

CHAPTER 6

VISITS BY NUCLEAR POWERED WARSHIPS: ARRANGEMENTS IN OTHER COUNTRIES

INTRODUCTION

6.1 The Committee attempted to discover the extent to which visits by nuclear powered warships to ports in other countries were subject to environmental monitoring and to the existence of contingency plans for reactor accidents. The position in the United States and the United Kingdom was of particular interest. It would be reasonable to assume that decisions by the national governments there on the need for, and extent of, planning and monitoring would have been made in the light of full knowledge of the design and operating procedures of their own nuclear powered warships.

6.2 The position in other countries was seen as less significant in that decisions in these countries would presumably have been based on no better information than that available to the Australian Government or to the Committee.

6.3 It was argued that contingency planning for visits to Australian ports should be at least as extensive as that which exists for the ports of the countries to which the vessels belong.¹ The Committee accepted this, provided the distinction was drawn between visits of the limited type which take place to Australian ports, and port or dockyard visits which occur in the warships' home countries. Because reactor repairs, refuelling, testing, etc. may occur during the latter, the accident risks are

1. e.g. submission from Scientists Against Nuclear Arms (Tas), p. 7
(Evidence, p. 826).

greater. Planning for these risks would not be required in Australia.

UNITED KINGDOM

Requirement for Plans

6.4 The Department of Defence told the Committee:

The UK view is that the safety record and stringent design and operational controls exercised do not make it necessary for the host nation to have contingency plans to cover short, occasional visits during which no work is done on the nuclear propulsion plant.²

6.5 However, the British Government has stated that plans exist for all United Kingdom ports receiving visits:

Safety schemes, detailing procedures and protective measures to be implemented in the unlikely event of an accidental release of radioactive material from a submarine are drawn up to cover the areas of all naval bases and other berths used by such vessels in the United Kingdom. These are produced in consultation with the appropriate local authorities, emergency services and other civilian agencies with a direct involvement, all of whom hold copies.³

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2. 'UK Nuclear Powered Warships Safety Procedures', (Paper prepared for the Committee by the Australian Department of Defence, July 1988), para. 3 (Evidence, p. 1300.13).
 3. UK, Parliamentary Debates (Commons), 6th series, vol. 129, Written Answers, 9 March 1988, col. 216. Not all the plans appear to have been made public in full, although elements of them have been publicly described: e.g., ibid., vol. 113, Written Answers, 23 March 1987, col. 4; ibid., vol. 128, 3 March 1988, cols. 1199, 1211; 'N-Sub Minutes from Disaster', Observer (London), 14 February 1988, p. 1; 'Nuclear submarine safety measures', Independent (London), 16 July 1987, p. 5. Copies of the Devonport plan have been put in local public libraries, reportedly on the basis that, while it is unclassified, access to it should be limited to persons concerned with public safety on a need to know basis: 'Everyman's guide to doomwatch at Devonport', Guardian (London), 16 July 1987, p. 2.

6.6 It appears that no British port is cleared to receive casual visits from nuclear powered warships unless a safety scheme is in place for that port.⁴

6.7 The Royal Navy's Flag Officer, Plymouth, Vice Admiral Sir John Webster KBE, RN, greatly assisted the Committee by making copies of two of the plans available to it. One related to the naval base at Devonport and the other to the port of Liverpool, which receives occasional visits of the type made to Australian ports.⁵

Scope of the Liverpool Plan

6.8 In broad terms the Liverpool safety scheme is comparable to the Western Australian port safety scheme. Like the latter, the document setting out the Liverpool scheme is not completely self-contained but links to other documents and plans. There are,

4. UK, Ministry of Defence, Liverpool Special Safety Scheme for Visits to Liverpool by Nuclear Powered Submarines, (April 1986), para. 28 states with reference to category Z (ie. casual visit) berths:

A special safety scheme appropriate to the characteristics of the berth is written by the responsible area flag officer in consultation with the Chairman, Naval Nuclear Technical Safety Panel (CNNTSP) and the local naval and civil authorities. Once agreed, the scheme is issued by the area flag officer and the berth is then available for use.

ibid., para. 30 provides:

A fully equipped NEMT [Naval Emergency Monitoring Team] is to be co-located at Z berths in England and Wales when occupied by a nuclear powered warship. ... Before approval is given for a nuclear powered warship to visit a category Z berth, CNNTSP must be satisfied that the arrangements contained in the appropriate safety orders can provide the necessary protection for the general public, and can be implemented satisfactorily.

