DEPARTMENT OF ENERGY

Development of the oil and gas resources of the United Kingdom

1976

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Introduction

In 1975 – the busiest year so far on the United Kingdom Continental Shelf – major progress was made with the development of the country's petroleum resources. The year brought:

– the first production of oil from the North Sea after some six years of exploration and development;

– the drilling of a record number of exploration and appraisal wells–115 compared with 100 in 1974;

– a record volume of drilling rig activity – a total of 27.7 rig years compared with 24.5 in 1974;

– an outstandingly successful exploration programme providing 24 new discoveries of oil – virtually as many as in the previous five years of exploration – plus four new discoveries of gas/condensate;

– an increase of 30 per cent over the year in the United Kingdom's total proven oil reserves to about 1,350m tonnes; and

– an increase in proven gas reserves, after taking into account the consumption of gas during the year.

Detailed figures for these activities are set out in Parts I and II of this Report.

In the year when the United Kingdom became an oil producing nation, with the prospect of becoming one of the world's top ten oil producers and the equivalence of self-sufficiency in oil within four years, the Government was given powers by Parliament:

– to exercise more effective control over its new energy resources; and

– to secure an adequate financial return from them for the nation as a whole.

These powers were secured by means of:

-- the Oil Taxation Act 1975, which introduced the Petroleum Revenue Tax and provided rules to protect the Corporation Tax yield, gave effect to the Government's proposals for securing for the country through taxation a reasonable share of the profits while leaving the oil companies a fair rate of return; and

– the Petroleum and Submarine Pipelines Act 1975 (summarised in Appendix 11) which came into force on 1 January 1976 and extended the Government's powers to control exploration and production of the United Kingdom Continental Shelf and provided for the creation of the British National Oil Corporation (BNOC) which will eventually become a fully integrated national oil company.

During the year the Government continued its discussions with a number of British and other companies with the objective of securing majority state participation through the BNOC in commercial oil fields under existing offshore licences. These discussions led to the conclusion of the first participation agreements with Gulf and Conoco in February 1976 and with Tricentrol in March. A number of other companies have signified agreement to the principle of State participation. Discussions with these and other companies continue.

In accordance with the terms of the Petroleum and Submarine Pipelines Act 1975 the BNOC acquired the National Coal Board's subsidiary NCB (Exploration) Ltd. The BNOC will also exercise the Government's rights with regard to commercial fields covered by participation agreements. As announced on 10 March 1976 agreement has been reached in principle for the purchase by the BNOC of Burmah's interests in the Ninian field and of a majority interest in a joint BNOC/Burmah company which will hold a substantial beneficial interest in the Thistle field.

Production of oil from the small Argyll and the major Forties oilfields should build up significantly this year after their delivery

of the first 1.1m tonnes of North Sea oil in 1975. The small Auk oilfield started regular production in February 1976 and another four fields (Beryl, Brent, Montrose and Piper) should be in production by the end of this year. This should bring a total North Sea oil production in 1976 of between 15–20m tonnes – equivalent to about a fifth of the United Kingdom's annual consumption of oil and worth up to something like £900m on the balance of payments.

Oil production was made possible by the emplacement of seven oil production platforms off our shores during 1975. Four of these were supplied from the United Kingdom, including the first conversion of a drilling rig for use as a production platform in the North Sea on the Argyll field. To promote a greater contribution by United Kingdom industry and commerce to the supplying of offshore operators, the Government reached an agreement with the United Kingdom Offshore Operator's Association in November 1975 on a Memorandum of Understanding and an associated Code of Practice on the procedures to be followed by operators to give British industry a full and fair opportunity to compete for orders.

Total recoverable reserves from currently designated areas on the United Kingdom Continental Shelf are still expected to lie between 3,000–4,500m tonnes. But these figures may well increase once the dividing lines with the Republic of Ireland, France and Norway have been fully agreed and new areas are designated. New discoveries and appraisal of existing finds raised the total of proven oil reserves by 30 per cent to about 1,350m tonnes. The total recoverable reserves from areas already licensed are now expected to lie in the range 2,300–3,200m tonnes.

One new oilfield was declared commercial during 1975 – the United Kingdom part of the huge United Kingdom/Norwegian Statfjord oil and gas field. A number of other United Kingdom finds are being appraised and development plans for some of them may well be announced fairly soon.

The 14 oilfields on the United Kingdom Continental Shelf which have so far been declared commercial and some others should provide something between 95–115m tonnes of oil in 1980 and this will probably meet more than total United Kingdom oil demand.

If finds continue, enough oil should be discovered to sustain a rate of oil production of between 100 and 150 million tonnes a year or more through the 1980s.

During the year over 37 billion cubic metres of natural gas (equivalent to more than 30 million tonnes of oil) was brought ashore from the Southern Basin of the North Sea. This represents about 97 per cent of our total gas supplies and by substituting for imported oil produced a balance of payments saving of over £1000 million.

In June 1975 British Gas signed contracts for supplies of associated gas from the Brent and Forties fields. It is envisaged that Brent gas, together with that from the joint British Norwegian Frigg field, will come ashore at a new natural gas terminal at St Fergus in North East Scotland. When peak production is reached in the early 1980s Brent and Frigg will be supplying more than half the total volume of gas now coming from the Southern Basin. This should allow for a continued expansion of the premium gas markets at a time when supplies from the Southern Basin will begin to decline.

In September 1975 the Secretary of State for Energy announced that a new – and fifth – round of offshore licensing would be held during 1976. This should promote continued exploration and development of the resources of the Continental Shelf and help to provide a long-term market for the United Kingdom's offshore supplies industry.

At the end of 1975 some 117 wells had still to be drilled under the third and fourth licensing rounds, including 20 in the Celtic Sea. These drilling programmes must be completed under the terms of the fourth round by March 1978. A total of 796 exploration appraisal and production wells had been started on the United Kingdom Continental Shelf since exploration began some ten years ago. 415 of these were exploration wells of which 82 showed significant quantities of oil or gas giving a success ratio of 1 in 5, although not all of these will eventually prove to be commercial. East of Shetland the success ratio has been roughly twice as good as this. These compare with world-wide success ratios for offshore exploration of about 1 in 20.

Offshore oil exploration and development in the North Sea calls for technical skills of an extremely high order and severely tests the physical endurance of both men and machinery. During 1975 the Government, with the co-operation of the United Kingdom offshore operators, added significantly to regulations to improve safety for those working on and around offshore installations.

In January 1975 safety regulations governing diving operations from installations on the United Kingdom Continental Shelf came into force. These were the first comprehensive diving regulations in the world designed to cater for North Sea conditions. They are being adopted virtually in their entirety as the basis for Norwegian regulations due to be made fairly shortly and are likely to be widely copied. Similar regulations for diving operations from United Kingdom registered vessels were made in March 1975 and the United Kingdom offshore operators agreed that the regulations would be observed on a voluntary basis by their contractors for all operations on the British sector of the Continental Shelf from vessels not registered in the United Kingdom.

The Petroleum and Submarine Pipelines Act provides powers to make safety regulations covering, among others, divers engaged in pipelaying and pipeline operations. It is intended to introduce regulations covering these operations at an early date. These new regulations will secure comprehensive statutory safety coverage for those engaged on the most dangerous work in the North Sea.

During 1975 six divers died during or as a result of operations on the United Kingdom Continental Shelf, bringing the total between 1971 and 1975 to 17. The number of diving deaths in 1975, though the highest on record, represented one of the lowest fatality rates since offshore exploration began – that is, when the number of deaths is related to the number of divers at risk. The first year's operation of the diving regulations has significantly increased diving safety on the United Kingdom Continental Shelf.

Under regulations made in 1974 all offshore oil and gas installations had to have their fitness as structures for oil and gas operations surveyed by the Certifying Authorities. Those which did not receive Certificates of Fitness by the end of August 1975 were, where appropriate, granted conditional exemptions by the Secretary of State for Energy.

A total of 41 installations received Certificates at the end of August 1975. Five mobile drilling rigs were given special short-term exemptions and four have been give Certificates after further survey work; the remaining one has been withdrawn from the United Kingdom Continental Shelf.

Twenty-one gas production platforms in the Southern basin, built before the Government had made regulations about the design of offshore installations, were found not to comply fully with the fitness regulations. All of them were given exemptions to allow them to continue operating (some subject to restrictions on working in certain conditions) to enable modifications to be studied and carried out. The TUC and British Gas, as well as the individual operators, were consulted about the Government's approach to the certification of gas platforms and the five mobile rigs which did not initially comply with the regulations.

Part I: Production and reserves of oil and gas

Oil production

1975 saw the first production of oil from the United Kingdom sector of the North Sea.

In June oil was landed by tanker at the Isle of Grain from the Argyll field. The operators are using a novel technique appropriate to a small oil field, employing a converted semi-submersible rig as a production platform and loading the oil into tankers via a single point buoy mooring.

In November the first oil from the major Forties field came onshore by pipeline and production was inaugurated by Her Majesty the Queen. The oil is being landed by a 32 inch pipeline 110 miles long which connects the field with the mainland at Cruden Bay from where a land pipeline carries it a further 130 miles to Grangemouth.

Production from offshore areas totalled 1.1 million tonnes during the year. Although there were some development problems during 1975 these have been of a minor nature and do not cast any doubt on the possibility of expanding production in 1976.

A total of five fields are expected to come on stream during 1976 (including Auk, which is already on stream) and as the production from them and the two fields which came on stream in 1975 builds up, the total amount produced in 1976 is expected to be between 15 and 20 million tonnes. Thereafter production should continue to build up rapidly year by year. Table 1 gives the latest range of forecasts for the next four years. The forecast for oil production in 1980 is 95—115m tonnes, more than equal to forecast national consumption. In general production from fields already under development is expected to remain at the levels previously forecast. Operators are now taking more time over preparation for developing new fields, and thus this element of possible 1980 production may well be 5m tonnes lower than the Government had estimated last year.

Table 1 Forecast of United Kingdom Continental Shelf oil production

Year	1976	1977	1978	1979	1980
Forecast production (m. tonnes)	15-20	35-45	55-70	75—95	95—115

During the 1980s production should lie in the range 100—150 million tonnes, but in some years may be higher. The annual rate of production in this period will depend to an increasing extent on fields which are not yet being developed, finds yet to be made and the depletion policy of the Government of the day, hence it is impossible to predict exact levels.

Oil reserves

Areas already licensed

Exploration and appraisal work in 1975 led to the proving of a further 295 million tonnes of oil on the United Kingdom Continental Shelf, an increase in the total of proven reserves of almost 30 per cent over the end-1974 estimate. This brings the total of proven United Kingdom reserves to about 1,350 million tonnes. The increase is located in fields not yet declared commercial and

does not represent a revaluation of existing fields.

Taking into account probable and possible* reserves, the total estimated for areas of the United Kingdom Continental Shelf already licensed has risen slightly this year to nearly 3,200m tonnes. Of this figure the proportion which lies in finds already made is estimated at nearly 2,300m tonnes. an increase of 27 per cent over the comparable end 1974 estimate. Thus continued exploration activity and the 24 new discoveries made during the year have now significantly increased confidence in our estimates of the size of the reserves in existing licensed areas.

The estimates of reserves of existing licences are given in detail in Table 2 and diagram 1. The reserves are divided in two ways. First, according to categories of discoveries:

i) those already under development (ie commercial fields);

ii) those discovered but not yet under development;

iii) those expected from future finds.

Second, according to the definitions set out in the footnote. The table shows that reserves of oil in existing licensed areas could total between 2,300 and 3,200 million tonnes.

United Kingdom designated area

Taking into account estimates of reserves of oil in areas of our shelf which are already designated but not yet licensed the total reserves could reach 4,500 million tonnes. However, within this total, there have been some changes in composition. It now appears that the area West of Shetland may not be as promising as had been hoped, though there remain a number of structures which will deserve exploration. But oil was found in other areas during 1975 in strata which had not been previously thought to be oil bearing (Cretaceous and Devonian) and estimates have accordingly now been made of the possible reserves in these strata.

Once the dividing lines between the United Kingdom and other countries, such as France, Norway and Ireland have been determined in full, it is reasonable to assume that oil discoveries may be made in these areas. The total of 3,000–4,500 million tonnes of possible United Kingdom reserves may well therefore be increased once the extent and nature of these further United Kingdom areas are known.

* The terms 'proven', 'probable' and 'possible' are given the internationally-accepted meanings in this context of:

i) Proven — those which on the available evidence are virtually certain to be technically and economically producible.

ii) Probable — those which are estimated to have better than a 50 per cent chance of being technically and economically producible.

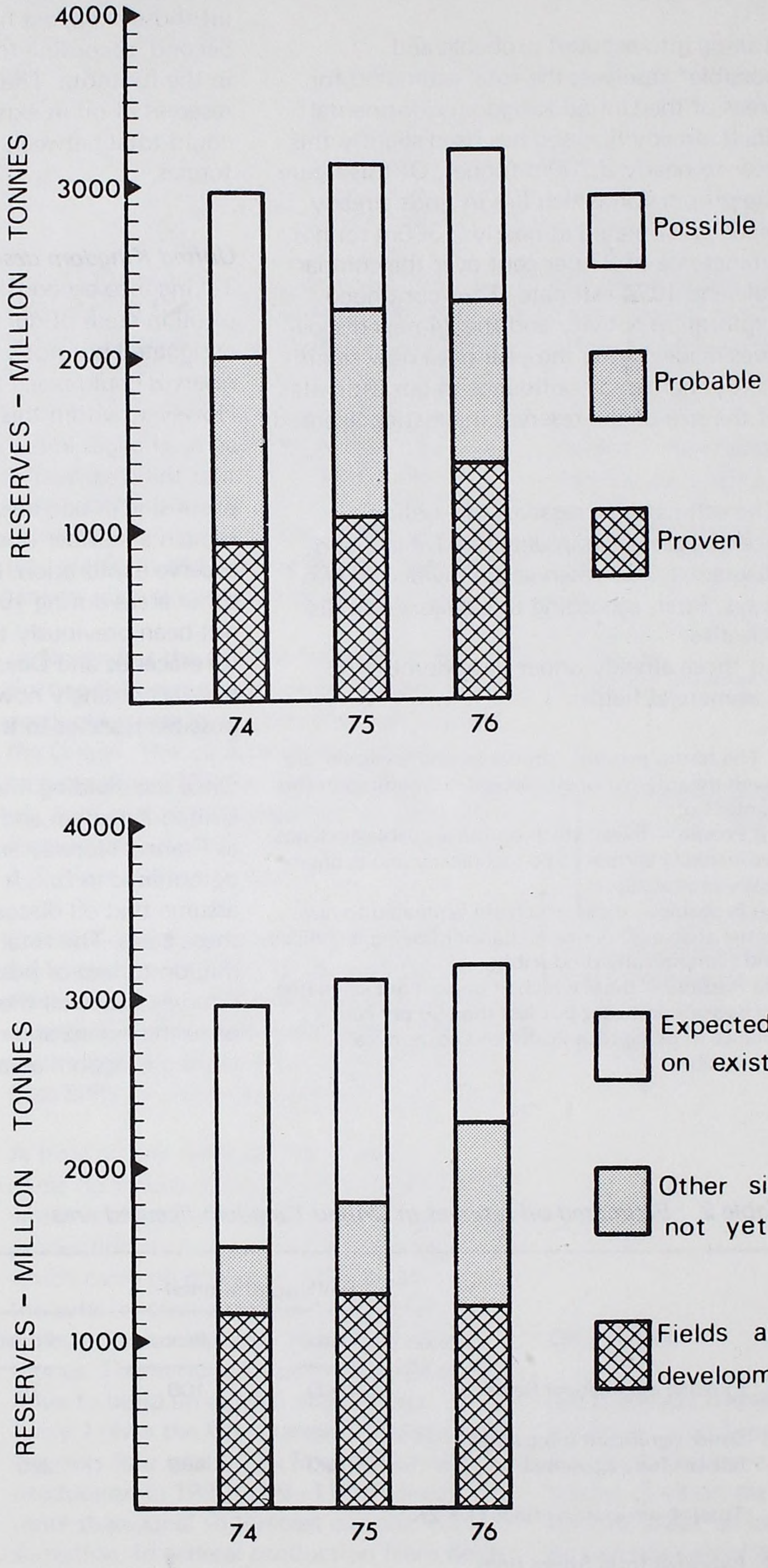
iii) Possible — those which at present are estimated to have a significant but less than 50 per cent chance of being technically and economically producible.

