCTION FACILITIES - PHASE I2.1. CDP1 production facilities2.11 Production modules2.111 Rework PM2 - PM3 - PM4

- Engineering : 99%
- Procurement : 97%
- Fabrication : 97%

2.112 New modules (production and utilities)

Engineering : Structural : 100%
 Piping : 99%
 Fire and safety : 99%
 Electrical : 99%
 Instrumentation : 99%

Procurement : Structural : 100%
 Piping : 98%
 Equipment : 99%
 Electrical : 99%
 Instrumentation : 95%

Fabrication : REG BOOTH (SD1) : 100%
 Module at the present time on CDP1.
 PENN & BAUDUIN (PH) : 100%
 Module at the present time on CDP1.
 DE GROOT (WHLA-1B) : 95%
 Module in Stavanger on barge.
 WILSON WALTON (BR1-BR2 : 100%
 Module on CDP1

Flare booms : 94% .The flare booms are
 stored on site in Stavanger.

At the present time, the following modules are on the platform :

PM2 - PM3 - PM4 - SD1 - SD2 - SD3 - T1 - T2 - PH1 - BR1 - BR2

2.2. Treatment platform nr. 1 - TP1

2.21 Engineering of treatment modules

(McDERMOTT-HUDSON ENGINEERING)

Finalisation of stubs drawings intended to compensate for the non horizontality of the platform, of stabbing guides, vertical jacking seats, internal sea fastening of modules 01,02 and 03 and reinforcement of the main structure of module 03.

2.22 Construction of treatment modules and deck units

(MERCANTILE MARINE under McDERMOTT management)

The main modules were loaded on using the roll-on method according to the following schedule :

Module 01	July 5	on barge MORLAND 5
" 02	" 8	" "
" 03	" 11	" "
" 04	" 15	on barge MORLAND 3
" 05	" 18	" "

The barge MORLAND 6 delayed a few days by bad weather should leave Antwerp on August 2. Some urgent structural work remaining to be performed on modules 02 and 03, during the offshore installation of module 01, MERCANTILE staff will be sent to Stavanger for a short period. The barge MORLAND 3 is expected to leave on August 9.

.../...

2.221 Erection of framing and painting

This work is completed except for the erection aids, the reinforcement of module 03 and numerous touch-ups

2.222 Prefabrication of piping

Fabrication is complete. All spools have been delivered to the site.

2.223 Module outfitting

Modules	01	02	03	04	05
Erection of equipment	100%	100%	100%	100%	100%
Electricity	100%	100%	99,5%	100%	100%
Instruments	100%	100%	100%	98%	100%
Cladding	95%	95%	90%	100%	100%
Erection of piping	99,6%	99,7%	99%	95%	84%

2.224 Deck unit outfitting

The status of deck unit 06, at the end of July is as follows (%) :

Erection of equipment	: 100%
Erection of piping	: 50%
Electricity	: 10%
Instruments	: 100%

2.3. Living quarters platform QP2.31 Engineering of living quarters building

(McDERMOTT - HUDSON)

Finalisation of details and operating manual.

Moreover, during the weighing of module B it was discovered that the weight of the module was much higher than assumed in our calculations. The reinforcement of the pad-eyes has been examined and will be performed in August. Design of the slings for lifting is nearing completion.

2.32 Construction of living quarters

(CDLG under McDERMOTT-HUDSON Management)

It has been decided to not unload the modules in Stavanger in August, as it may be possible to try an offshore lift in October. Consequently, the two cargo barges will remain in Bordeaux until September 10 and this period will be used to perform late completion operations which had been anticipated to be performed in the fall after unloading the modules in Stavanger.

The last important packages "UK communications room/battery room" and "Goods lift roof unit" were loaded on, on July 16 and 19 respectively on the cargo barges.

The main operations performed during this month were :

- . Cladding under helihangar for the air conditioning unit (nearly complete).
- . Modification of air conditioning system in the upper level of module B (completion date : August 4)
- . Various electrical work, mainly in the module B service area.
- . Completion of lab.
- . Completion of helihangar equipment.

2.33 Supervisory control and field communications

(COMSIP under McDERMOTT management)

2.331 QP Modules

Work was practically stopped during the month of July.



