

NAVAL NUCLEAR REGULATORY PANEL

**ENVIRONMENTAL IMPACT ASSESSMENT OF THE PROPOSED
DISMANTLING OF HMS RENOWN**

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REFERENCES

- A. Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999.
- B. Renown Dismantling Proposal, BRDL, Issue 1 August 2000: Environmental Statement and Non Technical Summary.

CONTENTS

Background

Regulation by the Naval Nuclear Regulatory Panel

Decision

Basis for the Decision

Human Beings, Flora and Fauna

Soil, Water, Air, Climate and the Landscape

Material Assets and the Cultural Heritage

Interaction between the above Factors

Change or Extension to Project

Annexes

- A. Consideration of the Environmental Statement
- B. Consultation Response
- C. Regulation of Submarine Dismantling

Appendices

- A. Consultees
- B. NRP Consultation Presentations
- C. Consultation Response
- D. Summary of Consultation Feedback

Figures

- 1. The 'Cascade' Logic for Material Disposal
- 2. The Environmental Impact Assessment Process

BACKGROUND

1. In May 2000, the Ministry of Defence announced the intention to establish and implement a strategy for dismantling nuclear submarines and storing their reactor compartments on land, as opposed to storing the de-fuelled, but otherwise complete, submarines afloat, which has been MoD's policy to date¹.
2. Separately to this announcement, Babcock Rosyth Defence Limited (BRDL) made an unsolicited commercial proposal to dismantle the submarine Renown and store the residual radioactive material in the existing Intermediate Level Waste² store at Rosyth. BRDL offered this proposal as an alternative to preparing the submarine for storage afloat, and as a pilot project to demonstrate the feasibility of one option for storing residual material from nuclear submarines on land.
3. The Ministry of Defence agreed that BRDL could undertake planning and feasibility work, but implementation would not be approved until all independent regulators were satisfied. In response to this requirement, BRDL sought to comply with the Environmental Impact Assessment Regulations (Reference B), and produced the Environmental Statement at Reference A. The Environmental Statement has been assessed by the Naval Nuclear Regulatory Panel (NNRP), who have also consulted the organisations listed at Appendix A on the potential environmental impact of BRDL's proposal.
4. The proposal appears technically feasible; the scope of work being similar to both submarine refit and preparation for storage afloat in which BRDL already has experience. The Environmental Statement is well written, clear and generally satisfactory, and indicates that there would be minimal environmental impact, provided the work is well managed and the assumptions made in the Environmental Statement are achieved.
5. The proposal would therefore significantly reduce the volume of material stored on BRDL's site with minimal environment impact.

REGULATION BY THE NAVAL NUCLEAR REGULATORY PANEL

6. The Environmental Impact Assessment Regulations state³:
"These Regulations shall not apply to any project serving national defence purposes."
7. This project relates to national defence purposes, hence the Regulations do not apply, however in such circumstances, it is the policy of the Secretary of State for Defence that:
"Where the Ministry has been granted specific exemptions, disapplications or derogations from legislation, international treaties or protocols, Departmental standards and arrangements are to be introduced which will be, so far as is reasonably practicable, at least as good as those required by the legislation"⁴.
8. This policy is implemented by requiring the Chairman of the Naval Nuclear Regulatory Panel (CNNRP) to regulate the project as if the regulations applied. A description

¹ Preparation for afloat storage involves de-fuelling the submarine, removing all reusable equipment, sealing all openings in the pressure hull with the exception of the major access hatches and preserving the pressure hull to a high standard to prevent degradation of the hull whilst afloat.

² The on site Intermediate Level Waste store is known as the Active Waste Accumulation Facility – AWAFF.

³ Reference A, Regulation 3

⁴ DCI Gen 227/00: Policy Statement by Secretary of State on the Management of Safety and Environmental Protection

of CNNRP's regulation, including his involvement and interaction with the other regulators, principally NII and SEPA, is given at Annex C. The Environmental Impact Regulations require the appropriate regulator, in this case CNNRP:

- a. Not to grant a consent⁵ unless:
 - i. An environmental impact assessment has been undertaken, taking into consideration the environmental statement;
 - ii. The response of those consulted has been taken into account; and
 - iii. Any representations have been taken into account.
 - b. To publish⁶:
 - i. The content of the decision and any conditions attached thereto;
 - ii. The main reasons and considerations on which the decision is based; and
 - iii. A description, where necessary, of the main measures to avoid, reduce and, if possible, offset the major adverse effects of the project.
9. BRDL's Environmental Statement (Reference B) forms the basis of this assessment.

DECISION

10. CNNRP agrees to the proposed pilot project to dismantle Renown on the basis of the Environmental Statement, albeit with significant qualifications.
11. The Environmental Statement demonstrates that the effect on the environment of the pilot project would be low, however BRDL have not considered any alternatives to the proposal, hence it does not demonstrate that the proposal represents the best environmental option for disposing of decommissioned nuclear submarines.
12. Agreement to the proposal is therefore given subject to the following conditions:
- a. NII regulate the dismantling of the submarine and storage of residual material in accordance with BRDL's Site Licence.
 - b. SEPA authorise the discharge of any material from the site. SEPA's authorisation to discharge must be in place before dismantling commences.
 - c. This agreement applies to the pilot project only, to inform the MoD's wider strategy, and is not agreement to the proposal as the preferred option for additional vessels.
 - d. CNNRP must be notified if the actual quantities of material disposed of to the different routes or stored in the AWAFF differ from the estimates quoted in the Environmental Statement.
 - e. There must be a commitment to maintain and operate the AWAFF until an alternative disposal route becomes available for the material stored therein.
 - f. Evidence must be provided of BNFL Drigg's agreement to accept the residual Low Level waste from this project.

⁵ Reference A, Regulation 8 – Procedure by the Executive

⁶ Reference A, Regulation 11 – Information as to Decision

13. This agreement relates to the Environmental Impact Assessment only and is not an instruction to proceed with dismantling. Project approval by the Ministry of Defence remains under consideration.

BASIS FOR THE DECISION

14. Reference A⁷ defines an “environmental impact assessment” as a process which identifies, describes and assesses in an appropriate manner, in the light of each individual case, the direct and indirect effects of a proposed project on:

- a. Human beings, flora and fauna.
- b. Soil, water, air climate and the landscape.
- c. Material assets and the cultural heritage.
- d. Interaction between the above factors.

15. The following provides a summary of the basis for the decision, a more detailed explanation being given at Annex A (Consideration of the Environmental Statement) and Annex B (Consultation Response).

16. The proposed process involves fully dismantling the submarine external to the reactor compartment and, after decontamination, partly dismantling the reactor compartment and primary circuit contained therein. The process would involve segregating the materials comprising the submarine into ‘conventional scrap’, ‘controlled waste’, ‘special waste’ and ‘radioactive material’. The effect on the environment would be dependent upon the discipline applied during the decontamination and dismantling process to prevent the uncontrolled or inadvertent release of any hazardous materials into the environment.

Human Beings, Flora and Fauna

17. Assessment of the environmental impact of BRDL’s proposed project has shown that the effect on human beings, flora and fauna would be no more severe than that arising from current refit activities. The principal effect would arise from discharges from the site:

- a. Dust, fumes and particulate material would arise from dismantling the submarine. Precautions would however be taken to minimise these at source and the overall releases would be comparable to that arising from refitting.
- b. Approximately 8000 tonnes of material would be transported by road to a ship breaker at Inverkeithing, approx. 3.4 km away. This would be over an 11-month period and would cause a minimal increase in traffic on local roads.
- c. Radioactive material would fall into three categories; solid, liquid and airborne. BRDL claim there would be no airborne release. Solid material would be disposed of to appropriate controlled sites (the on site AWAFF or BNFL’s site at Drigg, Cumbria). Small quantities of radioactive liquid would be released to the Forth under SEPA authorisation, the effect of which has been shown to be minimal.

Soil, Water, Air Climate and the Landscape

18. The Environmental Statement demonstrates that the effect on water and air would be no more severe than current refit activity and would arise principally from discharges from

⁷ Regulation 2 - Definitions

the site. There would be no effect on soil, the dismantling and storage taking place wholly within the dockyard which is on reclaimed land, remote from any agricultural land.

19. The project would have no effect on climate and there would be no effect on landscape, the process taking place wholly within extant buildings and facilities.

Material Assets and the Cultural Heritage

20. There would be no effect on material assets, the process taking place wholly within extant buildings and facilities.

21. There would be no effect on cultural heritage, the dismantling and storage taking place wholly within the dockyard which is on reclaimed land. The closest heritage sites are Rosyth Castle and Dovecot on the Europarc site remote from the Licensed Site.

Interaction between the above Factors

22. The principal interaction resulting from the proposed process is the effect on human beings, flora and fauna arising, or potentially arising, from discharges to soil, water or air.

Acceptance Criteria

23. The environmental impact of an activity may be assessed by a combination of:

- a. Assessment of the proposal against predetermined criteria.
- b. Assessment of the proposal in isolation, based upon the evidence presented in the Environmental Statement.
- c. Comparison of the proposal with alternative options to achieve the same aim.

24. This project has been presented as a pilot to demonstrate the viability of one option for dismantling a submarine. No alternatives to the specific proposal have been considered; hence the environmental impact assessment relies upon demonstration that:

- a. The environmental impact would be commensurate with that arising from current refit activity.
- b. Discharges from the site would be commensurate with discharges arising from current refit activity.
- c. Discharges from the site would be below limits authorised by SEPA.