Table 2 Estimated oil reserves in United Kingdom licensed area

(Millions of tonnes)

	Proven	Probable	Possible	Possible total
1. Existing commercial fields	1000	100	70	1170
2. Other significant discoveries not yet fully appraised	350	480	290	1120
Total from existing finds (1 + 2)				2290
3. Expected from future finds on existing licences	–	380	520	900
Total existing licences	1350	960	880	3190

Diagram 1: Comparison of annual reserves forecasts



Gas production

During the year 37.2 billion cubic metres of natural gas from the Continental Shelf was sold to British Gas. This represents 97 per cent of total United Kingdom gas supplies. Appendix 5 gives a detailed record of production from each of the gas fields from their start up.

In June British Gas signed a contract for supplies of associated gas from the Brent and Forties fields. The Forties gas, which is in relatively small quantities, comes ashore in solution in the oil and is separated out at Grangemouth. Until 1977 when the contract begins, BP are using the gas as refinery fuel. They will continue to do so after 1980 when the contract ends and supplies begin to decline.

Reserves of gas now under contract to British Gas including gas from the Norwegian part of the Frigg field are sufficient to support a production rate of about 200 million cubic metres a day (6000 mcfd) by the 1980s. Existing discoveries will support this level of production well into the decade and future contracts and discoveries may extend this further.

Because of the extensive exploration already carried out in the Southern Basin it is unlikely that further major reserves of gas will be found in that area but discoveries of either gas on its own or gas associated with oil are likely to continue to be made on other parts of the Continental Shelf.

In addition to methane, the gas mainly involved in British Gas contracts, North Sea oil fields are expected to yield substantial quantities of heavier gases, ethane, propane and butanes sometimes known as heavy natural

Table 3 Estimated United Kingdom Continental Shelf gas reserves (Remaining in known discoveries at 31 December 1975)

Totals in billion cubic metres*

	Proven	Probable	Possible	Total
Southern Basin				
Fields under production or under contract to British Gas	478 (16.9)	28 (1.0)	42 (1.5)	549 (19.4)
Other discovereries believed to be commercial but not yet contracted to British Gas	74 (2.6)	9 (0.3)	6 (0.2)	89 (3.1)
Other discoveries	0 (0)	34 (1.2)	40 (1.4)	74 (2.6)
Total Southern Basin	552 (19.5)	71 (2.5)	88 (3.1)	711 (25.1)
Northern Basin †				
Fields under contract to British Gas	190 (6.6)	8 (0.3)	0 (0)	198 (6.9)
Other significant finds †	28 (1.0)	150 (5.3)	155 (5.5)	333 (11.8)
Other gas with oil	45 (1.6)	96 (3.4)	47 (1.7)	188 (6.7)
Total Northern Basin	263 (9.2)	254 (9.0)	202 (7.2)	719 (25.4)
Total UK Continental Shelf	815 (28.7)	325 (11.5)	290 (10.3)	1430 (50.5)

* Figures (in brackets) are also given in tcf for comparison, the conversion factor assumed is 1 tcf (10^{12} cubic feet) = 28.317×10^{9} cubic metres

† Including reserves found in Liverpool Bay

gas or natural gas liquids. In various circumstances these gases could be used as petrochemical feedstock or for energy purposes. The Department of Energy is considering with the companies concerned the exploitation of these materials.

Gas reserves

The proven reserves of gas remaining at 31 December 1975 are estimated to be 815 billion cubic metres (29 tcf). This represents an increase of over 50 billion cubic metres over last year's figure in spite of the year's consumption of about 37 billion cubic metres (1.3 tcf). The total possible reserves could be as high as 1430 billion cubic metres. Table 3 shows the reserves in greater detail.

There was one new discovery in block 48/12 in the Southern Basin announced during the year. It is not yet possible to determine whether the find will prove to be commercial.

Much of the increase in reserves over last year's figures is due to gas associated with oil discoveries. The problem of transporting this gas is often a difficult one because of the relatively small quantities which are involved. In order to study this problem the Government commissioned a study (referred to later in this report) to consider whether a common gas gathering network would be economically justifiable. Even if such a gathering system were installed it is unlikely that it would be economic to bring ashore some of the very small pockets of gas which are included in Table 3.

No estimate of further reserves associated with oil has been attempted as the large range of gas to oil ratios found in the North Sea fields makes such estimating impossible.

Part II: Progress and prospects

Summary of activity

Exploration activity in the United Kingdom Continental Shelf reached a new peak in 1975. During the year, 24 significant new oil discoveries and four new gas/condensate bearing formations or structures were encountered, almost doubling the number of oil discoveries known. The best indicator of rig activity, the average number of mobile rigs present increased from 24.5 in 1974 to 27.7 in 1975 (not far short of the 1975 Brown Book forecast of 30).

The total number of exploration and appraisal wells drilled also rose from 100 in 1974 to 115 in 1975. By the middle of 1975 the earlier shortage of rigs had eased and several semi-submersible drilling rigs were idle in North European waters by the end of 1975.

As operators under existing licences work their way through their obligatory drilling programmes, exploration activity is not expected to continue throughout 1976 at the peak level of 1975. The average number of rigs active in United Kingdom waters in 1976 is expected to be in the range 20—25.

During 1975 the volume of drilling from fixed platforms in the gas fields in the Southern Basin of the North Sea continued to decrease as development work on producing fields approached completion. During 1976 development work on the new Rough field and on fields already producing, together with a little appraisal/exploration work, will sustain a level of activity similar to that of 1975.

In the Northern North Sea the first development wells on oil fields were drilled in 1975 and by the end of the year seven were complete. During the year eight more production platforms were installed bringing the total number in place to 11.

Development of the northern oil fields and the Frigg gas field is expected to expand rapidly this year. During 1975 the total amount of time spent drilling on the four fixed platforms where drilling activity took place added up to 1.1 rig-years. During 1976 ten fixed platforms will be engaged in drilling and the total amount of time spent drilling will be equivalent to 8 rig-years.

During the 1975 pipeline laying season a total of 392 miles of pipeline were laid in the United Kingdom sector of the North Sea, of diameters varying between 20in and 36in. This was an unexpectedly high level of achievement. In practically all cases the targets set by the oil companies for pipeline laying were exceeded, because of the exceptionally long period of good weather. The laying of the Ninian, Cormorant and Frigg pipelines should be completed during 1976.

Offshore licensing

In September, the Secretary of State announced his intention to hold a round of offshore licensing in 1976. The objectives in holding the round will be to ensure continued exploration and development of our Continental Shelf, and a continuing market for the United Kingdom offshore supplies industry. The detailed arrangements for the round will include provision in all new licences for majority State participation in any commercial finds made. Previous licensing rounds were held in 1964, 1965, 1970 and 1971/72

International matters

Negotiations on the division of the Continental Shelf with neighbouring states continued during 1975. The United Kingdom's offshore boundaries with Norway (south of 61°44′12″), Denmark, The Federal Republic of Germany and the Netherlands have already been settled and that with Belgium agreed in

principle. Talks with the Irish Government are in progress and talks with the Norwegian Government are also expected to begin shortly to settle the remaining stretch of boundary north of the present limit. The question of the United Kingdom/French boundary has been submitted to an independent international tribunal for arbitration.

During 1975, the United Kingdom and Norwegian Governments concluded negotiations on the unitisation of the Frigg gas field which straddles the United Kingdom/Norway median line in the North Sea. The resulting unitisation Agreement, which was initialled on 10 December 1975 and is awaiting signature, derives from Article 4 of the United Kingdom/Norway Continental Shelf Delimitation Agreement which requires the two countries to agree on the way in which cross median-line fields should be exploited most effectively and how their proceeds should be apportioned. The Frigg Agreement is the first international agreement of its kind. Discussions have started between the two Governments on the unitisation of the giant Statfjord oil and gas field whose extension into the United Kingdom sector was proved during the year.

British Offshore Supplies Industry

In 1975 British industry continued to take advantage of the opportunities offered for the supply of equipment required for the development of our offshore oil and gas discoveries. Of the seven major oil and one major gas production platforms emplaced during the year four were supplied from the United Kingdom, including in the Argyll field the first floating oil production platform to be used in the North Sea. This brings to ten the total of oil production platforms on station in the United Kingdom sector of the North Sea. A further ten platforms are under construction, seven of which are being built in United Kingdom yards. Details of these and of the further oil production platforms under construction are given in Appendix 7.

The pattern of ordering by the offshore oil operators changed in 1975. The absence of orders for major production platforms was disappointing but considerable sums were spent on activities connected with the installation of platforms on the seabed and the necessary work required to bring them into production. There was also an increase in orders for onshore facilities. Details of orders placed by the offshore operators in 1975 in the various sections of the offshore supplies industry will be published shortly. This will update the analysis of orders placed in 1974 which was published in July 1975.

Two sites in the West of Scotland, one at Portavadie in Argyll and the other at Hunterston on the Clyde, have received Government financial support under the Offshore Petroleum Development (Scotland) Act 1975 for development of facilities for building concrete production platforms. This will ensure that capacity is available for United Kingdom platform builders to tender for the expected future level of platform orders from operators on the United Kingdom Continental Shelf and elsewhere.

Survey work on tow-out routes from the West of Scotland to the North Sea oilfields is now being carried out by the Hydrographer to the Navy under a programme of priorities agreed with the oil companies.

Deep water areas required for the final stages of concrete platform construction have been designated by the Secretary of State for Scotland by Order under the Offshore Petroleum Development (Scotland) Act 1975 in Loch Fyne and the Inner Sound of Raasay thus ensuring (under a licence procedure) both availability of the necessary facilities and the required control of sea operations.

It is estimated that there are at least 80,000 people employed directly or indirectly in the United Kingdom on North Sea oil related work. Of these some 50–55,000 are in Scotland.

In addition to the extensive regional financial assistance given under the Industry Act 1972 by the Department of Industry towards strengthening the United Kingdom offshore supplies capability, the Offshore Supplies Office has provided assistance under Section 8 of the Act to individual

projects. Offers totalling £3.37m have been made and projects to benefit recently have included the building of tug/supply vessels and oil flow metering equipment.

In November 1975 following a number of meetings with representatives of the United Kingdom Offshore Operators Association, agreement was reached on the terms of a Memorandum of Understanding and associated Code of Practice on the procedure to be followed by all operators and their contractors to ensure that British industry is given a full and fair opportunity to compete for orders in the United Kingdom offshore market. The Government believes that agreement on this new procedure represents an important step forward in the policy that British firms should provide, on a competitive basis, an increasing share of the goods and services required for the United Kingdom Continental Shelf.

The Offshore Supplies Office have also turned their attention to the development of an export strategy, aimed at encouraging the British offshore supplies industry to deploy and develop worldwide the capabilities which they have built up to meet the needs of the North Sea offshore market. As part of the strategy to promote these capabilities the Offshore Supplies Office during 1975 sent missions to India, the Soviet Union and participated in exhibitions in Houston and Aberdeen.

Offshore employment

The continuing exploration for oil since 1970 has given rise to a rapid expansion of regular employment on offshore installations in the United Kingdom Continental Shelf and during 1975 there were over 6,000 workers so employed compared with 1,000 in 1970. Most of these were employed on mobile drilling rigs until 1975 when construction work on platforms installed offshore became significant. By 1980 most of the workers employed offshore will be those engaged in operations on permanent production platforms. The safety of all persons on board installations is protected by regulations under the Mineral Workings (Offshore Installations) Act 1971. However United Kingdom legislation concerned with terms and conditions of employment did not extend to United Kingdom territorial waters or the Continental Shelf. The Government therefore included in its Employment Protection Act 1975 provisions to enable regulations to be made by Order in Council to apply most of the provisions of the main Acts concerned with employment, and of the Employment Protection Act itself, to all employment in territorial waters and, within the British sector of the Continental Shelf, to any employment connected with the exploration of the sea bed or subsoil or the exploitation of their natural resources. The first Order in Council, to be made during the first half of 1976, will provide for the operation in those areas of the provisions of the Employment Protection Act which are by then in force on the mainland. That will make available the full range of services provided by the Advisory Conciliation and Arbitration Service (ACAS), ensure trade union recognition procedures and protect trade union membership and activities. The first Order will also apply existing legislation, modified in some cases by the Employment Protection Act, which will most notably give employees protection against unfair dismissal and the right to receive particulars of the terms and conditions of their employment.

Training

As part of the Manpower Services Commission's programme to improve training in diving and underwater working, the Training Services Agency published in 1975 the first national standard for training in commercial air diving and introduced a system of certification for trainees who successfully complete a training course which meets the standard. The first standard is for training in basic air diving. Following consultation with the industry the Agency will be publishing in 1976 standards for deep diving training.

The Manpower Services Commission has also established an Underwater Training Centre at Loch Linnhe. The centre opened in September with basic air diving training and will begin deep diving training during 1976. Other courses, for example in specialist underwater skills, may be provided later.

During 1975 the Petroleum Industry Training Board established a Drilling Technology

Training Centre at Livingston New Town. The centre is to provide training opportunities for offshore drilling and production platform crews and the first training course for rig crews was held in October. This is the initial or pilot stage of a project intended to improve the United Kingdom's capability in all aspects and levels of rig operation.

A training course in petroleum engineering at post-graduate level started at Heriot-Watt University during 1975. A Professor was appointed in May and the first students started in October. This course supplements the other post-graduate course which was started at Imperial College London in 1974.

Offshore safety and legislation

During the year progress in extending safety control continued in a number of areas. Two further sets of regulations introduced under the Mineral Workings (Offshore Installations) Act 1971 have the combined effect of requiring any employer of persons working on or from an offshore installation to obtain minimum insurance of £2 million to cover himself against claims made against him by his employees for injuries received as a result of their employment.

The regulations are the Offshore Installations (Application of the Employees' Liability (Compulsory Insurance) Act 1969) Regulations 1975 and the Employer's Liability (Compulsory Insurance) (Offshore Installations) Regulations 1975.

In the area of diving safety the Department of Trade introduced the Merchant Shipping (Diving Operations) Regulations 1975. These are based on the Offshore Installations (Diving Operations) Regulations 1974 and apply to all diving operations conducted from United Kingdom registered vessels and from all vessels in United Kingdom territorial waters.

Agreement was also reached with the diving companies by which, pending the introduction of diving regulations under the Petroleum and Submarine Pipelines Act 1975, the companies would apply the provisions of the Offshore Installations (Diving Operations) Regulations 1974 to pipelaying activities. The Department of Trade also reached agreement with the United Kingdom Offshore Operators Association on an arrangement under which the UKOOA would require all offshore installation standby vessels to be in possession of a Department of Trade Certificate of Survey.

Preparation of four further sets of Regulations to be introduced under the Mineral Workings (Offshore Installations) Act 1971 continued. They will be concerned with day-to-day safety, health and welfare of personnel and safety of equipment and working procedures; emergency and life-saving equipment; fire fighting systems and equipment; and emergency procedures.

Prior to the passing of the Petroleum and Submarine Pipelines Act 1975 the Government possessed no regulatory powers over the construction and use of submarine pipelines. In addition to requiring new pipeline operations to obtain a specific authority from the Secretary of State regarding construction, route and use, the 1975 Act empowers the Secretary of State to make regulations governing the safe construction and operation of pipelines and the safety, health and welfare of those engaged in pipeline works. The Secretary of State may also appoint Inspectors, with wide-ranging powers to inspect pipelines, to enter premises, vessels and installations associated with pipeline activities, to inspect and test equipment and in special circumstances to require operations to be suspended. Provision may also be made by regulations for the holding of public inquiries into accidents connected with pipelines.

Preparation began of the first three sets of regulations which it is intended will be made under the Act. They will be concerned with applications for authorisation to lay a pipeline; the powers of inspectors; and the safety of diving operations.

Certification of offshore installations

The requirement under the Offshore Installations (Construction and Survey) Regulations 1974 that all installations on the United Kingdom Shelf hold a valid Certificate of Fitness came into force on 31 August 1975. Five Certifying Authorities (Lloyds Register of Shipping, American Bureau of Shipping, Bureau Veritas, Det Norske Veritas and Germanischer Lloyd)

had been appointed by the Secretary of State in 1974 to issue Certificates on his behalf. The Certifying Authorities were involved, therefore, in a major survey programme including the assessment of documentation, reports on surveys, practical assessment on design criteria and all other available information aimed at establishing the fitness or otherwise of installations for their intended purpose.

The Certifying Authorities maintained continuous and close cooperation with the Department to ensure that common standards acceptable to the Department were uniformly applied. Because of the continuing need to clarify and develop certification procedures and requirements in the light of new experience, this cooperation will continue.

On 31 August there were 74 installations on the United Kingdom Shelf of which 70 were operational and required Certificates of Fitness. The Secretary of State issued short-term Exemptions from the requirement to possess Certificates in respect of five installations; in the case of four to enable the Certifying Authority to complete some aspects of underwater survey, and for the fifth because it was about to be withdrawn from the United Kingdom Shelf.