5. British planning categorises berths as X or Z depending on whether they will be used for building, refitting, repairing, or for operational, rest and recreational purposes: UK, Ministry of Defence, Liverpool Special Safety Scheme for Visits to Liverpool by Nuclear Powered Submarines, (April 1986), para. 27. Devonport has X berths while Liverpool has Z berths. The UK port that received the most occasional visits from UK nuclear powered submarines in the period 1970-1988 was Liverpool (29 visits): UK, Parliamentary Debates (Commons), 6th series, vol. 129, Written Answers, 9 March 1988, col. 216. Statistics for visits of this type by foreign nuclear powered warships are not available: ibid.

not surprisingly, many differences of detail and the more significant of these are noted in the relevant contexts in later parts of the report.

6.9 Here it is sufficient to discuss two of the more general differences. First, unlike the Australian plans, the Liverpool plan does not use the terminology of a reference accident as a basis for planning, although to a considerable extent this difference is one of terminology only. Secondly, the Liverpool plan does not call for the use of pre-positioned radiation detection monitors to provide notice of an accident.

References to Uncontained Accidents

6.10 The Liverpool plan identifies for its purposes two conceivable accidents. First, it identifies as 'a very remote possibility' a contained accident involving core meltdown resulting from a large uncontrolled primary coolant leak.⁶ This corresponds approximately to the reference accident which forms the basis of Australian plans.⁷

6.11 The plan states that the contained accident may result in the release from the primary to the secondary containment of iodine 131, together with other volatile and gaseous fission products over a period of 24 hours. It also states, however, that secondary containment procedures ensure that only a small proportion of this release will reach the atmosphere.⁸ The Australian Nuclear Science and Technology Organisation (ANSTO) makes the pessimistic assumption that there will be no

6. UK, Ministry of Defence, Liverpool Special Safety Scheme for Visits to Liverpool by Nuclear Powered Submarines, (April 1986), paras. 11 and

5. See also para. 15: the 'probability of this accident occurring is predicted at about once in 10,000 years of reactor operation'.

7. It is not possible to say that they are identical because the Liverpool plan does not state what leakage rate from containment is assumed. Nor does it state the core inventory or release fractions.

8. *ibid.*, para. 15. The meaning of 'secondary containment' is explained in para. 4.63 above.

attenuation of the release due to secondary containment.⁹

6.12 In addition to this contained accident, the Liverpool plan identifies as 'an even less likely accident' the 'sudden and complete failure of the primary coolant system concurrent with a breach of the primary containment'.¹⁰ It states that this uncontained meltdown accident may result in the release to the atmosphere within one hour of a greater quantity of the same material.¹¹

6.13 Following the contained accident, the plan defines an evacuation distance comprising a zone of 550 metres radius centred on the submarine. Outside this zone, no countermeasures are necessary to prevent individuals exceeding the upper level of the emergency reference level of exposure, even if they are directly downwind from the accident.¹²

6.14 This 550 metre zone compares with the 600 metre radius Zone 1 specified in Australian plans. However, Australian plans call for a Zone 2 of up to 2.2 kilometres radius around the accident site. The limit of this zone represents the limit of the area considered by Australian authorities to be one in which a risk from inhalation hazard might exist following the reference accident.¹³ The Australian plans assume that protective measures may be required in this zone. The size of zone two, therefore, is

9. Evidence, p. 383 (ANSTO).

10. *ibid.*, para. 6. See also para. 16: the 'probability of this accident occurring is predicted at about once in 1,000,000 years of reactor operation'.

11. *ibid.*, para. 16. The quantities are not stated in the plan but are provided in UK, Parliamentary Debates (Commons), 6th series, vol. 112, Written Answers, 20 March 1987, col. 635 (Evidence, p. 1300.19) as 1,000,000 Curies of iodine 131 and 10,000,000 Curies of other volatile and gaseous fission products. The context makes clear that the former figure is a misprint, and should be 100,000. The quantities released are thus 100 times greater than those released from the contained accident described in Liverpool plan. ANSTO used a similar ratio of releases from its reference accident and an uncontained accident: see para. 7.13 below.

