



ENTREPRISE DE RECHERCHES ET D'ACTIVITES PETROLIERES

FFG - G. 101.9 - FRF008

elf NORGE

FRIGG FIELD
PRODUCTION FACILITIES

MONTHLY REPORT

AUGUST 1976

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Arrivée le : 13 SEPT 1976	
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D.E.P.

Paris, August 30, 1976

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FRIGG FIELD

PRODUCTION FACILITIES

MONTHLY REPORT

AUGUST 1976

Distribution

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GENERAL VIEW OF FRIGG

LIST OF ATTACHMENTS

- . CDP1 Concrete drilling platform : Planning
- . DP2 drilling platform nr. 2 : Planning
- . QP living quarters platform : Planning
- . TCP2 treatment and compression platform nr. 2 : Planning
- . TP1 treatment platform nr. 1 : Planning
- . ELF NORGE - FRIGG FIELD : Construction schedule and production facilities

I. OFFSHORE OPERATIONS

(For the period ending August 20)

1.1. QP installation

The driving of the 4th pile on the structure was completed by July 17. On July 23, this pile had been grouted. The follower was removed on July 24.

Preparation relative to the skidding of the drill modules were then started. Stiffening was added to the generator module and extensions were welded onto the support frame on lines a and b. On August 4, the false rotary table, pipe rack, hughes rig, pile rack and two followers were removed from the structure. Two deep well pumps were removed on August 5. All the necessary lift-offs of pancakes and modules were completed by August 8. The stiffleg module was skidded into its new position by August 10. The tie-down of the module and the preparation of the stabbing guides to receive the drill module were completed on August 13. At the end of the week ending August 20, the operations to lift, skid and turn the drilling module and the temporary facilities had been completed requiring a total of 27 days.

No BROWN & ROOT activities on this platform during this period.

Various installation aids including stiffening, jacking anchors and associated walkways were fabricated by OCEANIC CONTRACTORS and sent to QP for the jacking of the stiffleg module.

1.2. DP2 jacket installation

The primary pile installation programme having been completed the efforts were now concentrated on the installation of the support frame and drilling equipment. Four large buoyancy tanks were removed after removal of the temporary work deck. All towing bridles were removed in preparation for the lift of the support frame.



The support frame arrived on location and was set on the DP2 jacket on August 4 by the barge PM 27. The welding of the support frame/jacket connection was completed on August 10.

The barges MORLAND 4 and GRIEG 2 were positioned beside the DB 22, on respectively August 10 and 11, in view of removal of the drilling equipment and installation of same on platform. Both stiffleg modules (SLM1 and SLM2) were set on the platform and tied down. The stiffleg sub-structure number one (SLSS 1) and the drill module 1 were also set on the DP2 platform and tied down.

The drilling equipment was modified in ANTIWERP for use on DP2 and was dispatched to the field.

Several installation aids for use in the insert pile programme are being fabricated, such as sections of primary pile PF 4, vertical pile transfer racks, vertical storage racks etc... Prices and delivery times have been requested for the delivery of cantilever supports for additional storage space.

No work was performed on the DP2 during the period extending from July 26 to August 3, due to adverse weather conditions.

1.3. Line installation

On July 24, the 26" spools R5 and R6, were transferred onto the barge LB MEADERS. They were laid on sea bottom and aligned with TP1 on July 26, ready for pull-in. Pull-in operations commenced on July 27, but this initial attempt to pull-in the first spool was unsuccessful due to a restriction at the bottom of the column which ultimately caused a cable failure. A second attempt was successfully carried out on August 10.

During the week ending August 6, divers replaced the tunnel caps on columns C1 of the TP1 platform.

The following week the 8" line between TP1 and CDP1 was pigged and tested. A leak was found on one of the flanged connections. Divers proceeded to repairs and pigging and testing was successfully completed on August 13.

Preparation for the pull-in operations of the 32" and 24" lines into TP1 have been completed.

1.4. CDP1 installation

The gantry crane was used as soon as July 1st to complete the dismantling of the Buzichelli mast.

It was tested to the required capability for the lifting of the modules on July 13 and 14.

The core cap was lifted and positioned on July 16.

