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Report of Inquiry into the proposed extension of the Royal Naval Armaments Depot at Coulport, Dumbarton, for the Trident Weapon System 20th/24th June 1983

9th September 1983

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Chapter 1. History of the Proposal.

1.1 Government Departments and Planning Procedures.

1.1.1 "Development by the Crown does not require planning permission" (Ref 1(a), para 5). The unrestricted exercise by Government Departments of this right to be exempt from planning regulations would make a nonsense of Local Authority Strategic Planning. To meet this difficulty Scottish Development Department Circular 49/1977 "sets out a guide to the planning procedures agreed in relation to Government Departments when a Department proposes development which, if undertaken by a private person, would require planning permission" (Ref 1(a), para 2).

1.1.2 In place of the Application for Planning Permission that a private person is required to make to the Planning Authority, the Government Department serves a Notice of Proposed Development (NoPD) on the Planning Authority, usually the District Council. The Planning Authority elicits views on the proposal from appropriate bodies. Consultations then take place between the developing Department and the Planning Authority. These consultations enable the Authority to discover whether the Proposed Development is compatible with the Structure Plan of the Region and the Local Plans of the Districts. Should there be any difference of view on the accommodation of the NoPD within the Planning Strategy of the Authority and should the developing Department be unable to resolve the issue to the satisfaction of both sides, "the developing Department, if they wish to proceed, will bring the matter to the attention of the Scottish Development Department" (Ref 1(a), para 17).

1.1.3 The Circular then goes on to say that "the method of dealing with such cases will depend upon the circumstances. Sometimes written representations or an informal meeting may suffice; but in other cases it may be desirable to take more formal steps and to hold a non-statutory public local inquiry. In all cases, the planning authority, the developing Department and other interested parties will be given an opportunity to express their views; and the decision will be announced by the Scottish Development Department in a letter to the planning authority." (Ref 1(a), para 18).

1.1.4 By this procedure, notwithstanding the rights of the Crown in the matter, the provisions of the usual planning procedures can, to a large extent, be applied in practice to Crown developments but with this important difference. In the case of a private Application, in certain circumstances, the Secretary of State is required by statute to hold a Public Inquiry and to have regard to its recommendations in determining the Application. In the case of a Crown development, the holding of an inquiry is entirely at the discretion of the Secretary of State.

1.1.5 It is important to note the timetable envisaged by the Circular for the events following the serving of a NoPD. "Any representations about the proposed development should be made to the Developing Department within

eight weeks from the date of receipt of the NoPD"(Ref 1(a),para 13). Where, even after a reminder, no representations have been received, the developing Department must inform the Scottish Development Department (Ref 1(a), para 16). "Although development proposals of Departments are not subject to any statutory publicity, it is intended that they should be given just as much publicity as if the NoPD were an application for planning permission"(Ref 1(a),para 12). "In formulating their representations the planning authority should have regard to any comments received by them in response to the publicity given"(Ref 1(a),para 13).

1.1.6 In the case of a NoPD as complicated as that for the extension of RNAD, Coulport and one which raises such special issues of public concern, the time required by the Local Authority to give the necessary attention to Planning considerations, to have regard to the likely "response to the publicity" by private persons and by the large number of known interested organisations and to prepare a wellfounded and reasoned representation to the Ministry could be considerably longer than two months. While an agreement to extend the time permitted (Ref 1(a),para 13) might be expected, it should be noted that, if the development had to be carried out according to a strict timetable and if the timetable fell behind, the NoPD could fall into the category of "rare cases" (Ref 1(a),para 16) on which a time limit of 14 working days can be set. In that event there could only be a reasonable representation by the Planning Authority to the developing Department if the Authority was already knowledgeable about likely local response and had studied the general planning and safety implications prior to receipt of the NoPD.

1.1.7 Since the issue of the Circular in 1977, there have been many examples of NoPD's mostly to the Districts but many requiring to be referred to the Region. These NoPD's have been at the instance of the Post Office, Health Boards, the Forestry Commission and the Ministry of Defence among others. There has not, to the knowledge of the Dumbarton District or Regional Planning Officials, been in Strathclyde a non-statutory inquiry in connection with a NoPD as referred to in Reference 1(a); there were such inquiries in connection with the NATO development at Stornoway Airport and in connection with a Firing Range in Lothian Region.