Of the remaining 65, 21 were existing gas platforms built before the Regulations were made and did not fully comply with those provisions of the Regulations relating to structural fire protection. To enable an adequate survey to be undertaken and recommendations for suitable modifications to be made, the Secretary of State issued Exemptions in this respect for an initial period of three months. Subsequently, these platforms have been further exempted until 31 August 1976 to enable the necessary work to be carried out.

The decision to grant Exemptions was only taken after the Government Departments concerned and the Certifying Authorities had satisfied themselves that the installations concerned were in practice fit for their intended purpose, that alternative safety arrangements had been made and taking into account any limitations on operations imposed as a condition of the Exemption.

The Certificates of Fitness issued vary in period from one year to the maximum of five years subject to a satisfactory annual survey.

When the present Certifying Authorities were appointed the Secretary of State indicated that he would consider the appointment of a limited number of further Certifying Authorities chosen from Consulting Engineers. In April it was agreed with the Association of Consulting Engineers that they would set up an independent committee which would draw up a short list of candidates for possible appointment. The Department in conjunction with its advisers, is considering these.

The Secretary of State's Advisory Committee on Fixed Offshore Installations met regularly and continued to make a useful contribution to the development of standards for the design and construction of fixed concrete structures.

Preparation of a new edition of the Department's publication *Guidance on the Design and Construction of Offshore Installations* started. When complete it will take into account lessons learned during the course of the certification programme and information fed back through contacts with the industry and specialist bodies including the Offshore Installations Technical Advisory Committee.

Protection of Installations

Measures for the protection of the installations on the United Kingdom's Continental Shelf were announced in Parliament on 11 February 1975; these provided for the construction of five new RN offshore patrol vessels and the deployment of four RAF aircraft especially for offshore tasks.

The new ships will start to enter service in 1977, by which time the aircraft will also be available. Together with the three ships already available to the Department of Agriculture and Fisheries for Scotland there will eventually be a force of eight ships in service.

As an interim measure HM Ships ***Jura*** and ***Reward*** are now on patrol and RAF aircraft are regularly overflying the installations. The

forces described are augmented by other RN ships and RAF aircraft.

An exercise was held on 27 November by the Department of Energy to test the lines of communication in the procedures for dealing with accidents to offshore installations. Valuable experience was gained from this exercise, drawn up with the full cooperation of BP, the UKOOA, Government Departments and others, and the lessons learned will enable procedures to be streamlined and will make a significant contribution in the development of adequate safeguards for offshore installations.

Review of accidents and dangerous occurrences

On offshore installations covered by the Mineral Workings (Offshore Installations) Act 1971 there were, during 1975, six fatal accidents and 46 serious injuries (excluding divers). One fatality and four serious injuries were recorded on vessels which were engaged in work related to these installations.

Amongst divers there were six fatalities. Four were divers working from installations covered by the Mineral Workings (Offshore Installations) Act 1971 including one diver who died from natural causes. The other two were divers working on the construction of a pipeline.

Appendix 8 shows how these figures relate to those of previous years, comparing levels of activity, and analyses them into categories of work. Operations on and around the drilling floor, diving and the use of cranes appear to cause the most accidents. This is in line with the comments made in 1974 with the exception that attendant vessels seem to have a better record in 1975 and were not involved in a significant number of accidents.

These accidents were in a year when the work force expanded rapidly. The six non-diving fatalities were from a workforce of 5800 people giving a fatality rate of approximately 1.0 per 1000. Of the six diving fatalities the three caused by accidents on installations covered by the Mineral Workings (Offshore Installations) Act 1971 were from a total workforce of about 500 divers estimated to have been employed, giving a fatality rate of 6 per 1000. No estimate is available of the number of seamen employed on the attendant vessels so no comparable statistics can be calculated for the single fatality that occurred on them.

Analysis of the causes of the accidents reveals that many of them were consequences of human error, but the decrease in most categories is a hopeful sign that personnel are now gaining experience in the drilling field, where the expansion of activity was not so marked in 1975 as in 1974. The first trainees from the Drilling Technology Training Centre at Livingston and the Underwater Training Centre near Fort William should be entering industry this year, and it is hoped that higher standards of expertise will in the long term have an effect in reducing accident rates.

The area where training still appears to be urgently required is that of crane operations, where most of the dangerous occurrences listed (25) were associated with a damaged boom. All such incidents have the potential to cause serious injury or death to personnel working in close proximity to the crane either on the installation or on attendant vessels. The Petroleum Industry Training Board is currently involved in setting up additional facilities to allow training of crane operators for installations.

A new feature of 1975 compared with previous years was that construction was carried out on the large Northern North Sea platforms. Labour forces on an individual platform run up to 400 men on the site and an estimated 2000 of the 6300 employed quoted in Appendix 8 were construction workers. Neither of the two fatalities that are registered under construction were directly concerned with construction activities, and the accident record of these construction work sites appears to be remarkably good.

Seven of the dangerous occurrences were fires. One of these was on a producing platform in the Leman Bank field and caused sufficient damage to put the facility out of action for some months.

The Offshore Installations (Diving Operations) Regulations 1974 came into operation on 1 January 1975 and the

strength of the diving specialists in the Department increased to three during the year.

During the last five years there have been 27 diving fatalities on all areas of the North and Celtic Seas. Of these 17 were in the United Kingdom Sector, eight in the Norwegian Sector and one each in the Irish and Dutch sectors. Year by year figures for each national sector are given in table 4 below.

Environmental aspects

The Offshore Installations (Construction and Survey) Regulations 1974 should ensure that offshore installations are designed and built to a high standard, and this will go some way towards minimisation of pollution risks. Operators are also required, under the terms of their production licences, to follow good oil field practice to avoid the escape of petroleum.

Government Departments have been establishing with the United Kingdom Offshore Operators Association procedures for dealing with any pollution which may occur as a result of accidental damage to installations. All operators are expected to draw up contingency plans which provide for clean up in the event of a spill and the UKOOA has provided stockpiles of spray gear and dispersant for use by members on a repayment or replacement basis. In addition, operators may seek Government assistance should any incident be beyond the resources of the offshore industry.

The industry has set up a voluntary scheme (the Offshore Pollution Liability Agreement — OPOL) under which up to $16 million will be immediately available to meet clean-up expenses and compensation (up to $8 million per incident in each case) arising from a spillage of oil from a facility operated by a subscriber to the Agreement. The scheme became operational in May 1975 and in September 1975 its scope was extended to cover those operators in Denmark, Federal Republic of Germany, France, Ireland, the Netherlands and Norway who wished to join.

In October 1975 the United Kingdom hosted a Conference at which it was joined by delegates from Belgium, Denmark, France, Federal Republic of Germany, Ireland, Netherlands, Norway and Sweden to discuss a Convention dealing with the question of civil liability for oil pollution damage from offshore operations.

Agreement was reached on most issues except that of the level of liability to be borne by the operator and the Conference is expected to resume discussion of this in London later this year. If a Convention is agreed it will, when ratified by the United Kingdom and in force, supersede OPOL.

Section 45 of the Petroleum and Submarine Pipelines Act amends the Prevention of Oil Pollution Act 1971. Under that Act the discharge of oil or oily mixtures into the sea was effectively prohibited. It is impossible in the present state of oil and water separation technology to remove all traces of oil from contaminated water before discharging the treated water. Hence the effects of such

Table 4 Diving fatalities on the North and Celtic Seas

	1971	1972	1973	1974	1975	total
British Sector	3	1	2	5	6*	17
Norwegian Sector	2	–	–	4	2	8
Irish Sector	–	–	–	1	–	1
Dutch Sector	–	–	–	–	1	1

The larger number of diving fatalities in the United Kingdom sector is a reflection of the much higher levels of activity than in the other sectors.

* Includes one death from natural causes.

a prohibition which applied to pipeline and tanker loading terminals on-shore as well as to off-shore platforms would have been to prevent offshore oil development. It was therefore necessary to amend the 1971 Act and, with effect from 1 January 1976, the Secretary of State for Energy has had the power to grant exemptions from Sections 2 and 3 of that Act subject to conditions to protect the environment. Because of the need to consider the marine environment, each application for exemption is closely scrutinised in a consultative process involving all appropriate Government Departments who in turn consult relevant outside bodies. Each installation will require a separate exemption, which will be subject to stringent conditions designed to protect the environment. The operations concerned will be closely monitored to ensure compliance with the conditions in default of which the exemption may be terminated. Conditions may also be varied to attain a higher quality of effluent as technology advances.

It is not the intention to prescribe general standards of discharge because of the varying conditions from one site to another. Consideration will be given to all environmental factors and to the plant involved in determining the discharge prescribed in each case.

One of the requirements of the Petroleum Production Regulations is that escape of petroleum be advised to the Secretary of State. Such escapes cover the loss of petroleum (oil) on the installation, from sub-sea wells and flow-lines, tanker loading facilities and flow-lines to shore. (Losses from tanker in transit or at shore based facilities are covered by other regulations.) A few very minor spillages occurred on the Argyll field on initial production and associated with the tanker loading equipment.

Offshore technology research and development

During the past year important organisational changes have been made in management by Government of research and development programmes in the field of offshore oil and gas technology.

The Government's research programme in this area was previously controlled by the Department of Industry's Ship and Marine Technology Requirements Board (SMTRB) and Chemicals and Minerals Requirements Board (CMRB). The events of the past two years, the oil crisis and the increasing importance to the economy of our North Sea resources led to a review, with the result that the Secretary of State for Energy announced in May 1975 the establishment of a new advisory Board, the Offshore Energy Technology Board (OETB), under the chairmanship of the Department's Chief Scientist to take over from the SMTRB and the CMRB the responsibility for supervising the development of a programme of R & D related specifically to offshore oil and gas exploitation.

The OETB, which includes among its members senior executives from oil companies (who are the ultimate customers for much of the R & D), will advise on R & D directed both towards ensuring the safety and efficiency of offshore operations and towards improving the competitive position of British industry in the offshore field.

A large continuing research programme has been inherited from the SMTRB and the CMRB (estimated expenditure 1975/6 about £6m) and the Board has been defining priorities for future work. The Department's research and development responsibilities cover three main areas:

i. The acquisition and analysis of geophysical, geological and reservoir engineering data to enable an appreciation to be made of our likely hydrocarbon reserves.

ii. The determination of the necessary standards to be laid down by the Department in pursuance of its statutory responsibilities for the safety of offshore operations.

iii. Assisting the development of the United Kingdom offshore supplies industry; not only to enable it to establish itself successfully as a significant force in the operations on our own Continental Shelf but also to enable it to compete in worldwide markets in the future.

Use of gas associated with oil

All North Sea oilfields produce associated gas in varying quantities. With the exception of the Brent field, no other proved oilfield in the United Kingdom sector has yet shown a sufficient quantity to justify a separate gas

pipeline. In some cases it may be possible and worthwhile to re-inject the gas into the reservoir provided that the geological formations are suitable. When the field is served by an oil pipeline it is possible to transport some gas dissolved in the oil. On many fields some associated gas is used for power generation on the platforms. But gas which cannot safely be recovered or conserved by any of these methods will have to be flared.

Under the Petroleum and Submarine Pipelines Act the Secretary of State's approval is required for flaring. Consents have been issued for flaring from the Auk and Argyll fields. The Government is satisfied that the quantities of gas to be produced from these fields are too small for delivery to be practical. Consent has been issued for the flaring of excess gas from the Beryl field for one year from the start of production and the reinjection of gas for a further two years. Consent has also been issued for 2 years from 1 January 1976 for the flaring of the small excess of gas above the quantity which can be safely transported in the oil pipeline from the Forties field. These consents are limited in case circumstances change. In order to be fully satisfied before authorising flaring that there is no economically viable alternative, the Secretary of State, in September 1975, commissioned Williams-Merz, consulting engineers of Newcastle upon consulting engineers of Newcastle upon Tyne to carry out a feasibility study to evaluate the relative economics of bringing associated gas ashore possibly through a gathering pipeline. Northern sector licensees have co-operated by providing confidential information as a basis for the study.

The study has now been received and is being considered. It is hoped that it will be possible to publish an edited version from which the commercially confidential information has been removed.

Information on wells and production
In September the release of well information on those wells drilled on the first round licences became due under the 11 year release rule agreed with UKOOA. The Petroleum and Submarine Pipelines Act changed the release period to five years for all wells and by the end of 1975 information on some 287 wells was due for release. In order to arrange for public access to this information the Department has set up the Well Records Centre. The information is to be stored on microfilm and facilities will be provided in London, Leeds and Aberdeen for viewing. It will be possible to purchase the information on microfiche from HMSO.

Licensees are required for royalty purposes to measure by a method approved by the Department the quantities of petroleum (oil, gas or condensate) which they produce. Gas metering has been carried out at the point of sale, when the pipelines from the Southern Gas fields come ashore. Oil metering started in 1975. Where oil is loaded offshore into tankers supervision and monitoring rests entirely with the Department of Energy but when oil comes ashore by pipeline the work is done in cooperation with Customs and Excise. Standards of meter requirements have been laid down after discussion with all interested parties.

Part III: Field by field progress

East of Shetland
The mobile rig activity was virtually identical to that of 1974 with 27 exploration and 24 appraisal wells, as compared with 26 and 24 respectively in 1974 (revised figures). Perhaps of greater significance, however, was the development well started on the Beryl platform — the first in the East Shetlands area. Fifteen significant discoveries of oil were made in the area in 1975 and a number of these promise to be commercially exploitable.

Mobile rig activity will continue at a high level in 1976 although there may be a decline from the 13.6 rig years activity of 1975.

Any decline in mobile rig activity will be counterbalanced by the rise in development activity and, if schedules are maintained, it is estimated that by the beginning of 1977 there will be five platform rigs operating.

A detailed assessment of the development in and prospects for each of the discoveries in the area is as follows:

(i) ***BRENT (Shell/Esso block 211/29 extension into block 3/4 Texaco)***
Appraisal drilling on the Southern extension to the Brent structure into block 3/4 continued.

Brent B concrete platform has been installed and the drilling rig is in use setting conductor pipes preparatory to drilling for production wells. Brent D (concrete) and A (steel) should be placed on site during the year and Brent C (concrete) in 1977.

The Spar loading buoy will be installed in 1976 to allow production via tanker to start this year.

In June British Gas signed a contract for supplies of associated gas from the field. It is expected that the gas will be delivered late in 1979. There will be a limited amount of flaring when oil production begins but as soon as the necessary equipment has been installed the gas will be re-injected until the gas pipeline is ready.

Site work on the Sullom Voe terminal started in February 1975. When completed Sullom Voe will be the major oil reception and trans-shipment port in the United Kingdom. Supplies will flow to the terminal through the Brent and Ninian pipeline systems and by the early 1980s the terminal should be handling nearly 50 per cent of our total North Sea oil production.

Tanker loading facilities presently planned consist of three jetties, two of which will be capable of receiving tankers of up to 300,000 dwt. At present the terminal is being designed to handle 1.2 million barrels of crude oil per day, 900,000 bpd from the Brent system and 300,000 bpd from the Ninian pipeline.

(ii) ***THISTLE (Burmah Group block 211/18 extension into block 211/19 Conoco Group)***
Appraisal drilling contined in 1975.

A steel platform should be installed in 1976 and drilling should start before year end. It is planned that production should begin in 1977.

(iii) ***BERYL (Mobil group block 9/13 extension into block 9/18 Conoco Group)***
Appraisal drilling continued in 1975 and drilling in the surface conductors from the concrete platform was in progress at the end of the year. Problems were experienced with the sub-sea completion of an existing well to be flowed to the platform and this operation

had been suspended at year end. The articulated loading tower was installed but then broke free from its moorings and is currently being repaired. This has caused the expected start up date to slip several months. Production will start in 1976.

Consent was given under the Petroleum and Submarine Pipelines Act for the flaring of gas for one year from the start of production and for reinjection for a further two years. The consent is limited in time in case circumstances change.

(iv) ***CORMORANT (Shell/Esso block 211/26)***
Appraisal drilling continued in 1975.

Because of construction delays the concrete platform will not now be installed in 1976 but in 1977 and will serve as both a drilling and production platform for the Cormorant field, and also as the main pumping platform for the Brent pipeline system. First production is planned for 1978.

(v) ***DUNLIN (Shell/Esso block 211/23 extension into block 211/24 Conoco Group)***
The concrete platform will not now be installed in 1976 but in 1977. Production will be into the Brent pipeline system, starting in 1978. No appraisal drilling was carried out in 1975.

(vi) ***Block 3/15 (Total Group)***
No appraisal drilling took place in 1975.

(vii) ***HUTTON (Conoco Group block 211/28 extension into block 211/27 Amoco Group)***
An appraisal well was drilled in 1975. No plans for commercial development have been announced. Appraisal drilling on a separate discovery in block 211/27 took place in 1975.