The global schedule for the installation of the modules is as follows :

Modules	Vessel	Date of setting
PH1 (utilities)	BEN VIKING	July 16
BR2 (utilities)	TENDER CAPTAIN	July 17
SD1 (utilities)	" "	July 18
BR1 (utilities)	" "	July 22
PM4 (production)	DINO II	July 23
PM3 (production)	"	July 24
PM2 (production)	"	July 25
5A (drilling)	TITAN 9	July 26
6 (drilling)	"	August 4
4 (drilling)	"	August 5
3 (drilling)	TITAN 8	August 6
2B (drilling)	"	August 7
5B (drilling)	"	August 7
2A (drilling)	"	August 8

Modules	Vessel	date of setting
1 (drilling)	TITAN 8	August 10
WH1B (production)	KARMOY	August 8
WH1A (production)	"	August 9

Completion of the lifting operations occurred in 26 days. Weather down time came to 11 days.

The ringer crane for the dismantling of the gantry crane has been installed on August 13 and is operational. Work is progressing satisfactorily.

The hook-up of the modules has commenced: Production and drilling living quarters are habitable.

The ELF radio cabin was installed.

The test equipment for the 8" line was hooked-up.

THE TRANSFER OF RESPONSIBILITY FROM T.O.M. TO ELF, RELATIVE TO THE CDPI PLATFORM HAD EFFECT FROM 00.00 HOURS ON THE 14TH DAY OF AUGUST.

1.5. Treatment platform nr. 1 - TP1

During the week ending July 23, pancakes 7, 9, 10 and 11 were lifted onto the platform. The TB 90 was also placed in position for pull-in.

The internal work on tunnels of columns C1 and C2 were completed in preparation for pull-in operations.

Column C1

The column C1 was ready for 26" pull-in on July 21, final activities being the hook-up of Nitrogen system and testing, removal and re-installation of tunnel shims, additional tunnel anodes installed, dewatering pumps fully commissioned, TV cameras installed and commissioned and foam granulation completed.

The breaking of pull-in cable necessitated the re-installation of tunnel blind flanges by diver operation and dewatering of column.

The column was re-prepared for the R5 and R6 pull-ins and flooded. The tunnel blind flanges were removed August 10, and the 26" riser R6 pull-in was completed August 11.

Column C2

The preparatory works for the 32" and 24" riser pull-ins were completed July 28 and the column ready for flooding. Final works included modification to protect the pull-in cable from possible snagging.

Permanent modules

On July 18, the LB MEADERS removed the eastern retrieval pancakes and lifted and set lower deck units 7, 9, 10 and 11. The deck unit guides were removed and units secured prior to final tie-down. The support frame was prepared to receive permanent modules, main activities being the fabrication of new skid beams, welding of load point stiffeners to support frame(south end) and the remaining stiffeners were notched to allow uninterrupted passage of gripper jacks.

The MORLAND 6 arrived at Dusavik on August 5 with modules 01, 02 and 03. Module 01 was lifted on August 6 onto the deck of the barge ETPM 1601 for transportation to the Frigg Field. The barge ETPM 1601 lifted and set module 01 on the southern end of the support frame which was skidded in its final location.

The ETPM 1601 returned to Dusavik to pick up module 03 which was on board on August 13, and installed on the platform on August 16. Modules 02 and 06 were lifted on August 17.

Miscellaneous

The FIELDCO riser spools were lifted and stowed in location on column C2.

The pump/sump casing extension piece was lifted into position.

The works associated with the removal of the immersion bridge was removed from the structure on August 8.

The equipment required for hydrotest on the 8" kill line was loaded on and hydrotest completed.

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II. PRODUCTION FACILITIES - PHASE I

2.1. CDPl production facilities

2.11 Production modules

2.111 Rework PM2 - PM3 - PM4.

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

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 : 98%

Fabrication :

Some spool pieces intended to be used for the inter-connections of the modules are being fabricated on the DE GROOT site.

2.2. Treatment platform nr. 1 - TP1

The construction programme of the TP1 modules is at the present time complete, except for the bridge intended to connect TP1 with the QP platform.