1.1.8 In a letter to the Clerk of this Inquiry dated 13th April 1983, Mr Rucker of the Ministry of Defence indicates that his Ministry proposes to proceed with respect to the revised proposals for the Coulport development under the provisions of SDD Circular 49/1977.

1.2 First Consultation with Dumbarton District Council.

1.2.1 As enjoined by the SDD 1977 Circular, the Ministry of Defence on 20th May 1981 held a "Trident Presentation" at Helensburgh to which representatives of Strathclyde Regional and Dumbarton District Councils were invited. This Presentation was made on behalf of the Ministry of

Defence by Viscount Trenchard and consisted (Annex to Ref 14) of several pages of summarised details of the Ministry's proposals together with a limited display of plans and illustrative sketches. Similar Presentations were held for members of the Press and local Community Councils.

1.2.2 On 2nd June 1981 a Notice of Proposed Development was served on Dumbarton District Council by the Ministry of Defence (D/Lancs/501/14F) (Ref 6). According to the heading it was for a "Site for the Trident Weapon System". It sought (par 2) consultation in outline with Dumbarton District Council under the 1977 Circular about the "proposal to develop a new site for use by the Royal Navy to provide storage and handling facilities for the Trident Weapon System". The new site was to be "to the north and east of the existing Polaris Depot at Coulport"(par 2). The development was to take place without disturbance to the existing provisions for the support of the Polaris System which would continue to operate for a period of years after the Trident System had come into full operation. The development was to involve(par 5) "the construction of berthing facilities for submarines, installations for the Trident missiles and other support buildings and services". The latter included a large Administrative Centre.

1.2.3 An illustrative, not exact, disposition of buildings in different possible locations was attached to the NoPD. The exact disposition of the buildings was to await the findings of a geotechnical survey then in progress and would depend on the solutions of problems arising from the terrain and from the requirements of safety distances. These safety distances, it is assumed, were with regard both to spacing between buildings and to proximity to public areas.

1.2.4 A requirement was foreseen for facilities during the construction period for the accommodation of employees from outside the immediate area.

1.2.5 The need for the construction of new roads was identified. In particular the need for a "spine road" from the A814 at Whistlefield to halfway along the Peaton Road was specified. Road improvements and the provision of better junctions was raised and consideration of delivery of material by sea and by rail was said to be under consideration.

1.2.6 Discussions were said to have taken place on water, sewerage and electrical requirements with the bodies responsible for the planning of these services.

1.2.7 On the question of safety, which is a most important consideration from the Region's point of view, all that is said (par 12) is that "the new facilities will be built to the Government's very stringent safety standards". There follows the assurance that care has been taken in siting the buildings to ensure that the "safeguarding" procedures, which are discussed in 5.5 below, do not impose restrictions on the public road nor on the major residential area of Garelochhead.

1.2.8 On 9th June 1981, the Director of Planning, Dumbarton District Council, informed the MoD of his fear that "the skeletal form of the submitted plans" would not allow him to carry out the consultations he would have to hold with other officials and bodies to enable him to make meaningful observations to the District Council. He was concerned that no "work camp" appeared in the drawings as this matter was one of the most controversial features of the development. He also requested the erection of a site notice (Ref 1(a), para 12) and the placing of an appropriate notice in the local newspaper.

1.2.9 In reply on 15th June, Mr Rucker, MoD, agreed to erect a site notice and to place a notice in the local newspaper. The site for a work camp was presenting difficulty but there was a possible site in mind. A meeting was to be held on 26th June 1981 to agree what further plans and drawings should be provided and it was agreed that the process of consultation would now begin. The warning note was sounded by MoD that "quite substantial alterations may have to be made before the detailed planning stage", at which time the Council would be fully consulted by the Property Services Agency, acting as agents for the Ministry of Defence.

1.2.10 On 15th July 1981 the District Council duly received a set of Plans showing the provisional disposition of buildings on the site. There were to be Process Buildings, Storage Buildings and an Administrative Centre. The District Council were asked to confirm "that this further information will meet your Council's requirements at this stage".

1.2.11 In reply (17th July 1981) the District Director of Planning and Development confirmed "that apart from the omission of any details of accommodation and/or transport of workers, and the absence of information on any wider ranging road developments the plans ..... are more in keeping with the type of information I would require to report to my Council on the outline stage of this development". This confirmation was made on the understanding that the promised information on ideas on the proposed line of the fences and photographs of a model which would give a good impression of the appearance of the development were forthcoming. He also asked, presumably in view of several significant additions to the original plans, that a further notice be placed in the local newspaper.

