RAPPORT
FRA
PRODUKSJONSTEST
AV "CLEAN SAND GAS ZONE"

BRØNN: 31/2-3

RIG: BORGNY DOLPHIN

statoil

RAPPORT

FRA

PRODUKSJONSTEST

AV "CLEAN SAND GAS ZONE"

BRØNN [redacted]

RIG: BORGNY DOLPHIN

20.000 8-77 Litografen 8927

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DATE	TIME	OPERATION
27/6-80		Schlumberger perforated the interval (8SPF)
28/6		Run backsurge test no. 1, 2, 3
1/7		Run gravel packer
2/7	14.00	Make-up B.H. sub. assemblies and begin R.I.H.
	15.45	Pressure test B.H. sub. assemblies
	16.15	Rig-up w/l and R.I.H. to retrieve s-1 plug
	17.00	POOH with S-1 plug, run 5" vam tubing
3/7	00.45	SSTT through rotary table
	04.00	Lubricator valve through rotary table
	05.30	Flow head on string
	05.45	Start to rig-up w/l
	06.35	Close lubricator valve
	07.30	Press. test w/l B.O.P.
	08.20	Start to run for dummy-run
	09.00	W/L out of hole
	09.18	Start to run with "Q"-test plug
	09.45	Close B.O.P.
	10.10	Start press. test
	11.40	Finish press. test
	12.10	W/L at surface
	12.30	Rig-up W/L lubricator & Stuff box

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DATE	TIME	OPERATION
3/7-80	13.30	Rig-up surface equipment
	15.45	Start press. test
	23.15	Start rig up W/L
	23.45	Shifting tool in lubricator & test lubricator
	23.55	Open lubricator value & R.I.H.
4/7	00.10	Open SSD & Pull out W/L
	00.40	W/L in lubricator - close lubricator valve
	01.15	Close swab valve
	01.18	Open lubricator valve
	01.20	Close kill valve
	01.25	Press test kill line
	01.40	Open kill valve
	01.43	Start on acid-stimulization
	02.45	Open flow-line valve
	03.00	Dowell stop pumping
	03.04	Close lub. valve
	03.05	Open lub. valve
	03.10	Dowell continue pumped
	03.25	Dowell stop pumping - 73 bbls pumben
	03.45	W/L in lub.
	03.50	Press. up lub. & open lub. valve
		Press on annulus to test SSD open
	03.55	W/L, start to run to clase SSD
	04.56	Open lub. valve
	04.57	Dowell start to bull-head 62 bbls

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DATE	TIME	OPERATION
4/7	05.55	Dowell, stop pumping-close lub. valve
	06.05	Sand bailer in lub.
	06.12	Run in hole with sand bailer
	07.20	W/L at surface
	07.20	Bleed down lub.
	07.30	Retrieve sand bailer
	07.35	Close swabvalve
	07.57	Open lub. valve
	08.08	Open well on 10/64" Adj. choke
	08.20	16/64"
	08.26	20/64"
	08.39	24/64"
	10.46	28/64"
	10.53	33/64"
	11.18	Switch flow trough sep.
	13.00	Changed to 32/64" adj. on heater
	16.52	By passed sep.
	17.36	Switched back to sep.
	22.47	Orifice up back to 32/64" fixed choke on choke manifo
	22.53	By passed heater
	23.02	Sep. by passed
	23.20	Switch through heather on 32/64" fixed choke
	23.25	Flow through sep.
	23.36	Changed orifice to 2.500

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DATE	TIME	OPERATION
5/7	04.02	32/64" fixed choke
	04.05	By passed heater
	04.19	Fixed choke 40/64" fixed choke
	05.08	Through heater 40/64" fixed choke
	05.23	3" orifice plate
	07.08	Switch flow trough sandtrap
	14.58	By passed Baker sandtrap
	15.17	48/64" at choke manifold
	15.25	Switch to heater choke 48/64"
	16.15	Change orifice to 3.500 inches
	19.38	Change to 44/64" adj. on choke manifold
	20.10	56/64" adj. choke on heater
	20.20	4" orifice
	22.05	Beaned up to 78/64 on heater
	22.08	4.5" orifice
	22.14	4.250" orifice
	22.35	Beaned up choke on heater
	22.45	Choke 86/64" on heater
	22.58	Bean up choke on heater
	23.05	Choke 96/64" on heater
6/7	01.08	Change choke to maximum (ID of sand spool 2.6875")
	08.45	Start injecting methanol and glycol at wellhead and SSTT.
	12.25	Shut in well at heater manifold
	12.34	Close lub. valve
	12.55	Open killvalve to bleed of lub.

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DATE	TIME	OPERATION
6/7	13.14	W/L string in lub. with S-1 RT to check tbg. drift
	13.19	Press up lub.
	13.22	Open lub. valve, RIH
	13.52	W/L string in lub.
	13.54	Close lub. valve
	13.59	Bleed down lub.
	14.08	Clock & Stylus on PE nr. 41673
	14.30	2 x Sperry-Sun + 1 Amerada in lub.
	14.36	Press up lub.
	14.41	Open lub. valve
	14.47	RIH
	14.57	Stop at 1062' for 5 min.
	15.14	Stop at 2529' for 5 min.
	15.25	Stop at 3503' for 5 min.
	15.37	In "F" nipple at 4512'
	15.39	POOH
	15.57	In lub with W/L string
	15.58	Close lub. valve
	16.03	Blead off through kill line
	16.08	Open lub. valve
	16.11	Close lub. valve
	16.15	Blead-off through kill line
	16.20	W/L tools out
	16.34	Kill valve and swab valve closed. Open lub. valve

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DATE	TIME	OPERATION
6/7	16.45	Open 3/8" choke on heater
	16.50	1/2"
	17.00	5/8"
	17.08	7/8"
	17.17	1"
	17.25	78/64"
	17.32	90/64"
	17.37	96/64"
	17.49	Fully open on heater choke
	18.30	Started injecting methanol and glycol at well head du to hydrate problems
	22.24	Shut-in at heater manifold
7/7	04.04	Close lub. valve
	04.30	W/L pulling tool in lub.
	04.34	Open lubricator valve & RIH to pull gauges
	05.17	W/L at surface and close lub.
	06.27	Clock and stylus on PE nr. 41673
	06.40	2 x Sperry Sun and 1 Amerada in lub.
	06.55	Start to run in hole
	07.05	Stop at 1062' for 5 min.
	07.23	Stop at 2529' for 5 min.
	07.36	Stop at 3503' for 5 min.
	07.51	Gauges landed
	07.53	POOH
	08.15	W/L at surface, close lub. valve.

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DATE	TIME	OPERATION
7/7	08.20	Bleed down lub.
	08.30	Press. up flow head
	08.35	Open lub. valve
	09.00	Open well on 1/4" choke on heater
	09.06	3/8"
	09.10	1/2"
	09.15	5/8"
	09.20	3/4"
	09.25	13/16"
	09.30	7/8"
	09.35	1"
	09.44	1 7/32"
	09.45	1 13/32"
	09.53	1 1/2"
	10.00	2.6875" (sand spool)
	13.25	Through Thornton manifold
	15.32	Well shut-in at heater
	16.55	Closed lub. valve
	17.37	Open lub. valve RIH 3 bombs
	17.57	Pull out with bombs
	18.18	Lub. valve closed
	18.21	Bleed off lub. and retrieve bombs
	20.38	2 x Sperry-Sun + 1 amerada in lub.
	20.40	Press. up lub.
	20.45	Open lub. valve and RIH

DATE	TIME	OPERATION
7/7	21.10	Landed gauges in "F"-Nipple & POOH
	21.54	Open well on adj. choke at heater manifold. Beam up adj. choke to 32/64"
	22.08	Through Thornton manifold
	22.19	Orifice 2.500"
	23.15	Bean up to 46/64" adj. choke
	23.17	Orifice 3.500"
8/7	01.00	First set of sep. samples
	01.50	Start injecting glycol
	02.40	Stop injecting glycol
	02.45	Second set of sep. samples
	03.10	Start injecting glycol
	04.00	Third set of sep. samples
	04.30	Forth set of sep. samples
	05.20	Increase choke to 60/64" adj. on heater
	06.35	Increase choke to maximum - 2.6875"
	08.00	Shut-in well at heater
	10.56	Close lub. valve
	11.05	Bleed down lub. and start to rig up W/L to retrieve gauges
	11.23	Press. up lub.
	11.25	Run in hole with W/L
	11.45	POOH with gauges
	12.06	Close lub. valve
	12.28	Bleed of lub.

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DATE	TIME	OPERATION
8/7	12.45	Rig down W/L
	15.00	Press rest Schluberger BOP.
	15.30	Rig up PCT
	16.33	Open sand trap manifold
	17.07	Open lub. valve
	21.07	Open lub. valve, RIH with PCT
9/7	00.08	Open well - bean up to 48/64" at heater
	01.30	Shut-in at choke manifold
	02.36	Schlumb. on surface, close lub. valve
	04.30	2 x Sperry-Sund + 1 Amerada in lub.
	04.32	Press. up lub.
	04.45	Open lubricator valve and RIH
	05.12	Land gauges in "F" - nipple
	05.40	W/L on surface, close lub. valve and rig down.
	05.55	Close kill-, swab-valve & open lub. valve
	06.00	Open well on 46/64" choke on heater
	07.02	Increase choke to maximum - 2.6875"
	08.02	Shut-in well at heater

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GRAVEL PACKING PRODEDYRE

Etter backsurge begynte en med gravel packing.

Kjorte "baker" gravel pack assembly med 5½" baker-weld liner.

Total vekt av utstyret en kjorte i hullet var ca. 5000 LBS.

Satte strengen forsiktig med en vekt på 3000 LBS.

Trykktestet Dowell linjene til 3000 PSI.

Sirkulerte 90 BBLS ren kalsiumklorid-"brine" (2 micron).

Satte 1 7/6" "kirksite" ball og ventet i 40 minutt.

Trykket opp drill-pipe trinnvis (1 minutt) 500 PSI.

Drog ut "Cross-over tool" ved å rotere 11 omdreininger mot høyre.

Opprettet "squeeze-", sirkulering- og revers sirkulerings posisjon.

