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SECRETARY OF STATE FOR ENERGY
THAMES HOUSE SOUTH
MILLBANK LONDON SW1P 4QJ
01-211-6402

M C Scholar Esq
Private Secretary to the Prime Minister
10 Downing Street
London SW1

13 May 1983

Dear Michael,

Thank you for your letter of 3 May about CEGB procurement. The only CEGB power station at the design stage is the Sizewell 'B' PWR.

The proposed design uses the Westinghouse reactor and the design of the station as a whole follows closely that of the Standardised Nuclear Unit Power Plant Station developed in the USA by Westinghouse and Bechtel. The National Nuclear Corporation have a licence agreement with Westinghouse and they are advised by Bechtel, who have a small team of engineers located in NNC offices. However, Bechtel have no formal responsibilities for the design.

My Secretary of State's minute of 28 January reported that the CEGB would shortly need to begin placing contracts for design work. It also said he would see to it that the Government's wish to minimise the import content of the project was fully satisfied, consistent with sensible cost control, securing the transfer of technology from Westinghouse to British companies, and fair play among suppliers. The Department and the CEGB are continuing discussions on contract strategy, and Sir Walter Marshall has devoted a great deal of personal attention to this. The Prime Minister may be interested to see the attached brochure published last month by the Board and distributed to British industry, setting out the contractual opportunities. The Board expect that the total import content of the station will be less than 10% by value.

There are however two major contracts which the CEGB have decided they must place with overseas suppliers. The first concerns the "primary circuit" of the reactor which includes the pressure vessel and the reactor itself, together with the steam generators, pressuriser, and main coolant pumps. The CEGB have decided to place the main contract for this package with a single contractor. They are negotiating with Westinghouse. The Board have told Westinghouse that they wish to maximise the share of British manufacturers through sub-contracts provided that appropriate cost, delivery and quality requirements can be assured. But the CEGB badly needs to deal with one single

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Prime Minister

Lord McAlpine wrote to you (flag A) about CEGB placing design orders overseas.

This letter and another at flag B give the story.

MLS 13/5

Please also see Nick Owen's minute at flag C.

contractor on whom it can place the responsibility for co-ordination. Past experience of power station construction argues for this, and the novelty in the UK of the PWR reinforces it. Sir Walter considers that Westinghouse are well qualified to do this and to co-ordinate the contribution of UK manufacturers in a field that is new to many of them.

Second, the CEGB have decided that the contract for the pressure vessel itself should be placed through Westinghouse with Framatome. Because of the safety requirement and controversy about the integrity of the vessel, they see it as sensible to procure it from a manufacturer highly experienced in this field. Most of the other parts of the primary circuit will be open to tender from British manufacturers through Westinghouse.

No specific announcements have yet been made about the placing of contracts for Sizewell 'B' except for the turbine generators, the design contract for which has been awarded to GEC. That was made public in February. The next step is likely to be the issue of invitations to British and foreign suppliers to bid for parts of the primary circuit. We are in touch with the CEGB about this, and Mr Lawson has asked them to consult him before any further announcements are made about the award of design, manufacturing or construction contracts.

I am sending copies of this letter to Jonathan Spencer and Muir Russel.

Yours ever,

JULIAN WEST
Private Secretary

Sizewell B pwr

contract strategy

Published by:
Generation Development and Construction Division
Central Electricity Generating Board
in co-operation with
National Nuclear Corporation Limited

SIZEWELL 'B' PWR CONTRACT STRATEGY

Introduction

The Central Electricity Generating Board (CEGB) is seeking to build a 1200MW pressurised water reactor (PWR) nuclear power station in Suffolk, to be known as Sizewell B.

The CEGB's application for the consent of the Secretary of State for Energy for Sizewell 'B' is currently subject to a Public Inquiry at Snape. The Inquiry is expected to last some months and the Inspector's report will then be reviewed by the Secretary of State and Parliament.

The CEGB currently expects to be ready to start preliminary work on site in July 1984 with the first permanent concrete being placed in April 1985, but the necessary consents and site licence from the Nuclear Installation Inspectorate (NII) must, of course, be given first. The target construction programme leads to commercial operation in 1991.

It is the policy of the CEGB to 'buy British' where possible, subject to availability, satisfactory price and delivery times. It is accordingly the intention of the CEGB to give all sections of British industry the maximum opportunity to participate to the full in the Sizewell 'B' project, subject to any overriding commercial or other obligations.

This brochure has, therefore, been prepared to explain to British industry the Contract Strategy which will apply to the project. It identifies in the attached schedule the packages of work (comprising plant, works and services) for which enquiries will be issued and for which contracts will be placed given the necessary consents and licences mentioned above.

The CEGB hopes that a significant part of the work for the Sizewell 'B' project will benefit companies in the East Anglian area. It should be noted that the contracts detailed in the schedule will lead to a large number of sub-contracts, and, in addition, a wide range of goods and services necessary to support a large industrial project will be required.

The Pressurised Water Reactor

In support of its case at the Public Inquiry, the CEGB has published a considerable volume of documentation. This covers both description and detail of the design of the proposed plant and the CEGB's case for building Sizewell 'B'. Details of those documents of most interest to potential suppliers, together with details of availability, are listed in the 'General Information' section of this brochure. Particular attention is drawn to 'A Technical Outline of Sizewell 'B' – The British Pressurised Water Reactor'.

The Sizewell 'B' Project

The National Nuclear Corporation (NNC) is designing and engineering the Sizewell 'B' power station for the CEGB.

If the CEGB is successful in obtaining the consents and licences necessary to build the station, then contracts for plant and construction will be placed and managed by NNC as agent for the CEGB.

Requirements from Contractors

Potential contractors will need to demonstrate to the CEGB and NNC that:

- they are technically competent and have the necessary resources to undertake the contracts
- they are able to meet the Quality Assurance standards and procedures appropriate to the plant in question
- they are able to take responsibility for detailed design work in accordance with the overall system requirements laid down by CEGB and NNC
- they are competitive, taking price and all other commercial and technical factors into account
- they are able to meet the contract programme. Contracts will contain incentives for timely completion including a "Key Date Procedure"
- they are able to accept the degree of commercial risk that is commensurate with their contractual responsibilities. Contracts will generally be let on the basis of design, supply, erection and setting to work with lump sum firm prices or schedule of rates, subject only to adjustment for escalation of prices as determined by nationally published indices
- they are able to back up their contractual obligations with appropriate system performance guarantees
- they can demonstrate that they have the appropriate financial standing to undertake the requirements set out above.

Enquiries for some contracts will need to be issued at an early stage and design contracts placed before construction of Sizewell 'B' can be sanctioned. These contracts will include an option covering supply of hardware, or supply and erection as appropriate, which will be exercised following receipt of the necessary consents and licences to build the station.

The early placing of the design contracts will provide the information necessary for the development of the overall design of the station and will, if necessary, also provide for technical back-up support to the Public Inquiry.

Many items of plant such as tanks, valves, pumps, etc. will be purchased directly from suppliers for free issue to other contractors for erection.

The CEGB also requires that a Management Group will be established as outlined below in "Construction Management". The Group will ensure that the site is well controlled and disciplined which will contribute to high productivity.

Construction Management

A problem in the past on construction sites, including power stations, has been a multiplicity of sub-contractors operating different policies towards their personnel especially with regard to earnings incentive schemes.

A major step towards resolution of this and other industrial relations problems should follow from the comparatively recent introduction of the National Agreement for the Engineering Construction Industry, which has among other objectives the harmonisation of incentive payments and a common code of industrial discipline. It also provides for the establishment of Project Joint Councils comprising representatives of the unions and contractors under independent chairmanship.

In addition, the CEGB has introduced successfully at Drax and Heysham II measures to improve site organisation and efficiency. These include management groups made up of representatives of all of the major contractors employed on the site, with a representative of the CEGB to be present at meetings as independent chairman and observer.
The measures also include contractual arrangements which provide incentives for the achievement of timely completion.

Opportunities for UK Contractors

The opportunities for UK contractors are considered to be extensive. The total capital cost of Sizewell 'B' power station is estimated to be £1,147 m at March 1982 price basis, and some £550 m of this cost is represented by contracts for plant, works and services for which UK contractors will be invited to bid.

Every effort will be made to utilise the design, manufacturing and erection skills of UK suppliers.

The imported content which is estimated to be worth approximately £100 m relates to certain specialised items of plant for which there is at present no established UK capability. For these items it is considered prudent, for the first UK civil PWR, to use experienced international manufacturers. In particular, the contract for the Primary Circuit will be placed with an established supplier. Nevertheless, it is anticipated that UK manufacturers will be given the opportunity to participate in the Primary Circuit contract, thus allowing them access to this technology. This will enable UK manufacturers to increase the proportion of UK supply in any further UK PWR Power Station projects, and to compete in export markets.

The balance of the estimated capital cost of the station consists of NNC and CEGB engineering costs and other costs not directly related to contracts for plant, works and services.

Contractors' Response

A schedule of the major contract packages for the Sizewell 'B' project is included at the end of this brochure. Any manufacturers who consider that they have the capability to meet the requirements described above should, as a first step, register their name and interest with Director of PWR, National Nuclear Corporation Limited, Cambridge Road, Whetstone, Leicester.

The decision to proceed with the project – which is, of course, dependent on receipt of the necessary consents and licences – will be followed by a phased release of contracts.

Applications from manufacturers who wish to be considered as potential contractors will be progressed relative to programme. Applications from manufacturers who wish to undertake work on a sub-contract basis will be forwarded by NNC to potential contractors.