12. *ibid.*, para. 23(c).

13. OPSMAN 1 (2nd edn.), Chapter 4, Annex B, para. 3 (Evidence, p. 93).

a measure of the extent to which Australian plans are more conservative (ie. safety-oriented) than the Liverpool plan.

6.15 For the far less likely uncontained accident, the Liverpool plan states that countermeasures may be required in the downwind sector out to as far as 10 kilometres. The probability of any risk to individuals further downwind is regarded as so remote that no planning is required for beyond the 10 kilometre distance.¹⁴

6.16 The plan provides that, following an uncontained accident, the area affected beyond the 550 metre evacuation distance is to be delineated by monitoring, and stable iodine tablets are to be distributed.¹⁵ Because an uncontained accident could involve a rapid release of short duration, sheltering is not considered to be an appropriate automatic countermeasure, as the hazard will have passed before the people can be notified. Evacuation to avoid the airborne radiation hazard is not envisaged. Monitoring would be used to assist in deciding if evacuation was needed to prevent individuals exceeding an emergency reference level due to ground deposition of fission products.

6.17 Apart from these provisions, the accident response elements of the Liverpool plan are not specifically directed to an uncontained accident. The plan states:

For the purposes of contingency planning, it is Ministry of Defence policy to assume that all accidents have consequences as severe as the Maximum Design [ie. contained] Accident.¹⁶

14. UK, Ministry of Defence, Liverpool Special Safety Scheme for Visits to Liverpool by Nuclear Powered Submarines, (April 1986), para. 23. Milk and pastures would be monitored beyond 10 km, however: para. 24(d).

15. *ibid.*, para. 24(c).

16. *ibid.*, para. 24. Contrast UK, Parliamentary Debates (Commons), 6th series, vol. 140, Written Answers, 10 November 1988, col. 303: exercises held to test the Clyde area public safety scheme 'envisage a range of accidents greater than the maximum design accident in order to examine the consequences outside the naval base of such accidents'. This scheme covers areas around the US and UK nuclear powered submarine bases on the Clyde.

6.18 Thus the specific focus is on a contained accident, although much of the response structure for which provision is made would be applicable to either a contained or uncontained accident.¹⁷ In this sense the Liverpool plan is best described as a plan based on a contained accident.¹⁸

6.19 The Committee asked ANSTO for its view on how the Liverpool plan compared to Australian plans based on a single reference accident. The Committee was told that there were differences in terminology and detail. However:

In practical terms ...the Liverpool Special Safety Scheme and the Australian port safety schemes are very similar: automatic implementation of countermeasures upon notification of an accident, within 550 or 600 metres, and monitoring to determine the need for countermeasures beyond these distances.¹⁹

6.20 It is also possible to compare in a number of ways the consequences of the accident used as the basis of the Liverpool plan with the reference accident used as the basis of the Australian plans. ANSTO told the Committee that one measure, the dose to the child thyroid at 600 metres from the vessel, indicates that the Australian reference accident is an order of magnitude more severe in terms of consequences than the contained accident used as the basis of the Liverpool plan.²⁰

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17. e.g. the provision for distribution of potassium iodate tablets makes detailed arrangements for the dock area, adjacent ships, tugs, etc. If these arrangements are followed, little of the total stock of 14,000 tablets (adult dose = 2 tablets) would be available for distribution outside the 550 metre zone: see para. 42(j). However the form of the leaflet to accompany distribution is applicable to householders with infants and older children: Annex 3F. Thus it could be used in a wider distribution, possibly using stocks of tablets not identified in the plan: cf. UK, Parliamentary Debates (Commons), 6th series, vol. 146, Written Answers, 7 February 1989, col 667. On the role of potassium iodate as a protective measure following a reactor accident, see chapter 9.
 18. cf. Letter from Mr J. E. Cook (ANSTO), 1 September 1988 (Evidence, p. 1300.41): the Liverpool plan 'requires no actions specifically based on the presumption of an uncontained accident'.
 19. *ibid.*, pp. 1300.41-42.
 20. *ibid.*, p. 1300.42. for the calculation leading to this result.