Opprettet sirkulerings trykk- og rater:

100 PSI	-	2 BPM
200 PSI	-	3.15 BPM
300 PSI	-	4.1 BPM
400 PSI	-	5.5 BPM

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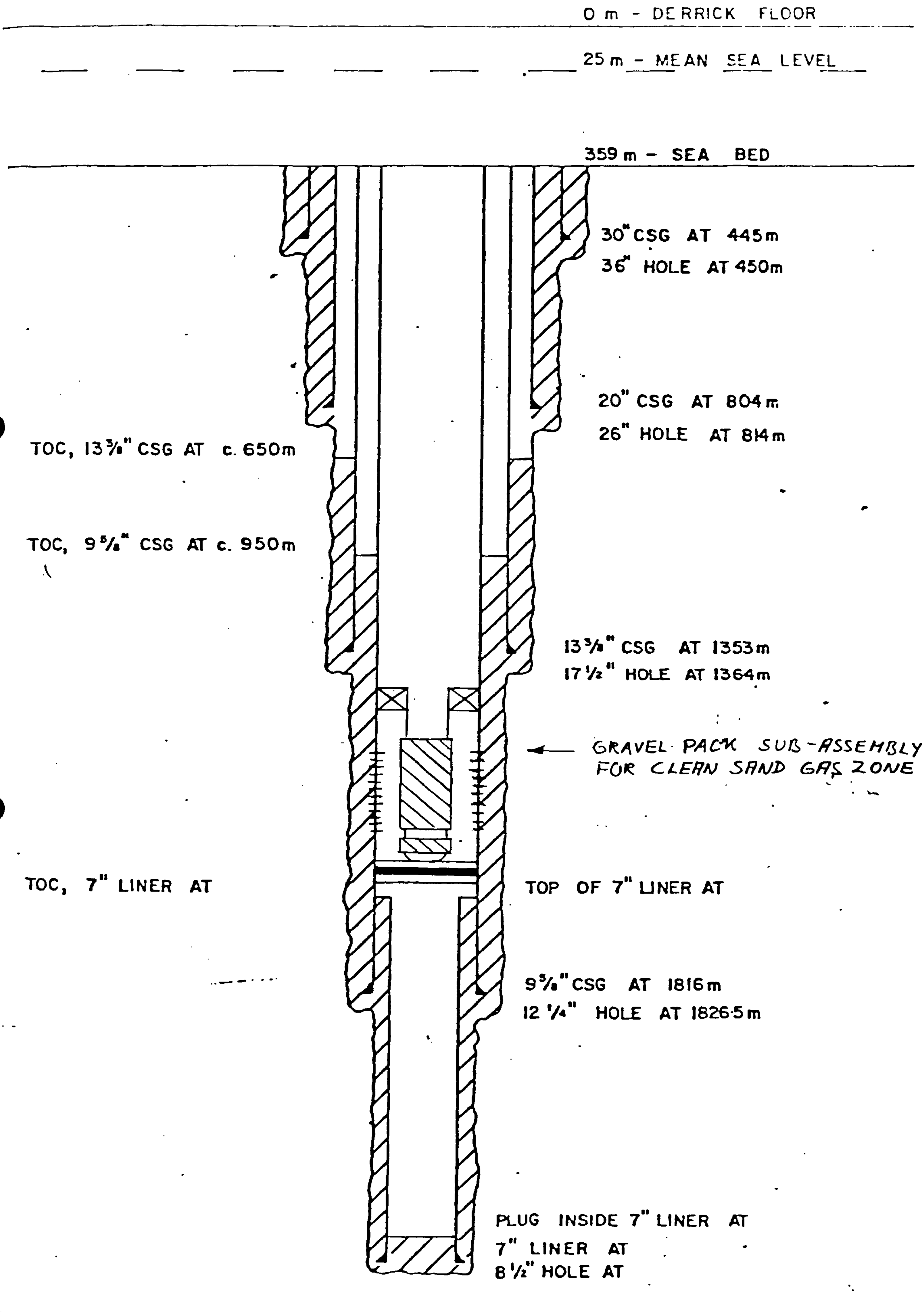
Opprettet "Squeezing" trykk- og rater:

260 PSI	-	1.15 BPM
390 PSI	-	1.75 BPM
500 PSI	-	2.25 BPM

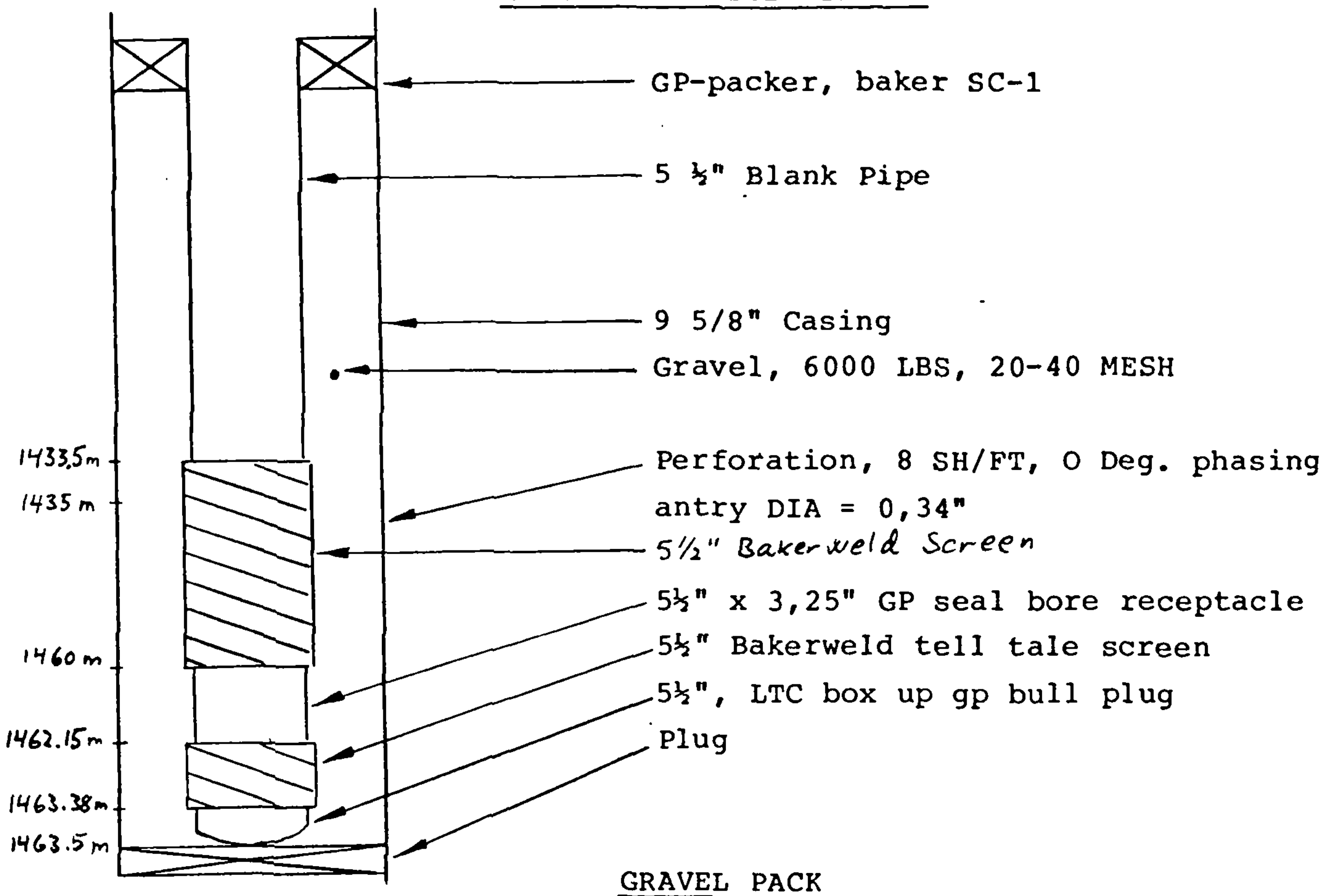
Volum pumpet ned i brønnen:

15 BBLS	prepad
24 BBLS	slurry (iblandet gravel)
5 BBLS	postpad
62 BBLS	ren kalsiumklorid med "GP-SUB ass." i sirkulerende posisjon.
8 BBLS	ren klasiumklorid med "GP-SUB ass." i "squeezing"-posisjon.
117 BBLS	Filtrert "brine" reversert ut. Samplet 500 LBS gravel - overskudd i "Gumbo Box".

WELL STATUS DIAGRAM, 31/2-3



GRAVEL PACK SUB-ASSEBLY



GRAVEL PACK

Gravel som ble brukt er fabrikert av Baker og er av typen "Low fine" (20-40 mesh) som "carrie" ble det brukt "waterpack" slurry, mikset med 6500 LBS Gravel.

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"SANDEC" SAND DETECTOR/MONITOR

Sandec er designet av Shell. Flopetrol har overtatt operasjonen av utstyret for å perfeksjonere det.

For å få opptimale avlesninger trengs det volumetriske eller masse-data som brukes til kalibrering av utstyret på stedet.

Utstyret på Borgny Dolphin ble ikke kalibrert.

Utstyret ble derfor kun brukt for å påvise om det var stor eller liten sandproduksjon.

Etter noen timers bruk stanset motor for skriveren. Panelet ble da skiftet ut med et reservepanel.

SANDEC: A SYSTEM FOR IN-LINE DETECTION OF SAND IN FLOW LINES

1 - INTRODUCTION

A substantial amount of all crude and natural gas production comes from reservoirs which require some type of sand control.

Management of this type of field calls for tools capable of early recognition and monitoring of sand production.

2 - THE SANDEC SYSTEM

The SANDEC system is a very sensitive sand grain counter. It is capable of detecting sand in gas, mist flow and single phase liquid flow. It consists of: (Fig.1)

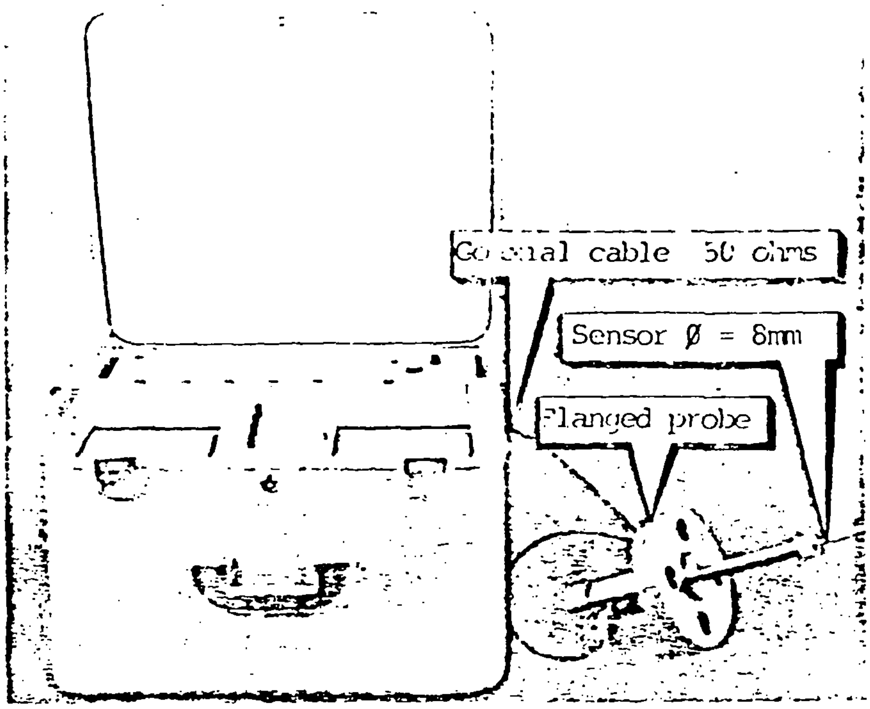
a. A probe, comprising:

- a sensor element
- electronic circuitry for conditioning the signal before transmission through coaxial cable.