1.2.12 Meantime, the Director of Planning and Development having reported to Dumbarton District Council that "the plans which accompanied the NoPD submitted by the MoD were insufficiently detailed to allow for proper consultation with other bodies, particularly with regard to the lack of information on the scale of the buildings and the materials to be used in construction", the District Director of Administration and Legal Services wrote (29th June 1981) to SDD expressing his Council's concern that "in a development of this magnitude, which involves technical/scientific aspects of an unusual nature my Council were not being given the fullest information possible". Further, the Council agreed "to urge the Secretary of State most strongly that the question of the proposed development be referred to a Planning Inquiry Commission in terms of Section 45 of the Town and Country Planning (Scotland) Act, 1972, in order

that all the aspects of the proposed development can be properly evaluated and a proper determination thereon reached".

1.2.13 Section 45 of the 1972 Act, among the matters that may be referred by the responsible Minister to a Planning Inquiry Commission, includes

"(d) a proposal that development should be carried out by or on behalf of a government department."

The Act further provides that

"(6) The commission inquiring into a matter referred to them under the section shall —

(a) identify and investigate the considerations relevant to or the technical and scientific aspects of, that matter which in their opinion are relevant to the question whether the proposed development should be permitted to be carried out and assess the importance to be attached to those considerations or aspects;

(c) report to the responsible Minister or Ministers on the matter referred to them."

1.2.14 On 9th July 1981, SDD replied resisting any departure from the procedures set out in the 1977 Circular, maintaining that the Ministry of Defence had undertaken to provide the required additional material and pointing out that there is provision in the procedures laid down in the Circular for modifications to be the subject of detailed planning consultations at a later stage.

1.2.15 A letter from the District Director of Planning and Development of 28th July 1981 to the MoD asking for information concerning "which buildings will contain the hazardous materials and an explanation of the statistical calculation factors used to determine the actual boundaries of the various safeguarding zones" was quickly followed by a reply from the MoD (31st July 1981). Considerable detail concerning fences, together with photographs of a three dimensional model and information on landscaping was provided. As far as storage of hazardous materials was concerned, there was the assurance that none would be stored in the northern part of the development. While a plan was provided showing proposed position of safeguarding zones there was no indication given of the requested "calculation factors".

1.2.16 A letter was sent on 6th August 1981 to the MoD by the Dumbarton District Director of Planning and Development stating that the District Planning Committee, having received on 4th August an interim report, including copies of the letters and copies of the plans and illustrations supplied by the Ministry, and having noted the repeated qualifications in the MoD letters that these submissions were subject to alterations, decided that "they would be unable to comprehend all of the

ramifications of this unique submission unless they were supplied with fully detailed and finalised plans". Accordingly consultations on the submission were discontinued pending the meeting of the District Council on 25th August when the matter would again be decided.

1.2.17 A letter on 21st August from Mr Rucker, MoD, expressed regret at this development and sought to spell out the difference between outline and detailed planning as laid down in the SDD Circular. Apart from further details in respect of the construction village, the Ministry claimed that they had now supplied sufficient information, indeed more than strictly required by the 1977 Circular, for outline planning purposes.

1.2.18 There were apparently letters of 2nd September and 6th November 1981, not submitted as evidence, from the District Director of Administration and Legal Services to SDD which evoked a reply from SDD of 30th November 1981 saying that it was not yet possible to give the Secretary of State's response to the Council's request that a Planning Commission be established, but that there was a hope of being able to do so in the near future. According to the representative of Dumbarton District Council, this hope had not been realised by the date of the Inquiry.

1.3 Consultation with Strathclyde Regional Council.

1.3.1 Strathclyde Regional Council, being not only the regional planning authority but also the authority responsible for water, roads, transport, sewerage, education and social work services, was consulted on the proposed development by Dumbarton District Council.

1.3.2 The matter would thus have come before the Regional Council in the normal course of events. However, in the unusual circumstances of this application, the MoD informed the Regional Council directly. In September 1981 the Regional Council, having considered the matter, agreed:-

(a) to lodge objections to the proposed development,

(b) that the development be the subject of an Environmental Impact Assessment, and

(c) that the Secretary of State for Scotland be called upon to present the results of such an assessment for public examination at an Inquiry convened to examine fully all issues of public concern related to the proposed development.