As stated above, the CEGB hopes that suppliers in the East Anglian area will benefit from the project. A directory of local contractors for goods and services will be compiled for the use of NNC, CEGB and main contractors on the Sizewell site. Arrangements for this will be made locally before the work on site commences.

The schedule overleaf sets out the Contract Packages and dates for the issue of enquiries. Whilst every effort will be made to keep to the strategy, timings and packages set out, it may be necessary to make alterations should circumstances change.

Sizewell 'B' Power Station
Major Contract Packages

Contract Package	Type of Contract	Issue Enquiry	Enquiry Number	Scope of Work
(a) CIVIL WORKS				
Main Civil Works	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	3rd Qtr. 1983	1C-28004	Construction of the reactor, auxiliary control, diesel, turbine, secondary diesel and control radwaste, ancillary buildings and outdoor structures. Construction includes foundation, super-structure, walls, roofs, embedded mechanical and electrical material post tensioning and architectural treatment. Also included are foundation bases for tanks together with on-shore trenches and tunnels for services and CW culverts from the terminal points of the CW pumphouse and surge chamber buried services and special doors.
Preliminary Works	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	3rd Qtr. 1983	1C-28001	Includes open-excavation for power block including dewatering system. Also provision of fill, site roads, car parks, temporary site fencing and supply and erection of site offices, refurbishment of existing offices and prepared areas, including temporary water, fire fighting, electrical supply, site foul drainage systems, permanent reservoirs and mass fill and blinding concrete, hard-standings for sub-contractors' areas, refurbishment of sewage works, demolition temporary compressor house. May also include series of site orientated contracts covering provision of items such as canteen facilities, cleaning and maintenance, and site security.
New Access Road	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	3rd Qtr. 1983	1C-28002	Includes construction of access road from Lovers Lane to NW corner of site including all necessary fill, piling, sub-base preparation and surfacing, and making allowance for local crossings and drains, adjacent landscaping and peripheral facilities.
Circulating Water System Civil Works	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	2nd Qtr. 1984	1C-28003	Includes construction of circulating water pumphouse off-shore tunnels and structures, on-shore tunnels up to and including the surge chamber, beach docking facility, hypochlorite building, excavation and dewatering, CW pump concrete volutes. Construction includes foundation, super-structure, walls, roofs, embedded mechanical and electrical material and architectural treatment.
Containment Liner	Lump Sum subject to Escalation	3rd Qtr. 1983	1C-28151	Includes limited design, supply and erection of carbon steel plating complete with carbon steel stiffeners/ties, together with any temporary stiffening and equipment required for construction of containment liner, comprising: keyhole, sumps and penetrations, baseplate, barrel plating, dome plating, cylindrical cavity liner, equipment latch and personnel airlocks embedments and containment spray piping attachment to the dome liner.
Liner Anchorage Testing	Lump Sum	1st Qtr. 1983	1C-28152	Includes liner anchorage testing.
Reactor Refuelling Cavity and Fuel Pond Liners	Lump Sum subject to Escalation	4th Qtr. 1983	1C-28171	Includes limited design, supply and erection of stainless steel plating complete with carbon steel stiffeners/ties and leak chase channels together with any temporary stiffening required for construction of liners for refuelling cavity and fuel pond.
Administration Building and 132/400kV Substation Civil Work	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	4th Qtr. 1985	1C-28006	Includes construction of the administration welfare building and 132/400kV substations access bridge, associated cable tunnel trenches and support steelwork, gatehouse and permanent car parks, and security fencing. Construction includes foundation, superstructure, walls, roofs, embedded mechanical and electrical material and architectural treatment.
Lifts	Lump Sum subject to Escalation (Prime Cost Sum, Civil)	2nd Qtr. 1984	1C-28007	Includes design, supply erection and commissioning of the lifts. It is anticipated that there will be 7 lifts throughout the station.
Off-Site Hostel	Lump Sum subject to Escalation	Forecast to follow	1C-28009	Includes design, supply and erection of the off-site hostel.
Site Finishing and Landscaping	Lump Sum subject to Escalation	3rd Qtr. 1989	1C-28010	Removal of temporary construction facilities final site grading and landscaping.
Civil Testing (Services Type Contract)	Unit rate	1st Qtr. 1984	1C-28005	Includes concrete and material testing.
Consulting Architectural Services	Reimbursable Consultancy Agreement	Contract Placed	–	Includes services to meet overall architectural requirements of CEGB internal architects and external executive architects.
Quantity Surveyor Services	Reimbursable Consultancy Agreement	Contract Placed	–	All civil quantity surveying services excluding cabling.
(b) MECHANICAL				
Primary Circuit	Lump Sum subject to Escalation	4th Qtr. 1982	1M-28700	Includes design, supply, erection and setting to work of all equipment in the primary circuit (reactor steam generators, pressuriser, reactor coolant pumps, loop pipe works, supports and restraints protection system and instrumentation). It is anticipated that some components and the erection will be sub-contracted to UK suppliers.
Turbine Generators	Lump Sum subject to Escalation	Design Contract placed	1M-28800	Includes design, supply and erection of turbines, generators, moisture separator reheaters, condensers, structural steel support frames, feedwater pumps and heaters and piping connecting these components.
Steam Generator Feed Water Pumps and Strainers	Lump Sum subject to Escalation	4th Qtr. 1983	1M-28011	Includes design, supply and erection of steam generator feed water pumps and strainers.
High Integrity Pipework and Safety Related Plant	Various	Letter of Intent 1st Qtr. 1983	1M-28350	Includes design, supply and erection of high integrity pipework and erection of safety related plant.
Conventional Mechanical Plant and Piping	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	4th Qtr. 1984	1M-28353	Includes design, supply and erection of all functional mechanical plant and pipework.
Radwaste Building, Mechanical Plant and Piping	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28352	Turnkey effort against functional specifications using the contractors involved in the main plant works.
HVAC (Safety)	Lump Sum subject to Escalation with some unit rates	1st Qtr. 1985	1M-28600	Includes limited design, complete supply and erection of all safety related HVAC duct work hangers and equipment. This excludes HVAC in the Administration Building and other non-safety classified buildings.
HVAC (non-safety)	Lump Sum subject to Escalation with some unit rates	1st Qtr. 1985	1M-28680	Includes design and supply of all non-safety related HVAC duct work, hangers, miscellaneous equipment and erection of HVAC duct work and equipment. This excludes HVAC in the administration building.
CW Pumps, Valves and Discharge Piping	Lump Sum subject to Escalation	3rd Qtr. 1983	1M-28008	Includes design, supply and erection of CW pumps, auxiliary CW pumps, valves and discharge piping.
Fuel Handling Equipment	Lump Sum subject to Escalation	2nd Qtr. 1985	1M-28716	Includes limited design, supply and erection of pond fuel handling machine, elevator, fuel transfer system, fuel storage racks, transfer gates handling equipment, and head assembly and erection only of refuelling machine.
ASME III Class 2 Centrifugal Pumps	Lump Sum subject to Escalation	2nd Qtr. 1983	1M-28908	Includes design, supply and erection of centrifugal charging pumps, high head safety injection pumps, and containment spray IRHR pumps.
Reactor Building Polar Crane and Fuel Building Crane	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28063	Includes design, supply and erection of the reactor building polar crane and fuel building crane.

Contract Package	Type of Contract	Issue Enquiry	Enquiry Number	Scope of Work
Shop Fabricated Tanks	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28101	Includes design, supply and erection of the shop fabricated tanks.
Site Erected Steel Tanks	Lump Sum subject to Escalation	3rd Qtr. 1984	1M-28109	Inludes design, supply and erection of large outdoor tanks.
Condensate Polishing and Water Treatment Plant and Piping	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28111	Includes design, supply and erection of condensate polishing and water treatment plant and piping.
Decontamination System Plant Package	Lump Sum subject to Escalation	1st Qtr. 1986	1M-28137	Includes design, supply and erection of the decontamination system plant package.
Reserve Ultimate Heat Sink	Lump Sum subject to Escalation	2nd Qtr. 1983	1M-28015	Includes design, supply and erection of reserve ultimate heat sink and platforms.
Auxiliary Boiler Plant and Piping	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28017	Includes design, supply and erection of the auxiliary boiler plant and piping, reaerator and reboiler.
Emergency Diesels	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28018	Includes design, supply and erection of emergency diesel system.
CW Screening Plant	Lump Sum subject to Escalation	4th Qtr. 1983	1M-28020	Includes design, supply and erection of CW screening plant.
Turbine Building Cranes	Lump Sum subject to Escalation	1st Qtr. 1984	1M-28060	Includes design, supply, erection and testing of the turbine hall cranes.
Miscellaneous Cranes	Lump Sum subject to Escalation	4th Qtr. 1985	1M-28061	Includes limited design, supply and erection of mechanical annex crane, diesel building cranes, CW pumphouse cranes decontamination shop crane, secondary diesel and control building cranes as well as miscellaneous hoists and jib cranes.
Sealing of Openings (Fire and Air stops)	Lump Sum subject to Escalation (Prime Cost Sum Civil)	2nd Qtr. 1988	1M-28663	Includes design, supply and erection of sealing material to close penetrations through concrete, masonry, and concrete floor slabs. Penetrations include HVAC, piping, electrical, instrumentation and structural steel throughout the plant.
Fire Protection System	Lump Sum subject to Escalation	2nd Qtr. 1985	1M-28649	Includes design, supply and erection of mechanical fire protection equipment throughout the station.