TP 1
Load-out module 01

As the modules now remain in Bordeaux a little longer, it has been decided to undertake at the beginning of August, the functional tests of phase II.

2.332 TP1 modules

. Interface room nr. 1 :

The functional tests are completed.

. Interface room nr. 2 :

The work did not start at the beginning of July as had been anticipated, due to delays in the installation of the air conditioning system and due to difficulties in procuring certain electric cables. The work will be started at the beginning of August.

2.34 Storage of QP modules

All preparatory work has been stopped awaiting the final decision relative to unloading in Stavanger.

The study by McDERMOTT is completed for the most important part and the corresponding report will be available at the beginning of August.

2.4. Lines and connections

The pipes for the 8" 5/8 kill line, 4" 1/4 condensate line and two 2" 3/8 air and pilot lines are in the process of being coated, these will be ready for laying in August.

The qualification of the welding (hyperbaric) procedures has been started at the end of July. The goal of these tests is to obtain an acceptable procedures (thread, electrode, parameteres chosen according to the results of the previous preliminary tests) as well as six welders.

The engineering relative to stabilisation and protection of the lines is in progress.

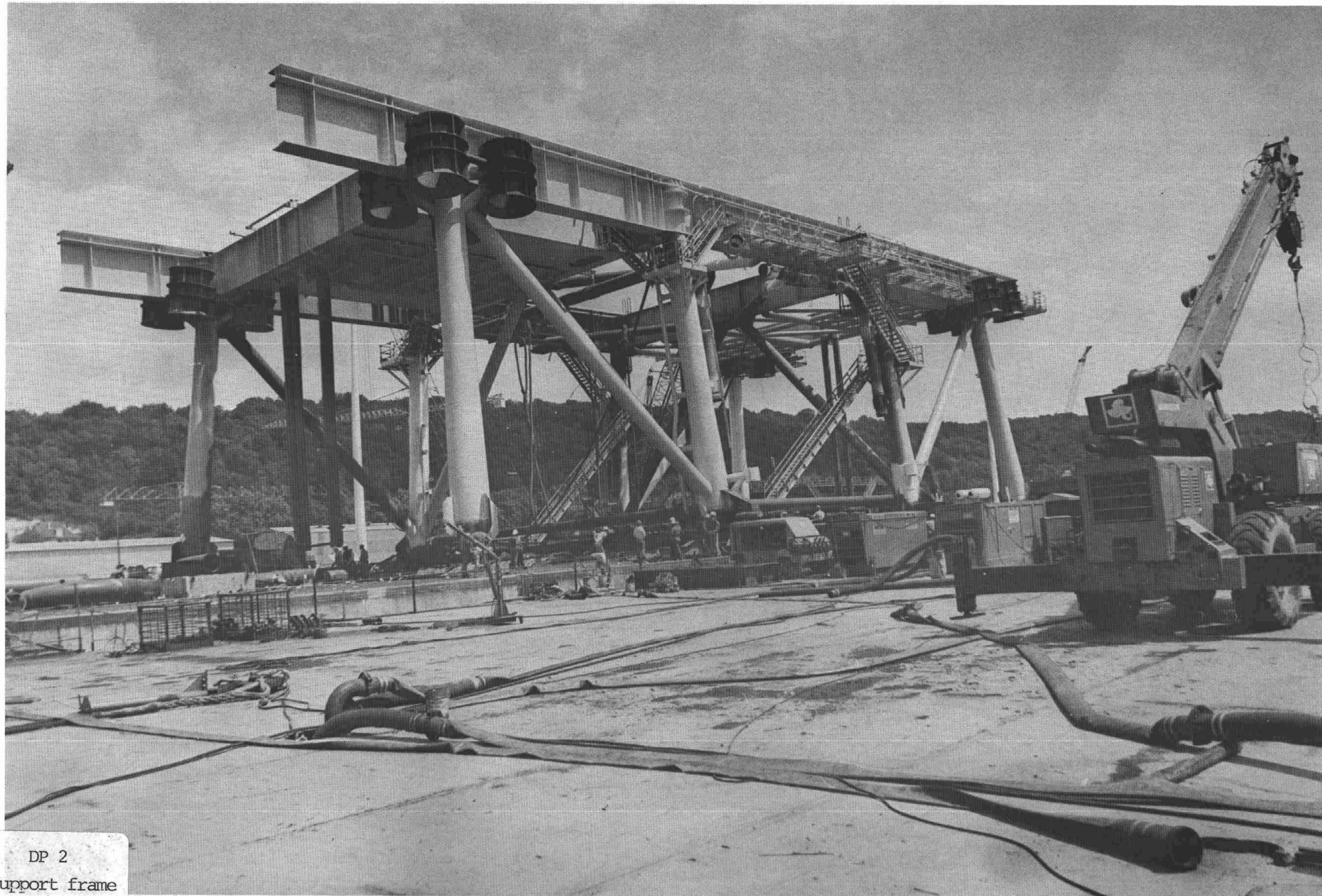
2.5. Telecommunications

2.51 Telecommunications with the U.K.

The tropo antenna were loaded on the barge MORLAND 5 on July 17. The study relative to offshore installation by SELTRUST is being examined by McDERMOTT.

2.52 Telecommunications with NORWAY

The study relative to the feasibility of the tests during the possible storage period of the QP modules in Stavanger is in progress.



DP 2

Support frame

III. PRODUCTION FACILITIES - PHASE II

3.1. Drilling platform nr. 2 - DP2

3.11 Support frame

At the U.I.E. yard in ST.WANDRILLE, the support frame for the DP2 drilling platform was loaded on the barge REFANUT on July 15. Some equipment relative to pump house will have to be completed off-shore.

The sea-fastening of the support frame was completed on July 21 and towing started on July 22 at 14.00 p.m.

3.12 Piling

The fabrication of the insert piles was progressing satisfactorily, unfortunately OCEANIC requested many modifications on the lifting rings and centralizers. These modifications will entail approximately 4000 additional working hours.