(viii) ***ALWYN (Total Group block 3/14a)***
No appraisal wells were started in 1975 but one started in 1974 was completed during 1975. The structure is complicated and further exploration and appraisal continues in the general area, which includes block 3/9 in order to establish the presence of sufficient reserves to justify field development.

(ix) ***HEATHER (Unocal Group block 2/5)***
Appraisal drilling continued in 1975 and a steel platform is to be floated out in 1977 with production in 1978 either through the planned Ninian pipeline or by means of an offshore loading system. Other prospects within the Block were also investigated.

(x) ***NINIAN (BP/Ranger Group block 3/8 extension into block 3/3 Burmah Group)***
Appraisal drilling continued in block 3/3 and one steel and one concrete platform have been ordered for installation in 1977. Construction of the submarine pipeline to the terminal at Sullom Voe has begun. Oil production is scheduled to start in 1978.

(xi) ***FRIGG (Petronord Group, Norwegian Waters extension into United Kingdom Waters block 10/1 Total Group)***
The misemplaced steel Drilling Platform I was not repaired for use but the concrete platform originally designed as a booster station was modified and installed as C Drilling Platform I. Drilling is expected to begin in the second half of 1976. The quarters, terminal, booster platforms and pipelines should all be finished to allow production in 1977.

Two appraisal wells were drilled. These formed part of the evaluation process required to aid allocation of reserves between British and Norwegian licensed areas.

(xii) ***Block 3/19 (Total Group)***
No further appraisal work has been done on this gas bearing structure.

(xiii) ***MAGNUS (BP block 211/12)***
An appraisal well was drilled in 1975 to delineate this potentially important discovery and further appraisal drilling will continue in 1976.

(xiv) ***BRUCE (Hamilton Group block 9/8)***
Appraisal drilling continued on this structure in 1975. It has not yet been determined as commercial.

(xv) ***STATFJORD (Mobil Group, Norway, extension into United Kingdom waters block 211/24 Conoco Group)***
The extension of this very large field into the United Kingdom sector was proved by a discovery well in block 211/24 in February, and the United Kingdom and Norwegian licensees have since entered into discussions on the joint development of the field, though no further appraisal drilling was carried out in 1975.

(xvi) *Block 9/13 (Mobil Group)*
Appraisal drilling occurred in block 9/13 of prospects other than the Beryl field and in the extension of the original Beryl field into the Conoco block 9/18 lying to the South.

(xvii) *MURCHISON (Conoco Group block 211/19)*
Appraisal drilling took place in 1975.

(xviii) *TERN (Shell/Esso block 210/25)*
Appraisal drilling is scheduled for 1976.

(xix) *Block 2/10 (Siebens Group)*
Appraisal drilling took place in 1975.

(xx) *CRAWFORD (Hamilton Group block 9/28)*
Two appraisal wells were drilled in 1975.

(xxi) *Block 3/4 (Texaco)*
Exploratory and appraisal drilling was carried out on structures in this block lying to the South of, but separate from, the Brent field.

East of Scotland
There was a marked increase in activity in 1975 with 44 exploration wells drilled (compared with 25 in 1974) and eleven significant discoveries were made.

Mobile rig activity will remain at a high level in 1976 although probably lower than in 1975. Overall activity will remain high, however, as the two platform rigs drilling at the beginning of 1976 should increase to seven or eight by year end.

A detailed assessment of the development in and prospects for each of the discoveries in the area is as follows:

(i) *MONTROSE (Amoco Group block 22/18 extension into block 22/17 Amoco Group)*
The steel platform was placed in August 1975 and drilling operations should start in the spring of 1976. Tanker loading via single point buoy mooring should begin by the middle of the year.

(ii) *FORTIES (BP block 21/10 extension into block 22/6 Shell/Esso)*
During the year the third and fourth platforms were placed and drilling started from the A platform. Oil was produced through the 110 mile-32 inch pipeline to Cruden Bay and then by land line to facilities at the Kerse of Kinneil.

By the end of the year three production wells had been drilled from the A platform and over 600,000 tonnes of oil had been produced. At the end of 1975 a second platform (FC) was ready to drill and all four platforms now in place should be drilling by 1977.

In June British Gas signed a contract for supplies of gas associated with the oil from this field. The relatively small quantities of gas involved will be brought ashore dissolved in the oil and separated out at the refinery in Grangemouth and until the contract begins in 1977 BP will use the gas in their refinery. Consent was given under the Petroleum and Submarine Pipelines Act to the flaring of the small excess of gas which could not be safely transported in the pipeline or used in power generation on the platform. This consent was limited to two years from 1 January 1976 in case circumstances change.

(iii) *AUK (Shell/Esso block 30/16)*
The platform was installed and drilling operations started. There was some delay following damage to the structure by a supply boat, but by year end token production had started. Problems were experienced with the Exposed Location Single Point Mooring system, but the first oil was landed by tanker at Teesport on 24 February 1976. Consent was given for flaring of the excess gas over that which can be used at the platform since the very small quantities involved make delivery ashore impractical.

(iv) *Block 30/2 (Burmah/Hamilton Group)*
No activity in 1975.

(v) *ARGYLL (Hamilton Group block 30/24)*
The operators are using a semi-submersible drilling rig, Transworld 58, modified to operate as a production platform. The rig was installed in March 1975 and production via sub-sea well head, sub-sea flow lines manifold and riser started in mid summer after some delay caused by damage to the riser. The first tanker load of oil was landed at the Isle of Grain in June and by the end of the year nearly half a million tonnes of oil had been produced.

As the quantities of gas produced with the oil are too small for delivery to be practical, consent was given to the flaring of gas.

(vi) *LOMOND (Amoco Group block 23/21 extension into block 23/22 Phillips Group)*
No further drilling occurred in this gas condensate field on block 23/21 and an appraisal well on block 23/22 proved disappointing.

(vii) *PIPER (Occidental Group block 15/17)*
With the steel platform now installed, problems, mostly associated with piling have caused some delays. Development drilling is not expected before mid-summer, with production to Flotta via the completed 30-inch pipeline starting in the Autumn.

Work on the Flotta Terminal in Scapa Flow in the Orkneys, started in 1974. On completion the terminal will be the oil reception and trans-shipment port for production from the Piper and Claymore fields. The Piper facilities will include two single point moorings, five surface crude storage 500,000 barrel tanks, a gas separation plant, liquid petroleum gas jetty, deballasting facilities, power generation and supporting services. In January of this year the loading facilities were virtually complete; the terminal tank farm and the terminal process facilities were more than four fifths complete.

The second and final phase of development, expanding terminal capacity to take the estimated peak Claymore production, is due for completion in late 1976. Expansion will include the provision of two 940,000 barrel storage tanks, additional separation plant capacity and an additional power generator.

Management of the Flotta terminal will be by the Orkney County Council in co-operation with Occidental, the operating company for both the Piper and Claymore fields.

(viii) *MAUREEN (Phillips Group block 16/29)*
No drilling activity was carried out in 1975 and no decision to develop the field has been made.

(ix) *CLAYMORE (Occidental Group block 14/19)*
Appraisal drilling took place in 1975. During 1976 the steel platform should be installed and a spur line to the Piper-Flotta line laid. Production via the pipeline to the Flotta terminal should follow drilling in 1977.

(x) *ANDREW (BP block 16/28 extension into block 16/27 Phillips Group)*
No further drilling followed the Phillips well drilled in May 1975 which proved the extension of the field into the adjacent block 16/27.

(xi) *BUCHAN (Transworld Group block 21/1)*
Appraisal drilling continued in 1975 but no development plans have been announced.

(xii) *Block 15/16 (Texaco)*
An active appraisal drilling programme was pursued in 1975 and five wells completed. The results, while providing encouragement, have not yet been sufficiently conclusive to enable a development programme to be drawn up and appraisal drilling continues in 1976.

(xiii) *Block 14/20 (Texaco)*
Two appraisal wells have been drilled which have shown this structure to be complex and requiring further appraisal.

(xiv) *BRAE (Panocean Group block 16/7)*
This field was discovered in April 1975. Another well was drilled on a related structure and appraisal drilling continues in 1976.

(xv) *Other discoveries*
No appraisal drilling followed the remaining significant discoveries made in the area in 1975.

Southern North Sea
The level of further development activity in 1975 showed a decline from the already low level of 1974. A low level of activity will continue in 1976.

(i) *LEMAN BANK*
Field development drilling on an existing platform was completed in mid-year. Compressors will be in operation on three platforms in 1976 to boost pressure on the trunk pipeline system to counteract the fall

in field pressure caused by production of gas from the reservoir.

(ii) *INDEFATIGABLE*
Field development drilling on an existing platform was completed early in the year. A further drilling and production platform complex will be installed in block 49/23 in 1976, together with a further production platform in block 49/24.

(iii) *VIKING AREA*
Drilling on two satellite platforms using a jack-up rig to drill and then install the production jacket continued throughout the year. By mid 1976 the last of these satellites, developing small gas reserves to be processed on the large platform of the Viking field, will be completed.

A compressor unit will be installed on an extension of one of these large platform complexes this year, and a further unit on the other platform to become operational in 1977.

(iv) *WEST SOLE*
No new developments occurred in 1975 or are scheduled for 1976.

(v) *HEWETT FIELD*
No new developments occurred in 1975 but drilling from a new platform to develop the structure also known as Dottie will start in 1976. An additional 24-inch pipeline will tie this platform into the Bacton shore base.

(vi) *ROUGH FIELD*
Drilling started on the platform in the spring of 1975 and will continue in 1976.

Production began during 1975 but was then interrupted when the 16-inch pipeline to Easington was ruptured near the platform by a supply boat anchor. The pipeline is still being repaired. Production is expected to recommence in the Spring.

West of Shetland
Three unsuccessful wells were drilled during the year bringing the total number of wells drilled – all unsuccessfully – in the area of 12. The continued lack of success in this area compared with the East of Shetlands and Scotland is reflected in the low level of activity in the area.

West of England and Wales
Activity remained at a very low level with two exploration wells and an appraisal well on the Hydrocarbons (GB) Limited 110/2 block discovery. Some increase in activity appears likely in 1976 as companies move into the area to meet their licence obligations.

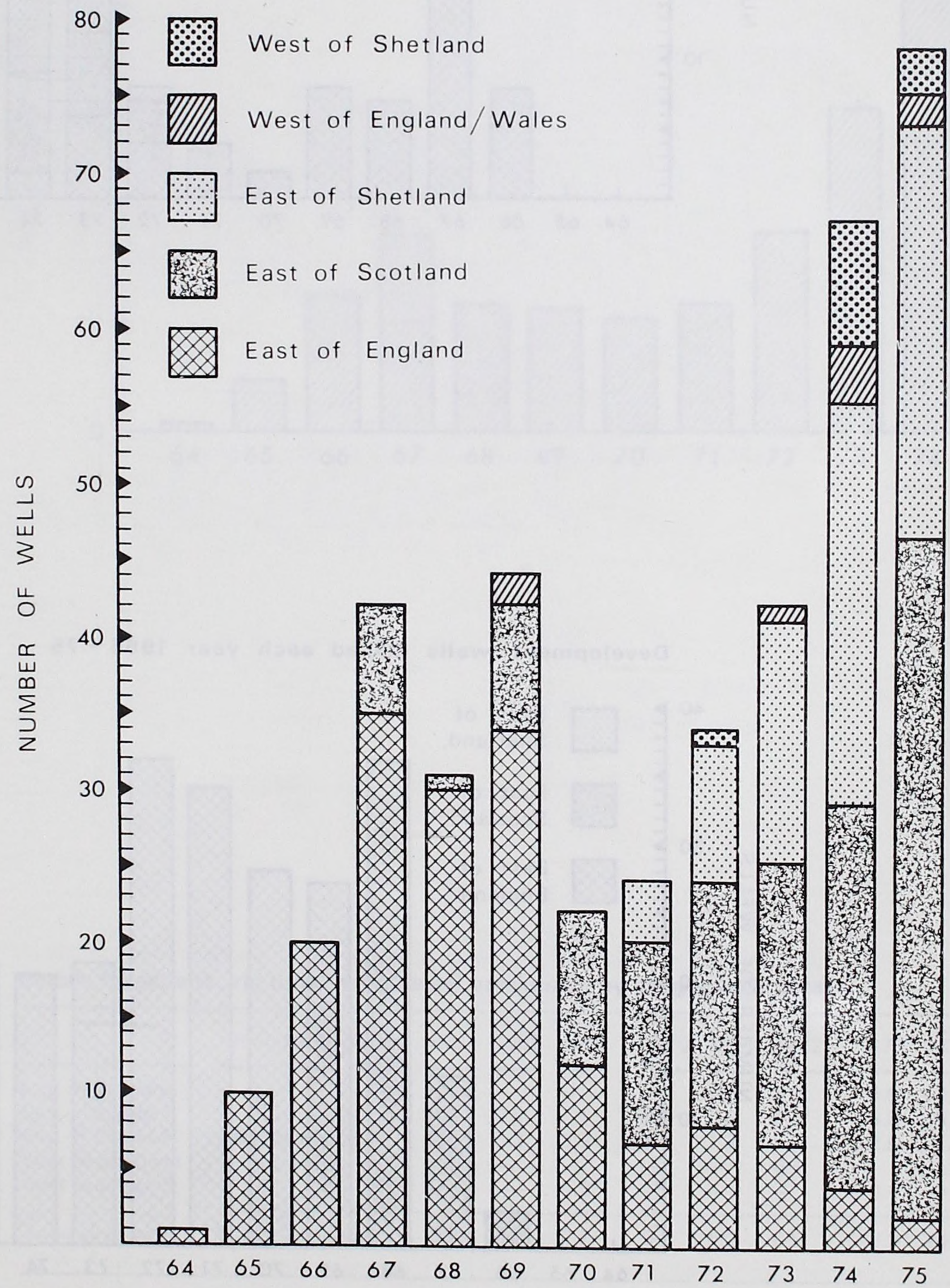
Landward operations
Four new exploration wells were drilled during 1975. Those in Yorkshire, Wiltshire and Gloucestershire were unsuccessful while the well in Dorset was on a structure adjoining Wytch Farm and encountered similar oil.

No development drilling took place at the British Gas 1973 Wytch Farm discovery or the Candecca 1973 Axholme discoveries. In the East Midlands development drilling was completed on a number of existing fields and little further activity is anticipated in 1976. The overall activity on land is not expected to rise in 1976.

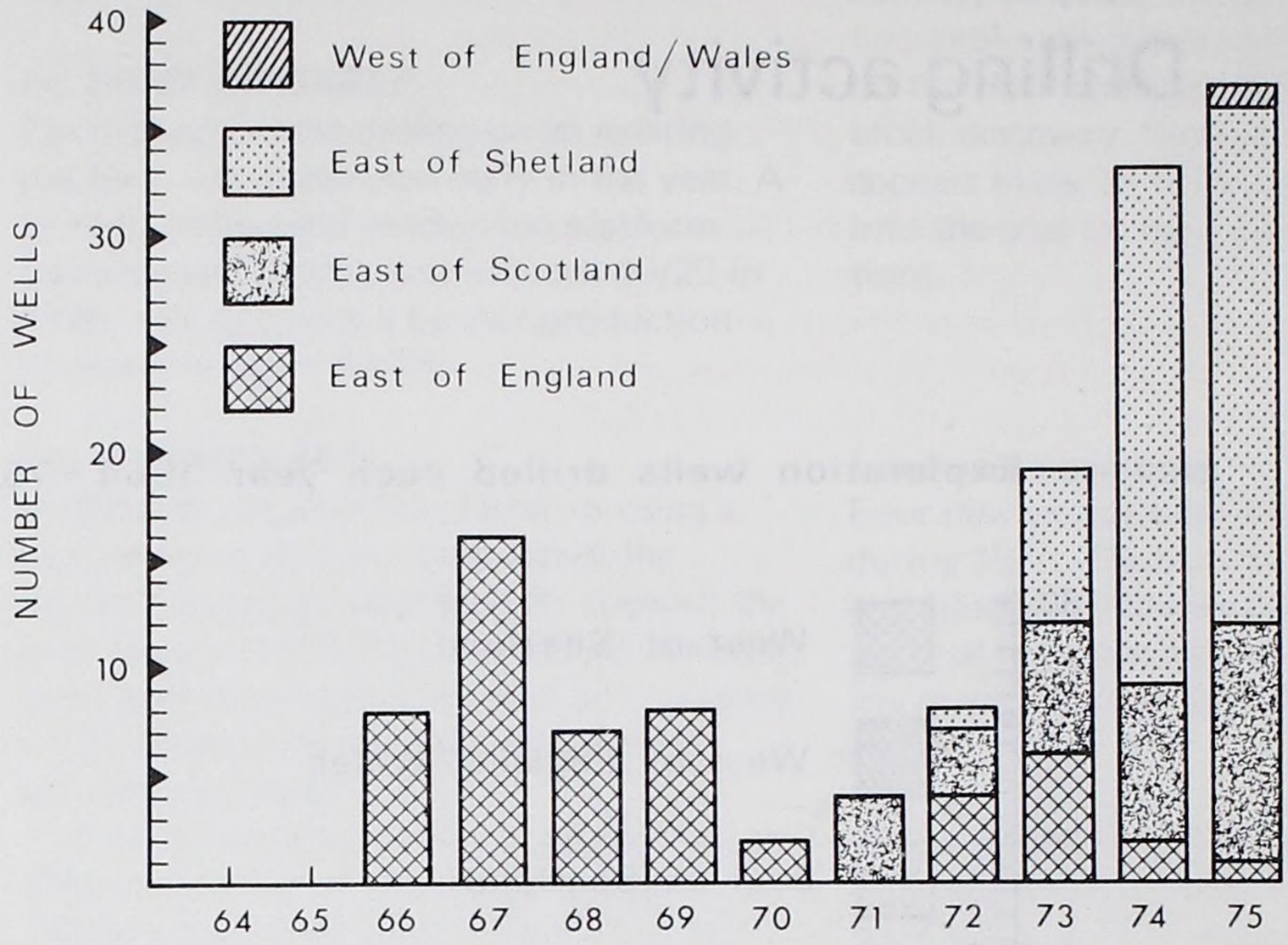
More than 100,000 tonnes of oil was produced from United Kingdom landward fields in 1975, the largest annual figure since 1964. The increase is due to development drilling in the Beckingham field, further efforts to arrest the production decline on the other Midlands fields and testing of the Wytch Farm field. Production is expected to be somewhat lower in 1976.