The barge MORLAND 6 with modules 01, 02 and 03 left Antwerp on August 2 and arrived in Stavanger on August 6.

A MERCANTILE team intervened on the site and completed :

- the stubs of module 01 on August 7,
- the stubs of modules 02 and 03 and the reinforcements of the structure of module 03 on August 13.

The barge MORLAND 3 left Antwerp on August 11 with modules 04 and 05 and deck unit 06.

McDERMOTT-HUDSON corrected the drawings of the bridge between QP and TP1 taking in consideration the real relative positions of the two platforms after setting. The construction of the bridge started again at the end of the month. It should be completed in the last week of September.

2.3. Living quarters platform QP

2.31 Engineering of living quarters building

(McDERMOTT-HUDSON)

The detail work to complete the QP modules is still in progress in Bordeaux, it is mainly relative to :

- Various electrical work.
- Paint touch-ups
- Reinforcement of the temporary cladding on the interface of modules A and B.
- Fabrication of temporary supports for tropo dishes for module A.
- Fabrication of identification signs.

- Fabrication of various lifting aids.
- Stress-relieving cutting of pad-eye supports and re-fitting of eyes.

At the end of the month, the treatment of the air of module A in view of an extended storage is in progress.

The barge MORLAND 5 with module B and helihangar should leave Bordeaux on September 10.

2.32 Supervisory control and field communications

2.321 QP Modules

The functional tests - Phase II are nearing completion.

2.322 TP1 Modules

It was not possible to start work on interface room nr.2 in Antwerp, due to lack of time.

2.4. Lines and connections

The qualification of the hyperbaric welding procedure was completed. This procedure has been accepted and qualified with or without pre-stressing. Two welders only having passed these qualification tests, a new series of welder qualification was started in view of obtaining six qualified welders at the end of the month.

At the same time, tests to extend the welding procedure to -40°C for the Charpy value are in progress.

Engineering studies relative to stability and protection of the lines is in progress.

2.5. Telecommunications

2.51 Telecommunications with Norway

No progress this month.

2.52 Telecommunications with U.K.

The installation method of the tropo dishes has been definitely decided upon in agreement with T.O.M. and the corresponding work started in Bordeaux.

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III. PRODUCTION FACILITIES - PHASE II

3.1. Drilling platform nr. 2 - DP2

3.11 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%

The job file books are in progress and we plan to distribute this document on November 1st, 1976.

. Procurement

Procurement progress is 99%. The material delivered on site is reaching 93%, including steel. We are still encountering some difficulties with the delivery of the MAPEGAZ valves and EUROFILCO equipment (24 x 26" T)

. Fabrication

Total progress is 85%.

a) Framing construction

At the present time, we still have to carry out 23.000 man hours to complete the electrical and instrument works and 24.000 manhours to complete piping and mechanical works (tests not included).

Module 01 : 62,6 %	Module 03 : 84%
Module 02 : 93,5 %	Module 04 : 55%

Presently, all efforts are now centered in order to have the modules sea-fastened on barge by November 1st, 1976.



TCP2

01-07-76

3.2. TCP2 platform

3.21 Structure

3.211 Management

An informal discussion was held with NORCON relative to a claim concerning a bonus clause to the contract. ELF made NORCON a financial proposal for each of the three change orders for which an agreement had not yet been reached :

- Change order nr. 14 : Connection between shafts and deck.
- Change order nr. 26 : Slowdown of slipforming of cells at ELF's request.
- Change order nr. X : BROWN & ROOT impediment on NORCON operations.

3.212 Engineering

The main activities have been :

- Detailed investigations of the two possible solutions considered to ensure sufficient buoyancy in case of damage to one of the columns during tow-out.
- Detailed ducking of implosion risk during immersion in view of deck erection.

3.213 Construction

- a) The pre-stressing of cables in columns 1, 3 and 5 is achieved, except for 33 cables around the temporary openings in the shaft. The sealing of cables has been performed. The grouting of cables is completed in columns 1 and 5, except for the cables around the temporary openings.
- b) Upper rings for connection between shafts and deck, form works, templates and bolts have been installed.

Work on reinforcements was started in the three shafts.