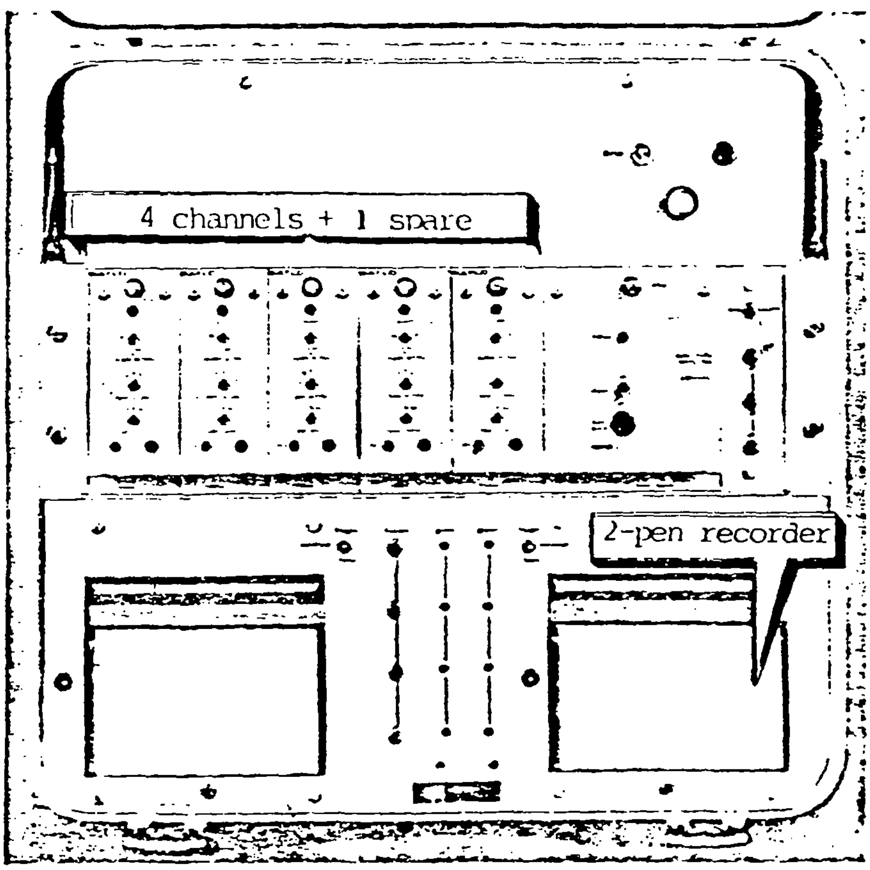
b. A processing unit, comprising :

- signal processing equipment,
- a read-out for the display and recording of both sand rate and cumulative sand production.

The probe has been made explosion-proof by application of a safety barrier (ener barrier) at the input of the processing unit.



a. Four-channel SANDEC system



b. Top view of processing unit

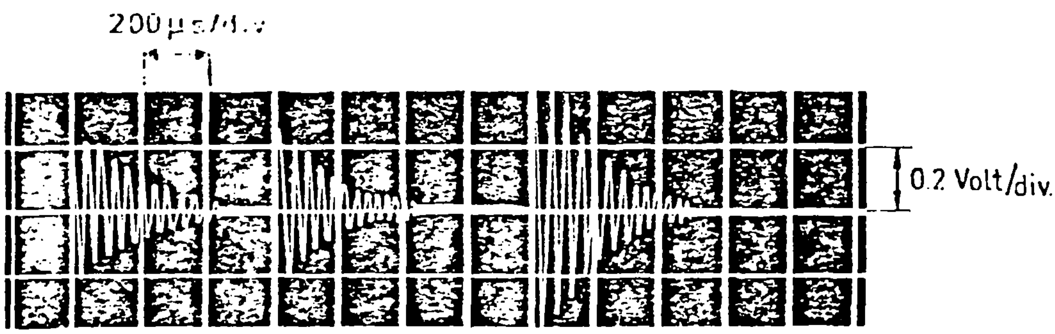
EXAMPLE OF SANDEC DESIGN

FIG. 1

2.1. Physical principle

A piezo-electric transducer converts a mechanical force into an electric signal. In SANDEC this phenomenon is employed for detecting the presence of sand particles in the flow lines.

A typical example of the electric response of a piezo-electric crystal to the impact of a sand grain is shown in Fig. 2. The impact causes a sudden deformation of the crystal which exhibits a damped mechanical oscillation. The associated oscillating tension over the faces of the crystal creates the electric signal.



RESPONSE OF PIEZO-ELECTRIC CRYSTAL TO SAND IMPACTS OF VARIOUS ENERGIES

Fig. 2

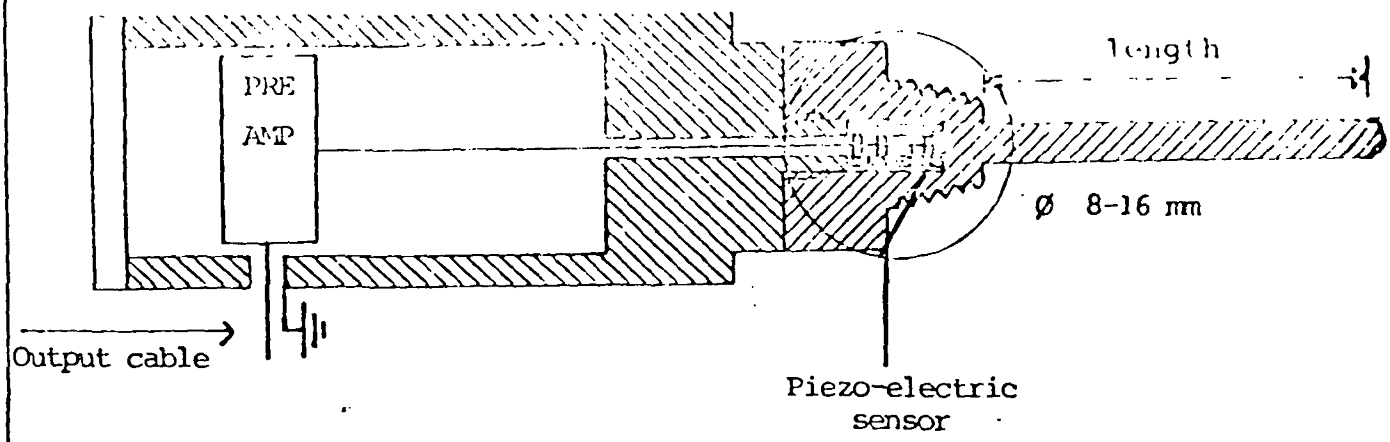
Sand grains in the stream can be detected as long as their impact signals are stronger than the background noise originating from the turbulent gas pressure variations over the transducer.

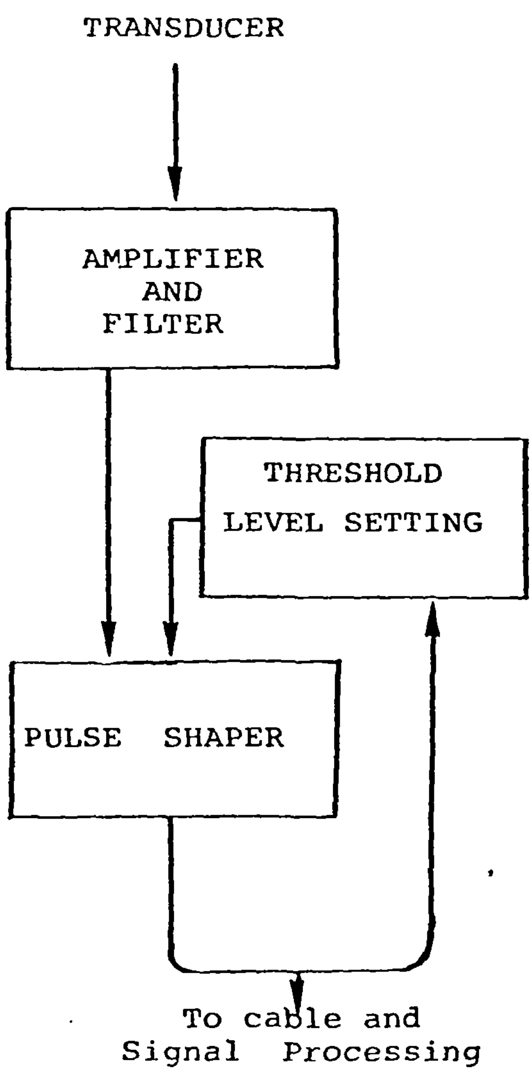
2.2. The SANDEC probe (Fig. 3)

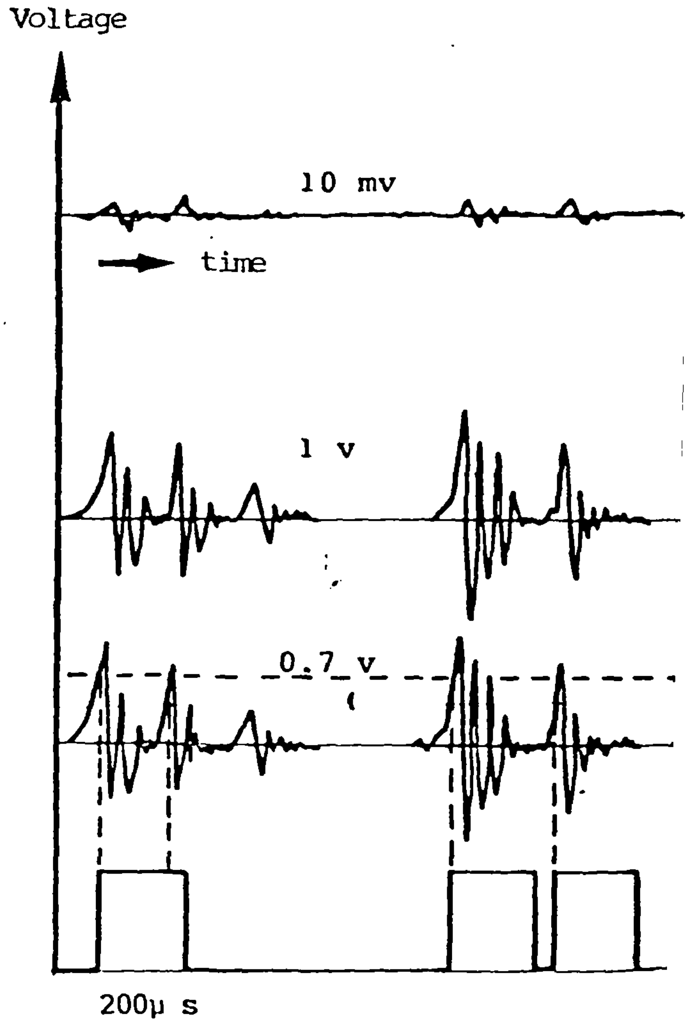
The probe consists of a steel sensor element, comprising the piezo-electric crystal, and a housing for a preamplifier. The transducer is spring-mounted in the sensor.

Its compact design includes a preamplifier as well as the discriminator and pulse shaper. The advantage of this design is that it allows probe location at any distance, say several hundreds of metres from the detection unit.

It also guarantees signal propagation free from interference, because the signal has been converted into standard pulses.







S A N D E C P R O B E

FIG. 3

A gate of 200 μ s will exclude the effect of the secondary peaks of an oscillatory signal generated by a single sand grain impact (Fig. 3)

Two or more impacts occurring within 200μ s will, however, be detected as one single impact only. For practical applications this is acceptable.

2.3. The SANDEC Signal Processor (Fig. 4)

Signal pulses from the probe are transmitted via a coaxial cable to the remote processing unit.

The signal processor consists of:

(1) A safety barrier (Zener diode circuits) preventing accidental high voltages from reaching the probe. The part of the system beyond the safety barrier is then explosion proof. (This barrier can be installed the main frame, if required.)

