

4506

8th November, 1966.

Scottish Gas Board,
Distribution Department,
29 Waterloo Place,
Edinburgh 1.

Attention: Mr. Strang.

Dear Mr. Strang,

Cousland Natural Gas Well

With reference to our recent telephone conversation, I am writing to confirm the position regarding the repacking of the 3" M.V. on Cousland No. 1 well.

Mr. Braddock of Bolton's Superheater and Pipe Works Ltd. (i.e. the valve manufacturers) affirms that the valve in question can be repacked under pressure. He stated that the closed in pressure should be below 1000 p.s.i.g; the valve should be tightly closed and then 'trapped pressure' in the valve body be slowly bled down through the drain plug in the base of the valve. The packing (1 $\frac{1}{2}$ - 1 $\frac{3}{4}$ graphited asbestos) can then be replaced.

I have written to Mr. J. Gibson concerning the proposed work, and I feel sure he will be willing to assist in any way possible if you contact him. I enclose a copy (apologies for the rather poor reproduction) of the manufacturers drawing of the valve, and I will forward to you another copy when these are to hand.

Please let us know, at your convenience, the results of work on the valve, and do not hesitate to contact us if you require further assistance.

Yours faithfully,
for BP PETROLEUM DEVELOPMENT LIMITED.

cc: Manager.
Mr. Adcock. ✓
Mr. McColm.
Mr. J. Gibson.
Mr. H. Jones (BP Grangemouth).

K. S. Collinson.

KSC/DWL.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF JSC/AB

YOUR REF.

31st October, 1966.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of October, 1966.

Yours faithfully,

For T. S. Ricketts

T. S. RICKETTS
(Chief Engineer)

THE SCOTTISH GAS BOARD.

NATURAL GAS WELL AT COUSLAND.

REPORT OF WELLHEAD PRESSURES.

October, 1966.

Well shut off at 10.0 a.m. on the 22nd April, 1965.

<u>Date.</u>	<u>Time.</u>	<u>Pressures.</u> <u>Pounds a square inch gauge.</u>
10th October, 1966.	11.30 a.m.	467.0

No Pressure Reading was taken during September, 1966.

File
clm

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF JSC/AB

YOUR REF.

26th August, 1966.

C.M. Adcock, Esq.,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTES.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of August, 1966.

Yours faithfully,

T. S. Ricketts
(T.S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

August, 1966

Well shut off at 10.0 a.m. on the 22nd April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch guage</u>
22nd August, 1966	12.25 p.m.	466.0

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF.

JSC/LH

YOUR REF.

1st August, 1966.

C.M. Adcock, Esq.,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of July, 1966.

Yours faithfully,

T.S. Ricketts
(T.S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

July, 1966.

Well shut off at 10.0 a.m. on the 22nd April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
20th July, 1966	4.25 p.m.	466.0

*F.G.
M*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSC/MM.

YOUR REF.

8th July, 1966.

C.M. Adcock Esq.,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of June, 1966.

Yours faithfully,

T.S. Ricketts

T.S. Ricketts
Chief Engineer.

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

June, 1966

Well shut off at 10.0 a.m. on the 22nd April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
30th June, 1966	12 noon	465.5

File
Woe

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSC/AB

YOUR REF.

6th June, 1966.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Bakring,
P.O. Box 1,
SOUTHWELL, NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of May, 1966.

Yours sincerely,

for T. S. RICKETTS
J.S.

T.S. RICKETTS
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT CLOUSLAND
REPORT OF WELLHEAD PRESSURES

May, 1966

Well shut off at 10.0 a.m. on the 22nd of April 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
25th May 1966	2.15 p.m.	465.5

File
us

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSC/AB

YOUR REF.

2nd May, 1966.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL, NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of April, 1966.

Yours sincerely,

hp. T. S. RICKETTS *JSC*
T.S. RICKETTS
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

April 1966

Well shut off at 10.0 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
22nd April 1966	8.45 a.m.	465.0

FE3491

File
the
7th April, 1966.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 5th instant enclosing the wellhead pressure data for the Cousland gas well for the months of February and March 1966.

Yours sincerely,

C.M. Adcock.

CMA/BW

Please acknowledge

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF JSC:JSC

YOUR REF.

C.M. Adcock Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL, NOTTS.

5th April 1966

Dear Mr Adcock,

Natural Gas - Cousland

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the months of February and March 1966.

Yours sincerely,

T. S. Ricketts
T.S. RICKETTS
(CHIEF ENGINEER)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

February - March 1966

Well shut off at 10.0 a.m. on the 22nd of April 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
24th February 1966	11.45 a.m.	464.0
1st April 1966	2.15 p.m.	465.0

File
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF JSC:MF

YOUR REF.

18th February, 1966.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of February, 1966.

Yours sincerely,

for T.S. RICKETTS
T.S. Ricketts,
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

February, 1966

Well shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
4th February, 1966.	2.30 p.m.	464.0

File
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSC:MF

YOUR REF.

6th January, 1966.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of December, 1965.

Yours sincerely,

T.S. Ricketts

T.S. Ricketts,
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

DECEMBER 1965

Well shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
30th December, 1965.	3.15 p.m.	463.0

*File
then*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF JSC/FLT

YOUR REF.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

8th December, 1965.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the months of November and December, 1965.

Yours sincerely,

T. S. Ricketts
T.S. Ricketts,
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES

NOVEMBER AND DECEMBER

Well shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
9th November, 1965	11.15 a.m.	463.0
7th December, 1965	11.30 a.m.	463.0

No reading was taken in October.

File
11/10

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSC:MF

YOUR REF.

14th October, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of September, 1965.

Yours sincerely,

For T. S. Ricketts
T.S. Ricketts,
(Chief Engineer)

THE SCOTTISH GAS BOARD

NATURAL GAS WELL AT COUSLAND

REPORT OF WELLHEAD PRESSURES.

SEPTEMBER 1965

Well shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
24th September, 1965	11.30 a.m.	462.0

It should be noted that this reading is now being taken monthly.

RECORD NOTE.

COUSLAND NO. 1 WELL

In response to Mr. Rutherford's (Ministry of Power) enquiry on the status of the above well which was reported as shut-in from 22nd April, 1965, the position has been clarified with The Gas Council. It seems that the retorts at Musselburgh gas works had reached the stage when they required resetting, at considerable cost. The works therefore was closed instead and the gas from the well has been shut off until such time as a decision can be taken on its future.

M. A. ARMSTRONG.

M. A. ARMSTRONG.

27th September, 1965

c.c. Mr. R.B. Holroyd

Mr. C.M. Adcock ✓

File: Well Records.

Feb
/11/65

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSC:MF

YOUR REF.

26th August, 1965.


C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of August, 1965.

Yours sincerely,

T. S. Ricketts 
T.S. Ricketts,
(Chief Engineer)

THE SCOTTISH GAS BOARD
NATURAL GAS WELL AT COUSLAND
REPORT OF WELLHEAD PRESSURES
AUGUST, 1965.

Well Shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
23rd August, 1965.	2.30 p.m.	461.0

It should be noted that this reading is now being taken monthly.

File

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSC:JRP

YOUR REF.

10th August, 1965.

C. M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving The Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of July, 1965.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)

File

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSC:JRP

YOUR REF.

10th August, 1965.

C. M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose one copy of a statement giving The Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of July, 1965.

Yours sincerely,

T.S. Ricketts
(T.S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD

NATURAL GAS WELL AT COUSLAND

REPORT OF WELLHEAD PRESSURES.

JULY 1965

Well shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
15th July, 1965.	11.45 a.m.	459.5

It should be noted that this reading is now being taken monthly.

File
da

THE SCOTTISH GAS BOARD

25 CHESTER STREET
EDINBURGH, 3

OUR REF.

JSC/MF

YOUR REF.

19th July, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose one copy of a statement giving the Gas Council information on the wellhead pressure at the natural gas well at Cousland for the month of June, 1965.

Yours sincerely,

T. S. Ricketts

T.S. RICKETTS,
(CHIEF ENGINEER)

THE SCOTTISH GAS BOARD

NATURAL GAS WELL AT COUSLAND

REPORT OF WELLHEAD PRESSURES.

JUNE, 1965.

Well Shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
23rd June, 1965.	2.30 p.m.	459.5

It should be noted that this reading is now being taken monthly.

File
Mo

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSC/VK

YOUR REF.

14th June, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose one copy of a statement giving the Gas Council information on the wellhead pressures at the natural gas well at Cousland for the period 5th of May, 1965 to the 9th of June, 1965.

Yours sincerely,

For T. S. Ricketts.

T.S. Ricketts,
Chief Engineer.

el

THE SCOTTISH GAS BOARD

NATURAL GAS WELL AT COUSLAND

REPORT OF WELLHEAD PRESSURES.

MAY, 1965.

Well Shut off at 10 a.m. on the 22nd of April, 1965.

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
5th May, 1965	8.30 a.m.	456.5
10th May, 1965	8.30 a.m.	456.5
12th May, 1965	8.30 a.m.	457.0
19th May, 1965	8.30 a.m.	457.5
25th May, 1965	8.30 a.m.	458.0
9th June, 1965	11.00 a.m.	458.5

F.6
Cm

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

DCE/MA

PE3164

Friday,
14th May,
1965.

C.M. Adcock, Esquire,
BP Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL.
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

Thank you for your letter of the 12th of May, 1965. I confirm that we have now shut down the carbonising plant at Musselburgh and this is the reason for ceasing to produce gas from the Cousland well. We have no immediate plans for utilising natural gas from this well.

It is noted that since no increase in wellhead pressure has occurred since the 15th of April, 1965, it will be sufficient for us to record pressures twice monthly for, say, the next two months and once monthly subsequently. This is being arranged and we shall continue to report the position to you as requested.

Yours sincerely,

TTR *del*

(T. S. Ricketts)
Chief Engineer.

cc Mr. C. Johnson

Copy

From Field Superintendent,
Eakring.

To Project Co-Ordinator U.K.,
BP House.

Our Ref. EXP/1/PE3172 **Your Ref.**

Date 17th May, 1965.

Subject Natural Gas - Cousland

The attached copy of a letter from The Scottish Gas Board's Chief Engineer, dated 14th May, confirms that Cousland well 1 has been permanently shut-in owing to the closing down of the carbonising plant at Musselburgh.

C.M. Adcock.

c.c. Manager, Eakring.

CMA/BW

File
Cousland

PE3165

12th May, 1965.

R.G.W. Brunstrom, Esq.,
BP House,
Ropemaker Street,
London, E.C.2.

Dear Geoff,

The following are the natural gas production statistics
which you need for your Institute of Petroleum paper:-

<u>Field</u>	<u>Year</u>	<u>Production S.C.F.</u>
Cousland	1957	3,765,746
	1958	24,875,510
	1959	24,025,641
	1960	28,780,180
	1961	49,081,742
	1962	35,494,920
	1963	37,748,770
	1964	17,722,746
		<hr/>
Eskdale		221,495,255 ✓
		4,533,125
		<hr/>
	1960	20,725,000
	1961	65,655,000
	1962	102,152,000
	1963	183,214,000
	1964	190,394,000
		<hr/>
Pumpherston		562,140,000
	1963	101,311
	1964	86,549
		<hr/>
		187,860

Calow was brought on production experimentally during January this year, and the total production to the end of April was 153,631,300 S.C.F.

I trust that this is the information you are requiring.

Yours sincerely,

C.M. Adcock.

F.6
110

FE3164

12th May, 1965.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26 Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 7th May enclosing the April report for the Cousland gas production, and for the information that well 1 was shut-in on 22nd April.

Is it correct to assume that well 1 has been shut-in permanently? I believe you intended to close-down the Musselburgh gas works, and I have concluded that this is the reason for stopping the natural gas flow from Cousland.

The pressure data which have been recorded since the shut-down will be required for the next assessment of producible gas reserves. Since no pressure rise has occurred after 15th April, it will be sufficient to record pressures twice monthly for say the next couple of months, and once monthly thereafter.

Yours sincerely,

C.M. Adcock.

c.c. Mr. E.R. Babb.
Mr. R.B. Holroyd.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

File
me

OUR REF.

YOUR REF.

JSC/MA

Friday,
7th May,
1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL.
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose two copies of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the period ended on the 22nd of April, 1965. You will note that the well was shut off at 10 a.m. on the 22nd of April, 1965. Further, as requested recently by Mr. Johnson, I also give a note of the information required regarding gas pressures.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

11

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1965.

Continuity of supply Gas was supplied from Cousland to
Musselburgh during the period 1st to
22nd April, 1965.

Volume supplied from Cousland to
Musselburgh during the month
(corrected) / 604,525 cubic feet.

Pressure at wellhead during the month
(to nearest 0.5 pounds a square inch by
deadweight pressure tester)

7th April - 454.0 pounds a square
inch gauge
14th April - 454.0 pounds a square
inch gauge
22nd April - 455.5 pounds a square
inch gauge

Number of days on which well was in action
during the month 22 days.

WELL SHUT OFF 10 a.m. ON THE 22nd OF APRIL, 1965.

INFORMATION REQUESTED ON PRESSURES:

<u>Date</u>	<u>Time</u>	<u>Pressures</u> <u>Pounds a square inch gauge</u>
22nd April, 1965	10.00 a.m. to 10.00 p.m.	455.5
23rd April, 1965	8 a.m., 9.00 a.m., 12 noon, 6.00 p.m., 10.00 p.m.	455.5
24th April, 1965	10.00 a.m.	455.5
25th April, 1965	11.00 a.m., 4.00 p.m., 9.00 p.m.	456 456.5
26th April, 1965	10.00 a.m., 4.00 p.m. 9.00 p.m.	456.5
27th April, 1965	8.30 a.m.	456.5
28th April, 1965	8.30 a.m.	456.5
29th April, 1965	8.30 a.m.	456.5
30th April, 1965	8.30 a.m.	456.5
3rd May, 1965	8.30 a.m.	456.5

/ Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

File
7/19

PE3138

12th April, 1965.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 7th instant, enclosing the March report for the Cousland gas production, which I note averaged 46,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

PE3137
Your Ref: S/160/3

12th April, 1965.

Dear Mr. Huxtable,

Natural Gas - Cousland

Thank you for your letter dated 9th April enclosing the Monthly Report from the Scottish Gas Board for the Cousland gas production.

The Scottish Gas Board also sends us a copy of this report from which we abstract the production data for the Monthly Report to the Ministry of Power.

Thus, we do not need to have your copy of the Scottish Gas Board's report, and suggest that you discontinue sending it to us.

Yours sincerely,

C.M. Adcock.

R.G. Huxtable, Esq.,
The Gas Council,
4 & 5 Grosvenor Place,
London, S.W.1.

CMA/BW

THE GAS COUNCIL

4 & 5, GROSVENOR PLACE
LONDON, S.W.1

Belgravia 2811

SECRETARY'S OFFICE

9th April, 1965.

Our Ref: S/160/3

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose, for transmission to the Ministry, a record of the production of natural gas from the well at Cousland during the month ended 31st March, 1965.

Yours sincerely,

R. G. Hunt

R. G. Hunt

C. M. Adcock, Esq.,
BP Petroleum Development Ltd.,
P.O. Box 1,
Southwell,
Nottingham.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1965.

Continuity of supply Gas was supplied from Cousland to Musselburgh during the period 1st to 31st of March, 1965, except for a period of 24 hours when freezing occurred in the main connecting the Wellhead to the Governors.

Volume supplied from Cousland to Musselburgh during the month (corrected) ϕ 1,376,570 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

4th March - 455.5 pounds a square inch gauge
10th March - 455.0 pounds a square inch gauge
17th March - 455.0 pounds a square inch gauge
24th March - 454.5 pounds a square inch gauge
31st March - 454.5 pounds a square inch gauge

Number of days on which well was in action during the month 30 days

Time for which well was shut down during the month 24 hours

ϕ Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSH/JGL

YOUR REF.

7th of April, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas : Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of March, 1965, from which it will be seen that the supply was interrupted for a period of 24 hours, due to freezing of the main connecting the wellhead to the Governor installation.

Yours sincerely,

T. S. Ricketts

T.S. Ricketts
(Chief Engineer)

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1965.

Continuity of supply Gas was supplied from Cousland to Musselburgh during the period 1st to 31st of March, 1965, except for a period of 24 hours when freezing occurred in the main connecting the Wellhead to the Governors.

Volume supplied from Cousland to Musselburgh during the month (corrected)[§] 1,376,570 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

4th March - 455.5 pounds a square inch gauge
10th March - 455.0 pounds a square inch gauge
17th March - 455.0 pounds a square inch gauge
24th March - 454.5 pounds a square inch gauge
31st March - 454.5 pounds a square inch gauge

Number of days on which well was in action during the month 30 days

Time for which well was shut down during the month 24 hours

[§] Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

THE GAS COUNCIL

4 & 5, GROSVENOR PLACE
LONDON, S.W.1

Belgravia 2811

SECRETARY'S OFFICE

10th March, 1965.

Our Ref: S/160/3

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose, for transmission to the Ministry, a record of the production of natural gas from the well at Cousland during the month ended 28th February, 1965.

Yours sincerely,

R. H. H. H.
→

C. M. Adcock, Esq.,
BP Development Ltd.,
P.O. Box 1,
Southwell,
Nottingham.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - FEBRUARY, 1965

Continuity of supply Gas was supplied without interruption from Cousland to Musselburgh during the period 1st to 28th of February, 1965,

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,246,240 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	5th February - 457.0 pounds a square inch gauge
	12th February - 456.5 pounds a square inch gauge
	19th February - 456.0 pounds a square inch gauge
	26th February 456.0 pounds a square inch gauge

Number of days on which well was in action during the month 28 days

Time for which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File
Chg

PE3104

11th March, 1965.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 8th instant, enclosing the February report for the Cousland gas production, which I note averaged 45,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

Telephone CALEDONIAN 2052-7—Telegrams "SCOTGASBO"

Mr Walker
Please acknowledge
Clear
3104

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSH/CMS

YOUR REF.

8th March, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas : Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 28th of February, 1965, from which it will be seen that the supply was uninterrupted during this period.

Yours sincerely,

for

T. S. Ricketts

T.S. Ricketts.
(Chief Engineer)

T.S.R.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - FEBRUARY, 1965

Continuity of supply Gas was supplied without interruption from Cousland to Musselburgh during the period 1st to 28th of February, 1965,

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,246,240 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	5th February - 457.0 pounds a square inch gauge
	12th February - 456.5 pounds a square inch gauge
	19th February - 456.0 pounds a square inch gauge
	26th February 456.0 pounds a square inch gauge

Number of days on which well was in action during the month 28 days

Time for which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File
na

PE3075

12th February, 1965.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 10th instant, enclosing the January report for the Cousland gas production, which I note averaged 42,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JSH/HW

YOUR REF.

10th February, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas : Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of January, 1965, from which it will be seen that the supply was interrupted for a period of 5 hours due to freezing of the main connecting the wellhead to the governor installation.

Yours sincerely,

for T. S. Ricketts *T.S.R.*
(T.S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JANUARY, 1965

Continuity of supply Gas was supplied from Cousland to Musselburgh during the period 1st to 31st of January, 1965, except for a period of 5 hours when freezing occurred in the main connecting the Wellhead to the Governors.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,305,790 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	8th January - 458.5 pounds a square inch gauge
	14th January - 458.0 pounds a square inch gauge
	22nd January - 457.5 pounds a square inch gauge
	29th January - 457.5 pounds a square inch gauge

Number of days on which well was in action during the month 31 days (less 5 hours.)

Time for which well was shut down during the month 5 hours.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File 129

PE3035

8th January, 1965.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 6th instant, enclosing the December report for the Cousland gas production, which I note averaged 43,000 cubic feet per day during the month.

Yours sincerely,

|

C.M. Adcock.

File
Chas

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. JSH/MF

YOUR REF.

6th January, 1965.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas from Cousland.

I forward each year to the Gas Council a statement giving the total production of natural gas for a calendar year, and I would advise you that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to the 31st of December, 1964, was 17,722,746 cubic feet.

The gross and net quantities are identical since no measurable impurities have been present and the volume is corrected to 30 inches of mercury and 60 degrees Fahrenheit.

Yours sincerely,

for T. S. Ricketts

T.S.R.

(T.S. Ricketts)
Chief Engineer.

Fila
Cher

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

JSH/MF

YOUR REF.

6th January, 1965.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas: Cousland.

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of December, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

for T. S. Ricketts *f.s.R.*
(T.S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD

Benn

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of December, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,331,500 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester) 1st to 31st of December, 1964
459.0 pounds a square inch gauge.

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

220,163.755
1,331.500

221,495.255
4,533.125

226,028.380

1965

700 - 100 1/2
226

474

PE3021

File
129
14th December, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for the letter of the 8th instant, enclosing the November report for the Cousland gas production, which I note averaged 45,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

3021

OUR REF. JSH/CMS

YOUR REF.

8th December, 1964.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas: Cousland.

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of November, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T.S. Ricketts *bp flt*
(T.S. Ricketts)
Chief Engineer

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - NOVEMBER, 1964.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of November, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)*; 1,341,380 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester) 1st to 30th of November, 1964 459.0 pounds a square inch gauge.

Number of days on which well was in action during the month 30 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

218,822,375
1,341,380

220,163,755

Fib
Ms

PE2980

9th November, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 6th instant, enclosing the October report for the Cousland gas production, which I note averaged 45,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. JH/VK

YOUR REF.

6th November, 1964.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Barking,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas: Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of October, 1964. It will be seen that the supply was interrupted for a period of nine days. This was due to a fault in the first stage governor.

Yours sincerely,

T. S. Ricketts

pp 7644
T.S. Ricketts.
(Chief Engineer)

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - OCTOBER,
1964.

Continuity of supply Gas was supplied, interrupted, from Cousland to Musselburgh during the period 1st to 31st of October, 1964, only for governor repairs.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 988,980 cubic feet

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

15th October - 459.5 pounds a square inch gauge

19th October - 459.5 pounds a square inch gauge

27th October - 459.0 pounds a square inch gauge

Number of days on which well was in action during the month 22 days

Number of days on which well was shut down during the month 9 days

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

217,833.395
988.980
218,822.375

File
Ch
THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. *DE/JM/CMS*

YOUR REF.

8th October, 1964.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Bakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas: Cousland.

...
I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of September, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts

T.S. Ricketts,
(Chief Engineer)
16

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - SEPTEMBER, 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of September, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,334,730 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

1st September - 460.0 pounds a square inch gauge

9th September - 460.0 pounds a square inch gauge

15th September - 460.0 pounds a square inch gauge

24th September - 459.5 pounds a square inch gauge

28th September - 459.5 pounds a square inch gauge

Number of days on which well was in action during the month 30 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

216.498,665
1.334,730
217.833,395

File
Re

PE2933

21st September, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant, enclosing the August report for the Cousland gas production, which I note averaged 43,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. DP/JM

YOUR REF.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

9th September, 1964.

Dear Mr. Adcock,

Natural Gas: Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of August, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts.

T.S. Ricketts,
(Chief Engineer)

46
[Signature]

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - AUGUST 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of August, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,337,350 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	5th August - 460.5 pounds a square inch gauge
	13th August - 460.5 pounds a square inch gauge
	20th August - 460.0 pounds a square inch gauge
	26th August - 460.0 pounds a square inch gauge

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

215,161,315
1,337,350
216,498,665

File
12/1

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

DE/MS.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

14th September, 1964.

Dear Mr. Adcock,

Natural Gas - Cousland.

Thank you for your letter of the 31st August, 1964 giving your comments on the wellhead pressure which had remained unchanged from March to the end of July, 1964 and also the enclosed graph showing wellhead pressure plotted against cumulative gas production.

From the report for the month of August, 1964 you will have noted that the wellhead pressure dropped from 460.5 to 460.0 pounds a square inch gauge.

Yours faithfully,

For T.S. Ricketts

T.S. Ricketts.
(Chief Engineer.)



*File
The*

PE2870

15th July, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant, enclosing the June report for the Cousland gas production, which I note averaged 42,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

File
Chs

FE2910

31st August, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 23rd July with reference to the wellhead pressure data recorded this year. Thank you also for your letter dated 10th August enclosing the monthly statement for the gas production during July. I apologise for taking so long to reply to you, but I have been away on leave recently.

With reference to the pressure data, I have brought up to date the graph I sent you with my letter dated 22nd November 1960. This graph shows the flowing pressures plotted against the cumulative gas production from the 1582' sand. A copy of the revised graph is being sent to you herewith.

The first section of the graph shows the decline line established during 1959 and 1960, when the well was initially brought on production at a rate of circa two million cubic feet per month. During 1961 to 1963 inclusive well 1 was produced at a rate of over three million cubic feet per month. The change in the production rate resulted in the establishment of a new pressure decline line.

During February - March 1964 the gas off-take rate was cut back to circa $1\frac{1}{2}$ million cubic feet per month. The immediate result was a rise in the wellhead flowing pressure from 458 p.s.i.g. to 461 p.s.i.g. As you point out, there has been no decline in the flowing pressure from March to end July.

The cumulative production is now 215 million cubic feet, and you will note that the last point on the graph lies on the extrapolation of the initial pressure decline line. Thus, the arrest in the pressure decline is due to the curtailment of the gas production rate; and the new pressure decline should become manifest in due course.

Yours sincerely,

c.c. Mr. E.R. Babb.
Mr. W.J. Baker, BP House.

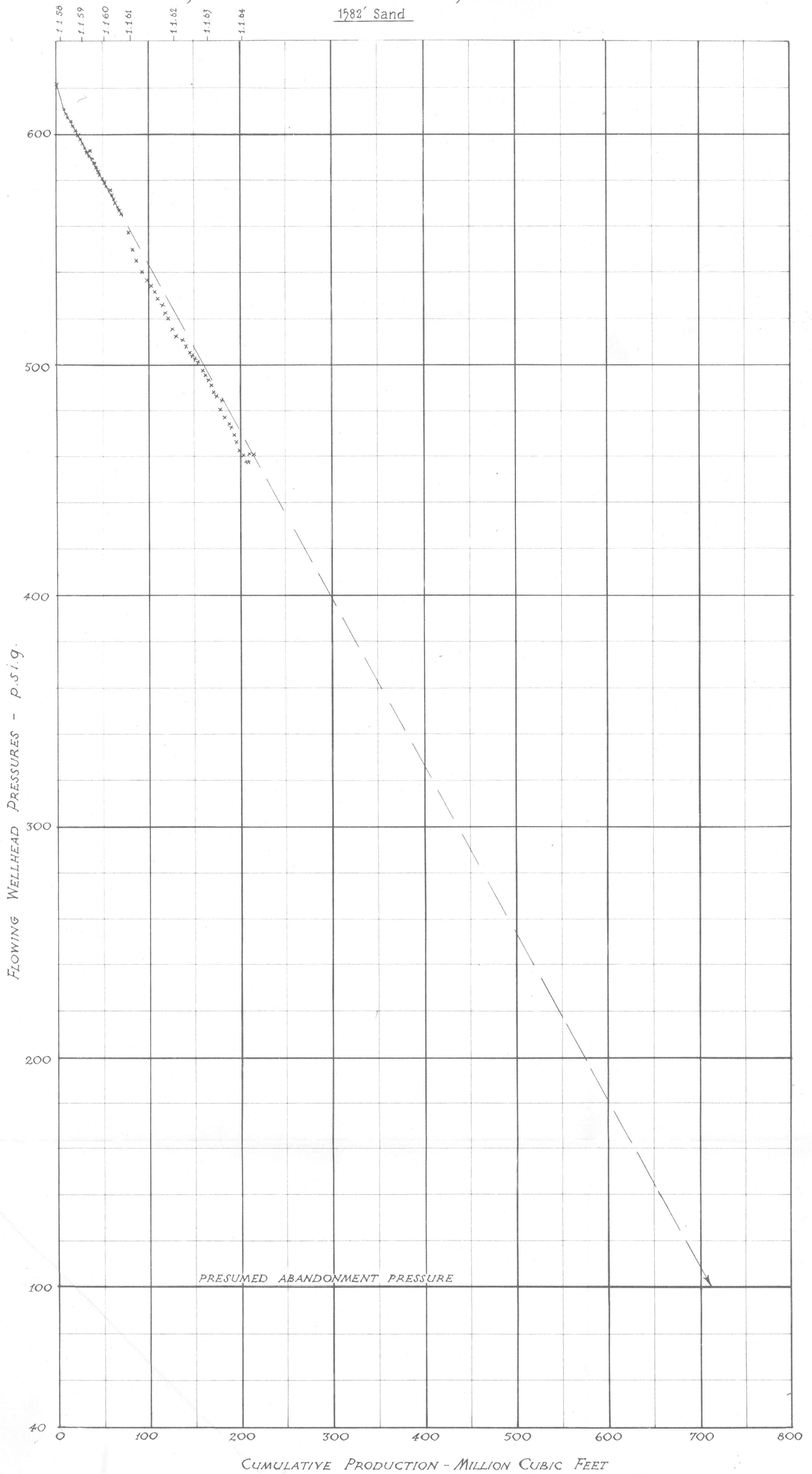
C.M. Adcock.

CMA/BW

COUSLAND WELL No. 1.

Flowing Wellhead Pressures Plotted Against Cumulative Production

1582' Sand



File
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DCE/VK

YOUR REF.

23rd July, 1964.

C.M. Adcock Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
Southwell,
Nottinghamshire.

Dear Mr. Adcock,

National Gas - Cousland

You will have noted from our returns of wellhead pressures at Cousland that no fall in pressure apparently has occurred since March of this year although between 5,000,000 and 6,000,000 cubic feet of gas have been removed. The wellhead pressure gauge of course has been verified by deadweight tests over this period.

I shall be very pleased to have your comments on this situation and particularly to know whether you consider that any significant change has taken place in "drive" conditions.

Yours faithfully,

For T. S. RICKERTS

Chief Engineer.

ll

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. DP/MS.

YOUR REF.

C.M. Adcock, Esquire,
B.P. Petroleum Development Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

10th August, 1964.

Dear Mr. Adcock,

Natural Gas: Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of July, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts

T.S. Ricketts.
Chief Engineer.



THE SCOTTISH GAS BOARD.

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JULY, 1964.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of July, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,294,410 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

3rd July - 460.5 pounds a square inch gauge
9th July - 460.5 pounds a square inch gauge
16th July - 460.5 pounds a square inch gauge
23rd July - 460.5 pounds a square inch gauge
30th July - 460.5 pounds a square inch gauge

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

213,866,905
1,294,410

215,161,315

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/JM

YOUR REF.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

9th July, 1964.

Dear Mr. Adcock,

Natural Gas: Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of June, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

pp. [signature]

THE SCOTTISH GAS BOARD.

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JUNE 1964.

Continuity of supply	Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of June, 1964.
Volume supplied from Cousland to Musselburgh during the month (corrected) ^x	1,261,290 cubic feet.
Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	3rd June - 460.5 pounds a square inch gauge 10th June - 460.5 pounds a square inch gauge 17th June - 460.5 pounds a square inch gauge 24th June - 460.5 pounds a square inch gauge
Number of days on which well was in action during the month	30 days.
Number of days on which well was shut down during the month	Nil

^x Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

212,605.615
1,261,290
213,866.905

FE2839

File
12th June, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant, enclosing the May report for the Cousland gas production, which I note averaged 40,600 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SW

YOUR REF.

9th June 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of May 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

TSR

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MAY 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of May 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,258,940 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	6th May - 460.5 pounds a square inch gauge
	13th May - 460.5 pounds a square inch gauge
	21st May - 460.5 pounds a square inch gauge
	23th May - 460.5 pounds a square inch gauge

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

211,346,675
1,258,940
212,605,615

File
CMA

FE2807

13th May, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 8th instant, enclosing the April report for the Cousland gas production, which I note averaged 41,500 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

File
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/JRP

YOUR REF.

8th May, 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
SOUTHWELL,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of April, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

140
86

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of April, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,243,790 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	8th April - 460.5 pounds a square inch gauge
	16th April - 460.5 pounds a square inch gauge
	22nd April - 460.5 pounds a square inch gauge
	30th April - 460.5 pounds a square inch gauge

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

210,102,885
1,243,790

211,346,675

Fib
169

THE SCOTTISH GAS BOARD
26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. TSR/EFW

PE2783

YOUR REF.

Friday,
24th April,
1964

C.M. Adcock, Esquire,
BP Petroleum Development Limited,
P.O. Box 1,
SOUTHWELL, Notts.

Dear Mr. Adcock,

Thank you for your letter of the 29th of April, 1964 and for the advance copy of the paper you are giving to the Wales and Monmouthshire Section of the Institution of Gas Engineers on the 7th/8th of May. I have found this very interesting reading indeed, and I am sure it will make a most valuable contribution to the Section's proceedings.

It was a great pleasure to welcome Mr. Babb and yourself to Edinburgh recently, and I do hope that the Salsburgh drilling will go ahead successfully in the not too distant future.

With kind regards,

Yours sincerely,

T S Ricketts

(T.S. Ricketts)
Chief Engineer

File
(ha)

file

PE2776

14th April, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 10th instant, enclosing the March report for the Cousland gas production, which I note averaged 42,700 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

File
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. **DE/HW**

YOUR REF.

10Th April, 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of March, 1964. You will note under the heading "Continuity of Supply" that there was no flow of gas for 3 days, $8\frac{1}{2}$ hours between the 10th and 13th of March.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer. *RS*

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1964

Continuity of supply The supply of gas from Cousland to Musselburgh was off for 3 days 8½ hours between the 10th and 13th of March, 1964. Initially the stoppage was due to a blockage between the wellhead and the governor installation, but it coincided with the insurance inspectors examination of the water separator and water receiver and at the same time a routine overhaul of the third stage governor was carried out.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,195,336 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressuretester)

4th March - 458.0 pounds
a square inch gauge

18th March - 461.0 pounds
a square inch gauge

25th March - 461.0 pounds
a square inch gauge

31st March - 460.5 pounds
a square inch gauge

Number of days on which well was in action during the month 28 days.

Number of days on which well was shut down during the month 3

* Corrected to 30 inches of Mercury and 60 degrees fahrenheit.

208,907,549
1,195,336
210,102,885

FE2753

File
cha

20th March, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 11th instant enclosing the February report for the Cousland gas production, which I note averaged 61,900 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/VK

YOUR REF.

11th March, 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 29th of February, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer. *for*

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - FEBRUARY, 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 29th of February, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,795,850 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressuretester)	6th February - 458.0 pounds
	a square inch gauge
	12th February - 458.0 pounds
	a square inch gauge
	19th February - 458.0 pounds
	a square inch gauge
	28th February - 458.0 pounds
	a square inch gauge

Number of days on which well was in action during the month 29 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees fahrenheit.

207,111.699
1,795.850
208,907.549

File
ma

2753

FE2692

12th February, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 10th instant enclosing the January report for the Cousland gas production, which I note averaged 108,000 cubic feet per day during the month.

61,900

Yours sincerely,

C.M. Adcock.

PERH2

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF.

YOUR REF.

10th February, 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of January, 1964, from which it will be seen that the supply continued uninterrupted during the period.

Yours sincerely,

T.S. Ricketts
DP HB

(T.S. Ricketts)
Chief Engineer.

DP/HB

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JANUARY, 1964

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of January, 1964.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 3,339,190

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

3rd January - 459.5 pounds
a square inch gauge
8th January - 459.5 pounds
a square inch gauge
15th January - 459.0 pounds
a square inch gauge
22nd January - 458.0 pounds
a square inch gauge
29th January - 457.5 pounds
a square inch gauge

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

203,772,509
3,339,190
207,111,699

FE2669

23rd January, 1964.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 14th January enclosing the December report for the Cousland gas production, which I note averaged 107,000 cubic feet per day during the month.

Thank you also for advising us that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to 31st December 1963, was 37,748,770 cubic feet. We agree that this computation is correct.

Yours sincerely,

C.M. Adcock.

CMA/BW

File
CRA

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF.

14th January, 1964. YOUR REF.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of December, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

DP/HB

R.S.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1963

200,435,929
3,336,580
203,772,509
166,013,739
37,748,770

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of December, 1963.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 3,336,580 cubic feet.

204.3
203.7
201.0
200.4

Pressure at wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)

5th December - 461.5 pounds a square inch
12th December - 460.5 pounds a square inch
20th December - 460.0 pounds a square inch
26th December - 459.5 pounds a square inch

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File
chg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF.

YOUR REF.

14th January, 1964.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas from Cousland.

I forward each year to the Gas Council a statement giving the total production of natural gas for a calendar year, and I would advise you that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to the 31st of December, 1963, was 37,748,770 cubic feet.

The gross and net quantities are identical since no measurable impurities have been present and the volume is corrected to 30 inches of mercury and 60 degrees Fahrenheit.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

MS

DP/HB

File
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PE2629

12th December, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant enclosing the November report for the Cousland gas production, which I note averaged 100,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

File

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/IA.

YOUR REF.

9th December, 1963.

C. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of November, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer

pp. [initials]

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - NOVEMBER, 1963.

198,019,689
3,016,240

201,035,929
6

200,4

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of November, 1963.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 3,016,240 cubic feet.

Pressure at Wellhead during the month (to nearest 0.5 pounds a square inch by deadweight pressure tester)	7th November - 465.5 pounds a square inch
	14th November - 464.5 pounds a square inch
	21st November - 463.0 pounds a square inch
	28th November - 461.5 pounds a square inch

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

FE2601

12th November, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 7th instant enclosing the October report for the Cousland gas production, which I note averaged 403,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock.

Fib
Ma

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SH.

YOUR REF.

7th November, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of October, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer. *th. R.*

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION - OCTOBER, 1963.

194,824,669
 3,195,020
 198,019,689
 6
 197,4

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of October, 1963.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 3,195,020 cubic feet.

Pressure at Wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	2nd October - 469.0 lbs. per square inch.
	9th October - 468.0 lbs. per square inch.
	17th October - 467.0 lbs. per square inch.
	24th October - 466.5 lbs per square inch.
	31st October - 466.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File
na

Ex 601

PE2526

11th September, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

143
Chr

Dear Mr. Ricketts,

Natural Gas - Cousland

Ex 601
Thank you for your letter of the 3rd instant enclosing the August report for the Cousland gas production, which I note averaged 85,000 cubic feet per day during the month.

103,000

Yours sincerely,

C.M. Adcock

*File
12a*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. DP/HB

YOUR REF.

8th October, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of September, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

(file)

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - SEPTEMBER, 1963

191,828,729
2,995,940
194,824,669
194,2

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of September, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) 2,995,940 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

4th September - 471.5 lbs. per square inch.
12th September - 470.5 lbs. per square inch.
18th September - 470.0 lbs. per square inch.
25th September - 469.0 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SH.

YOUR REF.

9th September, 1963.

C. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of August, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

16. 50

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - AUGUST, 1963

189, 207, 179
2, 621, 550
191, 828, 729
191, 828, 729
191, 828, 729

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of August, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) * 2,621,550 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester) 7th August - 473.5 lbs. per square inch.
14th August - 473.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

PE2497

13th August, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

August Thank you for your letter of the ^{9th} ~~7th~~ instant enclosing the ~~July~~ report for the Cousland gas production, which I note averaged 400,000 cubic feet per day during the month.

85,000

Yours sincerely,

B. Walker

P.P. C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/HB

YOUR REF.

7th August, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 31st of July, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer. *TSR*

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION - JULY, 1963

186.099.799
3.107.380
189,207,179
188,6

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of July, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) * 3,107,380 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	3rd July - 475.5 lbs. per square inch.
	11th July - 475.0 lbs. per square inch.
	24th July - 474.0 lbs. per square inch.
	31st July - 473.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

FE 2497

File
122

FE2476

10th July, 1963.

141
T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

July Thank you for your letter of the 8th instant enclosing the
June report for the Cousland gas production, which I note
averaged 110,000 cubic feet per day during the month.

100,000

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. DP/HB

YOUR REF.

8th July, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended on the 30th of June, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

ph. SD

Fib
Chg

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION - JUNE, 1963

182,787.499
 3,312.300
 186,099.799
 185,4

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of June, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) * 3,312,300 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	6th June - 478.0 lbs. per square inch.
	12th June - 477.5 lbs. per square inch.
	19th June - 477.0 lbs. per square inch.
	26th June - 476.0 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

File
C.A.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

21st June, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
P.O. Box 1,
Southwell,
Nottinghamshire.

Dear Mr. Adcock,

Natural Gas - Cousland.

... In response to your letter of the 18th of June, 1963, I attach herewith a further copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland for the month of April, 1963.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

10. R

DP/HB

COPY/

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1963

179,507,199
3,280,300
182,787,499
6
182,1

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of April, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) * 3,280,300 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	3rd April - 485.0 lbs. per square inch.
	10th April - 485.0 lbs. per square inch.
	24th April - 483.5 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

File
120

FE2461

18th June, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

We appear to have mislaid the copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th April 1963, and I wondered if you could send us another statement.

Yours sincerely,

C.M. Adcock

PE 2476

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12.9

PE2452

11th June, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

1 + 1
12.9

Dear Mr. Ricketts,

Natural Gas - Cousland

June Thank you for your letter of the ^{8th}~~7th~~ instant enclosing the
May report for the Cousland gas production, which I note
averaged 110,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

Tib
Ma

OUR REF. DP/SH.

YOUR REF.

7th June, 1963.

C. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of May, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

RD

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MAY, 1963.

176,098,399
3,408,800
179,507,199
6
+80,1
178,9

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of May, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected) * 3,408,800 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

1st May - 483.0 lbs. per square inch.
8th May - 481.5 lbs. per square inch.
15th May - 481.0 lbs. per square inch.
22nd May - 480.0 lbs. per square inch.
29th May - 479.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees Fahrenheit.

2452
PE2383

File
129
11th April, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant enclosing the March report for the Cousland gas production, which I note averaged 104,000 cubic feet per day during the month.

110,000

Yours sincerely,

C.M. Adcock

*File
The*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF. DP/JM.

YOUR REF.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

9th April, 1963.

Dear Mr. Adcock,

Natural Gas - Cousland.

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of March, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts)
Chief Engineer.