Appendix 1
Drilling activity

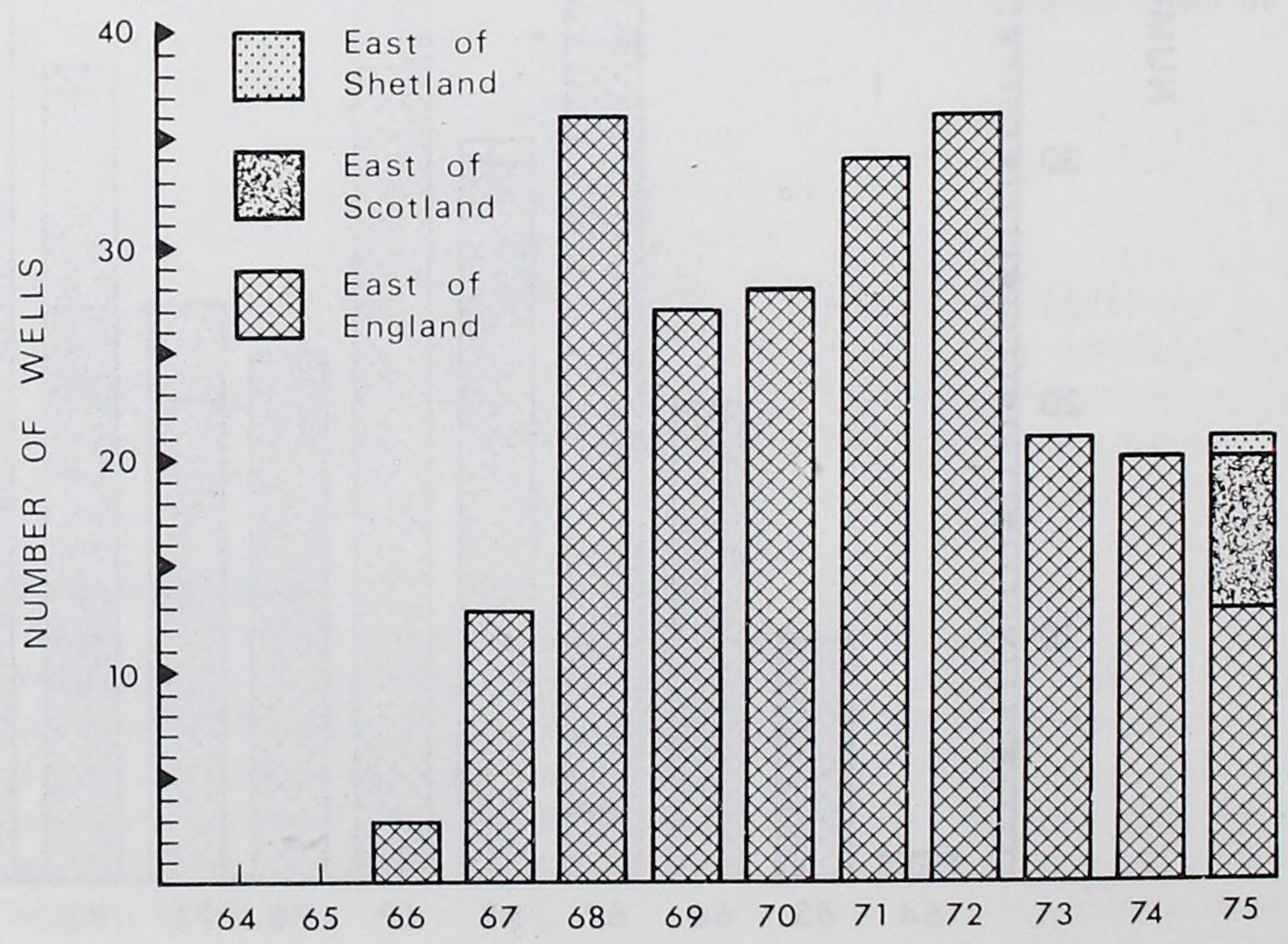
Exploration wells drilled each year 1964 - 75



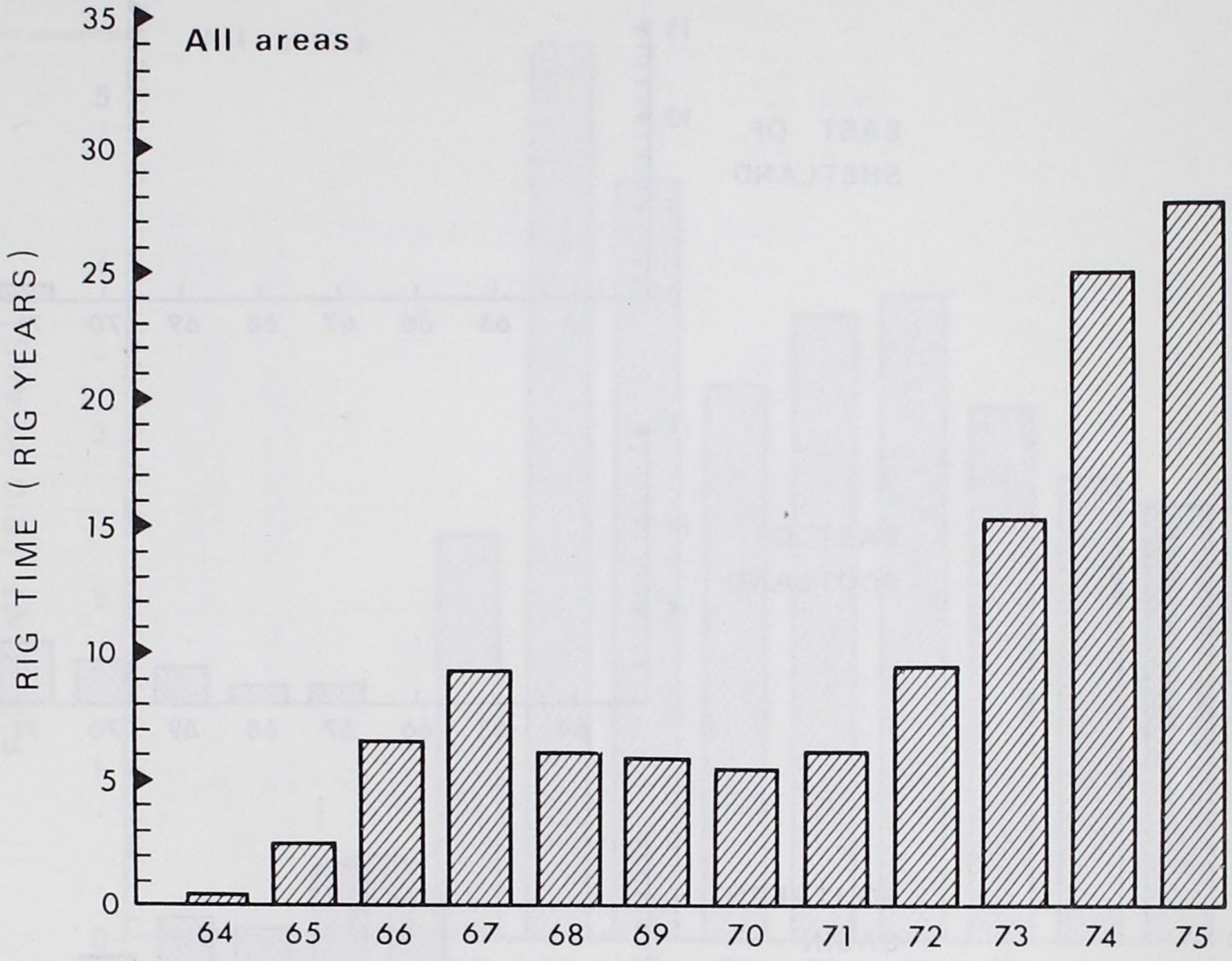
Appraisal wells drilled each year 1966 – 75



Development wells drilled each year 1966 – 75



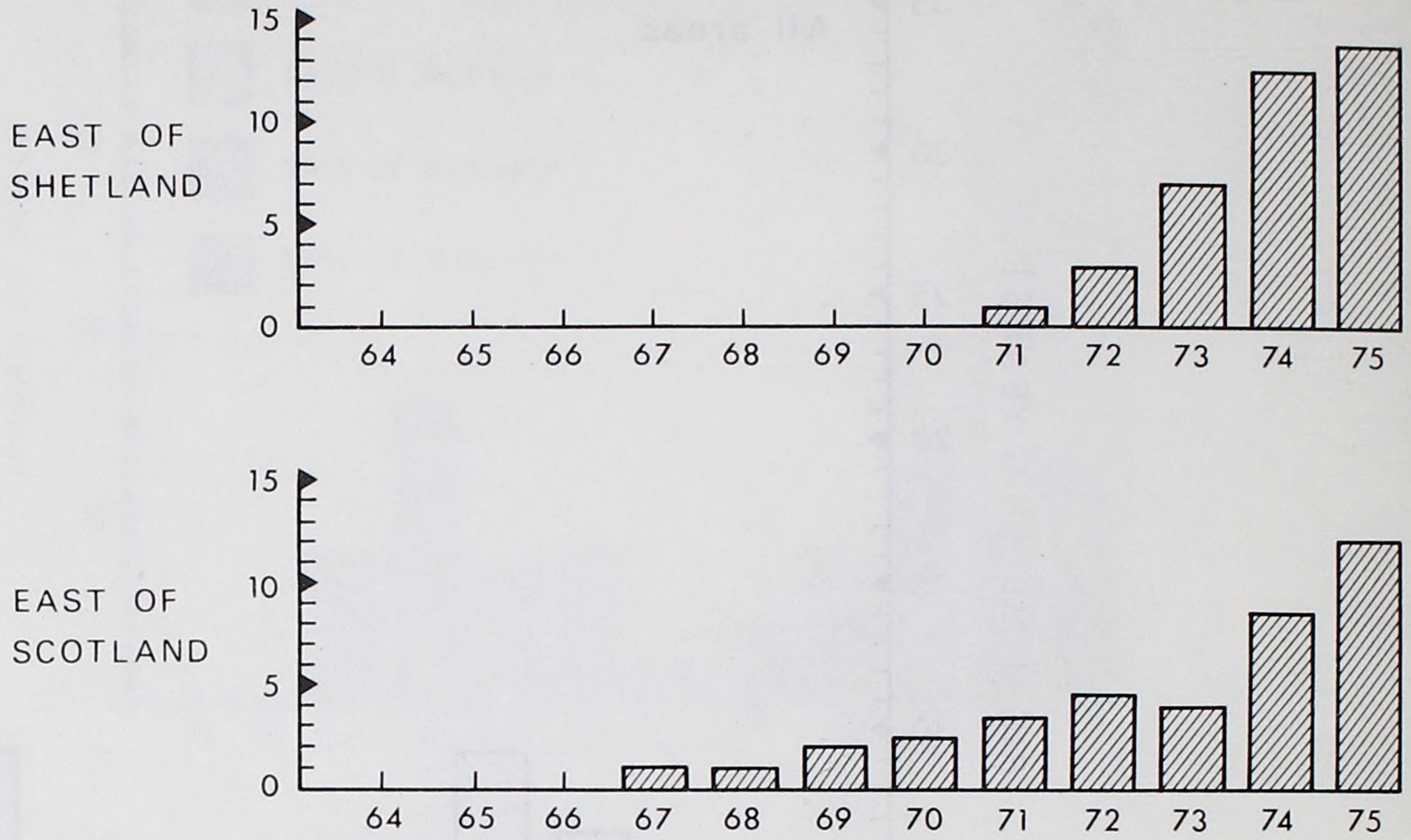
Mobile Rig Activity
Rig time spent in UK Continental Shelf



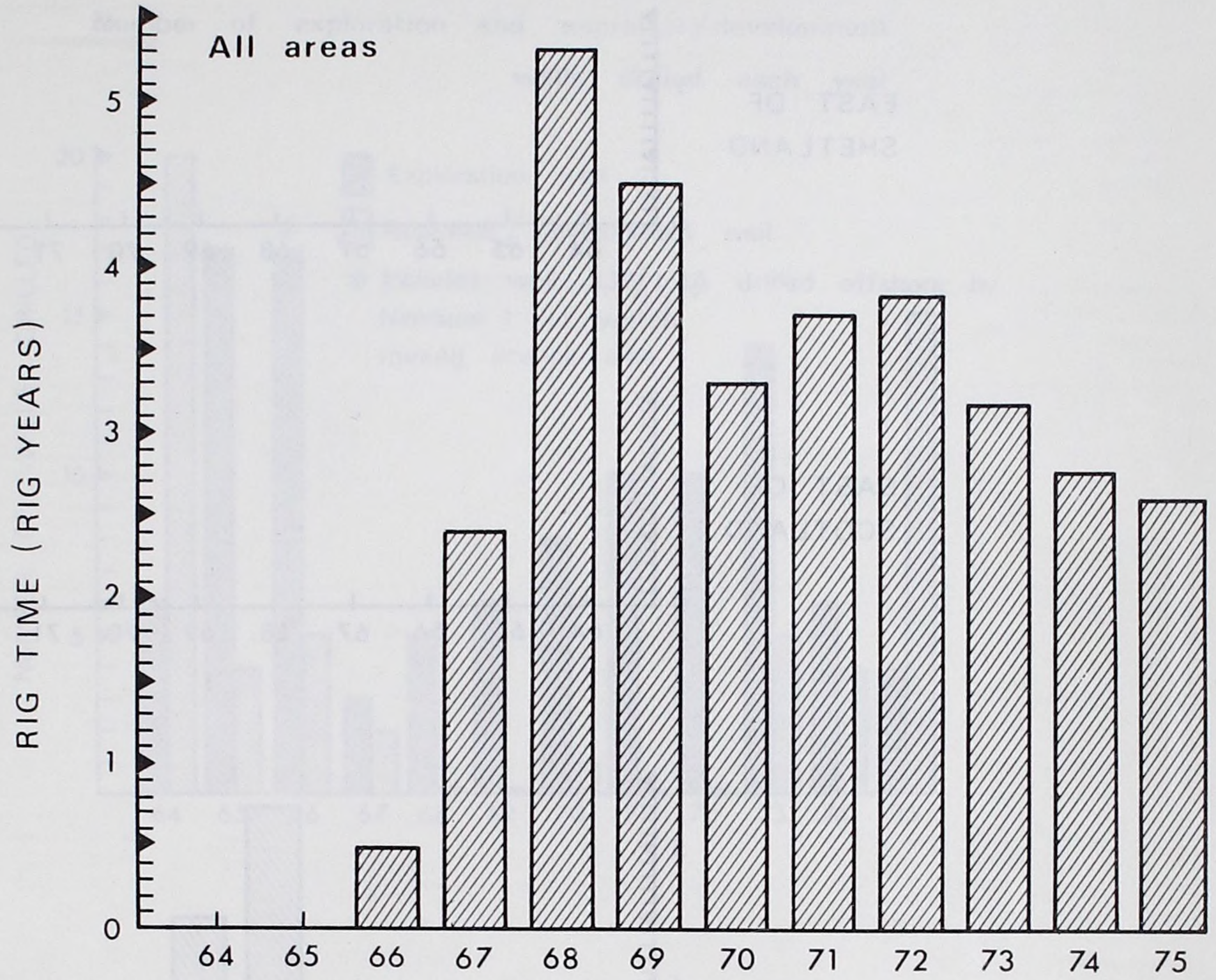
Mobile rig activity: rig time (in rig years) breakdown by geographical areas

