



Office for Civil Nuclear Security

Department of Trade and Industry



The State Of Security In The Civil Nuclear Industry

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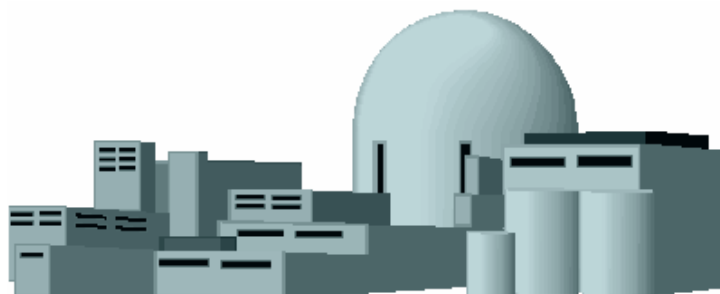
The Effectiveness Of Security Regulation

April 2002 – March 2003

A Report to the Secretary of State for Trade and Industry

by

The Director of Civil Nuclear Security



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An aerial view of Sellafield – Figure 1



The State Of Security In The Civil Nuclear Industry And The Effectiveness Of Security Regulation



A Report to the Secretary of State for Trade and Industry
By the Director of Civil Nuclear Security

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Introduction

1. This is my second annual report on the state of security in the civil nuclear industry and the effectiveness of regulation, since my staff and I transferred from the United Kingdom Atomic Energy Authority (UKAEA) to the Department of Trade and Industry (DTI) on 1st October 2000. The report will be published, subject to your approval, as was last year's, even though the subject matter is intrinsically sensitive. The Minister for Energy had given an undertaking to this effect at the time the transfer was announced. The aim in doing so is to provide assurance that security arrangements taken by the civil nuclear industry in the United Kingdom are comprehensive and effective in relation to prevailing security threats, subject to regulation by a competent Government authority independent of the industry, and in other respects as well consistent with treaty obligations and international agreements.

2. To help me prepare this second report, I reviewed comments made about last year'sⁱ. Reaction from the industry had been generally positive, because I had recognised the essential rôle played by the companies in delivering high standards of security. I had also acknowledged the co-operation received from the industry in the aftermath of the terrorist attacks in New York and Washington on the 11th September 2001. Comments by non-government bodies and individuals concerned about the use of nuclear power were mixed. I believe some individuals found the report complacent or pro-industry. I wish to make clear that I have no brief to act as advocate or apologist for the civil nuclear industry. My staff and I are simply security specialists undertaking an essential security function in the national interest. I report as I find.

3. Comments from professional contacts here and overseas were encouraging. The consensus was that I had got the balance about right in offering an informative, reassuring account, without revealing sensitive information breaching confidentiality obligations. A welcome bonus was that two new members of staff recruited during the year applied to join on the strength of the report.

4. The report has also been cited in various official and published documents. I was pleased to note a comment in a recent report published by The Environment Councilⁱⁱ on behalf of several organisations and experts interested in nuclear issues, welcoming the report's publication, but seeking further information. I hope this second report will go some way towards satisfying such expectations.

5. My first report had included some background information about protecting nuclear material and sensitive technology. As this is still relevant and may aid understanding, I have reproduced the material at Annex A, updated as appropriate.

The Office For Civil Nuclear Security (OCNS)

6. The DTI's Office for Civil Nuclear Security (OCNS), which I direct, regulates security arrangements for the protection of nuclear and radioactive material on licensed civil nuclear sites, as well as sensitive nuclear information, under the new *Nuclear Industries Security Regulations 2003* (which supersedes previous legislation). I have included a section on the new [Regulations](#) later in the report. OCNS was originally the Security Branch of the UKAEA but its responsibilities have broadened over the years, reflecting developments in the industry. OCNS was transferred from the UKAEA to the DTI on 1st October 2000, in response to a recommendation by the Trade and Industry Committee of the House of Commons, following an inquiry into various safety and security issues at the UKAEA's Dounreay site in Scotland. It had become patently untenable that the Government's security regulator should be legally a component of a nuclear operator itself subject to regulation, contrary to guidelines issued under IAEA auspices. At the time of the transfer, the then Minister for Energy announced that OCNS would function within the Department as an independent unit, with full autonomy in regulatory and operational matters. This remains the case.

7. My Office is currently 43 strong (a 23% increase on last year's figure), with annual expenditure of £1.8 million. An organisation diagram is at Annex B: cost and staff schematics at Annex C. Most of our security specialists gained their expertise in the security and intelligence agencies, the armed forces or the police, although others with different backgrounds are being recruited to broaden the range of skills available.

8. OCNS is not responsible for safety matters within the civil nuclear industry, for safeguards and nuclear materials accountancy issues, or for nuclear material on sites operated or sponsored by the Ministry of Defence (MOD). However, OCNS co-operates with government departments and agencies with these responsibilities. Close liaison is maintained with the Security Service, the DTI's Safeguards Office, and the Health and Safety Executive's Nuclear Installations Inspectorate (the NII, the safety regulator). In addition, we liaise with the police, counterparts overseas and the IAEA.

The Civil Nuclear Industry

9. OCNS now regulates security arrangements at 43 civil nuclear sites, from Dounreay at the tip of Caithness to Dungeness on the coast of Kent. These include 13 nuclear power stations generating electricity for the national grid, one of which (Sizewell B) operates a pressurised water reactor (PWR): the remainder run either advanced gas-cooled (AGR) or earlier generation Magnox reactors. Other sites include the large [Sellafield](#) reprocessing complex in Cumbria (Fig. 1), the Springfields fuel fabrication plant, uranium enrichment facilities at Capenhurst, and a number of power stations being decommissioned, plus several other ancillary, research and administrative facilities. Regulation has been extended recently to four sites operated by Amersham plc and two university sites. The map overleaf shows the locations of licensed sites subject to regulation (Fig. 2), with a complete list at Annex D. Background notes on the nuclear fuel-cycle are at Annex E, describing the process used to generate electricity from mined uranium ore or reprocessed spent fuel.



<u>Legend</u>			
1. Dounreay	7. Hartlepool	13. Cardiff (Amersham)	19. Sizewell A&B
2. Scottish Universities	8. Heysham I&II	14. Hinkley Point A&B	20. Bradwell
3. Hunterston A&B	9. Springfields	15. Oldbury	21. Ascot
4. Torness	10. Capenhurst	16. Berkeley	22. Dungeness A&B
5. Chapelcross	11. Wylfa	17. Harwell	23. Winfrith
6. Sellafield	12. Trawsfynydd	18. Amersham	

Locations of Civil Nuclear Sites – Figure 2

10. The nuclear operating companies, including British Nuclear Fuels Ltd. (BNFL), the UKAEA, Urenco and British Energy, take their security responsibilities seriously for commercial reasons and also in the broader national interest, but cannot be expected to regulate themselves. The threats to be countered require specialised support from the security and intelligence agencies, other government bodies, the police and the armed services, including Special Forces. To retain public confidence, the Government must also demonstrate that security requirements will not be cut back or undermined by commercial pressures, although the companies subject to regulation are entitled to expect that the security standards and procedures imposed are justifiable, practicable and proportionate. I have adopted the following mission statement (slightly amended from the version in my first report).

To ensure that nuclear and radioactive materials on licensed civil nuclear sites, sensitive nuclear information and those employed in the civil nuclear industry, are protected against criminal or malevolent acts that threaten national security, the environment or public safety, and help retain public confidence, without imposing unjustifiable burdens on the companies subject to regulation.

Threat Assessments

11. It is vital, given the potentially serious consequences of any criminal or malevolent activity directed against civil nuclear sites or material, or proliferation-sensitive technology, that security measures are designed to counter realistic threats. Resources must not be wasted on misdirected or ineffective security precautions.

12. I mentioned in my previous report the procedures we use to assess security threats, incorporated in a key planning document known as the Design Basis Threat (DBT), as recommended in security guidelines issued by the IAEA. The document is based on intelligence about the motives, intentions and capabilities of potential adversaries. It is designed to provide a definitive statement of the possible scale and methods of attack that could be faced at civil nuclear sites, or when nuclear material is being transported. The DBT also takes account of the availability of countermeasures and contingency arrangements provided by the police, the MOD and other agencies.

13. We have been refining the approach and will shortly issue an updated version, reflecting comments made by the operating companies and other specialists. For security reasons, the DBT is classified SECRET and no further details can be published. However, the document provides the basis for the design, implementation and management of security measures by the civil nuclear companies. It is also used by OCNS to develop or revise model security standards and guidance, to evaluate site and transport security plans prepared by the operators, and to monitor compliance.

14. The companies subject to regulation have supported this criteria-based approach because it provides a transparent, rational basis for security planning, resource management and quality control. Nevertheless, security threats are seldom constant, and it is neither effective nor efficient to maintain all available security measures at a constantly high state of

readiness. Although sites are required to have in place both the structural and technical defences, and the guarding, surveillance and response resources needed to operate at the highest levels of threat, OCNS also issues specific threat assessments and alerts to the operating companies, received from the central security authorities and the police, to enable tailored, additional measures to be activated or reduced in response to prevailing circumstances.

15. Throughout the past twelve months, high standards of vigilance have had to be maintained in response to continuing concerns about the terrorist threat, prompted in part by attacks against Western targets in Bali, Kenya and elsewhere. OCNS was involved in an exercise led by the Cabinet Office to adapt the government alert state system to reflect the changing nature of the terrorist threat. In response to this initiative, OCNS has reclassified civil nuclear sites into three new risk categories and revised the additional security measures to be taken in each category at different levels of alert. Two sites regulated by OCNS (Dounreay and Sellafield) are classified as HIGH category and as such apply the most rigorous security arrangements. All other licensed nuclear sites fall within the MEDIUM category requiring stringent baseline security measures, with a few ancillary sites classified as LOW risk. The opportunity was taken to bring the nuclear power stations run by British Energy and BNFL's Magnox Division, which had been operating a different system, into line with the colour-coded system operated by central government and other civil nuclear sites.

16. To ensure that customers like OCNS are kept as fully informed as possible, the intelligence agencies issue reports in various formats. Most reports are sent to OCNS electronically via an encrypted data link. A recent decision by the Government to establish a Joint Terrorism Analysis Centre (JTAC) is expected to enhance the quality and focus of intelligence reporting on the terrorist threat. I am a member of the JTAC Oversight Board and OCNS functions as a participating organisation. As well as receiving intelligence, we aim to provide JTAC with insights into nuclear security issues to aid reporting on these topics.

Security Standards

17. The security standards and procedures specified by OCNS are confidential but reflect published guidance on *The Physical Protection of Nuclear Material and Nuclear Facilities* issued by the IAEA (INFCIRC/225/Rev.4)ⁱⁱⁱ. OCNS has been closely involved with the IAEA and other foreign counterparts in developing the guidance and is the designated UK competent authority specified in these guidelines. The security measures taken at licensed nuclear sites are graduated to reflect the quantities and types of nuclear material held on site, against the categorisation table at Annex F. Additional measures are taken at some sites and at some facilities within certain sites, to reinforce the measures recommended in IAEA guidelines, either in response to specific threats identified in the DBT document or for other reasons.

Security Vetting

18. We have to assume that any attacks by proliferating states or terrorist groups would be planned carefully in advance. Although most individuals working within the industry are reliable and trustworthy, those planning attacks may seek to use a disaffected or suborned insider with exploitable access. Attempts by criminals to obtain saleable material or information must also be circumvented. In addition, individuals may pursue harmful or

irresponsible activities on their own account, perhaps in ignorance of the possible consequences. For these reasons, OCNS supervises a comprehensive system of security vetting applied throughout the industry under Regulations 4(3) and 9 of the *Nuclear Industries Security Regulations 2003* discussed later in this report.

19. The basis for security vetting for national security purposes had been set out in a statement to Parliament by the then Prime Minister on 15th December 1994. For OCNS, vetting is used as a contributory measure in controlling access to civil nuclear sites, special nuclear material (SNM) and sensitive nuclear information. As a vetting authority, OCNS has access to intelligence and criminal records. Depending on the level of clearance required, my staff may also undertake credit reference checks and background enquiries, including interviews with supervisors and other referees. Occasionally, if doubts persist, enquiries may be made with individuals known to candidates for security clearance who have not been nominated by them.

20. Comprehensive national guidance on applying vetting criteria forms the basis for the decisions taken on clearance. In considering previous criminal convictions, OCNS is authorised to take account of spent convictions under the Rehabilitation of Offenders Act 1974 (Exceptions) Order 1975, for the purpose of safeguarding national security. We place particular value on individuals being open and honest about any past convictions. However, decisions to withhold or withdraw security clearances could have serious consequences for the individuals affected. Sites like Sellafield or Dounreay are the major employers in regions with otherwise limited employment prospects. For this reason, care is taken not to disadvantage individuals unreasonably. Convictions for less serious offences may not lead to a clearance being refused, if individuals have been honest in declaring them and there is reason to believe that they will not re-offend. For similar reasons, we may decide not to withdraw security clearance from existing employees, if they are prepared to cooperate fully in resolving doubts about their fitness to retain a security clearance.

21. The policy and practice of national security vetting gives full regard to the requirements of the Human Rights Act, the Data Protection Act, the Regulation of Investigatory Powers Act and other relevant legislation.

Vetting Turnover And Performance

22. Over the last twelve months, OCNS has issued 9,468 vetting clearances and 2,766 revalidations, the greater majority at the lowest clearance level (BC+PNC), which involves a criminal records check and is used to authorise access to sites. Clearances to the three higher levels (CTC, SC and DV) are needed to permit unescorted access to sensitive facilities, information and nuclear material.

A breakdown for the year is provided in the following table:

Clearance Levels	New Cases	Revalidations
Developed Vetting Clearances (DV)	312	163
Security Checks (SC)	753	51
Counter-terrorist Checks (CTC)	22	0
Enhanced Basic Checks (BC+PNC)	8381	2552

23. During the past year, clearances were withheld in twelve cases but no existing clearances had to be revoked or downgraded. Nine cases are currently subject to local management supervision. Although these numbers may seem small in relation to the scale of checks undertaken, they fall within expectations based on past experience.