(2) A filter and a pulse amplifier

(3) A multivibrator to reshape the pulses

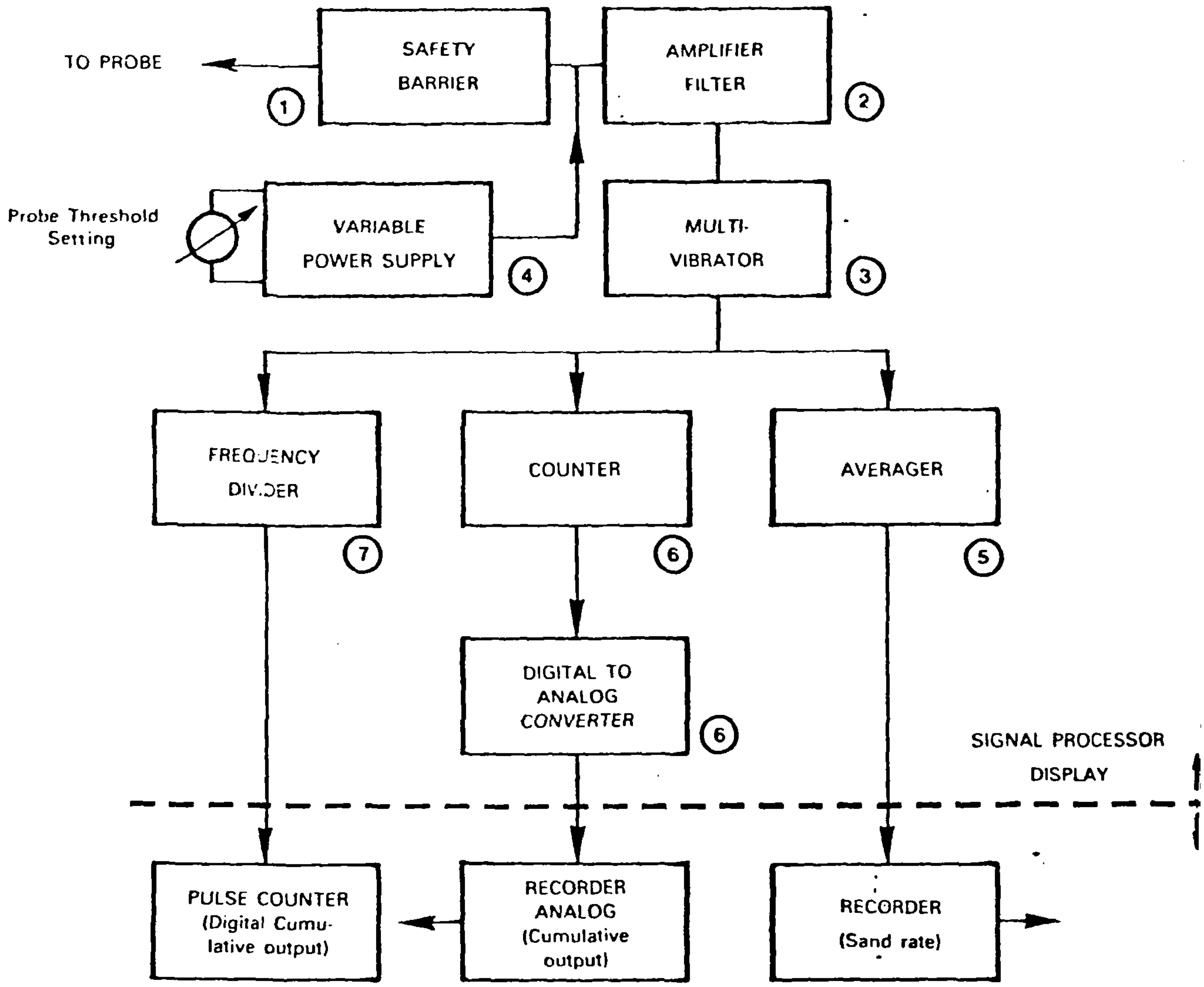
(4) A variable power supply which powers the probe and is also used to adjust the discriminator threshold by varying the supply voltage

(5) An averager giving an analog voltage representing the sand rate

(6) A counter and converter giving an analog voltage representing the cumulative output. Outputs of this circuit and of the averager can be displayed on recorders or further processed.

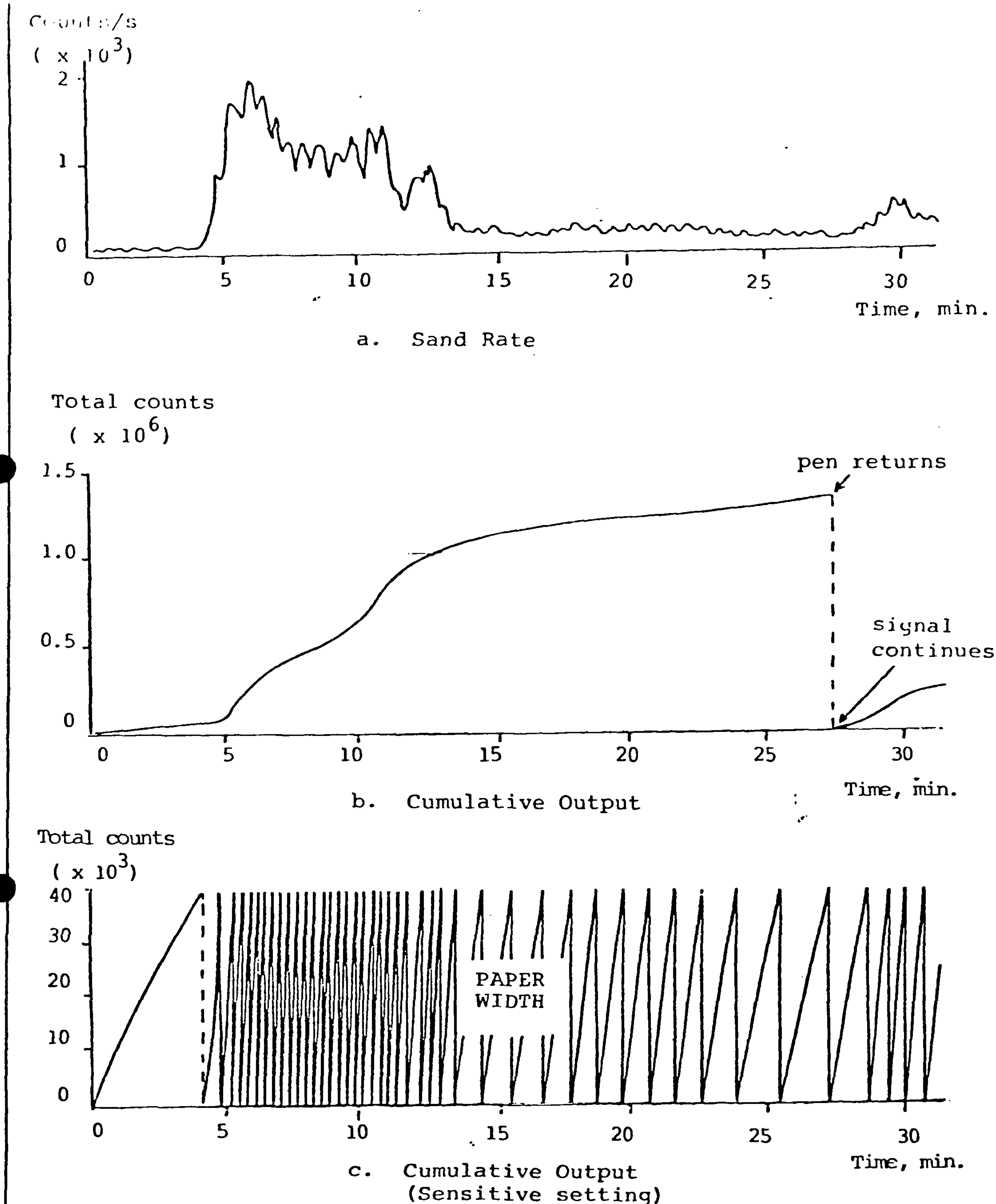
(7) A frequency divider supplying a frequency representing the cumulative output. This signal is usually displayed on a counter.

A typical SANDEC recording is shown on Fig. 5



PRINCIPLE OF SANDEC SIGNAL PROCESSOR

FIG. 4



EXAMPLE OF SANDEC RECORDING

FIG. 5

3. - CALIBRATION

SANDEC is an extremely sensitive sand grain counter when properly installed. The optimum position of the probe is in the vertical section of the flowline, where the sand grains are more evenly distributed, independent of flow velocity.

Sand counts made by SANDEC are, in principle, insensitive to variations in flow velocity. In practice, however, the impacts of very small grains at low velocity will not be detected and are thus not counted. In horizontal sections the sand grain concentration at the sensor is also dependent on the flow velocity.

If accurate volumetric or mass data is required it is essential to optimize the probe location on the site itself and to calibrate the system. Whenever possible, calibration should be performed using natural sand production and collection. If not applicable, artificial injection of sand will be necessary.

4. APPLICATIONS *

Some uses to which SANDEC has been put are briefly described in this section. These uses are:

- optimization of gas production
- sand failure tests
- testing of a sand consolidation technique
- production tests in gas-condensate wells.