MEASURES TO AVOID OR REDUCE THE EFFECT ON THE ENVIRONMENT

25. The following measures are necessary to avoid or reduce the effect on the environment:

- a. Discipline must be applied in the segregation of material and disposal to appropriate sites, to ensure that controlled wastes, special wastes and radioactive material are not inadvertently released to the environment.
- b. The release of dust, fumes and particulate matter must be minimised and the release prevented of any airborne discharges of radioactive materials. In the case of radioactive material, nil release is an exacting criterion to meet, particularly when cutting into the reactor compartment and primary circuit.
- c. One planned discharge to the environment is the liquid discharge to the Forth. Although estimated to be small and the effects of the discharge have been

demonstrated to be minimal, minimisation of that discharge would reduce the effect on the environment.

- d. The possibility of an accidental release of material to the environment has been considered in the Environmental Statement, two aspects of the project given particular consideration being a leak during the decontamination process and a dropped load while lifting the RPV assembly from the dock bottom. Incident response and containment measures have been described to minimise the effect on the environment of such events. Provided these measures are effective it has been shown that the effects would be confined to local, on site, contamination that would be cleaned up using established procedures. These are aspects of the project where a principle of 'defence in depth' must be employed to prevent their occurrence.
- e. The storage of materials in the AWF and the storage of resins in flasks are not totally passive. The AWF filtration system gives rise to used filters which must be treated as low level waste, and the catch tanks have a finite life, hence the resin must be periodically decanted to new flasks and the old flasks disposed of as waste. To minimise the environmental impact, consideration must be given to methods of the storage of residues which does not generate contaminated material.

CHANGE OR EXTENSION TO PROJECT

26. Reference A⁸ requires that, where a change or extension of any project may have significant adverse effects on the environment, the licensee shall apply to the regulator for a determination as to whether the project shall be made subject to an environmental impact assessment. The regulation continues that the licensee shall not commence or continue with the project until such determination has been made.

27. Describing the project as a 'pilot' implies intent to extend the process to other vessels on the site if the pilot project is successful:

- a. Success of the pilot project is dependent upon minimisation of the quantity of the wastes released to the environment and the volume of residual material it is necessary to store. Changes in the quantities of such materials will affect the environmental impact; hence CNNRP must be notified if the actual quantities differ from the estimates quoted in the Environmental Statement.
- b. This assessment considers the pilot project only and any extension to apply the process to additional submarines must not be commenced without the submission of an Environmental Statement addressing the effect of the new proposal.

⁸ Regulation 13 – Change or Extension to Project

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CONSIDERATION OF ENVIRONMENTAL STATEMENT

ENVIRONMENTAL STATEMENT

28. The Environmental Impact Regulations specify⁹ that the Environmental Statement should contain:
- a. A description of the project.
 - b. An outline of the main alternatives and reasons for choice.
 - c. A description of the aspects of the environment likely to be significantly affected by the proposal.
 - d. A description of the likely effects on the environment
 - e. A description of the measures to avoid or reduce the effect on the environment.
 - f. A non-technical summary.
 - g. An indication of any anticipated difficulties.

DESCRIPTION OF THE PROJECT

Whole Project Characteristics and Land Use

29. The Environmental Impact Regulations require the Environmental Statement to include:

“a description of the physical characteristics of the whole project and the land-use requirements during the construction and operational phases.”

30. The project is described as a pilot to demonstrate the feasibility of dismantling a nuclear submarine. As the statement highlights, “no attempt at dismantling a reactor compartment has been made by any of the world’s navies to date. The USA, former Soviet Union and France have removed reactor compartments for shore storage. BRDL’s proposed pilot for Renown provides an opportunity for the UK to take the lead in tackling an issue with international implications.”¹⁰ The purpose of the pilot project is to; “prove the viability of one option so that it may be taken forward for consideration by MoD”.

31. BRDL’s Environmental Statement provides a comprehensive description of the project, which would dismantle the submarine and segregate the resulting material into:

- a. Conventional scrap;
- b. Controlled waste;
- c. Special waste;
- d. Decontaminated material acceptable for free release;
- e. Liquid effluent discharged to the Forth;

⁹ Reference A, Regulation 5 (Provision of an Environmental Statement) and Schedule 1 (Information to be included in an Environmental Statement).

¹⁰ Reference B, Environmental Statement, Section 6.14.4 Pg 84.

- f. Low Level Waste (LLW); and
 - g. Intermediate Level Waste (ILW).
32. The physical characteristics of the project by which this would be achieved are:
- a. Dismantle the submarine external to the reactor compartment, segregate the material into conventional scrap, controlled waste and special waste, and dispose of that material in an appropriate manner. This would be conventional ship-breaking, having no radiological implications.
 - b. De-contaminate the reactor plant, part dismantle the reactor compartment and reactor plant, and segregate the material into conventional scrap (including decontaminated material achieving 'free release' criteria), Low Level waste and Intermediate Level waste.
 - c. Dispose of to appropriate sites, or store, the residual radioactive material. All Intermediate Level Waste would be stored in the existing on site store and all Low Level Waste would be disposed of to Drigg. A small quantity of liquid containing radioactive material would be discharged to the Forth.
33. The proposed land use of the project would be:
- a. Dock No 2, Rosyth Royal Dockyard, in which the decontamination and dismantling activity would take place.
 - b. The Active Waste Accumulation Facility (AWAF), Rosyth Royal Dockyard, the on site ILW Store.
 - c. The on site transport route for material between Dock No 2 and the AWAF.
 - d. BNFL's Low Level Waste facility at Drigg.
 - e. The National Repository for Intermediate Level Waste, when that facility becomes available.

Production Process Characteristics

34. The Environmental Impact Regulations require the Environmental Statement to include:

“a description of the main characteristics of the production processes, for instance the nature and quantity of materials used.”

35. BRDL's proposal aims to considerably reduce the volume of stored material on site by means of a combination of measures, shown in the flowchart at Figure 1.

36. Before dismantling starts, all unused fuel and fission products will have been removed from the submarine's reactor plant using established de-fuelling procedures. All fissile material and the great majority of radioactive material¹¹ will therefore have been removed before dismantling starts. The environmental impact of de-fuelling is considered separately and is not part of this environmental impact assessment.

¹¹ A used core contains between approx. 10^{17} Bq and 10^{18} Bq of activity, depending upon the time since shutdown. This is 100 to 1000 times more than the activity of the material remaining in the reactor plant after it has been de-fueled.

37. The Environmental Statement draws the analogy with the decommissioning strategy for civil nuclear power stations, which involves dismantling down to the reactor's biological shield over five to ten years followed by a one hundred year "safe-store" period of the reactor. The Environmental Statement argues that the submarine's Primary Shield Tank, as opposed to the submarine's Reactor Compartment, is a 'reasonable parallel' to the civil reactor's 'biological shield'. The key elements of the dismantling / segregation process¹² would be:

- a. **Ship-Breaking:** All parts of the submarine external to the reactor plant would be dismantled. The resulting material would be segregated into conventional scrap, controlled waste and special waste and disposed of in an appropriate manner. The bulk of the material would be disposed of as conventional scrap.
- b. **Decontamination:** The primary circuit, external to the Reactor Pressure Vessel (RPV), would be decontaminated by a cleaning process which transfers radioactive material, originally plated on the inside of primary circuit pipe-work, to special resins. The radioactive material would be transferred to the resins, contained in special flasks and would then be stored in the AWAf.
- c. **Dismantling:** The submarine reactor plant, external to the RPV, would be dismantled.
- d. **Segregation of Material:** The dismantled pipe-work would be monitored and that material which achieves the 'free release' criteria segregated from the remaining radioactive material.
- e. **Disposal of Waste:** A number of disposal paths would be utilised to dispose of material from the site:
 - i. **Scrap:** Material described as 'scrap metal and other material comprising the submarine structure and non-recoverable fittings' would be disposed of as conventional scrap to R M Supplies breakers yard, Inverkeithing. The majority of the material arising will be in this category.
 - ii. **Decontaminated Material:** Decontaminated scrap which meets the free release criteria would be disposed of as conventional scrap.
 - iii. **Controlled Wastes:** Designated skips would be placed around No 2 Dockside for controlled wastes which either be emptied by the Fife Council compactor vehicle, or compacted on site prior to off site disposal.
 - iv. **Special Wastes:** The MoD has notified BRDL of the presence of certain hazardous materials on the submarine, such as cadmium, lead etc. The location of the materials would be marked and the materials removed by controlled procedures to a purpose built waste storage facility, where they will be segregated and stored until sufficient volume is accumulated for economic off site disposal.

¹² Reference B, Environmental Statement, Pg 46, Section 5.6.1. Table 2 'Summary of Waste Types and Amounts'.