24. Unfortunately, a backlog in vetting developed during the year, due mainly to a rise in numbers subject to clearance, exacerbated to some extent by staff retirements. At their peak, delays at DV rose to 2 months against our usual 45-day target, although at Sellafield the backlog reached as high as 10 months. At SC and BC+PNC, delays reached 11 months and 17 days respectively, against corresponding standard target times of 30 and 3 days. Backlogs and delays are not uncommon among vetting agencies. However, they are unusual in OCNS and cause problems for the nuclear operating companies and their contractors, as many staff cannot be employed temporarily on less sensitive work and some new recruits have to be escorted while checks are being completed. Nevertheless, it is essential to avoid cutting corners to ameliorate working pressures. The purpose of vetting is easily undermined if sufficient time is not taken to identify problem cases, or to undertake additional checks and interviews where necessary to resolve doubts about reliability and trustworthiness. To avoid reducing quality standards while cutting these backlogs, we retained a retiring member of staff on a fixed-term contract and brought in some additional short-term help, while other members of the vetting team worked overtime. In addition, new members of the team recruited as replacements for retiring staff have begun to contribute. As a consequence, backlogs for new clearances have now been eliminated and turn-round times are back to target levels, except for DV clearances at Sellafield which are still running six months behind, due to unexpectedly high, continuing vetting requirements for the Sellafield MOX plant (SMP) commissioned the previous year. Unfortunately, revalidations at all levels are still running twelve months behind target, which I view with concern, although clearances are being extended where necessary to avoid operational or staffing difficulties.

25. I am indebted to all members of the OCNS vetting team, including those who retired during the year, for the care and commitment they continued to display during the past twelve months under unremitting pressure. Nevertheless, I am expecting current vetting demands to increase slightly following the introduction of the new Security Regulations and some further changes being made in clearance requirements. I am considering options to avoid further delays developing as a result and to eliminate remaining backlogs.

26. Towards the end of the year, the OCNS Vetting Office assumed lead responsibility, working in conjunction with the Foreign and Commonwealth Office (FCO), the DTI's Safeguards Office and the MOD, for granting clearance to foreign nationals visiting civil nuclear sites. In addition, the OCNS Vetting Office held three training seminars at Harwell for security staff employed by the operating companies on vetting administration. During the year, five audits were also completed of vetting records and procedures maintained and operated at selected sites.

Overseas Checks

27. It can be difficult vetting foreign nationals and British subjects who have recently lived overseas for extended periods of time. We have reciprocal vetting arrangements with counterparts in Europe, Australia and Canada, which work well but are rarely needed. However, although numbers are still small, we are encountering increasing problems vetting US nationals brought over by BNFL, following the latter's acquisition of a majority stake in

the Westinghouse Corporation. Although we are hoping to negotiate reciprocal arrangements with our US counterparts, we have not yet done so due to the devolved system of vetting within the United States.

Appeals

28. I mentioned in my previous report that the trade unions, as well as the operating companies' managers, have supported the requirement for vetting within the civil nuclear industry, even on occasions when it was necessary to extend vetting to new categories of staff. We take pains to be as fair and reasonable as possible in return. We have also introduced an appeals process, ultimately to the independent Security Vetting Appeals Panel (SVAP) established by the Cabinet Office, although this right of appeal is restricted to existing employees.

29. During the year, one case was referred to the Panel at the appellant's request, after the internal route of appeal within OCNS had been exhausted. This was the first time an OCNS case was to be considered by the SVAP. No-one in OCNS had had previous experience of the Panel's approach, although we had seen case reports. It is never easy deciding to withhold or revoke a security clearance. A good vetting officer should always bear in mind the particular personal circumstances and implications involved for the individual affected. It is sometimes possible to resolve matters by undertaking further enquiries or interviews, but doing so takes time and may signal to the employer that doubts have arisen. Nevertheless, we had done so in this case and taken pains to explain to the individual why we had reached the decision to withhold clearance, affording him the opportunity to contest the judgement and offer further extenuating material. We were reassured, therefore, when the Panel upheld the decision to withhold clearance. I was also pleased when the Chairman commented during the hearing that the procedures followed by OCNS had been exemplary.

30. I had been favourably impressed by the Panel's own proceedings. There was little formality: the appellant was supported by a Trade Union representative and afforded the opportunity to present his case. Moreover, although this was my only experience appearing before the Panel, it was evident that Panel members understood that it is sometimes necessary to withhold clearance on security grounds, even if the information available is open to interpretation and the decision to do so will cause hardship for the appellant.

Aftercare

31. Vetting is an essential security measure for staff entrusted with access to nuclear material or sensitive information and is recommended in security guidelines issued under IAEA auspices. However, we cannot read people's minds or anticipate future behaviour. We know from experience that information on record about individuals is sometimes incorrect or incomplete. Although revalidations are undertaken at set intervals, we place the onus on line managers and the companies' personnel staff to maintain effective staff reporting and assessment procedures, and to intervene, reporting to OCNS as necessary, if individuals with security clearance exhibit indications of unreliability or untrustworthiness. We become concerned if individuals incur substantial debts, exhibit signs of alcoholism or test positive for banned substances, are convicted for criminal offences, or if their behaviour in some other way casts doubt on their continuing fitness to retain security clearance.

32. This continuing oversight is known as *Aftercare*. We encourage employers to find ways, wherever possible, to help individuals overcome doubts about their fitness to retain security clearance, although it may still be necessary to restrict access or remove clearance altogether. Regrettably, aftercare is often the *Cinderella* element in vetting and OCNS is no exception. We have not been able to provide any consistent effort over the past year to promote effective aftercare arrangements in the operating companies. We have relied on the latter to do so largely unaided and believe that satisfactory arrangements have been maintained. Nevertheless, we need to find some more time this year to promote best practice and reinforce monitoring standards.

Inspections

33. My team of site inspectors track developments in security policy and practice, and advise on physical and technical security issues. However, their main responsibilities are reviewing site security plans and undertaking inspections or investigations at civil nuclear facilities. This is the fourth major element of activity undertaken by OCNS, complementing threat assessment, standard setting and security vetting. It is impossible, without a thorough and comprehensive programme of site inspections and investigations, undertaken by experts, to identify security weaknesses or monitor compliance with standards and regulations.

34. I mentioned in last year's report that the inspection programme had been suspended after the terrorist attacks in New York and Washington, to allow the inspectors to concentrate on implementing additional security measures. However, I stressed that site visits had been stepped up, so there had been no reduction in coverage, although the inspectors had had to work hard to achieve this. I indicated as well that I expected to resume routine inspections after July 2002. In fact, we resumed programmed inspections slightly later than I was expecting, in September last year, but have undertaken eight security inspections since then at selected sites. This is slightly more than would have been the case for the same period in a normal year, augmented by a higher number of site visits.

Post 9/11 Work

35. It would not be appropriate in a published document to comment in any detail on continuing work to strengthen security arrangements at civil nuclear sites in the aftermath of terrorist attacks in the United States, Indonesia and elsewhere since September 2001. However, I gave some indications in my last report about various additional security measures that had been implemented as a result. We were already taking stringent security precautions, principally against the threat posed by Irish republican terrorist groups, including the presence of armed police at designated nuclear sites. Nevertheless, chicanes and other measures were put in place promptly or strengthened around all civil nuclear sites, in case terrorists sought to use vehicles loaded with explosive to crash through perimeter defences. Security arrangements protecting certain sensitive areas inside sites were also extended or reinforced, against the threat that terrorists who were prepared to kill themselves or risk discovery might attempt to penetrate undetected into these areas to detonate explosives. Both these possibilities have been included in the DBT document.

36. Over the past twelve months, the operating companies have been refining or extending these additional precautions in the light of experience. Plans have been drawn up or action taken to replace some chicanes with permanent, purpose-designed barriers or traffic-

management schemes, partly for safety reasons. With the help of OCNS site inspectors, all perimeter defences at sites have been re-surveyed and in some instances provided with additional anti-crash features. Later in the report, I mention steps taken to extend or strengthen searching of vehicles and personnel.

37. During the course of the year, an important programme was started at Sellafield, in conjunction with the NII's safety inspectors and the operators' own safety and security specialists, to examine security and safety arrangements at Vital Areas. These are areas inside sites containing equipment, systems or devices, the failure of which could have serious consequences. The object of the programme is to understand fully the interaction between existing security, safety and operational features, in order to gauge the extent to which they might prevent or mitigate a serious radioactive release following a sabotage attack. In several instances, it was possible to demonstrate that duplicate or even triplicate cut-outs and other safety controls, designed to prevent an accidental release, would also function effectively in the event of a sabotage attack. In other cases, however, additional controls are being installed. Although very much an insurance programme, intended to reinforce already stringent security and safety arrangements at civil nuclear sites, the Vital Areas Study is an important new development at a level of sophistication beyond conventional counter-terrorist security arrangements. The programme will continue at Sellafield during the coming year, but has also been extended to other civil nuclear sites.

38. Over the past twelve months, OCNS has continued to work with the NII and the operating companies to provide additional measures at civil nuclear sites against the risk of a large aircraft being deliberately crashed onto such a site.

The Future For The Inspectorate

39. I mentioned in last year's report that I had started to change the way the Inspectorate operates, partly in response to requests from the nuclear operating companies. During the year, our inspectors were each assigned about five sites of their own to advise and monitor. This development, which became possible with increased numbers mentioned [later](#) in this report, enables OCNS Inspectors to make more frequent visits, including some that are unannounced, which had not been possible hitherto. OCNS inspectors are also now able to get to know their assigned sites, including details about holdings of nuclear and radioactive material, and key company managers, far better than has been possible before. In addition, they are now able to develop closer working links with the NII's site safety inspectors, as well as with unit commanders at sites policed by the UKAEA [Constabulary](#) (AEAC).

40. My aim over the next few years is to encourage the companies to undertake their own site audit programmes, to suitable quality standards, the results of which I would take into account in my Office's inspection process. This will allow OCNS inspectors to concentrate more on particular issues. In addition, in a move away from the present prescriptive regime of standards and procedures, the companies are being allowed to propose alternative arrangements, providing comparable levels of security but more closely reflecting company policy or local circumstances. The Design Basis Threat and the guidance accompanying the new Security Regulations described later in the report have been crafted with this aim in mind. The combination of this extra investment in effort and more flexible, focussed working arrangements should benefit all involved, enhancing security (and safety) at sites and regulatory oversight.

Chemical And Biological Threats

41. Shortly after the World Trade Center and Pentagon attacks in the United States on 11th September 2001, letters containing anthrax bacillus were sent to media offices in New York and Florida, and to targets in Washington, killing several people. Although the perpetrators were not thought to be connected with the World Trade Center and Pentagon attacks, OCNS and other security authorities have continued to be briefed by the Security Service and other specialist bodies about precautions to take in case terrorists make use of chemical and biological agents over here. During the year, we have arranged for briefings to be given to security staff employed by the civil nuclear companies and continue to pass on information about these risks.

The Transport Of Nuclear Material

42. OCNS regulates arrangements by the civil nuclear operators for the secure transport of sensitive categories of nuclear material (see Annex F). My Office is the UK's designated national security authority under the *Convention on the Physical Protection of Nuclear Material*^{lv} for shipments to and from overseas destinations.

43. My first annual report referred to planning for the return shipment of MOX fuel from Japan to the UK. This was the MOX fuel originally fabricated by BNFL at Sellafield and shipped to Japan in 1999 with a consignment from France, but rejected on arrival by the Japanese utilities due to quality-control irregularities widely reported at the time. It was always going to be difficult returning this material from Japan. Although MOX is not an attractive target, either for terrorists or proliferating states and is safe to transport (see Annex G), the production, use and especially the transport of this type of fuel is controversial and this particular shipment attracted a good deal of publicity. Nevertheless, the shipment was completed successfully last September, with details of the arrival at the port at Barrow again being widely reported. As with the first two shipments to Japan, the MOX fuel was conveyed in a specially equipped, British-flagged vessel escorted throughout the voyage by a second identical vessel, both operated by PNTL, a BNFL subsidiary. Both vessels again carried deck-mounted naval guns and an armed escort provided by the AEAC. Other less obvious, confidential measures were taken to retain continuous, secure communications throughout the voyage, counter any attempts to board either vessel, and prevent any unauthorised interference with the MOX cargo.

44. Throughout the operation, my Office maintained close liaison with the intelligence agencies, the MOD and other government departments involved with the shipment, as well as with the Japanese authorities and BNFL. As anticipated, the shipment did attract a degree of interest from anti-nuclear groups. The ships were overflown on several occasions. Groups of small boats, sometimes in company with Greenpeace vessels and with media representatives embarked, sought to intercept the ships on passage, initially in Japanese coastal waters, then off Australia and South Africa, and finally in the Irish Sea. Fortunately, the demonstrations were lower key than might have been the case, although there was one potentially dangerous incident in the Tasman Sea when some demonstrators jumped into the water in front of one of the vessels, forcing the Master to take evading action. With this one exception, those engaged in demonstrations prudently avoided impeding the ships' passage. I am pleased to note, therefore, that the protests did not directly interfere with the safe and secure passage of the MOX shipment and at no time was it considered necessary to implement any of the contingency arrangements anticipated in the approved transport security plan. Nevertheless,

the vessels had to take great care in the restricted waters where these demonstrations took place, to avoid any risk of accident.

45. On arrival at Barrow, a co-ordinated police operation ensured that the fuel was offloaded and moved safely and securely to Sellafield by rail. Police officers from six separate forces were deployed, including officers provided by Cumbria Constabulary, the British Transport Police (BTP) and the AEAC. One person was arrested for a public order offence at Barrow but this was not as a result of direct action against the movement. Overall, this was a highly successful operation, the benefits of thorough planning and robust security being clearly evident.

46. Whilst there are unlikely to be any MOX shipments to Japan in the coming year, it is expected that MOX fuel will be transported to destinations elsewhere in Europe: plans are well in hand. The MOX will be transported in special High-Security Vehicles (HSV) under armed police escort at all times. Other security measures are also being implemented to guard against unauthorised interference.

47. One shipment of irradiated fuel from Japan to the UK for reprocessing was also completed without incident in 2002 and there have been nineteen shipments of irradiated fuel to and from destinations in Switzerland, Germany and the Netherlands. Each shipment had been arranged in conjunction with our respective European counterparts, the police and the companies involved. In addition, over 400 transports of less sensitive nuclear materials have been carried out by road, rail and sea within the UK, and to or from overseas destinations, during the past year. This number includes regular movements by train of spent fuel from the nuclear power stations to Sellafield for reprocessing (except from Sizewell B, which stores spent fuel on site). There were no security incidents.