U.I.E. is reviewing the schedule, but at a first guess, eight complete sets of insert piles can be delivered at the end of August.

3.13 Production modules

. Engineering

The total engineering progress is 99%. The detailed engineering progress is as follows :

- . General arrangement : 100%
- . Model construction : 98%
- . Piping arrangement : 100% (except for firewater auxiliary pipework)
- . Isoing : 100%

. Procurement

Procurement progress is 99%. The material delivered on site is reaching 91%, including steel.

We are still encountering some difficulties with the delivery of the MAPEGAZ valves and SPP firefighting pumps.

. Fabrication

The total progress is 81.7%.

a) Framing construction

Framing construction is 100% complete. The welding of the lifting lugs is in progress and is 100% complete on module 04.

b) Equipment installation

The total progress is 71,5% (prefabrication of piping included).

Module 01 : 56,7%	Module 03 : 81,4%
Module 02 : 89,9%	Module 04 : 43,3%

Pumphouse : 100%

Miscellaneous : 50%

The pumphouse is 100% complete, welded to the support frame and loaded on barge.

The progress of module 03 is slow due to problems with the MAPEGAZ valves. The completion of the modules, tests not included is still anticipated for the end of October 1976.

3.2. TCP2 platform

3.21 Structure

3.211 Management

The two claims from NORCON relative to :

- . Financial consequences of the BROWN & ROOT activities on the NORCON operations.
- . Delay of contractual date of platform delivery due to extra contractual works.

are still under examination by ELF.

NORCON updated the schedule in order to put forward a new date for the completion of the structure. The new date being October 1st, 1976. (closing of accesses to shafts and immersion test excluded).

A proposal for change order nr. 17 relative to NORCON 's running costs during the 1976-1977 winter season was submitted and is under examination.

3.212 Engineering

The main activities have been :

- . Detailed design of watertight floors to be installed in each column to give the platform enough buoyancy in case of damage to one column with inflow of water. However, due to high cost and delay to build and remove these decks, this solution has been abandoned.

Two other solutions are being considered :

- . Cofferdam with polyurethane
- . Modification of water level during towing out in cells and columns in order to obtain sufficient buoyancy.

- . Detailed checking of implosion risks during deck erection-immersion.