- v. **Low Level Waste:** Low level radioactive waste would be transferred to the AWF and packaged for off-site disposal to the national Low Level Waste repository at Drigg, Cumbria.
- vi. **Discharge:** A limited quantity of liquid effluent would be discharged from the site. This may contain low levels of radioactive material and all such discharges would be authorised by SEPA.
- f. **Transport / Movement of Material:** The movement of material can be considered in two parts, off-site and on-site movement:
 - i. **Off-Site Movement.** Transport of the scrap material would be by road, involving approx. 900 round trips of 42 tonne max gross laden weight vehicles along a 3.4 km route from the dockyard to the breakers yard.
 - ii. **On-Site Movement:** On-site movement will comprise transfer material from No 2 Dock to the AWF, the most significant move being that of the RPV/PST assembly.
- g. **Storage of Material:** The residual material will be stored in the Active Waste Accumulation Facility in Rosyth. This material would comprise the Reactor Pressure Vessel / Primary Shield Tank (RPV/PST) assembly and other materials that do not meet the free release or low level waste criteria. The final fate of the material stored in the Active Waste Accumulation Facility is beyond the scope of this proposal, however the options are:
 - i. The activity of certain material, eg resins, will reduce by radioactive decay. Such materials will decay to meet the Low Level Waste criteria after 5 to 10 years, at which time they could be transferred to Drigg.
 - ii. Further processing of the Reactor Pressure Vessel / Primary Shield Tank assembly could be undertaken, segregating Low from Intermediate Level Waste. Low Level Waste could thereafter be transferred to Drigg.
 - iii. The remaining Intermediate Level Waste would be retained in the Active Waste Accumulation Facility until a national repository for such waste became available. Current predictions are that this may not be available for 50 years or more.

Residues and Emissions

38. The Environmental Impact Regulations require the Environmental Statement to include:

“an estimate, by type and quantity, of expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation and other similar matters) resulting from the proposed project.”

39. The radioactive material to be stored on site comprises steels and other reactor plant materials, irradiated during normal operation of the submarine; hence that material already exists and will not be generated by this process.

40. The estimated residues and emissions detailed in the Environmental Statement are:

ESTIMATED RESIDUES AND EMISSIONS BY MASS / TONNES	Table 1
Conventional Scrap	~ 8000 tonnes
Intermediate Level Waste : Residual Submarine Plant – Stored in AWAF	~ 150 tonnes
Decontaminated material, ‘free release’ to scrap	~ 85 tonnes
Low Level Waste: Disposed of to Drigg	~ 35 tonnes

ESTIMATED RESIDUES AND EMISSIONS BY VOLUME / M³	Table 2
Intermediate Level Waste: Residual Submarine Plant stored in AWAF	~ 55 m ³
Liquid Effluent Discharge	~ 20 m ³
Intermediate Level Waste: Resin stored in AWAF	~ 4 m ³

ESTIMATED RESIDUES AND EMISSIONS BY ACTIVITY	Table 3
Intermediate Level Waste : Residual Submarine Plant – Stored in AWAF	~1,300,000 GBq
Resin	~150 GBq
Low Level Waste: Disposed of to Drigg	< 10 GBq
Liquid Effluent Discharge	~6 GBq

Residues from Storage

41. A secondary factor to be considered is that of residues arising from the storage of materials in the AWAF and the storage of radioactive material plated on resins.

42. Storage of material in the AWAF results in residues as the filtration system generates used filters that must be treated as low level waste. In this instance, the AWAF pre-exists, hence used filters are already been generated as a result of the material currently been stored there. The project would not therefore give rise to additional residues.

43. The decontamination process transfers radioactive material, originally plated on the internal surfaces of the primary circuit, to resins, which are suitably contained and stored in the AWAF. Storage of the radioactive material in this manner generates waste as the resin and storage flasks become contaminated. The flasks currently used for storing resins have a finite life, hence the resin must be periodically decanted to new flasks and the old flasks disposed of as contaminated waste.

44. To minimise the environmental impact, a passive method of storing the residues, without generating waste, would need to be developed.

OUTLINE OF ALTERNATIVES

45. The Environmental Impact Regulations require the Environmental Statement to include:

“An outline of the main alternatives studied by the licensee and an indication of the main reasons for his choice, taking into account environmental effects.”

46. The Environmental Statement refers to the in-house study conducted by MoD as a precursor to announcing the ISOLUS¹³ strategy. Four viable disposal options were identified for Royal Naval nuclear submarines:

- a. Storage Afloat
- b. Storage of separated Reactor Compartments on land
- c. Storage of primary plant components as un-packaged ILW
- d. Storage of primary plant components as packaged ILW

47. This project would be a pilot to demonstrate the feasibility of one of those options to inform MoD’s wider strategy, namely the storage of primary plant components as un-packaged ILW. No alternatives are considered in the Environmental Statement, BRDL’s proposal being to conduct a specific pilot project, not to demonstrate that the proposed alternative is the best environmental option for the whole flotilla.

ASPECTS OF THE ENVIRONMENT LIKELY TO BE AFFECTED

48. The Environmental Impact Regulations require the Environmental Statement to contain:

“a description of the aspects of the environment likely to be significantly affected by the proposed project, including in particular, population, fauna, flora, soil, water, air, climate factors, and material assets, including architectural and archaeological heritage, landscape and the inter-relationship between the above factors.”

Population:

49. Population may be affected in a number of ways:

- a. BRDL workers will gain benefit from employment.
- b. BRDL workers will incur a risk from the decontamination and dismantling processes.
- c. The local public may incur a risk from off site releases or discharges, either planned or unplanned.

Fauna & Flora:

50. Local fauna and flora may incur a risk from off site releases or discharges, either planned or unplanned.

¹³ Interim Storage of Laid Up Submarines. The acronym for MoD’s strategy for dismantling submarines and storing their reactor compartments on land.

Soil

51. The dockyard is built upon reclaimed land, remote from agricultural land, in addition to which there is a strong emphasis within the dockyard on control measures to ensure the containment of hazardous materials. As 'defence in depth' to contamination, it is also planned to decommission the site once all nuclear related work is complete and return the site to conventional commercial use, at which time any residual low level contamination would be removed. No lasting effect on soil within the dockyard is therefore anticipated.

52. External to the dockyard, all disposals would be to controlled disposal sites, appropriate for the material. There is unlikely to be any affect on soil unless an uncontrolled release of hazardous material (conventional or radioactive) occurred.

Water

53. The project includes controlled effluent discharge to the Forth, which will have an affect on the environment, there being potential paths for discharged material to population, fauna, flora and sediment. The Environmental Statement demonstrates that those discharges are most likely to be below the limits of detection and the affects will be negligible. All radioactive discharges must be authorised by SEPA.

54. The accidental release of special wastes, oils or chemicals is considered in the Environmental Statement and the control measures to prevent accidental releases, or respond to a significant spill, are described.

Air

55. No 2 Dock is open to the atmosphere, hence there will be general releases of dust, fumes and particulate material to the atmosphere, unless local measures are taken to contain those releases.

56. The submarine's oil, diesel and sewerage tanks will be vented to atmosphere and low levels of gases such as hydrogen sulphide discharged. Such tasks are not unique to dismantling and are a necessary part of submarine refitting; however no smell has ever been detected, the odour threshold being 0.13 ppm. Such tanks are not part of the reactor plant and do not contain radioactive materials.

57. Dismantling of conventional parts of the submarine will give rise to dust, fumes and particulate releases. Such practices are not unique to dismantling and are a necessary part of submarine refit. Current refit working practices will be employed to reduce these releases to a minimum and no releases in excess of those experienced during a refit are anticipated.

58. The claim in the Environmental Statement is that "there will be no discharge of airborne radioactive material during the project hence there will be no environmental impact through this pathway." This will be achieved by a "basic philosophy of control at source and the total prevention of the escape of radioactive contamination into the work area and beyond into the environment." Nil release is an exacting criterion and assurance against accidental emissions will be achieved by NII's regulation against the Site Licence Conditions applied under the Nuclear Installations Act 1965 (as amended).

Climate factors

59. The scale of the project is such that there will be no effect on climate.

Material assets, including architectural and archaeological heritage

60. There is no requirement to take new land areas into industrial use or to erect new buildings to support this project. Existing facilities, principally No 2 Dock and the AWAFF, would be used in fundamentally the same manner as they have been used to support submarine refits. In this respect Renown presents an opportunity to make use of No 2 Dock while it remains available for nuclear use. Current plans are to decommission this facility for nuclear use once submarine refitting completes in Rosyth in 2002.

61. BNFL's Low Level Waste facility is also a pre-existing facility; hence the project will not require a change of land use for the purpose of low level waste disposal.

62. The absence of a National, Intermediate Level Waste facility means that proceeding with the project commits the MoD and BRDL to maintenance and operation of the AWAFF until an alternative disposal route becomes available for the material stored there. The AWAFF is a modern facility, which became operational in 1998. Upkeep of the AWAFF to support the necessary storage life is feasible.

63. Rosyth Dockyard was built upon reclaimed land in the early part of the 20th century, hence there are no archaeological sites within the dockyard. There are two scheduled ancient monuments, Rosyth Castle and Dovecote, in the Europarc adjacent to the Dockyard. These are however remote from the site of the proposed project, hence there will be no affects upon archaeological heritage.

Landscape

64. No new land will be taken up for industrial use and no materials will be permanently stored in the open; hence there will be no affect upon the landscape from this project.

LIKELY EFFECTS ON THE ENVIRONMENT

65. The Environmental Impact Regulations require the Environmental Statement to include:

“A description of the likely effects of the proposed project on the environment to be considered, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects resulting from:

- a. Existence of Project.
- b. Use of natural resources.
- c. Emission of Pollutants, creation of nuisances and elimination of waste.