48. The total transport security costs incurred by the companies subject to regulation is estimated for the past year at over £5 million.

49. This Office continues to keep under review all security arrangements for the transport of nuclear material, to ensure that the measures taken are amply robust to counter all possible security threats. At the request of the Metropolitan Police, we have looked again at security arrangements for the rail movements of spent fuel from the four power stations in the South East, which pass through Outer London.

50. The new Security Regulations extend direct security regulation for the first time to about twenty specialist companies approved to transport nuclear material, including PNTL and DRS (BNFL's rail freight subsidiary). Hitherto, nuclear operators were expected to ensure that their contracts with carriers required the latter to take specified security measures, which had proved difficult to monitor. OCNS will also step up the number of security inspections undertaken at ports, railheads and other transshipment points used by the transport companies. Further details are given later in this report. A list will be provided in next year's report when the number of companies granted or seeking approved carrier status under Regulation 14 is known. To cope with the additional work arising, the Transport Security Branch of OCNS has been strengthened by the appointment of an additional inspector.

Information Security

51. The responsibilities undertaken by OCNS include supervising arrangements within the civil nuclear industry to protect sensitive information, including investigating any loss or compromise of information. The Government's protective marking system is applied throughout the industry to classify information with defence, national security or proliferation implications. The companies are also expected to follow government guidelines on IT security, with OCNS acting as the industry's accreditation authority. The documentation that the companies are required to submit for approval is analogous to the security plans for civil nuclear sites and the transport of nuclear material mentioned elsewhere in this report.

52. In addition to the physical security inspections at civil nuclear facilities, OCNS also inspects the operating companies' information security arrangements. Since the normal inspection programme was resumed last September, this Office has carried out four such inspections: two computer security inspections and two wider-ranging INFOSEC inspections looking into arrangements at selected sites to protect documents, drawings and plans, as well as computer security measures. OCNS inspectors have also evaluated and accredited nine IT systems used by the operating companies to store or process sensitive information and have offered advice on the security aspects of a project to establish a secure network linking Urenco's sites in the UK, the Netherlands and Germany. All the operating companies subject to regulation have made good progress in implementing the BS 7799 standard for information security management systems, with assistance provided or arranged by OCNS.

53. During the year, two security breaches were reported to OCNS. One involved the loss of two protectively marked documents and the other the theft of a laptop carried by a company executive from a London hotel. Investigations are continuing.

54. In November, the OCNS Principal Inspector (Information Security) chaired a meeting called by the IAEA on the security of IT systems controlling security at nuclear facilities. A further meeting on this topic is planned. Little progress was made during the year to follow up the pilot project mentioned in my previous report to inspect safety-critical IT systems at civil nuclear sites, in conjunction with the NII, to guard against the risk of unauthorised interference, due to other priorities. Last year, a suitable methodology had been developed and two pilot inspections were undertaken. However, further inspections are planned to take place later this year.

55. To cope with a growing workload, the Information Security Branch of OCNS has been strengthened by the appointment of an additional inspector.

Information Disclosure

56. Section 79 of the Anti-Terrorism, Crime and Security Act 2001 introduced a new offence for anyone to make an intentional or reckless disclosure of information that might prejudice the security of nuclear premises or nuclear material. Existing statutory provision, including Official Secrets legislation, provided only partial protection against unauthorised disclosure, in particular where the intention (or possible effect) was to assist a terrorist group or individual, as opposed to a hostile state. Although the new offence applies to individuals, whether or not they work in the civil nuclear industry, the civil nuclear operating companies are also required to keep such information secure under the new Security Regulations.

57. Good progress was achieved during the year in drafting the revised guidance I had mentioned in last year's report, intended to assist the nuclear operating companies, the various regulatory authorities and government departments involved in deciding which categories of information need protection or could be disclosed. The work has been taken forward with the assistance of a group drawn from all the main operating companies and government bodies involved. Although further work continues, draft guidelines have been brought into use. Care is being taken to retain a reasonable balance between providing information of legitimate public interest and protecting the national interest against threats of terrorism and proliferation.

Counter-Proliferation

58. Most of the model standards and procedures specified by OCNS for the protection of information have a dual purpose, to protect details that could be exploited by terrorist groups, or technology of potential value to countries seeking to develop nuclear weapons. The Urenco Group, with plants at Capenhurst in Cheshire, in the Netherlands and in Germany, develops and operates sensitive centrifuge technology for the enrichment of uranium. Centrifuge components of Urenco design with supporting documents had been discovered in Iraq by an IAEA Action Team in 1991, leading eventually to the prosecution of Karl-Heinz Schaab, a contractor working for Urenco Deutschland in the 1980s. The earlier Khan Case, involving the theft of sensitive design information from the Urenco subsidiary in the Netherlands in the 1970s on behalf of the Pakistani nuclear programme, provides a further illustration of the sensitivity of this technology (see Annex A). As a result of these two cases, security arrangements at Urenco sites were reviewed and strengthened. My Office, with our German and Dutch counterparts, constitutes the security authority for Urenco under the terms of the Almelo Treaty. During the course of the year, we have continued to work together to ensure that stringent security arrangements are maintained at Urenco sites.

59. Urenco is applying to the United States authorities to construct a centrifuge enrichment plant at Hartsville in Tennessee. Work is well advanced on revising security arrangements to control the transfer of proliferation-sensitive information from the company's plants in Europe to the United States. Problems overcome include the fact that the US protective-marking system differs in some respects from those applied by the three Troika nations. OCNS has been working closely with its German and Dutch counterparts, the US Nuclear Regulatory Commission (NRC) and the US Department of Energy (DOE) on these issues.

The UKAEA Constabulary

60. The UKAEA Constabulary (AEAC) is a core component of the security regime supervised by OCNS. Its main function is to provide an armed response capability at designated civil nuclear sites in the event of a terrorist attack, although less lethal weaponry (eg. baton rounds) can be deployed. AEAC detachments at sites also provide perimeter and internal patrols, including dog patrols, and a police presence at all open perimeter gates and at certain designated sensitive buildings and areas inside sites. Unarmed AEAC officers policing the periphery of civil nuclear sites are usually able to deal with any minor public order incidents involving anti-nuclear demonstrators without having to wait for assistance from county forces, or risk involvement by armed officers. Furthermore, because the AEAC is authorised to investigate any possible criminal activities inside sites, such as indications of malicious damage, the evidence discovered can be useful in determining whether any

individuals proved to be implicated should be prosecuted, have their security clearances revoked or face disciplinary proceedings. With my full support, the AEAC maintains close liaison links with police Special Branches and other specialist police units. The Constabulary is also tasked by OCNS to provide armed escorts for sensitive nuclear material when being transported, in accordance with the *Convention on the Physical Protection of Nuclear Material*. Although OCNS determines the sites to be protected and the security tasks undertaken by the AEAC, the Constabulary's Chief Constable has operational autonomy in meeting this tasking, under the oversight of a non-statutory Police Authority. Both the Chief Constable and the Police Authority (of which I am a member) publish annual reports^v.

61. I had set up the Standing Committee on Police Establishments (SCOPE), shortly after taking over as Director, in the wake of a public dispute in 1998 about police numbers at Dounreay. The circumstances were investigated by the House of Commons Trade and Industry Committee which concluded, *inter alia*, that there had been pressure to reduce police numbers at several sites to save costs. SCOPE was created to reassure Ministers, Parliament and the general public that policing levels at sites protected by the UKAEA would be determined in future by my Office on security grounds and not by the companies' commercial interests. We have usually held annual meetings at every site protected by the AEAC, but only two further SCOPE meetings have taken place this year. This was due partly to competing priorities, but also to afford the Constabulary a period of consolidation to allow recruitment to catch up. Over the four years that SCOPE has been functioning, police complements (and supporting civilian staff) have been increased by 27% against the baseline 1998-99 establishment (478), excluding a supernumerary complement of 42 police officers to escort MOX shipments. In addition, relative increases have been made in the number of authorised firearms officers and dog patrols at sites. Increased staffing at headquarters and at the police training centre near Sellafield have also strengthened the Constabulary's command, operational, intelligence and training capabilities. I was particularly pleased that the Constabulary has succeeded in bringing policing levels to within 2% of the 2002-03 establishment, at a time when most other police forces have been actively recruiting as well.

62. In the aftermath of the terrorist attacks in the United States in September 2001, I required increased searches of personnel and vehicles, and additional patrols to be made. This extra activity has been maintained throughout the past twelve months and, at some sites, increased again. I continue to be impressed by the professionalism, discipline and commitment displayed by all ranks of the UKAEA Constabulary. Police officers on duty are expected to remain vigilant in all weathers around the clock. Authorised firearms officers (AFOs) are well aware that they may be called upon at any time, without warning, to use their weapons and that, after such an event, their actions would be closely scrutinised. I was pleased to note complimentary comments by Sir Ronnie Flanagan, one of Her Majesty's Inspectors of Constabulary (HMIC), about the AEAC's firearms capabilities, in a recent inspection report.

63. Work continued during the year on the proposals announced in 2001 to detach the Constabulary from the UKAEA and re-establish it as a stand-alone force under a new, statutory Police Authority, subject to the necessary legislation. I have been involved in preparatory work led by policy colleagues in the Department and the Home Office to take this forward. We are taking the opportunity to consider whether further changes should be made to the Constabulary's powers, principally that AEAC officers should be able to exercise additional powers included in the Terrorism Act 2000. In addition, I have supported proposals to authorize the AEAC to undertake special investigations, or participate with other police forces in doing so, under the Regulation of Investigatory Powers Act 2000.

64. I am supporting a project approved by the Police Authority to equip the Constabulary with a new, encrypted radio communications system developed for the emergency services (AIRWAVE), to be introduced at sites protected by the AEAC in phase with its adoption by county forces. Advice has been given by OCNS during the year on a secure information network for the AEAC. My officers and I have taken part in, or addressed, a number of internal meetings and conferences, as well as others involving other police forces. Another police officer was awarded *The OCNS Beat Officer of the Year Award* by the Chief Constable – an award I had instituted the previous year with his agreement to recognize the importance of fixed-point and patrol duties in protecting sites against hostile attack.

65. My Office will continue to maintain close professional contacts with the Chief Constable and other senior officers (eg. on sensitive operational and intelligence matters). During the coming year, we plan to draw up revised guidance for the Constabulary, to reflect guidelines issued to the operating companies under the new Security Regulations. With these aims in mind, a new Principal Inspector post has been filled to strengthen oversight of policing (and guarding and security management) issues.

Greenpeace Incursions At Sizewell

66. On the 14th October last year, 103 demonstrators organised by Greenpeace climbed over the perimeter fence lines into Sizewell B nuclear power station on the Suffolk coast. On 13th January this year, 34 demonstrators actually cut through the fence lines to enter the site. On both occasions, a small number of demonstrators then used ladders they had brought with them to climb about 15 metres onto a flat roof abutting the reactor block to gain access via a fire door into the Inner Secure Zone. Although they would not have been able to penetrate into sensitive inner areas, this should not have been possible. This Office had not been aware until the first occasion that this fire door was being left unsecured. Although the station had undertaken a variety of improvements in the intervening period, it had failed to act promptly enough to secure the door by the time of the second incursion, although this has now been done. This rare but regrettable occurrence illustrates why it was necessary to increase the number of OCNS inspectors mentioned at paragraph 39. We have taken advantage of this increased capacity to review the position quickly at other sites as well as Sizewell B.

67. Action has been taken to enhance deterrence and delay around the station perimeter at Sizewell B (and at other sites). More razor wire has been installed across the tops of fence lines, at ground level and at certain other points vulnerable to climbing. Electrified fencing is also being installed at selected sites. However, this will not prevent determined individuals cutting through or scaling perimeter fencing, if they are willing to risk lacerations from barbed tape. No practicable, cost-effective combination of perimeter fencing and other obstacles can prevent large numbers of demonstrators breaching outer barriers. The purpose of perimeter barriers is not to keep intruders outside sites, but to delay and detect intrusions taking place and afford time for contingency arrangements to be activated. On both occasions, the demonstrators breaking into Sizewell had been detected approaching the station by CCTV and had then tripped intruder alarm systems. The station's security guards had performed very credibly in accordance with contingency arrangements in containing these incursions until the demonstrators could be removed by local police.

68. Incursions by large numbers of demonstrators are wholly different in character and scale to attacks likely to be attempted by armed terrorists seeking access to sensitive sites. Terrorists do not operate in such numbers. They would aim to avoid triggering alarm systems

or drawing attention to themselves at outer barriers, to try to get as close as possible to sensitive inner areas before being detected. They would be unlikely to risk the delays and uncertainties entailed in climbing buildings in the hope of finding ways into sensitive areas. These considerations are relevant for two reasons. Firstly, I do not wish to divert effort and resources from maintaining counter-terrorist defences towards attempts to control and contain unarmed demonstrators. Secondly, I may not misuse statutory powers by requiring civil nuclear operators to incur operational difficulties and considerable expense which cannot be justified by genuine security threats, and are not required at other industrial sites not subject to security regulation. Incursions such as these are public order incidents and treated as such.

69. The second incursion could not be described as peaceful. A security guard was pushed through the gap in the inner fence cut by the demonstrators. A number of demonstrators spent several minutes using sledgehammers and crowbars in a failed attempt to smash through an armoured security door into the reactor block, before trying to breach another security door at ground level without success. However, these attempts caused a good deal of noise inside, alarming station safety and operations staff. Civil operators like British Energy are obliged to rely on the civil law of trespass to deter unauthorised intrusions into civil nuclear sites. Moreover, although causing criminal damage is an offence, it can be difficult to secure convictions without clear identifying evidence, usually in photographic form: demonstrators are adept at avoiding identification and sometimes seek to provoke confrontations with security guards and other members of staff. BNFL have had some success injuncting Greenpeace (eg. during MOX transports to Japan) and British Energy is following suit. Nevertheless, incursions by demonstrators into civil nuclear sites are, in my view, irresponsible and unjustified, particularly when the threat of terrorist attack is as high as it is at present. They divert security resources, worry staff and bring with them an increased risk of accident and injury.

Security Training And Awareness

70. As part of our responsibility for enhancing security awareness within the civil nuclear industry, my Office disseminates training material and sponsors nominees from the companies to attend specialist security courses run by the Security Service and other government agencies. This year, we also organised two security awareness briefings for staff employed by RWE Nukem and Serco working on nuclear assistance projects in Russia.