AKD

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1963.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of March, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 3,238,260 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

6th March - 487.5 lbs. per square inch.
13th March - 487.0 lbs. per square inch.
20th March - 486.0 lbs. per square inch.
27th March - 486.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

172. 260. 139
3. 238. 260
175 498 397

176. 4
175 4 6

2383
PE2351

121
Ch
FIG
CLG
11th March, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

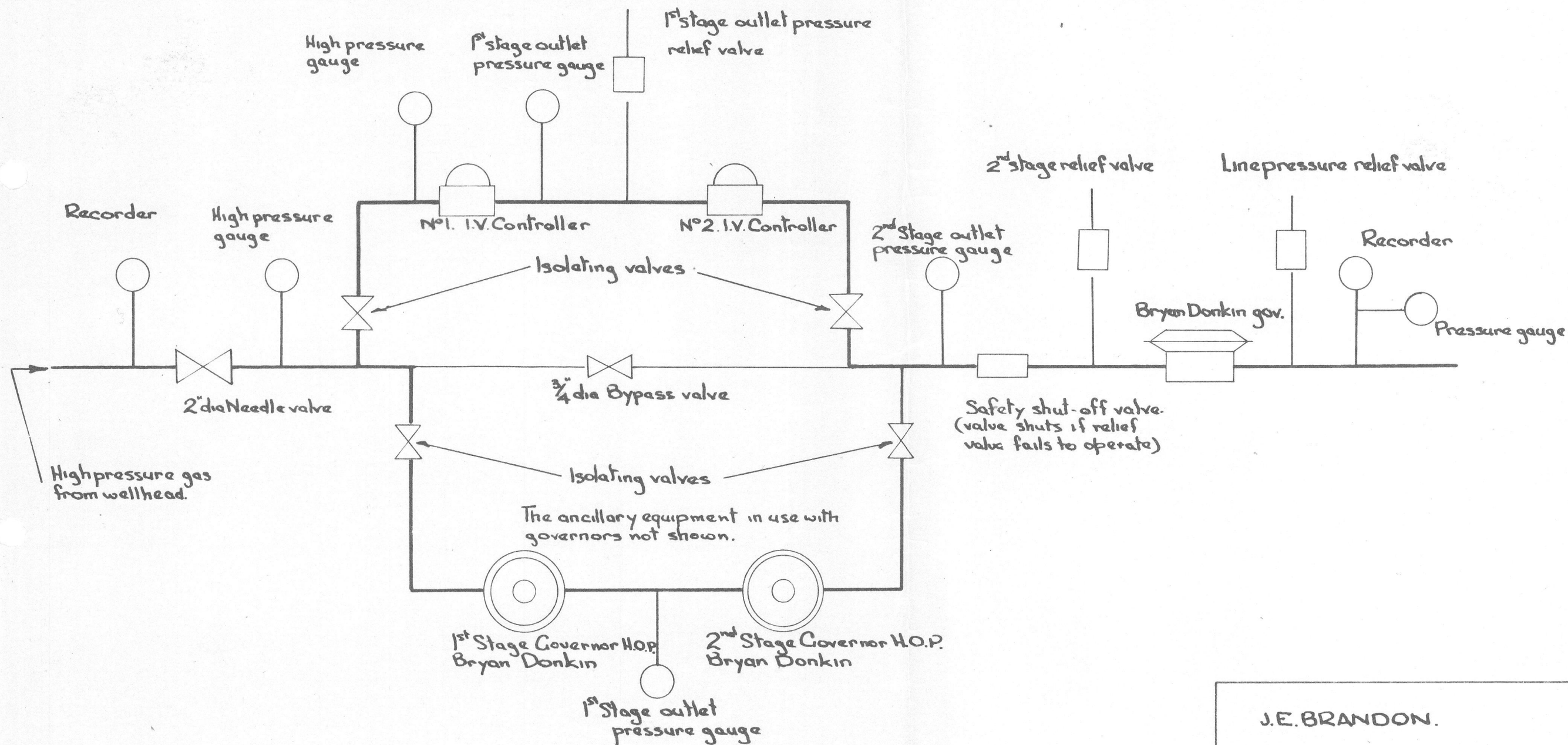
Natural Gas - Cousland

✓ *hard*
Thank you for your letter of the 7th instant enclosing the February report for the Cousland gas production, which I note averaged 107,000-cubic feet per day during the month.

104,000

Yours sincerely,

C.M. Adcock



J.E. BRANDON.

DIVISIONAL MANAGER

THE
SCOTTISH GAS BOARD
EDINBURGH & SOUTH
EASTERN DIVISION

SCALE N.T.S.
DRAWN BY W.B.L.
CHECKED BY
DATE 6.11.62

NATURAL GAS COUSLAND.
Diagrammatic Layout of Governor Installation.

DRAWING NO
383/27

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

File
129

OUR REF. DP/SH.

YOUR REF.

7th March, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 28th of February, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T. S. Ricketts)
Chief Engineer.

pp. 502

THE SCOTTISH GAS BOARDNATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH.REPORT ON GAS PRODUCTION - FEBRUARY, 1963.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 28th of February, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 3,006,000 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

6th February - 490.0 lbs. per square inch.
 13th February - 489.5 lbs. per square inch.
 20th February - 489.0 lbs. per square inch.
 27th February - 488.0 lbs. per square inch.

Number of days on which well was in action during the month 28 days.

Number of days on which well was shut down during the month Nil.

169,254.139
 3,006,000
 17 2,260,139

* Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

Re 2351

1+1
119

File
119

FE2319

14th February, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

February Thank you for your letter of the ^{7th} 11th instant enclosing the January report for the Cousland gas production, which I note averaged ~~104,000~~ cubic feet per day during the month.

107,000

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

*File
M-9*

OUR REF. RAB/HB

YOUR REF.

11th February, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of January, 1963, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

4

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH.

REPORT ON GAS PRODUCTION - JANUARY, 1963.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of January, 1963.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 3,230,400 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

4th January -	492.0 lbs. per square inch.
11th January -	491.5 lbs. per square inch.
16th January -	491.0 lbs. per square inch.
23rd January -	491.0 lbs. per square inch.
29th January -	490.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

166,023,739
3,230,400
169,254,139

* Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

File
C.L.B.

PE2250

14th December, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

1 + 2

122

Dear Mr. Ricketts,

Natural Gas - Cousland

January Thank you for your letter of the 7th instant enclosing the
November report for the Cousland gas production, which I note
averaged ~~99,000~~ cubic feet per day during the month.

104,000

Yours sincerely,

C.M. Adcock

File
1.2.9

Copy

From Senior Petroleum Engineer U.K.,
Bakring. To Project Co-ordinator U.K.,
BP House.

Our Ref. EXP/1/PE2288 Your Ref. Date 17th January, 1963.

Subject Royalty Statements for U.K. natural gas production

We are forwarding to you herewith two copies of the Royalty Statements for the Cousland and Eskdale natural gas productions, during the year 1962, in cubic feet, corrected to 30 inches of mercury and 60 degrees Fahrenheit.

C.M. Adcock

Encl.

c.c. Chief Petroleum Engineer, BP House.
Exploration Records.
Manager, Bakring.

CMA/BR

BP EXPLORATION COMPANY LIMITED

LICENCE A.205

COUSLAND

Statement of Natural Gas Production - 1st January 1962 to
31st December 1962 (Inclusive)

Cubic feet at 30 inches Mercury
and 60 degrees Fahrenheit

Natural Gas Won and Saved

January	3,144,350
February	2,759,780
March	2,905,540
April	2,939,100
May	3,049,800
June	2,928,290
July	2,974,300
August	2,929,280
September	2,811,830
October	2,947,430
November	2,960,020
December	3,145,200

NATURAL GAS LIABLE TO ROYALTY

35,494,920

✓
Total: 146,216,602,373

15th January, 1963.

CMA/BR

File
C.A.

PE2289

17th January, 1963.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural gas - Cousland

Thank you for your letters dated 9th and 14th January, enclosing the December report for the Cousland gas production, and advising the total natural gas offtake during the year 1962.

I confirm that the production for the twelve months to the 31st December 1962 was 35,494,920 cubic feet, corrected to 30 inches of mercury and 60 degrees Fahrenheit; and that this quantity will be shown on our Royalty return which is submitted to the Ministry of Power.

Yours sincerely,

C.M. Adcock

c.c. Manager, Eakring.
Mr. D.H. Deane, BP House.

Fi 6
129

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH 3

OUR REF.

YOUR REF.

14th January, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas from Cousland

I forward each year to the Gas Council a statement giving the total production of natural gas for a calendar year, and I would advise you that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to the 31st of December, 1962, was 35,494,920 cubic feet.

The gross and net quantities are identical since no measurable impurities have been present and the volume is corrected to 30 inches of mercury and 60 degrees Fahrenheit.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

pk.
[Signature]

DP/HB

File
C.L.G.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/MPL

YOUR REF.

9th January, 1963.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of December, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts)
Chief Engineer

ph. [initials]

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1962.

Continuity of Supply Gas was supplied uninterrupted
from Cousland to Musselburgh
during the period 1st to
31st of December, 1962.

Volume supplied from Cousland to
Musselburgh, during the month
(corrected)* 3,145,200 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	5th December - 494.5 lbs. per square inch.
	12th December - 494.0 lbs. per square inch.
	19th December - 493.5 lbs. per square inch.
	26th December - 493.0 lbs. per square inch.

Number of days on which well was
in action during the month 31 days.

Number of days on which well was
shut down during the month Nil.

* Corrected to 30 inches of Mercury and 60 degrees
Fahrenheit.

162,878,539
3,145,200
166,023,739

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SH.

YOUR REF.

7th December, 1962.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of November, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts),
Chief Engineer.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH.

REPORT ON GAS PRODUCTION - NOVEMBER, 1962.

Continuity of Supply Gas was supplied uninterrupted
from Cousland to Musselburgh
during the period 1st to
30th of November, 1962.

Volume supplied from Cousland to
Musselburgh, during the month
(corrected)* 2,960,020 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	2nd November - 497.0 lbs. per square inch.
	8th November - 496.0 lbs. per square inch.
	14th November - 495.5 lbs. per square inch.
	21st November - 495.0 lbs. per square inch.

Number of days on which well was
in action during the month 30 days.

Number of days on which well was
shut down during the month Nil.

* Corrected to 30-inches of Mercury and 60 degrees
Fahrenheit.

159,918,519
2,960,020
162,878,539

PE2212

20th November, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Many thanks for your letters dated 9th and 14th November. Thank you for the revised drawing showing the diagrammatic arrangement of the Governor Installation. I hope to be submitting the articles to the Gas World in the near future.

Thank you for the October report giving the Cousland gas production, which I note averaged 95,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SH.

YOUR REF.

9th November, 1962.

C. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of October, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T. S. Ricketts)
Chief Engineer. *pb.*

DS

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH.

REPORT ON GAS PRODUCTION - OCTOBER, 1962.

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of October, 1962.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 2,947,430 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester) 12th October - 498.5 lbs. per square inch.
31st October - 497.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

* Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

156,971,089
2,947,430
159,918,519

File
Chg

PE2172

15th October, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 12th instant enclosing the September report for the Cousland gas production, which I note averaged 94,000 cubic feet per day during the month.

I am writing a series of articles for The Gas World on the search for and utilisation of natural gas in Britain. I wonder whether you have a photograph of the wellhead or of the pressure controllers in the governor house, or even some simple diagrammatic sketch, which I might use to illustrate the section of the article describing the progress at Cousland?

I will be most obliged, and thank you for any illustrations which you are able to send me.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

File
M.G.

OUR REF. DP/SH.

YOUR REF.

12th October, 1962.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of September, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

bb.
[Signature]

THE SCOTTISH GAS BOARDNATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH.REPORT ON GAS PRODUCTION - SEPTEMBER, 1962.

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of September, 1962.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 2,811,830 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester) No wellhead pressure taken during the month.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

*Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

154, 159, 259
2, 811, 830

156, 971, 089

File
69

13th September, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 12th instant enclosing the August report for the Cousland gas production, which I note averaged 95,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

Wednesday,
12th September,
1962.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of August, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DP/MA

196.
DP

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - AUGUST, 1962.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of August, 1962.

Volume supplied from Cousland to Musselburgh, during the month (corrected)* 2,929,280 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	1st August - 502.5 lbs./square inch
	8th August - 502.5 lbs./square inch
	15th August - 502.0 lbs./square inch
	22nd August - 502.0 lbs./square inch
	29th August - 501.5 lbs./square inch

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

*Corrected to 30-inches of Mercury and 60 degrees Fahrenheit.

151,229.979
2,929.280
154,159.259

File
R.9

PE2129

13th August, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

August Thank you for your letter of the ^{12th} 8th instant enclosing the July report for the Cousland gas production, which I note averaged 96,000 cubic feet per day during the month.

95,000

Yours sincerely,

C.M. Adcock

1 + 2
R.9

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JULY, 1962

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of July, 1962.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 2,974,300 cubic feet

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	4th July - 503.5 lbs. per square inch
	11th July - 503.5 lbs. per square inch
	18th July - 503.0 lbs. per square inch
	25th July - 503.0 lbs. per square inch

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

148,255,679
2,974,300
151,229,979

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

DE/LMT

8th August, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of July, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

Ab.
[Signature]

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

DE/LMT

8th August, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of July, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

Ab.
[Signature]

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JULY, 1962

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of July, 1962.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 2,974,300 cubic feet

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	4th July - 503.5 lbs. per square inch
	11th July - 503.5 lbs. per square inch
	18th July - 503.0 lbs. per square inch
	25th July - 503.0 lbs. per square inch

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 600 Fahrenheit.

148,255,679
2,974,300
151,229,979

PE2129

FE2113

1 + 2
1.9

File
Ch. 9

17th July, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

July Thank you for your letter of the 10th instant enclosing the
June report for the Cousland gas production, which I note
averaged 98,000 cubic feet per day during the month.

96,000

Yours sincerely,

C.M. Adcock

File
Ch 2

1+2
ha

PE2062

12th June, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

me Thank you for your letter of the 8th instant enclosing the
May report for the Cousland gas production, which I note
averaged 98,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD
26 DRUMSHEUGH GARDENS
EDINBURGH, 3

File
lag

OUR REF.

YOUR REF.

DP/LMT

10th July, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of June, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T.S. Ricketts.

(T.S. Ricketts)
Chief Engineer

[Signature]

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JUNE, 1962.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of June, 1962.

Volume supplied from Cousland to Musselburgh, during the month (corrected)*..... 2,928,290 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	6th June - 504.5 lbs. per square inch
	13th June - 504.5 lbs. per square inch
	21st June - 504.0 lbs. per square inch
	27th June - 504.0 lbs. per square inch

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

145,327,389
2,928,290
148,255,679

Fig
Tha

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/HB

YOUR REF.

Friday,
8th June,
1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of May, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts)
Chief Engineer.

46
SD

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MAY, 1962.

Continuity of Supply Gas was supplied uninterrupted
from Cousland to Musselburgh
during the period 1st to 31st
of May, 1962.

Volume supplied from Cousland
to Musselburgh during the
month (corrected)²⁵ 3,049,800 cubic feet.

Pressure at wellhead during
the month (to nearest 0.5
pounds per square inch by
deadweight pressure tester)

2nd May	507.0	lbs. per square inch
9th May	506.5	lbs. per square inch
16th May	506.0	lbs. per square inch
23rd May	505.5	lbs. per square inch
30th May	505.0	lbs. per square inch

Number of days on which well was in
action during the month 31 days.

Number of days on which well was
shut down during the month Nil

²⁵ Corrected to 30 inches of Mercury and 60° Fahrenheit.

142, 277, 589
3,049, 800
145, 327, 389

FE2039

2062

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

My Thank you for your letter of the ⁸th instant enclosing the April report for the Cousland gas production, which I note averaged 98,000 cubic feet per day during the month. I apologise for the delay in acknowledging your letter.

Yours sincerely,

C.M. Adcock

CMA/BR

Fig
122

24th May, 1962.

1 + 2
Mar

*File
K.A.*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/OR

YOUR REF.

9th May, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.


Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of April, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts) *Ab.*
Chief Engineer. 

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1962.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of April, 1962.

Volume supplied from Cousland to Musselburgh during the month (corrected) [#] 2,939,100 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	4th April	511.0 lbs. per square inch
	12th April	510.0 lbs. per square inch
	18th April	509.0 lbs. per square inch
	25th April	508.0 lbs. per square inch

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil

[#] Corrected to 30 inches of Mercury and 60° Fahrenheit.

139,338,489
2,939,100
142,277,589

RE2039

File
phg

FE1980

12th April, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

1+2
phg

Dear Mr. Ricketts,

Natural Gas - Cousland

Am
Thank you for your letter of the 9th instant enclosing the
March report for the Cousland gas production, which I note
averaged 97,000 cubic feet per day during the month.

98 No delay in acknowledging your letter. I apologise for

Yours sincerely,

C.M. Adcock

CMA/BR



File
Chg

Your reference: PE1984

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~245 2111~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Thursday,
19th April, 1962.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
EAKRING.
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I refer to your letter of the 18th of April, 1962, and would confirm that the cumulative production of natural gas to the end of March, 1962, is 139,338,489 cubic feet.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DP/MA

AP.
SD

File
Ma

FE1984

18th April, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 12th April stating that the February gas production should have been 2,759,780 cubic feet instead of the 4,436,610 cubic feet reported in your monthly return. We have amended our own records, and we make the cumulative production to the end of March 139,338,489 cubic feet. Do you agree that this is the correct cumulative production?

Yours sincerely,

C.M. Adcock

CMA/BR

*File
the*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH 3

OUR REF. DP/EC.

YOUR REF.

Thursday,
12th April,
1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

I refer to the natural gas return sent to you on the 9th of March, 1962, and have to inform you that the amount of gas supplied from Cousland to Musselburgh during the month of February, should have been 2,759,780 cubic feet and not 4,436,610 cubic feet as given in the return.

We greatly regret this unfortunate error and apologise for any inconvenience caused.

Yours sincerely,

T.S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

*pp.
ds*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/HB

YOUR REF.

Monday,
9th April,
1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of March, 1962. Under the heading "Continuity of Supply" you will note that there was one stoppage during the month.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts) *ps.*
Chief Engineer. *(initials)*

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1962

Continuity of supply The supply of gas to Musselburgh failed at 8.30 a.m. on the 2nd of March, due to a blockage in the line between the Wellhead and the Governor House. This blockage was cleared and the supply restored at 4.00 p.m. on the 3rd of March.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 2,905,540 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

Deadweight pressure tester returned from makers on 23rd of March.

23rd March - 511.5 lbs. per square inch
28th March - 511.5 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month 1 day.

*Corrected to 30 inches of Mercury and 60° Fahrenheit.

136,432,949
2,905,540

139,338,489

PE 1980

FE1935

Fib
Phg

15th April
15th March, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

1 + 2
Phg

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant enclosing the February report for the Cousland gas production, which I note averaged 158,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SF

YOUR REF.

9th March, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 28th of February, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.
(T. S. Ricketts)
Chief Engineer.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - FEBRUARY, 1962.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 28th of February, 1962.

Volume supplied from Cousland to Musselburgh during the month (corrected) * $2,759,780$
 ~~$4,436,610$~~ cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

Deadweight pressure tester returned to makers for overhaul.

Number of days on which well was in action during the month 28 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

$$\begin{array}{r} 133,673,169 \\ 2,759,780 \\ \hline 136,432,949 \end{array}$$

$$\begin{array}{r} 133,673,169 \\ 4,436,610 \\ \hline 138,109,779 \end{array}$$

PE1935

1 + 2
119

File
119

PE1907

16th February, 1962.

Mark

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

February 1
Thank you for your letter of the 8th instant enclosing the
January report for the Cousland gas production, which I note
averaged 102,000 cubic feet per day during the month.

158,000

Yours sincerely,

C.M. Adcock

CMA/BR

File
Ph 9

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

DP/CWC

YOUR REF.

8th February, 1962.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of January, 1962, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

100
S

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JANUARY, 1962.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st of January, 1962.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 3,144,350 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	Deadweight pressure tester returned to makers for overhaul.
---	---

Number of days on which well was in action during the month..... 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

130,598,819
3,144,350

133,673,169

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

Friday,
19th January,
1962.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

I thank you for your letter of 15th January, 1962, and in answer to your query, I would advise you that we have permanently stopped using natural gas for underfiring in the producers of the continuous vertical retorts at Musselburgh gasworks.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.



PE1879

17th January, 1962.

File
m.9

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 15th instant. I confirm that the gross quantity of natural gas supplied from Cousland to Musselburgh during 1961 was 49,081,742 cubic feet at 30 inches of mercury and 60 degrees Fahrenheit; and that this is the quantity of gas recorded in the Royalty Statement, which is submitted to the Ministry of Power.

Yours sincerely,

C.M. Adcock

cc. A.S. Burt, Esq.,
The British Petroleum Company Ltd.,
BP House,
Ropemaker Street,
London E.C.2.

File
129

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH 3

OUR REF.

YOUR REF.

15th January, 1962.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas from Cousland

I forward each year to the Gas Council a statement giving the total production of natural gas for a calendar year, and I would advise you that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to 31st December, 1961, was 49,081,742 cubic feet.

The gross and net quantities are identical since no measurable impurities have been present and the volume is corrected to 30 inches of mercury and 60 degrees Fahrenheit.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts) *TR*
Chief Engineer. *ES*

DF/MH.

File
cha

PE1877

15th January, 1962.

Dear Steve,

Royalty Statements for Cousland and Eskdale natural gas production

The Royalty Statements for the Cousland and Eskdale natural gas production during 1961 have been prepared. In accordance with our established procedure, I am sending you herewith two copies of each of these statements.

Yours sincerely,

C.M. Adcock

A.S. Burt, Esq.,
The British Petroleum Company Ltd.,
BP House,
Ropemaker Street,
London E.C.2.

Encl.

CMA/BR

Fig
129

BP EXPLORATION COMPANY LIMITED

LICENCE A.205

COUSLAND

Statement of Natural Gas Production - 1st January 1961 to
31st December 1961 (Inclusive)

Cubic feet at 30 inches Mercury
and 60 degrees Fahrenheit

Natural Gas Won and Saved

January	4,425,780
February	4,033,780
March	3,875,179
April	4,376,710
May	4,269,760
June	3,955,130
July	3,787,070
August	4,078,370
September	4,023,066
October	4,332,370
November	4,436,610
December	3,487,917

NATURAL GAS LIABLE TO ROYALTY

49,081,742

166,023,739
130,528,819
35,494,920

130,528,819
3,144,350
2,759,780
2,905,540

139,338,489

15th January, 1962.

File
129

PE1876

15th January, 1962.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 2.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant enclosing the December report for the Cousland gas production, which I note averaged 112,000 cubic feet per day during the month.

Is it intended to stop using natural gas for underfiring in the producers of the continuous vertical retorts permanently, or is this a temporary winter arrangement?

Yours sincerely,

C.M. Adcock

CMA/BR

File
Chg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SF

YOUR REF.

9th January, 1962.

G. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of December, 1961. You will note under the heading "Continuity of Supply" that there were three stoppages during the month.

I have to advise you that on Monday, 11th December, 1961, we stopped using natural gas for underfiring in the producers of the continuous vertical retorts at Musselburgh gasworks.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts) *TR*
Chief Engineer.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1961.

127,040,902

3,487,917

130,528,819

Continuity of supply The supply of gas to Musselburgh failed at 9.45 a.m. on the 14th November, 1961, due to localised freezing at the governors as a result of a tape heater burning out. The supply was restored at 4.00 p.m. on the same day. There were two other stoppages due to trouble in the governors precipitated by the freezing on the 14th of November, 1961. These stoppages were from 9.25 p.m. to 10.20 p.m. on the 15th of November, and from 12.50 to 3.00 p.m. on the 16th of November.

Volume supplied from Cousland to Musselburgh during the month (corrected)*..... 3,487,917 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

6th December, - 513.5 lbs. per square inch.
13th December, - 513.0 lbs. per square inch.
20th December, - 512.5 lbs. per square inch.
27th December, - 512.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Fig
ms.

PE1849

13th December, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 8th instant enclosing the November report for the Cousland gas production, which I note averaged 148,000 cubic feet per day during the month.

May I take this opportunity of wishing you the compliments of the season.

Yours sincerely,

C.M. Adcock

CMA/BR

THE SCOTTISH GAS BOARD
26 DRUMSHEUGH GARDENS
EDINBURGH, 3

File
P.H.G.

OUR REF. DP/MH

YOUR REF.

8th December, 1961.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of November, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer

as.


122,604,292
4,436,610
127,040,902

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - NOVEMBER, 1961

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th of November, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 4,436,610 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	1st November, - 519.0 lbs. per square inch
	8th November, - 518.0 lbs. per square inch
	15th November, - 516.5 lbs. per square inch
	22nd November, - 515.5 lbs. per square inch
	29th November, - 514.5 lbs. per square inch

Number of days on which well was in action during the month.....30 days.

Number of days on which well was shut down during the month.....Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Copy

File
Cousland 12.9

From SENIOR GEOLOGIST, EAKRING

To MR. A.S. BURT

Our Ref. Geol/422/3484 Your Ref.

Date 30th November 1961

Subject GAS FIELD MINING LICENCES

Following your suggestion that suitable areas be defined as possible Mining Licences for the Eskdale and Cousland gas fields, we send you our proposals herewith. Mr. Adcock is in agreement with these areas.

Eskdale. The whole of Licence Area 117. No part of this can be dispensed with.

Cousland. The area enclosed in pink on the 1:25,000 map herewith. A written description of this is as follows:-

Approximate Area = 4.07 sq. miles.
Greatest length = 2.99 miles
Average width = 1.36 "
Ratio = 1:2.2 (Max. allowable 1:3)

Bounded by Belly Ford at (N.T 39526924)
thence straight line to road junction at (NT 39716736)
" straight line to junction of drive and lane (at NT 37076535)
" the North side of road to the junction at Whitehill Farm
(at NT 35696636)
" straight line to road junction (at NT 35926814)
" the south side of the road to road junction (at NT 36806887)
" straight line to Belly Ford.

R.G.W. Brunstrom

c.c. Manager, Eakring)
✓ Mr. Adcock) without map
Chief Geologist)
File (with map)

RGWB/AMS

Fig
129

FE1819

14th November, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 6th instant enclosing the October report for the Cousland gas production, which I note averaged 139,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

THE SCOTTISH GAS BOARD
26 DRUMSHEUGH GARDENS
EDINBURGH, 3

File
Ma

OUR REF. DP/MH

YOUR REF.

6th November, 1961.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of October, 1961. You will note under the heading, "Continuity of Supply", that there was no flow of gas for a period of two and a half hours on the 24th of October, 1961 due to localised freezing as a result of one of the tape heaters burning out.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts) *Ap.*
Chief Engineer *DR*

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - OCTOBER, 1961

118,271,922
4,332,370

122,604,292

Continuity of supply The supply of gas to Musselburgh failed at 7.45 a.m. on the 24th of October, 1961 due to localised freezing in the pipeline as a result of one of the Tape heaters burning out. The supply was restored at 10.15 a.m. on the same day.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 4,332,370 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	4th October, - 521.0 lbs. per square inch
	11th October, - 520.5 lbs. per square inch
	18th October, - 520.0 lbs. per square inch
	25th October, - 520.0 lbs. per square inch

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

ELECTROTHERMAL ENGINEERING LTD

270 NEVILLE ROAD, LONDON, E. 7.

TELEPHONE: GRANGEWOOD 9911

TELEX: 24176

TELEGRAMS: ELECTROTOP, LONDON

OUR REF. ELC/MW/3/646.

YOUR REF.

DATE 8th November, 1961.

For the attention of the Works Manager.

H. Adcock

Dear Sir,

Get it taped!

That's the way to solve those awkward problems of heating pipes, tanks, valves, instruments and machinery or anything else you can name!

Apply Electrothermal Flexible Heating Tapes for reliable heating. Whether you need high or low temperatures, a few watts or many kilowatts, there are Electrothermal Heating Tapes to suit your purpose. Select yours from the leaflets, or send details of your problem.

Got it taped now?

Yours faithfully,
ELECTROTHERMAL ENGINEERING LIMITED.

E. L. Curtis

E. L. Curtis.
CONTRACTS MANAGER.



Electrothermal[®]

HEATING TAPES

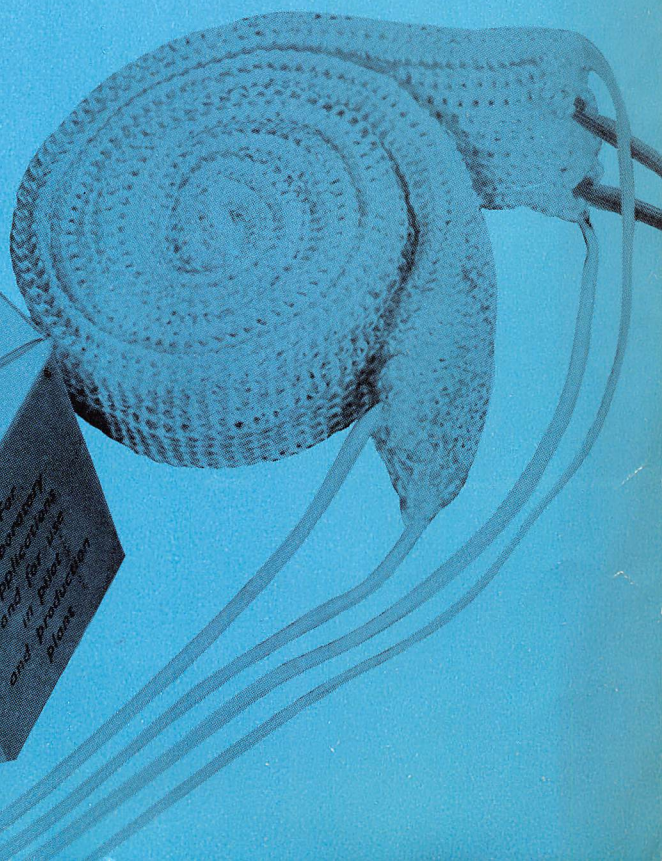
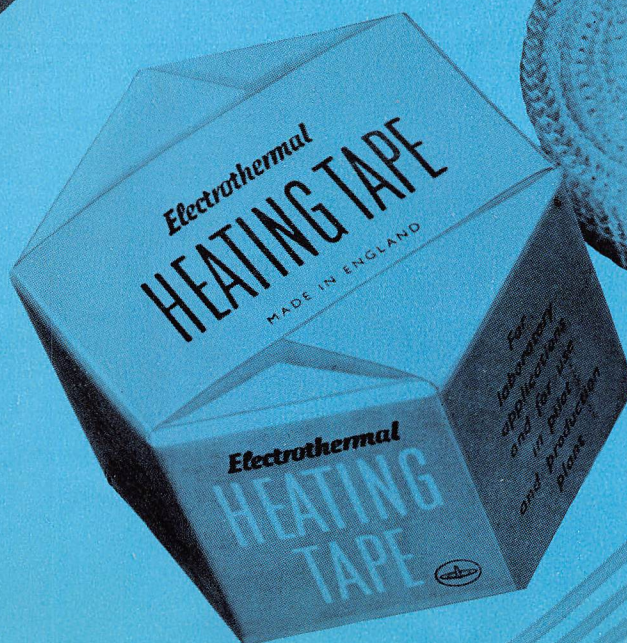
TEMPERATURES UP TO 450°C

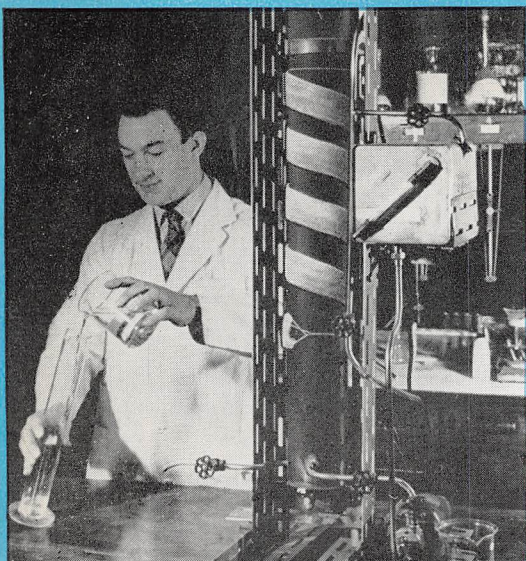
These tapes have been specially designed to solve the difficulties associated with the heating of fractionating columns, pipes, valves and transfer lines regardless of contour complexity.

The construction consists of one or more fabric bands of resistance wire separated and bordered by bands of high temperature resisting glass-fibre yarn. The width and length of the various tapes are carefully determined by the current carrying capacity of the resistance wire. The surface loading of standard heating tapes has been arranged approximately at $2\frac{1}{2}$ W/in.² (0.4 W/cm.²) area of tape. This wattage concentration enables temperatures of 400°C. (752°F.) and over to be reached inside a glass tube of 2 mm. wall thickness. Other surface loadings up to 8 W/in.² (1.25 W/cm.²) and other surface heaters up to 1,500°C (2,732°F) are available.

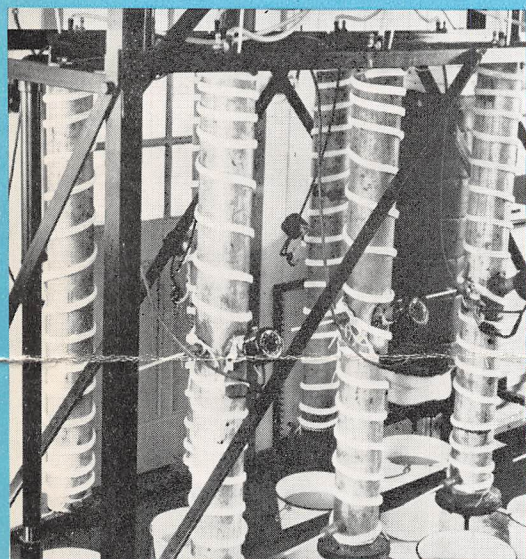
Heating Tapes are suitable for operation at controlled temperatures of up to 450°C. (842°F.) For maintaining constant temperatures suitable energy regulators can be supplied (see back page).

The tape is applied by simply winding it onto the surface to be heated. All tapes can be held in position by means of glass laces provided at both ends. They are fitted with suitable lead-in wire at one end terminating in a connector for easy connection to the mains.





HEATING TAPE USED ON AN EXPERIMENTAL
COPPER-FLOW RING-PACKED COLUMN
RUNNING AT ELEVATED TEMPERATURES



HEATING TAPES IN USE AT A PUMPING
STATION OF A DISTRICT WATER BOARD



ENERGY REGULATOR



AUTO-TRANSFORMER

OTHER ELECTROTHERMAL SURFACE HEATERS

(Details sent
on request)



Two principal designs are available:—

TYPE 3 - INSULATED ON BOTH SIDES

This tape is constructed of two insulation layers of knitted glass yarn with the current carrying bands in the centre. The tape can be safely wound onto metal, thus making it especially suitable for heating metal tubes, valves, nozzles and other conducting surfaces. Heat losses to atmosphere are minimised. Tests have been carried out on fractionating columns and temperatures between 35°–120°C. (95°–248°F.) were maintained for indefinite periods of time. Draughts did not cause a fluctuation of more than 2°C.

TYPE 4 - INSULATED ON BOTH SIDES (HEAVY DUTY)

In this design the heating element wires are held in position between layers of woven glass fabric. This results in a more robust construction which is recommended for use in industrial processes where dual flexibility is not of paramount importance.

SPECIAL TAPES

Special tapes in constructions, Type 3 or 4 can be made available in any length and width. Wattage loadings up to 8 W/in.² (1.25 W/cm.²) can be supplied. See also reference to heating tapes and other surface heaters up to 1,500°C (2732°F) at foot of page.

SERIES 3 & 4 HEATING TAPES

Cat. No.	Length (approx.)		Width (approx.)		Approx. watts	Max. Current Amps.		Price £ s. d.
	ins.	cm.	ins.	mm.		230v.	115v.	
HT 301 or 401	36	90	1"	25	100	0.8	1.6	3 0 0
HT 302 " 402	48	125	2 1/2"	64	250	1.5	3.0	4 0 0
HT 303 " 403	60	150	3"	76	450	2.3	4.6	5 15 0
HT 304 " 404	72	180	3 1/2"	90	500	2.6	5.2	6 10 0
HT 340 " 440	24	60	12.7"	36	36	0.25	0.5	2 0 0
HT 341 " 441	48	125	12.7"	72	72	0.5	1.0	3 0 0
HT 342 " 442	72	180	12.7"	108	108	0.75	1.5	3 15 0
HT 343 " 443	96	250	12.7"	144	144	1.0	2.0	4 10 0
HT 350 " 450	24	60	1"	25	72	0.5	1.0	2 10 0
HT 351 " 451	48	125	1"	25	144	1.0	2.0	3 15 0
HT 352 " 452	72	180	1"	25	216	1.25	2.5	4 17 6
HT 353 " 453	96	250	1"	25	288	1.5	3.0	5 12 6
HT 360 " 460	24	60	2"	50	120	0.75	1.5	3 10 0
HT 361 " 461	48	125	2"	50	240	1.5	3.0	4 5 0
HT 362 " 462	72	180	2"	50	360	2.0	4.0	5 12 6
HT 363 " 463	96	250	2"	50	480	2.5	5.0	6 15 0
HT 370 " 470	24	60	3 1/2"	90	210	1.25	2.5	4 5 0
HT 371 " 471	48	125	3 1/2"	90	420	2.2	4.4	5 2 6
HT 372 " 472	72	180	3 1/2"	90	630	3.75	7.5	6 10 0
HT 373 " 473	96	250	3 1/2"	90	840	5.0	10.0	9 0 0

ENERGY CONTROLLERS FOR A.C.

Cat. No.	Description	Voltage		Output Amps.		Price £ s. d.
		Input	Output	Rated	Max.	
MC 221	Energy Regulator	110/125 or 200/250	110/125 or 200/250	6	8	3 12 6
MC 401	Auto-transformer	250	0-270	2	2.5	15 10 0
MC 411	Auto-transformer	125	0-135	5	6	12 0 0

Suitable control gear can be supplied for D.C.

PLEASE STATE VOLTAGE WHEN ORDERING

SERIES	DESCRIPTION	LOADINGS UP TO		TEMPERATURES UP TO	
		W/in ²	W/cm ²	°C.	°F.
HP	PIPE HEATER	1.2	0.186	100	212
HT	HEAT-BY-THE-YARD ... can be cut to length	7	1	450	842
HC 1	THERMOCORD	26	4	450	842
HA	ARMOURED HEATER	30	4.65	800	1,472
HC 2	THERMOCORD	43	6.75	1,000	1,832
HT 5	HEATING TAPE	8	1.25	1,000	1,832
HR	FLEXIBLE FURNACE	50	7.6	1,500	2,732

ELECTROTHERMAL ENGINEERING LTD
270 NEVILLE ROAD, LONDON E.7
Telephone : GRAngewood 9911 Telex 24176
Telegrams: ELECTROTOP, LONDON TELEX

Electrothermal products are protected by patents
or registered designs or applications therefor

SUPPLIED BY

File

Ch. G.

FE1777

19th October, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 6th instant enclosing the September report for the Cousland gas production, which I note averaged 134,000 cubic feet per day during the month.

The Ministry of Power has approved the use of the second Holmes B.M. meter for the measurement of Cousland natural gas, and has confirmed that there is no necessity to have the second meter re-tested until it requires a major overhaul.

Yours sincerely,

C.M. Adcock

cc. Mr. A.S. Burt
BP House

CMA/BR

THE SCOTTISH GAS BOARD
26 DRUMSHEUGH GARDENS
EDINBURGH, 3

OUR REF.

DP/HB

YOUR REF.

6th October, 1961.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of September, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer.

pp.
[Signature]

114,248,856
4,023,066
118,271,922

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION - SEPTEMBER, 1961

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th September, 1961.

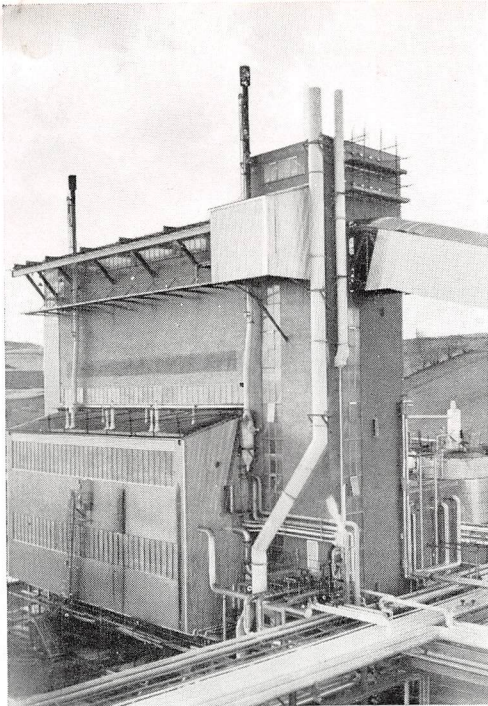
Volume supplied from Cousland to Musselburgh during the month (corrected) 4,023,066 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	6th September, - 523.5 lbs. per square inch
	13th September, - 523.0 lbs. per square inch
	20th September, - 522.0 lbs. per square inch
	27th September, - 522.0 lbs. per square inch

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



Lurgi House.

THE Westfield works was officially opened on Tuesday, 27th of June, by Her Majesty The Queen.

The plant which the Scottish Gas Board are building at a cost of £6,600,000 is the first in Britain, and only the third in the English speaking world to incorporate the Lurgi process of high-pressure gasification. (The others are

General view of the Westfield works.