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
East of Shetland	–	–	–	–	–	–	–	0.8	2.7	6.9	12.4	13.6
East of Scotland	–	–	–	0.8	0.8	2.1	2.2	3.2	4.1	3.8	8.2	12.0
East of England	0.02	2.6	6.4	8.0	5.2	5.3	3.1	1.2	1.9	2.5	1.7	1.6
West of Shetland	–	–	–	–	–	–	–	–	0.1	–	1.5	0.3
West of England	–	–	–	–	–	0.3	–	–	–	0.1	0.7	0.2
Total all areas	0.02	2.6	6.4	8.8	6.0	7.7	5.3	5.2	8.8	13.3	24.5	27.7

Mobile Rig Activity : (in Rig Years)
Breakdown by geographical areas



Fixed Platform Activity
Rig time spent in UK Continental Shelf

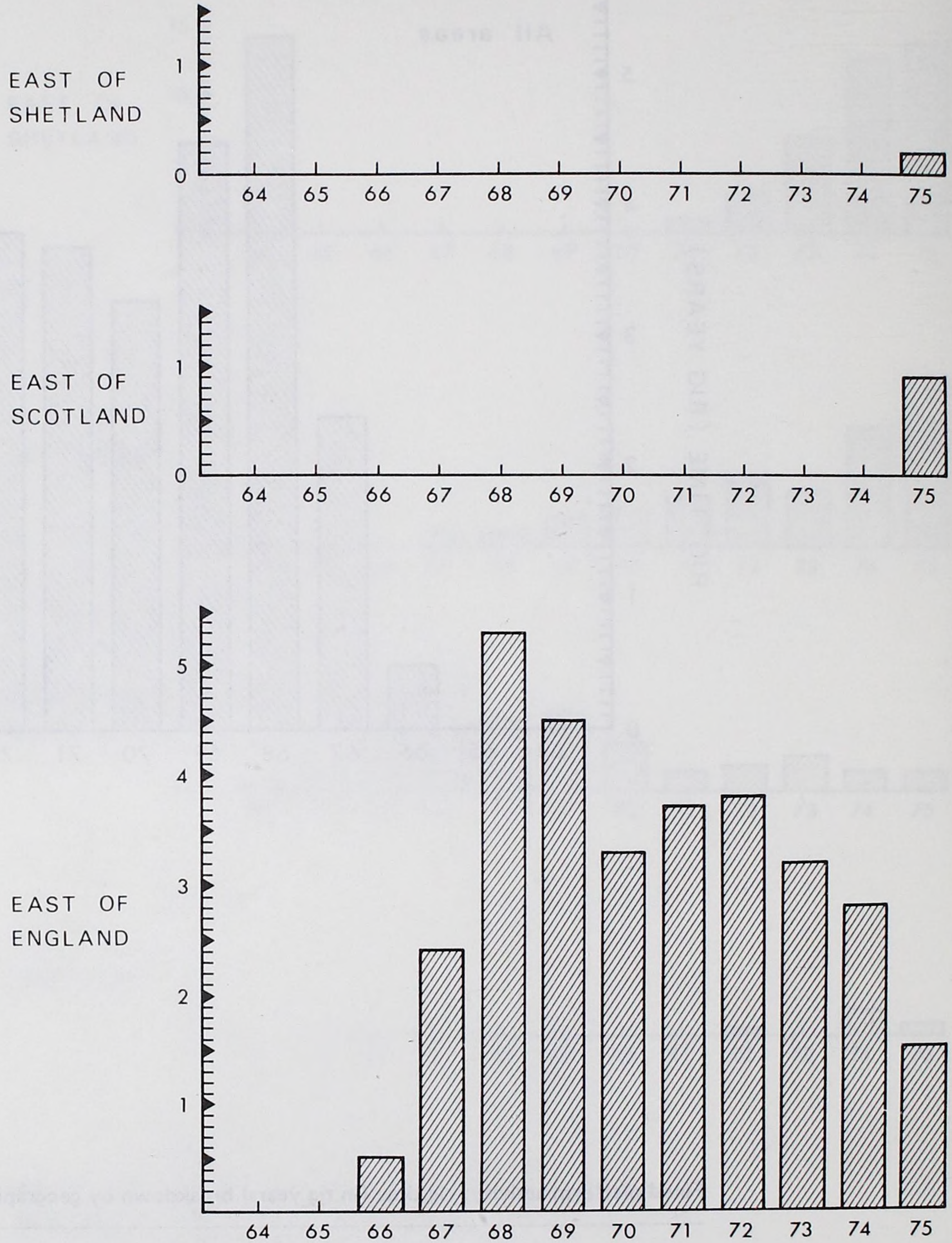


Fixed platform activity: rig time (in rig years) breakdown by geographical areas

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
East of Shetland	–	–	–	–	–	–	–	–	–	–	–	0.2
East of Scotland	–	–	–	–	–	–	–	–	–	–	–	0.9
East of England*	–	–	0.5	2.4	5.3	4.5	3.3	3.7	3.8	3.2	2.8	1.5
Total all areas	–	–	0.5	2.4	5.3	4.5	3.3	3.7	3.8	3.2	2.8	2.6

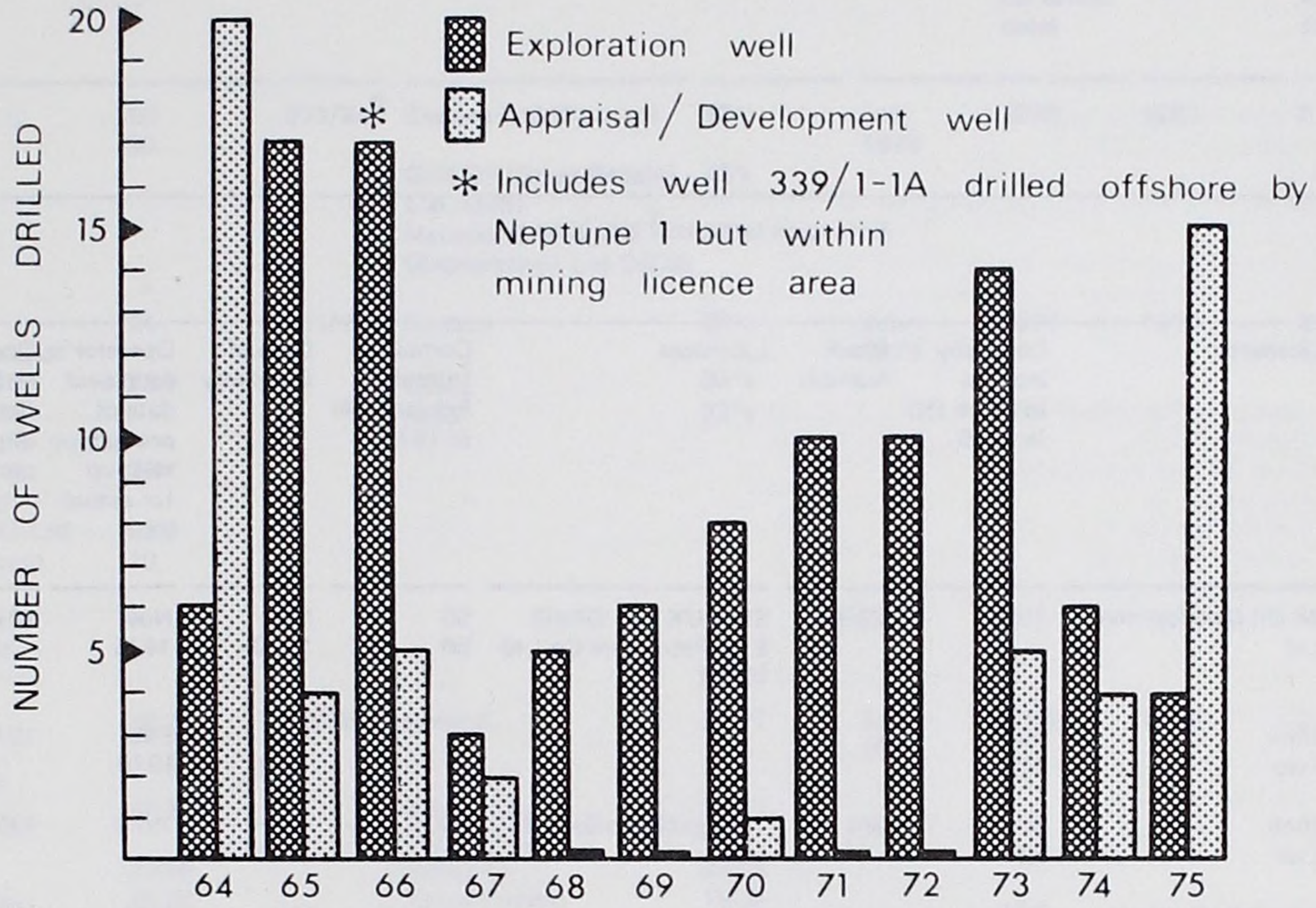
* Most of this activity was associated with the development of the Southern Basin gas fields.

Fixed Platform Activity : (in Rig Years)
Breakdown by geographical areas

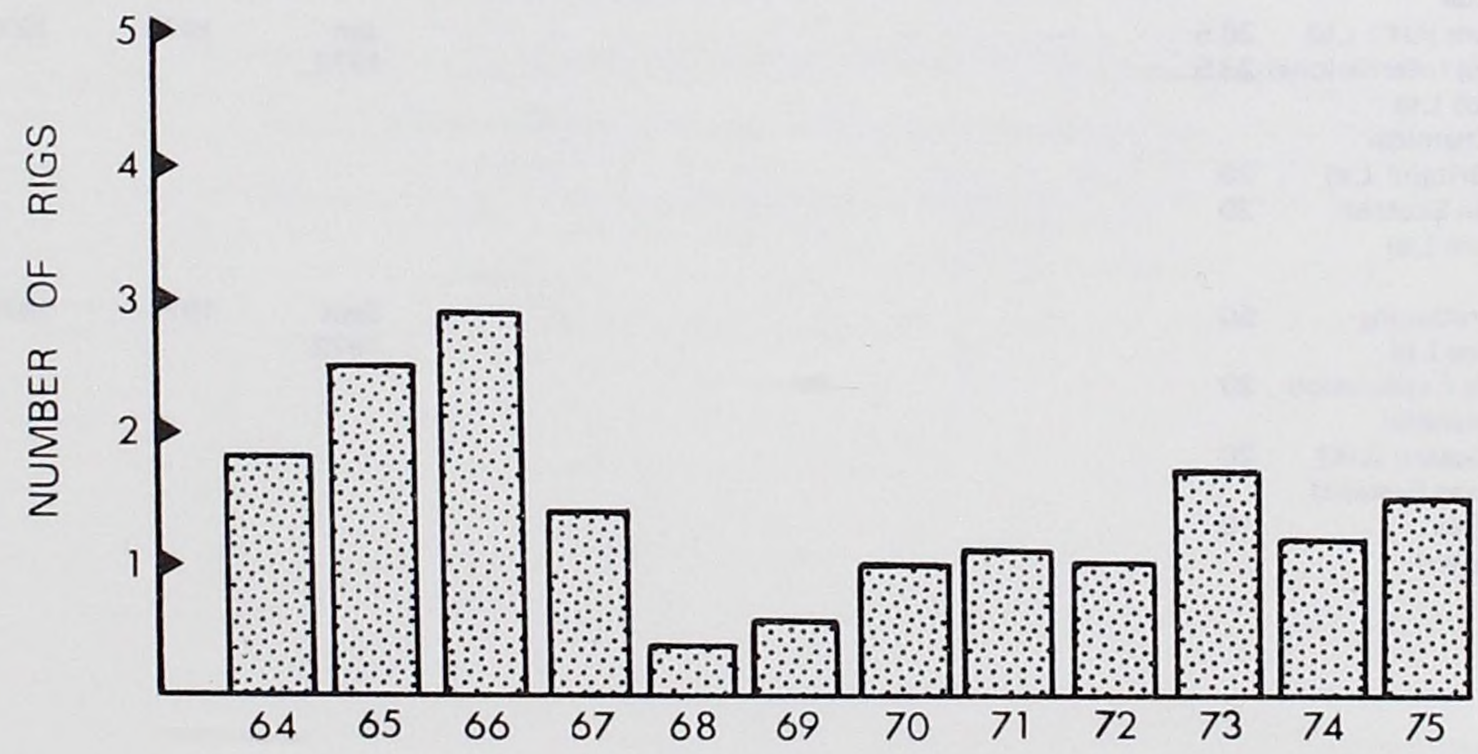


UK landward area

Number of exploration and appraisal / development wells drilled each year



Mobile rig activity in rig years



Appendix 2
Commercial oil fields

Proven Oil Fields	Main Block			Extension into other UK Blocks							
Field Name	Block Number	Licensees	Company interest in block (%) in 1975	Block Number	Licensees	Company Interest in block (%) in 1975	Date of Discovery	Operator's estimated date of production start-up (or actual date)	Operator's estimate of first year of peak production	Operator's estimated peak production (million tonnes per year)	Operator's estimate of Proven Recoverable Reserves for the field[1] (million tonnes)
Forties	21/10	BP Oil Development Ltd	100	22/6a	Shell UK Ltd (Shell) Esso Petroleum Co Ltd (Esso)	50 50	Nov 1970	Nov 1975	1977	20	240
Auk	30/16	Shell Esso	50 50				Feb 1971	Feb 1976	1977	2	7[2]
Brent	211/29	Shell Esso	50 50	3/4	Texaco North Sea UK Ltd	100	July 1971	1976	1982	22	195[2,3]
Argyll	30/24	Hamilton Brothers Oil Co (Great Britain) Ltd Hamilton Brothers Petroleum (UK) Ltd RTZ Oil and Gas Ltd Blackfriars Oil Co Ltd The Trans-European Co Ltd Texaco North Sea UK Ltd	28.8 7.2 25 12.5 2.5 24	–	–	–	Oct 1971	June 1975	1976	1.8	–[4]
Piper	15/17	Occidental Petroleum (UK) Ltd Getty Oil International (England) Ltd Allied Chemical (Great Britain) Ltd Thomson Scottish Petroleum Ltd	36.5 23.5 20 20	–	–	–	Jan 1973	1976	1979	11.9	85
Beryl	9/13	Mobil Producing North Sea Ltd Amerada Exploration Ltd (Amerada) Texas Eastern (UK) Ltd (Texas Eastern) British Gas Corporation	50 20 20 10	–	–	–	Sept 1972	1976	1977	4	70[5]

Proven Oil Fields	Main Block			Extension into other UK Blocks							
Field Name	Block Number	Licensees	Company interest in block (%) in 1975	Block Number	Licensees	Company Interest in block (%) in 1975	Date of Discovery	Operator's estimated date of production start-up (or actual date)	Operator's estimate of first year of peak production	Operator's estimated peak production (million tonnes per year)	Operator's estimate of Proven Recoverable Reserves for the field[1] (million tonnes)
Dunlin	211/23	Shell	50	211/24[6]	Conoco Ltd (Conoco)	33⅓	July 1973	1978	1982	5	58[2]
		Esso	50		Gulf Oil (Great Britain) Ltd (Gulf)	33⅓					
					National Coal Board (Exploration) Ltd (NCB)[7]	33⅓					
Thistle	211/18	Burmah Oil Development Ltd	24	211/19[6]	Conoco	33⅓	July 1973	1977	1978	8.8	50
		Deminex UK Exploration & Production Ltd	22.5		Gulf	33⅓					
		Deminex Oil & Gas (UK) Ltd	20		NCB[7]	33⅓					
		Sante Fe (UK) Ltd	22.5								
		Tricentrol North Sea Ltd	10								
		Charterhouse Securities Ltd	1								
Montrose	22/17	Amoco UK Petroleum Ltd (Amoco)	30.77	22/18	Amoco	30.77	Sept 1969	1976	1978	2.4	20
		British Gas Corporation	30.77		British Gas Corporation	30.77					
		Amerada	23.08		Amerada	23.08					
		Texas Eastern	15.38		Texas Eastern	15.38					
Ninian	3/3	Chevron Petroleum Ltd	24	3/8	BP Petroleum Development Ltd	50	Jan 1974	1978	1981	15[8]	130[8]
		Burmah Oil (North Sea) Ltd	30								
		Imperial Chemical Industries Ltd	26		Ranger Oil (UK) Ltd	20					
		Murphy Petroleum Ltd	10		Scottish Canadian Oil and Transportation Co Ltd	7					
		Ocean Exploration Co Ltd	10								
					London & Scottish Marine Oil Co Ltd	23					

Proven Oil Fields	Main Block			Extension into other UK Blocks							
Field Name	Block Number	Licensees	Company interest in block (%) in 1975	Block Number	Licensees	Company Interest in block (%) in 1975	Date of Discovery	Operator's estimated date of production start-up (or actual date)	Operator's estimate of first year of peak production	Operator's estimated peak production (million tonnes per year)	Operator's estimate of Proven Recoverable Reserves for the field [1] (million tonnes)
Heather	2/5	Unocal Exploration & Production Co (UK) Ltd	31.25	—	—	—	Dec 1973	1978	1980	2.5	20
		Skelly Oil Exploration (UK) Ltd	31.25								
		Tenneco Great Britain	31.25								
		The Norwegian Oil Co	6.25								
		DNO (UK) Ltd									
Claymore	14/19	Occidental Petroleum (Caledonia) Ltd	36.5	—	—	—	May 1974	1977	1979	8.5	50
		Getty Oil International (England) Ltd	23.5								
		Allied Chemical (Great Britain) Ltd	20.0								
		Thomson Scottish Petroleum Ltd	20.0								
Cormorant	211/26	Shell	50	211/21	Shell	50	Sept 1972	1978[9]	1981[9]	2[9]	22[2,9]
		Esso	50		Esso	50					
UK Statfjord	211/24[6]	Conoco	33 1/3	211/25[6]	Conoco	33 1/3	April 1974	1978	1987	4.5	—[10]
		Gulf	33 1/3		Gulf	33 1/3					
		NCB[7]	33 1/3		NCB[7]	33 1/3					

Approximate Conversion factors 1 m barrels per day = 50 m tonnes per year 1 tonne = 7.4 barrels

Notes

1 The reserves figures quoted may not be precisely comparable with each other and with other figures quoted in this report since differences exist in the procedures and assumptions adopted by different companies and by the Department of Energy.