(c) ELECTRICAL

Electric Power Cabling and Supporting Steelwork	Unit Rate/ Remeasure/Lump Sum for Site Management and Preliminaries	2nd Qtr. 1985	1E-28410	Includes design, supply and erection of cable supporting steelwork, cable traywork and conduit cables and terminations for power, control and instrumentation circuit terminations, as well as supply and erection of lighting, heating and small power equipment throughout the plant.
Low Voltage Switchgear	Lump Sum subject to Escalation	3rd Qtr. 1984	1E-28018	Includes design, supply and erection of motor control centres, DC circuit breakers, fusegear and contactor control gear, local control centres, 415 circuit breakers, fusegear and contactor control gear, valve actuator load centres and uninterruptable power supply load centres.
11kV Switchgear	Lump Sum subject to Escalation	4th Qtr. 1984	1E-28009	Includes design, supply and erection of 11kV switchgear.
3.3kV Switchgear	Lump Sum subject to Escalation	4th Qtr. 1984	1E-28190	Includes design, supply and erection of 3.3kV switchgear.
Generator Voltage Switch Disconnector	Lump Sum subject to Escalation	2nd Qtr. 1985	1E-28140	Includes design, supply and erection of generator voltage switch disconnector.
Generator Transformers	Lump Sum subject to Escalation	1st Qtr. 1985	1E-28001	Includes design, supply erection and commissioning of 2 432kV/23.5kV 800 MVA generator transformers.
Unit Transformers	Lump Sum subject to Escalation	3rd Qtr. 1984	1E-28002	Includes design, supply, erection and commissioning of 2 23.5kV/11.8kV 52 MVA unit transformers.
Main Connections	Lump Sum subject to Escalation	2nd Qtr. 1985	1E-28005	Includes design, supply and erection of 23kV main for use with 660MW turbo generators complete with earthing switches and earthing transformers.
Batteries and Chargers	Lump Sum subject to Escalation	3rd Qtr. 1985	1E-28050	Includes design, supply and erection of 4 48V 400 AH batteries and chargers, 4 110V 110 AH batteries and chargers, 2 110V 1500 AH batteries and chargers, 4 110V 1800 AH batteries and chargers, 2 250V 1500 AH batteries and chargers.
Auxiliary Transformers (ONAN) Services Transformers (AN)	Lump Sum subject to Escalation	1st Qtr. 1985	1E-28074	Includes design, supply, erection and commissioning of 4 11.8kV/3.3kVA 10MVA unit and station auxiliary transformers and 23 3.3kV/415V 0.5-2MVA type AN miscellaneous transformers.
Fault Level Indication Equipment	Lump Sum subject to Escalation	1st Qtr. 1984	1E-28230	Includes design, supply, and erection of fault level indication equipment.
Uninterruptable Power Supply Equipment	Lump Sum subject to Escalation	4th Qtr. 1984	1E-28270	Includes design, supply, and erection of static and rotating UPS equipment.
Tele-Communications Equipment	Lump Sum	1st Qtr. 1986	1E-28470	Includes the design, supply and erection of the direct wire telephone system, staff location system, station audible warning system, miscellaneous telecoms, intercom and loud speaking system, radio and telephone jack system.
Station Transformers	Lump Sum subject to Escalation	2nd Qtr. 1984	1E-28003	Includes design, supply, erection and commissioning of 2 132kV/11.8kV 60 MVA station transformers.
Metering Equipment	Lump Sum	2nd Qtr. 1985	1E-28550	Includes design, supply and erection of metering equipment including summation, metering and logging equipment and also station clocks.

(d) CONTROL & INSTRUMENTATION

Process and Control Instrumentation and Installation	Lump Sum subject to Escalation	2nd Qtr. 1985	1J-28110	Scope definition to follow.
Plant Computer	Lump Sum subject to Escalation	2nd Qtr. 1984	1J-28106	Includes design, supply, erection and commissioning of plant computer.
Sequence Control and Condition Monitoring System	Lump Sum subject to Escalation	2nd Qtr. 1984	1J-28115	Includes design, supply, and erection of sequence control and condition monitoring system.
Station Control System	Lump Sum subject to Escalation	2nd Qtr. 1984	1J-28116	Includes design, supply, and erection of the station control system.
Control Desk and Panels	Lump Sum subject to Escalation	4th Qtr. 1983	1J-28200	Includes design, supply, and erection of the control desk and panels.
Fire Protection Instrumentation and Control	Lump Sum subject to Escalation	4th Qtr. 1985	1J-28205	Includes design, supply, and erection of fire protection instrumentation and control.
Sampling Systems and Equipment	Lump Sum subject to Escalation	1st Qtr. 1986	1J-28350	Includes design, supply, and erection of the sampling systems and equipment.
Gas Monitoring System	Lump Sum subject to Escalation	4th Qtr. 1985	1J-28359	Includes design, supply, and erection of the gas monitoring system.
Radiation Monitoring System	Lump Sum subject to Escalation	1st Qtr. 1985	1J-28361	Includes design, supply and erection of the radiation monitoring system.
Seismic Instruments	Lump Sum subject to Escalation	1st Qtr. 1986	1J-28707	Includes design, supply, and erection of seismic instruments and vibration monitoring equipment.
Secondary Protection System	Lump Sum subject to Escalation	1st Qtr. 1985	1J-28768	Includes design, supply and erection of the Secondary Protection System.

Contract Package	Type of Contract	Issue Enquiry	Enquiry Number	Scope of Work
Facia Alarm System	Lump Sum subject to Escalation	4th Qtr. 1983	1J-28108	Includes design, supply, and erection of the facia alarm system.
Plant Security System	Lump sum subject to Escalation	1st Qtr. 1986	1J-28113	Includes design, supply and erection of a permanent plant security system including sensors, closed circuit television, fence alarms and access control.
(e) MISCELLANEOUS				
Acid clean and Flushing	To be decided	2nd Qtr. 1987	–	To be decided.
Heavy rigging	To be decided	1st Qtr. 1986	–	To be decided.
Site Services	To be decided	To be decided	(see 1C-28001)	To be decided – extra work which may be included under preliminary works.
Free Issue Equipment including specialised safety related equipment such as Electrical Penetrations, Accumulators, Auxiliary Feedwater Pumps and the Main Steam and Feedwater Isolation Valves	Supply only	See Scope of Work	–	These supply items will be purchased under separate "supply only" contracts, and free-issued to contractors who will erect them together with their own plant. A more definitive list including the forecast dates for issuing each enquiry will be available during the 3rd Qtr. 1983.
Painting	To be decided	3rd Qtr. 1987	1A-28042	To be decided.

General Information

PWR Publications and Films

TITLE	AVAILABLE FROM:
CEGB Statement of Case* Pre-Construction Safety Report* Reference Design*	*Generally inspection copies only available at CEGB & NNC
Sizewell 'B' PWR Nuclear Power Station (summary of Statement of Case)	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU
A Technical Outline of Sizewell 'B' – The British Pressurised Water Reactor	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU
Sizewell – proposed site for Britain's first PWR Power Station	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU
The Case for Sizewell 'B' Nuclear Power Station	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU
Opportunity at Sizewell (Film, or Video and booklet)	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU
Sizewell 'B' PWR Contract Strategy	Dept. of Information and Public Affairs, CEGB 15 Newgate Street, London EC1A 7AU

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SECRETARY OF STATE FOR ENERGY
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CONFIDENTIAL

M C Scholar Esq
Private Secretary to
the Prime Minister
10 Downing Street
London
SW1

13 May 1983

Dear Michael,

Further to my letter of today about CEGB procurement, in reply to yours of 3 May, my Secretary of State thought that the Prime Minister might like to see Sir Walter's paper on the subject to which Mr Lawson referred in his minute of 28 January.

I enclose a copy.

Yours ever,

J D WEST
Private Secretary

Recd 9/2/83

+ IC

cc PS/PUSS(common)
PS/PUS
Mr Manley
Mr Morpleth
Mr Henderson

CENTRAL ELECTRICITY GENERATING BOARD

Sudbury House, 15 Newgate Street, London EC1A 7AU. Telephone 01-248 1202

From the Chairman
Sir Walter Marshall, CBE, FRS

9 February 1983

The Rt Hon Nigel Lawson MP
Secretary of State for Energy
Department of Energy
Thames House South
Millbank
London
SW1P 4QJ

CEGB SECRET

Dear Secretary of State,

I understand from your officials you would like to have a paper from me concerning procurement policy for the Sizewell PWR. It is hard to know where to begin and where to end on this subject. The attached paper concerns all those matters which I think will be of interest to you.

I think you will also be interested in hearing about the meeting we had with a number of Trade Unions on 13 January. This meeting was held at their request and the people present are listed on the attached sheet. They opened the meeting by saying that they had heard disquieting rumours which led them to believe that we might not be giving enough emphasis to getting UK manufacture for the PWR project. They went on to explain that they fully accepted that the pressure vessel needed to be imported but they felt strongly that as much as possible of the remainder of the PWR should be manufactured in the UK. They had got the impression from potential contractors that the UK had the capability to do everything else immediately. We explained to them that it was our intention to get the maximum possible UK manufacture. We told them something of the procurement policy outlined in the attached paper though, of course, not in as much detail. We explained that we were going to Westinghouse on a single tender action for the primary circuit because that maximised our chance of getting UK manufacture within the primary circuit while nevertheless retaining Westinghouse guarantees. We described to them by some examples, how we would set about making the procurement decisions and we established that, overall, they were content that we were proceeding in the best way possible.