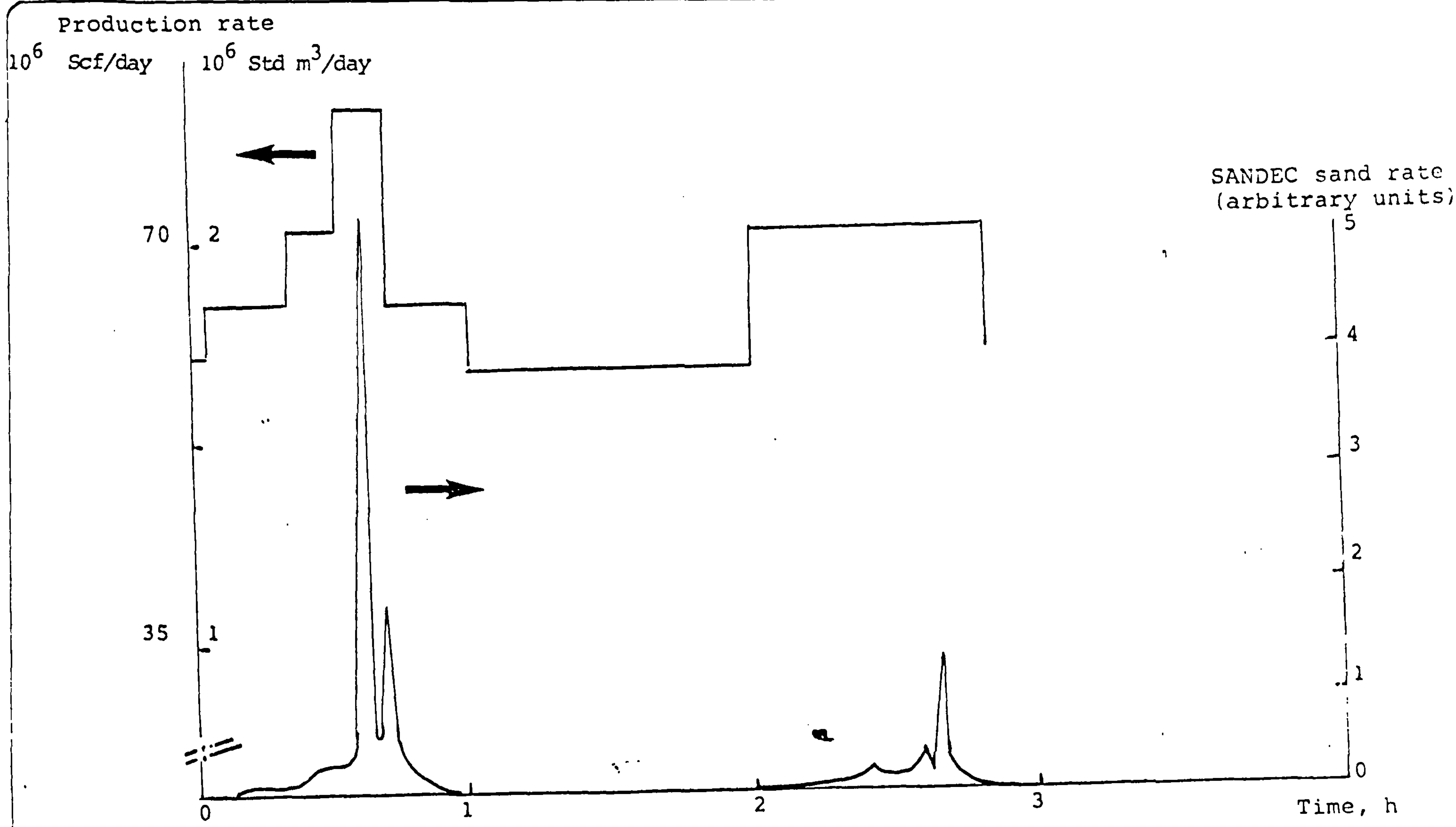
4.1. Optimization of Gas Production

A striking example of a SANDEC application is the optimization of the total gas production from a group of wells on an offshore platform. The objectives for the installation of SANDEC were:

- to establish the maximum production rate with sand production either zero or at an acceptable level,
- to provide an early warning of any increase in sand production,
- to identify sand producers and evaluate the need for remedial sand-exclusion treatments.

Figure 6 shows a typical example of a record of the sand production from one of the wells on the platform. It should be noted that sand was detected at the prevailing, rather low, flow velocities (less than 5 m/s, 16 ft/s). Before the installation of the SANDEC system, 2 500 litres (660 gallons) of sand were found in the platform facilities during the annual shutdown. After the installation of SANDEC equipment, the production of 6×10^6 Std m^3/day (210 MM Scf/day) was optimized for minimum sand production, and only 125 litres (33 gallons) of sand were collected during the next annual shutdown.

* Field tests reported in this brochure have been performed by Shell. Results and diagrams are published here by courtesy of Shell.



PART OF SANDEC RECORD OF OPTIMIZATION TEST

FIG. 6

4.2 Sand Failure Tests

The objectives of sand failure tests are to assess:

- the conditions at which sand production initially occurs,
- the amount of sand produced and how it changes with time,
- whether, and under what conditions, formation stabilization occurs after initial failure of the perforation holes.

To achieve these objectives, the use of sand detection equipment is essential.

An example of the equipment layout for such a test using SANDEC probes installed in a specially designed 4" test circuit is shown in Figure 7 A.

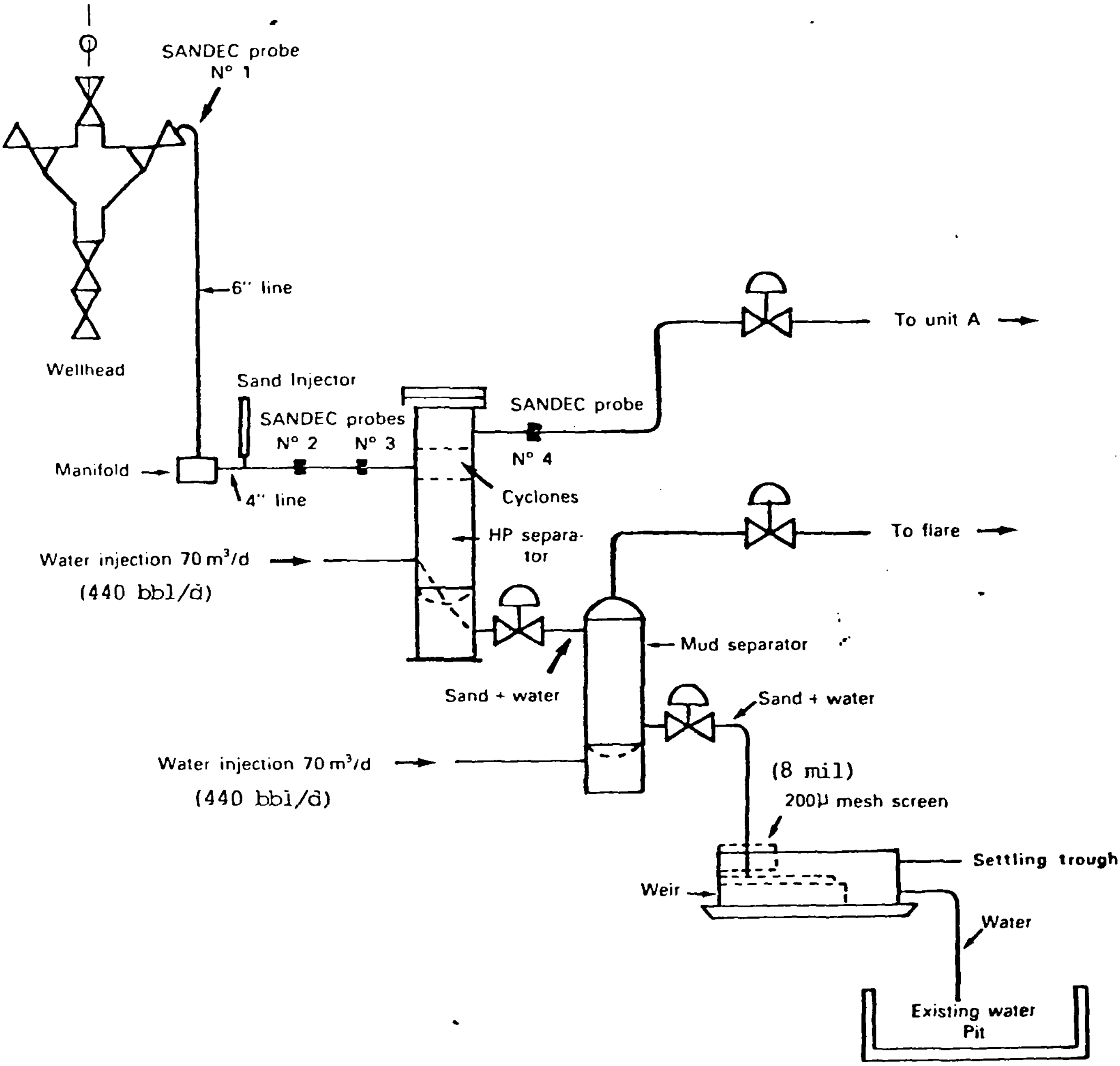
A sand injector was used to calibrate the SANDEC probes. The sand catcher allowed accurate measurement of the amount, and grain size distribution, of the sand produced. This method of sand collection also proved to be a satisfactory calibration method for the SANDEC (Fig. 7 B).

Some SANDEC recordings are shown in Figures 7 C and 7 D.

In Figure 7 C increasing sand production is seen to correlate well with changes in production conditions.

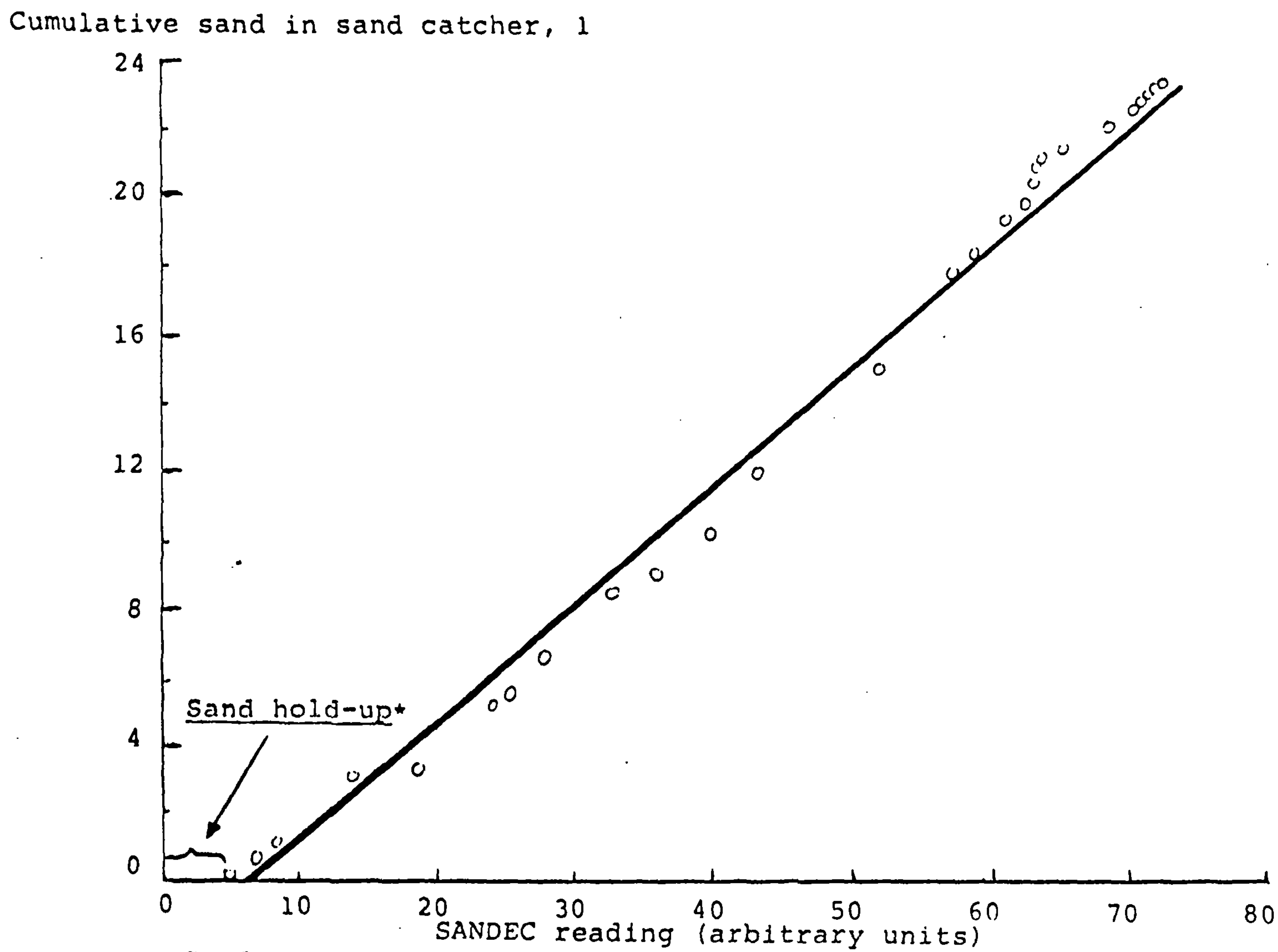
Also note that there is a tendency for stabilization towards lower sand rates with time.