- c) Installation of equipment in ballast cylinder is in progress. 79% of the work is complete.
- d) SYMINEX sensors have been installed under the slabs.

3.214 Support frame

Fabrication of the support frame was started at JULIN, ACB and SOCOMET. Welding procedures were completed at the various sub-contractors, who nearly all received the steel for completion of their part of the project. All shop drawings have been issued.

During August, a problem relative to hiring of welders arose, however, at the end of August, it seemed that all sub-contractors had enough hands to follow the fabrication schedules.

JULIN had to ask for help of two other companies belonging to his group FRANCE ENTREPRISE in order to meet a delivery date of December 31, 1976 for the green part. The two companies MUNCH and C.M.M. have already started welding homologation and received plates for cutting.

CMP (MARDYCK yard) also encountered a problem with the hiring of welders, however it seems that the problem has been settled and that they will be able to keep the delivery date for fabrication and assembly of the central square: end of December 1976.

At STORD, the fabrication is progressing with a one week delay for the first element which is to be delivered to CMP. This however is acceptable in view of an assembly of the central square in DUNKIRK.

The AKER/CMP joint venture should submit the details of the assembly procedure and a detailed schedule for the assembly of the three elements of the support frame in the dry dock at STORD.

The contract between NORCO and the joint venture will be finalized in September 1976.

3.215 TCP2 riser installationa) Cracks on tideguard protection of risers

After detailed discussions with experts (NPD - ELF - SOLUS SCHALL - AMERCOAT), it has been decided to remove the defective lining and to replace it with a new one. This procedure will apply to all internal and external risers.

b) Fabrication work

The removal of the tideguard lining on all external risers is finished.

c) Installation work

- . J-tubes have been installed up to level 35 m in columns 3 and 5.
- . The installation of supports at levels 75 and 95 meters for the sump caisson is in progress.

3.216 TCP2 temporary equipmenta) Management

The possible re-utilisation of temporary accommodations and helideck from QP and DP2 has been studied. After a detailed examination it has been decided to cancel the construction of module 66, which will be replaced by the DP2 temporary accommodations module. The re-utilisation of the DP2 or QP helideck is not feasible.

An amendment to contract E. 58 with H.D.W. has been prepared to cancel the construction of module 66.

b) Procurement

- . Purchase order for module 68 (accommodations) has been placed.
- . Bid tabulations have been submitted for :
 - Sewage treatment plant.
 - Diesel generator
- . Bid tabulations are in preparation for other equipments.

c) Engineering

- . Construction drawings for steel structure have been issued for construction.
- . Construction drawing for accommodation unit has been prepared .

d) Construction work

Work on the H.D.W. yard in HAMBURG has been started.

3.22 TCP2 treatment modules3.221 Structural design (job 2177)

- . Sales gas metering : The detailed design work on lift and erector installed items has been completed. Drafting is in progress.
- . Deck stiffening under sales gas metering in module 03 : The design work is complete.
- . Bridge : Work is proceeding on the design of the lifting frame and end bearings.
- . Pancakes 62-42-43 : Work is complete and drawings issued.
- . Generator package : All steel drawings have been issued. Minor modifications are in progress.
- . Pedestal for LP vent stack (module 04) : Drawings were issued at the end of August.
- . HP vent stack : Design of this item was started. The anticipated location is the north eastern area of module 03.

- . Stress analysis of module framing under lift and operational conditions : These were issued on July 20 and August 4. A meeting is to be held in London on September 2, 1976, to discuss the conclusions.

3.222 Process design (job 2169)

a) Process, mechanical and piping

- . Proposed general area firewater sprinkler systems have now been approved by NPD. Procurement and drafting are progressing satisfactorily.
- . We are still waiting for the approval from the NPD on items of the firewater system which are already installed on the TP1 platform.
- . Work is progressing on the review of vendor drawings and calculations for the sewage treatment plant and the heating, ventilation and air conditioning systems.
- . All MAPEGAZ valves have now been delivered to the site (VEROLME - ROTTERDAM). A quotation for nine additional valves for the metering system has been issued.
- . Modifications to the hydraulic power pack unit to comply with the NPD requirement for shutdown valve control is in progress.
- . The design of utilities piping is in progress. Drainage tie-ins are being discussed with KVAERNER/TECHNIP.
- . All problems with BROWN & ROOT relative to supply of material up to T.O.M. specifications are not yet solved.

b) Electrical

- . The onshore fabricator scope of work for power generator packages 08 and 09 was issued to S.B.V. on August 6.
- . The onshore fabricator scope of work for 05, 06, 07, 11 12 and 13 and the four modules is being issued.
- . The onshore and offshore fabricator scope of work is being internally reviewed and will be issued shortly.