Civil Nuclear Companies: Co-operation And Management

71. The companies making up the civil nuclear industry co-operated closely with OCNS throughout the past twelve months by maintaining stringent security standards, including strengthening certain existing security arrangements and introducing additional measures. In the current climate, directors and other senior managers plainly accept the need for effective security regulation, recognising that failing to comply fully would damage public confidence. I am pleased to note as well that, this year, heads of sites and middle management also cooperated in accepting operational difficulties in introducing new security arrangements and making sufficient resources available, even though this entailed in some instances having to divert funds from other priorities. In previous years, objections and prevarication at this level were not uncommon.

72. I have decided that the new Principal Security Inspector mentioned at paragraph 65 will also assume responsibility for monitoring the effectiveness and resilience of the operating companies' security management arrangements, which this Office has lacked the capacity to investigate systematically until now. In deciding to do so, I am adopting an idea first suggested in discussions with the NII, which takes a close interest in managerial issues. The new inspector will supervise compliance with guidelines issued under the Security Regulations covering aspects such as the companies' commitment to security at Board level, the quality, training and accountabilities of company security managers, funding provision, and the involvement of heads of sites and other budget-holders. Besides strengthening oversight in these key areas, the effectiveness of companies' internal security management arrangements will inform decisions about the extent to which individual companies would be permitted in future to exercise greater autonomy in managing security arrangements, including undertaking security audits and introducing variations in security provision, as discussed at paragraph 40.

The Nuclear Industries Security Regulations 2003

73. I drew attention in last year's report to Section 77 of the Anti-terrorism, Crime and Security Act 2001^{vi}, which enabled new Regulations to be made to strengthen and extend the scope of civil nuclear security regulation. Hitherto, the legislative framework administered by OCNS had been outdated and unsatisfactory. It had grown *ad hoc* to reflect the development of the industry since the 1950s, with the result that different parts of the industry were governed by separate, inconsistent regimes. In addition, there were gaps and anomalies: a few of the smaller licensed sites fell outside formal regulation altogether, so that regulation had to be exercised through unsatisfactory, indirect means. The same applied to companies transporting nuclear materials, including BNFL's two transport subsidiaries (PNTL and DRS), as well as premises with holdings of sensitive nuclear information, but no nuclear material. To address these deficiencies, the *Nuclear Industries Security Regulations 2003*^{vii} came into effect on 22nd March, after a period of public consultation between July and October last year. My Deputy Director played a lead rôle in developing the new Regulations, working in conjunction with policy colleagues and legal advisers.

74. The new Regulations carry forward the main substance of the previous regulatory regimes. They set requirements for the protection of nuclear material on sites or in transit, against the risks of theft or sabotage, and for the protection of sensitive nuclear information, such as site security arrangements. The core requirement is for operators to submit a security plan for each site to OCNS for approval, setting out the proposed security arrangements, and to comply with the provisions of the plan once approved. Guidance has been circulated to the companies on how the new Regulations should be interpreted. More detailed, generic technical guidance has also been circulated for consultation, on the security arrangements companies are expected to apply at civil nuclear sites, based on previous OCNS security standards. Companies are required to provide new or updated security plans by 22nd June 2003. Advice will be given by OCNS to companies on drawing up site security plans, particularly in the case of companies like Amersham plc that have not been subject to regulation hitherto. These companies have also been invited to attend six-monthly meetings of the Nuclear Industry Security Forum, a group I lead with help from policy officials and the Security Service to co-ordinate and review security arrangements applied throughout the industry in response to prevailing threats.

75. However, the main change is the introduction of direct regulation of the transport of nuclear material. Hitherto, nuclear operators were required to ensure that their contracts with carriers required the latter to take adequate security measures, but this was unreliable because it was difficult for operators to ensure that effective security was being maintained after contracts had been signed. The new Regulations extend direct regulation for transporting nuclear material within the UK and UK territorial waters (and for UK registered ships anywhere in the world). From now on, companies seeking to transport sensitive nuclear material will need to be approved by OCNS by submitting a statement of their security systems and arrangements, much as site operators are required to do. Given the critical need to ensure the security of nuclear material while in transit and the concerns that arise from time to time about the protection provided, I am in no doubt this was a necessary extension of regulation in the national interest.

The Radioactive Substances Act 1993

76. Currently, regulation is focussed on the types of nuclear material that present significant security risks, following the internationally agreed categorisations for such materials. We have considered whether there was a case for extending regulation to lower-risk nuclear materials used for research, industrial and medical purposes outside nuclear sites, such as natural and depleted Uranium, as well as very small quantities of enriched Uranium and Plutonium, and separated Americium and Neptunium. We have concluded, however, that this would not be justified, given the protection already provided through the controls of the Radioactive Substances Act 1993 (RSA), which regulate access and storage, and the need to avoid duplicated regulation. Instead, it has been agreed that OCNS would strengthen co-operation with the Environment Agency and SEPA, which administer the RSA, to ensure that the regime takes due account of security concerns. Conflicting priorities prevented much work on this last year, but further action will be taken in coming months.

Representational Activities

77. Unusually for OCNS, we were called upon during the year to take part in several meetings to brief government ministers and others about the effectiveness of the security regime supervised by this Office, including a meeting with the Radiological Protection Institute of Ireland (RPII). My Office also contributed to briefs for Ministers and answers made to about thirty-five Parliamentary Questions.

78. With some misgivings, I agreed during the year to a request that OCNS take part in discussions convened by The Environment Council between BNFL, our fellow nuclear regulators, some NGOs and individual experts interested in (or concerned about) nuclear issues. The group is known as the BNFL National Stakeholder Dialogue, with the aim of informing the company's decision-making in terms of its environmental performance. It is difficult in public discussions to avoid being drawn into disclosing sensitive details, without appearing to be uncooperative. In addition, I have very few policy-capable officers in a position to offer views across the board, because most of my staff specialise in particular aspects of security regulation. Nevertheless, I did agree on reflection to participate, in view of two of our mission obligations to help protect the environment and retain public confidence, and because I thought the stakeholder dialogue offered an opportunity to correct some misapprehensions about our rôle. Initially, we had to rely on a written exchange of questions and answers, due to conflicting commitments, the outcome of which featured in the BNFL

National Dialogue Plutonium Working Group report published in March. However, we will aim to attend future meetings. I welcome the group's acknowledgement, mentioned in that report, that it is legitimate for the Government to withhold specific security information in the interests of national security.

79. On two occasions, we replied in writing to questions by individuals concerned about nuclear issues, where we thought we could provide some reassurance without disclosing sensitive details. However, I decline to respond to direct requests from the media for more general details about our activities, preferring to work through the Department's Communications Directorate, to ensure consistency in response.

80. We do not have the staff to be drawn into the level of public discussion accepted by other regulatory bodies. In addition, there is little more we can say beyond the information published in this series of annual reports, for security reasons. On the other hand, I recognise that this Office does have an obligation to help retain public confidence in civil nuclear security arrangements. We make a distinction between providing information about the rigour and extent of the procedures enforced by OCNS, as instanced by this report, without disclosing sensitive details capable of being exploited by terrorists and others intent on causing public harm or breaching previously agreed confidentiality constraints.

Other Professional Activities

81. With some difficulty due to other priorities, we have continued to take part this year in various interdepartmental and professional bodies promoting best practice in protective security arrangements. Interdepartmental groups include the:

- Special Materials Accounts Committee (SMAC)
- Environmental Crime Group (ECG)
- Physical Security Working Group (PSWG)
- Electronic Security Working Group (ESWG)
- Information Technology Security Officers Forum (ITSOF)
- The Departmental Security Officers Conference
- The Information Security Officers Conference

82. OCNS staff participate in discussions with fellow experts in the private sector and overseas in several professional bodies, including the Risk and Security Management Forum (RSMF) and the Institute of Nuclear Materials Management (INMM).

International Activity

83. OCNS is the United Kingdom's designated security authority for civil nuclear matters under various treaties, international conventions and agreements. In addition, OCNS is tasked by the Department to manage nuclear security assistance projects overseas, mainly in Russia, the countries of the former Soviet Union and Eastern Europe.

84. We keep in close touch with our counterparts in the United States, France, Sweden, Germany and Japan. During the year, my two deputies and I paid several visits to the United

States for bilateral discussions with counterparts in the DOE's National Nuclear Security Administration (NNSA) and the Nuclear Regulatory Commission. Two meetings were also held with the Australian Safeguards and Non-Proliferation Office (ASNO). We also held a further bilateral meeting with our French counterparts in the Institut de Radioprotection et de Sûreté Nucléaire (IRSN).

European Civil Nuclear Security Regulators Forum

85. In October, I chaired a meeting in London of an informal group of government bodies with responsibilities for civil nuclear security in Belgium, France, Germany, Spain, Sweden, Switzerland and the United Kingdom. There have been several meetings of this group over the last three years, initially to take forward work on an amendment to *The Convention on the Physical Protection of Nuclear Material*. Since the terrorist attacks in the United States in September 2001, we have also been exchanging security information in response to the heightened terrorist threat. During the London meeting, agreement was reached in principle on a proposal by IRSN to establish the group on a formal basis, to facilitate confidential exchanges and provide the IAEA and other official bodies with a source of expert advice on the approach taken by member States on nuclear security. The group is modelled on the Western European Nuclear Regulators Association (WENRA), a group of the heads of nuclear safety authorities from European countries with nuclear power plants.

The IAEA

86. We also maintain close links with the IAEA's recently renamed Office of Nuclear Security. In the last twelve months, my staff continued to work with policy colleagues in the Department and our regulatory counterparts overseas in developing proposals to revise *The Convention on the Physical Protection of Nuclear Material*. My Deputy Director continued to serve on the Director General's Advisory Group on the agency's nuclear security programme (AdSec). OCNS acts as the UK's point of contact for the IAEA's illicit trafficking database.

87. My Office is one of the main contributory agencies supporting the IAEA's nuclear security programmes. The Deputy Director again acted as team leader in a follow-up mission to Lithuania under the IAEA's International Physical Protection Advisory Service (IPPAS). He also addressed a Regional Training Course held in December in Beijing. My Assistant Director has taken the lead role in developing a new workshop run by the IAEA on the Design Basis Threat approach: during the year, further workshops were held in Armenia, Slovenia and Indonesia. He has also co-ordinated drafting an IAEA technical document (Tecdoc) on the subject, currently being reviewed for publication. One of our Principal Inspectors took part in an expert group called to develop a new training workshop on security for Vital Areas.

Overseas Assistance

88. OCNS continues to collaborate with SKi and GAN, our Swedish and Russian counterparts respectively, on security assistance work in Northern Russia, in support of wider DTI programmes. This year, the Government has provided a 65% contribution towards installing security systems in two nuclear-powered icebreakers based at Murmansk, under

OCNS supervision. This is necessary because these vessels are each powered by two nuclear submarine reactors providing virtually unlimited range.

89. Little progress has been made this year in taking forward proposals to undertake security assistance projects at nuclear sites in Russia operated by Minatom. I admit to being disappointed. The dangers in Russia from insurgency and trafficking are serious, but underfunding hampers the maintenance of effective security measures. Helping the Russian authorities to improve nuclear security arrangements offers substantial benefits for the UK's own national security, in terms of both threat reduction and public safety.

90. I attended a conference in London in November co-sponsored by the US DOE and Minatom on coordinating additional security project work in Russia.

Generation IV

91. This year, OCNS was tasked by the DTI to take part in a new Counter-Proliferation and Safeguards Sub-Group of the Generation IV International Forum (GIF), initiated by the US Department of Energy (DOE) to develop next-generation reactor designs with improved safety, security and performance characteristics. The project is multi-national, currently involving ten countries, including the USA and the UK. Although we will continue to concentrate on more immediate issues, there are professional benefits for OCNS in having opportunities such as this to review longer-term security fundamentals with other foreign experts.

Security Of Radioactive Materials

92. Concerns have grown recently that terrorist groups might try to use radioactive material as an improvised radiation device (IRD). OCNS is not responsible for the security of radioactive material held outside licensed nuclear sites, such as radiation sources used in hospitals, research facilities and industry, or when sources are being transported. Nevertheless, we have offered advice on request to the Environment Agency, SEPA and the police National Counter-Terrorist Security Organisation (NaCTSO), drawing on experience gained regulating security at licensed civil nuclear sites. One of my Inspectors also took part in a recent meeting of technical experts revising the IAEA's code of conduct for the safety and security of radioactive sources.

Administration

93. For the two years following the transfer from the UKAEA, OCNS has been administered by the Nuclear Industries Directorate (NID), part of the DTI's Energy Group. However, a recent reorganisation has resulted in NID's dissolution and its nuclear policy responsibilities being reassigned. OCNS is now administered by a new Energy Innovation and Business Unit (EIBU). I am pleased to report that, despite this change, continuity of support has been maintained. Care has been taken as well to ensure that the business focus of this new unit does not conflict with our security responsibilities: the DTI's recently published Business Plan for 2003 – 2006 notes on page 6 that *we will ensure nuclear safety and security* and (at page 42) sets the aim of continued, effective civil nuclear security regulation by OCNS.

Staffing

94. A welcome development this year was the creation of eight new posts, including six new Inspector posts, mainly in response to the heightened terrorist threat, but also anticipating additional work arising from the new Security Regulations. Although small numerically, this represent a 23% increase on last year's establishment. I have already mentioned the benefits of improved coverage and continuity. The increase in staff has also allowed me to restructure the Inspectorate into specialist branches, to improve depth and continuity of expertise. In addition, the Inspectorate now has some margin available for leave, training and development.

95. Other welcome benefits from the increase in staffing have been improved opportunities for internal promotion, a slightly better age profile and a small improvement in gender balance. Five members of staff have been promoted during the year and the average age has fallen from 50.5 to 48.8. We now have six women officers at middle-management level, including three Inspectors, although none as yet in the Senior Management Group. We are beginning to see some progression from administrative grades into the more senior, specialised security posts, because we are no longer wholly reliant on imported expertise. We have recruited our first graduate trainee Inspector. We have also managed to recruit a broader range of skills from outside, including staff with experience working within the UKAEA, BNFL, the Cabinet Office, the Atomic Weapons Establishment at Aldermaston and the Police Scientific and Development Branch (PSDB). As a result, however, 45% of staff currently have less than three years service with OCNS, which I recognise imposes an additional mentoring responsibility on their more experienced colleagues.