Comparison of Monitoring Arrangements

6.21 Australian plans provide for continuous monitoring during the port visit of a nuclear powered warship. This provides a means independent of the warship's crew of detecting any significant reactor accident that might occur. In contrast, the Liverpool plan provides that monitoring is to begin as soon as an accident occurs.²¹ Although not stated in the plan, it appears that the crew are relied upon to provide accident notification.

6.22 The Liverpool plan makes no provision for monitoring to detect low-level waste discharges. The Department of Defence conducts marine environmental monitoring at Royal Navy bases and around the United States base at Holy Loch on the Clyde, but not, it seems, at other ports.²² It appears that no monitoring specifically directed at low-level nuclear wastes occurs in relation to nuclear powered warship visits to these other ports.

UNITED STATES

Absence of Plans?

6.23 The Committee asked the United States Embassy in Canberra if it could provide information relating to, amongst other things, safety plans for visits by nuclear powered warships to United States ports, other than ports where reactor repairs and maintenance, fuel handling, etc. occur.²³ No direct response

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21. UK, Ministry of Defence, Liverpool Special Safety Scheme for Visits to Liverpool by Nuclear Powered Submarines, (April 1986), para. 24(c).
 22. UK, Parliamentary Debates (Commons), 6th series, vol. 108, Written Answers, 15 January 1987, col. 307. But contrast *ibid.*, vol. 135, Written Answers, 17 June 1988, col. 346: Ministry of Defence also monitors UK territorial waters, as does the Ministry of Agriculture, Fisheries and Food.
 23. Letter to the US Ambassador, Mr L. W. Lane jr, 17 February 1987. The fact that no reply had been received was noted when the request was made again on 18 February 1988.

was received.²⁴

6.24 The naval attaché at the Embassy, however, confirmed to the Department of Defence that:

It is the policy of the US Navy that individual communities, domestic or international, need not prepare specific accident plans for the occasional visits of US nuclear powered or capable warships. We believe commonly prepared civil disaster preparedness plans such as those dealing with fires, floods, hurricanes, etc, are appropriate and sufficient adjuncts to the Navy's internal plans. For this reason, we do not consult with agencies choosing to develop their own specific plans and neither comment [on] or evaluate the technical adequacy of such plans.

Some communities in the USA have allegedly prepared specific plans for visits by USN warships. Where existing, these were prepared in isolation from the USN and I cannot speculate on any aspect of their content.

Please note that the use of the term 'occasionally' is intended to differentiate from ports where numbers of warships may be home ported.²⁵

6.25 At homeports, reactor-related activities will presumably occur which will not occur during visits to Australian ports. ANSTO told the Committee that it understood that berth assessment at US ports was based on radiological acceptance limits used for land based nuclear plants, modified to allow credit for vessel

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24. To an earlier, more general, request by the Committee made on 13 October 1986, the US Ambassador replied on 5 November 1986: the Government of the United States has passed relevant material on our nuclear-powered warships to the Government of Australia. Officials of the Government of Australia would, therefore, be appropriate sources for inquiry.
25. Advice from the US Navy attaché, Canberra to the Department of Defence, 20 October 1988 (Evidence, p. 1300.48). Advice previously given to the Committee by ANSTO was to the same effect (Evidence, p. 443.463). For earlier press reports of the US view that specific safety plans are not required for occasional visits see; 'Further call for Burke to detail plans', West Australian, 19 July 1986; 'Crisis plan not needed - U. S.', West Australian, 22 July 1986, p. 14.

removal: no distinction was made between differing reactor power levels.²⁶

Environmental Monitoring

6.26 The United States Navy currently 'conducts environmental monitoring in harbors frequented by its nuclear-powered ships'.²⁷ The inference is that monitoring is not regarded as necessary for ports used only occasionally. The Committee has not been able to locate any information that contradicts this inference. Civilian agencies have also monitored ports in the United States used frequently by United States nuclear powered warships. These 'agencies generally have not considered monitoring of all places used by nuclear powered warships necessary since the surveys performed have found no environmental concern'.²⁸

Bar on Visits to Some Cities?