Existence of Project

66. A number of positive effects would ensue from this project:

- a. The volume of stored material on the Rosyth Site would be reduced. One vessel would be removed from the basin, so removing the visual impact of a long term moored hulk.
- b. The residual material remaining on site would be stored within an existing building; hence there would be no visual impact resulting from storage.

Utilising an existing building would also have the positive effect of negating the need to build additional structures.

- c. The submarine would be dismantled in No 2 Dock, an extant nuclear facility, so negating the need to build a similar facility elsewhere. It should be noted that this facility has a finite life for nuclear use as the material infrastructure required to conduct nuclear work will be dismantled once the submarine refitting programme completes in Rosyth. Renown presents an opportunity that will not be available in the future unless a change of policy occurs and the nuclear infrastructure in Rosyth is maintained.
- d. The project would employ between 50 and 100 people, which would offset the consequences of completing the submarine refit programme in Rosyth. It would also enable the employment of people with recent experience in nuclear disciplines gained during that refit programme. These skills will be lost within a few years of completing the refit programme.

67. The project would not generate hazardous materials; the hazardous materials involved already exist, being part of the submarine. These include special wastes (such as cadmium and lead), oils and chemicals, and radioactive material (comprising steels and other reactor plant materials, irradiated during normal operation of the submarine). While those materials remain contained within the submarine hull they have no effect on the environment. The project aims to dismantle the submarine, segregate the non-hazardous material from the hazardous, recycle that material for which there is a demand, and dispose of / store the residual material on appropriate sites. By this means the volume of stored material can be significantly reduced.

68. The majority of the material (eg steels) would be recycled via R M Supplies Breakers Yard. The effect on the environment of the residual material would be minimised by discipline in the handling of hazardous materials, ensuring that the different categories of material (controlled waste, special wastes and radioactive waste) are disposed of to appropriate sites in a controlled manner. Only minimal quantities of hazardous materials would be released to the environment, it being demonstrated that those discharges would have minimal effect on the environment.

69. The project will commit BRDL and MoD to the maintenance and operation of the AWA until an alternative disposal route for the radioactive material can be established. Natural decay will enable a proportion of the material to be re-categorisation as Low Level Waste in 5 – 10 years, enabling it to be disposed of the Drigg repository. The remaining Intermediate Level Waste will, however, have to await the establishment of a National, Intermediate Level Waste repository to accept this material. Current predictions are that such a repository will not be available for 50 years or more.

Use of Natural Resources

70. The project would not require special use of natural resources, the resources required being power and electricity etc. necessary for day to day operation of the dockyard. The environmental effect of the use natural resources is therefore minimal.

Emission of Pollutants, creation of nuisances and elimination of waste.

71. Limited pollutants would be released in a controlled manner as a result of this process. The Environmental Statement demonstrates that the impact of the pilot project would be no

more severe than current refitting activities. The effect on the environment can be gauged by the impact resulting from the management of solid, liquid and airborne materials:

- a. **Solid:** The release of solid material as a pollutant is not anticipated. All solid material would be disposed of to appropriate sites or stored in the AWAFF. Discharges, in particular the transfer of LLW to Drigg, would be authorised by SEPA and the EA and the criteria for free release of decontaminated material will also be agreed with SEPA. Provided these processes are well managed, the only solid material released into the wider environment would be non-hazardous material that is not subject to control measures, including material with activity less than the free release criteria. All other solid hazardous material will be disposed of in a controlled manner or stored, hence it will have no environmental impact.
- b. **Liquid:** Limited liquid pollutants would be released as a result of this process. The Environmental Statement highlights BRDL's procedure for 'trade effluent disposal'. Discharges would only be permitted following a Laboratory Test and a list of substances to be controlled is available, outlined in the East of Scotland Waste Water Policy. Limited liquid discharge to the Forth resulting from the decontamination process would also be required, which would be authorised by SEPA. The Environmental Statement estimates that a maximum of 6GBq of activity would be released, having minimal impact on the environment¹⁴. Such pollutant discharges are within the limits already authorised for submarine refitting; hence the project would have no more severe effect on the environment than submarine refitting. The Environmental Statement provides comprehensive evidence of radiological surveys and assessments of effects on critical groups etc. to support this estimate.
- c. **Airborne:** The Environmental Statement identifies that, non-radioactive, dust, fumes and particulate releases will occur, but that these will be kept to a minimum, commensurate with normal refit working practices. The Environmental Statement also identifies that "There will be no discharges of airborne radioactive material during the project hence there will be no environmental impact through this pathway." Assurance against accidental emissions will be achieved by NII's regulation against the Site Licence Conditions applied under the Nuclear Installations Act 1965 (as amended). Provided the process is well managed and these assumptions are achieved, the environmental impact from airborne release will be no more severe than current refit practices.

72. The project would give rise to a number of nuisances, such as noise and light from the dismantling activity, but these would be commensurate with current refit activity. The location of No 2 Dock means that such nuisances would have minimal effect outside the dockyard site and would be no more severe than those currently incurred from submarine refitting.

¹⁴ Summarized in Reference A, Environmental Statement, Annex D, Section 5, Conclusions, pg 136. The radiation dose from this discharge to a member of the critical group is assessed to be $4.6 \times 10^{-5} \mu\text{Sv y}^{-1}$; significantly less than the recommended annual dose limit to members of the public of $1000 \mu\text{Sv y}^{-1}$ or the $300 \mu\text{Sv y}^{-1}$ recommended by the NRPB. The dose is also significantly less than the UK average annual dose from natural background radiation of $2200 \mu\text{Sv y}^{-1}$

73. The project will necessitate the transport of approximately 8000 tonnes of scrap from the dismantled submarine in Rosyth Dockyard to the breakers in Inverkeithing, some 3.4 km away. This will require approximately 900 round trips over an 11 month period, which equates to an average 4 journeys per day, assuming a 5 day week. The impact of this would be slight in comparison with the existing traffic on that route.

74. On the issue of elimination of waste, the prime object of the project is to reduce the volume of material it is necessary to store and return the maximum amount of material to the recycling stream.

MEASURES TO AVOID OR REDUCE THE EFFECT ON THE ENVIRONMENT

75. The effect on the environment of the project is dependent upon a number of measures:
- a. Discipline in the segregation of material and disposal to appropriate sites, to ensure that controlled waste, special waste or radioactive material are not inadvertently released to the environment.
 - b. The minimisation of the release of dust, fumes and particulate matter and the prevention of any airborne discharges of radioactive materials. In the case of radioactive material, nil release is an exacting criterion to meet, particularly when cutting into the reactor compartment and primary circuit.
 - c. One planned discharge to the environment is the liquid discharge to the Forth. Although forecast to be small and the effects of the discharge have been demonstrated to be minimal, minimisation of that discharge would reduce the effect on the environment.
 - d. The possibility of an accidental release of material to the environment has been considered in the Environmental Statement, two aspects of the project given particular consideration being a leak during the decontamination process and a dropped load while lifting the RPV assembly from the dock bottom. Incident response and containment measures have been described to minimise the effect on the environment of such events. Provided these measures are effective it has been shown that the effects would be confined to local, on site, contamination that would be cleaned up using established procedures. These are aspects of the project where a principle of 'defence in depth' must be employed to prevent their occurrence.

ANTICIPATED DIFFICULTIES

76. The assessed effect on the environment presented in the Environment Statement is predicated on a number of assumptions, the outcome of which would influence the success of the project and possibly the environmental impact. These are:

- a. **Effectiveness of the Decontamination Process.** The reduction in volume of stored waste is dependent upon the effectiveness of the decontamination process. The consequences of not achieving the assumed decontamination factors would be a change in the residual quantities of different category material; intermediate level waste, low level waste and free release. This would necessitate either the transfer of more material to Drigg, or the storage of more material in the AWF. Decontamination processes have been conducted on naval reactor plant in the past, but not the process proposed for this project, which would achieve a higher decontamination factor. The

proposed process has been used successfully on civil plant in the USA, but it has not yet been proven on naval plant.

- b. **Acceptance of the Low Level Waste by Drigg.** A key assumption in the proposal is that Drigg will accept the Low Level Waste arising from dismantling the submarine, but no written agreement to that assumption has yet been made. If Drigg were not to accept that waste, the impact would be the need to store more material in the AWAFF. Providing the capacity exists, there would be no impact on the environment.
- c. **Customer for Decontaminated Material.** It is also assumed that a customer exists for the decontaminated material. Consultation feedback has raised the issue that “the British Metals Federation (BMF) has stated that it does not want its industry blighted by public anxiety about recycled metals carrying residual contamination and has called for no detectable levels above background in scrap metals.” If a customer were not found for the decontaminated material, the environmental impact would again be the need to store more material in the AWAFF or transfer more material to Drigg.
- d. **Nil Airborne Release.** As already highlighted, the proposal states that no airborne release will arise from the project. This is a very exacting criterion. If this could not be achieved the impact of the release would need to be assessed and a discharge authorisation obtained from SEPA.

CONSULTATION RESPONSE

1. A number of issues are raised in the written responses to consultation (Appendix C):

HSE/NII

2. Subject to production of a satisfactory safety case, the HSE support the proposal as it would demonstrate the feasibility of dismantling of submarine, using a workforce with current nuclear experience, using proven technology, within an extant nuclear licensed site.