2 Total discounted reserves, that is, proven plus suitable discounted figures for probable and possible reserves.

3 Black oil only ie excluding condensate.

4 Currently under re-assessment.

5 Proved plus prospective.

6 In February 1976 BNOC obtained an increased interest (to 51%) in this block as a result of majority State participation agreements entered into with Gulf and Conoco.

7 The shareholding of National Coal Board (Exploration) Limited was acquired by BNOC under Section 13 of the Petroleum and Submarine Pipelines Act 1975 on 1 January 1976.

8 Based on the proven and probable recoverable reserves from the smaller of two possible development programmes.

9 These figures refer to production from block 211/26.

10 The full extent to which this field lies within the UK sector has not yet been determined and hence it is not possible to give an estimate of the reserves.

Appendix 3
Other significant oil discoveries announced by the end of 1975

Field name	Block number	Discovered by	Date discovered
Maureen	16/29	Phillips Group	February 1973
—	3/15	Total Group	July 1973
Hutton	211/28	Conoco/NCB/Gulf Group	September 1973
Alwyn	3/14A	Total Group	November 1973
Magnus	211/12	BP	June 1974
Andrew	16/28	BP	June 1974
—	9/13	Mobil Group	June 1974
Buchan	21/1	Transworld Group	August 1974
—	15/23	Texaco	October 1974
—	3/11	Amoco Group	December 1974
—	2/5	Union Oil Group	December 1974
—	15/16	Texaco	December 1974
—	14/20	Texaco	February 1975
Statfjord	211/24	Conoco/NCB/Gulf Group	February 1975
—	9/12	Union Oil Group	February 1975
Crawford	9/28	Hamilton Group	February 1975
—	3/4	Texaco	March 1975
Tern	210/25	Shell/Esso Group	April 1975
—	2/10	Siebens Group	April 1975
Brae	16/7	Pan Ocean Group	April 1975
—	211/27	Amoco Group	April 1975
Beryl North	9/13	Mobil Group	May 1975
—	21/2	Zapata Group	June 1975
—	3/2	Conoco/NCB/Gulf Group	June 1975
—	16/21	Sun Oil Group	August 1975
—	3/4	Texaco	August 1975
—	16/7	Pan Ocean Group	August 1975
Murchison	211/19	Conoco/NCB/Gulf Group	September 1975
—	211/18	Burmah Group	September 1975
—	15/13	BP Group	October 1975
—	3/9	Total Group	October 1975
—	15/21	Monsanto Group	October 1975

Appendix 4
Commercial gas fields

Proven Gas Fields	Main Block			Extension into other UK Blocks				
Field Name	Block number	Licensees	Company interest in block (%)	Block number	Licensees	Company interest in block (%)	Date discovered	Date of production start-up
West Sole	48/6	BP Petroleum Development Ltd	100	–	–	–	October 1965	March 1967
Leman Bank	49/26	Shell UK Ltd (Shell)	50	49/27	Amoco UK Petroleum Ltd (Amoco)	30.77	April 1966	August 1968
		Esso Petroleum Co Ltd (Esso)	50		British Gas Corporation	30.77		
					Amerada Exploration Ltd (Amerada)	23.08		
					Texas Eastern (UK) Ltd (Texas Eastern)	15.38		
				49/28	Arpet Petroeum Ltd (Arpet)	33⅓		
					British Sun Oil Co Ltd	23⅓		
					North Sea Exploitation and Research Co Ltd	10		
					Superior Oil (UK) Ltd	20		
					Canadian Superior Oil (UK) Ltd	3⅓		
					Sinclair (UK) Oil Co Ltd	10		
				53/2	Mobil Producing North Sea Ltd	100		
Indefatigable	49/18	Amoco	30.77	49/23	Amoco	30.77	June 1966	October 1971
		British Gas Corporation	30.77		British Gas Corporation	30.77		
		Amerada	23.08		Amerada	23.08		
		Texas Eastern	15.38		Texas Eastern	15.38		
				49/19	Shell	50		
					Esso	50		
				49/24	Shell	50		
					Esso	50		

Proven Gas Fields	Main Block			Extension into other UK Blocks				
Field Name	Block number	Licensees	Company interest in block (%)	Block number	Licensees	Company interest in block (%)	Date discovered	Date of production start-up
Hewett	48/29	Arpet	33⅓	48/30	Phillips Petroleum Exploration UK Ltd	35	October 1966	July 1969
		British Sun Oil Ltd	23⅓					
		North Sea Exploitation and Research Co Ltd	10		Fina Exploration Ltd	30		
					AGIP (UK) Ltd	15		
					Century Power and Light Ltd	7.22		
		Superior Oil (UK) Ltd	20					
		Canadian Superior Oil (UK) Ltd	3⅓		Plascom (1909) Ltd	4.26		
					Halkyn District United Mines Ltd	4.26		
		Sinclair (UK) Oil Co Ltd	10		Oil Exploration Ltd	4.26		
				52/5a	Phillips group as above			
Viking	49/17	Conoco Ltd (Conoco)	50	49/12a	Conoco	50	May 1968	July 1972
		National Coal Board (Exploration) Ltd (NCB)	50		NCB	50		
Rough	47/8 *	Amoco	13.68	47/3a	Amoco	30.77	May 1968	October 1975
		British Gas Corporation	69.23		British Gas Corporation	30.77		
		Amerada	10.26		Amerada	23.08		
		Texas Eastern	6.83		Texas Eastern	15.38		
Frigg (UK)	10/1	Total Oil Marine Ltd	33⅓	—	—	—	May 1972	1977 (planned)
		Aquitaine Oil (UK) Ltd	22²⁹					
		Elf Oil Exploration and Production (UK) Ltd	44⁴⁹					

* Discovered by Gulf Oil (Great Britain) Ltd but licence now assigned to Amoco group

Appendix 5
Natural gas production

	1967	1968	1969	1970	1971	1972	1973	1974	1975	Cumulative total to end 1975
West Sole Field										
$M^3 \times 10^7$	0.5	130	159	119	188	231	192	185	185	1392
Oil equivalent m. tonnes	–	1.11	1.35	1.02	1.60	1.96	1.63	1.57	1.57	11.81
Leman Bank Field										
$M^3 \times 10^7$	–	75	300	808	1317	1361	1360	1619	1562	8403
Oil equivalent m. tonnes	–	0.64	2.54	6.85	11.17	11.51	11.53	13.73	13.24	71.21
Hewett Field										
$M^3 \times 10^7$	–	–	55	199	344	527	581	713	773	3193
Oil equivalent m. tonnes	–	–	0.47	1.69	2.91	4.46	4.93	6.05	6.55	27.06
Indefatigable Field										
$M^3 \times 10^7$	–	–	–	–	18	460	466	569	640	2154
Oil equivalent m. tonnes	–	–	–	–	0.15	3.90	3.95	4.83	5.43	18.26
Viking Field										
$M^3 \times 10^7$	–	–	–	–	–	139	359	485	561	1544
Oil equivalent m. tonnes	–	–	–	–	–	1.18	3.04	4.11	4.76	13.09
Rough Field										
$M^3 \times 10^7$	–	–	–	–	–	–	–	–	1	1
Oil equivalent m. tonnes	–	–	–	–	–	–	–	–	–	–
Totals										
$M^3 \times 10^7$	0.5	205	514	1127	1867	2718	2959	3573	3723	16688
Oil equivalent m. tonnes	–	1.75	4.36	9.55	15.83	23.04	25.08	30.29	31.55	141.45

1 M^3 = 35.31 cubic feet
1 tonne = 1170 M^3

Appendix 6
Other significant gas and gas condensate discoveries announced

Field name	Block number	Discovered by	Date discovered
Dotty*	48/30	Phillips group	May 1967
—	53/4a	Signal group	July 1967
—	48/21a	Placid Oil (GB) Ltd	August 1967
Deborah*	48/30	Phillips group	August 1968
—	49/28	Arpet group	March 1969
Sean	49/25a	Allied Chemical group	April 1969
—	49/28	Arpet group	May 1969
—	41/24a	Total group	June 1969
—	43/20a	Hamilton group	June 1969
—	43/8a	Whitehall/Hamilton group	January 1970
—	47/13a	Tricentrol/Conoco/NCB group	April 1970
Viking Area	49/21	Signal/Conoco group	July 1970
Viking Area	49/16	Conoco/NCB group	January 1971
—	30/2 (gas condensate)	Burmah/Hamilton Group	June 1971
—	48/18b	Ranger/Sea Search group	April 1972
Lomond	23/21 (gas condensate)	Amoco group	May 1972
—	49/22	Mobil/Conoco/NCB group	May 1972
Amethyst	47/14a	Burmah group	October 1972
—	3/19	Total group	July 1973
Bruce	9/8 (gas condensate)	Hamilton group	July 1974
—	211/13 (gas condensate)	Shell/Esso	July 1974
—	3/25	Total Group	July 1974
—	110/2	Hydrocarbons (GB) Ltd	September 1974
—	15/30 (gas condensate)	Conoco/NCB/Gulf group	September 1975
—	21/2 (gas condensate)	Zapata Group	December 1975
—	48/12	Transocean Group	December 1975

* Gas supplies from these discoveries are included in the contract for the sale of gas from the Hewett Field.

Appendix 7
Oil production platforms

Field	Operator		Platform contractor	Site	Platform type	Installation date
Platforms installed						
Argyll	Hamilton		Converted by Wilson Walton	Teesside	Converted Drilling rig	March 1975
Auk	Shell		Redpath Dorman Long	Methill	Steel	July 1974
Beryl	Mobil		Hoyer/Ellefson/Aker/ Selmer	Stavanger Norway	Concrete	July 1975
Brent	Shell	B	Hoyer/Ellefson/Aker Selmer	Stavanger Norway	Concrete	August 1975
Forties	BP	I	Laing Offshore	Teesside	Steel	June 1974
		II	Highland Fabricators	Nigg Bay	Steel	August 1974
		III	Highland Fabricators	Nigg Bay	Steel	June 1975
		IV	Laing Offshore	Teesside	Steel	June 1975
Montrose	Amoco		Union Industrielle et D'Enterprise	Le Havre France	Steel	August 1975
Piper	Occidental		McDermott Union Industrielle et D'Enterprise	Ardersier Le Havre France	Steel	June 1975

						Platform delivery date
Platforms under construction						
Brent	Shell	A	Redpath Dorman Long	Methil	Steel	1976
		C	McAlpine	Ardyne Point	Concrete	1977
		D	Hoyer/Ellefson/Aker/ Selmer	Stavanger Norway	Concrete	1976
Claymore	Occidental		Union Industrielle et D'Enterprise	Le Havre France	Steel	1976
Cormorant	Shell		McAlpine	Ardyne Point	Concrete	1977
Dunlin	Shell		Andoc	Rotterdam Holland	Concrete	1977
Heather	Unocal		McDermott	Ardersier	Steel	1977
Ninian	Chevron	I	Howard/Doris	Loch Kishorn	Concrete	1977
		II	Highland Fabricators	Nigg Bay	Steel	1977
Thistle	Burmah		Laing Offshore	Teesside	Steel	1976

Appendix 8

Accident and employment statistics for offshore installations and attendant vessels

Year	Mobile drilling activity (Rig years)	Fixed platform drilling activity	Production platforms	Estimated numbers of men employed on installations	Number of fatal accidents		Number of serious accidents	
					Installations	Vessels	Installations	Vessels
1965	2.6	–	–	260	14	–	9	–
1966	6.4	0.5	–	690	1	–	15	–
1967	8.8	2.4	–	1120	1	–	18	–
1968	6.0	5.3	1	1210	3	5	21	–
1969	7.7	4.5	4	1450	2	1	19	–
1970	5.3	3.3	9	1150	1	–	12	–
1971	5.2	3.7	11	1260	4	–	15	2
1972	8.8	3.8	16	1850	3	–	17	–
1973	13.3	3.2	19	2430	2	1	22	–
1974	24.5	2.8	23	4030	9	3	19	6
1975	27.7	2.6	29	6300	9	1	46	4

Notes:
1 The figures for the years 1965–1974 are in categories corresponding to those in S1 No 1842 1973, the Offshore Installations (Inspectors and Casualties) Regulations 1973.
2 Appendix 14 of the 1975 Brown Book did not include figures for accidents involving ancillary vessels for the years before 1970. The relevent figures are now included. In addition one diving fatality in 1966 has been added to that year's figures.
3 Casualties associated with work on and from pipe-laying barges are not included, as such vessels are outside the scope of the Mineral Workings (Offshore Installations) Act. In addition during 1975 two diving fatalities occurred during pipe-laying operations inside UK territorial waters and a further diver died from natural causes while diving from an installation.
4 Exact figures for the numbers of persons employed are not available. The estimates given are based on the average number employed on each of the different types of operational installations, on the basis of an average of a 42 hours week worked, and industry advice on construction activity.

Fatal and serious accidents by activity

	Fatal accidents											Serious accidents											Dangerous occurrences	
	65	66	67	68	69	70	71	72	73	74	75	65	66	67	68	69	70	71	72	73	74	75	74	75
Construction											2				1			1				5		5
Drilling	14$			2			2	2		5	2	6$	11	11	10	10	4	5	7	10	13	26	8	5
Production																		2			1	2		4
Maintenance					1		1							1	1		1		2	1	3	6	4	
Diving		1*					1	1	1	3	3†		1		2	2		1	1	1			2	3
Helicopters																								2
Boats				5*	1*				1	3	1							2			2	4	10	7
Cranes			1	1	1	1			1	1	2	2	2			6	3	2	5	5	6	7	10	25
Domestic																							2	2
Unallocated†												1	1	6	7	1	4	4	2	5				
Total	14	1	1	8	3	1	4	3	3	12	10	9	15	18	21	19	12	17	17	22	25	50	36	53

$ Sea Gem accounts for 13 of the 1965 fatal accidents, and 6 serious accidents.
* See note 2 to previous table; not previously recorded.
† One further diver died from natural causes while diving from an offshore installation.
† 1965–1974 had an allocated group to Slips, Falls, etc., unassociated with working operations. The one fatal accident in 1968 and the five 1974 serious accidents have been reclassified, the others left in this grouping.