1.3.3 There was a reply dated 15th December 1981 from SDD to the approaches by Dumbarton District and Strathclyde Regional Councils. As the Regional submission explains (Ref 10, para 1.1.7), it was stated that the planning authority in the first instance had to take a view on the development. This, one assumes, would have to be based on the information in the NoPD together with what had emerged from the abortive MoD consultation with Dumbarton District and some further information that, according to the letter from SDD, MoD had intended to provide had it not

been for the District Council's decision to withdraw from discussion of the proposals. A public enquiry could not be considered until such a view had been established.

1.4 Second Consultation with Dumbarton District Council.

1.4.1 In the spring of 1982, the first of two major changes in Government policy with respect to Trident was announced. The C4, which was the missile the Government initially planned to purchase from the US Government, had been superseded for American use by the D5. The UK Government decided to replace the C4 in its plans by the D5 version. The Minister of Defence's answer to a Parliamentary Question on 11th March 1982 stated that the possibility that the D5 version of Trident would be purchased had been taken into account in planning the Loch Long Depot. However, he went on to say that some changes might be required to its design and layout as planning developed, the envionmental impact of such changes being an important consideration.

1.4.2 On 29th March 1982 a letter went from Dumbarton District Council to Mr Rucker, MoD, inviting, in the light of this development, the submission of a new Notice of Proposed Development with appropriate advertisements.

1.4.3 The MoD reply of 21st May 1982 indicated that the Ministers wished the proposal to go forward on the basis of the NoPD already submitted. This was based on the contention that the changes of layout in mind did not amount to a variation of the scope of the Depot already presented. In another paragraph, however, it is stated that, during the period of suspension of the consultations, the MoD, in association with the PSA, had reviewed the plans and now had in mind changes in layout which would have significant environmental and other advantages. These changes in layout were not yet ready for presentation to the District Council but were promised at a later date.

1.4.4 A letter from the District Director of Planning and Development was sent on 28th June 1982 to Mr Rucker, MoD, explaining that if a private developer had submitted a proposal for a development of this scale and after a period of delay had proposed significant environmental changes to the layout, the developer would have been asked to re-advertise the amended proposals and steps would have been taken to inform any objectors of the amendments to the plan. So, in conformity with the 1977 Circular, the District Council were requesting reconsideration by MoD of a fresh submission.

1.4.5 Then on 9th September 1982 the Ministry of Defence announced the second major change in the Trident plans. The initial preparation for service of Trident missiles and their periodic refurbishment was to be carried out in the USA. There was still to be a requirement for some smaller-scale facilities at Loch Long. As a consequence the Coulport development would not be as extensive as envisaged in the original NoPD.

The previous planning submissions having been superseded, new plans would be presented to the Councils as soon as further studies necessitated by the Government's decision had been completed.

1.4.6 The letter from the MoD to this Inquiry dated 13th April 1983 confirms that it is still the intention of MoD to proceed with this resubmission.

1.5 Reporter's Comments.

1.5.1 I have gone at length into the procedures for Crown developments and into the history to date of the Ministry of Defence proposal for the extension of RNAD, Coulport so that the following points can be clearly understood:-

(a) there may be, when the promised Notice of Proposed Development is resubmitted to Dumbarton District Council who will consult with the Regional Council, a limited time for the Regional and District Councils "to take a view" of the proposal. In the case of a development of such a long time span it could be argued that 14 working days notice would not be reasonable and the MoD is unlikely to insist on its "rare case" rights. However, the Councils should have regard to the slippage that has occurred with respect to the timetable in the plans provided to Dumbarton District Council during the abortive consultation and be making prudent anticipatory preparations.

(b) the information which the Councils will have on which to base their views is likely, when compared with that which accompanied the original NoPD, together with what emerged from the consultations, such as they have been to date, to be found to differ only with respect to the number of buildings demanded by the new plans.