- . The noise and vibration measurements of the generator packages will now be carried out by McDERMOTT on site with the intention of using a specialized company if necessary. The requisition for this work to ACOUSTIC TECHNOLOGY has therefore been cancelled.
- . During the month of August , the main efforts were directed towards having the largest possible electrical work and associated tests done at ORKANGER including testing of the turbo-generators.

c) Instrument

- . Specifications and drawings by COMSIP are in progress.
- . A meeting was held with ELF, McDERMOTT and DTI : the requirements relative to condensate metering were finally defined.
- . A draft of the scope of work for the onshore hook-up has been issued for internal review.

According to McDERMOTT (Monthly report ending August 15) the estimated percentage of completion is as follows :

Structural design and engineering	: 57%
Process design and engineering	: 63%
Project management	: 36%

This percentage is based on Cost Report from McDERMOTT (August issue).

There is a reduction on these percentages as compared to last month, because of the big increase in value in the cost report, which has not yet been justified by McDERMOTT.

In terms of actual estimated completion with reference to drawings and material on site, the estimated percentages are as follows :

Structural design and engineering	: 80%
Process design and engineering	: 85%

We did not accept this very large increase in value of the McDERMOTT cost report (August issue) and we are asking for detailed explanations on this change in estimates.

3.223 Construction of TCP2 treatment modules

1. Fabrication at Orkanger

The percentage of completion for the week ending August 15 is as follows :

	Work completed	Work anticipated on S.B.V. schedule
Structure	48,9	62,6
Piping	64,7	65,8
Equipment	60,6	68
Electrical	16,9	26,2
Instrument	0,35	9,9
Total	49,44	54,8

Manpower : 311 productive

39 staff

7 sub-contractors

357

The model made by FROST VINYARD left McDERMOTT HOUSE on August 27, 1976 and is due on site in September where it will be completed.

2. Fabrication at EGRSUND

Generator package 08 : Progress by KVAERNER BRUG was satisfactory and the load-out of this package was scheduled for Friday August 20. Unfortunately, the roof of the pancake was mishandled and fell from the crane hook, consequently the roof will have to be rebuilt. This is in progress as a crash operation and should be completed shortly without affecting the schedule.

3. The two fire pump houses will be built at KARMOEY STAALINDUSTRI. The testing of welders began on August 19, 1976.

4. The pancake 13 interface room structure is being fabricated at NYMO ENGINEERING A/S GRUNSTAD.

5. Schedule

During September S.B.V. will present ELF with an amended construction schedule taking in consideration the work performed up until now and the amount of work to be performed until the end of the contract. The result of the discussions will be reported in the next monthly report.

3.23 TCP2 compression

1. Management

Change orders Nr. 4, 7 and 9 were compiled in the form of amendments by KVAERNER TECHNIP and are at the present time being examined.

2. Engineering

Mechanical :

The proposals relative to turbines and compressors are being evaluated. Telexes were sent to the various vendors for additional information. Anomalies appear in the weight of equipments as indicated by the constructors.

Electrical :

The single line diagram was issued as a preliminary.

KVAERNER/TECHNIP supplied a report relative to the possible choice of electrical turbo-generation.

3. Procurement

. Meetings were held with five of the vendors who submitted a proposal for gas turbines. During these discussions, the payment schedules, the revision formulae, the general purchase and transportation conditions were examined.