3.213 Construction

a) The main activities have been :

- . end of shaft slipforming (completed on July 3).
- . repair of cracks.
- . Dismantling of shaft slipform.
- . Erection of safety floors.
- . Erection of form work for upper rings.

b) The status of progress is as follows :

- . Shaft slipforming : 100%
- . Repair of cracks outside cells : 100%
- . Dismantling of shaft slipform : 100%
- . Erection of safety floors : 100%
- . Erection of form work for upper rings. : 100%
- . Ballast cylinder : 72%

3.214 Support frame

The new dispositions taken for the fabrication of the support frame are now in effect. CMP received the steel corresponding to the additional tonnage which is to be fabricated in France.

Unfortunately, a strike of the dock workers in DUNKIRK delayed the dispatching of the steel, however in the middle of July the distribution was as follows :

- . JULIN : 157 tons
- . A.C.B. : 50 tons
- . SOCOMET : 100 tons

The homologation of welding procedures was realised at the sub-contractor's. This operation is not yet completed at SOCOMET.

C.M.P. entirely reviewed the schedule and the loading of the central square should occur December 15. This schedule is considered as being quite tight.

At STORD, the fabrication situation seems to have improved and the new schedule is being followed week by week. From a tonnage of 680 tons to be completed, 257 are accepted and 554 are finished but in need of repairs.

The joint venture presented a new contract NORCON/JOINT VENTURE. This new contract is being discussed, the discussion is relative to the three following points :

- . The general conditions for which an agreement should be reached quickly.
- . A contractual schedule for the assembly in order to determine a contractual date for completion of work, in view of final assembly which is anticipated to be performed in STORD.
- . Prices which are higher than anticipated

The contract should be finalized towards the middle of August.

3.215 TCP2 riser installation

a) Cracks on tideguard lining of risers

Cracks were discovered on the tideguard protection after execution of the pressure test on risers before their installation.

A detailed investigation has been made by BROWN & ROOT and ELF experts in order to find a technical solution to repair the protective coating of the risers.

Recommendations were made to ELF at a meeting held in ANDALSNES on July 22, 1976, but these were not accepted by the NPD representative. The investigation is still in progress.

b) CHRISTIANI & NIELSEN

Their activities were reduced due to the impossibility to proceed with the installation of risers.

The main activity has been the start of J-tube installation and riser supports in columns 3 and 5.

3.216 TCP2 temporary equipment

a) Management

After examining the bid packages received from eleven contractors and discussing these with four parties, a draft of the contract was signed by DEUTSCHE VERFT (H.D.W.). A telex asking them to proceed immediately was sent by ELF on July 23.

An inquiry was sent out for the fabrication of cabins for modules 66 and 68 (accommodation modules). The order will be sent out shortly.

BROWN & ROOT prepared a draft for addendum to contract S.109 for the management, engineering, procurement and supervision of temporary facilities. A detailed cost estimate is being examined.

b) Engineering

A preliminary definition of design and specifications has been discussed with NPD on July 15 in STAVANGER. Subject to minor modifications, the specifications for the temporary quarters have been approved.

Technical proposals for the classification of the TCP2 quarters modules were examined by NPD, who requested that ELD submit a comprehensive report including a complete design criteria based on a fire study.

Construction drawings for steel structure of modules are being prepared in order that construction be started at the beginning of August.

3.22 TCP2 treatment modules

3.221 Structural design

- . McDERMOTT completed the study relative to pipe supports and issued drawings AFC for modules 1,2,3 and pancakes 5,6 and 7.
- . Sales gas metering : The main study is complete.
- . Glycol reboiler bundle : A new dismantling study is in progress for the fire pipes.
- . Bridge between TP1 and TCP2 : McDERMOTT issued the drawings AFC for the main structure. Detail drawings (piping supports, bridges, cladding etc....) were to be completed before the end of JULY.
- . HP vent stack : A feasibility study was realised and showed that a self supported flare of 36 meters called for a 600 mm diameter at the top increasing to 1050 mm at the base.
- . Generator package : Nearly all structural drawings for the mini modules 08 and 09 have been issued. Detail drawings will be issued at the end of July.

3.222 Process designa) Process engineering

The BSB CQ1-A/B/C glycol regeneration units were delivered after testing on June 25. (contractual date).

The specification for the control panels for the glycol reboilers has been issued.