Figure 7 D shows that sand-free production can be obtained.



FLOW SCHEME FOR SAND CATCHING

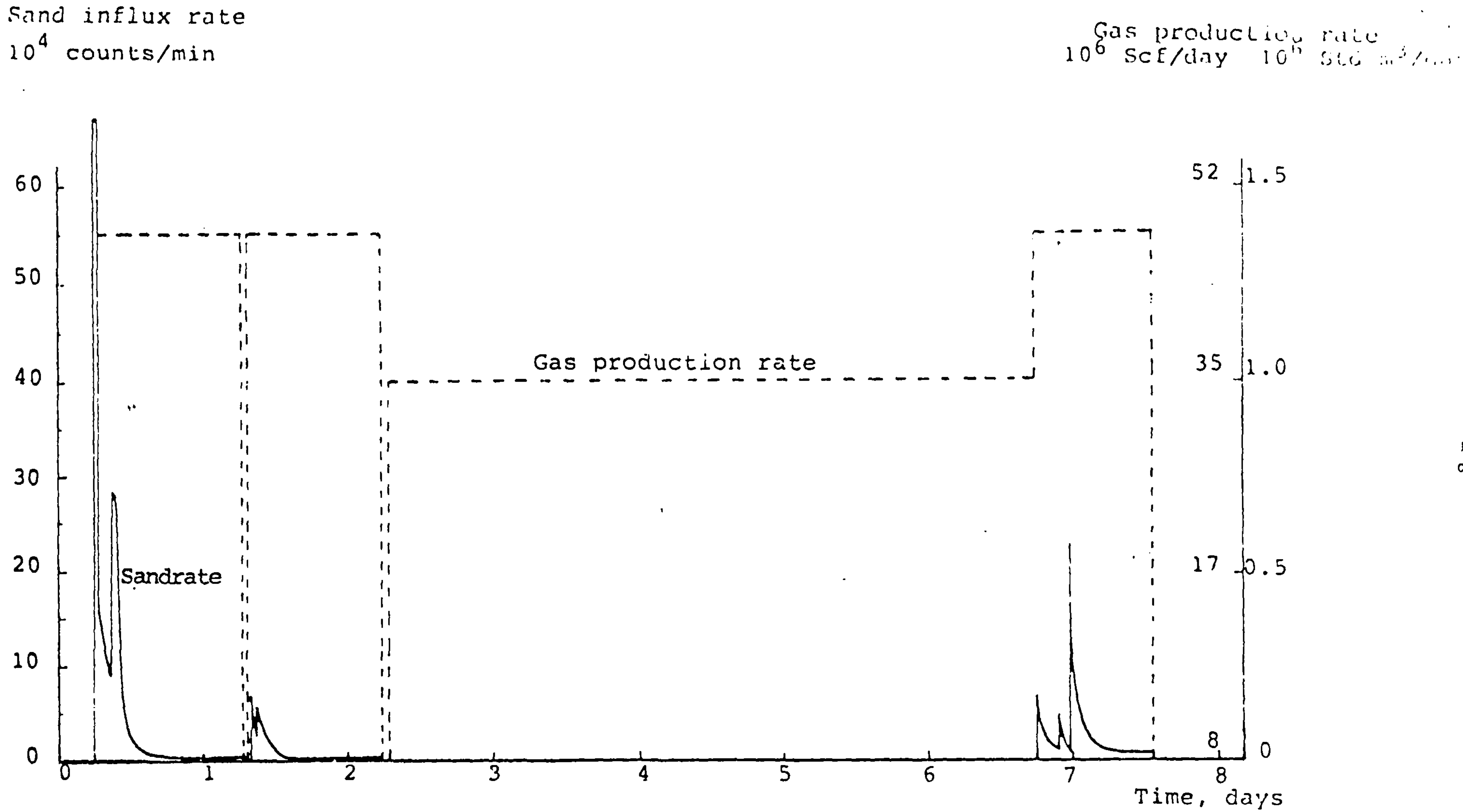
Fig 7-A



*Sand trapped in surface flow lines at beginning of injection.

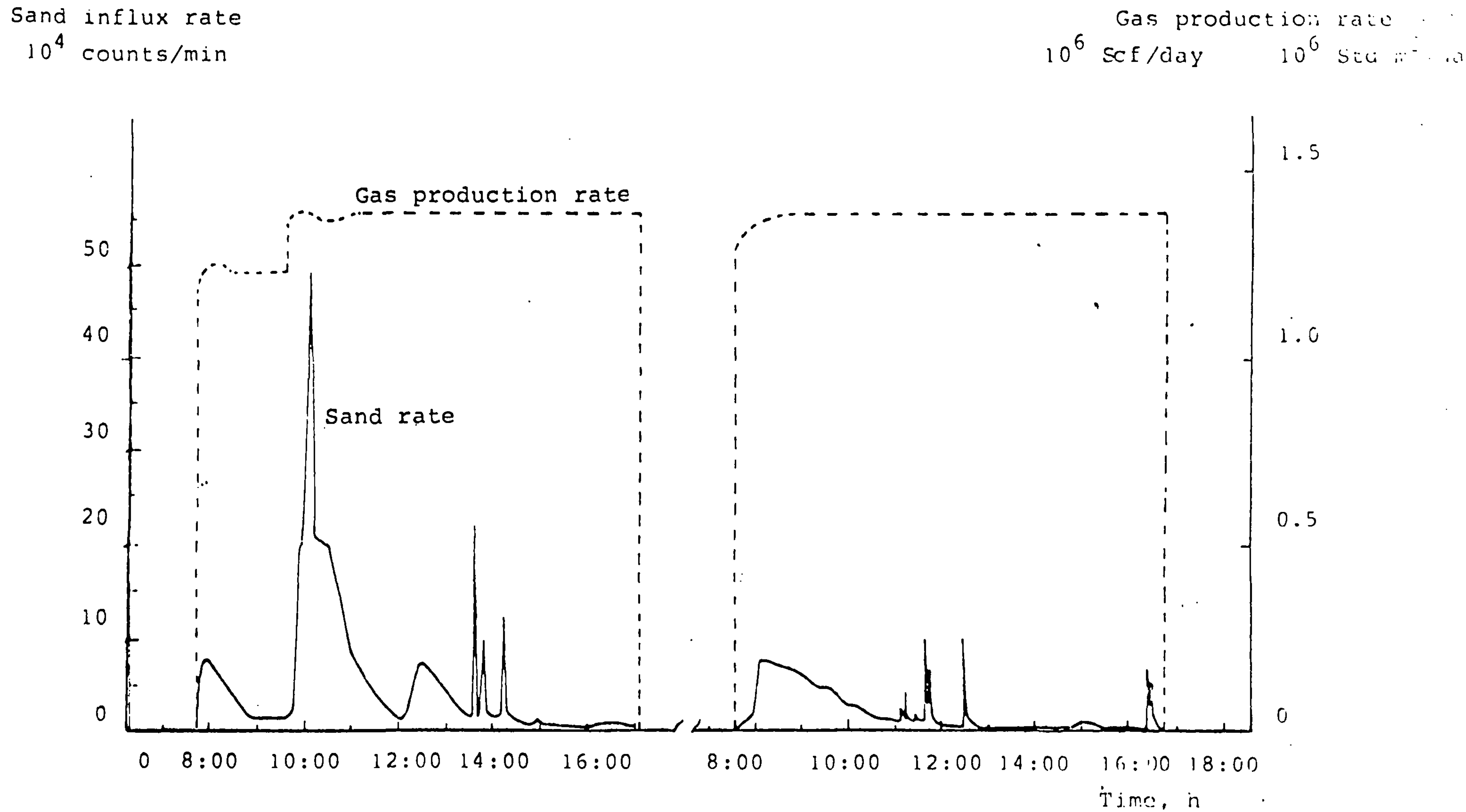
CUMULATIVE SAND EX SAND CATCHER VERSUS CUMULATIVE SANDEC READING
(first five days of sand-failure test in a well)
(1975)

FIG. 7-B



PART OF SANDEC RECORDING DURING SAND FAILURE TEST

FIG. 7-C



PART OF SANDEC RECORDING DURING SAND-FAILURE TEST

FIG. 7-D

4.3 Testing of Sand Consolidation Techniques

A new technique for sand consolidation was tested in a well known to produce sand and which had been used previously to prove the SANDEC technique.

The results of production tests before and after the sand consolidation treatment are summarized in Fig. 8 where both gas and sand production rates are plotted. Although some sand production was observed during the first few days after sand consolidation treatment, the well could be produced sand-free at a later stage at higher rates than possible prior to the treatment (days 28 - 31).

The cumulative amount of sand produced over the whole testing period was only 7 litres (1.5 gallons), illustrating the high sensitivity of SANDEC.

4.4 Production Tests in Gas-Condensate Wells

SANDEC has been applied also during production tests of gas-condensate wells. The condensate gas ratios (CGR) of the well tested have ranged up to 900 $m^3/10^6$ Std m^3 (170 bbls/10^6 Scf). Results of tests in two wells are illustrated in Figs. 9 and 10.

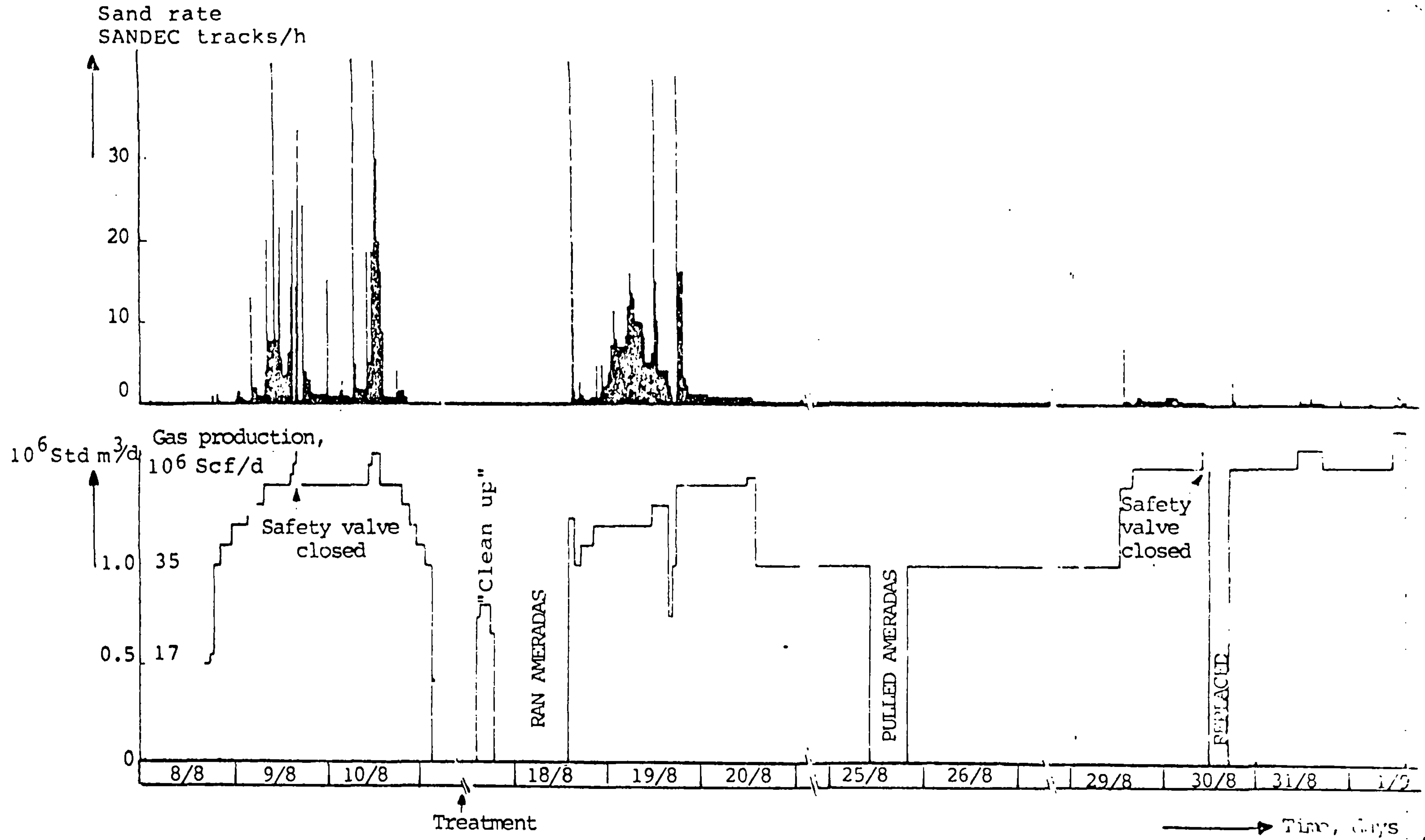
In the first well (CGR = 900 $m^3/10^6 m^3$) only a very limited amount (20 cm^3) of sand was produced. The greater part of this was produced during a period of excessive production that occurred during bean-up from 1.5 to 2.0 x 10^6 Std m^3/d (50 to 70 Scf/d) for some 20 minutes. (Fig. 9). This incident, caused by a failure in the control of the gas-flow control valve, illustrates the benefit of continuous sand detection. It clearly proved that this short, uncontrolled bean-up had not caused any serious sand production, and in this case there was no reason for concern about excessive erosion.