6.27 A few submissions suggested that nuclear powered warships were banned from visiting some major cities in the United States for safety reasons. New York and Boston were mentioned.²⁹ In response to a similar suggestion made in a Perth

26. Evidence, p. 443.463 (ANSTO). See also Evidence, p. 1300.48 (Department of Defence).

27. US, Department of the Navy, Environmental Monitoring and Disposal of Radioactive Wastes from U. S. Naval Nuclear Powered Ships and their Support Facilities 1987, (NT-88-1, February 1988), p. 19. This report is part of an annual series. In the year covered by it, 1987, monitoring was done at 23 berth areas within 14 harbours. Within Pearl Harbour, for example, 3 separate areas were monitored. All harbours were within US territory. In previous years, the US Navy has monitored bases used by it in other countries; in the 1960's Rota in Spain and Holy Loch in Scotland were monitored: US Congress, Joint Committee on Atomic Energy, Naval Nuclear Propulsion Program - Hearing, 26 January 1966, p. 71.

28. US, H of R, Committee on Armed Services, Subcommittee on Procurement and Military Nuclear Systems, Naval Nuclear Propulsion Program - 1984: Hearing on H. R. 5263, 28 February 1984, p. 201, Appendix D ('Discussion of Allegations Contained in Article "The Nuclear Navy"') (Evidence, p. 1300.68).

29. e.g. see the submissions from the Victorian Government, p. 6; Miss E. Ruzicka, p. 6; Australian Nuclear Free Zones Secretariat, p. 2; United Associations of Women. p. 1.

newspaper in 1986, the United States consulate in Perth provided a detailed response.³⁰ This stated that legally any US warship can visit any US port at any time. While for many ports there has been no operational requirement for nuclear powered vessels to visit, such visits had been made to Long Island and to Earle, New Jersey near New York.³¹ Examples were given of other ports in major metropolitan areas in the United States which had received visits from nuclear powered warships.³² Port visits apart, some United States nuclear powered warships have their home ports in or near major cities, such as Oakland and San Diego.³³ In addition, the nuclear powered merchant ship, NS Savannah, was a frequent visitor to New York in the 1960's.³⁴

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30. 'No New York ban on N-warships', West Australian, 22 July 1986.
 31. See to the same effect US, H of R, Committee on Armed Services, Subcommittee on Military Installations and Facilities, Civil Defense Aspects of the Three Mile Island Nuclear Accident - Hearings, 14 June 1979, p. 239 (Dr J. P. Wadco, Department of Defense). With respect to visits to Boston, the nuclear powered cruiser USS Bainbridge was commissioned at Boston Navy Yard: 'U. S. Commissions Nuclear Cruiser', New York Times, 10 September 1961, section 5, p. 11. For the 1962 goodwill visit to Boston of the nuclear powered aircraft carrier USS Enterprise see N. Polmar and T. B. Allen, Rickover, (Simon and Schuster, New York, 1982), p. 625.
 32. See also for example US, H of R, Committee on Foreign Affairs, Subcommittee on Asian and Pacific Affairs, Security Treaty between Australia, New Zealand, and the United States - Hearing, 18 March 1985, p. 171 (P. Wolfowitz, State Department and J. A. Kelly, Department of Defense): no ports in the US which Navy needs to visit that it cannot - nuclear powered ships visit all kinds of ports, including those in heavily populated areas.
 33. See US, Department of the Navy, Environmental Monitoring and Disposal of Radioactive Wastes from U. S. Naval Nuclear Powered Ships and their Support Facilities 1987, (NT-88-1, February 1988), pp. 40-41 for a list of ports frequented. See also A. M. Brown and R. O'Rourke, 'Ports for the Fleet', US Naval Institute, Proceedings, May 1986, p. 140, for a complete list of US Navy homeports as at 31 July 1985. Four nuclear powered surface ships are listed as being homeported at Alameda on San Francisco Bay and two more at San Diego. For an earlier list of examples, see Australia, Environmental Considerations of Visits of Nuclear Powered Warships to Australia, (May 1976), para. 66 (Evidence, p. 147).
 34. e.g. 'The Savannah, First Atom-Powered Merchant Ship, Gets Noisy Welcome', New York Times, 3 June 1964, p. 1 (berthed at pier at W44th Street, Manhattan); 'Tests of Savannah May Be Her Last', New York Times, 16 April 1967, p. 80 (berthed at pier at W44th Street, Manhattan for safety inspection, including tests involving entry into reactor compartment); 'A Nuclear Fleet For Cargo Urged', New York Times, 20 April 1968, p. 66 (W44th Street berth used).