Decommissioning would be carried out as soon as reasonably practicable, the process would use existing disposal routes while not foreclosing ILW disposal options and storage of residual material would be in a passively safe state. HSE do, however, note a number of cautions which have been reflected in this environmental assessment:

- a. Careful containment of contamination will be required once the reactor compartment is cut open to atmosphere.
- b. The decontamination technique has not been used in the UK before. BRDL must demonstrate that they understand the environmental risks and disposal routes.
- c. BRDL estimate of the amount of material that could go for free release needs to be substantiated to avoid an embarrassingly large amount of waste that they cannot store.
- d. Confirmation is required that Drigg can take the volume of LLW arising from the process.

Radioactive Waste Management Advisory Committee

3. The Radioactive Waste Management Advisory Committee (RWMAC) noted that the proposal appears technically feasible, would use existing personnel and plant, while having no significant impact on the environment. They advise a note of caution however with respect to the timing of this proposal and the consultation exercise being undertaken by MoD on the strategy for dealing with out of service submarines. Whilst the environmental impact of this proposal would be slight, progressing with that proposal may compromise the consultation on the broader strategy, which is seeking full and unfettered public discussion of the options to enable conclusions to be drawn and decisions made which derive from public participation in the process.

4. RWMAC raised two additional issues:
 - a. The need to assess the implications for long-term on-site storage of wastes contaminated with carbon-14.
 - b. Use of this process for other submarines could eventually lead to additional radioactive waste storage facilities being needed on the site.

5. The storage of waste would be regulated by NII under the Nuclear Installations Act, under whose regulation the carbon-14 issues would be addressed. This assessment applies to the pilot project only and any extension to the project to accommodate additional vessels must be accompanied by a separate submission.

Scottish Environmental Protection Agency

6. SEPA raised a number of concerns:
 - a. The process must not commence until SEPA have delivered their Authorisation as this may foreclose the Best Practical Environmental Option (BPEO) and could prejudice SEPA's consultation exercise.
 - b. No alternatives have been considered; the options of afloat storage, reactor compartment cutout, and reactor compartment dismantling should be compared.
 - c. Why have other countries not progressed further than reactor compartment cutout? Decontamination and dismantling carries a finite risk and opening the reactor compartment increases the spread of radioactivity, but reactor compartment cutout would incur a lower risk with less spread of radioactivity.
 - d. Whether the reactor compartment or RPV remain, the ultimate disposal problem will still fall to the next generation. Processing the wastes without achieving re-categorization of ILW as LLW will result in additional discharges without gain. The recycling of scrap meets the sustainable development principles, but creation of unnecessary scrap, which may not achieve free release, is detrimental to leaving that waste to allow decay.
 - e. BNFL have an embargo on wastes containing Carbon 14. BRDL do not have a letter of comfort from BNFL informing them that BNFL will accept the LLW.
 - f. How much is the project dependent upon free releasing 85 tonnes of decontaminated steel and what happens if this material has to be dispatched to Drigg?
7. It is agreed that the process must not commence until SEPA have delivered their Authorisation as this could prejudice SEPA's consultation exercise. Both the Environmental Impact Regulations and Radioactive Substances Act place emphasis on consultation as a means of informing the decision making process and that process must be transparent for consultation to be effective.
8. SEPA emphasise that as no alternatives have been considered, it has not been demonstrated that the proposed project is the best environmental option. The Environmental Statement demonstrates that the effect of this one option would be low, providing the assumed quantities of material can be disposed of to Drigg and to free release, and that no accidental release to the environment occurs. The small effect on the environment is also due, in part, to the available surplus capacity in the AWAFF and if this did not exist the environmental effect would be more significant. The AWAFF does not have sufficient capacity to receive the waste from all the vessels laid up at Rosyth. This project must therefore be considered as a pilot under the particular circumstances that apply.
9. While the environmental effect of the proposed pilot project would be small, the results of this project should be used to inform the wider debate and not to set a precedent on disposal options. A logical progression following from this project would be to consider the applicability of the process to the remainder of the flotilla. It must be demonstrable within the strategy for the whole flotilla that due consideration has been given to the best environmental option.

Scottish Executive

10. The Scottish Executive noted that reducing discharges to levels close to the limit of detection is consistent with the 'Sintra' (OSPAR) strategy. The OSPAR strategy aims to prevent maritime pollution by ionising radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the target of achieving concentrations in the marine environment close to zero for artificial substances.

Scottish Natural Heritage

11. Scottish Natural Heritage noted that, providing the works are confined to the Dockyard, there should be no physical impact on the local features or landscape.

Local Councils and the Nuclear Free Local Authorities

12. Written responses were received from a number of local councils which raise a number of recurrent issues:

- a. **Risk to the Public and Dockyard Workers:** A common question arose about the risk to the public and dockyard workers from both dismantling and storage of waste in the AWAFF. As for current dockyard Licensed Site activities, these aspects of the project will be regulated by HSE/NII against the Nuclear Installations Act, who will gain assurance that all risks are tolerable and as low as reasonably practicable.
- b. **Discharge of Radioactive Material:** Concerns were raised about the radioactive discharges arising from the project. The anticipated discharges would be similar to those arising from submarine refitting, and all discharges must be Authorised by SEPA in accordance with the Radioactive Substances Act. SEPA would also ratify the 'free release' criteria for decontaminated material. The concerns of the British Metals Federation that contaminated metal may enter the scrap metal trade from previously irradiated materials were also reiterated. As already noted this raises two issues, firstly the need for SEPA to ratify the free release criteria and secondly the consequences of having to store additional material if the criteria cannot be met. The final volume of residual material to be stored will be reviewed and compared with the estimates in the Environmental Statement. This information would thereafter be used to inform the strategy for the whole flotilla.
- c. **Options:** Several councils commented on the absence of options in the Environmental Statement, a particular issue being what were the comparative benefits of storing the whole reactor compartment as opposed to dismantling the reactor plant? There was also opposition to bringing any more vessels to Rosyth for dismantling or storage and the option of choice of site for such work was questioned. One response also referred to the pilot project as an experiment. This project would be a pilot to demonstrate the feasibility of applying processes proven elsewhere to nuclear submarines. The assessment has addressed the pilot only, in the particular circumstances pertaining to the proposed project. The environmental effect of the pilot has been demonstrated to be low, however this must not foreclose an options study for the strategy for the whole flotilla.

- d. **National Intermediate Level Waste Repository:** The need for a National ILW Repository was noted as this would dictate the length of time material would have to be stored on the Rosyth Site.
- e. **Workforce Experience:** The run down of nuclear work at Rosyth was noted and the question asked did Rosyth remain skilled enough to undertake this task? This will be addressed by the HSE/NII's regulation against the Nuclear Installation Act. It also emphasizes the finite window of opportunity that exists, as such skills will inevitably be lost once nuclear refitting completes.
- f. **Public Inquiry:** A number of councils requested a Public Inquiry into the proposed activity. The Environmental Impact Regulations, if they applied, do not include provision for a Public Inquiry; individual requests have therefore been forwarded to ministers who have replied separately.

REGULATION OF SUBMARINE DISMANTLING

Background

1. On 11 May 2000, following an in house study, the Ministry of Defence made an announcement concerning the storage of decommissioned submarines. Separately, an unsolicited commercial proposal was made by Babcock Rosyth Defence Limited (BRDL) to dismantle Renown, in lieu of the traditional preparation for afloat storage, and store the residual radioactive components in the existing Intermediate Level Waste Store at Rosyth. It was agreed that BRDL could undertake planning and feasibility work, although implementation would not be approved until all independent regulators were satisfied.
2. The following notes summarise the factors affecting the regulation of dismantling a nuclear submarine.

Status of Submarines

3. The Submarines are 'decommissioned' in a military sense, ie they have been taken out of 'commission' and no longer feature on the Royal Navy's list of active warships, in which state, they are referred to as 'laid up'.
4. To date, submarines taken out of commission have been de-fuelled, de-equipped of reusable material and laid up, a process known as DD&LP.
5. The majority of the submarine is not radioactive, only some 270 tons out of the total 8000 tons of the submarine having possibly been contaminated or activated due to operation of the reactor. That radioactive material within the submarines is 'bulk radioactive matter produced or irradiated in the course of the use of nuclear fuel', as defined in the Nuclear Installations Act 1965¹⁵. The radioactive material comprises either:
 - a. A thin film of activated corrosion products plated on the internal surfaces of the primary plant, known as 'crud'. This is very similar to the black magnetite rust which accumulates within a central heating system, but which has been activated by irradiation during normal operation of the reactor. Such material can be removed by decontamination.
 - b. Reactor structure, which has itself, become activated by neutron radiation during normal operation of the reactor, and not simply coated with a radioactive film. Such materials are not suitable for decontamination.

MoD Ownership of Submarines

6. MoD owns the submarines and all radioactive material within them; hence MoD has an irreducible responsibility for the safe management and operation¹⁶ of the vessels. MoD executes that responsibility either directly, ie under the direct control of a MoD organisation, or indirectly, through a contract on an industrial supplier. In the latter situation, the supplier must comply with all applicable legislation to ensure safe management and operation, but MoD must also be an Intelligent Customer of that support as MoD retains liability for the

¹⁵ NIA 65, article 1, (b), (iii)

¹⁶ As defined in HSE's Standard Site Licence Conditions: "Operations" includes maintenance, examination, testing and operation of the plant and the treatment, processing, keeping, storing, accumulating or carriage of any radioactive material or radioactive waste and "operating" and "operational" shall be construed accordingly.

vessels and is accountable for the exactitude of the arrangements for management and operation of the vessels on their behalf.