BRITAINS' FIRST

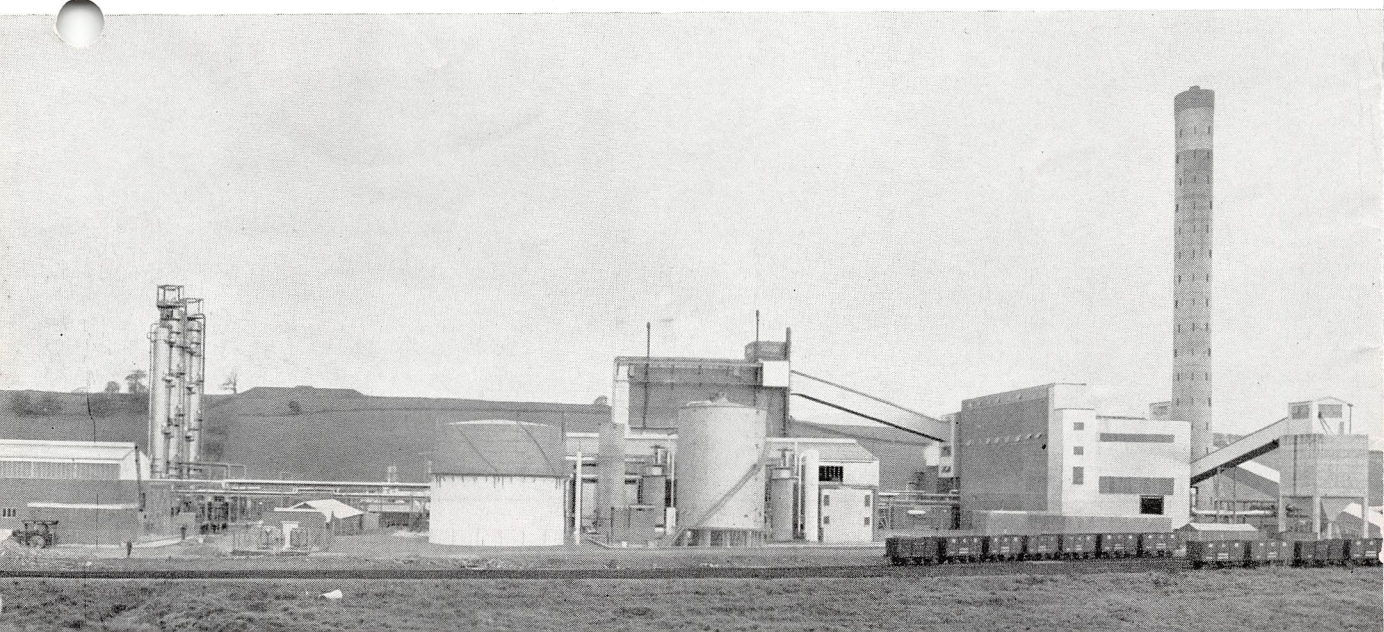
at Sasolburg in South Africa and Morwell in Australia).

The works is at present producing 15 million cubic feet of gas per day. When the second stage of construction is completed in a few months time this output will be doubled to 30 million cubic feet of gas per day, an amount equivalent to one-fifth of the present total demand for gas in Scotland.

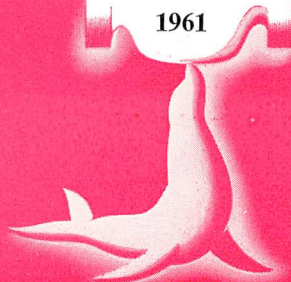
Since the gas is made at high pressure it can be readily distributed over considerable distances. The Scottish Gas Board are therefore also constructing a high-pressure pipeline across central Scotland which when linked with existing grid systems will enable gas from Westfield to be distributed over an area of some 4,000 square miles.

Raw Material

The Lurgi process makes large quantities of gas from low rank non-caking opencast coal which is totally unsuitable for gas-making by orthodox means. In effect this means the



Vol. 7
Number 3
October
1961



THE SEAL



H.M. The Queen in Scotland (see page 2).

LURGI PRESSURE GASIFICATION PLANT

development of a wholly new indigenous source of refined fuel.

A mixture of washed coal of size $\frac{1}{2}$ " to 1" to which a proportion of middlings (rejects of high-ash-content shale from the washery has been added) is delivered to the works by railway wagon and carried by conveyor belt to the gasifiers.

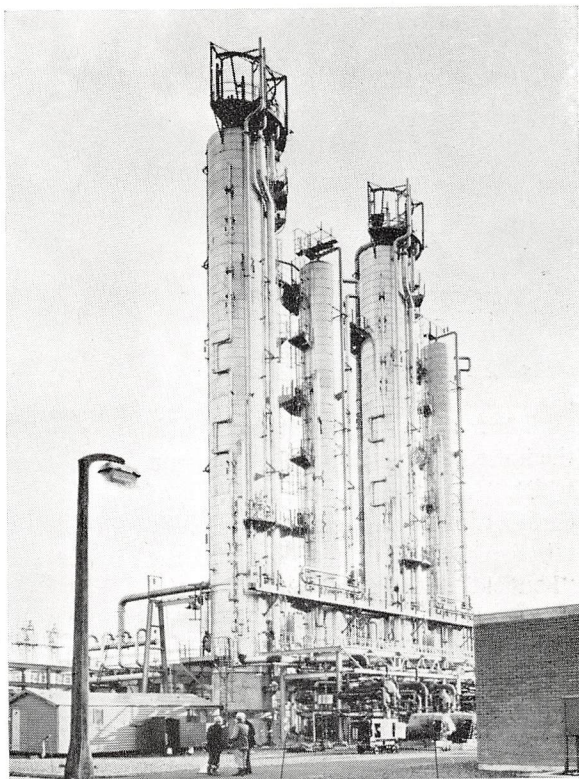
The Gasifiers

The Lurgi gasifier is a mild-steel vessel of fusion-welded construction. The main vessel is approximately 19 feet overall height with an outer diameter of 10 feet. The coal enters through a lockhopper attached to the top of the gasifier; steam and oxygen at high pressure are introduced at the lower end and the gas is generated as a result of the reaction of steam and oxygen with the coal at a pressure of about 30 atmospheres. Each gasifier produces upwards of $7\frac{1}{2}$ million cubic feet of gas per day. Normally with the present output of the works two are in use with one as a stand-by.

Cooling

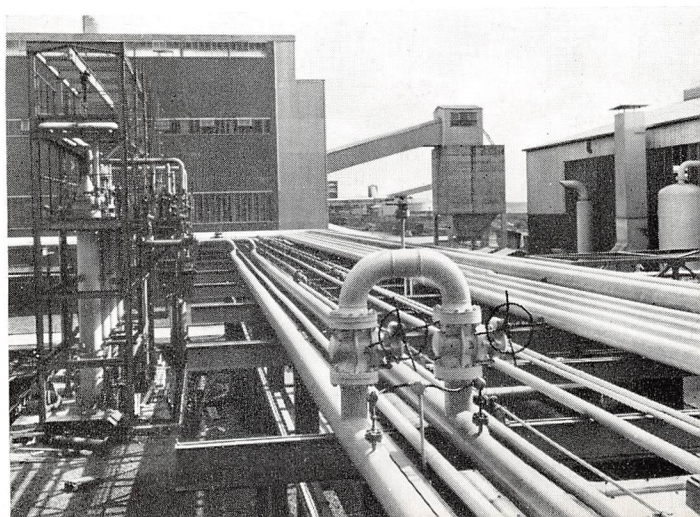
Crude gas leaves the gasifiers at a temperature of between 400 and 450 degrees Centigrade. Tar-Water is sprayed into the gas in a quench cooler and its temperature is reduced to about 196 degrees Centigrade. This allows the fullest use to be made of the latent heat of the gas as it passes through the waste-heat boilers; considerable quantities of low-pressure steam are obtained and used as process steam in the purification plant.

The gas passes from the waste-heat boilers to a pre-cooler and from there in twin streams to another installation of coolers, each stream of which consists of two vertical tubular water-cooled heat exchangers in series called respectively the "after-cooler" and the "final-cooler."



The Benfield plant.

Fig. 1.



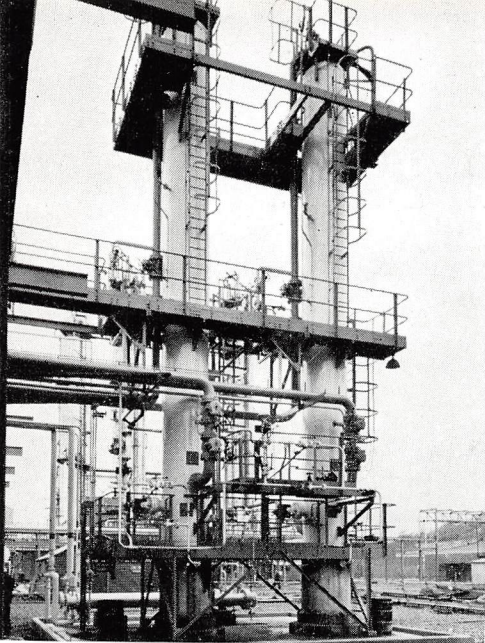


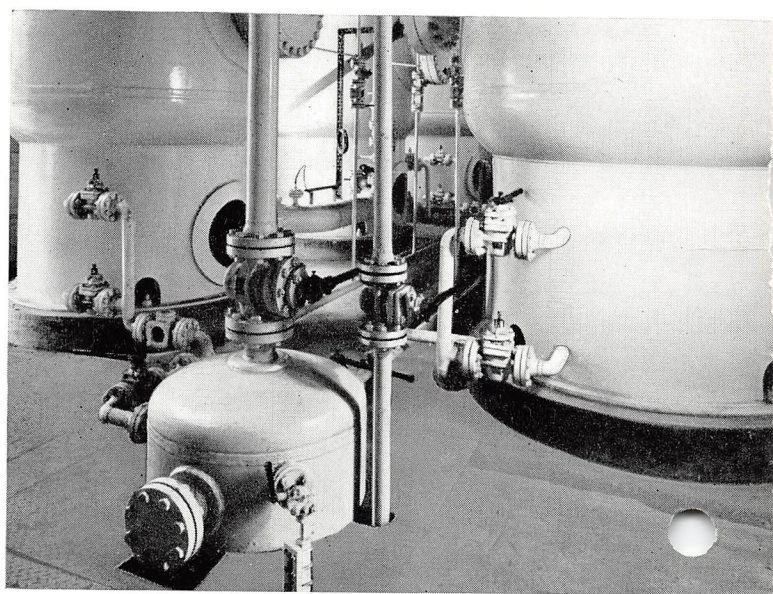
Fig. 2.

Figure 1 shows Gas Mains from the outlet of Final Gas Coolers and Cross-over connection with 10" Class 300 Audco Valves.

Purification

After the gas leaves the coolers it passes through various stages of purification. Benzole is removed by washing with light oil. A general view of the Benzole Absorbers is shown in Fig. 2. The Audco Valves here are also 10" Class 300. A further stage is the removal of carbon dioxide and hydrogen sulphide. This process may be carried out in one plant or in separate plants.

Fig. 3.



The method adopted at Westfield is the hot potassium carbonate process in which the simultaneous removal of carbon dioxide and hydrogen sulphide takes place. This is done in the "Benfield" plant, named after its inventors, Mr. Benson, and Mr. Field of Pittsburgh, U.S.A.

The carbon dioxide content of the Lurgi gas when it leaves the coolers is approximately 27 per cent and the hydrogen-sulphide content about 0.8 per cent. The high carbon-dioxide content must be reduced in view of its effect on the calorific value of the gas.

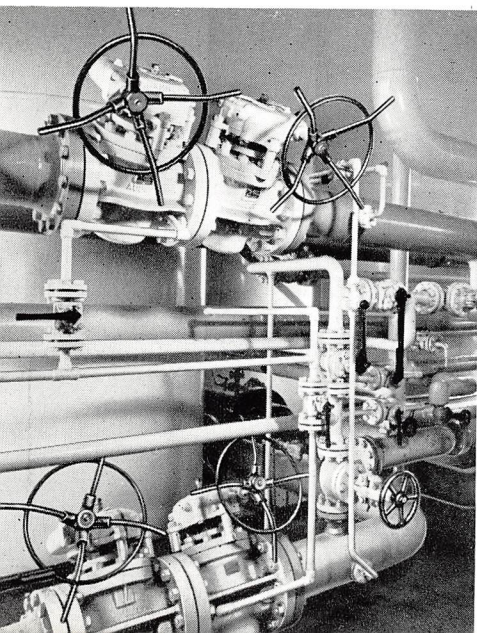


Fig. 4.

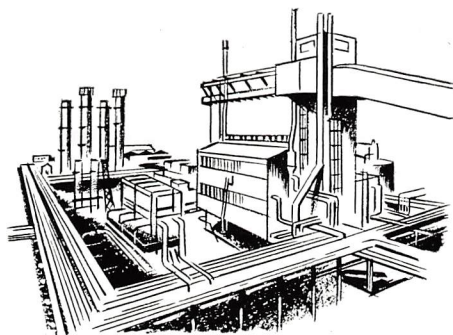
Essentially, the "Benfield" process involves the absorption of carbon-dioxide and hydrogen sulphide in a 35 per cent solution of potassium carbonate at high pressure and at a temperature of approximately 110 degrees Centigrade.

The carbon dioxide and hydrogen sulphide react with the potassium carbonate to form potassium bicarbonate and potassium bisulphide respectively; the solution leaves the absorber and, after a reduction of pressure from 325 pounds to 5 pounds a square inch, passes to a regenerator vessel where conventional steam

stripping is carried out at the same temperature.

The acid gases (or waste gases) leaving the top of the regenerator consist of approximately 98 per cent of carbon dioxide and 2 per cent of hydrogen sulphide. After being cooled they pass to a catalytic conversion plant where all hydrogen sulphide is oxidised to sulphur dioxide. The waste gases are then mixed with boiler flue gases and finally pass to the main stack. Plant for the recovery of sulphur from the waste gases will be installed during the second stage of the construction of the works.

The "Benfield" plant has been designed to give an absorption efficiency of carbon dioxide and hydrogen sulphide of over 90 per cent. In order to purify the gas to statutory requirements, it is necessary to add a further stage of purification before the gas passes into the grid main.



The "Bischoff" system of oxide purification has been chosen for the final stages of hydrogen sulphide removal. In this system the gas passes through two streams each of four towers designed for operation at pressure of 340 pounds a square inch; each purifier tower and one of two stacking towers is provided with twelve trays containing hydrated iron oxide. Essentially, the system operates on the principle that the oxide is removed in rotation from one tower to another at specific intervals and the towers themselves always remain in the fixed rotation order of 1, 2, 3, 4.

A view inside the Bischoff building shows in Fig. 3, Audco Class 300 Valves on the condensate system at the base of the Bischoff Towers. Fig. 4 is another view in the Bischoff Purification Plant and shows Audco Valves on the Gas Mains (double block and bleed system).

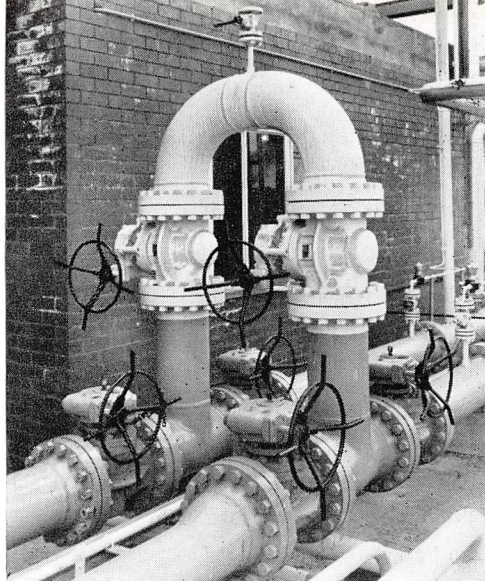


Fig. 6.

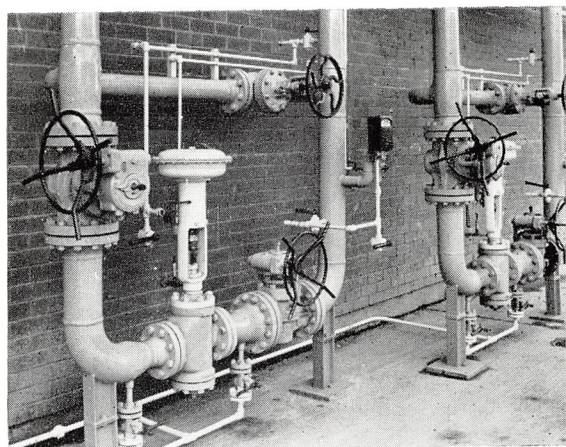


Fig. 5.

Fig. 7.

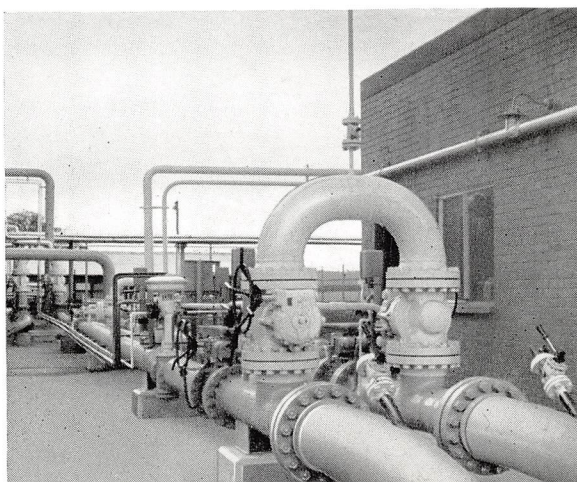


Fig. 5 shows Audco Valves on the Nitrogen dilution flow control system to Bischoff Towers.

The Audco Valves shown in Fig. 6 are on the Gas Mains and Cross-over connections at the outlet of the Gas Drying Plant.

Enrichment

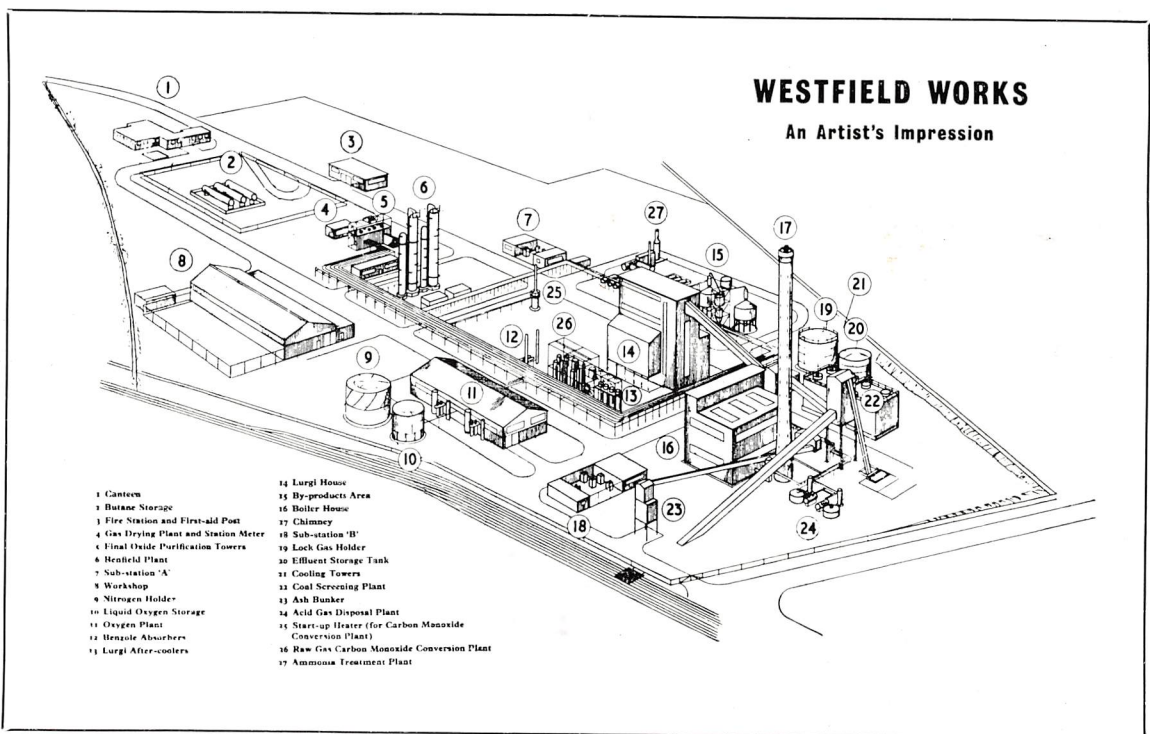
The gas which has been produced and purified by the processes described requires to be "conditioned" so that its calorific value and specific gravity correspond to district requirements. The purified Lurgi gas has a calorific value of 400 British Thermal Units per cubic foot. At present the gas is enriched to 450 British Thermal Units by the addition of butane,

supplies of which are brought in by road from Grangemouth Oil Refinery, 35 miles from Westfield.

The butane system is equipped with Steel Class 300 Audco Valves from the storage vessels, through gas treatment and to its final injection into the gas main.

Fig. 7 shows the gas mains as they finally leave the works. Class 300 Audco Valves can be seen on the Mains and Cross-over connections.

The Super Grid of some 1,100 miles which has been built to pipe the gas to customers is equipped with Class 300 Audco Valves in sizes up to 12". Audco valves are also used on the several governor stations.



File
169

FE1745

15th September, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 7th instant, enclosing the August report for the Cousland gas production, which I note averaged 132,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

CMA/BR

FIG
Phg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/MH

YOUR REF.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

7th September, 1961

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of August, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

p. T. S. RICKETTS

(T.S. Ricketts)
Chief Engineer.

Enc.

130
82
408

110, 170, 486
4,078, 370
114, 248, 856
16

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - AUGUST, 1961.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st August, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 4,078,370 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	2nd August, - 528.0 lbs per square inch
	9th August, - 527.5 lbs per square inch
	16th August, - 527.0 lbs per square inch
	23rd August, - 527.0 lbs per square inch
	30th August, - 526.0 lbs per square inch

132,000 p/dy

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Mr. Adcock.

File

Cousland

(11.6)

1st September, 1961.

Dear Millett,

I refer to your letter of 19th July in connection with the maintenance of the Holmes-Connersville impeller meter being used for measuring the supply of natural gas from Eskdale to the North Eastern Gas Board.

We have now had confirmation from the North Eastern Gas Board that arrangements have been made for the meter to be included in their maintenance contract with Messrs. W.C. Holmes. The first inspection and test is due to be carried out during the next few days and the certificate of accuracy, when issued, will, as you have suggested, be held at Eakring and made available to the Ministry on request.

We have also looked into the position at Cousland. We understand that no re-calibration of the Holmes B.H. Meter installed at Musselburgh, for the measurement of Cousland natural gas, has been undertaken since the meter was commissioned, and I am sorry for this. The Scottish Gas Board have advised us that they themselves carry out regular lubrication and levelling of the meter. No major overhaul on this meter has so far been necessary but the Board have confirmed that when this is required Messrs. W.C. Holmes will be asked to carry out the work and issue the appropriate test certificate. Should the Ministry require another calibration, I will arrange that the Board have the meter re-tested immediately.

The Scottish Gas Board have also advised us, as the result of these enquiries, that a second Holmes B.M. Meter is in use in connection with natural gas at Musselburgh. This meter, they say, was originally installed when it was intended to reform the natural gas in the retorts; these reforming experiments are not proceeding but the meter has been operated, since 20th June, 1961, to measure natural gas used for underfiring in the producer units, separately from the natural gas used for enrichment. We accept that approval should have been obtained from you before this meter was brought into use, and we have pointed this out to the Board. The details of this meter are as follows:-

/...

Size - Number 60; 20,000 cu.ft. per hour
Date of manufacture - 1944
Serial number - 1254

We are advised, however, that a 1960 test certificate is available and we should be pleased to arrange for a copy of this to be forwarded to you should you require confirmation of the test.

Yours sincerely,

Signed: A. F. M. Matthews

A.J. Millett, Esq.,
Ministry of Power,
Petroleum Division,
Thames House South,
Millbank,
LONDON S.W.1.

c.c. / Mr. C.M. Adcock (Eakring)
Mr. A.S. Burt

EE1717

28th August, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural gas - Cousland

Thank you for your letter dated 17th August, and for the particulars of the Holmes B.M. meters used for measuring Cousland gas. I have passed on this information to our London Office who will make it available to the Ministry.

As I explained to Mr. Elgin over the telephone, the second B.M. meter commissioned at Musselburgh should have been approved by the Ministry before it was used for the measurement of Cousland gas.

I will write to you again in due course should the Ministry require a copy of the latest test certificate for the second meter, or any other information.

Yours sincerely,

C.M. Adcock

cc. G.C. Hoyer-Miller, Esq.,
BP House,
Ropemaker Street,
London E.C.2.

CMA/BR

PE1718

28th August, 1961.

Dear Hoyer-Miller,

Both the Scottish and North Eastern Gas Boards have now replied to my letters requesting information on the maintenance of the natural gas Royalty meters. Copies of these letters are being sent to you herewith.

No re-calibration of the Holmes B.M. meters installed at Musselburgh, for the measurement of Cousland gas, has been undertaken since the meter was commissioned. The Scottish Gas Board will arrange to have the B.M. meter re-tested by Messrs. W.C. Holmes and Co. Ltd. should the Ministry require another calibration.

You will note that a second B.M. meter has been installed at Musselburgh, and that it is used to measure the natural gas consumption for underfiring in the producers. I told Mr. Elgin that the Ministry should have been informed about this development, so that the meter could have been approved before it was brought into use. However, a 1960 test certificate is available, and a copy can be obtained if the Ministry requires confirmation of the test.

The North Eastern Gas Board has arranged for the Holmes-Connersville meter, installed at Whitby, to be included in their maintenance contract with Messrs. W.C. Holmes. The first inspection and test is due to be carried out during the next few days. It is considered that this should be a satisfactory arrangement.

Yours sincerely,

C.M. Adcock

G.C. Hoyer-Miller, Esq.,
BP House,
Ropemaker Street,
London E.C.2.

Encl.

CMA/BR

File
Ph 9

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH 3

OUR REF.

YOUR REF.

Thursday,
17th August,
1961.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Bakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland

With reference to your letter of the 14th of August, 1961, we ourselves carry out regular lubrication and levelling of the Holmes B.M. meter measuring the Cousland gas. It has not been necessary, so far, to carry out a major overhaul on this meter but I confirm that, if this were required, W.C. Holmes and Company Limited would be asked to carry out the work and thereafter issue a new test certificate. We would, of course, be very pleased to have the meter re-tested immediately if this is required.

I also confirm your telephone conversation with Mr. Elgin this morning when he informed you that a second B.M. meter had been installed at Musselburgh gasworks to measure the natural gas. The meter was installed when it was intended to reform the natural gas in the retorts; the reforming experiments are not proceeding but the meter has been operating, since 20th June, 1961, to measure the natural gas used for underfiring in the producers, separately from the natural gas used for enrichment. The details of the meter are as follows:

Size	: Number 60, 20,000 cubic feet per hour.
Date of Manufacture	: 1944.
Serial number	: 1254.

It was last tested by W.C. Holmes in May, 1960, and a copy of the letter confirming this test can be made available to you if necessary.

I trust that this information will be of assistance to you and await your further observations.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

FE1705

File
Ch 9
14th August, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural gas - Cousland

Thank you for your letter of the 9th instant, enclosing the July report for the Cousland gas production, which I note averaged 122,000 cubic feet per day during the month.

The Ministry of Power has asked us whether you have any arrangements for the maintenance of the Holmes B.M. meter, installed at Musselburgh, to measure Cousland gas. It is presumed that Messrs. W.C. Holmes and Company Ltd. would undertake the overhaul work if required, and that you would then be issued with a new certificate of accuracy.

Would you please let me know what is the position in this respect so that I can pass this information on to the Ministry.

Yours sincerely,

C.M. Adcock

cc. Mr. G.C. Hoyer-Miller, BP House, Ropemaker Street, London E.C.2.

CMA/BR

File
14a

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF.

YOUR REF.

9th August, 1961.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of July, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. J. Ricketts

(T.S. Ricketts)
Chief Engineer.

[Signature]

DP/HB

106,383,416
 3,787,070
 110,170,486

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JULY, 1961.

Continuity of supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st July, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 3,787,070 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	9th July, - 551.5 lbs. per square inch.
	12th July, - 551.0 lbs. per square inch
	19th July, - 529.5 lbs. per square inch.
	26th July, - 529.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil



File
Cha-

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~CALEDONIAN~~ 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

7th July, 1961.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30th of June, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

DP/EC.

bp.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JUNE, 1961.

102,428,286
3,955,130
106,383,416

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th June, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 3,955,130 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	7th June, - 533.0 lbs. per square inch.
	14th June, - 531.0 lbs. per square inch.
	21st June, - 532.0 lbs. per square inch.
	29th June, - 532.0 lbs. per square inch.

Number of days on which well was in action during the month..... 30 days.

Number of days on which well was shut down during the month Nil

*Corrected to 30 inches of Mercury and 60° Fahrenheit.

File
129

PE1664

12th June, 1961.

Dear Mr. Johnson,

Cousland

Thank you for your letter of the 8th instant. I was surprised to learn that the firm of Mining Consultants employed by the Scottish Gas Board was not qualified to express an opinion on the extent of the limestone sterilization necessary to safeguard both the mine workings and the gas well.

Surely there must be other Mining Experts in the Edinburgh district whom the Scottish Gas Board could consult? I feel that, to make use of local knowledge, a regional approach to the limestone sterilization problem is the correct one.

With regard to the site for Cousland well 7, the decision taken at our meeting in the Basil Street Hotel was that Professor Illing and Mr. Brunstrom should jointly select and approve the location. Professor Illing should therefore indicate the precise location on a reference map, and I would concur if he recommended a site 700 feet to the north east of No.1 well.

Yours sincerely,

C.M. Adcock

C. Johnson, Esq.,
The Gas Council,
Murdoch House,
1, Grosvenor Place,
London S.W.1.

cc. Mr. W.M. Watson,
Mr. R.G.W. Brunstrom
Mr. A.S. Burt

CMA/BR

pt 2

15. 142 6m 45

THE GAS COUNCIL

MURDOCH HOUSE · 1 GROSVENOR PLACE
LONDON, S.W.1.

Belgravia 4321

8th June, 1961.

Dear Mr. Adcock,

Cousland

Thank you for your letter of the 1st May relating to the limestone compensation claim at Cousland and particularly referring to the appropriate radius of the area of sterilisation around No. 1 well. I passed on your views to Mr. Ricketts of the Scottish Gas Board and he has since replied to me to say that he is doubtful whether the firm of mining consultants employed by his Board would be qualified to express an opinion on the particular point at issue. Mr. Ricketts has asked me, therefore, to enquire of you whether you can mention a suitable firm to him.

While I am writing to you I will mention that your letter referred to a provisional location for the suggested No. 7 well at a distance of 600 ft. north east of No. 1 well. In a telephone discussion with Professor Iling this morning he mentioned a distance of 700 ft. and said that the tentative site was beyond the boundary of proposed limestone quarrying. Perhaps when you reply to the first point in my letter you will refer to this matter of distance or, better still, indicate the precise location on a simple reference map.

Yours sincerely,



C. M. Adcock, Esq.,
Senior Petroleum Production Engineer,
B.P. Exploration Co. Ltd.,
P.O. Box No. 1,
SOUTHWELL,
Notts.

File
CMA

PE1666

12th June, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 8th instant, enclosing the May report for the Cousland gas production, which I note averaged 138,000 cubic feet per day during the month.

Inadvertently you sent me two additional copies of this report, which I am returning to you herewith.

Yours sincerely,

C.M. Adcock

Encl.

CMA/BR

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DP/SF

YOUR REF.

8th June, 1961.

G. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of May, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts,)
Chief Engineer.

pp. [initials]

File
29

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MAY, 1961.

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st May, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 4,269,760 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	3rd May, - 535.5 lbs. per square inch.
	10th May, - 535.0 lbs. per square inch.
	17th May, - 534.0 lbs. per square inch.
	24th May, - 534.0 lbs. per square inch.
	31st May, - 534.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil

98,158,526
4,269,760
102,428,286

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Fig
CMA

PE1634

17th May, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your letter of the 9th instant, enclosing the April report for the Cousland gas production, which I note averaged 146,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

CMA/BR

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

OUR REF. DE/HB

YOUR REF.

9th May, 1961.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

Dear Mr. Adcock,

National Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 30st of April, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer. *pp. [initials]*

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1961

Continuity of Supply..... Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th April, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected) 4,376,716 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

5th April, - 540.0 lbs. per square inch.

12th April, - 539.0 lbs. per square inch.

19th April, - 538.0 lbs. per square inch.

26th April, - 537.0 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

93,781,816

4,376,710

98,158,526

PE1616

1st May, 1961.

Dear Mr. Johnson,

Cousland

Thank you for your letter dated 28th April. The question of the extent of the limestone sterilization necessary to safeguard both the mine workings and the gas well at Cousland is a matter which requires the services of a Mining Consultant for its assessment.

Dr. May, I believe, is of my opinion, that in view of the shallow depth of the limestone workings, it should not be necessary for the sterilization zone to extend beyond say a radius of 100 feet from the well bore. However, since I am not conversant with mining practices, I have advised that you should consult a Mining Expert.

You will have received from Mr. Ricketts the site plan showing the Nunnery Quarry and Windmill plantation, also the underground plan indicating the area of the limestone workings. It is of interest to note that no mine workings are shown on the underground plan 600 feet to the north-east of well 1, which is the tentative site for well 7.

Whether the new well will be subject to, or free from, limestone compensation claims, should be ascertained from the Stair Estates after the location has been selected by Professor Illing in conjunction with Mr. Brunstrom, and before any site work is undertaken.

Yours sincerely,

C.M. Adcock

C. Johnson, Esq.,
The Gas Council,
Murdoch House,
1, Grosvenor Place,
London, S.W.1.

cc. Mr. W.M. Watson
Mr. R.G.W. Brunstrom
Mr. A.S. Burt

CMA/BR

THE GAS COUNCIL

MURDOCH HOUSE · 1 GROSVENOR PLACE

LONDON, S.W.1.

Belgravia 4321

28th April, 1961.

Dear Mr. Adcock,

Cousland

During the course of our meeting at the Basil Street Hotel on 22nd March to consider the prospect of utilising the reserve of natural gas and creating a storage for town gas you raised an informal discussion on the compensation claim by Messrs. Stair Estates Ltd. for sterilization of limestone in the region of No. 1 well. Two issues were raised, namely, whether the affected area should extend to a radius of 150 ft. and whether the claim should be considered afresh if the Scottish Gas Board decided to proceed with the drilling of an additional well identified as No. 7 well.

I think it was left that you and Dr. May would discuss whether there was any need to amend the stipulated radius and that Professor Illing would look at the mining diagrams to decide whether any future drilling could be so located as to minimise limestone compensation claims.

In a different context the Scottish Gas Board have asked for our views on certain aspects of the limestone claim which is being pressed and I thought that if you were now of the opinion that the affected area needed to be modified Scottish Gas Board should be advised to take this into account. There was also the matter of whether a proposed new borehole, identifiable as No. 7 well, could be so sited, in agreement with Professor Illing, as to affect favourably any further claim that might be presented on this account.

I would be glad if you could let me have the up to date position on these points.

Yours sincerely,



C. M. Adcock, Esq.,
Senior Petroleum Production Engineer,
B.P. Exploration Co. Ltd.,
P.O. Box No. 1,
SOUTHWELL,
Notts.

File
Chis

PE1583

11th April 1961

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural gas - Cousland

Many thanks for your letter dated 29th March enclosing two copies each of the following drawings:-

- (a) Site plan showing the Nunnery Quarry and Windmill Plantation, with the location of the existing limestone workings to 13th May 1958.
- (b) Underground plan of the limestone mine workings showing the area which has been sterilised around Cousland well 1.

I have passed a copy of each drawing to Mr. Brunstrom, who will discuss the location of well 7 with Professor Illing. It is of interest to note that no mine workings are shown on the underground plan 600 feet to the north-east of well 1, which is the tentative site for well 7.

Thank you also for the March report for the Cousland gas production, which I note averaged 155,000 cubic feet per day during the 25 days the well was on production.

Yours sincerely,

C.M. Adcock

cc. Mr. R.G.W. Brunstrom
Mr. A.S. Burt

CMA/BR

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH 3

File
na

OUR REF.

YOUR REF.

5th April, 1961.

C. M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information relating to the supply of natural gas from Cousland to Musselburgh during the month ended 31st March, 1961. You will note under the heading 'Continuity of Supply', that there was a restriction in the flow of gas between the 1st and 6th of March due to a blockage in the line between the Wellhead and the Water Separator.

Yours sincerely,

T. S. Ricketts

T.S. Ricketts.
(Chief Engineer.) *Ap. Dr.*

The Scottish Gas Board

Natural Gas supplied from Cousland to Musselburgh.

Report on Gas Production - March, 1961.

Continuity of Supply

The gas supply to Musselburgh was restricted at 9.15 a.m. on the 1st of March, due to a blockage in the line between the Wellhead and the Water Separator. This blockage was eventually cleared and the gas supply restored at 2.00 p.m. on the 6th of March.

Volume supplied from
Cousland to Musselburgh
during the month
(corrected)*

3,875,179 cubic feet.

Pressure at Wellhead
during the month (to
nearest 0.5 pounds per
square inch by
deadweight tester).

1st March	-	547.0 pounds per square inch.
8th March	-	546.0 pounds per square inch.
15th March	-	543.0 pounds per square inch.
22nd March	-	541.0 pounds per square inch.
29th March	-	540.0 pounds per square inch.

Number of days on which
Well was in action during
the month.

26 Days.

Number of days on which
Well was shut down during
the month.

5 Days.

89,906,637
3,875,179
93,781,816

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



File
Ph. 9

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH. 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Wednesday,
29th March,
1961.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

During the meeting with Professor Illing, I promised to let you have copies of any drawings in our possession showing the position of underground workings in the vicinity of Cousland. I now enclose two copies of a plan showing the general disposition of workings as in 1958. Incidentally, this shows also the position of the minor surface collapse which took place in September, 1959. Two copies are also enclosed of a detailed drawing showing the workings in the immediate vicinity of the Number 1 well about the time when sterilisation was requested.

I have also sent copies of these drawings to Mr. Johnson and he will be sending one of them direct to Professor Illing. Although your firm may have these drawings already I thought you would like to have them for immediate reference.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DCE/MA

THE GAS COUNCIL

MURDOCH HOUSE · 1 GROSVENOR PLACE

LONDON, S.W.1.

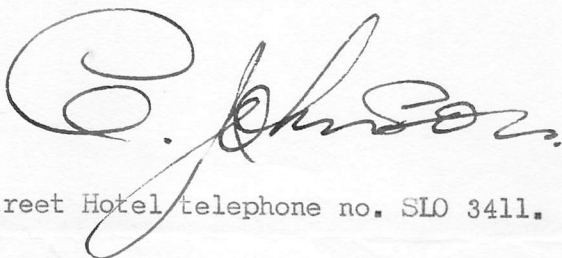
Belgravia 4321

20th March, 1961.

Dear Mr. Adcock,

It has been decided that our meeting on Wednesday, 22nd March, to discuss Cousland and Eskdale will be held in the Basil Street Hotel, Basil Street, near Knightsbridge Station, in a private room at 11 a.m. I trust this will be convenient to you.

Yours sincerely,

A large, stylized handwritten signature in dark ink, appearing to read 'E. Johnson'.

P.S. Basil Street Hotel telephone no. SLO 3411.

C. M. Adcock, Esq.,
Senior Petroleum Production Engineer,
B.P. Exploration Co. Ltd.,
P.O. Box No. 1,
SOUTHWELL,
Notts.

c.c. R.G.W. Brunstrom, Esq.

Scottish Gas Board *File 129*
THE GAS COUNCIL

MURDOCH HOUSE · 1 GROSVENOR PLACE

LONDON, S.W.1.

Belgravia 4321

9th March, 1961.

Dear Mr. Adcock,

Further to my letter of the 3rd instant the proposed meeting to discuss Cousland and Eskdale has been arranged here for 10.30 a.m. on Wednesday, 22nd March, and I trust this will be convenient to you and Mr. Brunstrom.

As I am uncertain about the duration of our meeting I have arranged that we shall have luncheon together and continue in the afternoon if necessary.

Yours sincerely,



C. M. Adcock, Esq.,
Senior Petroleum Production Engineer,
B.P. Exploration Co.,
P.O. Box No. 1,
SOUTHWELL,
Notts.



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Friday,
17th March,
1961

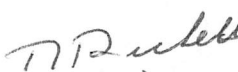
C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring, P.O. Box 1,
SOUTHWELL, Notts.

Dear Mr. Adcock,

Thank you very much for your letter of the 10th of March, 1961 and for the two copies of the "note for record" which you have prepared. Generally, the note is on the lines that we discussed at our meeting recently, and I found it very interesting reading indeed.

I have one or two reservations which do not, however, affect the main points and I am, in accordance with your suggestion, sending a copy to Mr. Johnson.

Yours sincerely,


(T.S. Ricketts)
Chief Engineer

TSR/EFW

File
Ch 9

FE1558

10th March 1961

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Thank you for your letter of the 8th instant confirming the meeting with Mr. Johnson at the Gas Council Office in London on 22nd March.

I am sending you herewith two copies of a "Note for Record" which I have prepared on the basis of our exploratory discussion at your Edinburgh Office on 19th January.

The objective has been to determine:-

- Firstly - How quickly well 1 can be depleted so that it can be used for coal gas storage.
- Secondly - How to deplete a new well, say well 7, without interfering with the gas production/gas storage project for well 1.
- Thirdly - The procedure to be adopted to be able to produce the stored coal gas from well 1 to Glasgow, and natural gas from well 7 to Granton for reforming, using a common pipe line.

The attached diagram shows the indicated development sequence. If you agree that these proposals are in accord with your future programme, may I suggest that you send one copy of the "Note for Record" to Mr. Johnson for his consideration before the meeting on 22nd March.

You will note that by 1st January 1967 stored coal gas from well 1 should be delivered to Glasgow. A total of 400 million cubic feet is to be stored in the summer and delivered to Glasgow during the winter. By 1971 both wells should be on coal gas storage and production, the total quantity of gas per cycle being 800 million cubic feet.

Yours sincerely,

Encl.

cc. Mr. M.H. Lowson, Britannic House,
Mr. W.M. Watson, Eakring
Mr. R.G.W. Brunstrom, Eakring
Mr. A.S. Burt, BP House

C.M. Adcock

CMA/BR

NOTE FOR RECORD

COUSLAND GAS PRODUCTION/GAS STORAGE PROJECT

TENTATIVE SCHEME

(Based on an exploratory discussion between Mr. T.S. Ricketts and the undersigned at the Edinburgh Office of the Scottish Gas Board on 19th Jan. 1961)

OUTLINE OF PROPOSALS

The gas to be stored is to be brought by pipe line from the Lurgi coal gasification at Westfield in Fife, at a pipe line pressure of 350 p.s.i. Reformed Refinery gases from Granton may not be suitable for underground storage, owing to the presence of unsaturated hydrocarbons having gum-forming possibilities.

The storage period will be from 1st May to 1st September each year. During the rest of the year the same pipe line will be required to take the production to Granton for reforming until the reservoir has been purged of natural gas. Thereafter the pipe line will be used for conveying stored coal gas to Glasgow.