96. Another useful development has been the introduction of a Pay Addition for our Inspector posts, to counter the increasing pay differentials offered to experienced security staff in the private sector that I had mentioned in last year's report. Although still below the upper band of private sector remuneration rates, the extra pay available has had a beneficial impact on the quantity and quality of applicants applying for OCNS posts. I was grateful to fellow RSMF members who provided the valorisation information needed to justify the introduction of the Pay Addition.

97. In the course of this report, I have mentioned various activities during the past year that we have had difficulty supporting as much as I would have liked. In addition, although co-operation with the NII continues to develop, there is scope for further improvement. We have also faced problems keeping in contact with the Department's Liabilities Management Unit (LMU) developing the proposals I had mentioned in last year's report to discharge public sector civil nuclear liabilities. We need to find better ways in future to meet these competing commitments.

98. We have continued to develop management effectiveness, partly by strengthening internal communications. Besides coordinating the recruitment of all our new staff, our Human Resources Manager has supervised work on developing an improved training package for new members of staff. For the first time, OCNS inspectors have attended training modules provided for NII staff, as well as courses run by the Security Service and NRPB.

Staff Travel

99. Although travel by road by OCNS staff was not quite as high as last year, the average for inspectors and investigating officers continued at 10,300 and 8,900 miles respectively, excluding overseas and non-official travel. Travel by rail is seldom practicable. In addition, it can take as long as five days to complete a site inspection or the more specialised studies and investigations now being undertaken. Overseas visits, although often interesting, can be tiring. I wish to take this opportunity, therefore, to record my appreciation once again for the commitment and adaptability offered by all members of staff during the year, as well as the patience shown by their families. Fortunately, the extra staff members we have been taking on are already helping to bring average travel figures to within sustainable, safe levels.

100. Nevertheless, travel commitments are still high. Our investigating officers are already recruited to work from home within the usual recruitment areas for nuclear sites in Scotland, the North West and the South. One of our inspectors also moved to the North East during the year, helping focus and speed of response. We aim over the next few years, when opportunities present, to recruit other inspectors based within a reasonable distance to Sellafield and perhaps other sites. In the meantime, Harwell-based staff are being encouraged to adopt flexible working patterns, to improve work-life balance. A programme to equip staff with laptop computers (protected by an accredited encryption system) is also underway, so that email and sensitive material may be accessed remotely when working away from the office.

Funding

101. OCNS costs during the year amounted to £1.8 million, excluding support provided centrally by the Department for IT, some personnel services and legal advice. OCNS costs recovered by charges levied on the operating companies are treated as ring-fenced. Last year, the proportion was 96%, because the Department makes a nominal contribution (currently £95,000) towards costs incurred undertaking overseas visits (although some are funded by the IAEA), or when this Office provides security advice unrelated to domestic civil nuclear security regulation. We are still exploring the feasibility of moving to a net running costs regime to give OCNS greater flexibility to vary resources in line with regulatory demands and help underpin our operational and regulatory autonomy. However, recent changes to accounting rules discussed with the Treasury may make this unnecessary.

102. The OCNS Head of Finance and Management Services led work during the year on a new charging regime to be incorporated in a Fees Order to accompany the new Security Regulations. The aim has been to introduce greater transparency and immediacy in cost recovery arrangements, without constraining the time needed for vetting checks, inspections and investigations which cannot be predicted accurately in advance.

103. This year, I thought it might be helpful to give some indication of the total annual cost of providing regulated security arrangements within the civil nuclear industry. Provisional estimates provided by the companies subject to regulation in 2002-03 yield a total figure in excess of £50 million, including staffing, policing and guarding costs, maintenance and depreciation, but excluding transport costs itemised separately at paragraph 48.

Conclusions

104. I remain confident that stringent security precautions are being taken to protect nuclear and radioactive materials on licensed civil nuclear sites, sensitive nuclear information, and those employed in the industry against terrorist attacks and other criminal activities that threaten national security, the environment or public safety, in accordance with our mission. Additional security measures have been introduced in response to developments during the year and other, longer-term work is continuing.

105. Much useful work has been accomplished by OCNS during the past twelve months, working in close concert with other specialist bodies, the operating companies, Departmental policy colleagues and liaison counterparts. We have done our best to respond to requests for briefings and attendance at meetings, to assist those requiring expert advice or in helping maintain confidence in the effectiveness of the security regime. Nevertheless, current working pressures have continued unabated since September 2001. The good news is that our new members of staff are beginning to make useful contributions.

106. The new Security Regulations introduced in March will help considerably in enabling OCNS to supervise a comprehensive, updated and effective security regime, backed by clear statutory powers and funding arrangements. However, there are bound to be teething problems, especially for those companies brought within regulation for the first time. It will not be clear, possibly for the next two years, how the new Regulations will actually work in practice. Some refinement may be needed. Although the regime supervised by OCNS will become more formal in nature, given the greater number of companies involved and the imposition of new statutory powers, we are anxious not to lose the present, largely informal and co-operative working arrangements we have with fellow security specialists in the civil nuclear operating and transport companies subject to regulation. This is not due to sentiment. High standards of security cannot be imposed remotely by direction and enforcement. This depends on a shared understanding of prevailing threats and a willingness to work together to implement effective security measures, tailored to suit operational conditions.

M. J. Buckland-Smith
Director of Civil Nuclear Security

May 2003

Footnotes

- ⁱ First annual OCNS Report at http://www.dti.gov.uk/energy/nuclear/safety/dens_report1.pdf
- ⁱⁱ BNFL National Stakeholder Dialogue Plutonium Working Group Report March 2003 at http://www.the-environment-council.org.uk/docs/PuWG_Report_Mar_03.pdf
- ⁱⁱⁱ IAEA publication INFCIRC/25/Rev.4 (Corrected) at http://www.iaea.org/worldatom/Programmes/Protection/inf225rev4/rev4_content.html
- ^{iv} IAEA Publication INFCIRC/274/Rev. 1 at <http://www.iaea.org/worldatom/Documents/Infcircs/Others/inf274r1.shtml>
- ^v Constabulary and Police Authority reports at <http://www.ukaea.org.uk/ukaeac/reports.htm>
- ^{vi} Anti-terrorism, Crime and Security Act 2001 at <http://www.hmso.gov.uk/acts/acts2001/20010024.htm>
- ^{vii} The Nuclear Industries Security Regulations 2003 at <http://www.legislation.hmso.gov.uk/si/si2003/20030403.htm>

Background Notes On Civil Nuclear Security

1. Security has been a preoccupation for the civil nuclear industry since its emergence from the nuclear weapons programme in the 1950s. The earliest security cases concerned the investigation of spies, such as Klaus Fuchs and Nunn May, convicted of passing atomic secrets to the former Soviet Union. Espionage is still a concern although, with the end of the Cold War, the main threat is posed by countries attempting to circumvent export controls to acquire proliferation-sensitive technology to further their own nuclear weapons programmes. The proliferation threat is often overlooked by commentators, but the dangers are real, as illustrated by the Khan and Schaab cases in the Netherlands and Germany in the 1970s and 1980s, which helped Pakistan and Iraq to acquire sensitive uranium-enrichment technology (UET).

2. However, since the late 1960s, the focus of public concern has become the threat that terrorists would seek to sabotage a nuclear facility, or steal fissile material to fabricate an improvised nuclear device (IND). Public concerns are often misconceived. There have been no terrorist attacks against any nuclear facilities in the United Kingdom and no known examples of malicious activity that could have caused a nuclear explosion or a serious release of radioactivity. Moreover, improvising a viable nuclear device would almost certainly fall outside the capabilities of current terrorist groups. Nevertheless, these dangers cannot be discounted. A successful sabotage attack on a nuclear facility could cause widespread radioactive contamination and loss of life. It is essential, therefore, that stringent security precautions are taken by the civil nuclear industry, well above normal commercial standards, on the basis of specialist advice available only to the Government and subject to strict Government supervision.

3. Concerns have grown in recent years that terrorist groups like Al Qaeda might attempt to use radioactive material in an improvised radiation dispersal device (RRD) or as improvised radiation device (IRD). Unlike fissile material (SNM), other forms of radioactive material (ORM) cannot produce a nuclear explosion. However, there is a danger that radioactive material could be dispersed by conventional explosives over an area of several hundred metres or concealed unshielded in a public place, such as a railway station or a busy shopping mall.

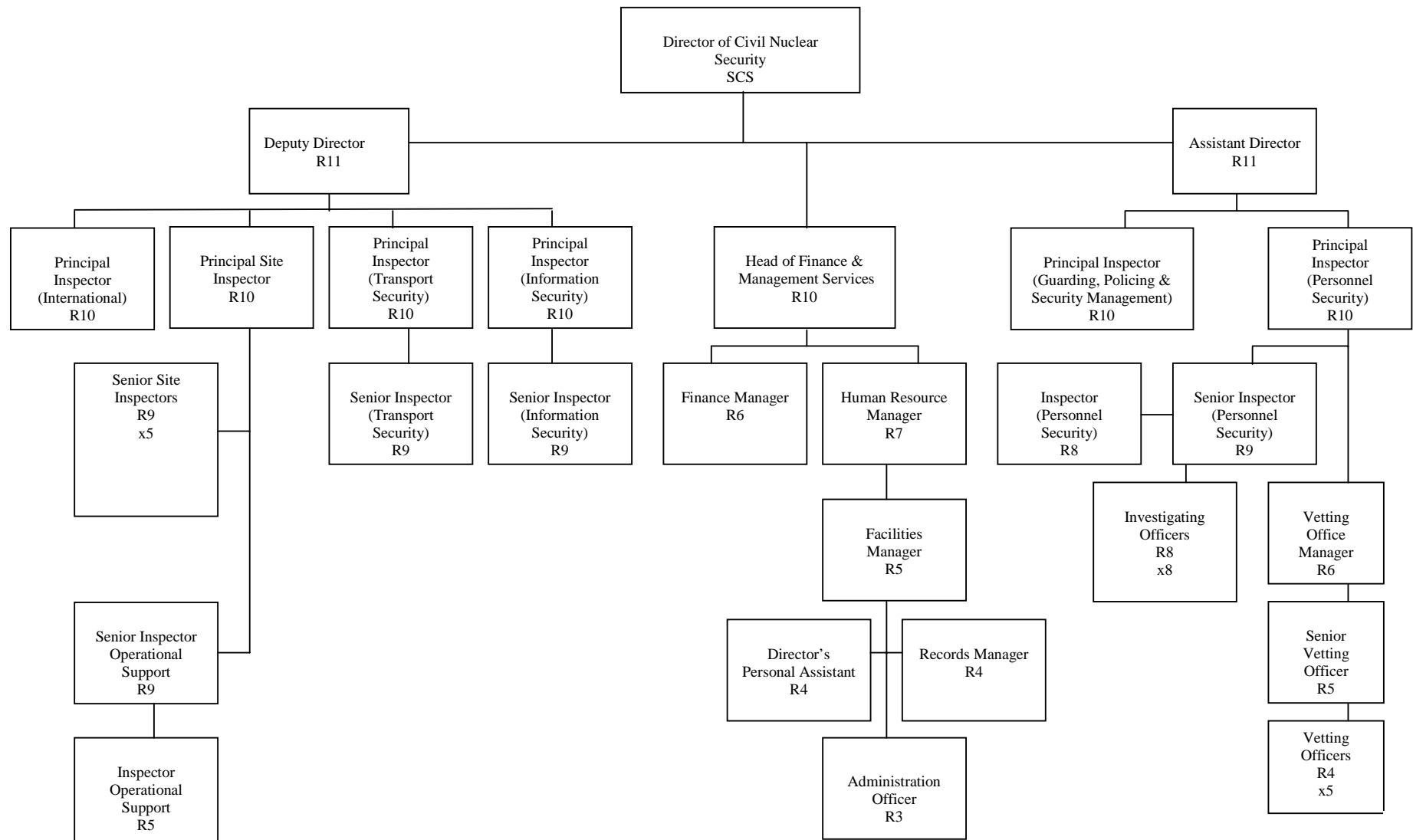
4. Maintaining an effective security regime against the threats of terrorism and proliferation is not straightforward. Those contemplating attacks usually have the advantage of surprise, selecting the time, method and location best suited to their purposes. They could also possibly circumvent security arrangements if they could learn about the measures being taken in advance from disaffected or suborned insiders, surveillance or any exploitable information made publicly available. Most nuclear facilities are large industrial complexes that cannot operate without substantial numbers of workers and regular deliveries of supplies, complicating effective controls on access. The amount and sensitivity of nuclear material varies between sites, new construction and maintenance work sometimes involving large numbers of contractors have to be catered for, and some sites need to attract tenant organisations. Furthermore, for business reasons and to meet various statutory requirements, a considerable amount of information about these sites and about nuclear technology is made publicly available.

5. Security is not just about physical barriers and guarding arrangements around fixed sites. Computers and safety-critical electronic control systems inside sites have to be protected against hacking and other forms of interference. In addition, nuclear material has to be transported for a variety of reasons, usually within the country by road or rail, and abroad by sea or, in certain limited circumstances, by air. It helps that most sites are located within tight-knit local communities: workers and their families and the local police are encouraged to report strangers behaving suspiciously. OCNS maintains close links with the security and intelligence services, the police and foreign counterparts, to ensure that prompt action can be taken in the event of advance warning of any hostile activity. Sites are protected by interlocking physical barriers, technical systems and security procedures, providing *defence in depth*. Frequent, random security patrols, both inside and outside sites, on foot, in vehicles, and with trained police dogs, are a valuable deterrent. The most sensitive sites are protected by specially-trained, armed police officers. Staff, visitors and vehicles are subject to search or may be scanned electronically. These measures in combination are designed to deter or counter any form of ground-based attack assessed as falling within the capabilities of terrorist groups and others posing a threat, and to reassure workers inside sites that they are not at risk. Other measures are taken to safeguard nuclear material in transit and protect civil nuclear sites from attack from the air.

6. Many individuals hold genuine concerns about the safety and security of nuclear power and are entitled to express their views, or to demonstrate outside civil nuclear sites. Sometimes, however, demonstrators attempt to bypass security arrangements, exposing themselves and others to risk. Security precautions at sites have to distinguish between this type of irresponsible behaviour and real threats. The objective, therefore, is to contain intruders at or within outer perimeters of sites. Inner security arrangements are designed to counter the most serious threats.