McDERMOTT performed a preliminary study of the sprinkling system as requested by NPD. After approval by ELF, this study was sent to NPD for approval.

b) Mechanical engineering

McDERMOTT paid several visits to the pump manufacturers to attend functional testing.

Vendor drawings for sewage treatment plant are being verified.

McDERMOTT is at the present time finalizing the study and vendor drawings for the HVAC equipment of the fire pump houses and generator package.

MAPEGAZ valves : On July 23, MAPEGAZ still had to deliver 16 valves out of 60 to VEROLME (Holland). MAPEGAZ promises delivery before the end of July.

At VEROLME, the welding of the pup pieces and the testing of the assembled parts are progressing normally. Work progress reaches 60%. On July 19, 22 valves had been sent to ORKANGER.

c) Electrical (generator package)

McDERMOTT is at the present time trying to estimate the consequences and develop a procedure to comply with ELF's requests : perform the maximum amount of work in ORKANGER in order to gain time during hook-up. The totality of the electrical equipment will have to be installed in pancakes 08 and 09. The functional tests of the turbo-generators will be performed in ORKANGER.

This will delay the completion date of some pancakes.

The analysis of the proposals for the noise and and vibration study is completed. The order can be placed at the end of July.

The revised scope of work for the installation of the generator package is nearing completion and will be sent to SPIE-VIGOR at the end of July. It has been revised in accordance with ELF's request of installing and connecting as much equipment as possible in ORKANGER.

The estimated percentage of completion is as follows :

. Structural design and engineering	: 75%
. Process design and engineering	: 83%
. Project management	: 44%

3.223 Construction of TCP2 treatment modules1. Fabrication at ORKANGER

The percentage of progress for the week ending July 16, 1976 is as follows :

	Work completed	Work anticipated on SBV schedule
Structure	41,9%	54,0%
Piping	53,4%	51,9%
Equipment	52,0%	64,0%
Electrical/Instru.	2,7%	10,0%
Total	40,6%	45,8%

Isometrics : 786 on site

Manpower : 217 productive present

2. Fabrication at EGRSUND

Module 04 was sent to ORKANGER on July 7, 1976.

We are awaiting delivery of material and drawings for generator package roof module 08.

3.23 TCP2 compression

1. Engineering

The requisitions for the turbo-generators are being drawn up taking into account ELF's comments.

Kvaerner/Technip issued PID and process diagrams which are being examined by ELF.

Kvaerner/Technip is obtaining from the other engineering companies the information needed for the study of the electrical inter-connection.

A revision of the weight estimate has been issued.

Investigations are in progress in view of specifying the materials to be used for the sea water network.

2. Drafting

The possible arrangements of the plot plan with various types of turbo generators have been examined.

A preliminary drawing for classification area has been issued.

3. Procurement

The proposals for gas turbines were received on July 15 and are being examined.

Proposals were received from :

- . AEG
- . JOHN BROWN
- . KVAERNER BRUGG
- . STAL LAVAL
- . TPMS

The following companies declined to bid :

- . ALSTHOM
- . THOMASSEN

NUOVO PIGONE did not answer within delays.

The proposals for the compressors are expected to come in at the end of July.

3.24 Lines and connections

The coating of the last pipe for the 24" line was started as part will be used as back up for phase I.

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OPERATIONS	1974												1975												1976													
	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 Graving Dock																																						
Concrete Structure 1 st Stage Construction																																						
Concrete Structure 2 nd Stage Construction																																						
Temporary Modules Fabrication																																						
Support Frame Rollin & Prefab																																						
Support Frame Assembly																																						
Loch Fyne Operation																																						
Deck Units Framing																																						
Deck Units Out Fitting																																						
Modules Framing																																						
Modules Outfitting																																						



TREATMENT PLATFORM N°1

elf
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FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 31 JULY 76

TP1

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																																						
COMPLETING ALL MODULES & PANCAKES WITH THEIR EQUIPMENTS																																						
TRANSPORTATION OF (M) & (P) TO THE IN-SHORE POSITION																																						
M & P LIFTING AND INSTALLATION																																						
HOOK-UP CONNECTIONS AND PRE-COMMISSIONING OF (M) AND (P) IN THE IN-SHORE POSITION																																						
TOWING OF THE STRUCTURE WITH THE EQUIPMENT																																						
GROUTING																																						
HOOK-UP OFFSHORE LIFTING AND INSTALLATION OF BRIDGE																																						