Suppose that the pipe line to Granton and the Reforming plant are in operation by 1st January 1963. To deplete the 1582' sand in well 1 quickly, 100 million cubic feet of gas should be flowed to Musselburgh annually; and, in 1963, an additional 200 million cubic feet should be flowed to Granton.

Well 1 is scheduled to be on coal gas injection by 1st May 1964 using one compressor having a capacity of 2.5 million cubic feet per day at 750 p.s.i. The quantity of gas stored during the summer season is expected to be circa 300 million cubic feet. The same quantity of gas would be delivered to Granton for reforming during the winter months.

It is estimated that the 1582' reservoir may have been purged of natural gas by 1st September 1966. Hence, during the period 1st January to 1st May 1967, stored gas, equivalent to 400 million cubic feet, could be delivered to Glasgow. This should reduce the wellhead pressure to circa 100 p.s.i.g., the pressure in the Glasgow pipe line.

The second compressor will be required on 1st May 1967 to store 400 million cubic feet of gas in well 1, and to commence gas storage into a second well.

Well 7, the proposed well to the 1720' sand, is scheduled to come on to production on 1st January 1964. Initially, the production would be to Musselburgh at the rate of 100 million cubic feet per year. From 1st September to 31st December 1966 an additional 150 million cubic feet gas should be delivered to Granton for the maximum depletion of the reservoir.

II

Well 7 is expected to be on coal gas injection on 1st May 1967, with both the 2.5 million cubic feet per day compressors in operation. The quantity of gas injected into well 7 during the season would be circa 190 million cubic feet. The stored gas will be delivered during the winter months to Musselburgh and Granton until the 1720' reservoir has been purged of natural gas.

Deliveries of low calorific stored gas to Glasgow should commence about 1st September 1970. By 1st May 1971 a third compressor will be required so that 400 million cubic feet of coal gas can be stored in each well.

The year 1971 should see the commencement of the annual cycle in which 800 million cubic feet of gas are stored in the summer and are delivered to Glasgow during the winter. Any increase in these quantities is dependent on the drilling of more wells and the commissioning of additional compressors.

The attached diagram shows the indicated development sequence for wells 1 and 7 as outlined by the foregoing proposals.

Ph. Adwick,
10/3/61

COUSLAND GAS PRODUCTION / GAS STORAGE PROJECT .

Diagram showing the indicated development sequence for Well No.1
& the proposals for Well No.7.

YEAR	COUSLAND WELL 1		REMARKS	
	Million cubic feet Musselburgh Granton One Year One Year			
1959	52.6	-	Cumulative production to 31/12/59	
1960	28.8	-	Under firing of retorts from November.	
1961	68.6	-	Reforming gas through coal charge in retorts from April.	
1962	100	-		
1963	100	200	(a) Production before coal gas injection on 1st May 1964	
1964	-	50 ^(a)	Total production before gas storage 600 million cubic feet.	

	COUSLAND WELL 7		REMARKS	
	Million cubic feet Musselburgh Granton One Year 120 days			
1964	300	150	100	-
1965	300	300 ^(b)	100	-
1966	300	150	100	150
1967	-	-	30 ^(c)	-

	Gas Stored 120 days	To Glasgow 120 days	Gas Stored 120 days	To Musselburgh 120 days	To Granton 120 days	
1967	400 ^(d)	400 ^(e)	190 ^(d)	30	150	(d) This is the combined capacity of the two 750p.s.i. compressors.
1968	400	400	190	60 ^(f)	150	(e) The purging of the reservoir having been completed, the gas can be delivered into the Glasgow pipe line.
1968	400	400	190	60 ^(f)	150	(f) To Musselburgh in 240 days.
1970	400	400	190	30	-	

	Gas Stored 120 days	To Glasgow 120 days	Gas Stored 120 days	To Glasgow 120 days	
1970	-	-	-	350 ^(g)	(g) Production to allow for a nett withdrawal of 700 million cubic feet.
1971	400 ^(h)	400	400 ^(h)	400	(h) A third compressor is required to inject 800 million cubic feet into the two wells in 120 days.
1972	400	400	400	400	

APPENDIX

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APPENDIX

COUSLAND GAS PRODUCTION/GAS STORAGE PROJECT

TENTATIVE SCHEME

This is a tentative scheme based on an exploratory discussion between Mr. T.S. Ricketts and the undersigned at the Edinburgh Office of the Scottish Gas Board on 19th January, 1961.

A. Natural gas production from Cousland well 1 until coal gas injection in 1964

1. The production of natural gas from Cousland well 1 to be continued until the spring of 1964. The production rate was increased during November 1960 by the under-firing of the retorts at Musselburgh with natural gas. Reforming of the gas will take place during April 1961 when natural gas will be fed up through the coal charge in the retorts. The test will commence experimentally in four retorts. It is proposed to increase the annual delivery of natural gas to Musselburgh to 100 million cubic feet.
2. It is assumed that Reforming plant at Granton will be in operation on 1st January 1963. It is assumed that 200 million cubic feet of gas will be delivered to Granton during 1963, making the total annual production from well 1 of 300 million cubic feet, or 820,000 cubic feet per day.
3. Coal gas injection into well 1 will commence on 1st May 1964 at a rate of 2.5 million cubic feet per day, equivalent to the capacity of one of the 750 p.s.i. compressors which the Scottish Gas Board proposes to purchase for this project.

TABLE I

Natural gas production from Cousland 1 until coal gas injection in 1964.

<u>Year</u>	<u>Gas supply Areas</u>		<u>Production - M ft³</u>		<u>Flowing wellhead pressure (estimated) at end of year p.s.i.g.</u>
	<u>Musselburgh</u> <u>M ft³</u>	<u>Granton</u> <u>M ft³</u>	<u>Annual</u>	<u>Cumulative</u>	
1960	28.8 ^(a)	-	28.8	81.4	550
1961	68.6 ^(b)	-	68.6	150	530
1962	100	-	100	250	430
1963	100	200 ^(c)	300	550	220
1964 ^(d)	- ^(e)	50	50	600	180

Notes

- (a) Under-firing of the retorts at Musselburgh commenced circa 23rd November 1960.
- (b) Feeding natural gas up through the coal charge in the retorts to reform the gas scheduled to commence April 1961.
- (c) Reforming plant at Granton assumed to be in operation on 1st January 1963, with available capacity for the treatment of 200 million cubic feet Cousland gas annually.
- (d) The natural gas production from Cousland well 1 would cease in the Spring of 1964. Coal gas injection would commence on 1st May 1964.
- (e) From 1st January 1964 the gas supply for Musselburgh will be drawn from well 7.

M Million cubic feet.

B. Coal gas storage followed by gas production from well 1.

1. The maximum quantity of gas which Granton can accept for reforming has been assessed at 300 million cubic feet during the 240 days production period per year, or an average of 1.25 million cubic feet per day. Hence the quantity of gas which may be injected into the 1582' sand during each 120 days storage period is 300 million cubic feet.
2. Musselburgh will not be able to accept any gas from Cousland well 1, since this pipe line will be in use for the depletion of well 7, the proposed new well for the drainage of the 1720' sand.
3. Suppose that the 1582' sand will be purged of natural gas after three storage cycles. The third cycle will take place from May to September 1966. Well 1 will be shut-in until 31st December 1966 since the Granton pipe line will be required to deplete well 7 during this period at a faster rate than is possible by producing it only to Musselburgh.
4. From 1st January to 1st May 1967 well 1 is to be produced into the 100 p.s.i. Glasgow pipe line at a rate of 3.4 million cubic feet per day, or 400 million cubic feet in 120 days. Since this is also the Granton pipe line, the production from well 7 will be delivered to Musselburgh only during this period. At the end of the Spring production period the compressors will be required to inject the Lurgi gas from the pipe line into wells 1 and 7 to build up the wellhead pressure from a minimum of 100 p.s.i. to a maximum of 400 p.s.i.g.
5. The cycle of storing 400 million cubic feet during the Summer and producing it to Glasgow at the beginning of the following year to be continued indefinitely. The period from 1st September to 31st December is required for delivering gas from well 7 to Granton for reforming until the 1782' sand has been purged of natural gas production.

TABLE II

Coal Gas Storage in Cousland well 1

Year	Cumulative production prior to storage M ft ³	Gas injection rate, M ft ³ per day	Gas stored in 120 days from 1st May to 1st Sept. M ft ³	Nett gas withdrawal from reservoir M ft ³	Cousland Well 1 pressures - p.s.i.g.				
					(1) Wellhead before coal gas injection	(2) B.H.D.P. for prdn. rate equivalent to injection rate	Initial injection pressure	(3) Wellhead pressure after storage S ft ³ gas	Injection pressure at end of storage period
	P		S	P - S	a	b	a+b+5%	c	b+c+5%
1964	600	2.5	300	300	180	160	360	400	600
1965	600	2.5	300	300	180	160	360	400	600
1966	600	2.5	300	300	180	160	360	400	600
1967 ⁽⁴⁾	700	3.4	400	300	100	270	400	400	700
1968	700	3.4	400	300	100	270	400	400	700

These cycles to be repeated annually

Notes:

- (1) Wellhead pressure read from graph showing wellhead flowing pressures plotted against cumulative production.
- (2) The B.H.D.P. for a given production rate has been read from graph 3 on accompanying the report on the putting of Cousland well 1 back on production from the 1582 sand dated 1st January 1957.
- (3) The wellhead pressure for the nett gas withdrawal has been read from the graph showing wellhead flowing pressures plotted against cumulative production.
- (4) By 1967 it has been assumed that the 1582 sand will have been purged of natural gas. Hence during the withdrawal period, the gas will be delivered direct to Glasgow without having to go to Granton for reforming.

M Million cubic feet.

TABLE III

Gas production after gas storage in well 1

Year	Nett gas withdrawal from reservoir M ft ³	Production period days		Million ft ³ Production		Wellhead pressure after production P.s.i.g.	Remarks
		from 1st Jan.	from 1st Sept.	To Granton during period	Nett withdrawal from reservoir		
<u>First storage cycle</u>							
1964	300	-	120	150	450	290	
1965	450	120	-	150	600	180	
<u>Second storage cycle</u>							
1965	300	-	120	150	450	290	
1966	450	120	-	150	600	180	
<u>To Glasgow</u>							
1966	300	-	-	-	-	400	Gas from well 7 to Granton
1967	300	120	-	400	700	100	Prdn. rate 3.4 M ft ³ day
<u>Fourth storage cycle</u>							
1967	300	-	-	-	-	-	Gas from well 7 to Granton
1968	300	120	-	400	700	100	

These cycles to be repeated annually

Notes:

It is assumed that after the third storage cycle the gas can be delivered to Glasgow without reforming at Granton. From 1966 onwards well 1 will be shut in each year from 1st September to 31st December, so that gas can be delivered from well 7 to Granton in order to deplete the new reservoir sufficiently quickly so that it can be used ultimately for gas storage.

C. Speculative natural gas production from well 7 until coal gas injection in May 1967

1. Well 7 is to be an exploitation well of the 1720' sand. Initially it may be drilled to the 2094' sand for its appraisal. Well 7 is to be located within 100 - 200 yards of well 1 in a north-easterly direction. A structural rise of circa 50 feet is expected, so that the 1720' sand could be used both for gas production and gas storage, its potential value being provisionally assessed as similar to that of the 1582' sand in well 1.
2. The supply of natural gas from well 7 to Musselburgh to commence on 1st January 1964, at a rate of 100 million cubic feet annually. From 1st September to 31st December 1966 an additional 150 million cubic feet gas would be supplied to Granton in order to deplete the 1720' sand sufficiently to commence coal gas injection on 1st May 1967.
3. Coal gas injection into well 7 should commence on 1st May 1967 at a rate of 1.6 million cubic feet per day. Together with the 3.4 million cubic feet per day being injected into well 1, the two compressors will be operating at their maximum capacity of 5.0 million cubic feet per day. The maximum injection pressure expected will be 700 p.s.i.g. at well 1. The rated capacity of the compressors of 750 p.s.i.g. appears to be adequate.

TABLE IV

Speculative gas production from Cousland 7 until coal gas injection in 1967

<u>Year</u>	<u>Gas supply Areas</u>		<u>Production - M ft³</u>		<u>(d) Flowing wellhead pressure (estimated) at end of year p.s.i.g.</u>
	<u>Musselburgh M ft³</u>	<u>Granton M ft³</u>	<u>Annual</u>	<u>Cumulative</u>	
1964	100	-	100	100	540
1965	100	-	100	200	470
1966	100	150 ^(a)	250	450	290
1967 ^(b)	30	- ^(c)	30	480	270

Notes:

- (a) This flowing period commences on 1st September 1966. Well 1 will be shut-in so that the gas from well 7 can be flowed to Granton for reforming. Average production rate 1.5 million cubic feet per day.
- (b) Natural gas from well 7 could cease by 1st May 1967, and the 120 days season for coal gas injection would commence.
- (c) No natural gas can be supplied to Granton from January to April inclusive since this is the period for the production of coal gas from well 1 into the trunk pipe line to Glasgow.
- (d) The flowing wellhead pressures have been based on the performance of well 1, and assume that similar reserves will be proved in the new sand brought on production in well 7.

M Million cubic feet.

TABLE V

Coal gas storage in Cousland well 7

Year	Cumulative production prior to storage M ft ³	Gas injection rate, M ft ³ per day	Gas stored in 120 days from 1st May to 1st Sept. M ft ³	Nett gas withdrawal from reservoir M ft ³	Cousland Well 7 pressures - p.s.i.g.				
					(1) Wellhead before coal gas injection	(2) B.H.D.P. for prdn. rate equivalent to injection rate	Initial injection pressure	(3) Wellhead pressure after storage S ft ³ gas	Injection pressure at end of storage period
	P		S	P - S	a	b	a+b+5%	c	b+c+5%
1967	480	1.6	190	290	270	70	360	410	500
1968	500	1.6	190	310	250	70	340	390	480
1969	520	1.6	190	330	240	70	330	370	460
1970	540	1.6	190	350	220	70	310	360	450
1971 ⁽⁴⁾	700	3.4	400	300	100	270	400	400	700
1972	700	3.4	400	300	100	270	400	400	700

Notes:

- (1) Wellhead pressures have been based on the performance of well 1, and have been read from the graph showing the pressures plotted against the cumulative production.
- (2) The B.H.D.P. for a given production rate has also been based on well 1, and has been read from graph 3 accompanying the Cousland report dated 1st January 1957.
- (3) The wellhead pressure for the nett gas withdrawal has also been based on well 1, and has been read from the graph showing the pressures plotted against cumulative production.
- (4) By 1971 it has been assumed that the 1720' sand will have been purged of natural gas. Hence, during the withdrawal period, the gas will be delivered direct to Glasgow without having to go to Granton for reforming.

M Million cubic feet.

D. Speculative coal gas storage followed by gas production from well 7

1. The maximum quantity of gas which Granton can accept for reforming is assessed at 150 million cubic feet during the 120 days period from 1st September to 31st December. The quantity of gas supplied to Musselburgh over the 240 days period from 1st September to 1st May of the following year is assessed at 60 million cubic feet. No gas can be supplied to Granton during the period 1st January to 1st May since coal gas will be accepted from well 1 into the pipe line during this period for delivery to Glasgow.
2. It is supposed that the 1720' sand will be purged of natural gas after four storage cycles. The fourth cycle will take place from May to September 1970. From 1st September to 31st December 1970 well 7 is to be produced into the Glasgow pipe line at a rate of 2.9 million cubic feet per day, or 350 million cubic feet in 120 days, the wellhead pressure being reduced to circa 100 p.s.i.g.
3. A third compressor will be required for the 1971 gas storage period, since it is proposed to inject gas into well 7 at a rate of 3.4 million cubic feet per day, or 400 million cubic feet from 1st May to 1st September.
4. From 1971 wells 1 and 7 will be available for the storage of 800 million cubic feet gas in the summer season and the production of 800 million cubic feet gas to the Glasgow pipe line during the winter season.

TABLE VI

Gas production after gas storage in well 7

<u>Year</u>	<u>Nett gas withdrawal from reservoir M ft³</u>	<u>Production period days</u>		<u>Million cubic feet production</u>			<u>Nett withdrawal from reservoir</u>	<u>Wellhead pressure after production P.S.I.G.</u>	<u>Remarks</u>
		<u>from 1st Jan.</u>	<u>from 1st Sept.</u>	<u>To Granton During period</u>	<u>To Musselburgh During period</u>	<u>Total During period</u>			
									<u>1st storage</u>
1967	290	-	120	150	30	180	470	270	
1968	470	120	-	-	30	30	500	250	
									<u>2nd storage</u>
1968	310	-	120	150	30	180	490	260	
1969	490	120	-	-	30	30	520	240	
									<u>3rd storage</u>
1969	330	-	120	150	30	180	510	250	
1970	510	120	-	-	30	30	540	230	
									<u>4th storage</u>
				<u>To Glasgow</u>					
1970	350	-	120	350			700	100	Prdn. rate 2.9 M ft ³ /day
1971	700	-	-	-			-	100	Gas from well 1 to Glasgow
1971	300	-	120	400			700	100	Prdn. rate 3.5 M ft ³ /day
1972	700	-	-	-			-	100	Gas from well 1 to Glasgow
1972	300	-	120	400			700	100	
1972	700	-	-	-			-	100	

These cycles to be repeated annually

Notes:

It is assumed that after the fourth storage cycle the gas can be delivered to Glasgow without reforming at Granton. From 1971 onwards well 7 will be shut-in each year from 1st January to 1st May, so that gas can be delivered from well 1 to Glasgow in order to deplete the 1562' sand for the next storage cycle.

TELEPHONE
NATIONAL 1200

EXP/132/539



File
129

BP House,
ROPEMAKER STREET,
LONDON, E.C.2

2nd March, 1961.

Dear Milton,

Thank you very much for the use of Cousland file
UK/COU/1/A1, which I now return.

As I mentioned to you on the telephone yesterday, it is now felt that we should not perhaps become too involved in this matter of compensation at Cousland. Dr. Gaskell, however, on the basis of the information confirmed in your letter of 23rd February, is clearly of the opinion that the "safety zone" originally fixed is probably greater than it need be and has suggested that, on the available evidence, the practice of the Collieries in the Eakring area may be taken as a suitable guide. A firm opinion on what should be taken as the minimum safe distance would really require an on the spot examination of the situation. This now seems further than we want to pursue the matter and I think that having made the point the S.G.B. might care to consider the matter further themselves. I hope that they will not suggest that we must bear responsibility for the fixing of an artificially large safety zone.

With kindest regards,

Yours sincerely,

A handwritten signature, likely of C.M. Adcock, written in dark ink.

C.M. Adcock, Esq.,
BP Exploration Co. Ltd.,
P.O. Box 1,
Southwell,
Notts.

Encl.



File
Cha

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 343215 ~~EDINBURGH~~ 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

9th March, 1961.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Qty sample collected 6 1/2 mins

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose two copies of the statement giving information relating to the supply of natural gas from Cousland to Musselburgh during the month ended the 28th February, 1961.

The supply of gas continued uninterrupted throughout the month although on Monday 27th of February, it was noted that the pressure at Cousland had fallen to approximately 250 pounds per square inch gauge, and arrangements were made to shut off the supply at the wellhead on Wednesday, 1st March, 1961 to eliminate the blockage.

The wellhead valve was operated each day from the 1st of March, 1961. Clearance of the blockage was effected, and the supply resumed on Monday, 6th March, 1961.

A sample of liquid removed from the wellhead to water separator pipe was obtained, and if you feel that analysis of this sample will be of value, I shall be pleased to have it sent to your laboratories if you will advise me of the address.

Yours sincerely,

T.S. RICKETTS

(T.S. Ricketts)
Chief Engineer

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION -FEBRUARY, 1961

Continuity of Supply	The supply of gas continued uninterrupted throughout the month although on Monday, 27th of February it was noted that the pressure at Cousland had fallen to approximately 250 pounds per square inch gauge, and arrangements were made to shut off the supply at the wellhead on Wednesday, 1st of March, 1961 to eliminate the blockage.
Volume supplied from Cousland to Musselburgh during the month (corrected)*	4,033,780 cubic feet.
Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	1st February - 545.0 lbs. per square inch 8th February - 545.0 lbs. per square inch 15th February - 544 lbs. per square inch 22nd February - 544 lbs. per square inch
Number of days on which well was in action during the month	28 days
Number of days on which well was shut down during the month	Nil.

851 872 857
 4033780
 89,906 637

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

THE SCOTTISH GAS BOARD
NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH
REPORT ON GAS PRODUCTION - FEBRUARY, 1961

Continuity of Supply	The supply of gas continued uninterrupted throughout the month although on Monday, 27th of February it was noted that the pressure at Cousland had fallen to approximately 250 pounds per square inch gauge, and arrangements were made to shut off the supply at the wellhead on Wednesday, 1st of March, 1961 to eliminate the blockage.
Volume supplied from Cousland to Musselburgh during the month (corrected)*	4,033,780 cubic feet.
Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	1st February - 545.0 lbs. per square inch 8th February - 545.0 lbs. per square inch 15th February - 544 lbs. per square inch 22nd February - 544 lbs. per square inch
Number of days on which well was in action during the month	28 days
Number of days on which well was shut down during the month	Nil.

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Copy

From SENIOR GEOLOGIST, BAKRING.

To MANAGER

Our Ref. Geol/370/
3162

Your Ref.

Date 24th March 1961.

Subject

MEETING TO DISCUSS UNDERGROUND GAS STORAGE AT
COUSLAND AND ESKDALE

Mr. Johnson of the Gas Council called a meeting in London on March 22nd., specifically to discuss Cousland and Eskdale. At the end the discussion turned to forthcoming work in the South Midlands also concerned with underground storage. The following were present.

Mr. Johnson	Chairman
Mr. Ricketts)	
Mr. Elgin)	Scottish Gas Board
Prof. Illing)	
Dr. May)	V.C. Illing and Partners.
Mr. Adcock)	
Mr. Brunstrom)	BP
Dr. Kent)	

The meeting reached agreement on the following points.

Cousland

- a) The 1582 Sand of No.1 Well, at present on production, is a suitable sand for gas storage after depletion. There is room for perhaps four hundred million cubic feet of gas in that sand. The exact figure is unknown, but is certainly not as much as one thousand million.
- b) The storage scheme would be better if a second sand could be brought into it, such as the 1720 sand of No.1.
- c) Another well should be drilled (No.7) higher on the structure than No.1 but not so far from it that reservoir conditions would have changed importantly. This well should be drilled to below the 2094 Sand of No.1 (i.e. it would be about 2100 ft. deep) so as to investigate all the known gas sands. These would be cored and tested. It is hoped that one at least

contd./...

would be suitable for storage.

- d) Professor Illing will select the site for No.7, after discussion with Brunstrom.
- e) Land Administration Officer, Mr. Acres, will be asked to investigate this site, with particular reference to underground limestone workings, and if possible arrange planning permission etc.
- f) Any legal agreement that has to be made with respect to the limestone workings will be effected by the Scottish Gas Board and not by BP.

Bekdale

- a) This area is geographically not ideal for 'large scale storage', being too far north, but might serve if no better-placed project were to mature. By large scale storage a storage volume of up to twenty thousand million cubic feet is intended, to be part of a scheme that might be nation-wide.
- b) The Bunter Sandstone, the intended reservoir rock, seems to have low permeability, but evidence is scanty.
- c) Before a storage scheme could start the crest of the structure would have to be located more exactly than is now the case, by drilling two or three structure-proving boreholes.
- d) It would not be wise to put gas from the Permian into the Bunter now, as it might be lost.
- e) Mr. Adcock undertook to examine all available records to see what information there was of mud losses in the Bunter. These would indicate fissuring, and hence more favourable reservoir conditions than would otherwise seem likely.

contd./...

South Midlands

a) Stow on the Wold

Mr. Acres to be asked to undertake the permitting. Mr. Johnson will inform the various Planning Officers personally of the Gas Council's intentions, but this is quite independent of Mr. Acres' work.

b) Daventry

Structure-drilling with shot-hole rigs to commence early in April. In a subsequent telephone conversation between Professor Illing and Brunstrom it was agreed that the Gas Council's mobile laboratory would be needed for this work, with lab. assistant. Also that a Permits Man would be needed to arrange access to drilling sites; and the occasional services of a Surveyor to work out the surface elevations of the boreholes.

c) Edge Hill

Structure drilling to commence early in May. There will then be two separate shot hole outfits working.

R.G.W. Brunstrom.

c.c. Mr. Johnson.
Mr. Ricketts.
Prof. Illing.
Mr. Adcock
Chief Geologist/Dr. Kent
Mr. Burt.

RGWB/AS

FE1557

10th March 1961

C. Johnson, Esq.,
The Gas Council,
Murdoch House,
1, Grosvenor Place,
London, S.W.1.

Dear Mr. Johnson,

Cousland

Many thanks for your letters dated 3rd and 9th instant. Mr. Brunstrom and I confirm that Wednesday, 22nd March will be convenient for the meeting to discuss Cousland at your office in London.

You were at a meeting when I telephoned you this morning, and so I asked your Secretary whether the time could be altered to 11.00 am, since our Nottingham train is not due to arrive at King's Cross until 10.30 am. I was assured that this alteration in time would be acceptable to you, and so we shall arrange to be at your office by 11.00 am.

Yours sincerely,

C.M. Adcock

cc. Mr. R.G.W. Brunstrom



Fig
Chg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Wednesday,
8th March,
1961

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring, P.O. Box 1,
SOUTHWELL, Notts.

Dear Mr. Adcock,

I am sorry I was not in when you telephoned: I have heard from Mr. Johnson to the effect that the 22nd of March would be a suitable date on which to hold our meeting in London and, as I understand that you can manage this date, I have agreed with Mr. Johnson that this shall be the date of our meeting. I enclose a copy of my letter to Mr. Johnson.

Mr. Elgin has told me that you are preparing a report and I shall look forward to receiving it before the meeting.

Yours sincerely,

TTR Ricketts

(T.S. Ricketts)
Chief Engineer

TSR/EFW

THE SCOTTISH GAS BOARD,
26 Drumsheugh Gardens,
EDINBURGH, 3.

Wednesday,
8th March,
1961

C. Johnson, Esquire,
The Gas Council,
Murdoch House,
1 Grosvenor Place,
London, S.W. 1

Dear Mr. Johnson,

Thank you for your letter of the 3rd of March, 1961. I will be pleased to attend the meeting with Professor Illing and N.P. Exploration Company on the morning of Wednesday, the 22nd of March at your offices in London.

I note that you will be asking Mr. Adeock and Mr. Brunstrom to attend this meeting.

Perhaps you will be good enough to let me know, in due course, the time of the meeting.

Yours sincerely,

(T.S. Ricketts)
Chief Engineer

TSR/RMF

Scottish
Gas Board

File
129

THE GAS COUNCIL

MURDOCH HOUSE · 1 GROSVENOR PLACE
LONDON, S.W.1.

Belgravia 4321

3rd March, 1961.

Dear Mr. Adcock,

Cousland

Regarding our proposed meeting here with Professor Illing and Mr. Ricketts of the Scottish Gas Board to discuss Cousland gas reserve, I have offered Mr. Ricketts the choice of the morning of Friday, 17th March, or any time during Wednesday, 22nd March. Would you care to keep these two dates in mind until I hear further from Mr. Ricketts.

I mentioned in my previous letter that Mr. Brunstrom would be welcome if he wished to join us and I understand that Mr. Ricketts has since suggested that he would like him to be present.

Yours sincerely,



C. M. Adcock, Esq.,
Senior Petroleum Production Engineer,
B.P. Exploration Co.,
P.O. Box No. 1,
SOUTHWELL,
Notts.

c.c. Mr. R.G.W. Brunstrom.
Mr. W. M. Watson.



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Wednesday,
1st March,
1961

C.M. Adcock, Esquire,
B.P Exploration Company Limited,
Eakring, P.O. Box 1,
Southwell, Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

Mr. Johnson, the Coal Officer of the Gas Council, has suggested that our forthcoming meeting with Professor Illing should be held in London in the second half of March. I have asked him to let me have a note of one or two suitable dates; I wonder if you could let me know the dates upon which it would be convenient for you and Mr. Brunstrom to travel to London for this meeting? I would be glad to receive your reply as soon as possible and I will then endeavour to arrange a meeting on a date which will be satisfactory to all.

Yours sincerely,

(T.S. Ricketts)
Chief Engineer

TSR/EFW

*Phoned 2. Elgin.
agreed to any
day in second half
of March.*

*File
the*

File
cha

PE1539

23rd February 1961

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh, 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letters dated 13th, 14th, and 16th February. I confirm that Mr. Brunstrom and myself will be pleased to be present at the forthcoming meeting with Professor Illing to discuss the programme for Cousland.

Thank you also for the information on the weight of the explosive charge used in the limestone workings near well 1. I have passed this information on to our London Office for their consideration.

From your January report on Cousland gas production I note that the offtake averaged 143,000 cubic feet per day during the month. Will you be cracking natural gas in the retorts in the near future?

Yours sincerely,

C.M. Adcock

PE1540

23rd February 1961

Dear Mr. Burt,

Sterilisation of limestone workings at Cousland

I am sending you herewith a copy of a letter I have received from the Scottish Gas Board, dated 16th February, confirming that the normal charge of gelignite used for blasting purposes is five to ten pounds, although this figure is unofficial and is largely determined by the practice of the Shot-firers themselves.

It is recalled that in our original agreement with Collieries in the Bakring area, compensation was paid for the sterilisation of a 50 diameter block of coal around each well. It will be interesting to know Dr. Gaskell's views on the size of the limestone block which should be sterilised around Cousland well 1.

Yours sincerely,

C.M. Adcock

Encl.

A.S. Burt, Esq.,
The British Petroleum Company Ltd.,
BP House,
Ropemaker Street,
London, E.C.2.

CMA/BR



1 copy please
14.6

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 348915-50 NIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Thursday,
16th February,
1961.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
EAKRING.
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland

Further to your recent telephone conversation with Mr. Elgin, we have been endeavouring to ascertain the weight of explosive charge used in connection with the limestone workings in the vicinity of Cousland.

The firm concerned are very indefinite about their practice and the weight of the charge appears to be left largely to the shot-firers themselves. We have, however, ascertained unofficially, that the charge varies between five to ten pounds of gelignite. The type of gelignite used is said to be Polar Alnon. No doubt you are more familiar with explosives than we are but we have been informed that this is the most powerful type of gelignite available. I suggest that when you pass this information on to your Geophysicist you should emphasise that the method of operation appears to be rather primitive and that allowance should be made for the rough and ready nature of the operations.

No doubt you will be letting me know in due course what minimum radius your Geophysicist eventually decides upon.

I /

I should mention that our Solicitor has commented that, even if the amount of sterilisation is now reduced, we may find ourselves faced with a claim for at least part of the difference between the present claim and a claim based on sterilisation within a radius of 50 feet of the wellhead; they may argue that a loss had been sustained as a result of having to curtail their operations, in the vicinity of the wellhead, in accordance with earlier requests.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DCE/MA



5-10 lbs gelignite.

File
120

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~CALEDONIAN~~ 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box, 1,
Southwell,
Notts.

13th February, 1961.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of January, 1961, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts
(T.S. Ricketts)
Chief Engineer. *MR.*

WT/EC./EC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JANUARY, 1961

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st January, 1961.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 4,425,780 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	5th January, - 548.0 lbs. per square inch.
	12th January, - 547.0 lbs. per square inch.
	19th January, - 546.0 lbs. per square inch.
	26th January, - 545.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days.

Number of days on which well was shut down during the month Nil.

81,447,077
4,425,780
85,872,857

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~24331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Mr. Brunstrom *leave*
for your information
File
Chng

Tuesday,
14th February,
1961

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring, P.O. Box 1,
Southwell, Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

Confirming our telephone conversation this morning, I feel it would be helpful if Dr. Brunstrom were present at our forthcoming meeting with Professor Illing, and I will bear this in mind when arrangements are made.

The Gas Council have asked for some preliminary details in respect of wellhead pressure and gas volumes taken, and I will be sending them this information in due course. I imagine that as soon as Professor Illing has had time to digest some of this preliminary information he will be ready to attend a meeting, and I will let you know as soon as I hear from him.

Yours sincerely,

T S Ricketts
(T.S. Ricketts)
Chief Engineer

CSR/EWF



Your reference: PE1508

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34931-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
6th February,
1961.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
EAKRING,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I was very pleased to have your letter of the 27th of January, 1961, and I look forward to receiving the tentative programme for future work at Cousland in due course.

The temperature conditions at the time of your visit to Cousland have been noted; as a matter of fact instructions regarding the windows and the operation of the space heaters were given immediately after your visit. I confirm that no difficulty has been recently reported with regard to blockage in the supply lines.

With thanks for your continued assistance.

Kind regards,

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

Fib
Ma

FE1508

27th January 1961

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

I had hoped to write up the tentative forward programme for future work at Cousland in lines with our discussion at your Office on 19th January during the current week.

Pressure of other work has prevented me from doing this, but I will write up the Cousland appraisal as soon as possible.

When I visited the well a week ago last Thursday afternoon, the three space heaters were switched on, and one of the windows in the building was open. There was no apparent difference in temperature between the air outside the building and the air inside the building. The temperature inside the building was, as far as I remember, 43°F. The natural gas was being heated to 70°F by the tape heater, which was adequate to prevent freezing during expansion.

I believe that if the window had been closed the space heaters could have been shut off without there being any danger of hydrate formation. I looked at the wellhead pressure which was 550 p.s.i.g. The same pressure was recorded on the high pressure side inside the building, and I would not consider that the formation of hydrates was taking place under these conditions.

Yours sincerely,

C.M. Adcock

EXP/132/496

File
Scottish Gas Board
1/11/61

17th January, 1961.

Dear Mr. Watson,

I enclose, for your information, a copy of the Ministry's letter of 11th January in connection with a revised Clause 10 (Royalties) together with a copy of the present form of this text.

You will note that there is to be no change in the royalty payable on crude oil but that in the case of royalty payable on natural gas this could be raised after 31st December, 1961, or on earlier expiry of any licence, at the discretion of the Minister with the consent of the Treasury. The present form of the text refers to "royalties ... as may be agreed between the Minister and the Licensee".

I have been advised unofficially, however, that at present the Ministry do not envisage any changes in the royalty payable on natural gas.

I have sent copies of the Ministry's letter to the Gas Council and suggested that they might care to make its contents known to the Scottish Gas Board.

Yours sincerely,

(Sgd.) A. S. BURT.

W.M. Watson, Esq.,
BP Exploration Co. Ltd.,
P.O. Box 1,
Southwell,
Notts.

Encls.

cc: Mr. C.M. Adcock - Eakring. ✓

TELEPHONE
NATIONAL 1200



EXP/132/484

File Scottish Gas Board
11-12
BP HOUSE,
ROPEMAKER STREET,
LONDON, E.C.2

13th January, 1961.

Dear Mr. Adcock,

Thank you for your letter PE.1484 of
12th January enclosing the Royalty Statements in
respect of Cousland and Eskdale gas production.

Yours sincerely,

C.M. Adcock, Esq.,
BP Exploration Co. Ltd.,
P.O. Box 1,
Southwell,
Notts.

C O P Y
19/1/61

NOTES ON THE GAS PROSPECTS OF THE D'ARCY
FARM CONCESSION OF ESSO

The natural gas reserves of the D'Arcy Farm area, discovered and partially developed by the Anglo American Oil Co., Ltd., lie on a subsidiary uplift south of Cousland, and separated from the Cousland area by faulting and down-warping. Of the wells drilled in this area, M-3 and M-6 were completed in gas zones, and would be available with a small amount of preparation to provide a total amount of gas of the order of 60,000 cu.ft/day. There has been an additional number of wells drilled by the same company, but either because of being off-structure or because of the tightness of the sands, no satisfactory production can be expected from them. The total area of gas is quite small, and lies in the crestal region, and only a portion of it can be accepted as proven.

If we accept the mapping, the total available reserves are of the order of 500 m.cu.ft. An earlier estimate, made independently in 1944 by Anglo American and myself, based on the Anglo American discoveries and core reports and samples, gave an estimate of 791 m.cu.ft., of which 363 m. was from the main B-11 - 14 sands.

Unfortunately a later well, M-6 penetrated these sands and found that they were thinning laterally at a very considerable rate. This has necessitated a revision of these figures, and on present evidence the figures of 500 m.cu.ft. is probably the maximum amount available. Of this reserve, one of the sands is now producing oil in another well, and unless it was agreed to close down this oil well, the gas zone above could not be taken, which would leave an available ultimate gas supply of about 474 m.cu.ft.

These estimates must still only be regarded as tentative, for the area has not been very evenly drilled, and much of the structure is still untested.

Experience in this general area is that the sands are rather variable, as indeed has been the experience of BP in Cousland to the north, and although the various sandy horizons are continuous over the area, the thickness of their component sands and particularly their porosity and permeability change laterally to a considerable extent.

It is partly for this latter reason that I advised the Gas Council to drill another well on the Cousland structure in order to see whether the results of Cousland 1 can be duplicated by an offset to the east near what we regard as the crest at depth and yet at a sufficient distance for No. 6 to indicate a sizeable reserve if it gave results comparable with No. 1.

If /

If it can be shown in due course that the Cousland gas reserves are sufficient to warrant more extensive production, it may become advisable to consider bringing the D'Arcy Farm gas reserves into the same orbit, but I see no advantage in doing so at this stage when the Cousland structure itself is being tested, and the results of the next well in Cousland are unknown.

The rate of production in the D - F sands is very much less than Cousland 1, and indeed the sands seem to have lower order of permeability and porosity. On the face of it, therefore, it appears to be from the point of view of the nature of its sands, and certainly from a structural point of view, much less attractive.

It seems to me that there is little point in pursuing the possibilities of the D'Arcy Farm area in view of the fact that the capacity of the two wells which have found gas are of a very low order.

After the Cousland well has been drilled and we have a clearer picture of what the major area is capable of, it may become of interest to reconsider the D'Arcy Farm area as a supplementary source of gas, but I feel that there would be no point in pursuing this matter further at the present moment.

C. C. ILLING

London,

23rd October, 1951

Thursday,
12th January,
1961

The Manager,
The North British Hotel,
Princes Street,
Edinburgh 1.

Dear Sir,

I confirm having reserved by telephone to-day in name of
Mr. C.M. Adeock, one single room for the nights of Wednesday, the 18th
and Thursday, the 19th of January, 1961.

Yours faithfully,

T.S.
(T.S. Ricketts)
Chief Engineer

EWT



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331.5

TELEGRAMS "SCOTGASBO"

CALEDONIAN 2052

REPLY TO CHIEF ENGINEER

*Lowland
Rates ?*

Thursday,
12th January,
1961

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring, P.O. Box 1,
Southwell, Notts.

Dear Mr. Adcock,

Confirming our telephone conversation to-day: I have reserved in your name a single room for the nights of Wednesday, the 18th and Thursday the 19th of January at the North British Hotel and I will pick you up at this hotel just after 9 a.m. on Thursday the 19th.

I look forward to seeing you and I do appreciate the very full answers you gave to my questions in your letter of the 5th of January, 1961.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts)
Chief Engineer

TSR/EWF

File
No

PE1485

12th January 1961

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Further to our telephone conversation I confirm that I will be travelling to Edinburgh on Wednesday 18th January. Thank you for arranging to pick me up at the North British Hotel on Thursday morning at about 9 a.m.

Thank you for your letter of the 9th instant enclosing the December return for the Cousland gas production, which I note averaged 145,000 cubic feet per day during the month. It is presumed that the under-firing of the retorts with natural gas was continuous throughout the month.

Yours sincerely,

C.M. Adcock

FE1484

12th January 1961

Dear Mr. Burt,

Royalty Statements for Cousland and Eskdale Gas Production

The Royalty Statements for the Cousland and Eskdale gas production during 1960 have been prepared and, in accordance with our established procedure, I am sending you two copies each of these statements herewith.

Yours sincerely,

C.M. Adcock

A.S. Burt, Esq.,
BP House,
Ropemaker Street,
London E.C. 2

BP EXPLORATION COMPANY LIMITED

LICENCE A.205

COUSLAND

143
Chase

Statement of Natural Gas Production - 1st January 1960 to
31st December 1960 (Inclusive)

Cubic feet at 30 inches Mercury
and 60 degrees Fahrenheit

Natural Gas Won and Saved

January	1,473,220
February	1,324,910
March	2,464,970
April	2,456,260
May	2,362,140
June	1,885,930
July	1,844,310
August	1,985,130
September	2,606,270
October	2,881,810
November	3,008,500
December	4,486,730

NATURAL GAS LIABLE TO ROYALTY

28,780,180

81,447,077
49,081,742
130,528,819 ✓

11th January 1961

BR



Our Ref: RAB/SM.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~GLASGOW~~ 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

9th January, 1961.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Bakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended the 31st of December, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. RICKETTS

(T.S. Ricketts)
Chief Engineer

ah

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1960

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st December, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected) 4,486,730 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)
7th December - 555.5 lbs. per square inch
14th December - 553.5 lbs. per square inch
21st December - 552.0 lbs. per square inch
28th December - 550.0 lbs. per square inch.

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil.

76,960,347
4,486,730 ✓
81,447,077
52,666,897
28,780,180

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



File / M.E.

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

9th January, 1961.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Bakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas from Cousland

As you will no doubt be aware I forward each year to the Gas Council a statement giving the total production of natural gas for a calendar year, and I would advise you that the gross quantity of natural gas supplied from Cousland to Musselburgh during the twelve months to 31st December, 1960, was 28,780,180 cubic feet.

The gross and net quantities are identical since no measurable impurities have been present and the volume is corrected to 30 inches of mercury and 60 degrees Fahrenheit.

Yours sincerely,

p. T.S. RICKETTS

(T.S. Ricketts)
Chief Engineer.

RAB/SM.

File
C29

PE1470

6th. January, 1961

Dear Mr. Burt,

Agreement between The Stair Estates Ltd. and
D'Arcy Exploration Co. Ltd. dated 11th November 1937

At your request we are forwarding to you the Cousland File reference UK/COU.1/A.1. This is the Land File covering the period 1.8.37. to 1.5.52. There are copies of a number of draft agreements in the file including the one dated 11th November 1937.

Will you please acknowledge receipt of this file, and return it to us in due course when you have finished with it.

Yours sincerely,

C.M. Adcock

A.S. Burt, Esq.,
BP House,
Ropemaker Street,
London E.C.2.