7. For security reasons, it is recognised by the IAEA and other international bodies that the responsibility for the establishment, implementation and maintenance of civil nuclear security arrangements is the sole, sovereign responsibility of a country's national government. It is recognised as well that sensitive details about security arrangements should not be made public in case they could be exploited by terrorists and others intending to mount attacks.

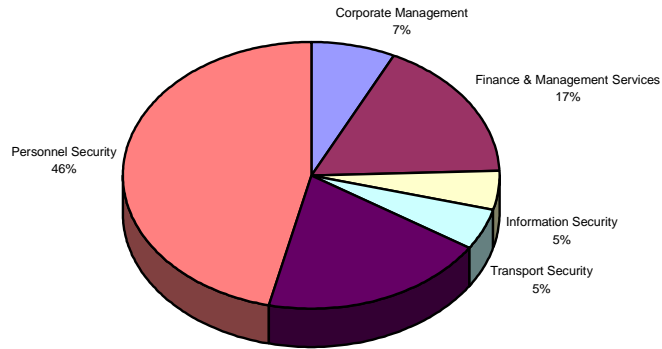




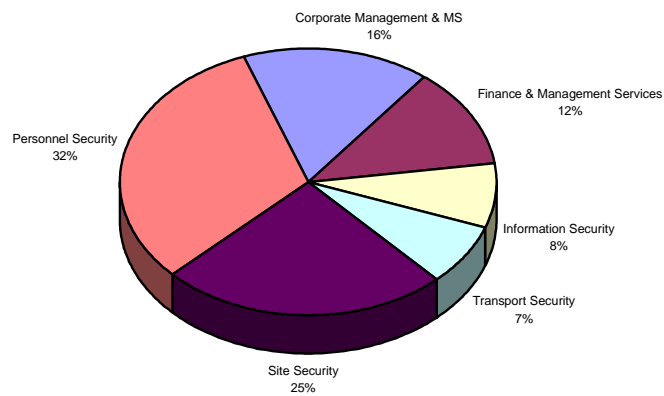
OCNS Organisation Diagram

OCNS Staffing and Costs 2002-03

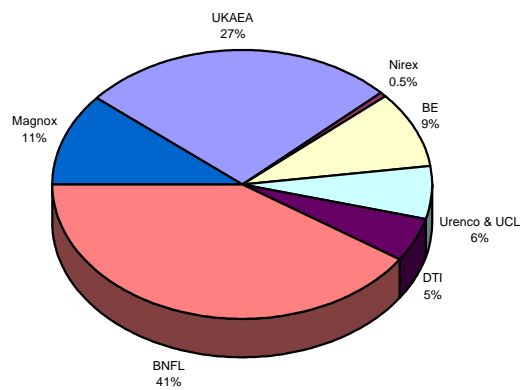
OCNS Staffing (Numbers)



OCNS Staffing (Costs)



OCNS Cost Recovery



Sites Covered By The Nuclear Industries Security Regulations 2003

Licensed Fuel Cycle Sites

1. Capenhurst (Category III) near Chester is divided into two adjacent licensed sites. The plant managed by BNFL was used originally to enrich uranium using the gaseous diffusion method but ceased operation in 1982. BNFL is removing the remaining nuclear residues with a planned completion date by March 2006.
2. Urenco (Capenhurst) Ltd shares the Capenhurst site with BNFL. The Urenco group, a British, German and Dutch joint venture set up under the Treaty of Almelo, undertakes uranium enrichment using centrifuge technology at plants in all three countries. At Capenhurst, the first commercial centrifuge demonstration plant was operational from 1976 until closed in 1991. A second larger plant began operation in 1982. Since then, additional capacity has been provided in stages, with the most recent plant due to come on stream during 2003.
3. Dounreay (Category I) is a UKAEA site on the north coast of Scotland, near Thurso. The site has a range of facilities including the Fuel Cycle Area (FCA), which is used to store and process plutonium and uranium. There are a number of facilities within the FCA, including laboratories and plant for recycling, the Cementation Plant and the Waste Receipt Assay Characterisation and Super Compaction Facility (WRACS). Dounreay is being decommissioned, but is not expected to be fully closed until 2050 – 2060. Decommissioning work includes the Dounreay Fast Reactor (DFR), which ceased operation in 1977 and the Prototype Fast Reactor (PFR) shut down in 1994. An adjacent site is managed by Rolls Royce on behalf of the MOD.
4. Drigg (Category II). Operated by BNFL, the site is located a few miles south of Sellafield. The site is used to store LLW and ILW in the form of plutonium contaminated material (PCM): this is being removed with completion set for 2006.
5. Harwell is the UKAEA's headquarters site, near Didcot, Oxfordshire. The site also houses the headquarters offices of OCNs. Although the birthplace of the civil nuclear industry in the UK, Harwell's three research reactors closed in 1990. The site has a Category II store containing spent nuclear fuel and PCM. In addition, the site contains two plants operated under separate licence by Amersham plc (see below). However, Harwell is nowadays run by the UKAEA as a science and technology business park, accommodating tenant organisations that do not undertake nuclear activities subject to security regulation, including AEA Technology and Serco. Organisations bordering the site include Nirex, the National Radiological Protection Board (NRPB), the Medical Research Council (MRC) and the Rutherford-Appleton Laboratory (RAL).
6. Sellafield (Category I) on the Cumbrian coast south of Whitehaven, is operated by BNFL. This is the largest licensed civil nuclear site in the UK. Nuclear facilities include the Sellafield MOX Plant (SMP), the Magnox and Thermal Oxide Reprocessing (THORP) plants, as well as waste compaction and vitrification plants. Spent fuel is transported to Sellafield for reprocessing as part of the fuel cycle process

described at Annex E. Over 80 tonnes of plutonium is stored at Sellafield. The site also contains the first Magnox nuclear reactor, known as Calder Hall, which ceased generation in March 2003 and the Windscale Piles (see para. 8).

7. Springfields (Category III), located near Preston in Lancashire, has been operating since 1946. Run by BNFL, the site manufactures reactor fuel for both AGR and Magnox reactors. It has in the past also fabricated fuel for the PWR at Sizewell B and still retains this capability. AGR fuel is made from UO₂ powder converted into pellets and stacked inside stainless steel tubes. Magnox fuel consists of a solid uranium metal rod encased in a machined magnesium alloy tube assembly. The PWR fuel for Sizewell B is also made from UO₂ pellets, encased in zirconium alloy tubes.

8. Windscale (Category III) is a separate licensed site at Sellafield run by the UKAEA. Two early reactors known as Piles 1 and 2, and the Windscale AGR, ceased operation in 1957 and 1981 respectively. Pile 2 is in a state of long term care and maintenance and other minor facilities are in the process of being decommissioned, or leased to tenants, including a Post Irradiation Examination (PIE) facility.

9. Winfrith (Category II), near Wool in Dorset, is also run by the UKAEA. The site was used originally to operate various prototype reactors, including the Dragon reactor and the Steam Generating Heavy Water Reactor (SGHWR), all of which have ceased operation and are being decommissioned. Inventory holdings at Winfrith are scheduled to fall below Category III in 2004 as remaining fuel is moved to Harwell. Winfrith is increasingly being operated as a business park and tenant organisations include AEA Technology, DSTL, QinetiQ and the Centre for Ecology and Hydrology.

Operating Nuclear Power Stations (7 AGR, 5 Magnox and 1 PWR)

10. Chapelcross (Category III), near Annan in Dumfriesshire. Commissioned in 1959 and operated by BNFL, this station has four Magnox reactors generating 168 MW. It is due to cease operating in 2005 and to be de-fuelled in 2007.

11. Dungeness A (Category III), near Romney March in Kent. Commissioned in 1965 and operated by BNFL, the station has two Magnox reactors generating 450 MW. It is due to cease operating in 2006 and to be de-fuelled in 2009.

12. Dungeness B (Category III), next to Dungeness A. Commissioned in 1983 and operated by British Energy (BE), the station has two Advanced Gas-Cooled reactors (AGR) generating 1110 MW.

13. Hartlepool (Category III), on the coast near Middlesbrough. Commissioned in 1983 and operated by BE, this station has two AGRs generating 1150 MW.

14. Heysham 1 (Category III), on the coast near Lancaster. Commissioned in 1983 and operated by BE, this station has two AGRs generating 1210 MW.

15. Heysham 2 (Category III), next to Heysham 1. Commissioned in 1988 and also operated by BE, this station has two AGRs generating 1250 MW.

16. Hinkley Point B (Category III), near Bridgewater, Somerset. Commissioned in 1976 and operated by BE, the station has two AGRs generating 1250 MW. The Magnox Hinkley Point A station ceased operating in 2001 (see below).

17. Hunterston B (Category III), near Largs on the Ayrshire coast. Commissioned in 1976 and operated by BE, this station has two AGRs generating 1190 MW. The Magnox Hunterston A station ceased operating in 1990 (see below).

18. Oldbury (Category III), on the River Severn about twelve miles from Bristol. Commissioned in 1968 and operated by BNFL, Oldbury has two Magnox reactors generating 434 MW. It is due to cease operating in 2008 and to be de-fuelled in 2010.

19. Sizewell A (Category III), on the Suffolk coast near Aldeburgh. Commissioned in 1966 and operated by BNFL, this station has two Magnox reactors generating 420 MW. It is due to cease operating in 2006 and to be de-fuelled in 2009.

20. Sizewell B (Category III), near Aldeburgh, on the Suffolk coast. Commissioned in 1995 and operated by BE, this station has the one Pressurised Water Reactor (PWR) in the UK, generating 1188 MW.

21. Torness (Category III) on the coast near Dunbar, East Lothian. Commissioned in 1988 and operated by BE, Torness has two AGRs generating 1220 MW.

22. Wylfa (Category III) on Anglesey. Commissioned in 1971 and operated by BNFL, the station has two Magnox reactors generating 980 MW. It is due to cease operating in 2010 and to be de-fuelled in 2012.

N.B. Although rated Category III, security arrangements at operating nuclear power stations are more stringent than those applied at other Category III sites.

Decommissioning Nuclear Power Stations

23. Bradwell (Category III), operated by BNFL near Maldon in Essex. Bradwell ceased generation in March 2002. The fuel is due to be removed by 2005.

24. Calder Hall (Category III) is operated by BNFL at the Sellafield site in Cumbria. This was the first commercial nuclear reactor station in the UK, commissioned in 1965. The last of the four Calder Hall Magnox reactors ceased power generation in March 2003. All four reactors will be de-fuelled by 2007.

25. Hinkley Point A (Category III) on the coast near Bridgewater in Somerset, is operated by BNFL. A Magnox station commissioned in 1965, this station ceased operating in 2001 and is due to be de-fuelled in 2005.

Other licensed nuclear premises subject to the Security Regulations 2003

26. Amersham plc specialises in medical diagnostics and life science research. The Grove Centre at Amersham (Category III) produces medical diagnostic and predictive imaging products, and another site at Cardiff undertakes disease research and new drug development. Some of this work involves radioactive materials, predominantly of low energy and short half-life.

27. Amersham plc also operates two facilities within the Harwell site (Categories III and IV) licensed to hold radioactive materials, one of which is being decommissioned and the other which reconditions radiation sources and stores radioactive waste.

28. At Ascot in Berkshire, London University's Imperial College of Science, Technology and Medicine operates a Consort II reactor with a thermal rating of 100KW (Category III). It is used for teaching and research in nuclear science and technology and provides an irradiation service to Imperial College and other organisations.

29. Berkeley is located 25 miles north of Bristol on the River Severn, not far from Oldbury. The licensed site has a decommissioned Magnox power station, which now contains Category IV quantities of ILW/LLW, and a PIE facility, which holds Category III irradiated fuel. BNFL's Environmental Services Headquarters is also located on the Berkeley site.

30. At Billingham in Cleveland, ICI operated a TRIGA research reactor until 1996. However, this has been decommissioned and the fuel removed to Dounreay. Other irradiated assemblies and waste have been removed to Sellafield for conditioning and disposal. The site is scheduled to be de-licensed within the next twelve months.

31. The Birniehill Scottish Universities' Research and Reactor Centre lies within the bounds of the Scottish Enterprise Technology Park (formerly the National Engineering Laboratory) in East Kilbride. A research reactor of the Argonaut type with a maximum power of 300 KW, it was operated for research and teaching between 1963 and 1995 by a consortium of Scottish universities. The reactor and associated facilities have now been decommissioned, demolished and removed from the licensed site. The building that housed the reactor is currently in the final stages of preparation for demolition. The intention in due course is to de-license the site. However, there are still a small number of active laboratories within the nuclear licensed site boundary used for geological sampling and testing. This activity is expected to continue for about ten years.

32. The Hunterston 'A' BNFL Magnox station shares a common perimeter with the Hunterston 'B' AGR station in Ayrshire. The former ceased power generation in 1990 and is currently disposing of redundant plant and equipment. No nuclear fuel elements remain there but the site still holds some ILW (Category IV). Planning permission has been granted for the building of a new store for this material. Work is well advanced in preparing the station for decommissioning due to begin by 2005.

33. Trawsfynedd is located a few miles north of Dolgellau in North Wales. It was the only nuclear power station not built on the coast. This Magnox station ceased operating in 1993 and has been de-fuelled. Material remaining on site, which consists of some ILW and LLW (Category IV), will be kept on site in purpose-built stores.

Non-licensed sites holding sensitive information subject to regulation

34. Culham, located near Abingdon, south of Oxford, and operated by the UKAEA, accommodates the headquarters of the UKAEA Constabulary (AEAC), as well as UKAEA administrative offices. Co-located on the site is the experimental Joint European Torus (JET). The JET undertaking came to an end in 1999 and its safety and operation is now maintained by the UKAEA on behalf of the European Fusion Development Agency (EFDA).

35. Barnwood, on the outskirts of Gloucester, houses various British Energy marketing and administrative offices.

36. Marlow in Buckinghamshire houses the headquarters of the Urenco Group.

37. UK Nirex Ltd., which is situated outside the site boundary fence at Harwell, was established to examine long-term options for the disposal of radioactive waste. The company also offers advice about waste packaging and publishes information about radioactive waste held or stored in the UK.

38. British Energy's group headquarters is located at Peel Park, East Kilbride, near Glasgow.

39. BNFL Group headquarters is located at Risley near Warrington in Cheshire.

40. The UKAEA also maintains a small outstation at Risley dealing mainly with safety cases and other safety-related matters.