6.28 There was a view held by some officials in the United States in the late 1950's that goodwill visits were not sufficiently important to warrant the risk involved in visits to ports in populated areas.³⁵ The Committee has not been able to discover any evidence that this view survived in official quarters once the safety record of nuclear powered warships was clearly demonstrated.³⁶

OTHER COUNTRIES

Nuclear Powered Warships

6.29 United States nuclear powered warships visit over 150 ports around the world.³⁷ The Committee has been unable to discover any country that does not permit port visits³⁸ by these

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35. See US Congress, Joint Committee on Atomic Energy, Naval Reactor Program and Polaris Missile System - Hearing, 9 April 1960 for extracts from correspondence from the Advisory Committee on Reactor Safeguards (p. 17) and Dr Edward Teller (p. 37) to this effect, and for testimony by Vice Admiral H. G. Rickover that he supported the instructions issued by the Chief of Naval Operations that there must be an actual military or national necessity before a nuclear ship can go into a populated harbour (p. 19). For the way in which Rickover's view was effectively overruled see N. Polmar and T. B. Allen, Rickover, (Simon and Schuster, New York, 1982), pp. 622-25. The issue was noted by the Australian press: e.g. Sydney Morning Herald, 16 June 1961, p. 1, 'Visiting Atom Submarine "Defied Order"'; ibid., 17 June 1961, p. 3, 'U. S. Pledge on Atom Submarine'.
36. cf. N. Polmar and T. B. Allen, Rickover, (Simon and Schuster, New York, 1982), p. 625: in referring to a 1962 goodwill visit to Boston by the USS Enterprise the authors state: 'but in other years other ships did not always go where the Navy wanted them to go'. No information is given as to which years or places are referred to.
37. US, H of R, Committee on Appropriations, Subcommittee on Energy and Water Development, Energy and Water Development Appropriations for 1989 - Hearings, 23 March 1988, p. 1331 (Admiral K. R. McKee).
38. This is not to say that visits are permitted to all ports in a given country. For example, it appears that the Turkish Government will not permit visits to Istanbul by the nuclear powered USS Nimitz, although visits elsewhere in Turkey are permitted: US, H of R, Committee on Armed Services, Subcommittee on Procurement and Military Nuclear Systems, Naval Nuclear Propulsion Program - 1988 - Hearing on H. R. 1748, 26 February 1987, p. 7 (Congressman Skelton).

vessels on the sole basis that the risk of a reactor accident is too great. New Zealand is a possible exception.³⁹ Other countries mentioned as exceptions either do not appear to ban visits,⁴⁰ or

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39. The rationale for the current New Zealand ban on nuclear powered vessel visits is unclear. It appears to be linked to the ban on nuclear weapons capable warships, which in turn is linked to concerns about nuclear war and the nuclearisation of the South Pacific. The possibility of a reactor accident in a New Zealand port does not appear to have been a major element. See S. McMillan, Neither Confirm Nor Deny: The Nuclear Ships Dispute between New Zealand and the United States, (Allan & Unwin, Wellington, 1987), pp. 38-40. See also US, H of R, Committee on Foreign Affairs, Subcommittee on Asian and Pacific Affairs, Security Treaty between Australia, New Zealand, and the United States - Hearing, 18 March 1985, p. 170 (P. Wolfowitz, State Department and J. A. Kelly, Department of Defense): prior to imposing the ban New Zealand had not sought information on US safety procedures and precautions relating to its nuclear powered warships, nor had it sought to explore with the US ways in which safety concerns might be overcome. The explanation given for the ban in David Lange, 'New Zealand's Security Policy', Foreign Affairs, Summer 1985, vol. 63(5), pp. 1010-13 makes no reference to reactor safety.
40. e.g. in 1985, retired US Rear Admiral E. Carroll stated that France continued to ban visits: US, H of R, Committee on Foreign Affairs, Subcommittee on Asian and Pacific Affairs, Security Treaty between Australia, New Zealand, and the United States - Hearing, 18 March 1985, p. 61. But a US State Department witness said this was incorrect: *ibid.*, p. 166. In 1976 it was explained that the then inability to visit arose because 'France has internal government regulations which establish conditions we cannot agree to without surrendering the traditional concept of sovereign immunity for warships': US, H of R, Committee on Appropriations, Subcommittee on the Department of Defense, Department of Defense Appropriations for 1977 - Hearings, 31 March 1976, p. 299 (Admiral H. G. Rickover).