CMA/BR

Travelling
Wednesday
Thursday
Friday.
North British
9.00 —

PE1465

5th. January, 1961.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 19th. December quoting Professor Illing on carboniferous sands. It is agreed that in general these rocks do not make ideal reservoirs, but they are nevertheless adequate in many instances. Practically all the U.K. crude oil production has been obtained from carboniferous sands having average porosities of 10 to 15 per cent with permeabilities of usually only a few tens of millidarcies.

The lack of success in Cousland well 6 may be due to its proximity to the easterly fault which this well penetrated. The indicated new reservoir area is possibly about 150 acres, and any purely exploitation wells should be drilled within 100 to 200 yards of well 1 in a north-easterly direction.

The drilling of well 6 has limited the size of the gas production/gas storage project, but has not in any way affected the usefulness of well 1 for this purpose. At a gas production rate from well 1 of 500,000 cubic feet per day (say 200 million cubic feet per year), the reserves of 700 million cubic feet will have been produced by 1964, when the wellhead pressure will have declined to 100 p.s.i.g. In which case, the injection of coal gas into the 1582 sand in well 1 could commence in 1964 in accordance with your anticipated programme.

I note that you are proposing to install two compressors each capable of compressing 2.5 million cubic feet of gas per day to a pressure of 750 p.s.i.g. At the optimum injection rate of 4 million cubic feet per day, mentioned in my letter dated 5th. December, you would not be able to store more than 250 Million cubic feet in well 1 without exceeding the injection pressure of 750 p.s.i.g. (See the wellhead pressure - production graph which I have sent you). At this injection rate the B.H.D.P. is 420 p.s.i.g. The wellhead pressure will rise from 100 p.s.i.g. to 290 p.s.i.g. Hence the required injection pressure, after storing 250 million cubic feet is $290 + 420 + 5\% = 750$ p.s.i.g.

However, gas storage could still be continued at a smaller injection rate. The B.H.D.P. for a production rate of 3 million cubic feet per day is 220 p.s.i.g. (See graph 3 - Cousland report dated 1st. January, 1957). If gas storage is continued at 3 million cubic feet per day, the wellhead pressure will have risen to 470 p.s.i.g. after injecting 500 million cubic feet gas. (See my letter dated 5th. December). Hence, the injection pressure will have risen to $470 + 220 + 5\% = 730$ p.s.i.g. Gas injection could commence into well 1, after the wellhead pressure has declined to 100 p.s.i.g., at a rate of 5 million cubic feet per day, the combined capacity of the two compressors.

It would be necessary to reduce the injection rate gradually to about 3 million cubic feet per day after 250 million cubic feet of gas had been stored. It would take about 60 days to store the first 250 million cubic feet and approximately 80 days to store the next 250 million cubic feet, or a total of 140 days to store 500 million cubic feet. In order to store gas at a faster rate, without drilling additional injection wells, it would be essential to install compressors operating at a pressure of circa 1200 p.s.i.g.

In view of the small size of the Cousland reservoir, I would recommend that the next well be drilled into the 1720' sand both for gas production and gas storage. As pointed out in my letter dated 5th. December, if this exploitation well is located within 100 - 200 yards to the north-east of well 1, a structural rise of about 50 feet without deterioration in sand conditions could be expected. The productivity of the 1720' sand should be at least equivalent to that of the 1582' sand, with similar gas reserves and gas storage potential.

Probably not more than two wells will be required for each producing horizon, the second well being necessary to provide additional and standby capacity. The existence of the 2094' gas sand in well 1 should not be forgotten, and this horizon could be readily re-tested when the next exploitation well is drilled. In well 1, the water-free gas production rate was 150,000 cubic feet per day. An open flow potential of circa one million cubic feet per day could probably be obtained after hydraulic fracturing. If the re-appraisal of the 2094' sand was sufficiently promising, a third reservoir would become available in the Cousland structure both for gas production and gas storage.

As you point out, the gas production/gas storage project can be still further expanded by the inclusion of the Midlothian gas well on D'Arcy Farm. The re-commissioning of Cousland well 4. on the Fordel Mains structure is another possibility.

- 3 -

In accordance with your suggestion I shall be pleased to visit Edinburgh to discuss the future of the Cousland gas with you. I confirm that I have provisionally booked Wednesday, 18th. January 1961 for this visit.

Yours sincerely,

cc. Mr. M.H. Lowson, Britannic House
Mr. A.S. Burt, B.P. House
Mr. W.M. Watson, Eakring
Mr. R.G.W. Brunstrom, Eakring

CMA/BR



4 copies

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
19th December,
1960

C.M. Adcock, Esquire,
BP Exploration Company Limited,
EAKRING, P.O. Box 1,
SOUTHWELL, Notts.

Dear Mr. Adcock,

Thank you for your letter of the 5th of December, 1960 and for your very helpful notes on the possibility of using Cousland for underground storage.

The risk of cementation to which I referred was first mentioned by Professor Illing, who stated that "... the danger in all this drilling into the carboniferous lies in the fact that most of the carboniferous sands are partially or completely cemented, and furthermore there is a considerable quantity of fine silt and clay filling the interstices or pores between the sand grains. When a sandstone of this nature has its critical porosity, which is normally if uncemented of the order of 30 per cent. reduced to a matter of 10 per cent., its permeability is reduced practically to zero, and therefore a large number of the sandstones in the carboniferous are useless as reservoirs because of the tightness of the sands. This is true in most if not all carboniferous sandstones. In the Cousland area there are several porous and permeable zones within the sandstones, but so far we have been unable to correlate any of these porous constituents of particular sands from one well to the next, and therefore we do not know how extensive are these porous zones. The answer to this problem is critical ... In order to settle this question at Cousland a second well is to be drilled by the Gas Council."

In view of the fact that Cousland number 6 was unsuccessful, presumably we are still in the dark as to whether we can use Cousland number 1 well for storage purposes; perhaps you can enlighten me on this matter?

As /

As you know, more than 100 million cubic feet of natural gas have now been extracted from Cousland number 1 well; I would like to commence the preparation of a scheme for the use of this well for underground storage purposes and I would like to feel that the scheme could be put into operation not later than 3 years from now. It would be essential, however, to obtain a satisfactory report in respect of the suitability of the sand for storage purposes.

I have in mind a scheme whereby three additional wells could be drilled within, say, 100 or 200 yards of Cousland number 1 well, thus making available, we hope, for storage and extraction purposes a total of four wells.

Thinking along these lines we can lay a pipeline from Cousland to Granton, extracting the natural gas to a pressure of, say, 100 pounds per square inch. During the period of extraction two compressors each capable of compressing $2\frac{1}{2}$ million cubic feet of gas per day to a pressure of, say, 750 pounds per square inch, would be installed near to the wellheads, complete with filter plant, for the purpose of removing gum-forming compounds. These compressors could well be gas-driven since we would have a surplus of gas available during the summer-time, that is, when compression into underground storage would be taking place. If these compressors operated over an average of 100 days during the summer we should be able to compress a maximum of about 500 million cubic feet into storage, assuming that the maximum pressure lay within the capacity of the compressors. During winter-time the four boreholes would enable us to draw off at satisfactory rates, but this, of course, would have to be checked and would be subject to the well pressure being high enough.

I would like to feel that if necessary we could build up on this basis at a later date by the addition of more compressors and more boreholes, and the inclusion of the D'Arcy Farm storage could also be considered.

I feel that the sort of programme I have referred to above could well be completed by the Spring of 1964 but it would, of course, be necessary to have confirmation of this.

Would it be possible for you to visit Edinburgh to discuss this matter during, say, the last two weeks of January? I shall look forward to receiving your reply and perhaps you would be good enough to let me have one or two alternative dates.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

TSR/EFW

File
C12.01

FE.1458

23rd December 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 13th December with reference to the control of gas hydrate formation.

When I telephoned you on 16th December you mentioned that there were a number of other matters you wished to discuss on the Cousland gas production. I confirm that I will be pleased to visit you at Edinburgh early in January, say Wednesday 11th January 1961, if convenient to you.

Yours sincerely,

C.M. Adcock

CMA/JMC



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

TELEPHONE ~~34881-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

*Phoned Rickells
16th Dec:
Will discuss problem
at Edinburgh early
in new year.*

Tuesday,
13th December,
1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

We have been considering in some detail the observations in your letter of the 22nd of November, 1960, with reference to the possible methods for reducing blockage in the line between the wellhead and the governor house at Cousland.

One suggestion you have put forward, as an alternative to methanol injection by means of a lubricator at the wellhead, is that the valve on the wellhead should be closed as soon as there is any evidence of blockage commencing; thereafter allowing the pressure between the wellhead and the pumps to fall to about 10 pounds per square inch above the pressure in the line from Cousland to Musselburgh. In this connection, one difficulty is that without an Attendant being present at Cousland, the first evidence of sudden blockage would be a fall in the line pressure as observed at Musselburgh. At that stage it would be too late to take the suggested action.

It may be significant, in connection with past blockages, that even after the pressure in the pipeline at Musselburgh has shown signs of falling, blockage has still persisted. This may be because the bulk of the blockage has been due to ice.

A further point is the comparatively small capacity of the main between the wellhead and the governor house which has a high /

high pressure capacity equivalent to only a few hundred cubic feet at normal temperature and pressure.

The additional possibility has been examined of operating the main between Cousland and Musselburgh, normally, at 20 pounds per square inch gauge giving a further reserve of gas volume should blockage occur. It is estimated, however, that even this would not give sufficient reserve to keep the wellhead valve closed for even one hour and still maintain supplies to Musselburgh, particularly now that we are increasing gas consumption there.

One or two other possibilities have occurred to us and I would like very much to have your views on them:

- i) the possibility of providing a second connection of greater diameter (say 6-inch diameter) for the short distance between the wellhead and the governor house at Cousland. It appears to us that this would not only reduce the possibility of blockage but would provide two alternative connections at the point where blockage is most likely to occur;
- ii) the possibility of a permanent drip feed of methanol at the wellhead avoiding the necessity of an electric drive. It is, of course, appreciated that under the conditions at the wellhead, drip feed might not give sufficient entrainment of the methanol. An alternative possibility is a methanol bubbler with a by-pass; the bubbler being sized so that the amount of gas passing through it can be adjusted to give the necessary entrainment of methanol.

Looking forward to having your comments on the above.

Yours sincerely,

T. S. RICKETTS

(T. S. Ricketts)
Chief Engineer.

DCE/MA

File Ma

FE.1441

12th December 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 9th instant, enclosing the November return for the Cousland gas production, which I note averaged 100,000 cubic feet per day during the month.

You do not state the date on which partial under-firing of retorts with natural gas was commenced. I presume that this was after November 23rd, and that the increase in the production rate is the reason for the lower pressure of 557.5 p.s.i.g. recorded at the end of the month.

With reference to your letter dated 28th November, I shall be pleased to visit you again at Edinburgh, whenever convenient, if I can be of further assistance to you.

Yours sincerely,

C.M. Adcock

CMA/JMC



File
cho

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331, 5
~~CALEDONIAN 2052~~

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O Box 1,
Southwell,
NOTTS.

9th December, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 30th November, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

P. T. S. RICKETTS

(T.S. Ricketts)
Chief Engineer.

38

RAB/EC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - NOVEMBER, 1960.

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th November, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected) 3,008,500 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

2nd November - 563.0 lbs. per square inch.
9th November - 563.0 lbs. per square inch.
16th November - 562.5 lbs. per square inch.
23rd November - 561.5 lbs. per square inch.
30th November - 557.5 lbs. per square inch.

Number of days on which well was in action during the month 30 days.

Number of days on which well was shut down during the month Nil.

73,951.847
3,008,500
76,960.347 Na

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

FE.1433

5th December 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your letter dated 28th November. I note you are going to investigate the applicability of the Menzel Mechanical Lubricator for Methanol injection.

With regard to the question of the suitability of the 1582' sand for gas storage you will remember that I have said on previous occasions that if a sand will produce gas it should be satisfactory for storing it.

The risk of cementation to which you refer is presumably "secondary cementation"?. This depends upon the quality of the injected gas. Substances which cause secondary cementation are unsaturated compounds which may form gums in the reservoir, also phenols, aromatic hydrocarbons, and oxides of nitrogen. If any of these compounds are present the gas will require to be purified before it is injected into the well.

In the Sunbury report KH/FE/101 "A Study of the feasibility of seasonal gas storage in the Cousland Reservoir" dated July 1959, of which you have a copy, it was concluded that 1000 million SCF of coal gas could not be stored in the 1582' sand at an injection rate of 10 million cubic feet per day, without exceeding a maximum wellhead pressure of 1200 p.s.i.g. However, this quantity of gas could be stored if the 1720' sand were also to be used as a storage reservoir.

If you will refer to my report on putting Cousland well 1 back to production from the 1582' sand, dated 1st January 1957, you will note from graph 3 that a production rate of 4 million cubic feet per day was attainable at a bottom hole differential pressure of 420 p.s.i.g. The graph has been shown dotted, since this production could not have been produced through the tubing owing to the pressure drop due to friction. However, the production rate could have been obtained from the casing annulus.

After the wellhead pressure has fallen to 100 p.s.i.g. by natural depletion it will be possible to inject gas into the 1582' sand at a rate of 4 million cubic feet per day at an injection pressure of circa 550 p.s.i.g. This is the sum of the abandonment pressure of 100 p.s.i.g. plus the B.H.D.P. of 420 p.s.i.g. plus 5% allowance for the changeover from production to injection.

It would not be desirable to store more than 500 million cubic feet in the 1582' sand. You will note from the wellhead pressure-production graph which I have sent you that the wellhead pressure will rise to 470 p.s.i.g. after 500 million cubic feet gas have been injected into the reservoir. The corresponding injection pressure will be 940 p.s.i.g. $(470 + 420 + 5\%)$. It would be desirable in your injection scheme to base on compressors operating at 1200 p.s.i.g.

It would be possible to inject gas into the 1582' sand at a faster rate than 4 million cubic feet per day if the reservoir connection is opened up first of all by a hydraulic fracturing operation, but it is doubtful if a sustained injection rate of 10 million cubic feet per day could be attained without exceeding an injection pressure of 1200 p.s.i.g.

In a report which I have sent to our Exploration Division, I have suggested that you could obtain additional gas production from the 1720' sand by drilling an exploitation well within 500 feet of well 1. The geological evidence is that a structural rise of about 50 feet could be obtained which would result in water-free gas production. Since the new well would be so close to well 1 no deterioration in sand conditions would be expected. The drilling of this well should give you improved operational flexibility, since you would have a second gas storage well after you had exhausted its natural gas reserves.

The producible natural gas reserves in the 1720' sand are of course still conjectural, but probably another 700 million cubic feet could be expected, sufficient for four years production at 500,000 cubic feet per day to the abandonment pressure of 100 p.s.i.g.

The approximate gas injection rate into the 1720' sand will have been ascertained from the back-pressure production tests carried out as soon as the well has been completed. If the open flow potential of the well is unsatisfactory a hydraulic fracturing workover will be undertaken to improve the reservoir connection. A gas injection rate of 5 million cubic feet per day is expected, with a storage capacity of 500 million cubic feet.

I was interested to learn that you have increased the offtake from Cousland Well 1 by partial under-firing of retorts with natural gas. I am looking forward to receiving your next monthly report for details of production rates and wellhead pressures.

Yours sincerely,

C.M. Adcock

cc. Mr. M.H. Lowson, Britannic House
Mr. A.S. Burt, BP House
Mr. W.M. Watson, Bakring
Mr. R.G.W. Brunstrom, Bakring.

CMA/JMC



Your ref: PE.1407

4 copies

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
28th November,
1960

C.M. Adcock, Esquire,
BP Exploration Company Limited,
EAKRING,
P.O. Box 1, Southwell, Notts.

Dear Mr. Adcock,

NATURAL GAS: COUSLAND


Thank you very much for your letter of the 22nd of November, 1960. It was very kind of you to send us the information on the Menzel Mechanical Lubricator, and we will examine the suitability of this for methanol injection.

I was very interested in the last paragraph on page 2. of your letter: we are now increasing the rate of utilisation of natural gas by the partial under-firing of retorts by means of natural gas, in an endeavour to exhaust the Well in, say, three years.

The next question I would like to ask you is this: is the nature of the 1582 feet sand in Well 1 suitable for gas storage? That is to say, is it sufficiently porous and is there a negligible risk of cementation? I do not think I have so far received any information from you on this matter, but it is very important to me as I am now drawing up proposals for the installation of compressors and filters at the Wellhead.

I look forward to seeing you again in Edinburgh when we could perhaps discuss this matter further.

Yours sincerely,


(T.S. Ricketts)
Chief Engineer

TSR/EWF

INDICATED COMPRESSOR HORSEPOWER REQUIRED TO COMPRESS ONE MILLION CU. FT. OF NATURAL GAS PER 24-HR. DAY

Discharge pressure. lb. per sq. in. gauge	Intake pressure, lb. per sq. in. gauge																			
	0	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200	250	300	350	400
25	55	34	19																	
50	85	55	40	30	20															
75	106	72	55	43	34	28	22	17												
100	119	87	68	54	45	38½	33	27	22½	17½										
125	130	99	79	64½	54	47	41	35	31½	26½	20½	13½								
150	139	110	88½	73	62	54½	47½	42	38	33	28½	21½	14½							
175	146½	117½	97	81	69	61½	54	48½	44	39½	35	28	20½	15½						
200	153	123½	105	88½	76	68	60	54	49	45	40½	33½	26	20½	16½					
225	159	129	111	95	82½	74	65½	59½	54½	49½	45½	38	31	25½	21	16½				
250	165	134½	116½	101	88½	79½	70½	65	59	54½	50	42½	35½	30½	25½	20½				
275	170½	139	121½	106½	94½	85	76	69½	63½	58½	54	46½	39½	34½	30	24½	15½			
300	176	143½	125½	111½	99½	90	80½	73½	67½	62½	58	50½	43½	38½	33½	28½	18½			
325	181	147½	129½	116	104	94½	85½	78	72	66½	62	54	47	42	37	32	22	15		
350	185½	151½	133	119½	108	99	89½	82	75½	70	65	57½	50	45	40	35½	25	18		
375	190	155	136½	123	112	103	94	85½	79½	73	68½	60½	53	48	43	38½	28	20½	14½	
400	194	158	140	126½	116	107	97½	89	83	76½	71½	63½	56	51	46	41½	31	23	17	
425	197½	161½	143	130	119½	110	101½	92½	86½	80	75	67	59	54	49	44	34	25½	19½	14
450	200½	164½	146	133	122½	113	105	96	89½	83	78	70	62	56½	51	46½	36½	28	21½	16½
475	203	167½	148½	135½	125	116	108	99	93	86	81	72½	64½	59	53½	49	39½	30½	24	18½
500	205½	170	151	138	127½	118½	110½	102	96	89	84	75	67	61½	56	51½	42	33	26	20½
525	208	173	153½	140½	130	121	113½	105	99	92	87	77½	69½	63½	58½	54	44	35	28½	22½
550	210	175½	156	143	132½	123½	116	108	102	95	89½	80	72	66	61	56	46	37½	30½	24½
575	212	178	158½	145	134½	126	118½	111	104½	97½	92	82½	74½	68½	63	58	48	39½	32½	26½
600	214	180½	160½	147½	136½	128	120½	113½	107	100½	94½	85	76½	70½	65	60	50	41½	34	28½
625	216	183	163	149½	138½	130	122½	116	109½	103	97	87½	79	73	67	62	51½	43½	36	30½
650	217½	185½	165	151½	140	131½	124½	118	111½	105½	99½	89½	81	75	69	64	53½	45	38	32½
675	219	187½	167½	153½	142	133½	126½	120	113½	107½	102	92	83	77	71	66	55	47	40	34½
700	220½	190	169½	155½	144	135	128½	122	115½	110	104	94	85½	79	73	68	57	48½	41½	36
725	222	192	171½	157½	146	137	130½	124	117½	112	106	96	87½	81	75	69½	58½	50	43½	38
750	223½	194	173½	159	147½	138½	132	125½	119½	113½	107½	98	89½	82½	76½	71½	60	51½	45	39½
775	225	196	175½	161	149½	140½	134	127½	121	115½	109½	100	91½	84½	78½	73	61½	53	46½	41
800	226½	198	177½	162½	151	142	135½	129	123	117	111	102	93	86	80½	75	63	54½	48	42½
825	228	199½	179	164½	153	144	137	130½	125	118½	113	103½	95	88	82	77	65	56	49½	44
850	229½	201	181	166	154½	145½	138½	132	126½	120	114½	105½	97	89½	84	78½	66½	57½	51	45½

¹Those interested in gas transmission may find it preferable to classify this table under P 624.2, whereas those interested in extraction of natural gasoline may prefer to classify it under P 772.3.

INDICATED COMPRESSOR HORSEPOWER REQUIRED TO COMPRESS ONE MILLION CU. FT. OF NATURAL GAS PER 24-HOUR DAY

Discharge pressure, lb. per sq. in. gauge	Intake pressure, lb. per sq. in. gauge																			
	0	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200	250	300	350	400
875	231	203	183	168	156	147	140	133½	128	121½	116	107	99	91½	85½	79½	67½	59	52	47
900	232	204½	184½	169	157½	148½	141½	135	129½	123	118	108½	101	93	87	81	69	60	53½	48
925	233	206	186	170½	159	150	143	136½	131	124½	119½	110½	102½	95	89	82½	70½	61½	55	49½
950	234½	207½	187½	172	161	151½	144	138	132	126	121	112	104	96½	90½	84	72	63	56	50½
975	236	209	189	173½	162½	153	145½	139	133½	127	122	113½	106	98	92	85½	73½	64	57	51½
1000	237	210½	190½	175	164	154½	147	140	135	128½	123½	115	107½	99½	93½	87	75	65½	58	52½
1025	238	211½	192	176	165½	156	148	141½	136	129½	125	116	109	101	95	88	76½	67	59½	54
1050	239	213	193	177½	167	157	149½	143	137	131	126	117½	110½	102	96½	89½	77½	68	60½	55
1075	240	214	194½	179	168	158½	151	144	138½	132	127½	119	112	103½	98	91	79	69	62	56
1100	241	215	196	180	169½	160	152	145	139½	133	128½	120	113	105	99½	92	80	70½	63	57
1125		216	197	181½	171	161	153½	146½	140½	134	129½	121	114½	106	101	93	81	71½	64	58
1150		217	198	183	172	162	155	147½	141½	135½	130½	122½	115½	107½	102½	94½	82½	72½	65	59
1175		218	199½	184	173	163½	156	149	143	136½	132	123½	117	108½	104	95½	83½	73½	66½	60
1200		219	200½	185½	174½	165	157	150	144	137½	133	125	118	109½	105	97	84½	75	67½	61
1225		220	201½	186½	176	166	158	151	145	139	134	126	119	111	106	98	86	76	69	62
1250		221½	202½	188	177	167	159½	152	146	140	135	127	120	112	107½	99½	87	77	70	63
1275		222½	203½	189	178	168	160½	153	147	141	135½	128	121	113	108½	100½	88	78½	71	64
1300		223½	204½	190	179	169	161½	154	148	142	136½	129	122	114	109½	101½	89	79½	72	65
1325		224½	205½	191½	180	170	162½	155	149	143	137½	130	123	115	110½	103	90	80½	73	66
1350		225½	206½	192½	181	171	163	156	150	144	138½	131	124	116	111½	104	91½	81½	74½	67
1375		226½	207½	194	182½	172	164	157	151	145	139½	132	125	117	112½	105	92½	83	75½	68
1400		227½	208½	195	183½	173	165	158	152	146	140	133	126	118	113½	106	93½	84	76½	69
1425		228	209½	196½	184½	174	166	159	153	147	141	134	127	119	114½	107½	94½	85	77½	70
1450		229	210½	197½	185½	175	167	160	154	148	142	135	128	120	115½	108½	96	86	78½	70½
1475		230	211½	198½	186½	176	168	161	155	149	143	136	129	121	116½	109½	97	87	79½	71½
1500		231	212½	200	187½	177	169	162	155½	150	143½	137	130	122	117½	111	98	88	80½	72½
1525		232	213½	201	188½	178	170	163	156½	151	144½	138	131	123	118½	112	99	89	81½	73½
1550		233	214½	202	189½	179	171	163½	157	152	145	139	132	124	119½	113	100	90	82½	74½
1575		234	215	203½	190½	180	171½	164	158	152½	146	139½	132½	125	120½	114	101	91	83½	75½
1600		235	216	204½	191½	180½	172½	165	159	153	147	140	133½	126	121	115	102	92	84	76
1625		235½	217	205½	192½	181½	173½	166	160	154	147½	141	134	126½	122	115½	103	92½	85	77
1650		236½	218	206½	193½	182½	174	167	160½	154½	148½	141½	134½	127½	123	116½	104	93½	86	77½
1675		237	219	207½	194½	183½	175	167½	161½	155½	149	142	135½	128	124	117	105	94	86½	78½
1700		238	219½	208½	195½	184	176	168½	162	156	150	143	136	129	125	118	106	95	87	79

*Those interested in gas transmission may find it preferable to classify this table under P 624.2, whereas those interested in extraction of natural gasoline may prefer to classify it under P 772.3.

File
Mo

PE.1407

22nd November 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas Cousland

Many thanks for your letter dated 15th November. You will remember that I asked our Engineering Division to enquire whether a high pressure drip feed Methanol Lubricator could be obtained from U.K. Suppliers. Our Engineering Division was unable to find a U.K. Manufacturer of such equipment, and they forwarded to us instead quotations for various types of metering pumps.

I did not pass this information on to you, as I understood from Mr. Elgin that you did not wish to have an electric motor continuously in operation at the wellhead. However, I am now forwarding to you copies of the quotations obtained by our Engineering Division. In their opinion, the Manzel Mechanical Lubricator might be suitable for Methanol injection, supplied by the British Manzel Oil Pump Co. Unfortunately this lubricator is motor driven.

As mentioned in my letter dated 17th June, even with Methanol injection at the wellhead, the tape heaters in the governor house will still be required. If there is any water production at all, the Methanol will be removed with the water in the separator, and there will be no Methanol in the gas entering the governor house. Hence the tape heaters will be needed to overcome the freezing effects due to the gas expansion.

On previous occasions, when the hydrate compounds, which caused the pipe blockage, were exposed to atmospheric conditions, disintegration into water and an oily deposit took place. Hence it should be possible to dissipate any blockaging which may occur in the future by allowing the plant pressure to fall to about 20 p.s.i.g., or say 10 p.s.i. above the pressure in the Musselburgh pipe line. Since hydrate blockages are infrequent, this should be a simpler means of clearing them than Methanol injection.

When hydrates are forming and the pipeline is blocking, there will be a difference between the pressure at the wellhead and the pressure inside the governor house before the gas passes to the first pressure reducing valve. The worse the blockage the more marked will be this pressure difference.

As soon as any evidence of hydrate formation is obtained, the well should be shut-in at the wellhead whilst the gas is still flowing into the pipe line to Musselburgh. It may take more than one hour for the plant pressure to fall to circa 20 p.s.i.g. After this period of time, the hydrates will have been liquefied and will have been produced into the separator, so that the resultant liquid can be drained off. The wellhead valve is once more opened up, and the well is produced under the normal operating conditions.

I am sending you herewith a copy of a graph on which I have plotted the Cousland well 1 flowing pressures against the cumulative production. The extrapolation of the graph indicates a cumulative production of 700 million cubic feet to an abandonment pressure of 100 p.s.i.g. It is probable that well 1 could be produced at a rate of 500,000 cubic feet per day without producing substantial quantities of reservoir water. If you could handle gas at this production rate, the 1582' sand in well 1 would be available for gas storage use within four years.

Yours sincerely,

C.M. Adcock

Encl.

CMA/JMC



File
Mg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34831-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

21st November, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland.

I thought you would wish to know that we have just commenced using small quantities of natural gas from Cousland for experiments in underfiring in the producers of the continuous vertical retorts at Musselburgh Gasworks. This is of course in addition to the amount used for enrichment.

All natural gas being used passes through the B.M. meter previously installed at the Musselburgh Gasworks.

Yours sincerely,

(T.S. Ricketts)
Chief Engineer.

RAB/EC.

PE.1401

17th November 1960

Dear Murray,

The report, which I am now sending you, is a review of the Cousland well 1 production from the 1582' sand during the last three years. The wellhead pressure production graph indicates gas reserves of 700 million cubic feet to an abandonment pressure of 100 p.s.i.g.

The Scottish Gas Board is anxious to deplete the sand as quickly as possible so that it can be used for gas storage. A Reforming Plant would be required to handle 500,000 cubic feet gas per day; and, at this rate, the sand could be depleted in less than four years, which is too short a time for the amortisation of the plant.

The report reviews the possibilities of drilling a production well on the Cousland anticline, near well 1, for the exploitation of the 1720' sand: and of reinstating and commissioning well 4 on the Fordel Mains structure. After hydraulic fracturing, well 4 could yield gas production at the rate of circa one million cubic feet per day.

The additional gas reserves from the Cousland 1720' sand and from the two sand groups in well 4 on the Fordel Mains structure have been very tentatively estimated at 2000 million cubic feet, sufficient to keep the Reforming Plant supplied with gas for 10 years, and to allow for its depreciation.

Estimates have been made of the cost of drilling an exploitation well and of opening up well 4. These estimates have been based on the cost of drilling well 6, which was a structure defining well.

I am sending A.S. Burt a copy of this report since he has been looking into the future possibilities of the Cousland area.

Yours sincerely,

C.M. Adcock

M.H. Lowson, Esq.,
The British Petroleum Company Ltd.,
Britannic House,
Finsbury Circus,
London, E.C.2.

CMA/TMC

PE.1400

17th November 1960

Dear Mr. Burt,

I am sending you herewith a copy of my report on "Natural Gas Production from the Cousland and Fordel Mains Structures".

The main point is that the Scottish Gas Board is anxious to deplete the 1582' sand as quickly as possible so that it can be used for gas storage. Additional sources of gas are required to pay for the cost of the Reforming Plant.

The new gas reserves could be obtained from the 1720' sand at Cousland or from the two sand groups in well 4 on the Fordel Mains structure. The report discusses these possibilities, and includes cost estimates for the drilling of a production well and for the opening up of well 4.

Yours sincerely,

C.M. Adcock

A.S. Burt, Esq.,
The British Petroleum Company Ltd.,
BP House,
Ropemaker Street,
London, E.C.2.

CMA/JMC

BP EXPLORATION COMPANY LIMITED

NATURAL GAS PRODUCTION FROM THE

COUSLAND AND FORDEL MAINS STRUCTURES

Assessment of the gas production before
depleted wells are available for gas storage

Eakring
November 1960

Report by: C.M. Adcock

II

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SUMMARY

The Scottish Gas Board's objective at Cousland well 1 is to deplete the 1582' sand at a fast rate, so that it can be used for gas storage. The cumulative gas production from the 1582' sand in well 1, to an abandonment pressure of 100 p.s.i.g., is estimated at 700 million cubic feet, of which 74 million cubic feet have so far been produced.

Assuming that the Scottish Gas Board has financial backing for the installation of a Reforming Plant, the offtake from well 1 could be increased to 500,000 cubic feet per day. The 1582' sand would be depleted in $3\frac{1}{2}$ years, when it could be used for gas storage.

An exploitation well, drilled not more than 500' N.E. of Well 1 should produce water-free gas from the 1720' sand. The additional reserves are estimated at 700 million cubic feet, sufficient to supply the Reforming Plant for a further 4 years.

The reinstatement and commissioning of well 4 would provide a further supply of natural gas from a new structure, the required offtake rate being obtained after hydraulic fracturing to open up the reservoir connection. Estimates for gas reserves in the Fordel Mains anticline must be very tentative, but are provisionally put at about 1300 million cubic feet.

The cost of drilling the structure test well 6 was £38,400 including 25% establishment charges. The cost of drilling well 7 as an exploitation well, and completing it with a string of 2" tubing and an O.C.T. wellhead for gas production, is estimated at £23,300. Similarly, the cost of commissioning well 4, inclusive of perforation charges, hydraulic fracturing; and completing it with a string of 2" tubing and an O.C.T. Wellhead for gas production, is estimated at £12,200.

COUSLAND WELL 1

1. Production from the 1582' - 1632' sand

The well was put to flowing production from the top member of the 1582' sand on 28th October 1957. A total of 74 million cubic feet of gas has been produced to the end of October 1960. The flowing pressure has fallen from 621 p.s.i.g. to 564 p.s.i.g. over this period. No reservoir water has been produced during this period.

Graph 1 is a plot of flowing wellhead pressures against the cumulative production from the well. The estimated cumulative production to an abandonment pressure of 100 p.s.i.g. is 700 million cubic feet. The recoverable balance is therefore approximately 630 million cubic feet gas.

At the current offtake rate of 24 million cubic feet per year, it will take a further 26 years to deplete the gas sand to the abandonment pressure, so that economic gas production could be obtained until circa 1986.

2. Exploitation of additional production from the Cousland anticline

It is proposed to assume for the purpose of this appraisal, that the cost of installing Reforming Plant at the Musselburgh terminal, would be justified for certain conditions.

A production rate of 500,000 cubic feet per day could be obtained from the 1582' sand for a bottom hole differential pressure of 12 p.s.i. No coning up of reservoir water would be expected with such a low BHDP, so that it should be practicable to maintain the well on production continuously at this rate. (a)

The annual offtake rate would be increased from 24 to 180 million cubic feet. It would then take about $3\frac{1}{2}$ years to produce the remaining reserves of 630 million cubic feet. After this period, the 1582' sand would be available for gas storage, and would be a valuable asset, since the Scottish Gas Board is seeking sub-surface reservoirs for the storage of gas.

The Reforming Plant would not be written off in $3\frac{1}{2}$ years, so that a new supply of natural gas would be required. A.P. Terris (b) has recommended the drilling of another structure defining well 1000 feet N.E. of well 1, but in view of the negative results obtained in wells 5 and 6, it would be difficult to support such a recommendation.

There are two further alternatives to be examined:-

- A. Open up & complete well 4 as a gas production well.
- B. Drill a new well not more than 500 feet N.E. of well 1, for
 - (i) Gas production from the 1720' - 1806' sand.
 - (ii) Gas storage in the 1720' sand.

(a) See report on putting Cousland well 1 back on production from the 1582' sand, by C.M. Adcock, dated 1st Jan. 1957.

(b) Geological Completion report for Cousland No.6, Midlothian, by A.P. Terris, dated 24.3.60, Records No. U.K. 345

The merits of opening up well 4 are discussed in the second section of this report. A second well, drilled near well 1, should encounter similar sand conditions, and a structural rise of 50' is anticipated. (c) The bottom of the 1720' sand should then be penetrated at circa 1760', or about 40' above the gas/water level found at 1800' in well 1.

The new well could be drilled as part of the gas storage project. Assuming that the gas reserves in the 1720' sand are approximately 700 million cubic feet, the sand could be depleted to the 100 p.s.i. abandonment level, at a production rate of 500,000 cubic feet per day, in a 4 years period. The pay-off time for the Reforming Plant would therefore be about 8 years.

There is also the possibility of obtaining additional gas from the 2094' - 2122' sand group of well 1. This sand produced gas at a rate of 150,000 cubic feet per day during a formation test. (d) After hydraulic fracturing a production rate of one million cubic feet per day could be expected. The exploitation of the 2094' sand would provide another source of supply of natural gas for the Reforming Plant.

3. Gas production per acre-foot of sand

It is assumed that Cousland well 1 will be adequate for draining the 1582' gas sand. The reservoir area is not known in detail. Estimates of 113 acres (e) and 230 acres (f) have been made. These two areas are shown on fig. 2 of the Report RGWB-5. The lack of success in finding gas in well 6 can be attributed to the accidental location of the well near the easterly fault. (c)

In consequence the indicated reservoir area of 230 acres must be reduced, possibly by about one third, making the new area circa 150 acres. The thickness of clean sand in the 1582' sand group is 40' (d). The top sand member occurs over the interval 1582' - 1613'; and the lower sand member occurs over the interval 1623' - 1632'.

It is presumed that both sand members are in reservoir connection, and that the perforations opposite the top sand body will deplete both sands. Hence a reservoir volume of 6000 acre-foot is obtained. Accepting the economic production as 700 million cubic feet, an anticipated production of 117,000 cubic feet will be obtained per acre-foot of reservoir volume.

(c) Report No. U.K. 345 - Fig. 2.

(d) Cousland Geological Completion Report by N.L. Falcon, Records No. U.K. 62.

(e) Report on the Cousland Area by W.D.V. Jones. Records No. U.K. 195, dated 22.10.54.

(f) The prospects of finding more gas in the Cousland Area, by R.G.W. Brunstrom, reference GL-RGWB-5-UK-Scotland, dated 10.5.55.

$$\begin{aligned} D^2 \times .7854 &= 150 \text{ acres} \\ D^2 &= \frac{150}{.7854} = 191.0 \\ D &= \sqrt{191.0} = 13.82 \end{aligned}$$

$D^2 = 8,300,000$
 $D = 2880$
 $R = 1400$

4. Possible gas reserves in the 1720' and 2094' sands

The thickness of clean sand in the 1720' group is 70' (d). There are five sand member, viz: 1720' - 1734'; 1738' - 1744'; 1752' - 1758'; 1760' - 1790'; and 1792' - 1806'. The reservoir area above gas/water level in the 1720' sand group may not be more than about 80 acres. This is half the reservoir area above gas/water level in the 1582' sand. Since there is over double the thickness of clean sand in the 1720' group as compared with the 1582' group, the indications are that the producible reserves of gas should be similar in quantity for both sand groups. A production of 700 million cubic feet could be expected therefore from the 1720' sand group.

The reservoir area of the 2094' sand above gas/water level is not known. When this sand was tested in well 1, dry gas production was obtained without any reservoir water (d). The reservoir area might then be at least as extensive as is at present indicated for the 1582' sand, viz. 150 acres. The total thickness of clean sand in well 1 is 26'. Hence, the reservoir volume is 3900 acre-feet. Basing on a production of 117,000 cubic feet per acre-foot, the producible gas reserves are estimated to be 450 million cubic feet.

5. Cost of drilling and completing well 7 for gas exploitation from the 1720' sand.

The cost of drilling well 6, including 25% establishment charges, was £38,400. In an exploitation well there would be no coring, no formation tests, no hole conditioning for formation tests, and no reaming. This would reduce the total drilling and completion time from 80 days to 40 days.

In addition, since the 1720' sand group is hard, it is proposed to cement the casing above the gas sand, and to complete the well barefoot. There would therefore be no perforation charges, but there would be the usual electric logging charges. The total cost of drilling well 7 with an Ideal T.20 drilling outfit, including 25% establishment charges, is £22,000, thus effecting a saving of £16,400 as compared with well 6.

A string of 2" tubing and an O.C.T. Wellhead are required to complete the well for gas production. The total cost of this equipment is £1300 making the total cost of completing well 7 as a gas well £23,300.

COUSLAND WELL 4

1. Reinstatement considerations for commissioning well 4

(i) Production stimulation by hydraulic fracturing

Cousland well 4, drilled on the Fordel Mains structure, penetrated a total of 176 feet reservoir rocks, all of which yielded some gas production. The gas flow from any one sand was small, the maximum production rate obtained being 101,000 cubic feet per day.

Well 4 was drilled in 1947 before the development of hydraulic fracturing as a production stimulation technique. The gas production was considered uneconomic, and the well was abandoned after placing a 50 feet cement plug at 1200 feet followed by a 500 feet cement plug to surface inside the 11 $\frac{3}{4}$ " casing string.

There is no U.K. yard stick for assessing the production gain to be expected as a result of a hydraulic fracture workover in a gas sand. However, in a tight gas sand in the Midlands, at Ironville well 3, the open hole was shot with polar blasting gelatine. The production was increased fifty times as a result of this workover. The U.K. experience with oil sands is that if a production increase is obtained by shooting, a better production increase will be obtained by hydraulic fracturing (a).

Prior to shooting, the Kinderscout Grit gas sand at Ironville well 3 was produced during a drill stem test lasting 20 days. (b) The gas production rate increased from 75 cubic feet per day to 15,000 cubic feet per day at the end of the test. After shooting the gas sand with B.G., the production rate increased to 800,000 cubic feet per day. (c)

With equally effective production stimulation at Cousland well 4, a gas production rate exceeding one million cubic feet per day should be obtained from the more permeable sand. Production rates up to 500,000 cubic feet per day should be obtained from some of the other sands.

-
- (a) Report on hydraulic fracturing at Egmonton, years 1956 - 1958 inclusive, by C.M. Adcock and J.H. Edwards, dated April 1960.
- (b) See formation test report by F.W. Dixon, reference PRO/1/3793, dated 1st January 1957.
- (c) Report on Flow tests, carried out on Kinderscout Grit gas sand from 1665' - 1738' by K.Kirby, dated February 1957.

(ii) Production from known gas sands in Fordel Mains structure

Mostly thin gas sands were penetrated when well 4 was drilled. Reservoir water was also produced from three horizons. The water zones have been used to subdivide the gas sands into three arbitrary groups, viz:

<u>Sand Group</u>	<u>Overall Int:</u>	<u>Water Zone</u>	<u>Thickness gas sands</u>	<u>Total Gas prdn. rate cu.ft/day</u>	<u>Water Prdn. rate gals/day</u>
Top	900'-1300'	ca. 1250'	76'	18,800	1,500
Middle	1430'-1840'	ca. 1820'	70'	101,900	9,100
Bottom	1850'-1995'	ca. 1970'	30'	6,800	3,400

With the reinstatement and commissioning of well 4, gas production will be obtained from known gas sands in a new structure. The new supply of natural gas will be required for the Reforming Plant whilst the depleted gas sands in well 1 are used for gas storage.

(iii) Proposed completion procedure for well 4.

It is intended to carry out the reinstatement of well 4 with a Cardwell outfit and a Cardwell mast to keep costs to a minimum. When the well was abandoned, the 8 $\frac{5}{8}$ " hole had been carried to 1822', with a 5 $\frac{3}{8}$ " pilot hole to the completion depth of 1995'. The bottom sand group is located in the pilot hole and it would be plugged off with cement, so that the well can be completed as a producer from either the top or middle sand groups. After drilling out the cement plugs, and shutting off the pilot hole, a production string of 6 $\frac{3}{8}$ " casing will be run to 1800' and cemented.