41. Summergrove, near Sellafield, accommodates the AEAC Training Centre.



A Brief Outline Of The Nuclear Fuel Cycle

1. Currently, there are almost 440 nuclear power reactors in operation in over thirty countries worldwide. In many cases they supply a substantial proportion of national electricity requirements.

Reactor Types

2. The majority of the world's power reactors are of the light water type (LWR), where ordinary water acts as both moderator, slowing down neutrons to efficient speeds for nuclear fission to occur, and coolant, transferring heat from the nuclear reaction to steam generators for producing electricity.

3. Because ordinary water is an inefficient moderator, LWRs must be operated on enriched uranium, that is, uranium in which the proportion of the fissile isotope U-235 has been increased from the level in natural uranium (0.71%) usually to between 3% and 5%. Some reactor types can be operated on natural uranium, by using more efficient moderators, such as heavy water, which has a proportion of the heavier hydrogen isotope deuterium, and graphite. Typical examples of this type of reactor are the Canadian CANDU, which is moderated and cooled by heavy water, and gas-cooled graphite-moderated reactors such as the Magnox reactors operated in the UK.

Fuel Cycle Stages

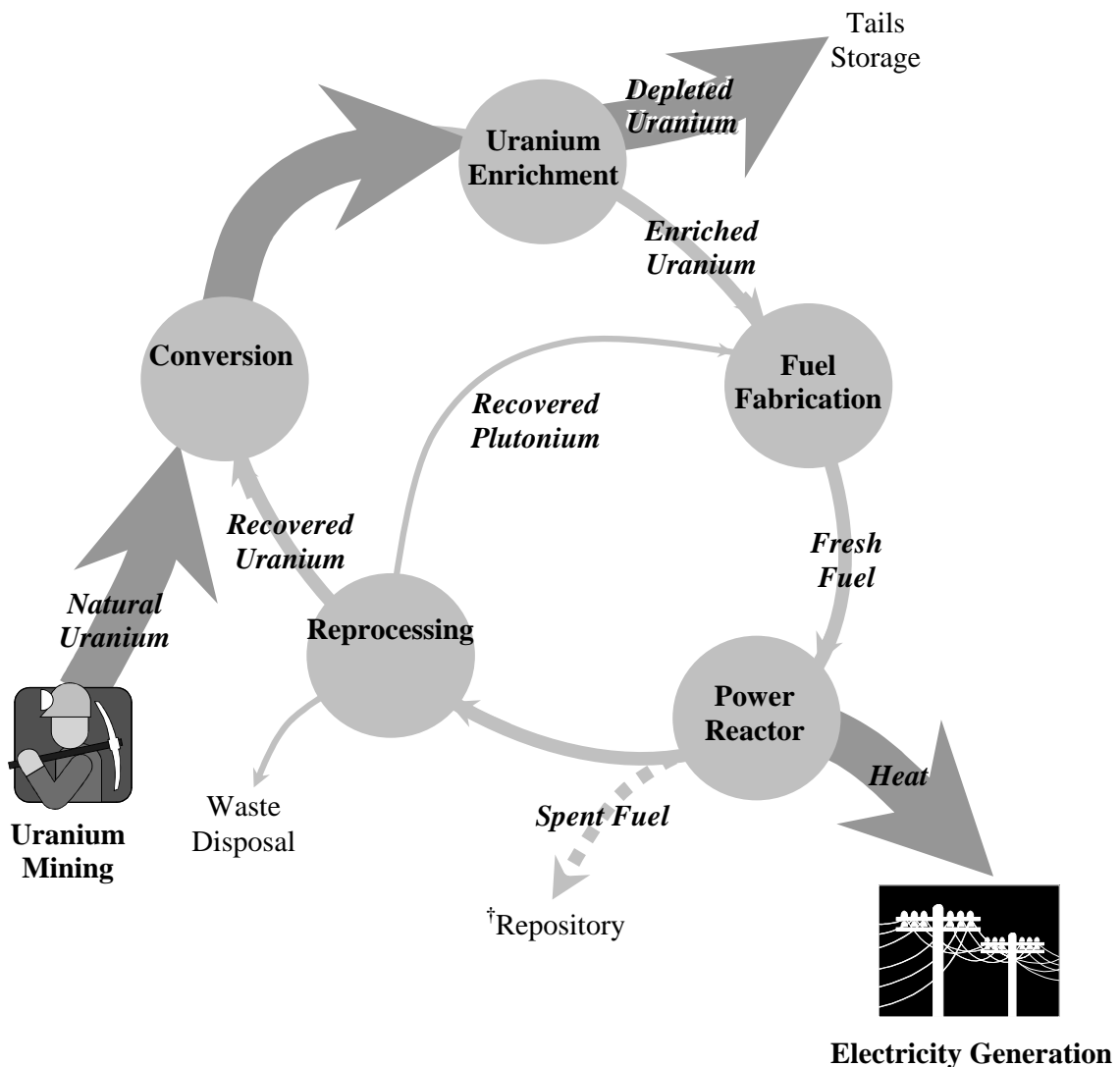
4. Following mining and milling of uranium and production of uranium ore concentrates (yellowcake), the stages of the light water fuel cycle are (Fig 3):

- Conversion: natural uranium is formed into a gaseous compound, uranium hexafluoride (UF₆), prior to enrichment.
- Enrichment: a process by which the proportion of the U-235 content is increased. The main technologies in use are gaseous diffusion and centrifuge. The product is described as low enriched uranium (LEU), typically containing between 3% and 5% U-235.
- Fabrication: manufacture of LEU into uranium oxide fuel pellets, which are assembled into fuel rods and then fuel elements for use in a reactor.
- Reactors: a power reactor uses the heat from a controlled nuclear chain reaction to drive a turbine to generate electricity. Typically, the turbine(s) is driven by steam. In the case of pressurised water reactors as well as liquid metal-cooled reactors and some gas-cooled reactors, steam for the turbines is produced in a secondary circuit. There are some high-temperature gas-cooled reactors where the generating turbine is gas-driven.

- In a typical LWR, fuel elements are used over 3 - 4 operating cycles each of 12 to 18 months (i.e. the reactor might be unloaded every 12 months, with a third of the core being replaced each time);
- Reprocessing: spent fuel is dissolved for the separation of highly radioactive fission products, and for the recovery of plutonium and uranium. Uranium can be re-enriched for further reactor use. Plutonium is mixed with uranium to produce MOX (mixed oxide) fuel and used both in LWRs and potentially in fast neutron reactors.

Partly because depressed uranium prices are impacting on the economics of reprocessing, a number of countries have committed to, or are considering, the once-through cycle, where spent fuel will be disposed of without reprocessing.

Civil Nuclear Fuel Cycle-Outline



†Some countries choose to dispose of their spent fuel in repositories instead of recycling it.

Figure 3

Military Fuel Cycle

5. There are five acknowledged nuclear-weapon states (the US, Russia, the UK, France and China) and three 'threshold' states, two of which have conducted nuclear explosive tests (India and Pakistan) and one which is suspected of having a nuclear weapon capability (Israel). In all cases, the military nuclear programs developed ahead of civil power programs. In addition, North Korea has recently claimed to have nuclear weapons. Military programs involve the production of special grades of nuclear material, substantially different to the material used in civil programs.
6. Nuclear weapons are based on the following nuclear materials:

Plutonium

7. Plutonium is formed through the irradiation of uranium in a reactor. The uranium-238 isotope absorbs a neutron, leading to the formation of plutonium-239. Longer irradiation times lead to the formation of higher plutonium isotopes, Pu-240, Pu-241 and Pu-242.
8. Weapons-grade plutonium predominantly comprises the isotope Pu-239 and contains no more than 7% of the isotope Pu-240. Pu-240 (and the higher isotope Pu-242) are undesirable for weapons purposes because their rate of spontaneous fission causes pre-initiation (a premature chain reaction). By contrast, 'reactor-grade' plutonium from the normal operation of a LWR contains high levels of Pu-240, typically around 25%.
9. Because of the need to minimise the Pu-240 content, weapons-grade plutonium is produced in dedicated plutonium production reactors, usually natural uranium-fuelled, graphite-moderated, where irradiated fuel can be removed after short irradiation times (i.e. at low burn-up levels).

Uranium

10. Weapons-grade uranium is very highly enriched, to 90% or more U-235. This compares with normal civil enrichment levels of around 3–5% U-235. High enrichment levels are produced in enrichment plants specially designed and operated for this purpose.

<p>This description of the fuel cycle has been reproduced by kind permission of the Director General of the Australian Safeguards and Non-Proliferation Office (ASNO) and is taken from the ASNO Annual Report 2001 – 02.</p>

Categories Of Nuclear Material

MATERIAL	CATEGORIES	
	I/II	III
1. Plutonium (other than Plutonium with an isotopic concentration exceeding 80% in Plutonium-238) which is not irradiated	More than 500 grammes	500 grammes or less, but more than 15 grammes
2. Uranium-233 which is not irradiated	More than 500 grammes	500 grammes or less, but more than 15 grammes
3. Previously separated Neptunium-237 which is not irradiated	More than 1 kilogramme	1 kilogramme or less, but more than 15 grammes
4. Previously separated Americium-241, previously separated Americium-242 or previously separated Americium-243, which are not irradiated	More than 1 kilogramme	1 kilogramme or less, but more than 15 grammes
5. Uranium-235 in enriched Uranium containing 20% or more of Uranium-235, which is not irradiated	More than 1 kilogramme	1 kilogramme or less, but more than 15 grammes
6. Uranium-235 in enriched Uranium containing 10% or more, but less than 20%, of Uranium-235, which is not irradiated	10 kilogrammes or more	Less than 10 kilogrammes, but more than 1 kilogramme
7. Uranium-235 in enriched uranium containing less than 10% but more than 0.711% of Uranium-235, which is not irradiated		10 kilogrammes or more
8. Irradiated reactor fuel being used, stored or transported within the United Kingdom		Any quantity
9. Irradiated reactor fuel being transported outside the United Kingdom, other than such fuel which, prior to being irradiated, was Uranium enriched so as to contain 10% or more, but less than 20%, of Uranium-235	Any quantity	
10. Irradiated reactor fuel being transported outside the United Kingdom which, prior to being irradiated, was Uranium enriched so as to contain 10% or more, but less than 20%, of uranium-235		Any quantity
11. Other irradiated nuclear material		Any quantity

Notes:

1. This table is used for material being transported and to identify premises other than licensed civil nuclear sites subject to the Nuclear Industries Security Regulations 2003.
2. *Enriched Uranium* is Uranium enriched so as to contain more than 0.711% of Uranium-235.
3. The terms *Irradiated* and *previously separated* have the meanings given in Regulation 3(2).

MOX Fuel – A Brief Discussion

What is MOX?

1. The term MOX stands for **M**ixed **O**xide and is used to describe any mixture of uranium and plutonium oxides. MOX potentially covers a wide range of material types and compositions, but the form of MOX that is in general use today is MOX in light water reactor (LWR) fuel assemblies. MOX is also used in fast breeder reactor (FBR) driver fuel. The MOX used for LWRs and FBRs is a mixture of plutonium oxide (PuO₂) and uranium oxide (UO₂), sintered to form a hard, dense, durable refractory ceramic that remains stable at temperatures of up to 2,815°C.
2. The MOX used in LWR fuel typically contains between 5% and 7% plutonium (depending on the proportion of the isotope Pu-239): by far the greatest constituent of this MOX (93-95%) is uranium, either natural or depleted. The overall fissile content of this MOX fuel is similar to that of LEU (low enriched uranium) fuel.

How is MOX used?

3. For LWR fuel, MOX is formed into fuel assemblies that are very similar to standard LEU fuel assemblies. As with LEU, the MOX is formed into cylindrical pellets, enclosed in zirconium tubes, or fuel rods. The fuel rods are arranged into a rectangular or hexagonal array. A typical MOX fuel assembly will weigh one tonne or more, of which around 500-600 kg will be MOX pellets.

Is MOX dangerous to transport?

4. Finished MOX fuel assemblies are commercially valuable items that are subject to both international nuclear safeguards and the protection requirements of the *Convention on the Physical Protection of Nuclear Material* (CPPNM). Those involved in the transport of MOX take great care to ensure it is transported in ways commensurate with its commercial value (each assembly costs around a million dollars) and complies with international obligations to ensure it is appropriately protected. During transport, the MOX assemblies are placed in containers designed to protect against impact, fire and theft.
5. As noted above, MOX fuel pellets take the form of a hard, dense, durable, refractory ceramic. MOX fuel assemblies are designed to contain their contents in the intense pressures and high temperatures experienced in a reactor core. MOX is difficult to destroy or disperse even in the event of extreme accidents.

Is MOX dangerous to use in reactors?

6. During the operation of any reactor using uranium fuel, plutonium is formed in the fuel - through neutron capture by the uranium isotope U-238 - and that plutonium contributes to the reactor's energy output. As fissile uranium (U-235) in the fuel is consumed, increasing amounts of plutonium are formed in the fuel and, by the end of an operating cycle, the energy produced from the fissioning of plutonium will be almost as great as the energy from the fissioning of uranium. Where it is decided to use MOX fuel, in most cases around a third of the reactor core can be loaded with MOX fuel without the need for any engineering or operational modifications to the reactor.

Where does the plutonium for MOX come from?

7. Plutonium is produced through the irradiation of uranium. Spent fuel discharged from a light water reactor contains about 1% plutonium. This plutonium can be recovered from the spent fuel through reprocessing, and fabricated into fresh MOX fuel.

8. There are also proposals to make MOX fuel from ex-military plutonium retired from the nuclear arsenals of the USA and Russia as part of their nuclear threat reduction initiatives. The idea behind such proposals is that the plutonium from weapons can be fabricated into an economically useful form, and the use of the plutonium in a reactor will degrade its isotopic composition so it will no longer be weapons-grade.

Why is MOX used?

9. MOX is used as a means of recycling plutonium. This provides a means of increasing the efficiency of usage of existing uranium resources. The term *thermal recycle* refers to the use of MOX in *moderated* (usually light water, but possibly also heavy water or graphite) reactors. Thermal recycle of plutonium increases the efficiency of uranium usage by about 25%. Plutonium recycle reduces stockpiles of separated plutonium, and reduces spent fuel storage requirements.