do not clearly do so on the ground of reactor safety.⁴¹ The issue of Suez canal transits is also unclear, with transits having to be negotiated on a case-by-case basis.⁴²

6.30 However, the United States has not sought to make port visits to all possible countries.⁴³ It may be that if visits were

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41. e.g. C. Ewald, 'Book Review of R. E. White, Nuclear Ship Visit Policies and Ship Visit Data for 55 Countries, (SANA, Auckland, 1988)', SANA Update (Scientists Against Nuclear Arms Australia Newsletter), November 1988, No. 67, p. 7: the People's Republic of China has a strong policy of not allowing nuclear-powered ship visits. But the reviewer does not indicate if the policy rests on safety grounds. The Chinese Embassy in Canberra responded to the Committee's request for information by stating that China 'had not yet developed any safety and emergency plans for visits of nuclear powered vessels', but did not indicate that there was a ban on such visits: letter of 25 November 1986. See also R. E. White, The New Zealand Ship Ban: Is Compromise Possible?, (Working Paper No. 40, Peace Research Centre, Australian National University, Canberra, 1988), pp. 4-5: China, Egypt, and the Solomon Islands do not permit port entry to nuclear powered ships. This statement is based on information provided to the author by diplomatic representatives of China and Egypt in New Zealand and the Solomon Islands' Ministry of Foreign Affairs. In all three cases the ban is linked to a similar ban on nuclear weapons capable vessels, and no reason is given by the author for the bans. He makes the point with respect to vessel-visit policies that there may well be a difference between officially stated policy and what actually occurs. One illustration given is that US nuclear powered warships visited Egyptian ports in 1985, despite the apparent official ban on visits (pp. 6 and 10). See also p. 9, where it is noted that China's apparent official policy of not allowing visits may not apply in practice to prevent specific visits.
42. US, H of R, Committee on Appropriations, Subcommittee on Energy and Water Development, Energy and Water Development Appropriations for 1988 - Hearings, 11 March 1987, pp. 890-91 (Admiral K. R. McKee). See also the Times (London), 31 October 1977, p. 1, 'Suez Barred to nuclear submarine': HMS Dreadnought refused passage.
43. cf. US, H of R, Committee on Appropriations, Subcommittee on Energy and Water Development, Energy and Water Development Appropriations for 1989 - Hearings, 23 March 1988, p. 1331:
Mr J. T. Myers: How many others [in addition to New Zealand] have denied us port access?
Admiral McKee: It is hard to say because we have not asked everybody in the world to let us come in, but I believe the only place where there is a national policy against the visit of nuclear-powered ships is there. There are several islands in the South Pacific that have banded together to create nuclear-free zones, but we have visited some of those, not all. There are periodic stand-offs that come along. They say, well maybe not now. But eventually it works.

sought they would be refused on safety grounds.⁴⁴ Alternatively, visits may not be sought because the host country's conditions for visits are not acceptable.⁴⁵ It is also possible that some countries permit visits because they see the benefits outweighing major concerns about safety.

Nuclear Powered Merchant Ships

6.31 During the 1960's and 1970's the nuclear powered merchant ships NS Savannah and NS Otto Hahn visited a large number of ports in a large number of countries.⁴⁶ Although there are no reports of any nuclear-related safety problems occurring during any of these visits, safety studies were made and contingency plans were drawn up in respect of at least some of the ports visited.

6.32 The Committee examined only a small sample of the literature relating to these studies and plans. The overseas plans were based on port visits, it apparently being accepted

44. e.g. the question of visits to Swedish ports by civilian or military nuclear powered vessels has not arisen since 1964. Hence the Government has not had reason to consider whether visits should be permitted: letter from the Swedish Embassy, Canberra to Senator McIntosh, 15 December 1986.