The only difficult area of discussion concerned the manufacture of the steam generators and, in the exchange of views which ensued between us, it became evident that all the Trade Unionists had been subjected to heavy lobbying from Babcocks. During that lobbying process it appeared

Cont'd/.....

that Babcocks had inadvertently given the impression that they, Babcocks, were equipped to manufacture the entire steam generator without further capital investment, immediately. That, of course, is not correct and as soon as the Union people had understood that it would take time and a learning process to get the steam generator manufacture transferred from the USA to the UK, they expressed themselves content. I think they may have come to the conclusion that they had been lobbied ostensibly to get UK rather than US manufacture but actually to get a preferred position for Babcocks ahead of NEI. That conclusion may, of course, be correct.

At the end of the meeting Frank Chapple, John Lyons and Gavin Laird agreed that their fears had been put to rest. I undertook to meet with them again if we ran into snags when implementing the procurement policy which I had outlined to them. They then promised that if I did run into snags they would use their best endeavours as responsible Trade Unionists to help resolve difficulties. They stressed to me that they had no axe to grind in the choice between one company and another within the UK - that was not their concern. I replied that I did not expect the British companies themselves to take such a relaxed view and we therefore felt an obligation to proceed step by step in this matter so that all the decisions we reached could be properly defended thus preserving the integrity of the CEGB and avoiding embarrassment to the Government.

Yours sincerely

Walter Marshall

W Marshalll

List of Trade Unionists who attended meeting with Sir Walter Marshall

Thursday 13 January 1983

Name	Union
F J Howell	TGWU
W Gannon	EEPTU
F Franks	EEPTU
J Lyons	EPEA
F Chapple	EEPTU
K Cure	AEUW
G Laird	AEUW
K J Reid	TGWU
S Lynch	GMWU
J W Edmonds	GMWU
Rita Stephens	APEX
J Brankin	NALGO
D Prentice	NALGO

CEGB SECRET

Procurement Policy for the Sizewell PWR

Introduction

This paper sets out the procurement policy we propose to follow for this project. It attempts to identify the difficult or controversial decisions that will arise and highlights the nature of the lobbying that companies will undertake, particularly when they are disappointed in their hopes.

Our broad intent is easily described. Other than for major components of the nuclear steam supply system it is the intention of the CEGB on Sizewell 'B' to maximise UK produced components, materials and plant, and to encourage the main UK contractors to ensure that their sub-contracts are also placed with UK suppliers. For the PWR stations subsequent to Sizewell 'B', it is our intent to arrange for increased UK manufacture of the major nuclear steam supply system components, whilst ensuring that in so doing it does not put either programme or quality at risk. Given this intent, this paper can concentrate heavily on the procurement of the specialised NSSS components.

For the implementation of this intent, the first point to make is that the CEGB will make all the major decisions on procurement but will do so only on the recommendations of NNC. Throughout the paper, therefore, we should assume that NNC and the CEGB stand together in justifying their decisions.

The second point to make is that Mr Howell, when he was the Secretary of State for Energy, gave evidence to the Select Committee concerning the import content of the first PWR. The relevant part of his statement reads as follows -

> 41. The NNC consider that the import bill for the first PWR could be around £42 million. For subsequent PWRs the import bill could be progressively reduced to a point where components were completely manufactured in the UK and only materials of a specialised nature, costing around £10 million, were imported. The extent to which this minimum level of imports was achieved in practice would depend upon the annual ordering rate in the UK and the international supply position for PWR components. But in any event these import costs would be only a small proportion - around 5 per cent or less - of the total cost of a station.

42. The decision to order a PWR would help our existing trade in PWR components and could in time also enable our nuclear industry to participate in the world market for PWRs.

That statement, with the figures updated for inflation since January 1980, remains valid. Roughly speaking the figure of £42 million quoted in January 1980 corresponds to, say, £55 million in January 1983 and would comprise of a pressure vessel, four steam generators, the reactor internals, the primary pumps and the pressuriser. The figure of £10 million, roughly speaking, corresponds to the cost of the pressure vessel and other specialist components. The costs quoted by Mr Howell were based on a budgetary Westinghouse quotation: the sterling price will increase due to the fall in sterling against the dollar.

The main part of this paper sets out the procurement issues in the sequence that they are likley to arise in the public arena. The paper attempts to identify in advance the nature of the complaints and criticisms which will undoubtedly arise. Obviously we may anticipate that when the competition has been between a number of British firms the disappointed companies will argue that they were unfairly treated one way or another. In the rare case when the competition has been between British and foreign companies, if the latter gets the contracts the complaint will be that we have not properly looked to the national interest and our need to achieve the transfer of technology and manufacturing knowhow to the UK. By proceeding carefully and meticulously it ought to be possible to deal with arguments of that kind. A more difficult class of argument will concern the implications of any decision on Sizewell on procurement for future PWRs. A British company winning a contract for Sizewell will be anxious to use that contract to negotiate or at least claim that they should be given a preferred position in that particular area of work for PWRs in the future. The disappointed companies will, of course, be anxious to argue the exact reverse. Several examples of this will occur in what follows.

The Pressure Vessel

The first procurement decision to be made concerns the pressure vessel. This is such a difficult task and it carries such heavy implications for the safety of the reactor that we are obliged to go to an established, high quality pressure vessel fabricator for this item. The value of the

contract would be about £7 million for the pressure vessel of our exacting quality. There is no reasonable prospect that a pressure vessel of this kind and quality could be manufactured in the UK within the foreseeable future. We have, therefore, said publicly that for the indefinite future we expect to import the pressure vessels. There are a number of pressure vessel manufacturers in the world that, in principle, could supply us but, in a joint exercise carried out by NNC and the CEGB, the shortlist was narrowed rapidly to just two: Combustion Engineering in the USA and Framatome in France. Sometime ago we announced that we had chosen Framatome and a senior engineer of that company is now preparing to give evidence to the Sizewell Public Inquiry about the quality of Framatome's manufacturing plant and about the ways Framatome will meet our exacting requirements.

No British company has made a serious criticism of this decision. The only British company which could conceivably manufacture a pressure vessel would be Babcocks using their works at Renfrew, but they would need to invest capital equipment to gain the capability for this manufacture and it is not common sense for them to do that. It is difficult, exacting and specialised work because there is only one pressure vessel per reactor and therefore it does not actually have a high work content.

For these reasons, providing the performance of Framatome in the event is entirely satisfactory, we would expect to continue to import the pressure vessel from them in the future and we do not expect serious criticism from British industry for such a policy. Simultaneously we will suggest to the French that if we continue to buy pressure vessels from them, they should undertake to buy an equivalent amount of goods from the UK for their nuclear programme. For example, we will press that they should continue to take some of the large diameter, high integrity pipework from Cameron Iron Works as they do at the moment.

Turbo-Generator

Before deciding to use 2 x 600 MW machines at Sizewell 'B' the Board carefully considered the options, which were:

Competitive tender NEI and GEC for turbo-alternators of -

2 x 600 MW, or

1 x 1200 MW single shaft.

It was wellknown that for a 1200 MW machine NEI would quote a slow speed machine (1500 rpm), GEC a high speed machine (3000 rpm). Both would be prototype machines and would need to be supported as part of the capital cost of Sizewell 'B' with a complete range of spares. In the event of a problem arising with the prototype 1200 MW machine, the PWR would be shut down until the problem was resolved and new components manufactured and fitted. Because both manufacturers' machines would be prototype, the Board would not want two prototype machines with their attendant spares and possible teething troubles. Therefore, the decision on Sizewell 'B' would, in all probability, determine the future supplier of machines for all PWRs.

For the 2 x 600 MW machines, both manufacturers would use standard proven 6-flow LPs and alternators, and in the event of the failure of one turbo-alternator the PWR could stay in service at more than half load whilst the faulted machine was repaired using spares held for other 660 MW machines on our system.

The purpose of Sizewell 'B' is to prove PWR technology, not a new prototype 1200 MW single shaft machine. It was therefore decided to minimise the risk and install proven turbo-alternators. (The 4-flow v 6-flow argument does not arise: because of the PWR steam conditions both manufacturers would quote 6-flow LP machines.)

The decision on the turbine generator will be taken at the CEGB Board Meeting early in February and will become public soon after that. We have deliberately made the decision that the PWR will have two 600 MW turbo-alternators since, in addition to the above reasons, it permits a straightforward competitive battle between GEC and NEI (Parsons). The two companies submitted competitive bids nearly a year ago.

Both companies' tenders were qualified making it necessary for the CEGB and NNC to make subjective price assessments of the qualification to bring the tenders to a common basis; the incidence of spend curves were different and, against the background of discussion which had been held with manufacturers on the question of international plant cost comparisons, the prices were considered high. It was therefore decided to hold a joint meeting with both manufacturers and to request them to re-price their tenders, removing all qualifications, to quote on the basis of a common incidence of expenditure curve (mean of their proposed incidence curve) and to look again at the level

of pricing, thus leaving the assessed output as the only judgement to be made by the Board. This judgement will be based on the measured output of machines and machine components already in operation on our system and information available on UK manufacturers plant overseas.

Both companies appear to have cut their prices to the bone, both have clearly taken a decision that this order is vital to them and both understand that it is an extremely keen competitive situation. The company which wins the contract will complain that they have been maneouvred by the CEGB into a position where they will see little, if any, profit. The disappointed company will argue that in some way or another it has been unfairly treated in the tendering process. The successful company will go on to argue that it is only common sense that they should be given the turbine generator order for the second, third, fourth PWRs. The disappointed company will, of course, argue the exact reverse and will argue not only that for PWR 2 they should have a fair chance to win the contract, but that it would be "fair and in the national interest" that the law of "Buggin's turn" should apply and they should get the next contract on a negotiated basis. They might even argue that a decision for a second PWR should be made now so that each turbine generator company can be given an order.