10. It is envisaged that eventually the plutonium generated in light water reactors will be used to fuel fast breeder or other fast neutron reactors. The use of plutonium in fast neutron reactors could increase the efficiency of uranium usage by a factor of fifty or more. Technical and economic difficulties have delayed the introduction of fast neutron reactors - the use of thermal recycle is a way of getting value from reserves of plutonium in the interim.

Can MOX be used in nuclear weapons?

11. MOX does not contain enough fissile material to be usable in a nuclear weapon. MOX fuel for light water reactors typically comprises only 5% to 7% plutonium. The total fissile content - fissile plutonium isotopes and fissile uranium (U-235) - in such fuel will only be around 6%. This compares with nuclear materials used in nuclear weapons which have fissile contents of at least 80% (in the case of

uranium - *weapons-grade* is 93% U-235) or well over 90% (in the case of plutonium - *weapons-grade* is around 93% fissile isotopes (Pu-239 and Pu-241)).

12. MOX fuel is not an attractive source of plutonium for nuclear weapons. Separating the plutonium from the MOX is a complex task requiring specialised equipment and handling. The plutonium in MOX fuel is of a quality referred to as *reactor grade*—comprising around 70% fissile isotopes. The presence of a high proportion of non-fissile plutonium isotopes greatly complicates the design of any nuclear explosive, because these isotopes generate a lot of heat and spontaneous fission neutrons.

Does MOX usage increase the world's plutonium inventories?

13. Use of MOX fuel is expected to significantly reduce plutonium inventories. As an example, the Euratom Supply Agency estimates that the use of a single typical MOX fuel element results in a net consumption of 9 kg of plutonium, and avoids the production of a further 5 kg (compared with the use of low enriched uranium fuel). Thus in this example each typical MOX fuel element used results in a net reduction of 14 kg of plutonium.

14. Currently plutonium is being recycled as MOX in 32 light water reactors in Europe, and the use of MOX is expected to commence in Japan within the next few years. Use of MOX fuels in LWRs will increase over the next decade. While this will involve mainly reprocessed civil plutonium, the use of MOX fuel to degrade weapons-grade plutonium transferred from military programs as part of the disarmament process, will assume increasing importance. By 2010 it is expected that MOX fuels will be used with 45 reactors in Europe, together with up to 16–18 in Japan, and possibly five in Russia and six in the US, that is, some 15 - 20% of the world's power reactors.

<p>This description of MOX has been reproduced by kind permission of the Director General of the Australian Safeguards and Non-Proliferation Office (ASNO) and is taken from the ASNO Annual Report 2001 – 02.</p>
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Glossary Of Abbreviations, Acronyms And Definitions

AEAC	United Kingdom Atomic Energy Authority Constabulary
AFO	Authorised Firearms Officer
AGR	Advanced Gas-Cooled Reactor
Al Qaeda	Properly <i>al Qa'ida</i> , an Islamic terrorist group responsible for the terrorist attacks on the World Trade Center and the Pentagon in Washington on 11 th September 2001 as well as attacks in other countries. Al Qaeda has links with (or influences) several other Islamic terrorist groups.
Americium	A man-made radioactive material produced in very small amounts from plutonium, used in smoke alarms and many other industrial applications.
Anthrax	An acute infectious disease found in cattle and other animals that can also be fatal for humans. Anthrax can also be used as an agent by terrorists to kill human beings.
ARV	Armoured Response Vehicle
ASNO	Australian Safeguards and Non-Proliferation Office
BC	A basic check to confirm a person's identity
BC + PNC	Basic Check plus PNC Criminal Records Check
BE	British Energy plc
BNFL	British Nuclear Fuels Limited
BTP	British Transport Police
CCTV	Closed-circuit Television
Classified	Classified information, more correctly referred to as <i>protectively marked</i> information, is sensitive information given a government-defined label, to ensure it is not disclosed to unauthorised individuals. The usual markings are RESTRICTED, CONFIDENTIAL, SECRET and TOP SECRET, although various other markings and codewords may also be used. Within the civil nuclear industry, classified information may be proliferation-sensitive or provide exploitable details about security arrangements.
Cogema	The French civil nuclear operating company
CPPNM	The Convention on the Physical Protection of Nuclear Material
CTC	Counter-terrorist Check
Counter-Proliferation	Security arrangements to prevent certain foreign states illicitly acquiring sensitive information and technology to help them develop nuclear weapons.
DBT	Design Basis Threat
DFR	Dounreay Fast Reactor
DOE	United States Department of Energy
DRS	BNFL's Direct Rail Services rail freight subsidiary
DSO	Departmental Security Officer
DSTL	Defence Science and Technology Laboratories
DTI	Department of Trade and Industry
DV	Developed Vetting Clearance
EFDA	The European Fusion Development Agency
EIBU	DTI's Energy Innovation and Business Unit
ECG	Environmental Crime Group
ESWG	Electronic Security Working Group
Enrichment	See Annex E
FBR	Fast Breeder Reactor

FCA	The Dounreay Category I Fuel Cycle Area
FCO	Foreign and Commonwealth Office
Fissile	Only a few naturally occurring substances, known as fissile material, are easily fissionable (capable of sustaining a fission chain reaction). These include Uranium-235 and Thorium.
Fission	Nuclear fission involves splitting an atom into two or more fractions. A fission reaction is achieved by bombarding fissile material with neutrons. This causes the nuclei to split, emitting extra neutrons and starting a chain-reaction resulting in a great deal of energy in the form of heat and radiation. Although fission is the process used in an atomic bomb, in the civil nuclear industry the heat energy created is controlled and sustained to generate electricity. Once material is involved in a fission reaction, it becomes highly radioactive, requiring very careful handling under safe conditions.
Fuel Cycle	See Annex E
Fusion	Nuclear fusion, unlike fission, involves fusing (merging) the nuclei of two heavy isotopes of Hydrogen – Deuterium and Tritium. A fusion reaction requires very high temperatures (over 100 million degrees Celsius), capable of separating electrons from their nuclei and the plasma created has to be contained with an electro-magnetic field. However, the material needed can be cheaply extracted from water, the process is inherently safe and no lasting radioactivity is caused. Experiments have been conducted for many years in the US, the UK, Russia and other countries, to find out how to make fusion reactions self-sustaining, producing more energy than the power needed to start and maintain the reaction. The JET toroidal vacuum vessel at Culham is one of the most advanced experimental fusion plants currently in operation.
GAN	GOZATOMNADZOR, the Russian nuclear security and safety authority
GIF	The Generation IV International Forum initiated by the DOE to develop next-generation reactor designs with improved safety, security and performance characteristics. The forum is multi-national, currently involving ten countries, including the USA and the UK.
HLW	High Level Waste consists mainly of the liquid waste produced from the reprocessing of nuclear fuels.
HSE	The Health and Safety Executive
HSV	High Security Vehicle
HEU	High Enriched Uranium, enriched to 20% or more in U-235
HMIC	Her Majesty's Inspectorate of Constabulary
IAEA	The International Atomic Energy Agency
ILW	Intermediate Level Waste consists mainly of material that has been irradiated in a nuclear reactor.
IND	Improvised Nuclear Device
INFCIRC	An IAEA Information Circular
Information Security	The branch of security specialising in the protection of information, including information processed by computer, or held or transmitted in electronic, digital form – see INFOSEC.
INFOSEC	Information Security
INMM	Institute of Nuclear Materials Management
ITSOF	Information Technology Security Officers Forum (ITSOF)

Inspection	A pre-programmed, routine audit of an operator's security arrangements, as specified in an approved site or transport security plan, based on OCNS model security standards.
Inspector	A member of OCNS authorised to enter civil nuclear sites and other nuclear premises to conduct inspections or investigations under the Nuclear Industries Security Regulations 2003.
Investigation	An enquiry to determine the causes of a breach in security arrangements; a police investigation into criminal activity; or a special investigation into particular security issues.
Investigating Officer	A member of OCNS authorised to undertake background enquiries and interview referees in connection with candidates for DV clearance.
IPPAS	International Physical Protection Advisory Service
IRD	Improvised Radiation Device
IRR	Ionising Radiations Regulations 1999
IRSN	Institut de Radioprotection et de Sûreté Nucléaire, the French counterpart to OCNS.
Isotope	Forms of the same type of chemical element, with the same number of protons but different numbers of neutrons.
JET	Joint European Torus
JTAC	Joint Terrorism Analysis Centre
LEU	Low Enriched Uranium, with less than 20% U-235
Licensed	Licensed nuclear sites in the UK have been licensed by the NII under the terms of the Health and Safety at Work Act 1974 and related legislation, with conditions covering the design, construction, operation and maintenance of nuclear installations.
LLW	Low Level Waste covers items such as protective clothing and laboratory equipment that has come into contact with radioactive material.
LWR	Light Water Reactor
Magnox	First-generation nuclear power reactor
Materials Protection	Security arrangements protecting nuclear and radioactive material, as opposed to personnel or sensitive information.
MOD	Ministry of Defence
MOX	Mixed Oxide fuel, consisting of a mixture of uranium and plutonium oxides – see Annex G.
MRC	The Medical Research Council
Neptunium	A man-made radioactive metal extracted in small amounts from spent Uranium reactor fuel.
NGO	Non-government Organisations, used in the context of bodies like Greenpeace concerned about nuclear issues.
NII	HSE's Nuclear Installations Inspectorate
Nirex	UK Nirex Ltd was set up by the nuclear industry with Government endorsement to examine long-term options for the disposal of radioactive waste, which also offers advice about waste packaging and publishes information about radioactive waste held or stored in the UK.
NNSA	The DOE's National Nuclear Security Administration
NRC	US Nuclear Regulatory Commission
NRPB	National Radiation Protection Board
Nuclear	The term is widely used and has several shades of meaning but is intended in the context of this report to refer to material and processes capable of generating a nuclear chain reaction, a nuclear explosion or radioactivity.

OCNS	DTI's Office for Civil Nuclear Security
ORM	Other Radioactive Material
PFR	Prototype Fast Reactor
PCM	Plutonium Contaminated Material (Intermediate Level Waste).
Physical Protection	A term used internationally to denote security arrangements to protect personnel, material or information. It came into use because, in many languages, security has several meanings, covering concepts such as insurance and safety.
PIE	Post Irradiation Examination
PIRA	The Provisional Irish Republican Army – a terrorist group.
Plc	Publicly listed company
Plutonium	A man-made, radioactive metal extracted from spent nuclear (Uranium) fuel. Plutonium can also be used as a nuclear fuel and in nuclear weapons.
PNC	Police National Computer
PNTL	Pacific Nuclear Transport Limited, a BNFL subsidiary with minority shareholdings held by Cogema in France and the Japanese nuclear power utilities.
Proliferation	Used in this report to indicate attempts by certain foreign states to acquire information and technology illicitly to help them develop nuclear weapons.
Protectively marked	See Classified
PSDB	Police Scientific and Development Branch
PSWG	Physical Security Working Group
PuO ₂	Plutonium Dioxide
PWR	Pressurised Water Reactor
Radioactivity	The property of certain types of nuclear material to emit energy in the form of charged particles or gamma radiation. Some naturally occurring material is radioactive, like Uranium and Radon gas. However, material used in nuclear reactors produces harmful emissions until decay processes result in safer levels, a process that take can thousands of years, depending on the type of material.
RAL	Rutherford-Appleton Laboratory
RDD	Radiation Dispersal Device
Reprocessing	Processing of spent nuclear fuel to separate Uranium and Plutonium from highly radioactive fission products.
RIPA	Regulation of Investigatory Powers Act 2000
RIRA	The Real Irish Republican Army – a terrorist group.
RPII	The Radiological Protection Institute of Ireland
RSA	Radioactive Substances Act 1993
RSMF	The Risk and Security Management Forum
Safety	Another term with wide shades of meaning which, in the nuclear context, is used to refer to standards, procedures and equipment designed to reduce or mitigate the risk of an accidental nuclear explosion or release of radiation.
SC	Security Check
Security	A term used to describe standards, systems and procedures intended to counter deliberate, criminal or malicious attempts to sabotage nuclear facilities, steal nuclear or radioactive material or obtain sensitive information without authorisation – see also Safety and Physical Protection.
SEPA	The Scottish Environment Protection Agency
SGHWR	The Steam Generating Heavy Water Reactor at Winfrith
SKi	The Stätens Karnkraftinspektion, the Swedish Nuclear Power Inspectorate.
SMAC	Special Materials Accounts Committee

SNM	Special Nuclear Material - see Annex D.
SMP	The Sellafield MOX Plant
SO	The Official Committee on Security
Spent Fuel	Reactor fuel that will no longer sustain a chain reaction after constant use. Spent fuel is often misleadingly referred to as <i>Waste</i> , but can be reprocessed into fresh fuel, because it still contains about 96% Uranium, 1% Plutonium and only around 3% radioactive waste – See Annex E.
SVAP	Cabinet Office Security Vetting Appeals Panel
Tecdoc	An IAEA series of technical documents
THORP	The Sellafield Thermal Oxide Reprocessing Plant.
Troika	The governments of Germany, the Netherlands and the United Kingdom, operating under the Treaty of Almelo
UCL	Urenco (Capenhurst) Limited
UET	Uranium Enrichment Technology
UK	The United Kingdom of Great Britain and Northern Ireland
USA	The United States of America
UKAEA	United Kingdom Atomic Energy Authority
UO ₂	Uranium Dioxide
Uranium	A naturally occurring, radioactive metal, consisting of about 99% Uranium-238 and 1% Uranium-235. Only the latter form is capable of sustaining a chain reaction. Uranium is mined in Australia, Canada, parts of Africa, Russia and the USA.
URENCO	The Uranium Enrichment Company
Vital Areas	Areas inside nuclear sites containing equipment, systems or devices, the failure of which could directly or indirectly lead to unacceptable radiological consequences
XNP	DTI's Export Control and Non-Proliferation Directorate
Yellow Cake	Concentrated, crude Uranium Oxide (about 60% UO ₂).
WAGR	Windscale Advanced Gas-Cooled Reactor
Waste	Categorised as High, Intermediate or Low, depending on the amount of radiation emitted. See Annex E.
WRACS	The Dounreay Waste Receipt Assay Characterisation and Super Compaction Facility
WENRA	The Western European Nuclear Regulators Association, an association of the heads of nuclear safety authorities from European countries with nuclear power plants.