In the second test (Fig. 10) SANDEC clearly detected sand although again the amount of sand produced was small (approx. 1 kg, 2.2 lbs).

At low production rates, only a limited volume of sand was produced in a very short period at the moment of beaning-up ; this sand had probably been held up in the flow line during the previous producing period (Fig. 10-A).

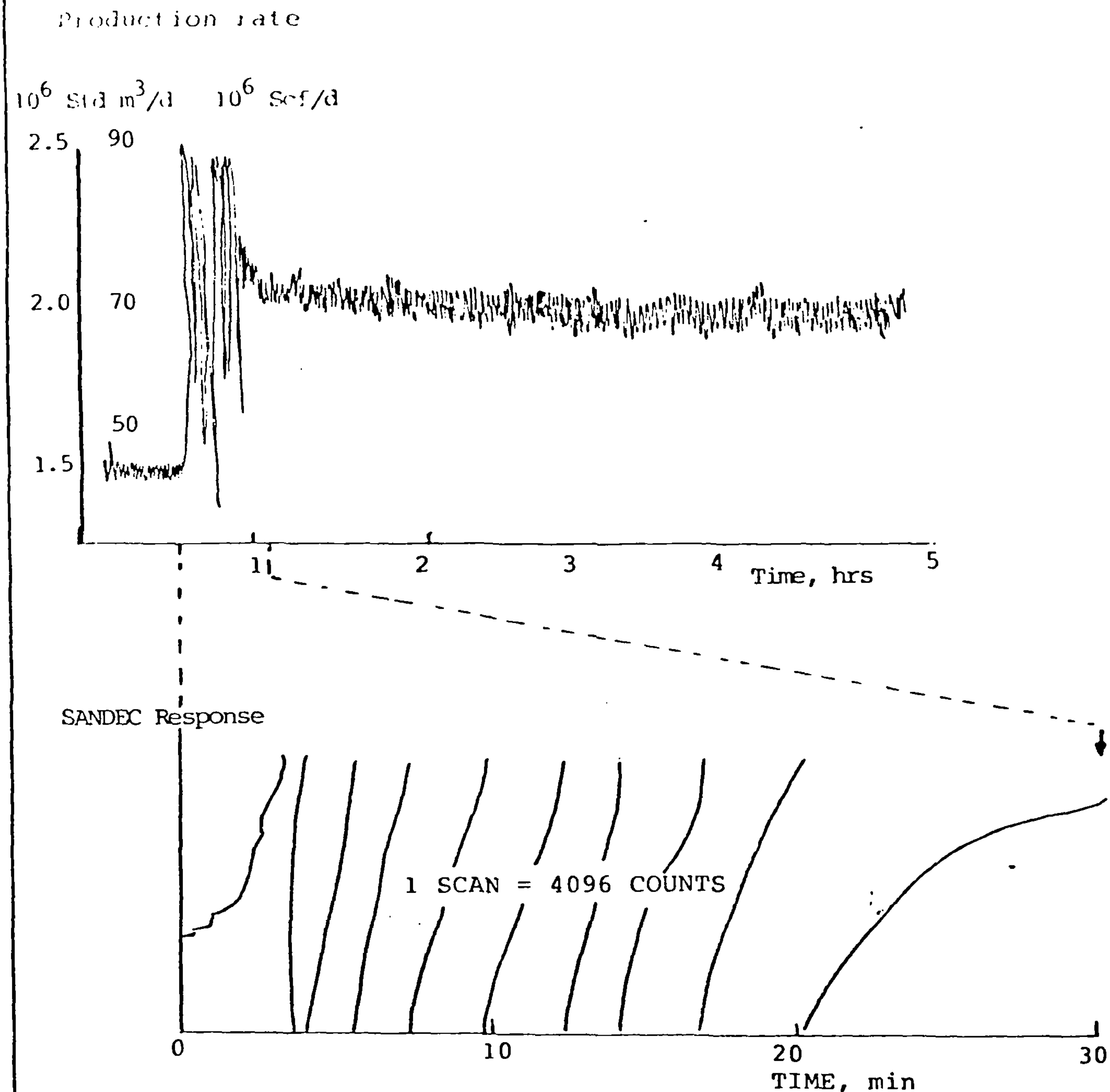
At higer production rates, a limited sand peak was seen some 5 to 10 minutes after the bean-up. This was no doubt caused by the increased drawdown (Fig. 10-B).

At the highest flow rate of the final flow period, more prolonged sand production was observed. Over the first 40 minutes at this rate, some 0.25 kg (0.5 lbs) of sand was collected. (Fig. 10-C).
After this, the sand rate decreased again.



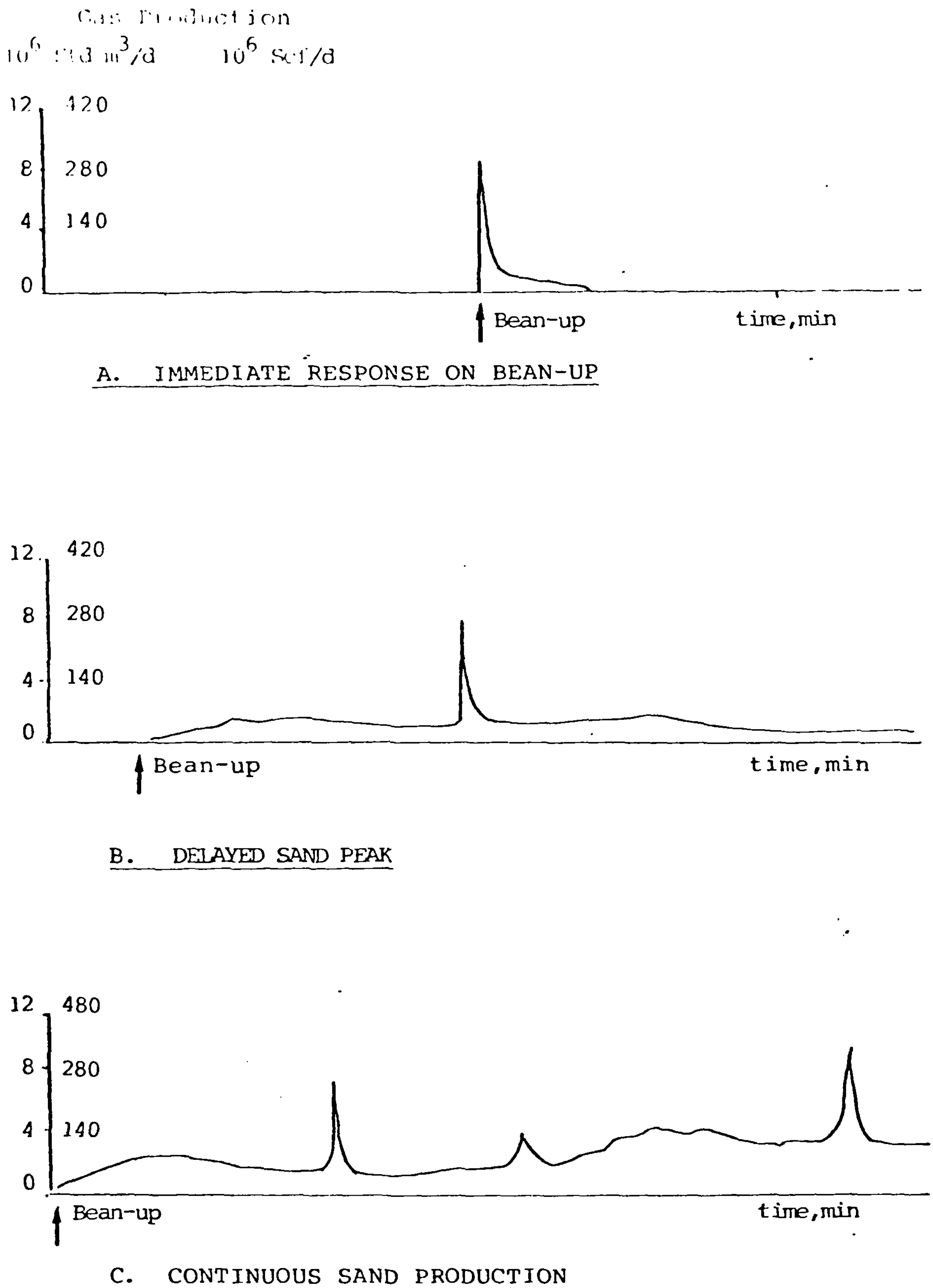
PRODUCTION TEST OF TREATED INTERVAL IN A WELL

FIG. 8



SAND PRODUCTION CAUSED BY UNINTENTIONAL PRODUCTION PEAK DURING BEAN-UP FROM 1.5 TO 2 x10^6 Std m^3/d (50 to 70 10^6 Scf/day)
(CGR = 6000 scuft/bbl)

FIG. 9



EXAMPLE OF SANDEC RECORDING DURING GAS PRODUCTION TEST
(CGR = 12500 scuft/bbl)

FIG. 10

5.3. Other Configurations

More sophisticated systems are sometimes required and are designed on specific requests.

6 - RECOMMENDATIONS FOR LOCATION OF PROBE

A typical installation is shown on FIG.13 . It consists of probes, transmission cable, safety barriers and processing electronics.