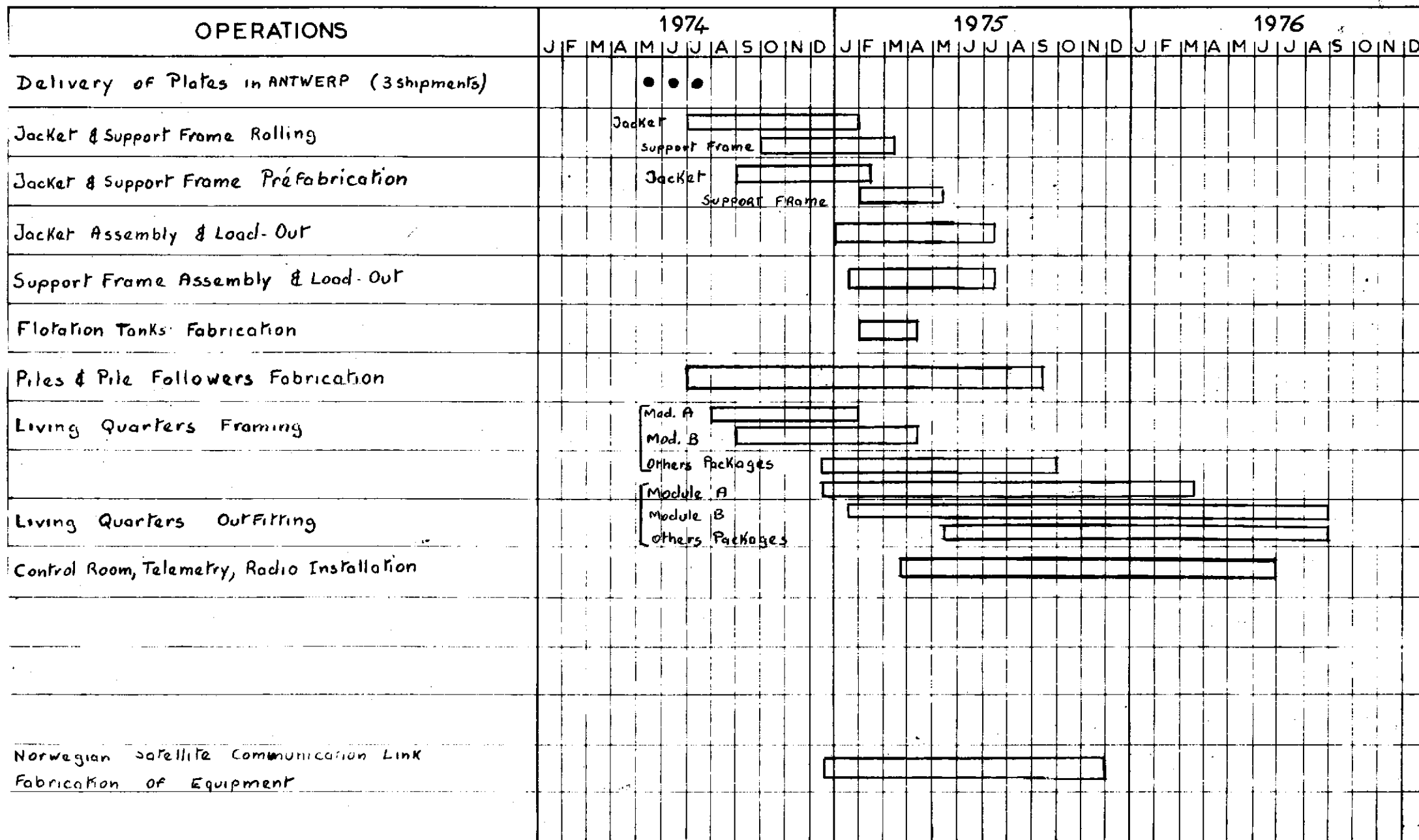
TCP 2

TREATMENT AND COMPRESSION PLATFORM N°2

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FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 31 JULY 1976