45. e.g. Denmark permits nuclear powered vessel visits subject to stringent conditions, including the provision of technical information which would permit the Danish authorities to evaluate the safety-related standards of the vessel. 'Experience has shown that countries that have expressed a wish for a visit to Danish ports of their nuclear-powered vessel have not in practice felt able to meet the necessary conditions': letter from the Danish Embassy, Canberra to Senator McIntosh, 17 February 1987. No nuclear powered vessel has visited a Danish port since the NS Savannah in 1964; *ibid.*

46. Figures of 107 ports in 40 countries are given in D. McMichael and H. Bianchi, 'Port Entry of Nuclear Ships: Differences, Procedures and Conditions' in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), p. 407. The NS Otto Hahn visited populated ports such as Rotterdam, Southampton, Lisbon, Cape Town, Buenos Aires, and Rio de Janeiro: W. Boulanger, 'Legal Aspects of Nuclear Merchant Ships' in *ibid.*, p. 530.

that there was no need to plan for accidents occurring at sea.⁴⁷ The Committee's examination indicated that Australian planning is within the bounds of what was considered necessary overseas, after making allowance for the difference between naval and merchant vessels.⁴⁸ Australian planning tends towards the conservative (ie. more safety-oriented) end of the spectrum.

6.33 Dutch planners, for example, envisaged an evacuation zone radius which might extend to 600 metres. But there was no equivalent to the Zone 2 in Australian plans. The planners based their plans on a contained accident, but assumed a higher leak rate from containment than the ship's designers.⁴⁹

6.34 South African plans provided for a 600 metre zone for immediate evacuation, with people immediately outside this zone being issued with potassium iodate tablets, warned to stay indoors, etc.⁵⁰ Monitoring for radiation was required throughout the visit, with readings taken every hour near the ship.⁵¹

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47. C. J. van Daatselaar, 'Arrangements for and Experience with the Visits of the Nuclear Ship "Otto Hahn" to the Harbours of Rotterdam and Vlaardingen in the Netherlands' in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), p. 405 ('At a distance of 5 miles from the coast the risk to population will be negligible ...'); M. Kuramoto, 'Some Considerations on the Safety of Nuclear Ships' in *ibid.*, p. 461 (accident in the open sea 'would have no consequence on the population at large').
48. On overseas planning, see for example the general discussion in R. O'Neil, 'Port Interface Requirements' in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), pp. 71-87.
49. C. J. van Daatselaar, 'Arrangements for and Experience with the Visits of the Nuclear Ship "Otto Hahn" to the Harbours of Rotterdam and Vlaardingen in the Netherlands' in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), p. 406.
50. J. O. Tattersall, 'The Position of a Host Country in Receiving Nuclear Ships' in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), p. 478.
51. *ibid.*, p. 474.

Australian guidelines call for monitoring only once daily.⁵² In both cases there is provision for alarm monitors which will automatically indicate the occurrence of an accident.

6.35 The safety scheme for Southampton provided for a 600 yard evacuation and exclusion zone, with little need seen for measures beyond this zone.⁵³ For example, potassium iodate tablets were to be issued only to persons within the 600 yard zone.⁵⁴

6.36 The safety scheme for Wellington similarly focuses almost all its protective measures, including evacuation, within a 600 metre zone around the accident.⁵⁵ Provision is made for a prohibition on the consumption of foodstuffs in the downwind sector out to 1,000 metres from the accident site.

CONCLUSIONS

6.37 Australian contingency plans are more stringent than the arrangements for warships thought necessary by the United Kingdom and the United States. Based upon comparison with a small sample of overseas plans relating to nuclear powered merchant ship visits, Australian plans are clearly at the more stringent end of the spectrum.

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52. Department of Defence, Environmental Radiation Monitoring during Visits of Nuclear Powered Warships to Australian Ports: Requirements, Arrangements and Procedures, (May 1988), para. 3.1.1.
 53. Southampton Special Safety Scheme for Visits of Nuclear Merchant Ships reproduced in Organisation for Economic Cooperation and Development, Nuclear Energy Agency, Symposium on the Safety of Nuclear Ships: Proceedings, Hamburg, 5-9 December 1977, (OECD, Paris, 1978), p. 427-53. See p. 428 (health hazard beyond 600 yards 'most unlikely'), p. 429 (600 yard exclusion distance), p. 438 (ban consumption of foodstuffs within 880 yards and take action to ensure that warning is given to all persons), and p. 439 (arrange testing of milk samples from farms up to 5 and a half miles down wind of the accident site).
 54. *ibid.*, p. 429.
 55. New Zealand, Wellington Regional Civil Defence Plan for a Nuclear Powered Vessel Visit to the Port of Wellington, (1983), para. 8 (Evidence, 1147).