Appendix 9
Major North Sea pipelines

Major North Sea Pipelines from – to	Length (miles)	Diameter (inches)	Material conveyed	Operator	Year commissioned	Remarks
(a) *Operating*						
West Sole–Easington	42	16	Natural Gas	BP	1967	
Leman Bank–Bacton	35	30	Natural Gas	Shell/Esso	1968	
Hewett–Bacton	20½	30	Natural Gas	Phillips/Arpet	1969	
Leman Bank–Bacton	38	30	Natural Gas	Amoco	1969	
Leman Bank–Bacton	40	30	Natural Gas	Amoco-Shell/Esso	1970	Joint line
Leman Bank–Leman Bank	5	30	Natural Gas	Amoco-Shell/Esso	1970	Joint link line
Indefatigable–Leman Bank	25	30	Natural Gas	Amoco-Shell/Esso	1971	Joint line
Viking–Mablethorpe	86	28	Natural Gas	Conoco	1972	
Hewett–Bacton	20½	30	Natural Gas	Phillips/Arpet	1973	
Leman Bank–Bacton	36	30	Natural Gas	Amoco-Shell/Esso	1973	
Rough–Easington	18	16	Natural Gas	Amoco	1975	
Ekofisk–Teesside	220	34	Crude Oil	Phillips	1975	Originates in Norwegian waters
Forties–Cruden Bay	111	32	Crude Oil	BP	1975	
(b) *Under construction*						
Piper–Flotta	124	30	Crude Oil	Occidental		
Frigg–St. Fergus No. 1 Frigg–St. Fergus No. 2	225	32	Natural Gas	Total Oil Marine		
Cormorant–Sullom Voe (Brent System)	93	36	Crude Oil	Shell/Esso		Will serve Brent and other fields
Ninian–Sullom Voe	105	36	Crude Oil	BP		
Claymore–Pipeline (tie-in)	8	30	Crude Oil	Occidental		
Piper-Claymore	19	16	Associated gas	Occidental		

Appendix 10
Licensing rounds

Offshore production and exploration licences are issued under the Petroleum (Production) Act 1934, as extended offshore by the Continental Shelf Act 1964. To date there have been four rounds of production licensing in 1964, 1965, 1970 and 1971/1972. Details of each round are given below.

Petroleum production licensing – round by round

Round	Area under offer	No of blocks on offer	No of applications	No of companies in consortia	No of blocks applied for	Licences		
						No of blocks	No awarded	No of companies
First (1964)	North Sea	960	31	61	394	348	53	51
Second (1965)	North Sea Irish Sea English Channel	1102	21	54	127	127	37	44
Third (1970)	North Sea Irish Sea Orkney/ Shetland Basin	157	34	54	117	106	37	61
Fourth (1971/ 1972)	North Sea Irish Sea Celtic Sea Orkney/ Shetland Basin	421 for Discretionary award; 15 for tender bid	92 31	228 73	271 15	282	118	213

Appendix 11
Summary of Petroleum and Submarine Pipelines Act 1975

The following summary is a guide to the main provisions of the Act. It does not, however, purport to constitute a legal interpretation of any of them.

The Act received Royal Assent on 12 November 1975 and came into force on 1 January 1976. It is in five main sections.

Part I and Schedule 1 provide for the establishment of the British National Oil Corporation (BNOC) and give it wide powers, including power to:

(i) explore for and produce petroleum;
(ii) transport and refine petroleum;
(iii) store, distribute and buy and sell petroleum and products;
(iv) take over the Government's participation interest in United Kingdom licences;
(v) carry out consultancy, research and training in petroleum matters;
(vi) build, hire or operate refineries, pipelines and tankers.

But certain activities (eg exploration and production abroad, "downstream" activities such as refining and trading in products, setting up or acquiring subsidiaries, giving loans and guarantees) can be carried out only with the consent of the Secretary of State. The BNOC is also required to notify the Secretary of State before it embarks on any new activity or a substantial expansion of an existing activity.

Under the Act, the Secretary of State may give the BNOC general or specific directions, request it to perform duties of a financial nature and, with the approval of the Treasury, may make loans to the Corporation. The BNOC must keep proper accounts and records and prepare statements of accounts as required by the Secretary of State. The Act makes provision for the transfer to the Corporation of the shares of NCB (Exploration) Ltd and for the co-ordination of the activities of the BNOC with those of the British Gas Corporation and their subsidiaries.

The Board of the BNOC is required by the Act to consist of between 8 and 20 members appointed by the Secretary of State and to include two members of the Civil Service.

Part II and Schedules 2 and 3 provide for changes to the model clauses incorporated in petroleum production licences. The changes provide for the exercise by the Secretary of State of additional controls over exploration, development and the rate of production of petroleum on the Continental Shelf and require a wider range of information to be furnished by licensees. They also provide for the exercise of control by the Secretary of State over changes in the ownership of licences and enable him to require the payment of royalty in kind.

Part III and Schedule 4 provide for control by the Secretary of State over all aspects of the construction and operation of submarine pipe-lines and make provision for the use by third parties of both proposed and existing pipe-lines. Provision is also made for the making by the Secretary of State of regulations to ensure the safety of pipe-lines and the safety and health of people working on them.

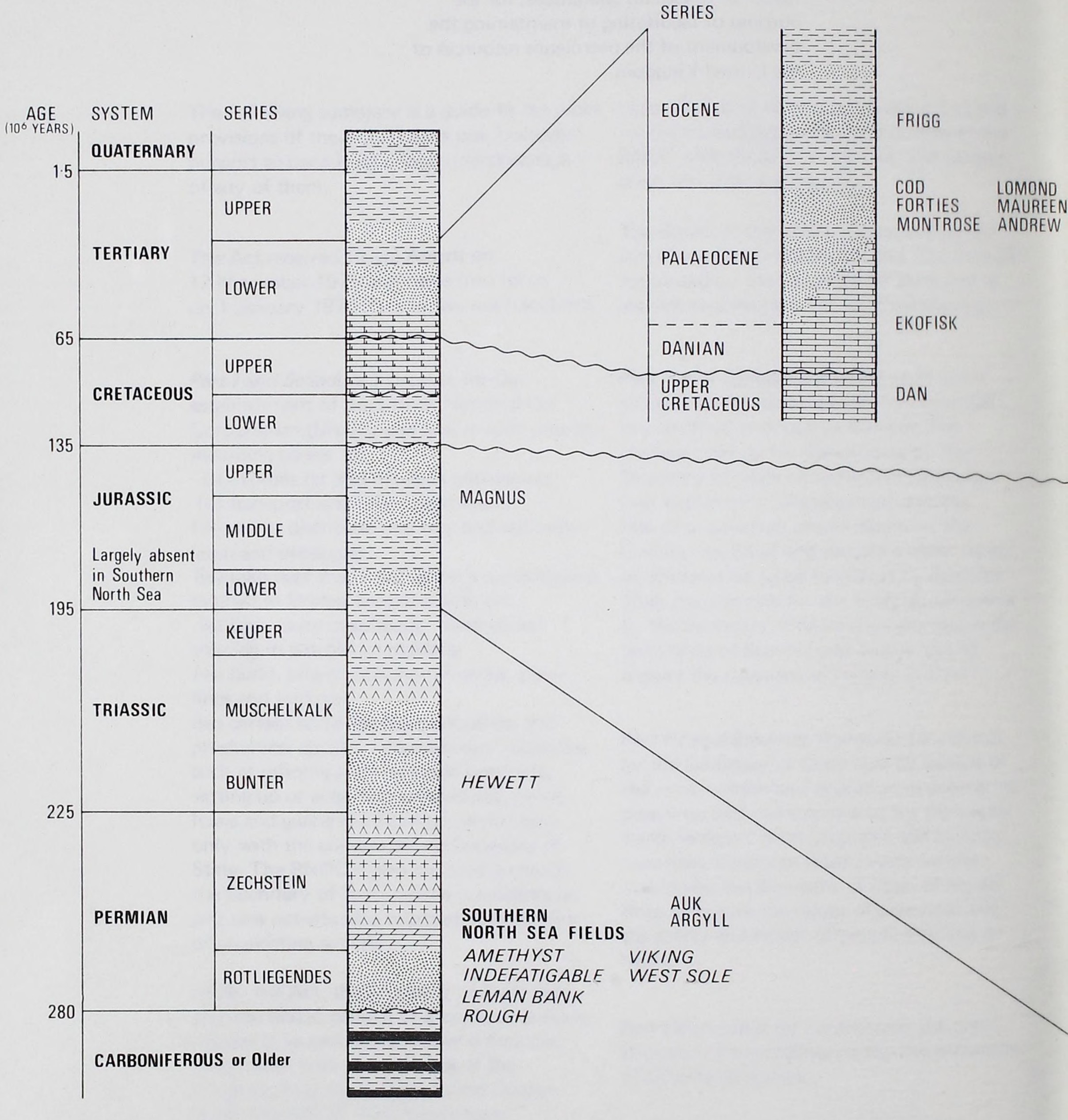
Part IV provides for control over the construction of new refineries and the expansion of existing refineries.

Part V (Miscellaneous and General) provides inter alia for the setting up of the National Oil Account which is to be subject to the control and management of the Secretary

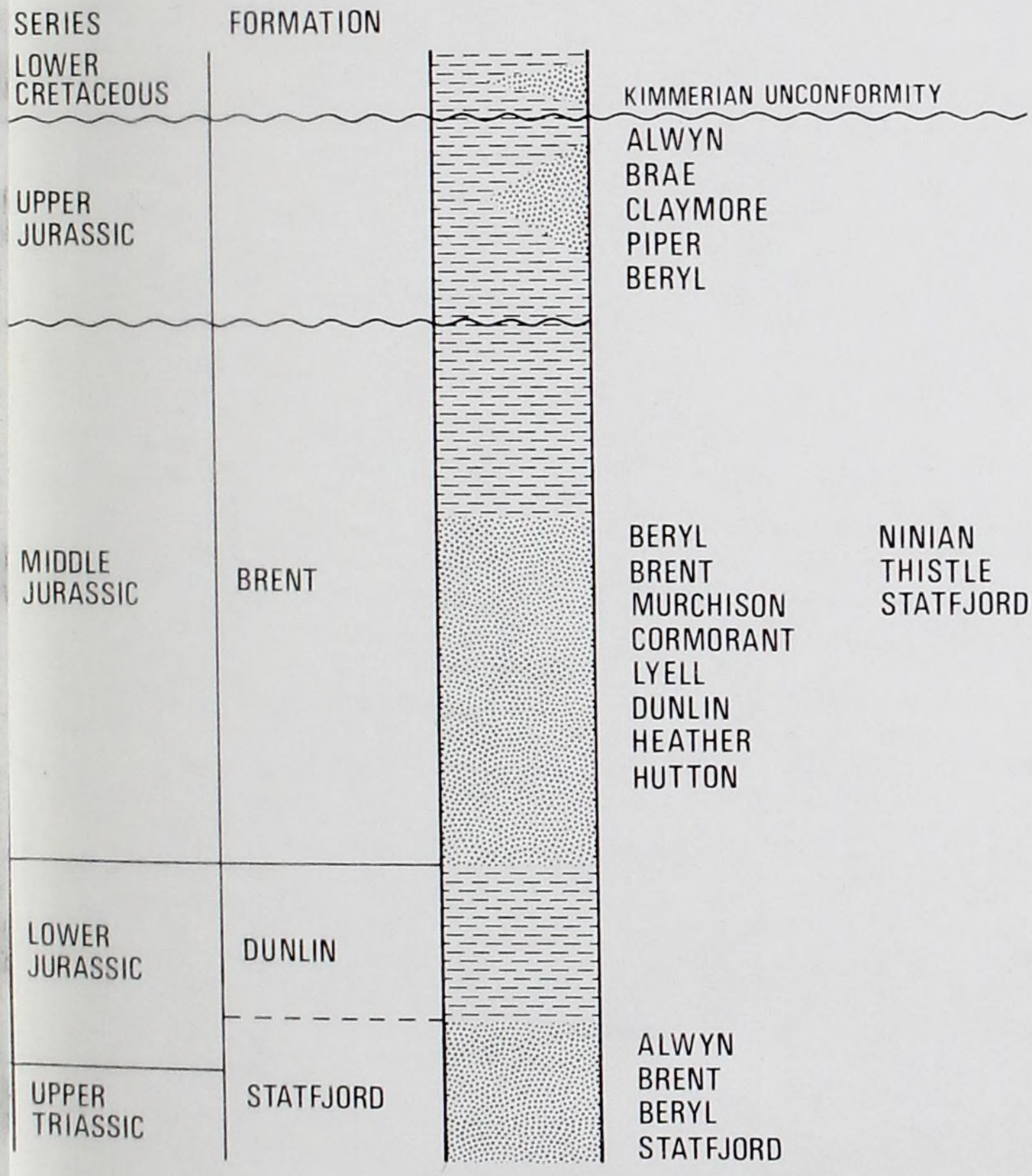
of State. The Act provides that all the BNOC's revenues are to be paid into the Account and all its costs are to be met from it. This part of the Act also gives the Secretary of State power, with the approval of the Treasury, to make loans from voted funds, or to extend guarantees, for the purpose of facilitating or maintaining the development of the petroleum resources of the United Kingdom.

Appendix 12
Generalised stratigraphy of the North Sea

SHOWING THE APPROXIMATE AGE OF RESERVOIRS



NORTHERN NORTH SEA FIELDS



Appendix 13

Location of sedimentary basins UK Continental Shelf

LOCATION OF SEDIMENTARY BASINS
UK Continental Shelf

Appendix 14
Activity map of the North Sea

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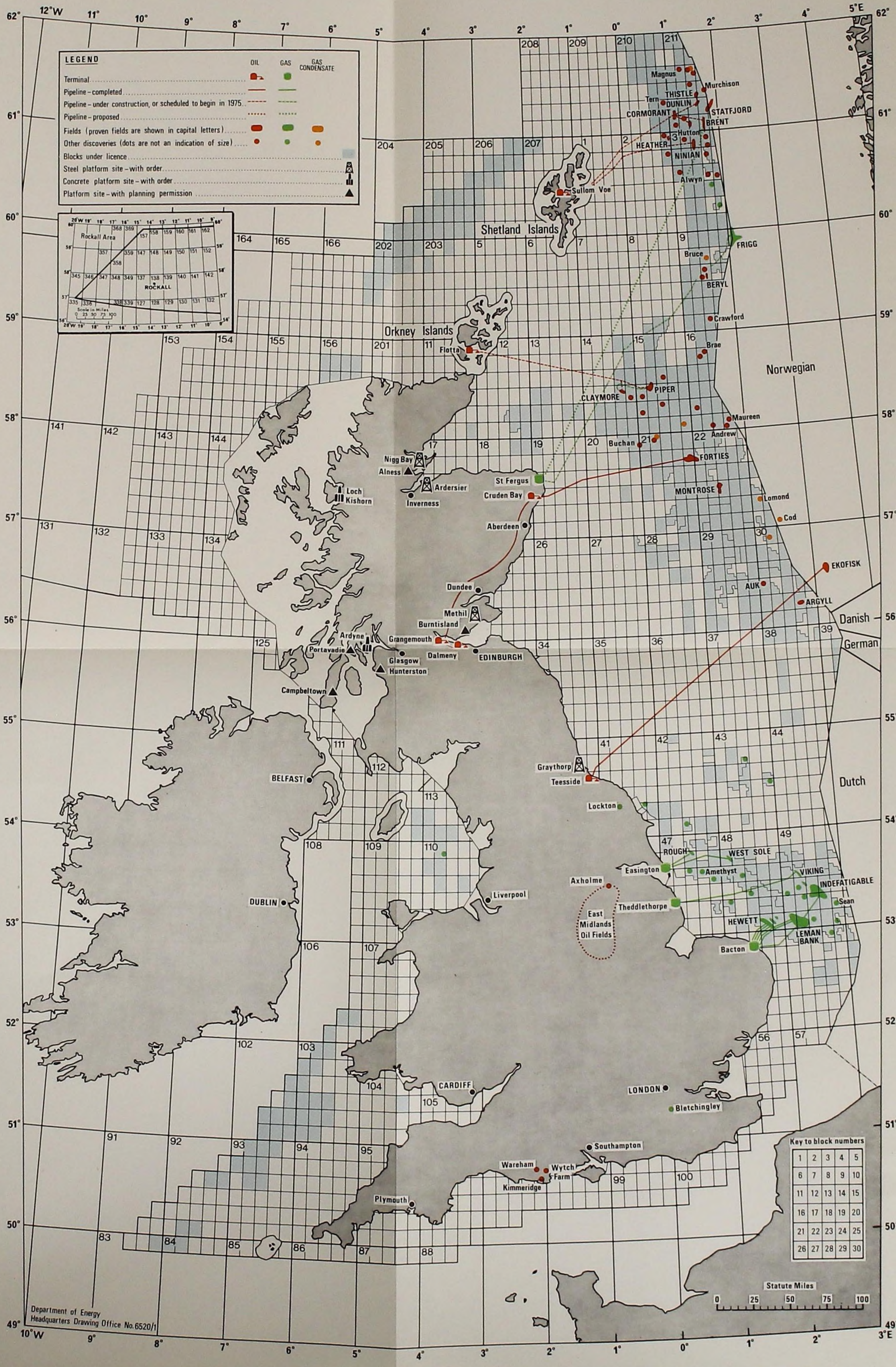
UK CONTINENTAL SHELF — SPRING 1976



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