. Proposals relative to compressors were sent in by :

- . ALLIS CHALMERS
- . CHANTIERS DE L'ATLANTIQUE
- . CREUSOT-LOIRE
- . DRESSER
- . ELLIOTT
- . SULZER

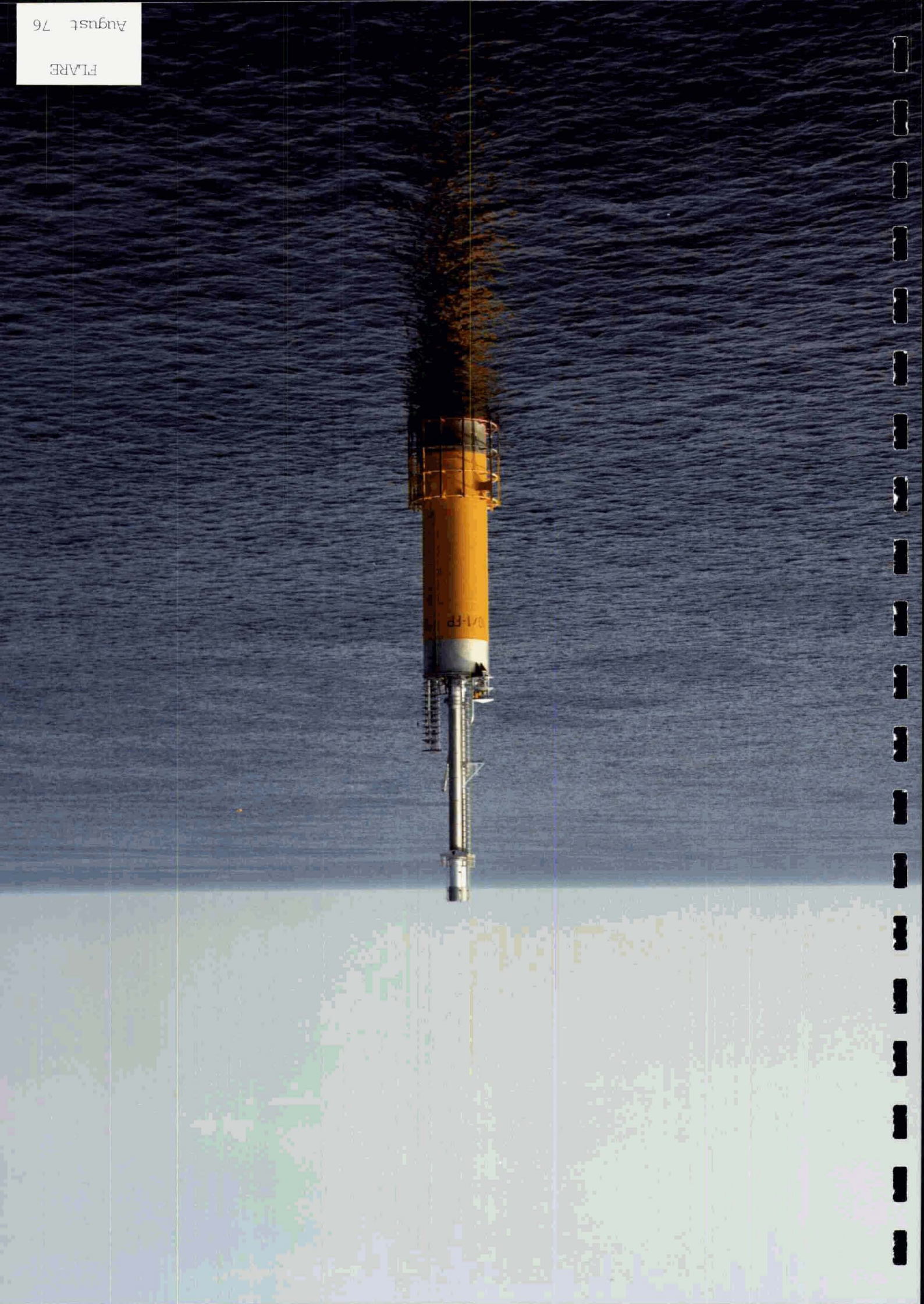
KVAERNER BRUG submitted an offer for the construction of a DRESSER compressor.

INGERSOLL RAND declined to bid.

These proposals are being examined and a programme of meetings with the vendors is anticipated for.