Applicable Legislation

7. Several pieces of legislation apply to the dismantling of nuclear reactors, principally:
 - a. The Nuclear Installations Act: for operations on Licensed Sites, regulated by the Nuclear Installations Inspectorate (NII).
 - b. The Radioactive Substances Act: for discharges from Licensed Sites, regulated in Scotland by the Scottish Environmental Protection Agency (SEPA).
 - c. The Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (NR(EIA)99): for the environmental impact of dismantling.

MoD Exemption from Legislation

8. The MoD has been granted specific exemption from certain legislation, in which circumstances the policy of the Secretary of State for Defence is:

“Where the Ministry has been granted specific exemptions, disapplications or derogations from legislation, international treaties or protocols, Departmental standards and arrangements are to be introduced which will be, so far as is reasonably practicable, at least as good as those required by the legislation”¹⁷.

9. For activities associated with the naval nuclear propulsion programme, the Naval Nuclear Regulatory Panel regulates those operations as if the legislation applied.

Nuclear Installations Act

10. The Nuclear Installations Act does not apply to ‘Crown’ operations or ‘reactors comprised in a means of transport’. Operation of the in-service or laid up submarines is therefore regulated by the NNRP, as if the act applied, and not by NII.
11. The proposed dismantling would take place on BRDL’s Licensed Site, hence the dismantling process itself would be subject to NII regulation under NIA65. BRDL would:
 - a. have a ‘no fault’ liability for activities on their site, the duties of a Licensee being articulated in article 7 of NIA65; and
 - b. act as the agent of the MoD for processing and storage of MoD’s ‘bulk radioactive matter’.
12. The proposal would be subject to BRDL making satisfactory safety cases for the dismantling processes and storage of the resulting wastes. These would be judged against conformance to safety principles and criteria laid down by the NII under the provisions of NIA65.

¹⁷ DCI Gen 227/00: Policy Statement by Secretary of State on the Management of Safety and Environmental Protection

Radioactive Substances Act

13. Any discharges from the Licensed Site are the responsibility of the Site Licensee, who must comply with the Radioactive Substances Act. All such discharges must be authorised by SEPA.

Environmental Impact Regulations

14. The Ministry of Defence has a specific exemption from NR(EIA)99, article 3 (3), stating:

“These regulations shall not apply to any project serving national defence purposes”.

15. The Naval Nuclear Regulatory Panel (NNRP) is the organisation responsible for regulation of the activity, so far as is reasonably practicable, as if the legislation applied. That regulation does not interfere with the activity of the NII or SEPA in pursuit of their statutory duty.

16. Dismantling excludes de-fuelling, which would be managed in accordance with extant refit arrangements, of which de-fuel is a part. This is consistent with NR(EIA)99 which states:

“but it does not include the removal from a power station or reactor of fuel elements, neutron absorption cartridges or control rods carried out in accordance with normal operating procedures.”¹⁸

Joint Regulation

17. Three regulators are therefore involved in the regulation of Renown:

- a. NII against the Nuclear Installations Act
- b. SEPA against the Radioactive Substances Act
- c. NNRP against the Environmental Impact Regulations

18. To avoid undue overlap while ensuring coherency of regulation, the three regulators conduct their individual inspection programmes independently, but collaborate closely. NII is recognized as having primacy; NII therefore requires assurance from SEPA and the NNRP that they are content with the Site’s compliance with the respective regulations before giving consent to proceed with dismantling.

Environmental Impact Assessment

19. The NNRP has produced this report in reply to BRDL’s Environmental Statement, drawing upon, where appropriate, the responses received from the specified consultation bodies.

20. The key stages of the Environmental Impact Assessment of a defence project (Figure 2) are:

- a. Production of an Environmental Statement by the duty holder¹⁹.

¹⁸ NR(EIA)99, article 2, (1) “project”.

¹⁹ The NR(EIA)99 requires the Licensee to produce the Environmental Statement, the Licensee being the holder of the Licence granted by the HSE/NII under the Nuclear Installations Act. The term duty holder is used here,

- b. Assessment of the Environmental Statement by the Naval Nuclear Regulatory Panel.
- c. Consultation between the Naval Nuclear Regulatory Panel and specified consultation bodies, on the duty holder's Environmental Statement; the consultation being conducted in parallel with the regulatory assessment.
- d. Public notification of the proposed activity and placement by the duty holder of the Environmental Statement for public inspection.
- e. Forwarding to the Naval Nuclear Regulatory Panel of any representations resulting from the public statement.
- f. Regulatory decision following the consultation process, taking into account representations made by the consultation bodies and the public.

using the HSC's definition; "action is focused on the duty holders who are responsible for the risk and who are best placed to control it." Health & Safety Commission – Enforcement policy statement.

CONSULTEES

Scottish Executive

Scottish Executive Development Planning
Services

Planning Division
Room 2-G
Victoria Quay
Edinburgh EH6 6QQ

Scotland Office

Economy and Industry Division
1st Floor
Meridian Court
5 Cadogan Street
Glasgow
G22 6AT

HM Principal Inspector of Nuclear Installations

NII Site Inspector for Rosyth
St Peter's House
Stanley Precinct
Bootle
Merseyside L20 3LZ

Scottish Environment Protection Agency

Operations Director
SEPA East Region
Clearwater House
Herriot Watt Research Park
Avenue North, Riccarton
Edinburgh EH14 4AP

Scottish Natural Heritage

Head of National Strategy
12 Hope Terrace
Edinburgh EH9 2AS

RAWMAC

The Secretary
Romney House
43 Marsham Street
LONDON
SW1P 3PY

NRPB

Chilton
Didcot
Oxon OX11 0RQ

Local Councils & Local Planning Authorities

Standing Conference Local Authorities

Forth Estuary

Area law and administration manager
Fife Council
City Chambers
Dunfermline

Fife Council (West)

Fife Council Planning Services (West)
3 New Row
Dunfermline KY12 7NN

Glenrothes

Corporate Manager Environment and
Development Strategy
Fife Council
Fife House
North street
Glenrothes KY7 5LT

Clackmannanshire

Environmental and Contract Services
Clackmannanshire Council
Lime Tree House
Castle Street
Alloa
FK10 1EX

Stirling

Environmental Services
Stirling Council
View Forth Stirling
FK8 2ET

City of Edinburgh

Environmental and Consumer Services
500 Gorgie Road
Cheffer House
Edinburgh
EH11 3YJ

**Local Councils & Local Planning
Authorities (cont)**

Falkirk

Environmental Services
Falkirk Council
Municipal Buildings
Falkirk
FK1 5RS

West Lothian

Environmental Services
West Lothian Council
Sidlaw House
Almondville
Livingston
West Lothian
EH54 6QG

Midlothian

Environmental Services
Midlothian Council
Midlothian House
Buckleugh Street
Dalkeith
EH22 1DN

East Lothian

Environmental Services
East Lothian Council
Haddington House
Haddington
EH41 4BU

NNRP CONSULTATION PRESENTATIONS

Presentations were given on the Environmental Impact Statement by ACNNRP(SI)1 on the following occasions and locations:

11 October 2000
Fife Council Area Development Committee
City Chambers, Dunfermline
Ref KSM/JM Dated 5 Oct 00

21 November 2000
Rosyth Local Liaison Committee
HMS Caledonia

7 December 2000
Edinburgh City Council
Environmental Quality Scrutiny Panel

19 December 2000
West Lothian Council

9 January 2001
Clackmannackshire Council

18 January 2001
Scottish Executive

CONSULTATION RESPONSE

Responses:

- A. Health & Safety Executive, Nuclear Safety Directorate, HM Nuclear Installations Inspectorate. NIN 317/43/31/1P1E11 Dated 9 Oct 2000
- B. Radioactive Waste Management Advisory Committee's Consultation Response – dated 12 February 2001
- C. SEPA's IL/JAS dated 23 January 2001. Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999. Dismantling of HMS RENOWN.
- D. Scottish Executive's letter: Environmental Impact Assessment – Dismantling of Nuclear Submarines; Dated 9 October 2000
- E. Scottish Natural Heritage's letter: Environmental Impact Assessment – Proposed Dismantling of Nuclear Submarine HMS RENOWN at Rosyth; Dated 9 October 2000
- F. Edinburgh City Council's Environmental Quality Scrutiny Panel - EQSP/0712/MS/CE Dated 22 December 2000.
- G. Nuclear Free Local Authorities E Mail nfznc@gn.apc.org dated 29 December 2000. Response from the Nuclear Free Local Authorities to the MoD on the Renown Dismantling Proposal – Environmental Statement.
- H. Charlestown, Limekilns & Pattiemuir Community Council's Letter dated 15 January 2001. HMS Renown Dismantling Proposal – Environmental Statement
- I. Fife Council's ALS KMS/JCM dated 19 January 2001. Proposals for dismantling HMS Renown at Rosyth.
- J. Royal Burgh of Inverkeithing Community Council Dated 26 March 2001

SUMMARY OF CONSULTATION FEEDBACK

Response A: Health & Safety Executive, Nuclear Safety Directorate, HM Nuclear Installations Inspectorate. NIN 317/43/31/1P1E11 Dated 9 Oct 2000

Subject to a satisfactory safety case, the HSE broadly support BRDL's proposal as it will:

- Decommission as soon as reasonably practicable;
- Store in a passively safe state;
- Use existing disposal routes;
- Progressively reduce risk;
- Use proven technology;
- Avoid foreclosing ILW disposal options.