TCP 2

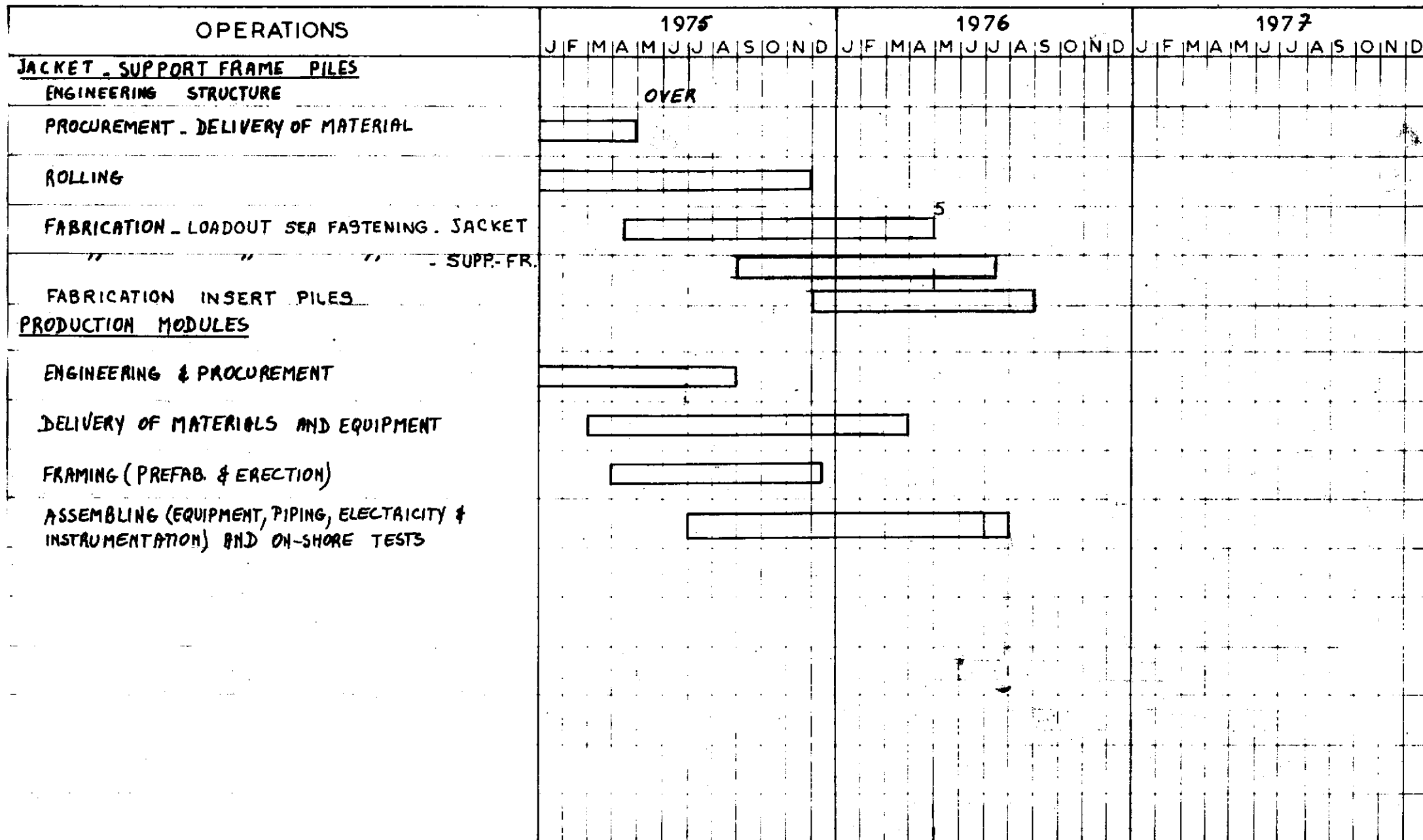


LIVING QUARTERS PLATE^m

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PRODUCTION FACILITIES
ISSUED: 31 JULY 76

QP



CDDP.1

CDP.1	CONCRETE DRILLING PLATFORM N°1	elf NORGE	FRIGG FIELD PRODUCTION FACILITIES	CDP.1
			ISSUED: JULY 30th 1970	

4. D. 2.