Initially, production is to be drawn from the more permeable sands in the Middle Sand Group. It is proposed to perforate the casing opposite the top permeable sands of the group, which produced gas at the rate of 101,000 cubic feet per day, at a density of four shots per foot. The perforation density will be reduced to one shot per foot opposite the thicker, lower, and less permeable sand bodies.

The hydraulic fracturing programme will be carried out in two stages. Initially, the packer will be set above the main producing horizon. During the first Hydrafrac operation, the upper, and more permeable sand bodies will be fractured. For the second Hydrafrac, the packer will be lowered and will be set above the tighter and thicker sands. The final operation will be to bring the well on production, and to undertake back-pressure production tests to determine the open flow potential of the well.

(iv) Cost of reinstatement and commissioning well 4

The cost of reinstating well 4, inclusive of electric logging and the cost of the 6 $\frac{3}{8}$ " casing production string; and with the addition of 25% establishment charges, is estimated at £9,600. This compares with the estimated cost of £22,000 for drilling a new exploitation well near well 1.

The total time taken to reinstate well 4 is estimated at 20 days, or half the time required to drill another well. The cost of casing perforation is estimated at £1300. The cost of the Hydrafrac workover has been included in the estimate of the cleaning out operations. Hence the total cost of reinstating and commissioning well 4 will be £10,900. There will be a further cost of £1300 for a string of 2" tubing, and an O.C.T. Wellhead, making the total cost of putting well 4 on production £12,200.

2. Tentative estimate for the gas reserves in the Fordel Mains structure.

The extent of the closure in the Fordel Mains anticline is not known. The reservoir area above gas/water level has been taken as 80 acres.(d) The true reservoir area could occupy double this acreage.

The producible gas, to an abandonment pressure of 100 p.s.i.g., is assumed to be 117,000 cubic feet per acre-foot of reservoir volume. This is the calculated gas production from the 1582' sand of well 1.

The porosities of the reservoir rocks in well 4 may be less than the porosities in well 1, but no data are available. The error in assuming identical porosities will be small compared with the possible error in the estimate of the reservoir area. Since gas production is to be drawn firstly from the Middle Sand Group, and then possibly afterwards from the Top Sand Group, with the Bottom Sand Group cemented off, the producible gas reserves have been estimated only for the Top and Middle Sand Groups. Accepting these premises, the following results are obtained for a reservoir area of 80 acres:-

<u>Sand Group</u>	<u>Acre-feet reservoir Sands</u>	<u>Producible gas - Million Cu.ft</u>
Top	6,080	700
Middle	5,600	650
<hr/>		
Total	11,680	1,350

The total producible gas from the Middle Sand Group could be about the same as has been estimated for the 1582' sand in well 1. The rate at which the gas can be withdrawn from the borehole will depend upon the extent to which the reservoir is opened up by hydraulic fracturing.

(d) Report RGWB 5 dated 10.5.55., fig: 2. The reservoir area has been taken as that represented by the 105.4 contour.

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A. COST OF DRILLING WELL 7 AND OF OPENING UP WELL 41. Estimate of time to drill well 7 from an analysis of the drilling work at well 6

<u>Ideal T.20 drilling outfit</u>			
	<u>Well 6</u>	<u>Well 7</u>	
	<u>Depth 1910'</u>	<u>Depth 1760'</u>	
	<u>Hours</u>	<u>Hours</u>	
Drilling	579½	500 ^(a)	
Round trips	108	100 ^(b)	
Rigging up	154	154	
Breaking down	16	16	
Casing and cementing	63	130 ^(c)	
Deviation survey	14	14	
Logging	16	16	
Conditioning mud	16½	16	
Hole conditioning	124¾ ^(d)	-	
Fishing	5	-	
Repairs	13½	-	
Coring	337½	-	
Formation Tests	217½	-	
Reaming	15½	-	
Plugging back	124	-	
Shooting with B.G.	100	-	
Bailing hole	8	8	
	<hr/>	<hr/>	
Totals - Hours	1912½	954	
	<hr/>	<hr/>	
Days	80	40	

Notes

- (a) Drilling time for 1760' based on an average of 3.5 ft per hour.
- (b) Round trips based on completion depths ratio of 1760'/1910'.
- (c) In well 6 there was only a surface string of casing. Allowance has been made for running a 6½" production string of casing in well 7.
- (d) The hole conditioning in well 6 was necessary prior to formation testing. No such considerations apply to well 7.

It will be noted that the saving in the completion time of well 7 as an exploitation well is due to the omission from the drilling programme of all coring, formation testing, hole conditioning, and reaming. Other special items such as shooting with B.G. have been omitted, or fortuitous items such as fishing and repairs. Such incidental items are covered by the contingency allowance in the cost estimate for well 7.

2. Expenditure on well 6 and estimate for well 7(i) Direct expenditure

	<u>Ideal T.20 drilling outfit</u>	
	<u>Actual on well 6</u>	<u>Estimate for well 7</u>
Access to site roads etc.	£1109	£1100
Transportation costs and erection of drilling equipment	2320	2300
Dismantling and cleaning site	1295	1300
Installation of services (water, light, power)	225	200
General expenses, (lodging, travelling, etc)	2130	1050 ^(a)
Drilling operations	15022	6500 ^(b)
Drilling, Plant, and Tool hire	8225	4000 ^(c)
Contractors Charges	2544	1250 ^(a)
	<u> </u>	<u> </u>
Totals	£ 32870	£ 17700 ^(d)
	<u> </u>	<u> </u>

Notes:

- (a) Completion time for well 7, at 40 days, is half the completion time for well 6, at 80 days. Hence, general expenses and Contractors Charges have been reduced for well 7 to half the expenditure for well 6.
- (b) The drilling operations sum of £6,500 is the difference sum to tie-in with the total costs of £17,700.
- (c) The drilling, plant, and tool hire cost is based upon £100 per day rig depreciation charge.
- (d) The total of £17,700 is a pro rata figure based on the analysis of the drilling work, plus the cost of the 6 $\frac{3}{8}$ " production string of casing, viz:

$$\frac{£ 32,870 \times 954 \text{ hours}}{1912.5 \text{ hours}} = £16,400$$

$$\text{Plus cost of 6}\frac{3}{8}\text{" casing to 1680' and cementing} = £1,300$$

$$\text{Total Cost} = \underline{\underline{£17,700}}$$

The 6 $\frac{3}{8}$ " casing will be run to 1680', i.e. the estimated top of the 1720' sand. Hence the well is to be completed barefoot, and there will be no perforation charges.

(ii) Allocation of establishment charges

	<u>Well 6</u>	<u>Well 7</u>
Total direct expenditure	£32,870	£17,700
<u>Plus contingencies</u>	-	500
	<u>£32,870</u>	<u>£18,200</u>
<u>Less drilling plant and tool hire and contractors charges</u>	10,769	5,250
	<u>£22,101</u>	<u>£12,950</u>
<u>Plus 25% Establishment Charges</u>	5,530	3,200
	<u>£27,631</u>	<u>£16,150</u>
<u>Plus drilling plant and tool hire and contractors charges</u>	10,769	5,250
	<u>£38,400</u>	<u>£21,400</u>
<u>Total Costs</u>	<u>£38,400</u>	<u>£21,400</u>

(iii) Electric logging in Well 7

	<u>Depth Charge^(a)</u>	<u>Survey Charge^(b)</u>	<u>Total Cost</u>
Electric log 0-1760'	£51	£29	£80
Microlog 1300'-1700'	14	8	22
Gamma ray log 0-1760'	51	29	80
Flat Charge			100
			<u>£282</u>
Mileage charge and travelling time			209
			<u>£491</u>
Plus 15% increase			74
			<u>£565</u>
		Say	<u>£600</u>

Notes

(a) Depth charge 7d per foot

(b) Survey charge 4d per foot.

(iv) Cost of wellhead fittings

Tubing 2" - 1700 feet at 4/- per foot	£350
O.C.T. Wellhead (order L-EK-716-735-3)	950
	<u>£1,300</u>
	<u>£1,300</u>

Hence total cost of completing well 7 for gas production£23,300

3. Cost of completing well 4 as a production well

Since the open hole is not to be cleaned out beyond 1822', and since the production string of 6 $\frac{3}{8}$ " casing is to be run to 1800', a Cardwell outfit with a Cardwell mast, can be used for the workover. This will bring about a considerable saving in "Drilling Plant and Tool Hire" expenses, since the charge for rig depreciation will be £3 per day instead of £100 per day.

An allowance of 20 days has been made to complete the job. It is presumed that erection and dismantling of the Cardwell will take a total of eight days, and the hydraulic fracturing workover, with production tests, about 4 days. The allowance made for cleaning out the open hole and running casing is therefore 8 days.

The cost of completing well 4 as a production well is therefore as follows:--

(i) Cost of cleaning out the well and running casing.

	<u>Well 4</u>
Access to site roads etc.,	£1,000
Transportation costs and erection of Cardwell outfit	1,300 ^(a)
Dismantling and cleaning site	1,000
Installation of services (water, light, power)	200
General expenses (lodging, travelling, etc.)	500 ^(b)
Drilling operations	2,400 ^(c)
Drilling plant, and tool hire	100 ^(d)
Contractors Charges	600 ^(b)
Contingencies	300
	<hr/>
Total Cost	£7,400
	<hr/>

Notes

- (a) The Cardwell outfit will be driven up to Cousland. Hence, it will be possible to save £1,000 in transportation costs as compared with using the T.20 outfit on well 6.
- (b) Since the completion time is 20 days, general expenses and contractors charges will be one quarter of the costs in well 6.
- (c) The drilling time has been taken as 12 days, and the Cardwell drilling charges have been assessed at £200 per day.
- (d) For the Cardwell drilling outfit, the drilling plant and tool hire charge is £3 per day. The total cost over the 20 days period will be £60, or say £100.

(ii) Allocation of establishment charges

	<u>Well 4</u>
Total direct expenditure	£7,400
<u>Less</u> drilling plant, tool hire, and Contractor charges	700
	£6,700
<u>Plus</u> 25% Establishment charges	1,600
	£8,300
<u>Plus</u> drilling plant, tool hire, and Contractor charges	700
	£9,000
Total Costs	£9,000

(iii) Casing perforation cost

- (a) 6 guns over interval 1436' - 1505' at 4 shots per foot
 (b) 6 guns over interval 1593' - 1712' at 1 shot per foot

Flat Charge	£125
<u>4 shots per foot</u>	
20 shots	82
80 shots at £4.2.0.	328
44 shots at £3.19.0.	174
	£709
<u>1 shot per foot</u>	
36 shots at £5	£180
	£889
<u>Mileage Charge</u>	
564 miles at 5/- per mile	£141
<u>Travelling Time</u>	
18 hours engineer and truck at £3.10.0 per hour	£63
	£1093
Plus 15% increase	164
	£1257
Total	£1257
Say	£1300

(iv) Electric logging in well 4

	<u>Depth charge</u> ^(a)	<u>Survey charge</u> ^(b)	<u>Total Cost</u>
Electric log 0'-1822'	£53	£30	£83
Microlog 850'-1822'	28	16	44
Gamma ray log 0'-1822'	52	30	83
Flat charge			100
			<u>£310</u>
Mileage charge and travelling time			209
			<u>£519</u>
Plus 15% increase			78
			<u>£597</u>
		Say	<u>£600</u>

Notes

(a) Depth charge 7d per foot

(b) Survey charge 4d per foot

(v) Cost of wellhead fittings

Tubing 2" - 1700 feet at 4/- per foot	£350
O.C.T. Wellhead (order L-EK-716-735-3)	950
	<u>£1300</u>

Hence total cost of completing well 4 for gas production£12,200

*underlines
results
but does not
invalidate*

B. COUSLAND 1 - PRODUCTION FROM THE 1582' - 1632' SAND

1. Casing perforation - 8th November 1956

The gamma-ray log, based on the Cardwell rotary table, gave the following intervals for the two sand groups constituting the 1582' - 1632' gas sand:- (a)

Top member	-	1575' - 1604'
Lower Member	-	1608' - 1633'

The top member only was perforated for gas production on 8th November 1956, over the interval 1575' - 1605' with 120 cone shots.

The closed-in pressure by dead-weight tester, after bringing-in the well, was 620.4 p.s.i.g. on 11th November 1956. (b)

2. Tabulation of flowing pressures against cumulative production

The data used for the construction of graph 1 have been abstracted from the Scottish Gas Board's Monthly reports. The tabulated data are as follows:-

<u>Year</u>	<u>Month</u>	<u>Cumulative Production</u> <u>Million cubic feet</u>	<u>Flowing Pressure</u> <u>p.s.i.g.</u>
1958	January	-	-
	February	8.2	610.5
	March	9.78	608.5
	April	12.4	606.5
	May	14.25	605.5
	June	15.93	604.5
	July	17.95	604.0
	August	19.68	603.0
	September	21.6	601.0
	October	23.9	599.5
	November	26.2	597.0
	December	28.6	595.5
1959	January	31.1	593.5
	February	33.4	591.5
	March	36.0	590.0
	April	36.3	592.5
	May	37.1	591.5
	June	39.3	588.5
	July	41.4	587.0
	August	43.6	585.0
	September	45.7	583.5
	October	48.0	581.5
	November	50.3	580.0
	December	52.7	578.5

*620
42.2 atm*

100 = 6.8

*7.2 atm out
242
17.6 atm*

*100
17
8.3*

(a) Report 334/57 dated 17th January 1957

(b) Report on putting the well back to production from the 1582' - 1632' gas sand, by C.M. Adcock, dated 1st January 1957.

<u>Year</u>	<u>Month</u>	<u>Cumulative Production</u> <u>Million cubic feet</u>	<u>Flowing Pressure</u> <u>p.s.i.g.</u>
1960	January	54.1	577.5
	February	55.5	577.5
	March	57.9	574.5
	April	60.4	573.0
	May	62.7	571.0
	June	64.6	569.0
	July	66.5	568.0
	August	68.5	566.5
	September	71.1	565.0
	October	73.95	563.5
	November		
	December		

C. SAND GROUPS ENCOUNTERED IN WELL 4

Mostly thin gas sands were penetrated when well 4 was drilled. Reservoir water was produced from three horizons. The water zones have been used to subdivide the gas sands into three groups:-

1. Top sand group

	<u>Sand members</u>	<u>thickness</u>	<u>Gas prod.rate</u> <u>Cu.ft./day</u>	<u>Water prod.rate</u> <u>gals/day</u>
Overall interval	912' - 918'	6'	1000	
900' - 1300'	928' - 947'	19' }		
Water horizon	962' - 975'	15' }	1800	
circa 1250'	998' - 1000'	2' }		
	x 1038' - 1052'	14'	12,000	
	1096' - 1099'	3'	-	
	1152' - 1158'	6'	100	
	y 1232' - 1243'	11'	3,900	
	z 1246' - 1257'	}		1,500
	z 1260' - 1268'			
Totals		76'	18,800	1,500

Notes

- x Grey crinoidal limestone
- y Assumed to be gas bearing
- z Assumed to be water bearing

Test 6 covered the interval 1238' - 1291', the production consisting of gas and reservoir water.

2. Middle sand group

	<u>Sand members</u>	<u>thickness</u>	<u>Gas prod. rate</u> <u>cu.ft./day</u>	<u>Water prod. rate</u> <u>gals/day</u>
Overall Int:	1436' - 1440'	4'	-	
1430'-1840'	1463' - 1470'	7' }		
Water horizon	1480' - 1490'	10' }	101,000	
circa 1820'	1495' - 1505'	10' }		
	1593' - 1615'	22' }	900	
	1617' - 1632'	15' (
	1710' - 1712'	2'	-	
	1828' - 1832'	-	trace	9,100
Totals		70'	101,900	9,100

3. Bottom Sand group

	<u>Sand members</u>	<u>thickness</u>	<u>Gas prod. rate</u> <u>cu.ft./day</u>	<u>Water prod. rate</u> <u>gals/day</u>
Overall Int:	1854' - 1858'	4' }		
1850'-2000'	1868' - 1871'	3' }	6,000	
Water horizon	1880' - 1896'	6' }		
circa 1970'	1924' - 1932'	8'	-	
	y 1945' - 1954'	9'	800	
	z 1972' - 1992'	-	-	3,400
Totals		30'	6,800	3,400

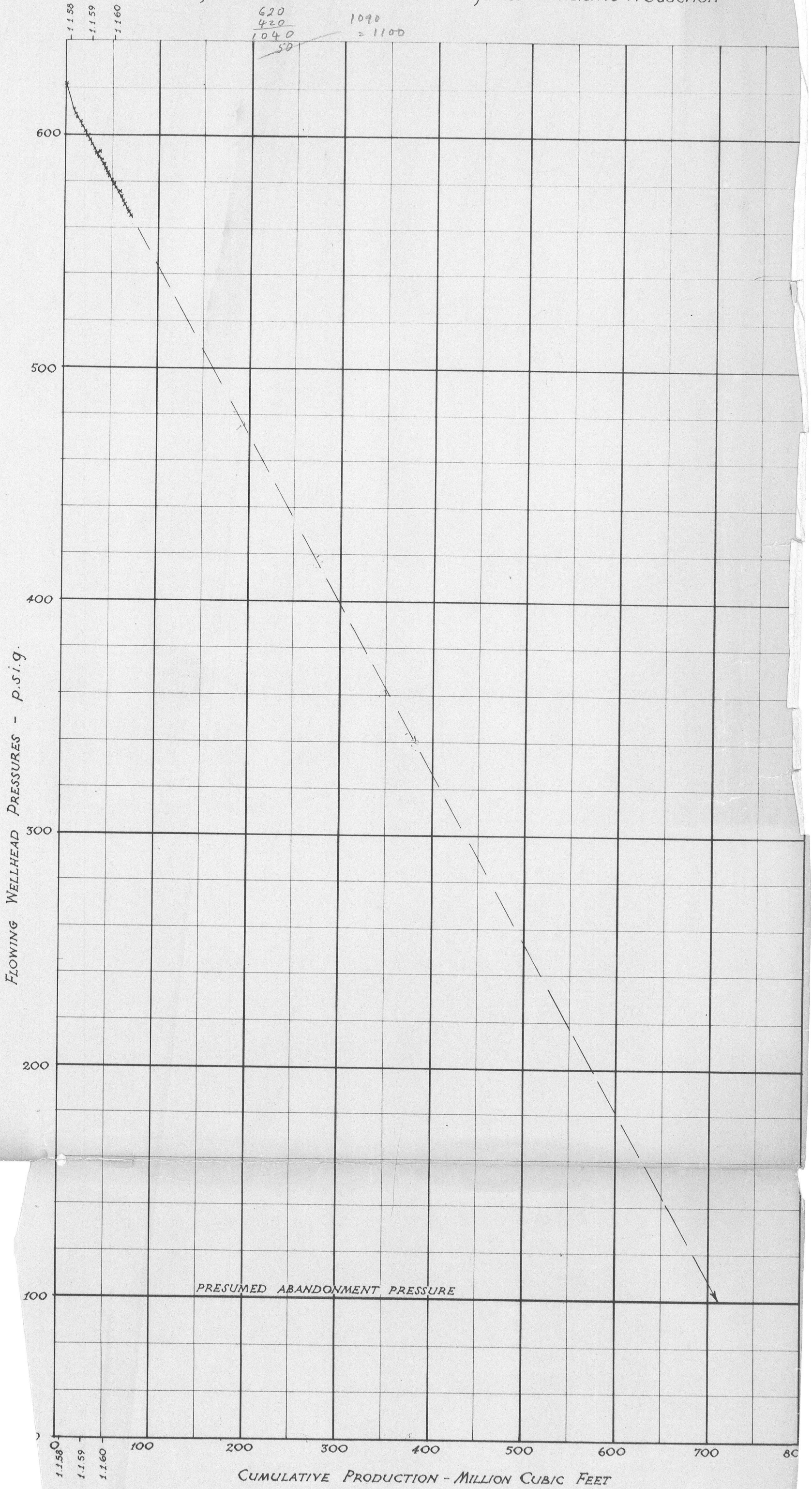
Notes

y Assumed to be gas bearing

z Assumed to be water bearing

COUSLAND WELL No. 1.

Flowing Wellhead Pressures Plotted Against Cumulative Production



1st January 1957

COUSLAND NO. 1 WELL

REPORT ON PUTTING THE WELL BACK TO PRODUCTION FROM
THE 1582 - 1632 GAS SAND.

11th - 12th November 1956.

C.M. ADCOCK

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COUSLAND NO. 1 WELL.REPORT ON PUTTING THE WELL BACK TO
PRODUCTION FROM THE 1582'-1632' GAS SAND.11th - 12th November 1956.I WELL DATA.

Rotary Table Elevation 565'.

Depths below R.T.1. May 1945.

Top of cellar wall	6'
Cellar floor	12'

Casing perforation with 3/8" bullets. (in 1939)

(a) <u>Upper gas sand</u> - top member	131 bullets	1582'	-	1613'
	lower member	33 bullets	1623'	- 1630'
(b) <u>Lower gas sand</u> - top member	61 bullets	1720'	-	1735'
	lower member	186 bullets	1760'	- 1806'

Top of cement plug in 8.3/4" casing	1740'
11.3/4" casing shoe at	268'
8.3/4" casing shoe at	2057'
Top of fish at	2086'

2. July 1951.

Plugged back with cement to	1465'
Anti-corrosive mud to	50'
Cement plug to cellar floor	12'
Wellhead burned off at cellar floor	12'

3. November 1956.

Anti-corrosive mud and cement in casing	
cleaned out to	1663'
<u>Upper gas sand</u> from gamma ray log - top member	1582' - 1602'
	lower member 1614' - 1630'
<u>Casing perforated with shaped charges</u>	
Upper gas sand - top member 120 shaped charges	1575' - 1605'

II CUMULATIVE GAS PRODUCTION FROM WELL.Million cubic feet.

- Gas from 1760' - 1806' sand to tests
ending 15th May 1939 35.9
- Gas from 1582' - 1632' and 1720' - 1735'
sands to tests ending 19th May 1945 30.65
- Gas from 1582' - 1602' interval during tests
from 10th - 12th Nov. 1956
 - To bring in the well 580,000 cubic feet
 - During production tests 734,000 cubic feet 1.314

<u>HENCE CUMULATIVE TOTAL FROM WELL</u>	<u>67.864.</u>
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III OBJECTIVE IN PRODUCING SOLELY FROM THE TOP MEMBER OF THE 1582' - 1632' GAS SAND.

1. During the production tests in November 1939, with the casing perforated opposite the 1582' - 1632' and 1720' - 1735' sands, the water level built up in the well. It was not definitely known whether the water produced was reservoir water or shooting water; but it was certain that it was coming from the 1720' - 1735' sand. Hence, with the 1720' - 1735' sand now below the cement plug at 1663', the possibility of water production from this horizon has been excluded.
2. The sand member from 1582' - 1613' constitutes the main section of the upper gas sand. Correlating reservoir pressures in wells 1 and 5, the indicated gas/water level is put at 1110' sub-sea, equivalent to a depth of 1675' in well 1. These considerations put the gas/water level 70' below the perforated interval in well 1. Hence, at low production rates, and a minimum of water coning, the well should produce dry gas for a considerable period of time.
3. On present considerations the 1582' - 1632' sand is the most important gas sand, and contains the bulk of the Cousland gas reserves. Most of the gas supply to be obtained in the neighbourhood of well 1 will be derived from this sand. Gas reserves in the lower sands in well 1 must be discounted since they occur not far off edge-water level.

IV FURTHER POSSIBILITIES AT COUSLAND.

Further possibilities of increasing the gas supply from the Cousland anticline are conditioned by the consideration as to whether additional drilling is economically justifiable. In general terms the following are the main prospects:-

1. The 1720' - 1806' sand group of well 1.

The indicated gas/water level in this sand group is put at 1280' sub-sea (see Report on Cousland 5) equivalent to a depth of 1845' in well 1. However, an earlier assessment placed the gas/water level at 1802' in well 1.

There may be a 90' structural rise from well 1 to the crest of the Cousland anticline (Report GL-RGWB-5) in which case most of the gas reserves in the 1720' - 1806' sand group could be drawn from a crestal well. The 90' structural rise would also be sufficient to ensure water free gas production at moderate rates. If this sand can be put on production the value of the Cousland gas reserves would be much enhanced.

2. The 2094' - 2122' sand group of well 1.

This gas sand is mentioned as a further possibility as it is liable to be overlooked. During a formation test in well 1 water-free gas was produced at a rate of 150,000 cubic feet per day. This may not be a particularly promising production rate from the economic standpoint; but the geological opinion is that sand conditions improve towards the inferred crestal area (Report GL-RGWB-5).

The 2094' - 2122' sand may therefore have developed into as prolific a gas sand in the crestal area of the anticline as any of the other Cousland gas sands: and in an area of good sand development there is also the possibility of discovering other gas sands.

V RESULTS OF CASING PERFORATION WITH SHAPED CHARGES.

1. Improved penetration of shaped charges.

When bullets were used in 1939 the casing cannot have been particularly effectively perforated: when the well was bailed, bullets were recovered in the bailer. During the cleaning out operations in 1956 the drilling bit was badly scored with bullet marks, indicating that there were bullets still protruding from the casing.

2. Improved well performance by perforating only the upper gas sand.

During the flowing tests in 1939 wellhead pressures declined excessively due to the build-up of the water level in the casing. After the flowing tests had been completed it took about a week for the water level to fall back to somewhere near the 1720' - 1735' sand. There was then a further very slow rise in the closed-in wellhead pressure.

After perforating the 1582' - 1602' sand member in 1956 no reservoir water production was obtained during the short production tests. At the conclusion of the production tests the closed-in pressure built-up to within 20 p.s.i. of the equilibrium pressure in 10 minutes; and to the final equilibrium pressure within about one hour.

3. Improved gas production capacity.

During the original formation test in 1938 gas was produced from the 1582' - 1632' sand at a rate of 3 million cubic feet per day. Before carrying out the 1956 production tests 2.1/2" tubing had been run in the well. The maximum production rate obtained was 3.56 million cubic feet per day through the tubing. The pressure loss due to friction in the tubing was 279 p.s.i. In consequence, the working pressure at the sand face at this production rate was still as high as 376 p.s.i.a. The open flow potential of the well has been calculated using the method recommended by the Railroad Commission of Texas. From the graph it is seen that the maximum open flow well capacity is of the order of 4.5 million cubic feet per day.

4. Initial wellhead pressure recorded after bringing in well.

Before opening up the well again in 1956 the previously recorded closed-in wellhead pressure was 621.4 p.s.i.g. on 4th June 1947. After bringing in the well and reproducing the shooting water, the measured closed-in wellhead pressure was 620.4 p.s.i.g. For the purposes of calculation the datum pressure has been taken as 621 p.s.i.g. at the wellhead.

From the earlier production tests it would appear that the reservoir pressure drop per million cubic feet gas production was 1.6 p.s.i. approximately. If the well is now produced at a rate of circa 100,000 cubic feet per day, there will be no measurable bottom hole differential pressure. Thus, and so long as there is no water production, any drop in the formation pressure will be immediately apparent by a similar fall in the wellhead pressure. Hence, a continuous record of reservoir pressure decline rates will be obtained.

VI COMMENTS ON PRODUCTION TESTS.

1. Reservoir Pressure decline with production.

The gas produced during the production tests on 11th and 12th November 1956 was 734,000 cubic feet. This was too small a production to determine the reservoir pressure decline with production.

It will be noted that there was no detectable decline in the closed-in wellhead pressure of 621 p.s.i.g. before and after the production tests. Possibly the true decline rate is less than 1.6 p.s.i. per million cubic feet production (see memo D.C./559 dated 31st Jan. 1942). It will be a simple matter to study pressure decline rates when the well is produced steadily into the gas main.

The static reservoir pressure at 1582', the top of the gas sand, has been calculated to be 660 p.s.i.a. This is the shut-in pressure which has been used to calculate the open flow potential of the well from back-pressure tests using the Railroad Commission of Texas method.

2. Production Test Results.

By producing the well through tubing the working pressure at the sand face can be calculated for each stabilised production rate from the pressure in the annulus between the tubing and casing. A burning line of 3" nominal bore and 530' long was used for the determination of production rates by measuring the fall in pressure between an upstream and a downstream connecting point. The Molesworth flow formula was used for calculating small production rates; and the Weymouth flow formula for all other production rates.

Using the data obtained during these tests the following graphs have been constructed:-

Graph 1. - Annular Space Pressures, Tubing Pressures and Pressure loss due to friction in tubing versus gas production rates.

Graph 2. - Square of pressure loss in tubing versus gas production rates. This gives a straight line graph from which the pressure loss at any given production rate can be calculated.

Graph 3. - Gas production rates versus Bottom hole differential pressures. The B.H.D.P. is the difference between the shut-in reservoir pressure and the working pressure at the sand face.

Graph 4.- Back pressure curve to determine the open flow potential of the well. A straight line graph is obtained by plotting the difference in the square of the formation shut-in pressure and the square of the working pressure at the sand face.

3. Cooling effect due to gas expansion.

As no bottom hole choke has been run in the tubing, the cooling effect due to gas expansion will take place at the wellhead. It is only at the higher production rates that there is sufficient pressure loss in the tubing for the bulk of the cooling effect to take place in the tubing. This is illustrated by the following graph:-

Graph 5.- Upstream line temperatures (i.e. near gas expansion point) and Tubing pressures plotted against gas production rates.

It will be noted that a minimum temperature of 17°F has been recorded at a production rate of about 750,000 cubic feet per day with a tubing pressure of just under 600 p.s.i.g. The upstream line temperature does not rise above freezing point until the production rate reaches 2.75 million cubic feet per day, with a tubing pressure of circa 340 p.s.i.g.

It will also be noted that at a production rate of around 100,000 cubic feet per day the cooling effect will be largely offset by a gain in temperature from the atmosphere. Hence freezing conditions should only occur at particularly low atmospheric temperatures.

4. Build-up of closed-in wellhead pressure.

The first closed-in wellhead pressure build-up was recorded after bringing the well in on 10th November. The second closed-in wellhead pressure build-up was recorded after the completion of the production tests on 12th November. Both tubing and annular space pressures were recorded.

Graph 6.- Annular space closed-in wellhead pressures plotted against time in minutes, recorded after the production tests on 12th November.

Tubing pressures, and the pressures recorded on 10th November have not been plotted since very similar curves are obtained in each case. It will be noted that the closed-in equilibrium pressure is obtained within about one hour.

5. Reservoir water production.

There was no pressure evidence at all for the production of formation water during the gas production tests. On 11th November a dipper was run into the tubing as far as the bursting disc, but no water was recovered.

APPENDIX.

COUSLAND NO. 1 WELL.

I WELLHEAD PRESSURE BUILD-UP DATA.

Gauge pressures corrected by dead weight tester

Date 10th November 1956.

After bringing in well and reproducing water in the casing.

9.50 p.m. Closed-in tubing.

<u>Time.</u>	<u>Minutes.</u>	<u>P.S.I.G.</u>		<u>Remarks.</u>
		<u>Tubing</u>	<u>Annular Space</u>	
9.52 p.m.	2	400	415	Pressure before closing-in. Tubing 78 A.S.355.
9.55 p.m.	5	502	520	
10.00 p.m.	10	602	610	
10.04 p.m.	14	606	620	
10.10 p.m.	20	612	622	
11.00 p.m.	70	612	622	
Midnight	130	622	-	A.S.gauge out of order.

11th November.

1.00 p.m.	190	622	-	
2.00 a.m.	250	622	-	
10.00 a.m.	-	622	622	Checked A.S.pressure with tubing gauge. Tubing pressure by D.W.T. 620;4
10.40 a.m.	-	622	622	

Date 12th November 1956.

After completion of production tests; and producing
580,000 cubic feet gas.

6.31 p.m. Closed-in tubing.

<u>Time.</u>	<u>Minutes.</u>	<u>P.S.I.G.</u>		<u>Remarks.</u>
		<u>Tubing.</u>	<u>Annular Space.</u>	
6.33 p.m.	2	450	450	Pressure before closing-in. Tubing 138 A.S.360
6.34 p.m.	3	495	492	
6.35 p.m.	4	525	522	
6.36 p.m.	5	545	549	Gauge pressures connected by dead- weight tester.
6.37 p.m.	6	567	567	
6.38 p.m.	7	580	582	
6.39 p.m.	8	593	592	
6.40 p.m.	9	600	600	
6.41 p.m.	10	605	602	
6.42 p.m.	11	607	603	
6.47 p.m.	16	613	610	
6.52 p.m.	21	614	612	
6.57 p.m.	26	615	614	

13th November.

9.30 a.m.	-	620	622	
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II TABULATION OF PRODUCTION TEST RESULTS.

1. By Molesworth flow formula.
(for very small pressure differences).
2. By Weymouth flow formula.

1. Molesworth Flow Formula.

$$Q = 41,500 \times \left(\frac{d^5 h}{GL} \right)^{\frac{1}{2}} \times \left(\frac{520}{T} \right)^{\frac{1}{2}}$$

where,

Q = Standard cubic feet per day of gas.

d = Inside diameter of pipe in inches.

For 3" nominal bore pipe $D^5 = 243$.

h = Pressure difference - inches of water.

G = Specific gravity of gas relative to air.

L = Length of burning line section in feet. (530')

T = Absolute temperature of the gas °R.

For Cousland gas.

$$G = 0.6$$

$$\text{Hence } Q = 36,300 \times h^{\frac{1}{2}} \times \left(\frac{520}{T} \right)^{\frac{1}{2}}$$

Date 11th November 1956.

Barometric pressure - 29.34"Hg = 14.4 p.s.i.a

1. By Molesworth Flow Formula.

(for very small pressure differences).

Closed-in Wellhead pressures (corrected gauge) Tubing 620 p.s.i.g.
Annular Space 622 p.s.i.g.

Flow Test No.	1		2		3	
<u>Duration</u>	<u>hours mins.</u>		<u>hours mins.</u>		<u>hours mins.</u>	
	2	20	0	17	1	45
<u>Average wellhead pressures -</u> <u>p.s.i.g. corrected gauge.</u>	<u>T</u>	<u>A.S.</u>	<u>T</u>	<u>A.S.</u>	<u>T</u>	<u>A.S.</u>
	620	622	618	622	613	617
T = Tubing A.S. = Annular Space.						
<u>Average burning line pressures.</u>	<u>P₁</u>	<u>P₂</u>	<u>P₁</u>	<u>P₂</u>	<u>P₁</u>	<u>P₂</u>
P ₁ = Upstream pressure.						
P ₂ = Downstream pressure.						
Inches mercury	-	-	0.77	-	2.55	-
Inches water	11.2	0.8	10.5	0.8	34.7	4.3
h = P ₁ - P ₂ (inches water)	10.4		9.7		30.4	
h ^{1/2}	3.22		3.12		5.52	
<u>Average burning line</u> <u>temperatures °F.</u>	<u>T₁</u>	<u>T₂</u>	<u>T₁</u>	<u>T₂</u>	<u>T₁</u>	<u>T₂</u>
T ₁ = Upstream temperature	39	47	32	45	23	42
T ₂ = Downstream temperature.						
(a) T mean °F	43		39		33	
(b) T mean °R	503		499		493	
(c) 520/T mean °R	1.034		1.043		1.055	
(d) (520/T mean °R) ^{1/2}	1.018		1.022		1.028	
<u>Average production rates</u> <u>- cubic feet per day.</u>						
Q = 36,300 x h ^{1/2} x (520/T) ^{1/2}	119,000		116,000		206,000	
Cubic feet per hour	4,960		4,840		8,600	

2. Weymouth's Flow Formula.

$$Q = 886.22 \times d^{2.667} \times \left(\frac{P_1^2 - P_2^2}{L} \right)^{\frac{1}{2}} \times \left(\frac{0.6}{G} \right)^{\frac{1}{2}} \times \left(\frac{520}{T} \right)^{\frac{1}{2}} \times \left(\frac{1}{Z} \right)^{\frac{1}{2}}$$

where,

Q = Standard cubic feet per day of 0.6 gravity gas at 60°F and 14.40 p.s.i.a. base pressure.

d = Diameter inside of pipe in inches.

For 3" nominal bore pipe (3.07" i.d.) $d^{2.667} = 19.8$

P₁ = Upstream end pressure in the burning line - p.s.i.a.

P₂ = Downstream end pressure in the burning line - p.s.i.a.

T = Absolute temperature of the gas - °R

Z = Compressibility factor

G = Specific gravity of the gas relative to air flowing through the line.

L = Length of the burning line section in miles.

Length = 530' = 0.1004 miles.

For Cousland gas.

G = 0.6

Z = 1 (under conditions of measurement)

Hence $Q = 55,400 \times (P_1^2 - P_2^2)^{\frac{1}{2}} \times \left(\frac{520}{T} \right)^{\frac{1}{2}}$ cubic feet per day.

Date 12th November 1956.

2. By Weymouth Flow Formula.

Closed-in Wellhead pressures (corrected gauge) Tubing 620 p.s.i.g.
Annular Space 622 p.s.i.g.

Flow Test No.	4	5	6	7	8	9
Duration	hours minutes 1 58	hours minutes 2 15	hours minutes 1 45	hours minutes 1 15	hours minutes 1 15	hours minutes 0 30
Average wellhead pressures - p.s.i.g. corrected gauge. T = Tubing. A.S. = Annular Space.	T A.S. 599 602	T A.S. 553 570	T A.S. 452 495	T A.S. 331 437	T A.S. 213 387	T A.S. 83 362
Average Burning Line pressures. P ₁ = Upstream pressure P ₂ = Downstream pressure. Note Gauge pressures have been corrected by D.W.T.	P ₁ P ₂ - 18.3 10.3 - 5.04 0.65 19.54 15.15 382 229 153 12.37	P ₁ P ₂ - - - 4.0 12.67 1.96 27.17 16.46 735 271 464 21.55	P ₁ P ₂ - - - 9.0 25.4 4.41 39.9 18.91 1590 358 1232 35.15	P ₁ P ₂ - - - 12.1 37.8 5.94 52.3 20.44 2730 418 2312 48.1	P ₁ P ₂ - - - 14.6 46.6 7.17 61.1 21.61 3730 467 3263 57.1	P ₁ P ₂ - - - - 53.5 11.5 68.0 26.0 4630 676 3954 62.8
Average Burning line temperatures °F. T ₁ = Upstream temperature. T ₂ = Downstream temperature. (a) T mean °F (b) T mean °R (c) 520/T mean °R (d) (520/T _{OR}) ^{1/2}	T ₁ T ₂ 17 46 31 491 1.059 1.03	T ₁ T ₂ 19 39 29 489 1.064 1.033	T ₁ T ₂ 25 29 27 487 1.067 1.034	T ₁ T ₂ 31 30 30 490 1.062 1.032	T ₁ T ₂ 36 32 34 494 1.054 1.028	T ₁ T ₂ 40 33 37 497 1.047 1.023
Average production rates - Cubic feet per day. Q = 55,400 x (P ₁ ² - P ₂ ²) ^{1/2} x (520/T) ^{1/2}	705,000	1,230,000	2,020,000	2,750,000	3,250,000	3,560,000
Cubic feet per hour.	29,300	51,200	84,000	115,000	135,000	148,000

CUMULATIVE GAS PRODUCTION FROM COUSLAND NO.1 WELL.

A. From 1582 - 1632 and 1720 - 1735 gas sands.

1. Cumulative gas produced to tests ending 24th June 1943. 30,618,000 cu.ft.
2. Approx. gas produced whilst running tubing ending 19th May 1945.
Circa 32,000 cubic feet. Cumulative 30,650,000 cu.ft.
3. Approx. gas produced whilst bringing well in 10th November 1956.
 - (a) Circa 4 p.m. to 6 p.m.
@ 80,000 ft. 3/hr: 160,000 cu.ft.
 - (b) 6 p.m. to 9.50 p.m. @
110,000 ft. 3/hr: 420,000 cu.ft.
580,000 cu.ft.

Cumulative - 31,230,000 cu.ft.

4. Gas produced during tests on 11th and 12th November 1956.

Test No.	Prodn. rate.Cu. ft./hr.	Duration of test. Hours.	Prodn. during test. Cu.ft.	Total prodn. since commencement of tests. Cu.ft.	Remarks.
1	4,960	2.33	11,500	11,500	Production tests on 11th November using Molesworth Flow Formula. Production tests on 12th November using Weymouth Flow Formula.
2	4,840	0.28	1,400	12,900	
3	8,600	1.75	15,000	27,900	
4	29,300	1.97	57,600	85,500	
5	51,200	2.25	115,000	200,500	
6	84,000	1.75	147,000	347,500	
7	115,000	1.25	143,500	491,000	
8	135,000	1.25	169,000	660,000	
9	148,000	0.50	74,000	734,000	

Hence cumulative production from well to end 1956:-

31,964,000 cubic feet.

B. From 1760 - 1806 gas sand.

Cumulative gas produced to tests ending 15th May 1939. 35,900,000 cu.ft.

HENCE TOTAL CUMULATIVE PRODUCTION FROM WELL - 67,864,000 cu.ft.

III BOTTOM HOLE PRESSURE DATA AND OPEN FLOW POTENTIAL OF WELL.

Note: On 4th June 1947 the closed-in surface pressure recorded by deadweight tester was 621.4 p.s.i.g. This compares with 620.4 p.s.i.g. recorded on 11th November 1956 after bringing on production the 1582-1613 sand member. (gamma log 1580'-1602').

Reservoir Temperature - 68°F at 1582'.
Assume average static well temperature 60°F.

1. Determination of pressure at sand face from surface closed in pressure.

Pressure formula.

$$\log_{10} P_2 = \log_{10} P_1 + \frac{qsl}{144 \times 2.3026 \times A \times Z}$$

where P_2 = pressure at sand face at 1580' - p.s.i.a.
 P_1 = closed-in pressure at top of column - p.s.i.a.
 q = density of air at atmospheric pressure and average temperature of gas column (60°F)
 = 0.07634 lbs. per cubic foot.
 s = specific gravity of gas relative to air = 0.6
 l = length of gas column = 1580'
 A = Atmospheric pressure = 14.7 p.s.i.
 Z = compressibility factor = 0.915 at 660 p.s.i.a. & 60°F.

$$\text{Hence, } \log_{10} P_2 = \log_{10} P_1 + \frac{0.07634 \times 0.6 \times 1580}{144 \times 2.3026 \times 14.7 \times 0.915}$$

$$\text{Hence } \log_{10} P_2 = \log_{10} P_1 + 0.0162.$$

2. Calculation of Gas Pressure gradient from gas analysis.

Gas analysis of gas sample from 1582 - 1632 sand.
Sunbury Report reference A.P.S.51.