Rosyth has the facilities, capability and expertise to dismantle the submarines.

Trials dismantling would maximize use of existing facilities and expertise.

Project would bring significant safety and radioactive waste management benefits, making use of national resources.

Dismantling process is an extension of work already conducted in the dockyard, the potential for environmental impact is therefore well understood, controlled and monitored.

Careful containment of contamination will be required once the reactor compartment is cut open to atmosphere.

The decontamination technique has not been used in the UK before. BRDL must demonstrate that they understand the environmental risks and disposal routes.

BRDL estimate of the amount of material that could go for free release needs to be substantiated to avoid an embarrassingly large amount of waste that they cannot store.

Confirmation is required that Drigg can take the volume of LLW arising from the process.

Response B: Radioactive Waste Management Advisory Committee's Consultation Response. Dated 12 February 2001

The Environmental Statement is generally satisfactory and indicates there will be no significant impact on the environment, provided the work is suitably managed.

Acceptance of the Renown proposal at this stage would be incompatible with, and could have potentially damaging effects upon the MoD's Interim Storage of Laid-Up Submarines (ISOLUS) study:

“It is in the national, as well as MoD’s, interests that the ISOLUS programme should proceed in a way that reflects the need for: transparency in the information provided; full and unfettered public discussion of the options; and decisions which can be seen to derive from public participation in the process.”

“RWMAC believes it would be a mistake for MoD to take up the BRDL proposal at this stage in the ISOLUS study... If MoD was to take up the BRDL proposal, it would essentially be pre-selecting a contractor, a strategy for the work, and a site on which to initiate the programme. This would be contrary to the stated principles of the ISOLUS initiative.”

“A decision by MoD to go ahead with the Renown proposal, in the middle of the ISOLUS initiative, would, in particular, be to undermine the principle of public participation under which the latter is being undertaken.”

“RWMAC’s wider advice to MoD, irrespective of NNRP’s consideration of BRDL:’s ES, is that it should be extremely wary of pursuing the Renown proposal at this point in time because of the potentially damaging effect of doing so on the wider ISOLUS programme.”

The proposal appears technically feasible, basically consistent with submarine de-fuel and lay-up work, and would use existing plant.

Management of radioactive wastes and discharges does not appear to have significant adverse effect on the environment.

RWMAC has no reason to question that only minor airborne discharges would arise from cutting out the reactor compartment.

Additional liquid discharges are estimated to lead to extremely low additional radiation dose to the critical group of much less than 1 μ Sv/Yr.

The potential for an accidental spillage is low and if it occurred the effects could be suitably mitigated.

The implications for long-term on-site storage of wastes contaminated with carbon-14 need to be assessed.

Use of this process for other submarines could eventually lead to additional radioactive waste storage facilities being needed on the site.

Response C: SEPA’s IL/JAS dated 23 January 2001. Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999. Dismantling of HMS RENOWN

The process must not commence until SEPA have delivered their Authorisation as this may foreclose the BPEO and could prejudice SEPA’s consultation exercise.

NR(EIA)99 states “The operator should provide an outline of the main alternatives studied by the licensee and an indication of the main reasons for his choice, taking into account environmental factors”:

This has not been done in a transparent manner that would be readily comprehensible to a person with limited knowledge.

The options of afloat storage, reactor compartment cut-out, and reactor compartment dismantling should be compared.

Why have other countries not progressed further than removing the reactor compartment from submarines?

Whether the reactor compartment or RPV remain, the ultimate disposal problem will still fall to the next generation.

Decontamination and dismantling carries a finite risk and opening the reactor compartment increases the spread of radioactivity, but reactor compartment cut-out should lead to a lower risk with less spread of radioactivity.

What is the radio nuclide inventory remaining within the RPV/PST against the inventory remaining in the intact reactor compartment?

BNFL have an embargo on wastes containing Carbon 14. BRDL do not have a letter of comfort from BNFL informing them that BNFL will accept the LLW.

Processing the wastes without achieving re-categorization of ILW as LLW will result in additional discharges without gain.

How much is the project dependent upon free releasing 85 tonnes of decontaminated steel and what happens if this material has to be dispatched to Drigg?

The recycling of scrap meets the sustainable development principles, but creation of unnecessary scrap, which may not achieve free release, is detrimental to leaving that waste to allow decay.

Response D: Scottish Executive's letter: Environmental Impact Assessment – Dismantling of Nuclear Submarines; Dated 9 October 2000

The project conforms to the principles of sustainability set out in the Government's policy on radioactive waste.

The intention to reduce discharges to levels close to the limit of detection is consistent with the 'Sintra' (OSPAR) strategy, the object of which is to prevent pollution of the maritime area from ionising radiation through progressive and substantial reductions of discharges, emissions and losses of radioactive substances, with the aim of achieving concentrations in the marine environment close to zero for artificial substances.

Response E: Scottish Natural Heritage's letter: Environmental Impact Assessment – Proposed Dismantling of Nuclear Submarine HMS RENOWN at Rosyth; Dated 9 October 2000

The summary of natural heritage interests omitted one of the most important conservation designations – that of the Firth of Forth Site of Special Scientific Interest and Special Protection Area.

Providing the works are confined to the Dockyard, there should be no physical impact on the local features or landscape.

Response F: Edinburgh City Council's Environmental Scrutiny Panel

The Panel noted:

- The Environmental Statement concluded there would be negligible risk to the environment.
- The proposals conform to the principle of sustainable development.
- The concerns raised by the British Metal Federation that contaminated scrap metal may be entering the scrap metal trade from previously irradiated materials and that safety measures be introduced to monitor this.

The Panel recommended that the Council Executive:

- Ask the Scottish Executive to hold a public inquiry.
- Inform the NNRP that the Council requires further information before opposing or approving the project.

Response G: Nuclear Free Local Authorities response from the Nuclear Free Local Authorities to the MoD on the Renown Dismantling Proposal dated 29 December 2000

The NFLA asked:

- Why has Renown been chosen as the radioactivity in submarines that were taken out of service earlier will have had longer to decay?
- What radionuclides would be discharged to the Forth, how long lived are they and how do they compare with current discharges.
- What studies have been undertaken into accidental liquid releases?
- What studies have been undertaken into the specific impact of the discharges on species other than man?

The NFLA considered that the following studies should be considered:

- Heriot-Watt University study (1979) into gender-bending of Copepod (plankton) in the Forth.
- Yorkshire TV (1985) analysis of cancer in Rosyth dockyard workers and young persons.
- Scottish Health Service's (1987) report of a super-cluster of cancers at Rosyth.

The ES does not consider alternatives.

What are the costs and benefits of Rosyth & Devonport? What other sites have been considered and why have they been discounted? If other sites have not been considered, why not?

What are the costs and benefits of leaving the RPV in the reactor compartment and storing this section of this submarine complete on land? This would reduce workers exposure, reduce the amount of decontamination and discharges to the Forth.

Concerning the proposal to dispose of decontaminated material as scrap:

The British Metals Federation (BMF) has stated that it does not want its industry blighted by public anxiety about recycled metals carrying residual contamination and has called for no detectable levels above background in scrap metals.

- How will volumetric contamination be removed?
- How can BRDL ensure that ‘hotspots’ in scrap are detected and removed?
- Can volumetric contamination be masked by surface coatings (paint)?
- Where will the scrap go from the breakers yard in Inverkeithing?
- What monitoring equipment exists at Inverkeithing?

On the issue of free release:

- What will the legal basis be for ‘averaging’ and the ‘free release criteria’?
- If it is at the discretion of regulatory authorities, what advice will they rely on in arriving at their determination?

The Government’s response to Royal Commission on Environmental Pollution’s report on setting environmental standards is that transparency in standard setting is vital. Will standard setting be subject to formal public consultation?

What is the risk of a widespread dispersal and release of small or medium amounts of radioactive material?

The Environmental Statement does not address “direct, indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects of the project.”²⁰

For the law, see for example, opinion of Advocate General Gulman, case C-396/92 Bund Naturschutz: “as far as reasonably practicable, account should be taken in the Environmental Statement of any plans to extend the project in hand.”

NFLA support the call for a Public Enquiry.

Response H: Charlestown, Limekilns & Pattiemuir Community Council’s Letter dated 15 January 2001. HMS Renown Dismantling Proposal

Pleased that industry favours dry storage on land.

As the ISOLUS study concluded that the preferred option was land storage of reactor compartments ashore, how has this been translated to store the RPV alone?

Content that risks no greater than submarine refitting.

As current nuclear work comes to an end, and with this being pioneering work, will BRDL have suitably qualified and experienced personnel to execute the task?

²⁰ Sch 1, Part 1, Para 4 or NR(EIA)99

Reservations are held about using the AWAf for a new purpose, in particular cutting a hole in the roof. Will this affect containment?