The Primary Circuit

The primary circuit consists of the pressure vessel, four steam generators, the pressuriser, the reactor internals, four main coolant pumps and the large diameter, high quality pipework which connects all these together.

After careful consideration we have decided that the contract for the primary circuit should be given to Westinghouse by negotiation. We have felt it unwise to break up this primary circuit into its component parts and place separate contracts for each part. We have found it essential that an established PWR vendor company should take responsibility for this the central part of the PWR. We have considered and rejected the possibility of going to Framatome for the primary circuit and we have considered but rejected competitive bids between Westinghouse and Framatome for this work. The major reason for going to Westinghouse by single tender action is the following.

We feel obliged to use the Sizewell PWR as a method of technology and manufacturing transfer into the UK. Westinghouse has successfully transferred technology and manufacturing knowhow into a number of countries and has made a firm commitment to bring that about in the UK. Also the NNC/Westinghouse Licence includes detailed manufacturing information in addition to access to technology. We do not think that the French would have the same motivation and determination to help British industry. In effect, we have made the judgement that since Westinghouse is our chosen licensor, they are our chosen instrument for accomplishing technology and manufacturing transfer and that they had best be given the primary circuit responsibility and, within that responsibility, we should look for as high a UK participation as possible.

The contract for the primary circuit will be given to Westinghouse subject to the following conditions.

1. The Westinghouse price must be related to US and world levels. It is up to Westinghouse to satisfy us that their prices are fair and reasonable and it is agreed that Bechtel can be used to give advice on this matter.

2. Westinghouse will guarantee the delivery dates, key interim dates and the steam production from the primary circuit.

3. Westinghouse must then sub-contract back as much work as possible to an approved list of British manufacturers which NNC would work out with them component by component.

4. Similarly the erection contract must be sub-contracted to a UK manufacturer/contractor.

5. It is accepted that the requirement to sub-contract back to British manufacturers will increase costs. Westinghouse will therefore be asked to quote their basic price and British manufacturers will then be invited to tender and a view will be taken on whether the expected premia over the basic price are acceptable.

By proceeding in this way, we hope that the various parts of the primary circuit will fall into one of two categories. Those where the British price is a modest mark-up on the American price (we expect this to happen where the British company is equipped to produce the component without

significant capital expenditure or new workshop facilities or quality controlled procedures). In that case we would justify the modest mark-up as part of the cost of "technology and manufacturing transfer" on a one-off basis.

In other situations, most likely involving significant capital expenditure to create the manufacturing capability in the first place, we would expect the UK premium to be very large. We would then make the decision that UK manufacturing was not justified for Sizewell but might be justified for a tranche of PWRs to be ordered at a later date when the setting up costs could be spread across a number of stations. The outcome of this approach is likely to be along the following lines.

The pressuriser can be built in the UK for Sizewell and for subsequent PWRs with only a modest mark-up. The likely winner of that contract is Babcock. The large diameter, high quality pipework can be produced in the UK with no mark-up at all. The contract will be won by Cameron Iron Works. The pressure vessel will be manufactured overseas both for Sizewell and for later PWRs. The reactor internals will be manufactured by Westinghouse for Sizewell but possibly in the UK for all subsequent PWRs. There will be a bitter competitive battle between GEC and Babcocks for this work. Virtually all manufacture outside the primary circuit will come from the UK for Sizewell and for subsequent PWRs. For the primary pumps the electric motors will come from the UK for Sizewell and for subsequent PWRs. The pump casing and impellers will come from abroad for Sizewell and be manufactured under licence in the UK subsequently. It is our present judgement that in all we have mentioned so far, there will not be genuine controversy between manufacturers overseas and manufacturers at home - though naturally we do not expect explicit praise either. There will, of course, be bitter controversy between the successful and disappointed British firms and in all cases the disappointed firms will try to claim that either Westinghouse, NNC or the CEGB, or all three, were prejudiced against them.

All this leaves one important and significant area of controversy which may well dominate the lobbying of Government by manufacturers and the unions concerned. It concerns the manufacture of the four steam generators for Sizewell and the four steam generators for every subsequent PWR. Because there are four steam generators per reactor the contract to manufacture them is a "plum". It will be much sought after by several boiler makers and perhaps by GEC. Very roughly speaking, the contract for the steam generators will be analogous to the contract for the AGR boilers. In the latter case political lobbying by the two boiler making companies led to a degree of

work sharing by the two. It is unclear how the lobbying on the steam generators will go but it is clear that it will be intense.

The reason why the steam generators become controversial is both because they involve a substantial chunk of money and because they sit uneasily between the extreme specialisation of the pressure vessel and conventional but high quality engineering of the remainder of the PWR. Because of the public discussion the steam generators are likely to have, it is necessary to discuss the manufacturing process for them in some detail. The steam generators fall naturally into an area of British Heavy Industry which is short of work.

The shell of the steam generator is manufactured by welding together forgings made of a special steel of special quality. The only sources of such forgings at the present moment in time are the Japanese Steel Company and Framatome. Curiously enough a likely competitor in the future will be the River Don Works at Sheffield but it is unclear when and if they can provide forgings of the requisite quality. Certainly we will seek to get them from an established manufacturer for the Sizewell reactor. Welding together of the forgings is a high precision task comparable to the welding together of the pressure vessel. We will wish to have that done abroad and the Babcock company, and possibly other British companies, will claim they are capable of doing that task. They will argue that that task is entirely similar to the manufacture of pressure vessels for our nuclear submarines but our decision on this matter must be heavily influenced by the fact that this process has great significance for the safety clearance of the reactor. We therefore have a strong preference to go abroad for this manufacturing step for Sizewell. For future PWRs we will have to make a difficult policy decision between continuing to go abroad or upgrading a chosen British engineering capability which would then become a monopoly supplier to us.

Forgings for the tube plate will probably come from abroad. The tube plate then has to be drilled. It is possible that this could be done at GEC for Sizewell. Certainly the UK will have the capability to do it for later PWRs. The U tubes for the steam generator have to be manufactured probably abroad for Sizewell and in the UK for subsequent PWRs and the tube assembly then has to be done. The tube assembly will probably be done by

Westinghouse for Sizewell and by a chosen UK manufacturer for subsequent PWRs. The top of the steam generator where the steam and water is first separated might be manufactured by Westinghouse or might be manufactured in the UK for the Sizewell station but surely must be manufactured in the UK for subsequent stations.

Putting all this complicated story together, it will be seen that there is not a simple statement along the lines that steam generators will be manufactured either in the USA or the UK. They are likely to be manufactured right from the beginning partially in the USA and partially in the UK with an increasing UK content as we go from one PWR to the next. The detailed timing of this transfer of manufacturing knowhow from Westinghouse to the UK can only be determined by detailed negotiations over the next year. The nature of this process is, I believe, well understood by industrial companies. They are likely to present the controversy in terms of the speed that this transfer of technology and manufacturing takes place. The underlying argument is not really about the speed of the transfer but about the choice of manufacturer to be the NNC/Westinghouse sub-licensee.

By the terms of their licence, Westinghouse are obliged to educate our chosen licensee into the manufacturing technology for steam generators. They stand ready to do that and any British company we choose for that task is likely to be acceptable to Westinghouse. However, Westinghouse will quite reasonably refuse to put their effort into educating several British companies for this task. The various British companies will therefore lobby for a decision which best suits their particular situation.

The Babcock company has clearly and correctly analysed that it is, at the moment, the front runner to be the UK manufacturer of steam generators. They want that agreed now. They want it agreed for Sizewell. They know that they themselves cannot manufacture much of the steam generator for Sizewell but if they can get us to agree now that they are the NNC/Westinghouse licensee, they can start learning the technology and prepare to manufacture sizeable parts of the steam generator starting with the second PWR. In the meantime they will be able to do what they can for Sizewell itself.

Other companies with ambitions to manufacture steam generators will, of course, make the exact reverse argument. They will argue that for Sizewell the task should be left for Westinghouse, that no commitment should be made to any company at this moment in time but the commitment should be made after giving them a fair chance to bid for the business for PWR 2 and subsequent reactors.

It is not possible for us to see our way through this particular jungle at this particular moment in time. A happy outcome might well be an agreement with Babcock that they were in a special position for steam generators with a compensating amount of manufacturing work on the remainder of the station going to other heavy engineering companies. However, it is premature to assume that we can negotiate ourselves into that position through the difficulties that lie ahead.

Pipework

The efficient design, manufacture and erection of pipework is a crucial step in keeping PWR construction to time and cost. The way we set about that is therefore vital for the success of the project. We cannot simply copy the pipework layout of SNUPPS because our design is more complex than SNUPPS. Therefore, although we have a good start for the pipework, a great deal of new work must be done. The lead position on that must be taken by the central design team at Whetstone and one possible way of proceeding is to do all the design inhouse and then go to British manufacturers for competitive bids for the supply and erection of that pipework. This last approach has been advocated to us by Bechtel but we have turned our face against it because it involves recruiting pipework specialists to the Whetstone team when that expertise already exists in our UK pipework companies. We have therefore decided to work in partnership with three pipework companies to complete the design, get a smooth transfer to the manufacturing operation and a continuity of information flowing into the erection step. The three pipework companies, Babcock, Aiton and PED Ltd, have agreed to pool their effort into a joint venture, send designers to Whetstone and work closely with us on this important task. The necessary corollary of this approach is that they undertake this work as a result of a negotiated contract, not a competitive contract. They, of course, are delighted to get this opportunity. It puts them in a strong and unique position to undertake this pipework of future PWRs in this country and to quote for pipework design and supply on export work.