1	2	3	4	5	6	7	8
Component	Mole Fraction n	Molecular weight of Component M	n M	Critical Temperature of component. T _c	nT _c	Critical Pressure of Component P _c	nP _c
N ₂	0.015	28	0.42	227	3.4	492	7.4
C ₁	0.959	16	15.35	344	330.0	673	645.0
C ₂	0.026	30	0.78	550	14.3	709	18.4
	1.000	-	16.55	-	347.7	-	670.8

Base on reservoir temperature at 1582' - 68°F - 528°R
Base on reservoir pressure at 1582' - 660.3 p.s.i.a.

(a) Pseudo-reduced temperature $\frac{528}{347.7} = 1.52$

(b) Pseudo-reduced pressure $\frac{660.3}{670.8} = 0.985$

(c) Compressibility factor (from graph) = 0.910 (Z)

(d) Average molecular weight of gas = 16.55

(e) Density = $\frac{1}{V} = \frac{PM}{ZRT} = \frac{660 \times 16.55}{0.910 \times 10.73 \times 528}$

Hence Density = 2.12 lbs. per cubic foot.

(d) Gas Gradient = $\frac{2.12}{144} = 0.0147$ p.s.i. per foot.

660
16
645

3. Check on Reservoir Pressure at 1582'.

Wellhead closed-in pressure - 636 p.s.i.a.
 Pressure of 1582' column of gas - 23.3 p.s.i.
 Hence Reservoir Pressure at 1582' - 659.3 p.s.i.a.

4. Gas production rates at bottom hole pressure and temperature.

(a) Volume of reservoir space containing 1 cubic foot of gas at S.T.P.

$$B = \frac{14.7}{P} Z \times \frac{T}{520} = 0.02827 \frac{TZ}{P}$$

Where P = Reservoir Pressure - p.s.i.a.
 T = Reservoir Temperature °R
 Z = Compressibility factor.
 B = Volume of reservoir space containing 1 cubic foot gas.

$$S = \frac{1}{B} = \frac{P}{0.02827 TZ}$$

Where S = gas saturation, or cubic feet of gas at STP in 1 cubic foot reservoir space.

Base on T = 528°R

$$\text{Hence } S = \frac{P}{14.92 \times Z}$$

5. Open flow potential of well from back-pressure tests.

Method used as detailed by the Railroad Commission of Texas in their publication "Back-pressure test for Natural Gas Wells."

Basis.

When the rate of flow is plotted against the corresponding value for the difference in the square of the shut-in pressure in the formation and the square of the working pressure at the sand face on logarithmic co-ordinate paper, the points delineate a straight line which is expressed by the formula:-

$$Q = C (P_f^2 - P_s^2)^n$$

Where:- Q = Rate of flow in cubic feet per 24 hours.

C = A numerical co-efficient, characteristic of the well.

P_f = Shut-in formation pressure - p.s.i.a.

P_s = Working pressure at the sand face - p.s.i.a.

n = Numerical exponent characteristic of the well.
 The value of "n" is equal to the reciprocal of the slope of the back-pressure curve.

(a) Check on pressure calculations.

$$\text{BHP} = \text{Psi} + \frac{14,268 \times \text{Psi} \times G \times L}{759,931 \times \text{Tsi}}$$

Where:- BHP = Bottom Hole Pressure - p.s.i.a.

Psi = Wellhead Pressure under shut-in conditions.

G = Specific gravity of the gas in the flow-string (air = 1).

L = Length of the flow-string - feet.

Tsi = Average temperature of flow-string °F.

$$\therefore \text{BHP} = 636 + \frac{14,268 \times 636 \times 0.6 \times 1580}{759,931 \times 520}$$

$$= 636 + 21.9 = \underline{657.9 \text{ p.s.i.a.}}$$

$$\text{Hence } P_{av} = \frac{636 + 657.9}{2} = 646.9 \text{ p.s.i.a.}$$

$$\text{Hence } P_a = \frac{646.9}{670.8} = 0.964.$$

$$\text{Hence } T_a = \frac{520}{347.7} = 1.497.$$

Where P_a = Pseudo-reduced critical pressure
and T_a = Pseudo-reduced critical temperature.

Hence F_{pv} (Supercompressibility factor) = 1.053

$$\text{Now } F_{pv} = \left(\frac{1}{Z}\right)^{\frac{1}{2}}$$

$$S = (F_{pv})^2 = \frac{1}{Z} = 1.108.$$

$$\text{Now } P_f = P_{si} \times e^{KS}$$

$$\text{And } K_{si} = \frac{GL}{53.34 \times T_{si}}$$

Where P_f = Formation Pressure - p.s.i.a.

P_{si} = Shut-in wellhead pressure - p.s.i.a.

e^{KS} = Factor for evaluating the pressure drop due to the weight of the gas column to the sand face.

53.34 = Gas constant for air.

T_{si} = Shut-in well Temperature $^{\circ}R$.

$$\text{Hence } K_{si} = \frac{0.6 \times 1580}{53.34 \times 528} = 0.0337.$$

$$\text{Hence } KS = 0.0337 \times 1.108 = 0.0373.$$

$$e^{KS} = (2.718)^{0.0373}$$

$$\log e^{KS} = 0.0373 \times \log 2.718$$

$$= 0.0373 \times 0.4343 = 0.0162.$$

$$\text{And } e^{KS} = 1.038.$$

$$\text{Hence } P_f = 636 \times 1.038 = \underline{660.0 \text{ p.s.i.a.}}$$

This is in good agreement with the figure of 660.3 p.s.i.a. as initially calculated. Hence the calculations already made for P_g the working pressures at the sand face have been accepted.

The values of $(P_f^2 - P_g^2)$ have been plotted versus the corresponding rates of flow on logarithmic co-ordinate paper. The straight line through these points has been extended until it intersects the horizontal line representing $P_f^2 = 436,000$. At the point of intersection a vertical line is dropped to the abscissa to determine the open flow potential of the well; and from the graph this is seen to be $4\frac{1}{2}$ million cubic feet per day.

The exponent "n" of the flow equation is the cotangent of the angle ϕ , and is the slope of the back-pressure curve. By measurement $\phi = 55^{\circ}$, and $n = .7002$.

6. Pressure loss due to friction in tubing during production tests.

It will be noted from the graph that the square of the pressure loss in the tubing due to friction gives a straight line relationship when plotted against production rates.

The friction pressure drop R has been taken as the difference between the wellhead Annular Space and Tubing pressures. By adopting this procedure no corrections have to be made for changes in temperature and variations in the density of the gas column.

From the graph it will be noted that at a production rate of 4 million cubic feet per day $R^2 = 230,000$; and hence $R = 480$ p.s.i. But from the back pressure production curve it will be noted that at 4 million cubic feet per day $(P_f^2 - P_s^2) = 365,000$. Hence $P_s^2 = 71,000$, which gives a pressure at the sand face of 266 p.s.i.a. Hence the well could not be produced at 4 million cubic feet per day through 2" tubing.

BOTTOM HOLE PRESSURE - PRODUCTION DATA.

Test No:	Closed-in pressure.	3	4	5	6	7	8	9
A.S. Wellhead pressure - p.s.i.g. p.s.i.a. $\log_{10} P_1 + 0.0162$ $\log_{10} P_1$ $\therefore P_2$ - p.s.i.a. p.s.i.g.	621 636 2.8035 2.8197 660.3 645	617 632 2.8007 2.8169 656.0 641	602 617 2.7903 2.8065 640.4 626	570 585 2.7672 2.7834 607.3 592	495 510 2.7076 2.7238 529.4 515	437 452 2.6551 2.6713 469.1 454	387 402 2.6042 2.6204 417.3 402	362 377 2.5763 2.5925 391.3 376
Bottom Hole differential pressure - p.s.i. Gas production rates at S.T.P. - cubic feet per day.	- -	4.3 206,000	19.9 705,000	53.0 1,230,000	130.9 2,020,000	191.2 2,750,000	243.0 3,250,000	269.0 3,560,000
<u>Production rates at bottom hole pressure and temperature.</u> pseudo-reduced temperature pseudo-reduced pressure $P_2/670.8$ Compressibility Z (from graph) $S = \frac{P}{14.92 \times Z}$ (a) $14.92 \times Z$ (b) S Hence gas rates at bottom hole temperature and pressure: Cu.ft./day.	1.52 0.985 0.910 13.56 48.7	1.52 0.979 0.910 13.56 48.4	1.52 0.956 0.911 13.58 47.2	1.52 0.906 0.912 13.60 44.7	1.52 0.789 0.922 13.74 38.5	1.52 0.700 0.932 13.90 33.7	1.52 0.623 0.940 14.02 29.8	1.52 0.584 0.944 14.07 27.8
<u>Open flow potential of well.</u> P_f^2 (Shut-in formation pressure) P_s^2 (working pressure at the sand face) $P_f^2 - P_s^2$	436,000 - -	. 430,000 6,000	. 410,000 26,000	. 368,000 68,000	. 280,000 156,000	. 220,000 216,000	. 174,000 262,000	. 152,000 284,000
<u>Friction Pressure loss in tubing.</u> Tubing wellhead pressure - p.s.i.g. Hence pressure loss due to friction R - p.s.i. Hence R^2	- - -	613 4 16	599 3 9	553 17 289	452 43 1,850	331 106 11,240	213 174 30,280	83 279 77,840

IV DIARY OF WORK CARRIED OUT TO BRING IN THE WELL.

NOVEMBER 1956.

Note: In July 1951 the well had been plugged back with cement to 1465'. Anti-corrosive mud had been run into the casing to 50', with a cement plug to surface. During the current workover operation the top cement plug and the anti-corrosive mud were cleaned out. The bottom cement plug was drilled out to 1663'. The lower sand from 1720' to the top of the original cement plug at 1735' were therefore still plugged off with cement. The procedure was therefore to put the 1582' - 1632' sand on production only, in order to avoid bringing in reservoir water. The details relating to the bringing in of the well are as follows:-

Thursday 11.00 a.m. Well standing full of water with cement
8th Nov. plug drilled out to 1663'.
11.30 a.m. Arrival of Schlumberger truck. Running gamma ray survey to locate shooting interval. The gamma ray log indicated that the top sand member occurred over the interval 1580' - 1602'; and the lower sand member over the interval 1614' - 1630'.
1.45 p.m. Preparing to shoot the top sand member over the interval 1575' - 1605', the Schlumberger depths being measured from the Cardwell rotary table.
2.40 p.m. Fired four guns, thus perforating the casing with 96 shaped charges over the interval 1581' - 1605'. The fifth gun failed to fire, there being a hole in one cap which caused the gun to become water-logged.
3.40 p.m. Re-loaded and fired fifth gun over the interval 1575' - 1581' with 24 shaped charges. Hence casing perforated with a total of 120 shaped charges. During shooting, the casing was kept full of water; and it was found that the well would not take any water at all.
3.45 p.m. Running in 2" plain A.P.I. tubing (i.d. 1.995") with the end of the bottom joint plugged; and the perforated joint covering the interval 1565' - 1589'. The bursting disc holder, complete with aluminium bursting disc was run immediately above the perforated joint.
5.30 p.m. Completed running in tubing. The top joint was screwed into a flange to match up with the casing flange.
6.00 p.m. Preparing to remove Cardwell rotary table, sleepers, etc; and to make up the production wellhead.

Friday. 9.00 a.m. Wellhead made up complete with 3" main valve,
9th Nov. and 2" side valves on tubing and casing annulus. No water had been lost to the well overnight, there being no annular space pressure.
9.15 a.m. Opened up 2" tubing valves to burning line.
9.40 a.m. Dropped first 'go-devil'. Bursting disc did not break.
10.15 a.m. Dropped second 'go-devil'. Bursting disc did not break.
10.45 a.m. Dropped third 'go-devil'. Bursting disc was fractured. Indications were that the 'go-devils' dropped into the tail pipe. Air was sucked into the annular space indicating that the water levels in casing and tubing were being equalised.

Friday. 11.00 a.m. The fluid levels had become equalised; but
9th Nov. no gas production was obtained through the
 (contd.) tubing.

12.05 p.m. Obtained a supply of compressed air from the quarry which was connected in to the casing annulus. Pressure circa 100 p.s.i.g.

12.10 p.m. Opened up compressed air to the casing annulus.

12.13 p.m. Well producing water through the tubing into the cellar.

12.35 p.m. No further water produced by air supply, which was disconnected. Casing annulus pressure 65 p.s.i.g. Shut-in tubing.

12.50 p.m. Annular space 66 p.s.i.g. Tubing 40 p.s.i.g.

1.57 p.m. Annular space 57 p.s.i.g. Tubing 60 p.s.i.g.

2.00 p.m. Blew down tubing pressure. Gas and a little water produced.

2.05 p.m. Shut-in tubing.

2.50 p.m. Annular space 51 p.s.i.g. Tubing 52 p.s.i.g. Blew down tubing pressure. Gas and a little water produced. Shut-in tubing.

3.28 p.m. Annular space 46 p.s.i.g. Tubing 50 p.s.i.g. Blew down tubing pressure. Gas and a little water produced. Shut-in tubing.

4.19 p.m. Annular space 37 p.s.i.g. Tubing 45 p.s.i.g. Blew down tubing pressure. Shut-in tubing. Keeping well shut-in overnight. Awaiting 2" swab from Eakring.

Saturday. 9.15 a.m. Annular space 35 p.s.i.g. Tubing 40 p.s.i.g.
10th Nov. Well standing shut-in, awaiting 2" swab.

12.00 p.m. Re-connected compressed air from quarry to casing annulus, and pressure built up to 75 p.s.i.g. Received 2" swab. Running swab into tubing and recovering water.

12.10 p.m. Shut off compressed air to repair pipe line leaks.

12.15 p.m. Swab rubbers badly cut after 3 runs to about 70'. No spare rubbers available. Hence swabbing ceased.

12.30 p.m. Air pressure 75 p.s.i.g. Flowing water through tubing. Shut compressor down to repair air leaks.

12.50 p.m. Opened up air line after repairing leak. Water flowing out of tubing.

1.05 p.m. Air pressure 93 p.s.i.g. Shut-in tubing after water ceased to flow.

1.10 p.m. Opened up tubing to vacuum tanker. Annular space 90 p.s.i.g. Tubing 22" vacuum.

1.35 p.m. Disconnected vacuum tanker, and closed-in tubing. Water recovery to date during test:- Nov. 9th - 400 gallons, Nov. 10th - 500 gallons. Total 900 gallons.

2.45 p.m. Annular space 93 p.s.i.g. Tubing 20 p.s.i.g. Opened up tubing to atmosphere. Blew down annular space pressure fast to rock well.

2.48 p.m. Shut-in annular space and tubing valves. Re-connected air supply to casing annulus. Building up pressure.

3.00 p.m. Annular space 90 p.s.i.g. Tubing 35 p.s.i.g. Blew down tubing pressure; and well started flowing water slightly through tubing into cellar.

3.05 p.m. Water and gas production increasing. Pumping water from cellar into vacuum tanker.

3.17 p.m. Closed-in tubing. Preparing to flow well to burning line. Water recovered circa 500 gallons, i.e. cumulative since start of tests in all 1400 gallons.

3.20 p.m. Annular space 120 p.s.i.g. Tubing 110 p.s.i.g. Shut off compressed air supply from quarry.

Saturday. 3.25 p.m. Annular space 170 p.s.i.g. Tubing 210 p.s.i.g.
10th Nov. Opened up well to burning line through tubing.
Well surging gas and water.
4.00 p.m. Estimated water production rate 6 gallons
per minute.
4.25 p.m. Surging ceased, and obtained a continuous
gas flow. Water estimated produced
400 gallons, i.e. cumulative 1800 gallons.
4.35 p.m. Lit gas flare. Dribble of water being
produced from end of burning line.
5.30 p.m. Slight water dribble from end of burning line.
8.30 p.m. Flame observation indicated the production
of dry gas. Hence all water in casing
presumed reproduced.
9.50 p.m. Shut-in well. Annular space 355 p.s.i.g.
Tubing 78 p.s.i.g.
10.00 p.m. Annular space 610 p.s.i.g. Tubing 600 p.s.i.g.
10.10 p.m. Annular space 622 p.s.i.g. Tubing 610 p.s.i.g.

Sunday. 10.00 a.m. Annular space 622 p.s.i.g. Tubing 620 p.s.i.g.
11th Nov. (calibrated gauge).
10.40 a.m. Tubing closed-in pressure - 620.4 p.s.i.g.
checked by deadweight tester.
12.00 p.m. Ran dipper to 1559' below R.T., i.e. above
'go-devil' level.
12.15 p.m. Pulled out dipper. No fluid obtained.
Hence no detectable water in well.
12.43 p.m. Commenced flowing well at rate of 119,000
cubic feet gas per day.
3.03 p.m. Flowing rate decreased to 116,000 cubic feet
gas per day.
3.15 p.m. Increased production to an average of 206,000
cubic feet gas per day.
5.00 p.m. Shut off burning line, completing low rate
production tests.
5.05 p.m. Closed-in tubing for the night.

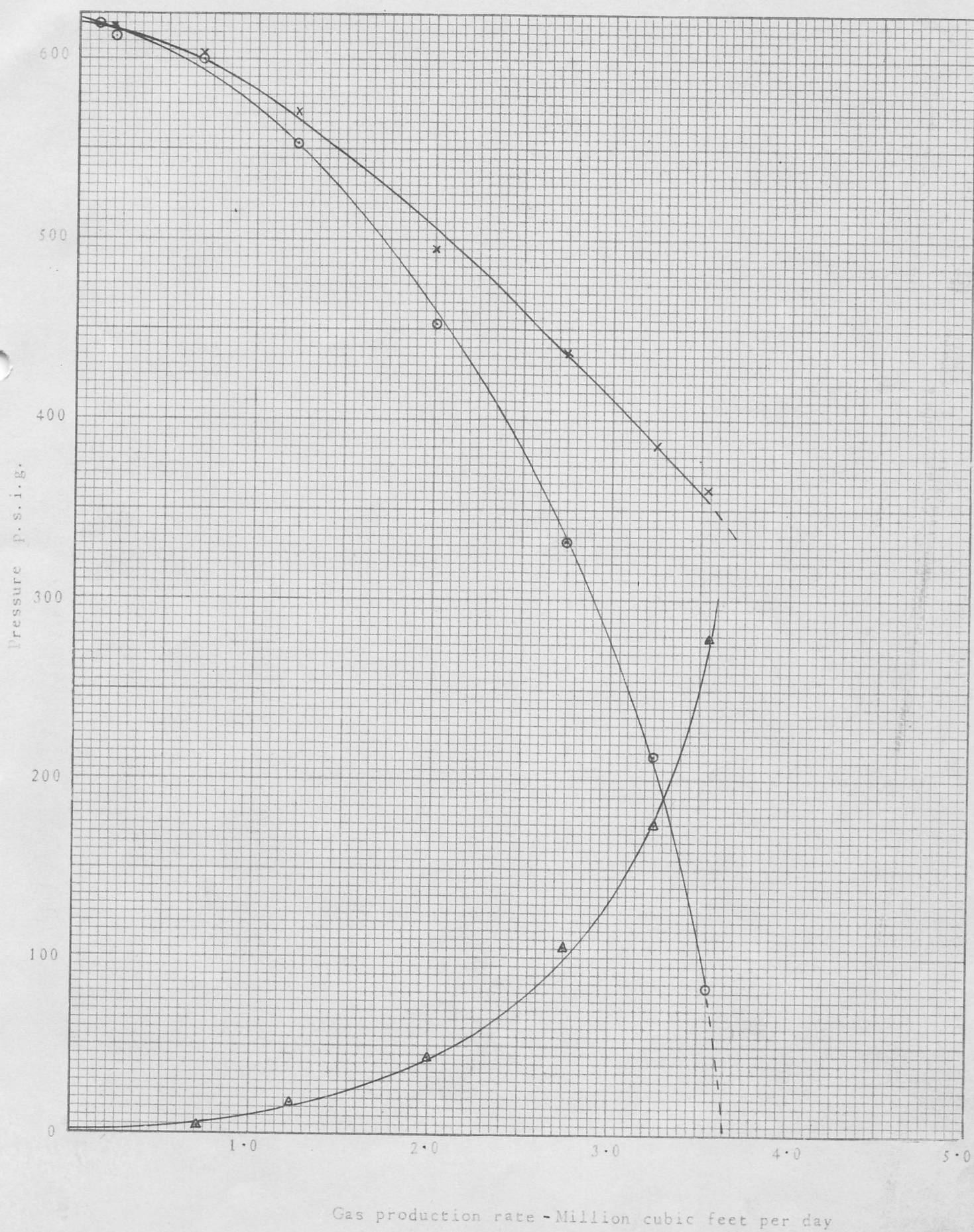
Monday. 9.20 a.m. Annular space 622 p.s.i.g.
12th Nov. Tubing 620 p.s.i.g. (corrected gauge).
9.32 a.m. Opened up well to burning line. Average
production rate 705,000 cubic feet gas per day.
11.30 a.m. Increased production rate to an average of
1,230,000 cubic feet per day.
1.45 p.m. Increased production rate to an average of
2,020,000 cubic feet per day.
3.30 p.m. Increased production rate to an average of
2,750,000 cubic feet per day.
4.45 p.m. Increased production rate to an average of
3,250,000 cubic feet per day.
6.00 p.m. Increased production rate to an average of
3,560,000 cubic feet per day.
6.30 p.m. Completed production tests. Shut in
burning line.
6.31 p.m. Closed-in tubing.
6.57 p.m. Annular space 612 p.s.i.g.
Tubing 615 p.s.i.g.

Tuesday. 9.30 a.m. Annular space 620 p.s.i.g.
13th Nov. Tubing 618 p.s.i.g. (corrected gauge).

x — x — x — Annular space pressures

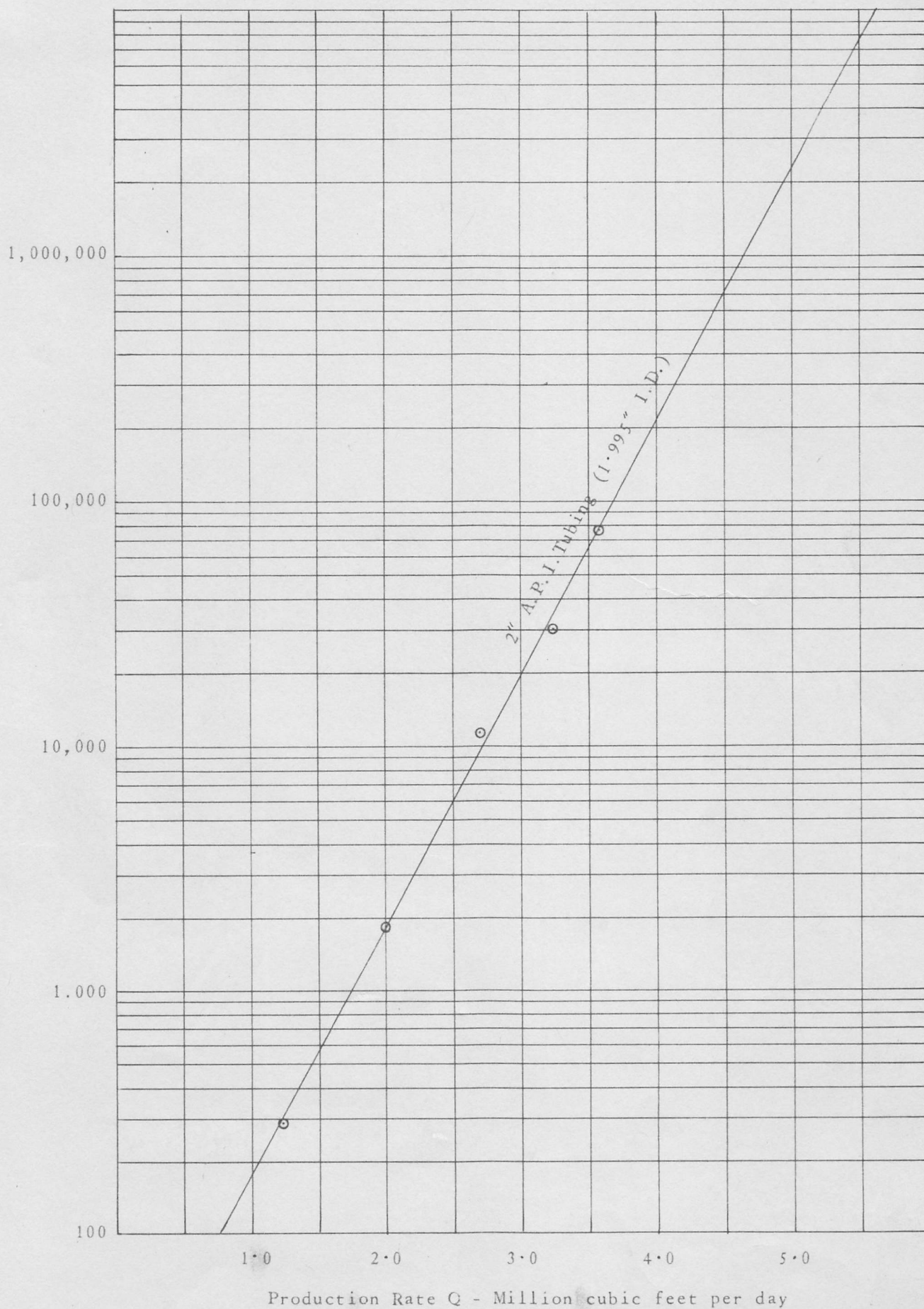
o — o — o — Tubing pressures

Δ — Δ — Δ — Pressure drop due to friction in tubing

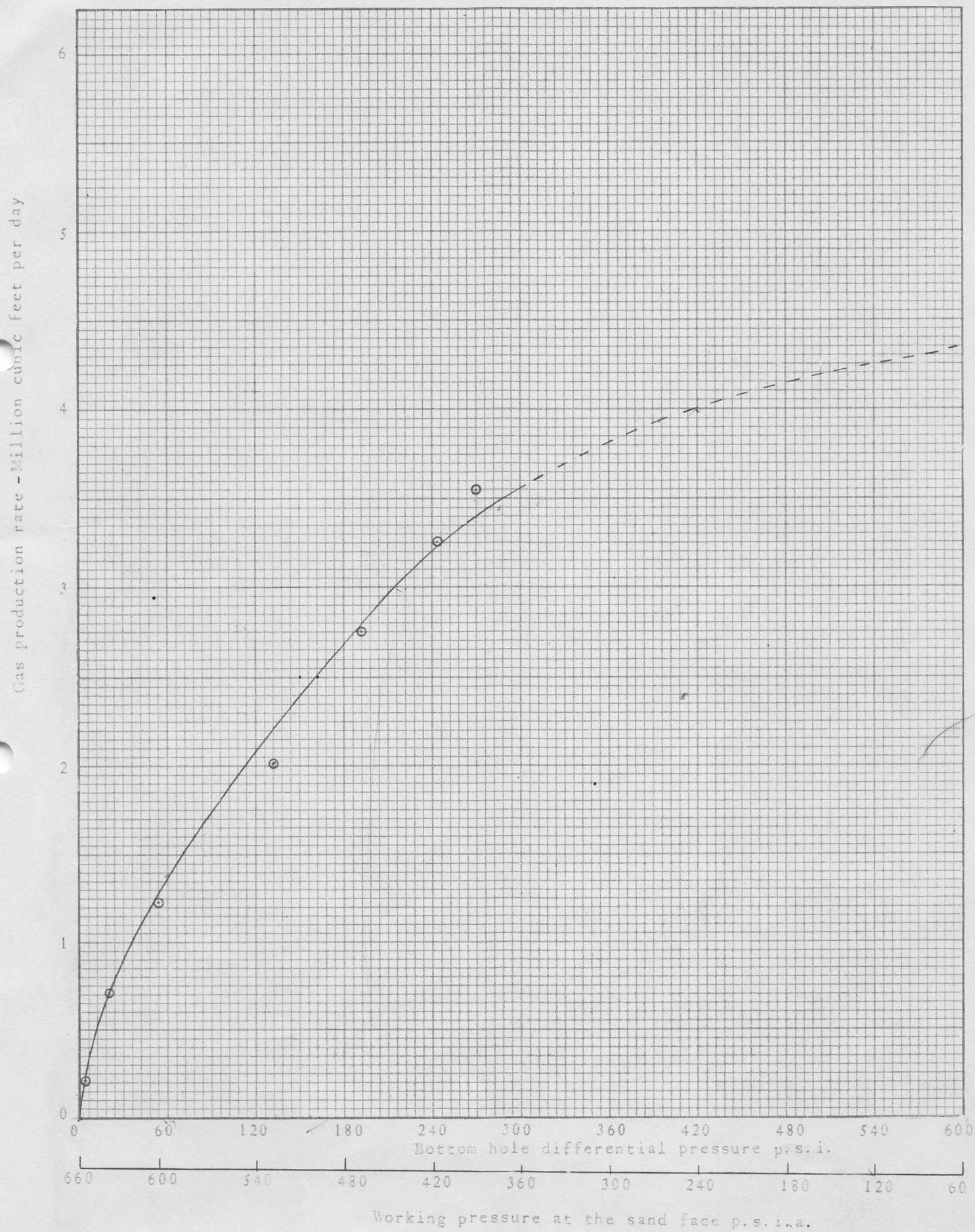


Friction pressure loss in tubing during production tests
(Tubing to top of perforations 1565')

R^2 , where R is the pressure loss in the tubing due to friction



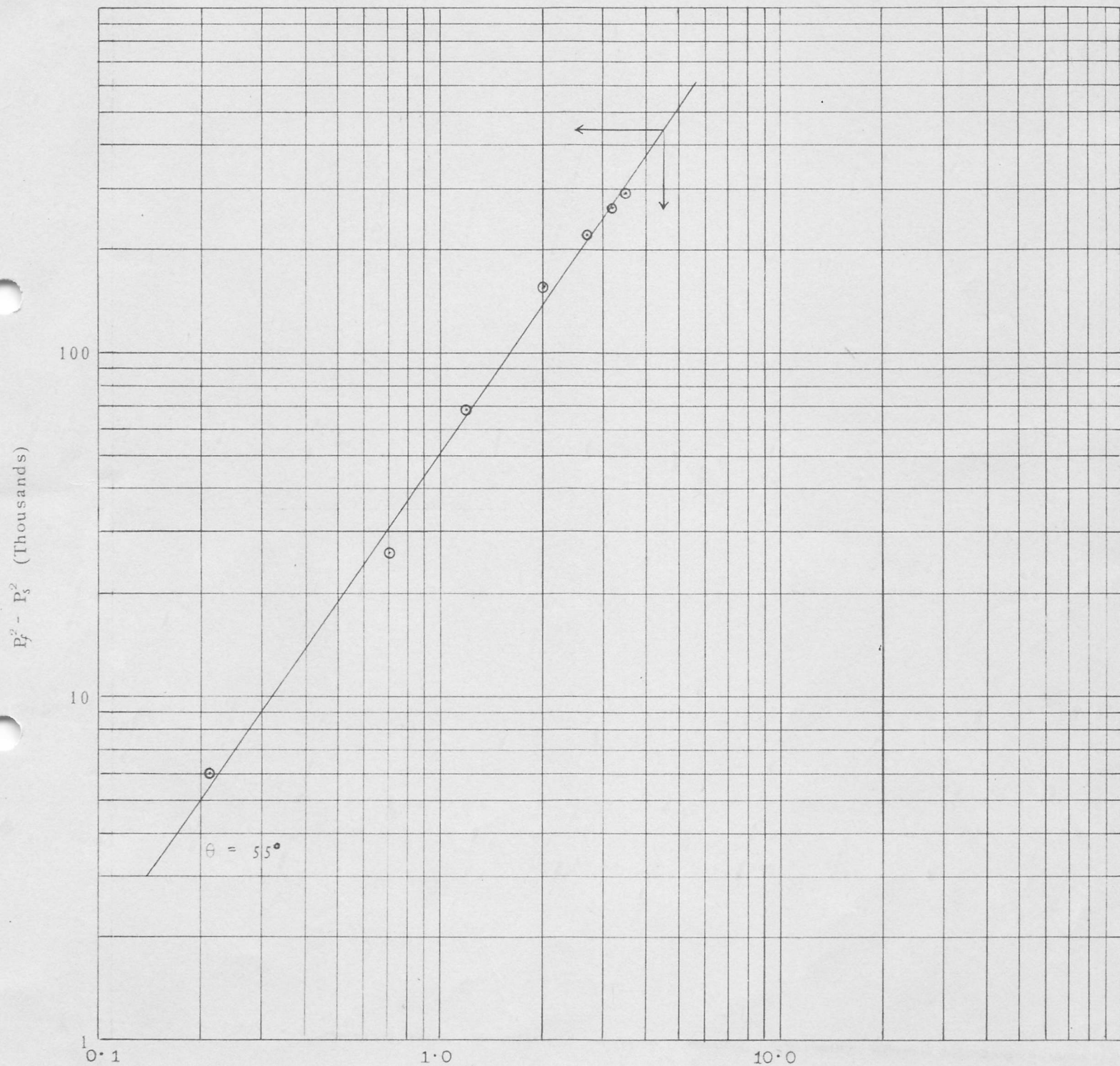
Production rates v Bottom hole differential pressures



Railroad Commission of Texas Method

Back pressure curve. Exponent $n = .7002$

Open flow potential $4\frac{1}{2}$ million cubic feet per day



Production Rate Q - Million cubic feet per day

$$Q = C (P_f^2 - P_s^2)^n$$

P_f = Shut in formation pressure p.s.i.

P_s = Working pressure at sand face p.s.

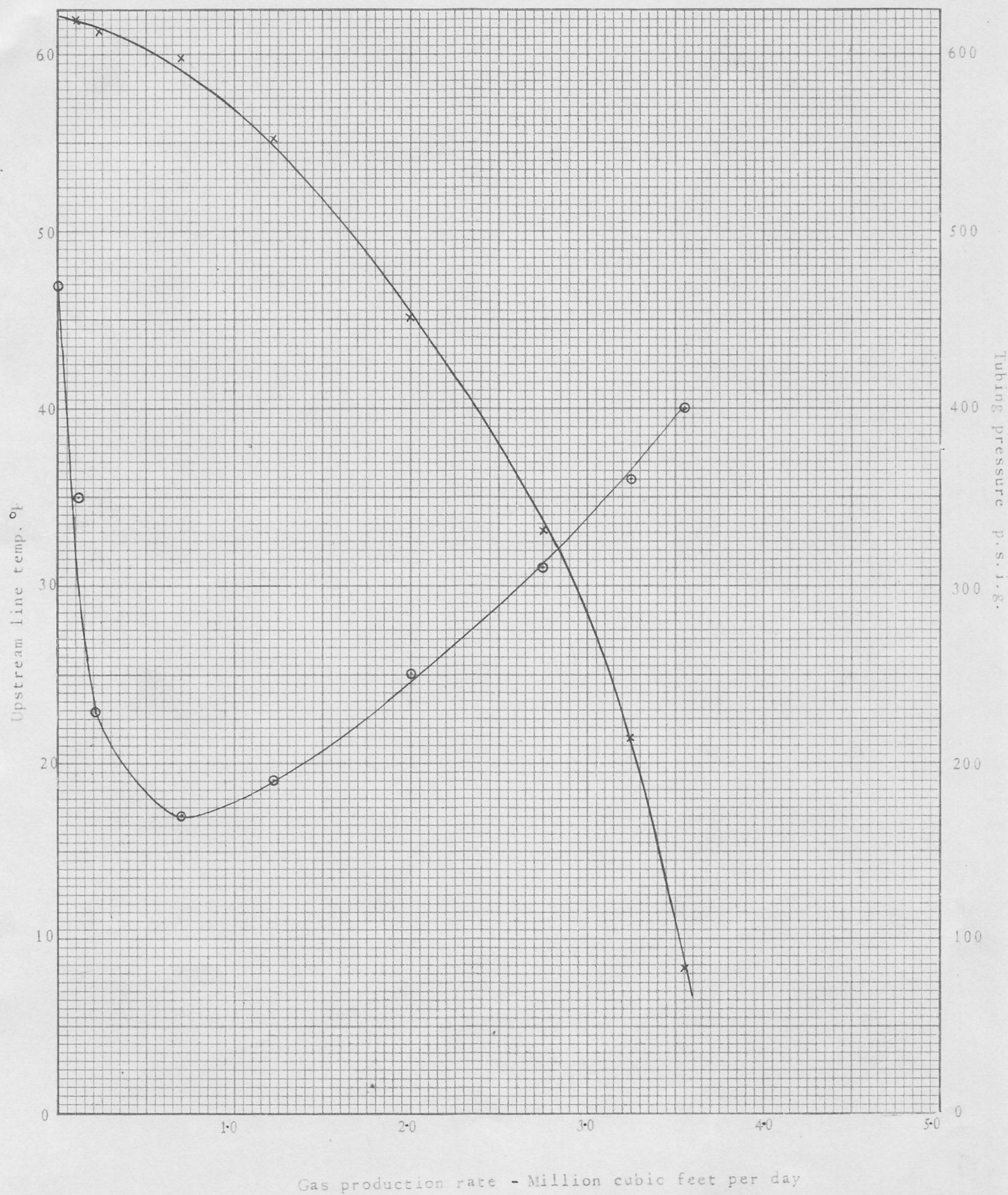
○ — ○ — ○ Upstream line temp.

× — × — × Tubing pressures

Atmospheric temp. 47°F

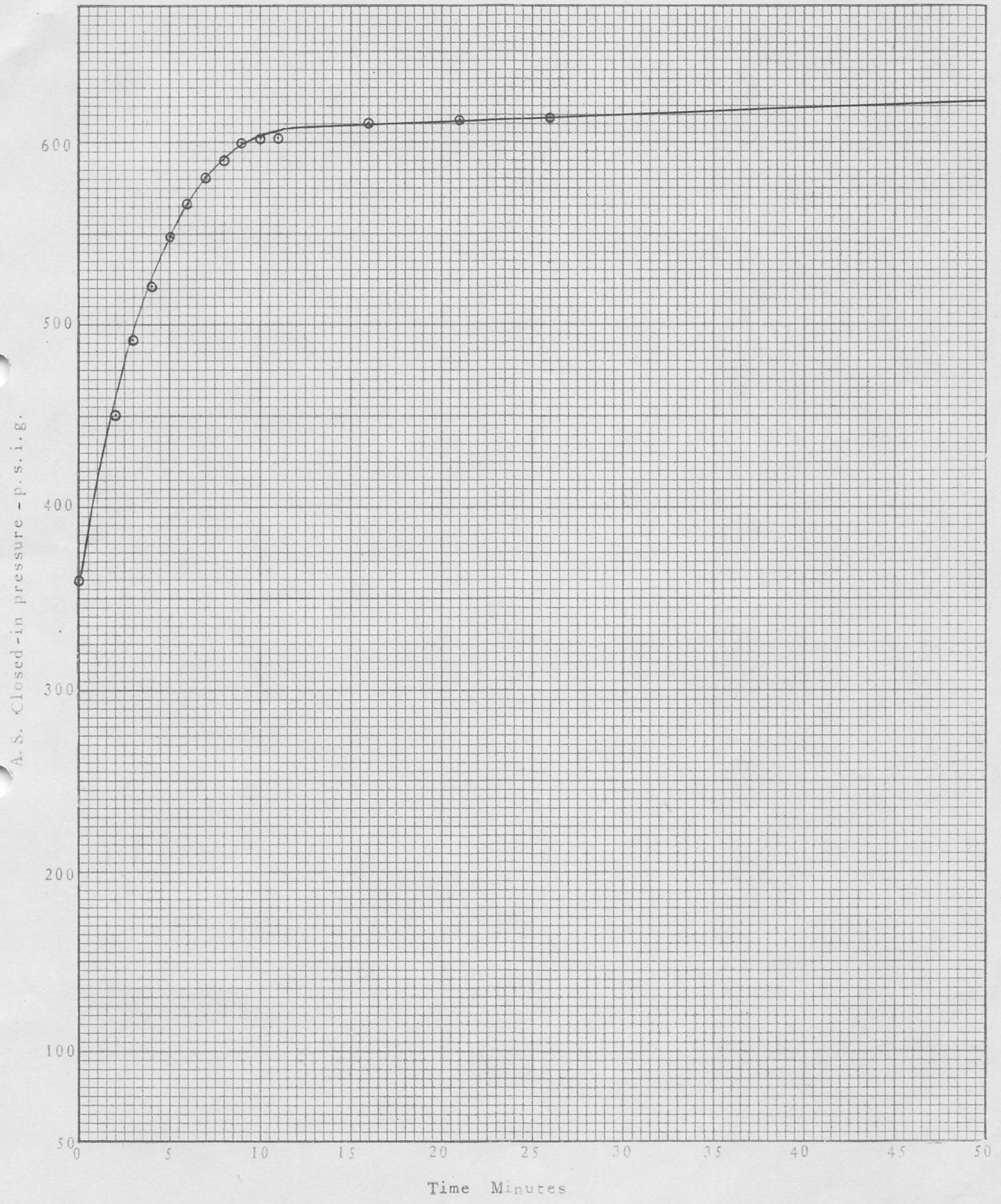
Cousland No. 1 Well

Production tests 11th. & 12th. Nov. 1956



Cousland No. 1 Well
Pressure build up curve after
production tests on 12th. November

Annular space closed-in wellhead pressure build up curve





File
Phd

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

CALEDONIAN 2052

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

15th November, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

I Thank you for your letter of 11th November, 1960, and note that you have received the information on gas production at Cousland for the month of October. There was no evidence of hydrate formation during the month of October.

You may recall that in our correspondence in June of this year mention was made of a drip feed Methanol lubricator. I wonder if you are yet in a position to give any information on the type of lubricator which could be used at Cousland.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts)
Chief Engineer.

RR

RAB/EC.

PE.1394

11th November 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your letter of the 7th instant enclosing the October report for the Cousland gas production, which I note averaged 93,000 cubic feet per day during the month. Were the tape heaters adequate to prevent hydrate formation during October, or did you have to supplement these with space heating?

Yours sincerely,

C.M. Adcock

CMA/JMC

File
Cha

1394
PE.1345

14th Dec.
13th October 1960

1+2
Cha

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

October

Many thanks for your letter of the 7th instant enclosing the September report for the Cousland gas production, which I note averaged 87,000 cubic feet per day during the month. Were the tape heaters adequate to prevent hydrate formation during September?