The council would be more convinced if the findings were supported by a risk analysis, eg what would be the effect of dropping the RPV when lifting it out of the dock? With reduced manning in the yard, will BRDL still have the capability to mitigate the consequences of such an event?

What is the predicted change in trends, peaks and troughs of discharges to the Forth if dismantling were to proceed.

With regards the Habits Survey (ES pg 37 & 38), clarification was sought of the effect on recreational/sports users of the Forth (sailing and canoeing) and 'families at home'.

What is the risk to workers in the Primary Plant Decontamination process?

What is the potential for an accidental release during the decontamination process?

Why should Rosyth put itself at greater (albeit low) risk when nuclear refitting has been transferred to Devonport?

Response I: Fife Council's ALS KMS/JCM dated 19 January 2001. Proposals for dismantling HMS Renown at Rosyth.

Support NII, SEPA and NNRP regulation.

Required a copy of the Safety Case to be submitted to the Council.

Require sight of consents issued by NNRP or other regulatory body.

The Council is firmly opposed to the use of Rosyth for the dismantling or storage of any submarines beyond those currently located at Rosyth.

Continue to make representations to central government for a long term repository for the storage of nuclear waste.

Response J: Royal Burgh of Inverkeithing Community Council Dated 26 March 2001

Recommend a Public Inquiry to put people's minds at rest or people will be more and more unsure of the safety of this experiment.

Quote: "If we are getting the smell from the rotting fish in the dockyard, what else may be in the air now and in the future that we can't smell. We don't want this experiment here."

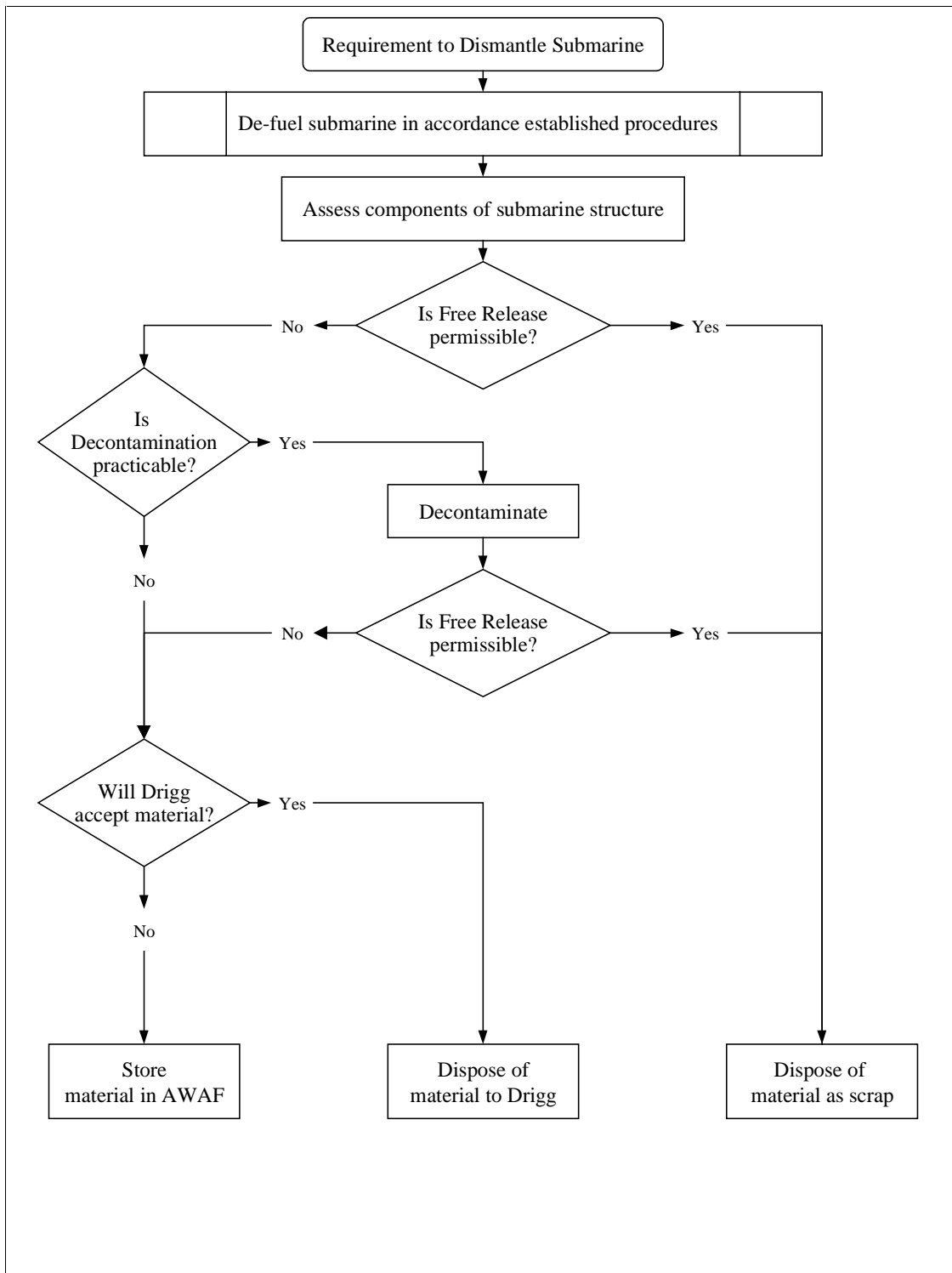


Figure 1: The 'Cascade' Logic for Material Disposal

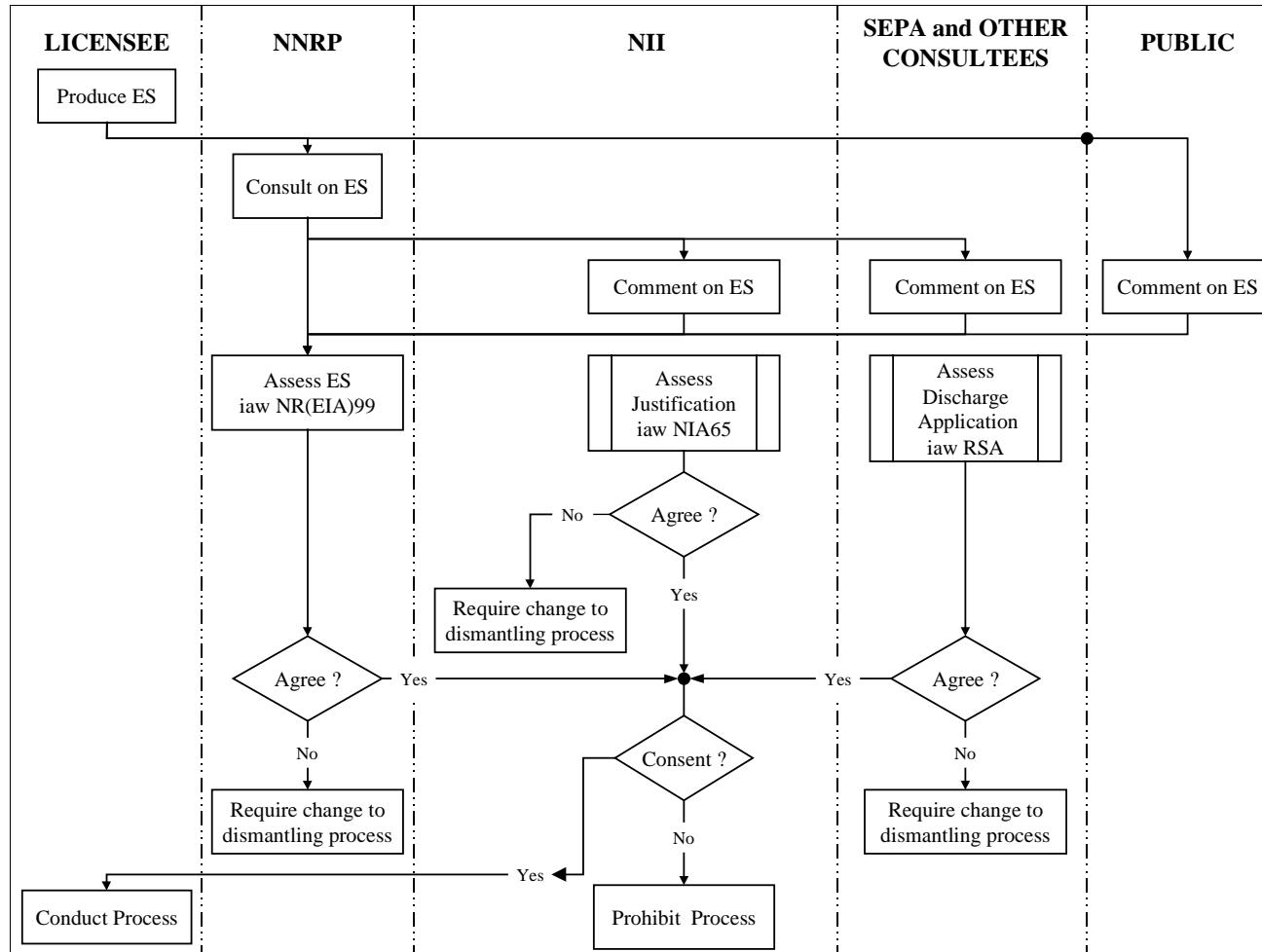


Figure 2: The Environmental Impact Assessment Process