These three companies will be full of praise for the long-sighted view of the CEGB in proceeding in this way in full acknowledgement of the national interest. Their potential competitors, NEI, William Press, Davy McKee, GEC and Foster Wheeler, will be equally forthright in their condemnation of this procedure which has given them no opportunity to bid for work that they think they might undertake and which has frozen them out of the business for the indefinite future. We will reply that we cannot have a free-for-all in the important area of pipework supply and we have simply done our best.

Sizewell Followed by a Programme of PWRs

The success of the French PWR programme can largely be traced to the standardised approach to tranches of reactors, the rationalisation of industry and the establishment of first class facilities for manufacture of standardised major components. The intention of the Board is, through NNC, to establish a safe reliable design of PWR for Sizewell 'B' and then to replicate that design for a tranche of PWRs. For this policy to be successful it will require in many areas using the same manufacturer or the same design of component for follow-on plants to Sizewell 'B'. The Board will therefore encourage manufacturers with a common expectation to form joint ventures to undertake areas of work similar to the arrangement being made for pipework design, fabrication and erection.

In conclusion I must re-emphasise a point I made at the beginning of this paper. The concerns expressed in public about the various procurement decisions are equally likely to be dictated by thoughts of the future than by the immediate Sizewell project. British industry generally is expecting Sizewell to be followed by a modest programme of PWRs and have seen that as the major prize for which Sizewell is the overture.

W Marshall
31.1.83

Energy Pol 8

Prime Minister (4)

To be aware of Sir J King's (Babcocks') view.

The Energy letters are attached.

MLS 26/5

LCC NO

NEW ST. ANDREWS HOUSE
ST. JAMES CENTRE
EDINBURGH EH1 3SX

Michael Scholar Esq
Private Secretary
10 Downing Street
LONDON SW1

20 May 1983

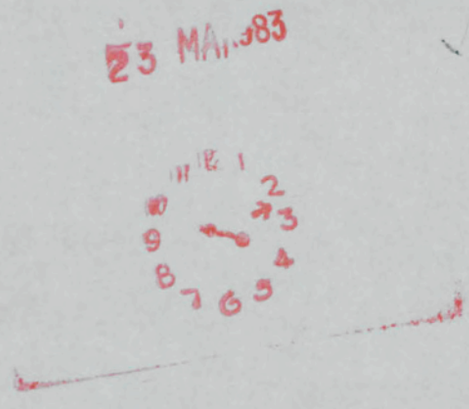
Dear Mr Scholar

I have seen a copy of Julian West's letter to you of 13 May about CEGB procurement. My Secretary of State has a very keen interest in the placing of contracts for Sizewell B PWR because of the possible effect on Babcock Power Ltd, a company operating in Renfrew near Glasgow. He has written to the Secretary of State for Energy on this subject and I attach a copy of his letter for your information. In addition to my Secretary of State's visit to Babcock the Secretary of State for Industry visited the company on 13 May and was made fully aware of the problems by Sir John King, Chairman of Babcock International Ltd.

The basic problem, as seen by Sir John, is that he does not believe that the desired transfer of knowledge and technology will be achieved if the orders for the primary circuit and the pressure vessel itself are placed directly with Westinghouse and with Framatome through Westinghouse; that would only happen if Framatome were sub-contractor to a British company which could insist on access to the manufacturing process. As far as the steam generators are concerned Sir John considers that there should be no question of the order being placed abroad because the UK "heavy" boiler-makers, such as Babcock, could produce these if given a reasonably early start by CEGB. Babcock are prepared to put in the necessary investment if they could secure the order.

I realise that this is a matter for CEGB and the Department of Energy but would stress the importance of these orders coming to Britain and hope that CEGB could be made aware of the consequences feared by Sir John King if the orders are placed abroad. I am copying this letter to Julian West and to Jonathan Spencer.

Joyce M. Clemie
for A MUIR RUSSELL
Private Secretary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MR SCHOLAR

13 May 1983

CEGB PROCUREMENT

I think that the CEGB have provided convincing arguments for placing two Sizewell B contracts overseas

- the co-ordinating contract for the 'primary circuit' with Westinghouse and the pressure vessel with Framatome.

Assuming that the CEGB survives the Sizewell Enquiry, it will need to demonstrate over the next 10-15 years that PWRs are safe and economic. CEGB cannot afford the additional risk entailed by commissioning an inexperienced British Contractor for the pressure vessel itself. Nor can it afford the risk of the financially disastrous over-runs which have beset the construction of all nuclear power stations in Britain.

Westinghouse's co-ordinating expertise seems essential, especially in view of the novelty of the engineering problems which the PWR poses for CEGB. In 1981 the CEGB was severely criticised, quite rightly, by the Monopolies and Mergers Commission for its methods of investment appraisal, which unduly favoured the nuclear option by overlooking the exceptional over-runs on nuclear projects in this country. This criticism will be made much of at the Enquiry, because the over-runs have a disastrous effect on the economics of the exceptionally capital-intensive nuclear plants. The PWR case rests heavily on its superior economics, since we have no need of additional generating capacity for a decade or more. CEGB cannot therefore afford to dispense with Westinghouse's managerial expertise.

PA BASCOM.

NICHOLAS OWEN

file

CONFIDENTIAL

10 DOWNING STREET

From the Private Secretary

3 May 1983

Dear Julian,

The Prime Minister has been told that CEGB are placing design orders with Bechtel and Westinghouse, notwithstanding that their British competitors in the consulting engineering design profession have all the necessary technical knowledge.

The Prime Minister has asked whether this is true, and whether it relates to Sizewell.

Yours sincerely,

Michael Scholar

Julian West Esq
Department of Energy.

CONFIDENTIAL

A

From
Lord McAlpine of Moffat
Telephone: 01-837 3377

40, Bernard Street,
London, WC1N 1LG

25th
~~19th~~ April 1983

My dear Prime Minister

I am enclosing some facts and figures following our conversation at Lady Airey's Cocktail Party. These show the quite remarkable value of work carried out by the Consulting Engineering Design Profession overseas.

I apologise for the delay in letting you have this information but my office was closed for 10 days over Easter.

I believe that this invisible export is so impressive and of such significance that I am distressed at the C.E.G.B. placing design orders with Bechtel and Westinghouse when British Consultants have the know-how needed.

I am continuing my research on how to get more British materials incorporated into the Sizewell contract. Both Sir John King and Ian MacGregor will be of considerable help to me in this and I feel it is of sufficient importance to merit delaying Sizewell if necessary.

All good wishes

Yours ever

Peter

The Rt Hon Margaret Thatcher, MP,
10 Downing Street
London SW1

SIR ROBERT McALPINE & SONS, LTD.
AND ASSOCIATED COMPANIES

MEMORANDUM

FROM **HEAD OFFICE** Our Ref. RBW/AMMcD CONTRACT

TO Lord Edwin Your Ref. Date 18th April, 1983

SUBJECT BRITISH CONSULTANTS WORKING ABROAD

The ACE Report "Overseas Work Entrusted to Members during 1982" is summarised on the attached sheet.

A breakdown you might find helpful is given below:

	Value of Work in hand during 1982	Number of Projects in Report Stage in 1982
Nuclear Power Stations	£248 million	-
Thermal Power Stations	£4,745 million	31
Hydro Electric Works	£2,689 million	26
Transmission of Power	£2,035 million	24
Electrical & Mechanical Services	£3,027 million	14
	£12,744 million	95

It is interesting to note that 60% of this work by value is in the hands of 3 Consulting firms:

Kennedy & Donkin	£2,625m
Merz & McLellan	£3,348m
Preece, Cardew & Rider	£1,720m

The ACE membership covers about 1100 companies and some additional work overseas will be carried out by non-members.

R. B. Woodd

R. B. Woodd

VALUE OF OVERSEAS WORK ENTRUSTED TO A.C.E. MEMBERS DURING 1982

VALUE OF PROJECTS GIVEN IN £ million	MAJOR WORKS ABROAD			
	No. of Projects	Total Value	Work * Completed in 1982	Work still in hand
1. Nuclear Power Stations	16	248	35	213
2. Thermal Power Stations	100	4745	116	4629
3. Hydro Electric Works	49	2689	268	2421
4. Transmission of Power	137	2035	104	1931
5. Electrical & Mechanical Services	414	3027	366	2661
6. Chemical, Petroleum & Gas Plants	30	2104	233	1871
7. Structural Industrial	337	4499	648	3851
8. Structural Commercial	753	8727	682	8045
9. Railways	64	5155	168	4987
10. Roads, Bridges & Tunnels	456	9993	943	9050
11. Desalination	24	1071	430	641
12. Water Supply	344	5325	487	4838
13. Drainage Sewerage & Refuse Disposal	268	5765	273	5492
14. Irrigation	79	1660	124	1536
15. Harbours, docks and sea defences	274	5728	1297	4431
16. Airports	62	2123	19	2104
17. Land planning & development	130	2094	433	1661
18. Miscellaneous	65	1149	21	1128
Total Work in all Categories	3602	68137	6647	61490
Totals carried out by individual Consulting Firms:				
Merz & McLellan	125	3388	171	3217
Preece, Cardew & Rider	124	2178	63	2115
Kennedy & Donkin	116	3799	206	3593
Totals	265	9365	440	8925

MR 14/4. 4AJC.