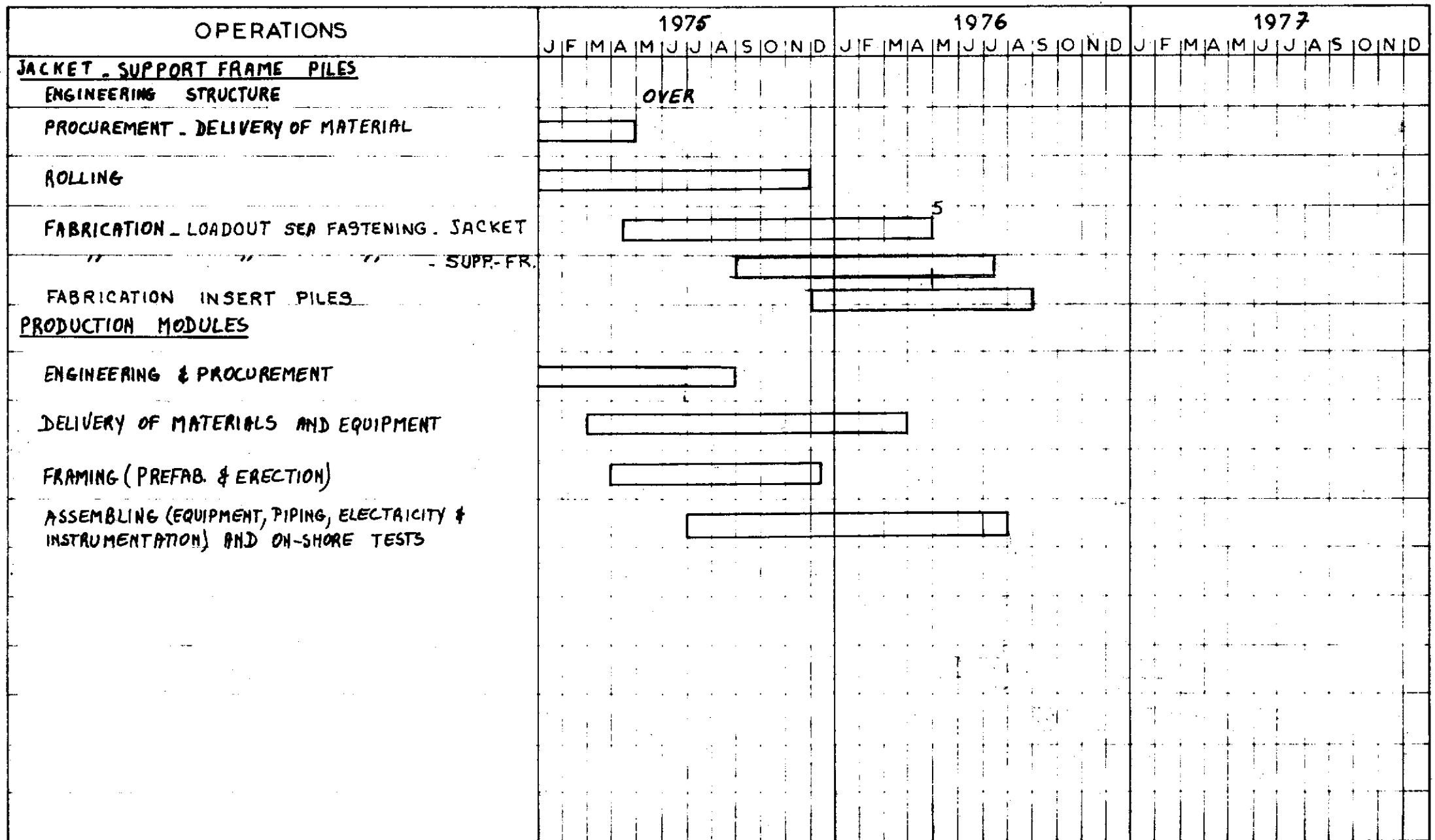
3.24 Lines and connections

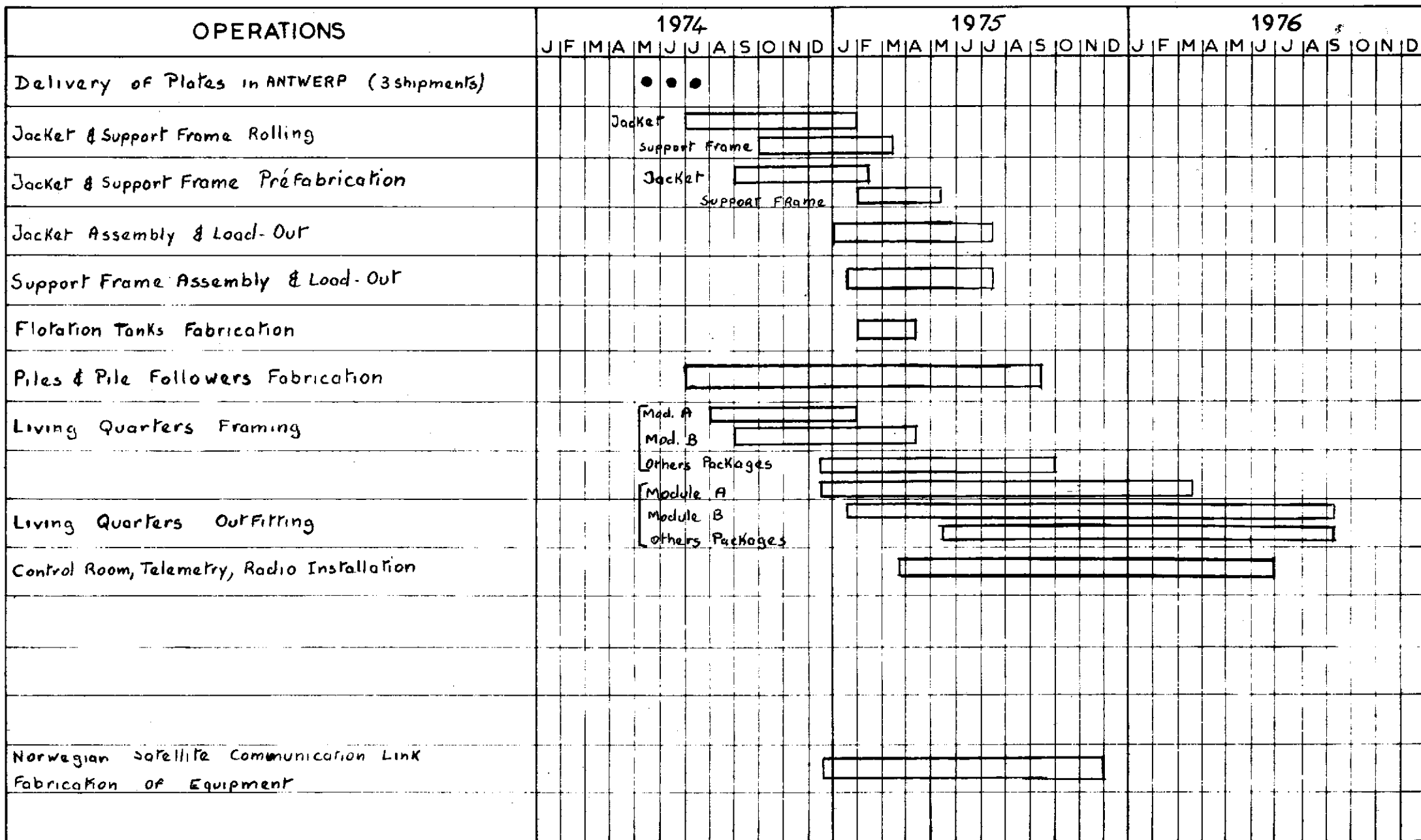
The coating of the pipes is in progress.



CDDP.1

CDP.1	CONCRETE DRILLING PLATFORM N°1	OF NORGE	FRIGG FIELD PRODUCTION FACILITIES	CDP.1
			ISSUED: AUGUST 31st. 1976	





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**

**elf
NORGE**

FRIGG FIELD
PRODUCTION FACILITIES
ISSUED: 31 AUGUST 1976

TCP 2

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 Rolling & 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 AUG 76

TP1