93,000
you have to supplement this with space heating? or did
Yours sincerely,

C.M. Adcock

CMA/JMC



F6
Chg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 84331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

7th November, 1960.

G.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Bakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 31st October, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

p. T.S. Ricketts

(T.S. Ricketts)
Chief Engineer.

TR

RAB/EC.

THE SCOTTISH GAS BOARD.

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - OCTOBER, 1960

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st October, 1960..

Volume supplied from Cousland to Musselburgh during the month (corrected)*..... 2,881,810 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)	5th October - 564.5 lbs. per square inch.
	12th October - 564.0 lbs. per square inch.
	19th October - 563.5 lbs. per square inch.
	26th October - 563.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

71.070,037
2.881,810
73.951,847
61.

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



File
Ch

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited
Eakring,
P.O. Box, 1,
Southwell,
NOTTS.

19th October, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

I thank you for your letter of the 13th October, 1960, and note that you received the September report for gas production from the Cousland well.

The current through the tape heaters was increased on the 15th of September, and again on the 19th of September to combat condensation on the external surfaces of the pipes but no hydrate formation has yet been noticed.

Yours sincerely,

p. T.S. Ricketts

(T.S. Ricketts)
Chief Engineer.

RAB/EC.



Fib
Pha

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~24361-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASSO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

7th October, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

...
I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 30th September, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

p. T. S. Ricketts

(T.S. Ricketts)
Chief Engineer.

RAB/EC.

RS

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - SEPTEMBER, 1960.

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th September, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 2,606,270 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)

7th August - 566.5 lbs. per square inch.
14th August - 566.0 lbs. per square inch.
21st August - 565.5 lbs. per square inch.
28th August - 565.0 lbs. per square inch.

Number of days on which well was in action during the month 30 days

Number of days on which well was shut down during the month Nil

68,463,767
2,606,270
71,070,037
Sgt

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

File
Mag

134
PE.1303

12th September 1960

12th Oct.

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

1 + 2
Mag

Dear Mr. Ricketts,

Natural Gas - Cousland

My thanks for your letter of the 7th instant enclosing the ^{September} August report for the Cousland gas production, which I note averaged 64,000 ^{87,000} cubic feet per day during the month. The tape heaters were presumably ^{adequate} all that was required to prevent hydrate formation during September.

Yours sincerely,

C.M. Adcock

CMA/JMC

Mr Adcock

Copy

From SENIOR GEOLOGIST, EAKRING

To Mr. A. S. BURT,
BP HOUSE.

Our Ref. Geol./A.65/
2930

Your Ref. EXP/132/309

Date 30th September, 1960

Subject COUSLAND

The meeting on 20th July to which you refer took place during my holidays, and was not brought to my attention prior to receipt of your letter.

The most recent geological appraisal of further gas prospects at Cousland is Mr. Terris' Completion Report for Cousland No. 6 (Report U.K. 345). On Page 13 Terris concludes that a well could be drilled 1000 ft. N.E. of No. 1, and he notes that the Falside - Carberry Hill culmination has not yet been adequately tested. This latter is an independent high a mile and a half north of Cousland No. 1.

The failure of No. 6 makes it unlikely that the Gas Council would agree to drill a well 1000 ft. N.E. of No. 1, and I would not propose such a well myself. If it be desired to prove additional gas reserves a more hopeful prospect has been suggested by Mr. Adcock. It concerns Cousland No. 4.

No. 4 is one mile S.S.W. of No. 1, on a separate and higher culmination. It was drilled at our expense in 1947 in search of gas. Several gas sands were proved, of which the best was tested over the interval 1471 - 1520 ft. and produced at rates up to 100,000 cu.ft./day. This was not adequate to warrant retention, and the well was abandoned. It was cased to 280 ft., and below that depth the hole is also probably still open because the rocks are so hard at Cousland.

Adcock points out that the hydraulic fracturing technique which we now employ as a standard routine to improve the productivity of certain oil sands could be applied to the gas sands at Cousland. He has recommended that No. 4 be re-located and re-opened, and the known gas sand fractured in that way. It would be necessary to cement 6 $\frac{1}{2}$ " casing to about 1580 ft. after running Schlumberger logs, and to perforate this casing, but these costs would be less than that of drilling a new hole.

Adcock estimates that a gas production of at least 1,000,000 cu.ft./day could be obtained by this method, with much less risk of failure than with a new well. I warmly support his proposal, and advise that it be put up to the Gas Council, if Chief Geologist agrees.

R. G. W. Brunstrom.

c.c. Chief Geologist
Manager, Eakring
Mr. C. M. Adcock

RGWB/BS.

EXP/132/309

26th September, 1960.

Dear Mr. Brunstrom,

One of the points raised by Mr. Matthews, when he visited Bakring on 20th July, was the position regarding further drilling at Cousland. I believe Mr. Adcock indicated, during the discussion, that he was satisfied that the production flow test has now served its purpose. It was agreed that an early geological recommendation on further boring should, therefore, be obtained and I should be grateful if you could advise me of the present position in this respect. Should any recommendation for further boring be made to the Gas Council and turned down by them we should have to delineate an area for eventual conversion to a Mining Licence.

Yours sincerely,

(Sgd.) A. S. BURT.

R.G.W. Brunstrom, Esq.,
BP Exploration Co. Ltd.,
P.O. Box 1,
Southwell,
Notts.

cc: Mr. C.M. Adcock ✓
Mr. A.N. Thomas
Mr. A.F.M. Matthews.

Suggested pump up
& fracturing well 4.
Plw
29/9/60



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 342315
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

8th September, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box No.1,
Southwell, Notts.

Dear Mr. Adcock,

Natural Gas - Cousland.

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 31st August, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts pme

(T.S. Ricketts)
Chief Engineer.

JMcC/DMM

THE SCOTTISH GAS BOARD.

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELLBURGH

REPORT ON GAS PRODUCTION - AUGUST, 1960

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st August, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,985,130 cubic feet

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)
3rd August - 568 lbs. per square inch
12th August - 567.5 lbs. per square inch
17th August - 567.5 lbs. per square inch
24th August - 567.0 lbs. per square inch
31st August - 566.5 lbs. per square inch

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

66,478,637
1,985,130
68,463,767 Aug.

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

F.6
129

FE.1277

23rd August 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your letter of the 8th instant, and for your July report for the Cousland gas production, which I note averaged 60,000 cubic feet per day during the month.

It is presumed that you had no occasion to use your space heaters during the month, and that the tape heaters were sufficient to prevent hydrate formation.

Yours sincerely,

C.M. Adcock

CMA/JMC



File me

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

8th August, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 31st July, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts
P.

(T.S. Ricketts)
Chief Engineer.

AB.

RAB/EC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JULY, 1960

Continuity of Supply Gas was supplied uninterrupted
from Cousland to Musselburgh
during the period 1st to 31st
July, 1960.

Volume supplied from Cousland
to Musselburgh during the
month (Corrected)^x 1,844,310 cubic feet

Pressure at wellhead during	6th July - 569.0 lbs.per square inch
the month (to nearest 0.5	13th July - 568.5 lbs.per square inch
pounds per square inch by	20th July - 568.5 lbs.per square inch
deadweight pressure tester)	27th July - 568.0 lbs.per square inch

Number of days on which well
was in action during the month 31 days

Number of days on which well was
shut down during the month Nil

64,634,327
1,844,310
66,478,637 July

X Corrected to 30 inches of Mercury and 60° Fahrenheit

File
Chad

PE.1221

15th July 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your June report for the Cousland natural gas production, which I note averaged 63,000 cubic feet per day during the month.

I was interested to learn that only the tape heaters had been in use during June, and that you were able to shut-off the space heaters without experiencing any deleterious results.

Yours sincerely,

C.M. Adcock

720 milli- / 113 @ 24 million / year

$$\frac{720}{24} = \frac{30 \text{ years}}{1}$$

1958
30

1988

CMA/JMC



File
Chg

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

8th July, 1960.

Dear Mr. Adcock,

Natural Gas - Cousland

I enclose a copy of the statement giving the Gas Council information relating to the supply of Natural gas from Cousland to Musselburgh during the month ended 30 June, 1960, from which you will note that the supply of gas continued uninterrupted during this period.

The space heaters were not used throughout the month of June, 1960, the tape heaters only being in use.

Yours sincerely,

T.S. Ricketts
(T.S. Ricketts) *1/13*
Chief Engineer

JMB/EC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JUNE, 1960

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 30th June, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,885,930 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester).....

1st June - 571 lbs. per square inch
8th June - 572.5 lbs. per square inch
15th June - 570 lbs. per square inch
22nd June - 569.5 lbs. per square inch
29th June - 569 lbs. per square inch

Number of days on which well was in action during the month 30 days

Number of days on which well was shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

Say abundant pressure 100 psi"

$$\frac{250}{180} \times 340 = \frac{470}{250} = 7.20$$

$$\begin{array}{r} 62,748,397 \\ 1,885,930 \\ \hline 64,634,327 \text{ gals} \end{array}$$

250 mlli for 180 p.s.i. day

File
Chg

Copy

From Mr. C.M. Adcock

To

Manager,
Engineering Department,
Pipelines and Terminals Div.
Longbow House.

Our Ref. EXP/1/PE.1198 Your Ref.

Date 17th June 1960

Subject Cousland Gas Production Scheme

Thank you for your memorandum dated 15th June, and we agree with you that the devices listed are not suitable for Methanol injection at Cousland.

The units consist essentially of motor driven proportioning pumps. The Scottish Gas Board requires a high pressure drip feed lubricator. There is no power supply at the Cousland wellhead, and electric motors would have to be flameproof.

The advantage of a drip feed lubricator is that it can be left completely unattended, and any failure of the equipment would be of no particular consequence. There would also be no operating costs, apart from replenishing the Methanol supply periodically.

C.M. Adcock

CMA/JMC

File
(42)

FE.1196

17th June 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Many thanks for your May report for the Cousland gas production, which I note averaged 76,000 cubic feet per day during the month.

I have not made much progress with our Engineering Division for the supply of a drip feed Methanol lubricator. I have received quotations for proportioning pumps complete with electric motors, but you do not require this type of equipment. I am still endeavouring to obtain details of high pressure lubricators.

From your report, the gas supply has obviously been uninterrupted since you shut down the auxiliary space heaters in the governor house, and you should be able to show eventually an appreciable saving of electricity.

Even with Methanol injection at the wellhead, you will still require tubing heating in the governor house. If there is any water production, the Methanol will be removed with the water in the separator.

Yours sincerely,

C.M. Adcock

CMA/JMC

Memorandum

File
Cousland
He

From REFINERIES & TECHNICAL DEPT.,
PIPELINES & TERMINALS DIVISION.

To MR. C. M. ADCOCK,
EAKRING.

Our Ref. ENG/124/178 **Your Ref.** EXP/1/PE.1127 **Date** 15th June, 1960.

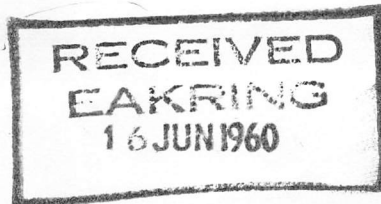
Subject COUSLAND GAS PRODUCTION SCHEME

In reply to your memorandum of 29th April, we enclose copies of various quotations which we have received for a device for injecting methanol into the Cousland Gas Line.

Unfortunately none of these seem to be really suitable for the job though it might be worth while making further enquiries from the British Manzel Oil Pump Co.

D Buxham
(D. BUCKHAM)

DB/SE





File
129

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

8th June, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information relating to the supply of Natural gas from Cousland to Musselburgh during the month ended 31st May, 1960, from which you will note that the supply of gas continued uninterrupted during this period.

Yours sincerely,

P. T.S. Ricketts
(T.S. Ricketts)
Chief Engineer

JMB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MAY, 1960

Continuity of Supply Gas was supplied uninterrupted
from Cousland to Musselburgh
during the period 1st to 31st
May, 1960.

Volume supplied from Cousland
to Musselburgh during the
month (corrected)* 2,362,140 cubic feet.

Pressure at wellhead during
the month (to nearest 0.5
pounds per square inch by
deadweight pressure tester)
3rd May - 573 lbs. per square inch
10th May - 572 lbs. per square inch
18th May - 572 lbs. per square inch
25th May - 571 lbs. per square inch

Number of days on which well was
in action during the month 31 days

Number of days on which well was
shut down during the month Nil

60,386,257
2,362,140
62,748,397 117

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



Your reference: PE.1161

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34831-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

File
the
Friday,
20th May, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I was very pleased to learn from your letter of the 18th of May, 1960 that Mr. Simpson and Mr. Rutherford of the Ministry of Power were satisfied with what they saw during their visit to Cousland on Tuesday, 17th May, 1960.

I was very interested to have the copies of the graphs taken from the report on the Italian Gas Fields and referring to the melting points of gas hydrates in a typical natural gas. This amply confirms the point that a substantial reduction could be obtained in the amount of electric heating at Cousland.

Our Edinburgh and South-Eastern Division have now been instructed that all that is necessary is for the gas at the inlet of the installation to be heated to about 70 degrees Fahrenheit and that this should be attainable without the use of the auxilliary space heaters in the governor house, except during the coldest periods of the winter.

I was very pleased to have the opportunity of seeing you in Scotland again.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DCE/MA

File
Ph 9

PE.1161

18th May 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

You will be pleased to know that Mr. Simpson and Mr. Rutherford of the Ministry of Power were impressed by the layout of the production plant and the wellhead arrangements at Cousland, and complimented you on the standard of upkeep and maintenance.

Mr. Elgin will have reported back to you the gist of our discussion for reducing the cost of the electricity used in the governor house.

In this connection I am sending you two copies each of two graphs which I have had abstracted from the Gas Council's report on the Italian gas fields.

The heavy line on graph 2/1 indicates the melting points of gas hydrates in a typical natural gas. You will note that at a pressure of 580 p.s.i. gas hydrates do not form at temperatures above 55°F.

Graph 3/23 is used to calculate the temperature drop as a result of the Joule-Thomson effect. At Cousland, the absolute wellhead pressure is 590 p.s.i.a., equivalent to 41.5 Kg/Cm². Before passing to the Gas Board's Governor, the gas is expanded to 40 p.s.i.a., equivalent to 28.1 Kg/Cm².

This is a fall in pressure of 13.4 Kg/Cm². Assuming wellhead gas temperature of 10°C, the Joule-Thomson coefficient is seen to be 0.44°C per 1 Kg/Cm² pressure drop. Hence the total fall in temperature will be 5.9°C, equivalent to 11°F.

Hence the Cousland gas production requires to be heated to 66°F, if the temperature after expansion is not to fall below 55°F, the gas hydrate melting point for 580 p.s.i. natural gas.

To allow a safety margin, I would suggest that the gas is heated to 70°F. If this temperature is attainable by means of the heating tape wrapped around the 2" pipe, there should be no necessity to use the auxiliary heaters in the Governor House, except during cold weather spells.

Yours sincerely,

C.M. Adcock

Encls.

CMA/JMC



Fi6
u
Your Reference: PE.1139

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 24831-5

CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

12th May, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

I thank you for your letter of 10th May, 1960, and am very pleased to see that you will be coming to Edinburgh on Monday, 16th May, 1960, and calling at my office on Tuesday shortly after 11 a.m.

I will be very pleased indeed to see you, but unfortunately I feel I shall be unable to travel to Cousland with you as I have another appointment. Mr. Elgin, however, will be joining you and will go to Cousland with you. Confirming our telephone conversation this morning, I look forward to seeing you and having the pleasure of your company at lunch on that day.

Yours sincerely,

T. S. Ricketts
(T.S. Ricketts)
Chief Engineer

TSR/RC.

File *me*

FE.1139

10th May 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Thank you for your April report for the Cousland gas production, which I note averaged 82,000 cubic feet per day during the month.

Further to my telephone conversation with Mr. Elgin yesterday, I confirm that Mr. Simpson and Mr. Rutherford of the Ministry of Power will be visiting the Cousland Well 1 site about mid-day on Tuesday 17th May.

I will be driving up to Edinburgh on Monday 16th May, and I have asked Mr. Elgin to book me hotel accommodation for the night. I understand that both you and Mr. Elgin may also wish to meet the Ministry's representatives at Cousland, and so I have arranged to call at your office on Tuesday shortly after 11 a.m. My car will be at your disposal for the visit to Cousland.

Yours sincerely,

C.M. Adcock

CC. Mr. A.F. Matthews, Britannic House
Manager, Eakring.

CMA/JMC



*File
che*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

4th May, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 30th April, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

RB.

RAB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1960

Continuity of Supply Gas was supplied uninterrupted from
Cousland to Musselburgh during the
period 1st to 30th April, 1960.

Volume supplied from Cousland
to Musselburgh during the
month (Corrected) * 2,456,260 cubic feet.

Pressure at wellhead during the
month (to nearest 0.5 pounds
per square inch by deadweight
pressure tester)
5th April - 574.5 lbs. per square inch
12th April - 574.5 lbs. per square inch
19th April - 573.5 lbs. per square inch
26th April - 573 lbs. per square inch

Number of days on which well was
in action during the month 30 days

Number of days on which well was
shut down during the month Nil

57,929.997
2,456,260
60,386,257 April

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



Your reference: PE1126

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
2nd May, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

I was very pleased to have your letter of the 29th of April, 1960 referring to the possibility of injecting methanol into the natural gas line at Cousland to prevent hydrate deposition.

So far the blockages which have occurred have appeared to be of a very temporary nature. There has been no evidence of long-term pressure reductions but, of course, this is rather difficult to confirm since, at the moment, although there is a pressure recorder at the governor house, a pressure gauge only is installed at the wellhead. We are now putting in hand arrangements to record the wellhead pressure also and this should enable a clearer picture to be obtained of the formation of blockages along the lines mentioned in your letter.

Thank you for arranging to let me have details of the lubricator suitable for providing a drip-feed of methanol. When this information is available we propose to take further the possibility of fitting a unit on the wellhead as discussed; it has been noted that you have no objection to this possibility.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

File *MA*

FE.1126

29th April 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 25th April reference the use of Methanol injection to prevent hydrate formation.

As I mentioned in my letter of the 22nd inst, the best way to find out whether there is a restriction to the gas flow is to record carefully the pressure at the wellhead and the pressure on the upstream side of the first pressure governor. The gas flow rate is so small that the friction loss between these two points will be negligible, and identical pressures should be recorded. Any pressure difference will be indicative of a blockage in the flow line.

We can see no objection to the connecting in of a Methanol drip feed lubricator into the 2" gas supply line at the wellhead. I am hoping to obtain details of such a lubricator in due course, and I will write to you again as soon as I have received these particulars.

Yours sincerely,

C.M. Adcock

CMA/JMC



*File
che*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

4th May, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 30th April, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

RB.

RAB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - APRIL, 1960

Continuity of Supply Gas was supplied uninterrupted from
Cousland to Musselburgh during the
period 1st to 30th April, 1960.

Volume supplied from Cousland
to Musselburgh during the
month (Corrected) * 2,456,260 cubic feet.

Pressure at wellhead during the
month (to nearest 0.5 pounds
per square inch by deadweight
pressure tester)
5th April - 574.5 lbs. per square inch
12th April - 574.5 lbs. per square inch
19th April - 573.5 lbs. per square inch
26th April - 573 lbs. per square inch

Number of days on which well was
in action during the month 30 days

Number of days on which well was
shut down during the month Nil

57,929,997
2,456,260
60,386,257 mm²

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



Your reference: PE1126

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
2nd May, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
NOTTS.

Dear Mr. Adcock,

Natural Gas - Cousland

I was very pleased to have your letter of the 29th of April, 1960 referring to the possibility of injecting methanol into the natural gas line at Cousland to prevent hydrate deposition.

So far the blockages which have occurred have appeared to be of a very temporary nature. There has been no evidence of long-term pressure reductions but, of course, this is rather difficult to confirm since, at the moment, although there is a pressure recorder at the governor house, a pressure gauge only is installed at the wellhead. We are now putting in hand arrangements to record the wellhead pressure also and this should enable a clearer picture to be obtained of the formation of blockages along the lines mentioned in your letter.

Thank you for arranging to let me have details of the lubricator suitable for providing a drip-feed of methanol. When this information is available we propose to take further the possibility of fitting a unit on the wellhead as discussed; it has been noted that you have no objection to this possibility.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

File 129

FE.1126

29th April 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 25th April reference the use of Methanol injection to prevent hydrate formation.

As I mentioned in my letter of the 22nd inst, the best way to find out whether there is a restriction to the gas flow is to record carefully the pressure at the wellhead and the pressure on the upstream side of the first pressure governor. The gas flow rate is so small that the friction loss between these two points will be negligible, and identical pressures should be recorded. Any pressure difference will be indicative of a blockage in the flow line.

We can see no objection to the connecting in of a Methanol drip feed lubricator into the 2" gas supply line at the wellhead. I am hoping to obtain details of such a lubricator in due course, and I will write to you again as soon as I have received these particulars.

Yours sincerely,

C.M. Adcock

CMA/JMC

Copy

File
CMA

From Mr. C.M. Adcock,
Bakring.

To

Manager,
Engineering Department,
Pipelines & Terminal Branch,
Longbow House.

Our Ref. EXP/1/PE.1127 Your Ref.

Date 29th April 1960

Subject Cousland Gas Production Scheme

We have received an enquiry from the Scottish Gas Board for a high pressure lubricator to drip feed Methanol into the gas stream at the wellhead, to overcome freezing conditions and the formation of Methane hydrates.

The lubricator should feed into the 2" pipe line adjoining the wellhead valves. The position on your drawing No.1205, dated January 1957, is between elbow No.24 and pipe No.7 at the wellhead.

The quantity of gas being produced is approximately 70,000 cu.ft. per day at S.T.P. The wellhead pressure is 580 p.s.i.g. It is estimated that the quantity of Methanol required may be as little as 0.2 gallons per 24 hours. In order to make an adequate allowance for contingencies, the maximum capacity of the lubricator should be about 1 gallon Methanol per day.

We would appreciate it if you would obtain particulars of a drip feed lubricator to meet these requirements, suitable for a working pressure of 600 p.s.i.g., including price, to enable us to pass on this information to the Scottish Gas Board.

C.M. Adcock

CMA/JMC



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Ch

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

TELEGRAMS "SCOTGASBO"

CALEDONIAN 2052

REPLY TO CHIEF ENGINEER

Monday,
25th April, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

Thank you for your letter of the 22nd of April, 1960 in reply to my suggestion that methanol might be used, as it is in the United States, to clear deposits at Cousland.

I was particularly interested to note that you would not have expected hydrates to be formed at the wellhead unless the flow of gas was restricted in some way. We have confirmed that the appropriate valves at the wellhead are fully open so that, as far as we can see, a restriction could not have occurred due to a partially closed valve. The fact remains, however, that unexplainable blockages have been occurring between the wellhead and the governor installation. On one occasion (when Mr. Gibson visited Cousland and freed the jammed valves) a deposit was removed; this appeared to be mainly ice with an oily deposit. The air temperature was, of course, around and below freezing point about that time.

On other occasions blockages have occurred between the wellhead and the governor installation with air temperatures well above freezing point and it was these blockages which we suspected might be due to hydrates. We wonder if it would be possible for a partial dust blockage to occur throttling the gas to the extent that hydrate formation would occur. No doubt after the pressure was shut off at the inlet to the blockage the methane hydrates would clear and after pressure had been restored on the up-stream side of the blockage the dust probably would dissipate. I would be very pleased to have your comments on this possibility.

I /

In this connection it may be relevant that in the installations which I saw during my visit to the United States, the drip feed arrangements for admission of methanol were at the wellhead. I was also interested in your suggestion that methanol might be drip fed in the governor house on the up-stream side of the pressure regulators as a substitute for the present electric tape heaters. Since the annual electricity consumption on these heaters amounts to about £110, it would appear that this would be well worthwhile. Presumably if it were decided to drip feed the methanol at the wellhead a sufficient amount could be fed in to substitute for the electric tape heating.

I shall be very pleased to avail myself of your offer to obtain details of the type of lubricator required to drip feed the methanol.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

DCE/MA



Fib
the

Your reference: PE.1115

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS
EDINBURGH, 3

TELEPHONE ~~34831-5~~
GALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Friday,
22nd April, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

Thank you for your letter of the 21st of April, 1960, from which I have noted that you agree with the scheme put forward by the Mining Consultants, J.W.H. Ross and Company, for wedging hardwood timber chocks between the pavement and the roof of the working in order to prevent dangerous settlement in the area of the governor house.

We will be taking this matter further at an early date and will keep you informed.

Yours sincerely,

T. S. Ricketts

(T. S. Ricketts)
Chief Engineer.

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DCE/MA

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PE.1113

21st April 1960

Dear Mr. Burt,

Natural Gas - Cousland

I am forwarding to you copies of a memorandum and correspondence referring to the stabilisation of the governor house at Cousland. I am also sending you a copy of my letter to Mr. Ricketts in this connection.

Previous correspondence referring to mining subsidence at Cousland was forwarded to Mr. C.E. Woodbridge in the first instance, and subsequently to Mr. G.C. Hoyer Millar.

Yours sincerely,

C.M. Adcock

A.S. Burt, Esq.,
BP House,
Ropemaker Street,
London, E.C.2.

Encl.

CMA/JMC

PE.1115

21st April 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

I must apologise for taking so long to reply to your letters dated 31st March and 7th April. The reason is that I have been away recently re-commissioning the Eskdale gas wells.

Thank you for the copies of the correspondence referring to the stabilisation of the governor house at Cousland. I am forwarding this correspondence to Mr. A.S. Burt, BP House, so that our London Office can be kept informed of developments in this connection.

For our part, we agree that the scheme put forward by Messrs. J.W.H. Ross and Co. Ltd., for wedging hardwood timber chocks between the pavement and roof of the working, should be quite satisfactory as an insurance against dangerous settlement in the governor house area.

Thank you for the March report for the Cousland gas production, which I note averaged 79,500 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

cc. Mr. A.S. Burt, BP House.

CMA/JMC



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

File
Ma
Tuesday,
19th April, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box No. 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural gas - Cousland

During my recent visit to the United States I noticed that at a number of natural gas installations arrangements were made whereby methanol could be drip fed into the gas stream as necessary in order to clear deposits of methane hydrates.

As you will have noticed from a number of our regular reports on the natural gas supply at Cousland, we have had intermittent trouble with blockages there and it occurs to me that these difficulties might be overcome by arranging for the addition of methanol as described above. Perhaps you will let me have your comments on this. It would be useful also if you could let me have details of a suitable attachment and if you could indicate at which point in the line or near the wellhead at Cousland this could best be fitted.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

22nd April, 1960.

T. S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh, 3.

Dear Mr. Ricketts,

Natural gas - Cousland

Many thanks for your letter dated 19th April requesting information on the use of Methanol to clear deposits of Methane hydrates.

As I explained to Mr. Elgin over the telephone today we would not have expected hydrates to form at the wellhead, unless the flow of gas was in some way restricted. This would be the case if the well valve was only partially open, and a pressure drop occurred at the wellhead.

The existence of such a throttling effect can be ascertained by comparing the wellhead pressure with the pressure on the upstream side of the first pressure governor. The gas flow rate is so small that there should be no significant difference in pressure between these two points.

The correct place to inject the Methanol is in the governor house, on the up-stream side of the pressure regulators. The Methanol injection would replace the electric tape heaters you are now using. You would no doubt wish to show an appreciable saving in operating costs, before changing over to Methanol injection.

Recently we used Methanol to overcome freezing conditions in gas production tests at Eskdale. We found we had to use up to about 6 gallons of Methanol per million cubic feet of gas. You would require less Methanol for Cousland, say 3 gallons per million cubic feet of gas.

The Cousland annual gas production rate is roughly 25 million cubic feet, so that you would require 75 gallons

Methanol per year. The cost is approximately 8/- per gallon, and the annual expenditure on Methanol would be about £30. How does this compare with the cost of electrical heating?

You would require a high pressure lubricator to drip feed the Methanol into the gas stream. I have no details of this type of equipment at Bakring, but I can look into this matter, should you wish me to do so.

Yours sincerely,

CMA/FEK



File
C/A

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O.Box 1,
Southwell,
Notts.

7th April, 1960

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information on the operation of the natural gas well at Cousland during the month ended 31st March, 1960, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

p. T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

AB.

RAB/BMB

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - MARCH, 1960

Continuity of Supply Gas was supplied uninterrupted from Cousland to Musselburgh during the period 1st to 31st March, 1960.

Volume supplied from Cousland to Musselburgh during the month (Corrected)* 2,464,970 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester) 1st March - 577.5 lbs. per square inch.
8th March - 577.0 lbs. per square inch
15th March - 577.0 lbs. per square inch
23rd March - 575.0 lbs. per square inch
29th March - 574.5 lbs. per square inch.

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

Note: A partial blockage, probably due to hydrate formation, occurred between 1.30 p.m. on the 22nd of March and 2.30 p.m. on the 23rd of March, but this resulted in a reduction in pressure only and did not interrupt the supply of gas to Musselburgh.

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

55,465,027
2,464,970
57,929,997^{new}



File
lea

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Thursday,
31st March, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose copies of a memorandum and correspondence referring to the stabilisation of the governor house at Cousland. Please let me know if you have any comments on the proposal for providing temporary support along the lines suggested.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

Fig/Me

PE.1080

14th March 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3

Dear Mr. Ricketts,

Natural Gas - Cousland

Many thanks for your letter dated 7th March enclosing your report for February for the Cousland gas production.

I was pleased to learn that the gas has been flowing freely since 17th February, and I note that the average offtake during the 20 days the well was on production was 66,000 cubic feet per day.

Yours sincerely,

C.M. Adcock

CMA/JMC



File
Ch

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2082

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

7th March, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement giving the Gas Council information relating to the supply of natural gas from Cousland to Musselburgh during the month ended 29th February, 1960. You will note under the heading, "Continuity of Supply", that there was no flow of gas between the 8th and 17th of February, due to a blockage at the wellhead.

Yours sincerely,

p. T. S. Ricketts.

(T.S. Ricketts)
Chief Engineer

ms.

RAB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - FEBRUARY, 1960

Continuity of Supply The supply of gas to Musselburgh failed at 1 a.m. on the 8th of February, due to a blockage at the wellhead. Initial attempts to clear the blockage were unsuccessful and the assistance of a member of the British Petroleum Company's staff was obtained. The wellhead valves were freed, the line blockage cleared, and the supply restored at 12 noon on the 17th of February, 1960.

The installation of the modified Bryan Donkin governors was undertaken while the gas supply was off, and final testing and commissioning of the governors took place on the 26th of February, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected)* 1,324,910 cubic feet.

Pressure at wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester)
2nd February - 577.5 lbs. per square inch
17th February - 577.5 lbs. per square inch
23rd February - 577.5 lbs. per square inch

Number of days on which well was in action during the month 20 days

Number of days on which well was shut down during the month 9 days

54,140,117
1,324,910
55,465,027 and Feb.

* Corrected to 30 inches of Mercury and 60° Fahrenheit.



Mr Clark *File* *OK* *MA*
Your reference: 1113

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Friday,
19th February, 1960.

A. Laird, Esquire,
BP Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Laird,

Natural gas - Cousland

Thank you for your letter of 17th February, 1960. I had also been informed that Mr. Gibson had succeeded in clearing and operating the main control valve on the Christmas tree at Cousland.

The instructions which Mr. Gibson left with us regarding facilities for the removal of accumulations of solid matter will be implemented. I have also passed on to our Edinburgh and South-Eastern Division your advice that the various valves should be manipulated at regular and frequent intervals to ensure continued smooth operation.

I have to thank you for placing Mr. Gibson at our disposal at such short notice and for the considerable assistance which he was able to give.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer. *11/4*

File
ma

FE.1047

19th February 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter dated 8th February, which I found awaiting me on my return from Papua. In your January report for the Cousland gas production, I note that the offtake rate averaged 48,000 cubic feet per day during the month.

I understand that the blockages you have been experiencing recently have been due to the formation of gas hydrates, which have now been removed, and that the operation of your wellhead plant is now satisfactory.

Yours sincerely,

C.M. Adcock

CMA/JMC



File
the

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331.5~~

CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
18th January, 1960.

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
Southwell,
Notts.

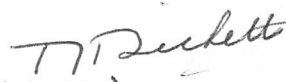
Dear Mr. Adcock,

Natural Gas - Cousland

I refer to my letter of 12th January, 1960 referring to discussions we have had with J.W.H. Ross and Company, Mining and Civil Engineering consultants regarding the stabilisation of the natural gas governor house at Cousland.

For your information I have to inform you that, following the recommendations of these consultants, the next step is that they are now proceeding to make a detailed survey to ascertain in exact detail the position of the underground workings relative to the position of the governor house; following this they will take tenders for the necessary work and submit them to us for consideration and approval.

Yours sincerely,


(T. S. Ricketts)
Chief Engineer.

DCE/MA



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~34331-5~~

~~CALEDONIAN 2052~~

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

8th February, 1960.

C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

... I enclose a copy of the statement giving the Gas Council information relating to the supply of natural gas from Cousland to Musselburgh during the month ended 31st January, 1960. You will note under the heading, "Continuity of Supply", that the flow of gas has been restricted to approximately half its normal rate for most of the month.

Yours sincerely,

T.S. Ricketts

(T.S. Ricketts) *RB.*
Chief Engineer

RAB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - JANUARY, 1960

Continuity of Supply From the 8th of January, 1960, onwards the supply of natural gas to Musselburgh gasworks was reduced to approximately a half of the normal rate. This was due to:

(a) a partial blockage between the wellhead and the water separator; and

(b) icing-up following the burning out of the electric tape heater in the governor house. A replacement tape heater has been fitted but no further action has been taken to remedy this restriction in flow as it is intended to reinstall the Bryan Donkin governors on the 8th of February, 1960.

Volume supplied from Cousland to Musselburgh during the month (corrected) * 1,473,220 cubic feet.

Pressure at Wellhead during the month (to nearest 0.5 pounds per square inch by deadweight pressure tester) 5th January - 578 lbs. per square inch
12th January - 578 lbs. per square inch
19th January - 578 lbs. per square inch
26th January - 577.5 lbs. per square inch

Number of days on which well was in action during the month 31 days

Number of days on which well was shut down during the month Nil

52,666,897
1,473,220
54,140,117 and Jan

* Corrected to 30 inches of Mercury and 60° Fahrenheit.

File
Ma

C. J. M. R.

1113

17th February 1960

T.S. Ricketts, Esq.,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh, 3.

Dear Mr. Ricketts,

Thank you for your letter dated 15.2.60. I well appreciate your anxiety about the blockages already experienced and you may rest assured that the cause will be thoroughly investigated.

I understand from Mr. Watson, Manager Eskring, that Mr. Gibson succeeded yesterday in clearing and operating the main control valve on the Christmas tree, also that he instructed Mr. Gibson to see that facilities exist for removal of accumulations of solid matter in the wellhead installation by periodic blowing-clear using the high pressure gas. In addition to this it will in future be advisable to manipulate the various valves at fairly frequent intervals to ensure continued smooth operation.

With kindest regards,

Yours sincerely,

A. Laird

cc. Mr. Watson
Mr. Adcock ✓

AL/JMC



THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Monday,
15th February, 1960.

A. Laird, Esquire,
BP. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Laird,

Natural Gas - Cousland

I understand that as Mr. Adcock was not available Mr. Elgin got in touch with you regarding the blockages which have recently taken place at the Cousland wellhead. Mr. Elgin explained then that we had been informed by our Edinburgh and South-Eastern Division that the blockage had built up over a period of more than a week; during Sunday, 7th February, 1960 evidently complete blockage had taken place and no gas pressure was available at the governor installation.

As you know, a few blockages have occurred in the past but apparently these have cleared after the gas supply has been shut off at the wellhead. On this occasion it has been impossible to clear the blockage since the main control valve on the riser of the christmas tree would only shut off half way. In addition, the valve on the branch line on the main gas producing branch of the christmas tree now fails to shut by about one turn. There is a pressure in excess of 100 pounds per square inch at the outlet of this valve when closed as far as possible.

I understand that you have arranged, through your drilling people, for Mr. Gibson to come to Scotland immediately in order to look into this blockage and arrange for the wellhead to be repaired. Mr. Elgin also mentioned to you that I am anxious about these recurring blockages and would like to have their nature determined as soon as possible. For this reason I would like Mr. Gibson to have samples taken for analysis at your laboratories. It should be noted particularly that these blockages are occurring at extremely low rates of flow which, as you know, have continued to be reasonably steady throughout the operation of the wellhead.

Yours sincerely,

T. S. Ricketts
(T. S. Ricketts)
Chief Engineer.

DCE/MA

FE.1015

18th January 1960

Dear Hoyer Millar,

In accordance with established procedure, I am forwarding to you herewith two copies of the Royalty Statement covering the production of Natural Gas at Cousland during the year 1959.

Yours sincerely,

C.M. Adcock

G.C. Hoyer Millar, Esq.,
BP House.

CMA/JMC

BP EXPLORATION COMPANY LIMITED

LICENCE A.205

COUSLAND

Statement of Natural Gas Production - 1st January 1959 to
31st December 1959 (Inclusive)

Cubic feet at 30 inches Mercury
and 60 degrees Fahrenheit

Natural Gas Won and Saved

January	2,464,400
February	2,326,320
March	2,615,890
April	286,391
May	842,560
June	2,159,570
July	2,089,090
August	2,232,560
September	2,065,840
October	2,242,640
November	2,336,100
December	2,364,280

NATURAL GAS LIABLE TO ROYALTY

24,025,641

18th January 1960
JMC

File
The

PE.1015

18th January 1960

Dear Hoyer Millar,

In accordance with established procedure, I am forwarding to you herewith two copies of the Royalty Statement covering the production of Natural Gas at Cousland during the year 1959.

Yours sincerely,

C.M. Adcock

G.C. Hoyer Millar, Esq.,
BP House.

CMA/JMC

BP EXPLORATION COMPANY LIMITED

LICENCE A.205

COUSLAND

Statement of Natural Gas Production - 1st January 1959 to
31st December 1959 (Inclusive)

Cubic feet at 30 inches Mercury
and 60 degrees Fahrenheit

Natural Gas Won and Saved

January	2,464,400
February	2,326,320
March	2,615,890
April	286,391
May	842,560
June	2,159,570
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August	2,232,560
September	2,065,840
October	2,242,640
November	2,336,100
December	2,364,280
	<hr/>
NATURAL GAS LIABLE TO ROYALTY	24,025,641
	<hr/>

18th January 1960
JMC

File
M9

PE.1014

15th January 1960

T.S. Ricketts, Esq.,
Chief Engineer,
The Scottish Gas Board,
26, Drumsheugh Gardens,
Edinburgh 3.

Dear Mr. Ricketts,

Natural Gas - Cousland

Thank you for your letter of the 12th instant detailing the steps you are taking to ensure the stabilisation of the ground conditions in the vicinity of the governor house at Cousland.

I have no comments to make at this stage, but I am forwarding a copy of your letter to Mr. G.C. Hoyer Millar, BP House, so that our London Office can be kept informed of developments in this connection.

Thank you also for your December report for the Cousland gas production, which I note averaged 76,000 cubic feet per day during the month.

Yours sincerely,

C.M. Adcock

cc. Mr. G.C. Hoyer Millar, BP House.

CMA/JMC



2 copies

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE 34331-5

CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

Tuesday,
12th January, 1960

C.M. Adcock, Esquire,
BP Exploration Company Limited,
Eakring,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

I refer to our previous discussions and correspondence on the possibility of stabilising ground conditions in the vicinity of the natural gas governor house at Cousland.

This matter has now been investigated by Mr. D.W.G. Cameron of J.W.H. Ross and Company, the Mining and Civil Engineering consultants. I have now instructed this firm to proceed with a scheme recommended by them, to construct, underground, a rectangular brickwork chamber to be filled up with a cheap grout mixture in order to give permanent support to the building.

The next stage in the scheme is that the consultants will make a detailed survey to ascertain the exact position of the underground workings relative to the position of the governor house. They will then take tenders for the necessary work.

You will, of course, appreciate that, in accordance with our previous discussions and correspondence, this work refers only to the workings which are likely to affect the governor house and in no way relates to sterilisation in connection with the natural gas reservoir itself.

I shall keep you in touch with any further developments in this connection. Please let me know if you have any comments at this stage.

I have sent a copy of this letter to Mr. Johnstone of the Gas Council.

Yours sincerely,

T.S. Ricketts
(T.S. Ricketts)
Chief Engineer

DCE/MA
BMB



*Please prepare
Royalty Statement;*

THE SCOTTISH GAS BOARD

26 DRUMSHEUGH GARDENS

EDINBURGH, 3

TELEPHONE ~~343315~~
CALEDONIAN 2052

TELEGRAMS "SCOTGASBO"

REPLY TO CHIEF ENGINEER

7th January, 1960.

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C.M. Adcock, Esquire,
B.P. Exploration Company Limited,
Eakring,
P.O. Box 1,
Southwell,
Notts.

Dear Mr. Adcock,

Natural Gas - Cousland

...

I enclose a copy of the statement sent to the Gas Council relating to the supply of natural gas from Cousland to Musselburgh during the month ended 31st December, 1959, from which it will be seen that the supply continued uninterrupted during this period.

Yours sincerely,

T. S. Ricketts

(T.S. Ricketts)
Chief Engineer

RAB

RAB/RC.

THE SCOTTISH GAS BOARD

NATURAL GAS SUPPLIED FROM COUSLAND TO MUSSELBURGH

REPORT ON GAS PRODUCTION - DECEMBER, 1959

Continuity of Supply Gas was supplied uninterrupted from
Cousland to Musselburgh during the
period 1st to 31st December, 1959.

Volume supplied from Cousland
to Musselburgh during the
month (corrected) * 2,364,280 cubic feet. 76,500

Pressure at wellhead during the
month (to nearest 0.5 pounds per
square inch by deadweight pressure
tester)
1st December) Deadweight tester
8th December) returned to makers
15th December) for annual overhaul.
22nd December - 579.0 lbs. per square
inch.
29th December - 578.5 lbs. per square
inch.

Number of days on which well was
in action during the month 31 days

Number of days on which well was
shut down during the month Nil

* Corrected to 30 inches of Mercury and 60° Fahrenheit.