Energy

The attached guidance notes on presentation of nuclear power policy are for the personal use of all Ministers, who should associate them with the earlier notes in this series.

THE GOVERNMENT'S POLICY FOR NUCLEAR POWER

Public perceptions For many years, there was no great public concern about the safety aspect of nuclear power. More recently, however, there has been an increase in public awareness and, to an extent, in public concern.

The Electricity Council monitors the trend in public opinion on nuclear power, using NOP Random Surveys. Since October 1979, these have shown a falling number of people agreeing that nuclear power has a very good safety record, and a growing minority disagreeing. The November 1982 figures were 46% agreeing and 25% disagreeing.

Opinion has changed more markedly over the period on the question of need. The proportion agreeing that nuclear power is needed to "keep our factories, houses and transport running" has fallen from 65% in October 1979 to 45% in November 1982. The proportions feeling that nuclear power is not needed has increased from 17% to 30% over this period. Since May 1981, there has been a higher proportion against than for building more nuclear power stations. In November 1982, the result was 35% in favour of building more; 40% against.

The people working in the industry have a strong understanding that nuclear power is safe. Those living close to existing nuclear stations, and to Sellafield (formerly known as Windscale) and the prototype fast reactor at Dounreay, tend to be supporters. Other people tend to be against the idea of a nuclear station being built close to their homes. This feeling would very probably be extended to any other industrial development.

The environmentalist groups consistently stress the allegedly adverse impact of nuclear power on the environment, and in particular claim that the technology is unsafe. The present NUM President is strongly opposed to nuclear power, because it is seen as unwelcome competition. The unions representing workers in the electricity supply industry are staunch advocates of nuclear power, and the TUC made it clear in its August 1981 Review of Energy Policy that it too favours the development of nuclear power.

The important points to stress are:

- Nuclear power offers a safe, clean, secure and economic source of electricity.

- The new nuclear power stations coming on stream in the next decade will replace old, inefficient plant. This will mean electricity prices in the future below what they would otherwise have been. Economic and secure electricity supplies are important for jobs, particularly in the electricity-intensive industries.

- Coal presently meets around 80% of fuel needs for electricity. There will be obvious benefits from reducing the degree of dependence, not least because competition between fuels puts downward pressure on their prices.

- Britain used to generate a higher proportion of its electricity from nuclear power than any other country. It has now slipped to eighth among the OECD countries. At present, nuclear power meets 12% of our electricity needs, although this will rise to 20% when the three advanced gas cooled reactors (AGRs) nearing completion are commissioned. France, Sweden, Finland, Belgium and Switzerland already generate more than 20% of their electricity needs in nuclear power plants.

- The French figure is 39%, and this is set to increase very rapidly in future years. This is a major reason why French industry enjoys, as the recent CBI study* showed, the cheapest electricity in Europe.

* 'European Industrial Energy Prices', Confederation of British Industry, October 1982

- The safety record of nuclear power in the UK has been excellent. Workers in the industry are among the staunchest advocates of nuclear power. The Health and Safety Executive have published a major study on the literature on comparative safety of generating plant worldwide. It concluded: "suitably sited, constructed and maintained, nuclear systems of the type reviewed involve no more, and probably less, risk than oil- or coal-burning systems, taking account in each case of the whole fuel cycle". (HSE Research Paper 11, December 1980). The UK safety regulatory system is one of the most effective in the world.

- No large-scale method of electricity generation leaves the environment unaffected. For example, solid waste from oil and coal-fired plants contains poisonous materials which could, over time, contaminate water supplies and crops grown on land fill sites. Emissions into the atmosphere contain radioactive elements and other potential carcinogens. Sulphur dioxide, which can be removed only at considerable expense, contributes to the problem known as acid rain. All fossil fuel combustion generates carbon dioxide, which has been slowly increasing its concentration in the atmosphere. The climatic effects of this are unknown, but it could conceivably bestow problems on future generations. All these effects are carefully monitored, and where possible, kept under control. Nevertheless, the small risks to health involved have to be considered alongside the question of the environmental impact of nuclear power. At least one 'environmentalist' has concluded: "I believe that the environmental lobby, of which I count myself a member, should stop putting on funny masks (to symbolise opposition to nuclear power) and posturing in front of television cameras, and start to address the long-term, fundamental problems". (Nigel Sitwell, 'The Spectator', 26 February 1983).

The UK Record. Lord Rutherford, working in Cambridge in 1919, was the first person in history to split the atom. This work opened up for the first time the possibility that the energy stored in the atomic nucleus could be used as a source of power. It was fitting therefore that, in 1956, Britain's Calder Hall reactor should be the first in the world to generate electricity from nuclear fuel, and feed it into a national grid. The Magnox reactors, developed from the Calder Hall design, provided and still provide a reliable source of base load electricity. Their safety record has been excellent, over twenty years of commercial operation. Magnox was not originally expected to be a cheap alternative to oil and coal. It was rather seen as an entree into nuclear technology, and a source of fuel diversity. Nevertheless, as it turns out, the costs from the Magnox stations, over their lifetimes (if, as expected, they operate for thirty years) will be comparable with that from coal-fired stations built at around the same time.

The Magnox reactors burn natural uranium. The next generation Advanced Gas Cooled Reactors (AGR) developed in Britain use uranium enriched in the isotope Ur 235. Together with our Dutch and German partners in URENCO, we have achieved a significant technological lead in enrichment technology. URENCO has developed the world's first commercial gas centrifuge plant for uranium enrichment. The CEGB has one AGR in operation, Hinkley Point B, and this will, over its lifetime, produce cheaper electricity than the comparable coal-fired plant, Drax. The other AGRs nearing completion will also prove worthwhile additions to the system, with the exception of Dungeness B. This last project has been seriously undermined by difficulties in its construction.

Spent fuel from commercial reactors can be reprocessed to recover unburnt uranium 235 and the by-product plutonium. These are very valuable materials which will, at some time in the future, fuel the new generation of fast reactors (see p6). Britain has long experience in reprocessing technology, and British Nuclear Fuels Ltd, at Sellafield, is a world leader in both reprocessing and fuel fabrication. About 60 per cent of the spent fuel reprocessed in the Western world has been reprocessed here in Britain.

The Government's Policy

Britain's nuclear power programme has received bipartisan support in Parliament, ever since 1946 when Mr Attlee took the initial decision to develop civil nuclear power. In 1976 Mr Benn, then Energy Secretary commissioned a thorough review of thermal reactor systems by the National Nuclear Corporation. On the basis of that review, in January 1978, he announced his decision to authorise the electricity supply industries to order two new Advanced Gas Cooled Reactors. Latest estimates show that these will produce cheaper electricity over their lifetimes than could have been expected from comparable coal-fired plant.

At the same time, Mr Benn announced that, having regard to the importance of nuclear power, the UK should not be dependent upon an exclusive commitment to any one reactor system. He said: "We must develop the option of adopting the PWR (pressurised water reactor) system in the early 1980s". (Hansard, 25 January 1978, col 1392).

Conservatives supported this statement at the time, and have accepted it as a basis for policy in Government. Work has continued on the adaptation of an American PWR design to meet British needs and safety requirements. The main conclusion of a review by the NII on the generic safety issues relating to pressurised water reactors was that there was no fundamental reason for regarding safety as an obstacle to the selection of a PWR for commercial electricity generation in the UK. Our nuclear powered submarines, with over twenty years of totally safe operation, are powered by this type of reactor. Thus, PWR technology is not new to Britain.

The Government sees an important and necessary role for nuclear power in the years ahead, as older generating plant is retired. Nuclear power stations have the potential to provide electricity economically provided they are built to time and cost.

A public inquiry into the CEGB's application to build a PWR at Sizewell in Suffolk is under way, and the main public hearing, which is being held close to the proposed site, opened on 11 January 1983. The inquiry will look into

all aspects of the CEGB's proposed new power station. As well as the normal planning considerations, the safety and the economics of the proposed development will be considered in depth. The Government's general policy for a growing nuclear component in no way pre-empts this particular decision. All proposals to build new stations are considered on their individual merits.

For the future, the Government has re-affirmed its commitment to the development of the fast reactor. It seems likely that reactors of this type will be needed in the early part of the next century. This type of reactor will be able to burn depleted uranium and plutonium recovered from spent fuel from the present commercial reactors, and can create out of it energy equivalent to our present economically recoverable coal reserves. This is of major significance for our future energy supplies.

Britain is among the world leaders in fact reactor technology, and a substantial development programme is concentrated at Dounreay in the North of Scotland.

Safety The nuclear power industry is, by comparison with other energy industries and with most of the chemical and petrochemical industries, safe for both its workers and the public. Successive Governments have ensured that safety considerations have been paramount.

The most serious accident which has occurred in a nuclear plant in Britain was in 1957. This occurred not in a civil plant, but in a reactor at Windscale used to produce plutonium for defence purposes. Within 38 hours, the reactor was cold and under control, but a good deal of radioactive iodine was released. There is no physical evidence that the health of anyone in the UK was adversely affected by the accident. There have been reports in the press recently of the results of a theoretical estimate of its possible ill-effects. Every year, tragically, 120,000 people die from

cancer. Natural background radiation is held responsible for a small proportion of these, of which 15 to 25 per year are deaths from thyroid cancer. The recent analysis of the Windscale accident put an upper limit of 0.33 additional deaths per year due to the accident. There has however been no actual increase detected in the incidence of thyroid cancer in the North West.