Probes should be installed in vertical sections of flowlines whenever possible to reduce the influence of velocity on sand grain repartition.

When this is not feasible and probe has to be installed in a horizontal section, the influence of velocity has to be taken into account. If a low velocity is expected, the probe should be placed upside down (FIG.14) to make sure that sand grains rolling on the bottom of the pipe are detected.

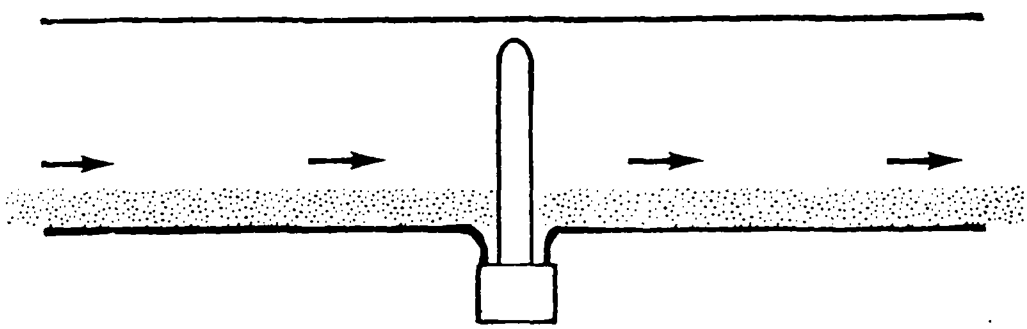


FIG. 14

Very high velocity should also be avoided for two reasons:

- It is more difficult to distinguish sand grain impacts from the environmental noise. The signal to noise ratio should be as high as possible. A typical value would be around 3 to 4.

- In case of a mist flow which is the most usual case, it is important to be able to differentiate between the impact of a sand particle and a liquid droplet.

  When velocity goes up, it becomes increasingly difficult to distinguish the impact of a droplet from a small size particle as shown in FIG. 15 .

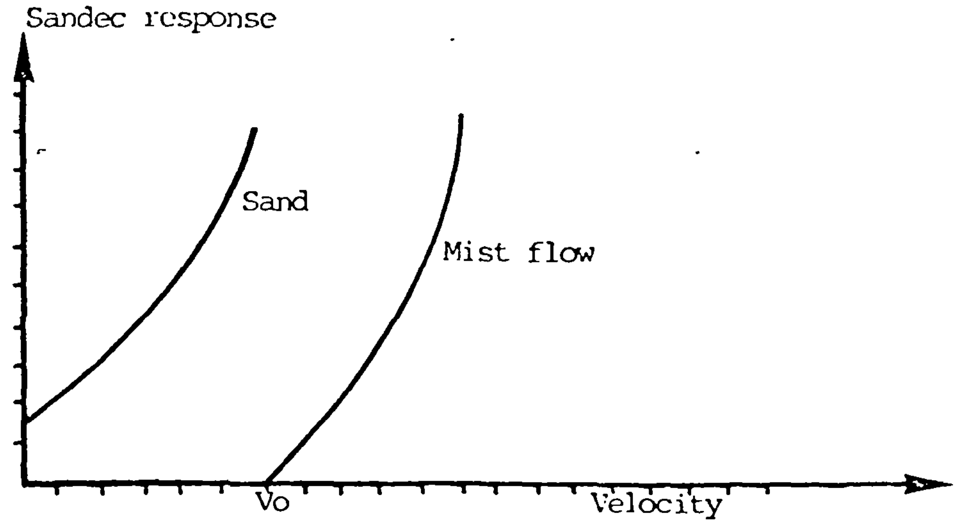


FIG. 15

The value of Vo is usually around 20m/s (66 ft/s) but this has to be evaluated in each set-up during the optimization of this system.

After a choke, it is essential to have a straight section of approximately 4-5 m (10-15 ft) to eliminate turbulence. However, positioning of probes is dictated by individual layout and on site tests are essential to optimize the location of the probe.

7 - INSTALLATION PROCEDURE

Before equipment is installed, the user should have pipe fittings welded in place. Probes will have been also installed if there is no shut down at time of installation. Customer will also make provision for the installation and protection of the cable. FLOPETROL will provide one Engineer and one Technician to lay the cable through pre-arranged routing paths, install and start up the electronic equipment.

On Customer's request, FLOPETROL will supply a team to optimize the system by evaluating various probe locations and possibly assist the customer in calibrating its system by measuring natural sand production or artificially injected sand.

statoil

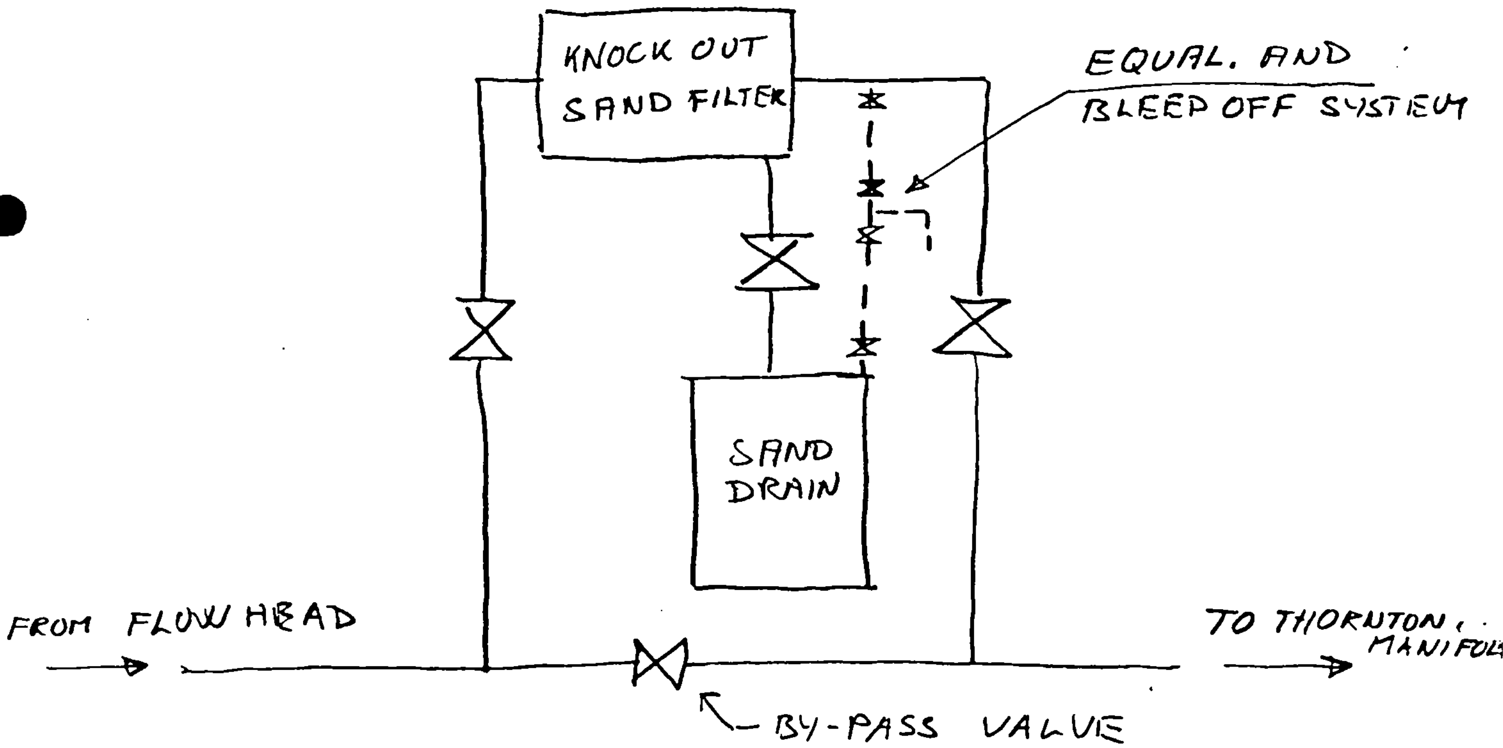
BAKER SAND-TRAP

"Baker sand-trap" ble brukt for å samle opp event. sand gjennom en "flow" periode og deretter tømming av "Drain" for inspeksjon og mengde-måling.

Ved trykktesting før oppstart var det problemer med lekasje i "sandfilter" og "drain". P.g.a. liten sand-produksjon og problemer med trykktestingen ble ikke "drain" opnet for rengjøring etter hver "flow" periode.

Det ble antatt at "flow" gjennom sandfilter medførte et betydligt trykktap.

BAKER SAND TRAP



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THORNTON MINI-RAFENERI

Systemet består av to enheter. En manifold og en LAB-konteiner.

Manifoldens funksjon er å blande gas/kondensat for å få representative prøver. Manifolden er fabrikert av Flopetrol etter spesifikasjoner fra Shell.

Lab-konteineren inneholder et prosessanlegg med blant annet et to-trinns separasjons-anlegg.

Prøvene ble tatt 8/7 i perioden fra kl. 01.00 til kl. 05.20. Flopetrol tok 4 sett separator-prøver i samme perioden. Dette for å få sammenligne prøvene. I denne perioden var gassraten ca. 20 MMSCF/D og LGR ca. 1.5 BBLS/MMSCF.

Neste side er en liste over data en samler inn i prøvetaking-perioden. På grunnlag av innsamlet data kalkulerer en komposisjon av hydrokarbonene og andre egenskaper av gass og kondensat.

1ST-STAGE SEPARATION

Temperature .... °C
Pressure .... lbf/in²
Gas well flow rate .... mmscf/d
Calculated isokinetic sampling rate .... ft³/min
Sampling time ....min........... s
High-flow gasmeter reading (EOT) .... ft³
High-flow gasmeter reading (SOT) ....______ ft³
Volume of gas treated ....______ ft³
High-flow gasmeter vent temperature .... °C
High-flow gasmeter vent back-pressure .... lbf/in²

FLASHING OF 1ST-STAGE CONDENSATE

Water gasmeter reading (EOT) .... litres
Water gasmeter reading (SOT) ....______ litres
Volume of flashed gas ....______ litres
Water gasmeter water temperature .... °C
Volume of vented condensate .... cm³
Temperature of vented condensate .... °C

SAMPLES

Vented condensate
Flashed gas
Final gas (if only one stage of separation required)

CONDENSATE DENSITY DETERMINATION (1st-stage separation conditions)

Wt. of density vessel + buffer vessel + condensate (EOT) .... g
Wt. of density vessel + buffer vessel (SOT) ....______ g
Wt. of condensate ....______ g
Volume of density vessel .... cm³

2ND-STAGE SEPARATION

Temperature .... °C
Pressure .... lbf/in²
Low-flow gasmeter reading (EOT) .... m³
Low-flow gasmeter reading (SOT) ....______ m³
Volume of gas treated ....______ m³
Low-flow gasmeter vent temperature .... °C
Wt. of vessel charged (EOT) .... g
Wt. of vessel charged (SOT) ....______ g
Wt. of condensate at TC ....______ g
Wt. of vessel vented (EOT) .... g
Wt. of vessel vented (SOT) ....______ g
Wt. of condensate vented ....______ g

SAMPLES

Vented condensate
Final gas

statoil

Det ble diskutert om brønnen skulle plugges og sirkulere "brein" gjennom SSD eller "drepes". Det ble senere bestemt å "drepe" den.