The accident stimulated an exhaustive review of the safety arrangements in the UK. The Nuclear Installations Inspectorate (NII) was established as an independent licencing body, and the principle was firmly established that the operator of any nuclear installation in the UK has the absolute responsibility to ensure its safety. This system has served the country very well indeed. Britain's safety record at nuclear installations is second to none. It is noteworthy that the changes proposed by the Kemeney Commission, which was set up in the US after the accident at Three Mile Island, would make the US regulatory sytem much more like the system we have had in Britain for the last twenty two years.

The questions on safety have to be addressed at various levels:

- How likely is a major accident? - It is unlikely in the extreme. 281 nuclear reactors operate in 24 countries; the technology has been in use for almost twenty years; yet a major accident resulting in any significant hazard to public health has never happened. Nuclear power plants are designed with safety in depth, and are very closely regulated indeed. The accident at Three Mile Island, which was a serious financial disaster, did not pose a significant threat to the people living in the vicinity.

- What if a major accident happened? - First, a reactor core cannot explode like an atomic bomb. However, the worst possible accident that can be imagined at a nuclear plant would be very serious. The same is true of very many other large installations. The

point is that the worst possible accidents are precisely the ones which the designers and regulators are so careful to avoid. Throughout history, the great disasters have been natural - plague, floods, earthquake. Apart from wars, hydro dam failures are the only man-made disasters which have caused well over a thousand deaths in a single incident.

- What about the less spectacular risk of radiation escaping from nuclear power plants during normal operation? This is easily measurable and demonstrably insignificant. The environment in which we live is permeated by radiation; a small amount is added by burning nuclear fuel. It has been estimated that the present level of radiation from the nuclear programme is as dangerous to the individual as the smoking of two cigarettes in his or her lifetime.

The Department of the Environment and the Ministry of Agriculture, Fisheries and Food both monitor the effects of pollutants, including those from the nuclear power programme, in the environment. Both are independent of the sponsoring Department of the nuclear industry.

Waste Management. 96 per cent of spent fuel from nuclear reactors is unburnt uranium or plutonium, which is reusable. The remaining waste, although highly radioactive, is produced in very small quantities. One of the virtues of nuclear fuel is that a small volume produces a large amount of energy. Coal and oil, on the other hand, have to be burned in large quantities, and produce large amounts of solid and gaseous waste, some of which is potentially hazardous.

The safe storage of highly active waste from nuclear fuel is essential. At present, it is stored at Sellafield, in solution form, in high integrity stainless steel tanks. A process for turning this waste into glass has been developed on an industrial scale by BNFL's partners in France, and work of this kind will soon start at Sellafield. The waste will then be glassified

within stainless steel containers, and stored at Sellafield until much of its activity has decayed. This will take about 50 years, after which the well-sealed containers will be permanently stored.

Nuclear Energy and Nuclear Weapons

The civil nuclear power industry worldwide has always been alert to the possibility that plutonium extracted from spent fuel or highly enriched uranium could be be used by countries to develop atomic weapons. There are, of course, much easier and cheaper ways in which a country intent upon making nuclear weapons could proceed. Nevertheless, a comprehensive system of international agreements and inspections minimises the risk that the legitimate rights of countries to civil nuclear power do not lead to their developing nuclear weapons.

The prime instrument of control is the Non-Proliferation Treaty. States party to the NPT have undertaken not to provide nuclear materials or equipment to a non-nuclear weapons state unless they are covered by safeguards monitored by the International Atomic Energy Agency. Most other countries not party to the NPT have all their nuclear facilities under IAEA safeguards. There are only four non-nuclear weapons states which are not party to the NPT and where certain nuclear facilities are not under IAEA safeguards. These are India, Pakistan, Israel and South Africa. The safeguards system is designed to verify member states compliance with their stated commitments and to account for all the nuclear materials handled by their civil nuclear programmes so that misuse would be detected at an early stage.

Secondly, the principal exporters of nuclear materials and technology, including the UK, belong to the Nuclear Suppliers Group, and observe agreed guidelines for the transfer of sensitive nuclear items and technology. These are specifically designed to reduce the risk of misuse.

As a country which already has nuclear weapons, we need not submit to IAEA safeguards, but have chosen to do so. The Government has recently reaffirmed that no plutonium recovered from our civil nuclear programme has ever been used for military purposes and that there are no plans to do so in the future.

Common misconceptions

If a nuclear station ever "goes seriously wrong" there could be terrible consequences for thousands of people	There has never been a nuclear emergency at any nuclear station in the UK. All have well rehearsed emergency plans should such an emergency ever be declared. It is precisely because the potential risks from a nuclear accident are serious that the industry is required to spend tens of millions of pounds on the safety system built into the plant. If the Government really believed that accidents might happen on the scale even approaching the maximum theoretical release of radioactivity, then it would never have agreed to the construction of nuclear power stations in this country.
Progress on renewable sources of energy is hampered by concentration on nuclear power	No significant contribution can be expected from the renewable sources of energy at least before the year 2000. Nonetheless, the Government is active in its promotion of R&D in this area.

Conservation could eliminate the need for more nuclear power

Conservation is very important, particularly in reducing the energy used in space heating. However, electricity is relatively little used in this application. In any case, measures such as loft insulation have relatively little impact on the peak demand for electricity, and this is the factor which determines the amount of generating capacity needed. Thus more home insulation, while very sensible in cutting heating bills, does not mean we need to have less generating capacity.

The ordering and building of nuclear power stations is grinding to a halt worldwide. In the US, some are closing down.

The building of power plants has been affected by the worldwide recession. However, the situation has been exaggerated by opponents of nuclear power.

In West Germany a five year gap in building nuclear power stations ended last year and work on two new stations began. In all, nine plants are under construction and 13 more are planned. Of these 22, 17 are PWRs.

In Switzerland a 5th nuclear plant (BWR) is planned, and this will mean that 35% of their electricity will be generated in nuclear plant by 1990.

France is pressing ahead with an extensive programme. 27 PWR's are presently under construction.

Italy has recently announced plans to start building three new nuclear power stations in less than two years.

Recession and higher interest rates combined with delays in the licensing process have led, in the US, to cancellations of generating plants under construction. However, some 20 stations presently under construction are expected to come onstream by the end of 1984 and a further 40 are in an advanced stage of construction. Coal-fired capacity has not been hit so hard as nuclear due to lower initial capital costs, simpler licencing and the availability of cheap opencast coal close to potential power station sites.

Britain's 12% of electricity met by nuclear power compares with 15% in Germany, 15½% in Japan, 26% in Belgium, 29% in Switzerland, 34% in Finland, 37% in Sweden and 39% in France.

The Three Mile Island accident demonstrates that the PWR is intrinsically unsafe.

Not a single injury resulted from this accident. The Presidential Inquiry into the accident by the Kemeney Commission concluded that

the small release of radiation had negligible impact on the health of individuals.

Meltdown (as portrayed in the fanciful film, 'The China Syndrome') did not occur. Even if it had, the Commission concluded that there was a high probability that the resulting radiation would have been contained by the reactor building.

The PWR is not inherently unsafe; it is the most common nuclear generating technology in use in the world today. The Commission's main conclusion about the accident at Three Mile Island was that faults in the system of licensing and regulating US nuclear plant were largely responsible for the seriousness of the accident. The changes suggested would bring the US system into line with that in the UK.

The NII will be determined to ensure that the events which occurred at Three Mile Island could not be reproduced in a British PWR. The Electrical Power Engineers Association, which represents the engineers, managers and scientific staff who plan and run the electricity supply industry, has concluded that the PWR "cannot be opposed on the grounds of its safety implications for the staff who will be involved in its commissioning and operating" (Guardian, 5 January 1982).

The disposal of highly active nuclear waste poses a threat to future generations

Nuclear waste will be glassified inside high-integrity capsules, and stored in safety for about 50 years, until its activity is substantially reduced.

These capsules will then be disposed of, in stable geological formations underground or possibly under the ocean. The chances of their reaching the surface and being assimilated by humans will be effectively zero.

The transport of nuclear waste is a hazard to the public

Nuclear fuel is transported in steel flasks up to 12 inches thick. Arrangements for moving spent fuel in the UK are in accordance with internationally agreed safety standards.

Transportation flasks are subjected to simulated accidents to test resistance to fire and impact. They have been proved safe.

More fuel has been moved by the two UK Generating Boards than by all the rest of the world's commercial organisations put together. Just over 12½ thousand tonnes of irradiated fuel have been moved from CEGB power stations to Sellafield since 1962 without incident.

Terrorists could steal plutonium from the civil nuclear fuel cycle to release in a public place or to use for weapons production

Plutonium is a very dangerous material if inhaled as fine dust. The most stringent security measures are enforced to ensure that plutonium is not stolen, even in minute quantities. If terrorists wish to poison large numbers of people, there are many easier ways of doing so with less danger to themselves.

It seems highly unlikely that terrorists could make weapons from plutonium from civil nuclear power stations. It is more likely that they could buy such weapons from irreponsible governments. A moratorium on nuclear power generation would not in any way change the nature of the terrorist threat.

A uranium based society will inevitably lead to a restriction of civil liberties

Objectors to reprocessing at the Windscale Inquiry in 1977 said that civil liberties would be eroded by the security measures necessary to protect plutonium from saboteurs. Nothing that has occurred in the six years since then shows any evidence of such a trend. If there were such a trend employees in the industry would be the first to object, but the Unions concerned have made no complaints about the security measures enforced.