(c) departing from the procedure of SDD Circular 49/1977 under which the Secretary of State would not be required by statute to hold a Public Inquiry and proceeding under sections 44 to 47 of the 1972 Act with an Inquiry Commission would ensure that an Inquiry was held. However, although the Inquiry would be held under the Tribunals and Inquiries Act of 1971 and would result in a report carrying perhaps more weight than that of a non-statutory inquiry under the 1977 Circular, assuming the Secretary of State called it, it is important to note that the Commission would not have the power to overrule a refusal on the grounds of national security by the Ministry to produce information required, for example, for Risk Evaluation. The question of reassurance of the public with respect to peace-time hazard might still be in conflict with the Ministry's view of necessary security secrecy. This is discussed in detail in Chapter 8.

Chapter 2. The Strathclyde Regional Council Public Inquiry.

2.1 The Constitution of the Inquiry.

2.1.1 On 16th September 1982 the Policy and Resources Committee (Augmented) of Strathclyde Regional Council approved the Terms of Reference or the Inquiry as follows:-

"To receive and consider, with regard to the Government's proposed siting of Trident missiles at Coulport, Dumbarton, all the evidence, whether written or verbal, before them on the impact of Trident on employment, services, health, safety, pollution, propensity to nuclear attack and any other matter which they consider relevant and thereafter to assess that evidence and report their findings to the Regional Council".

The Committee also approved the terms of reference of the Environmental Impact Assessment as follows:-

"To assess the impact on the environment of the proposed development at Coulport, Dumbarton, by the Ministry of Defence of a Royal Naval Armament Depot for the Trident Weapon System as a result of:-

(1) all factors including nuclear and non-nuclear hazards arising from accidents, but excluding such hazards arising from acts of war or terrorism; and

(2) nuclear and non-nuclear hazards arising from acts of war or terrorism; and, in that connection, to appoint consultants as necessary and to require such information as may be necessary from any Regional Council Department or District Council".

On 9th December 1982 the Policy and Resources Committee (Augmented) further recommended that:-

(i) Professor J.M.Reid be appointed as Reporter to the Trident Inquiry with powers to appoint a Clerk to the Inquiry; and

(ii) that the firm of Cremer and Warner be appointed as consultants to the proposed Environmental Impact Assessment on the issue of Hazard, both accidental and war-induced.

On 22nd December 1982 the Regional Council accepted the recommendations of the Augmented Policy and Resources Committee.

As empowered, I appointed as Clerk to the Inquiry Mr Iain J.S.Talman,LL.B.,N.P..

In an effort to reduce the time and expense of the Inquiry while at the same time allowing a full investigation of the Proposal and the views of interested parties, it had been decided by the Regional Council that

written submissions would first require to be lodged with me. I, thereafter, at my discretion, would have the power to hear oral submissions and evidence from those who had made written submissions. In view of the time allotted it was necessary to restrict the opportunities for cross-examination at the Hearing and so efforts had to be made to ensure that parties were aware in advance of the submissions and evidence of other parties. Within those limits and those of natural justice, the procedure was in my discretion, as the procedure under the Planning Inquiry regulations did not apply. After inviting, receiving and considering any submissions on it from parties to the Inquiry, I decided to adopt the procedure as set out in the Note of Intended Procedure (Annex A).

2.1.2 A Public Notice (Annex B) was inserted in the Glasgow Herald, the Scotsman, Helensburgh Advertiser and Dumbarton County Reporter and attention was drawn to it in the news columns of the main newspapers in the Region. It was also noted in the Region's Newsletter and mentioned on the Radio News.

2.1.3 As a consequence, 104 representations were received by the closing date and 8 late submissions were allowed. A list of the parties making written submission is given in Annex C. A selection of those considered best to assist in meeting the terms of reference of the inquiry resulted in the issuing of 40 invitations to parties to give verbal evidence at the Inquiry. Those who accepted this invitation and attended the Inquiry were accommodated in the Timetable of the Inquiry which is given in Annex D.

2.2 Public Hearing.

The Public Hearing was held in the Council Chamber of Strathclyde Regional Council in the period 20th to 24th June 1983. There was a site visit on Wednesday 22nd June; a trip around and across Rosneath peninsula by bus was followed by a sail up Loch Long as far as the entrance to Loch Goil. On the other four days, morning and afternoon hearings were held in the Regional Council Chamber.

Chapter 3. Environmental Impact Assessment.

3.1 The Concept and Status of Environmental Impact Assessment.

3.1.1 Environmental Impact Assessment (EIA) is a standardised approach designed to provide an unbiased and balanced assessment of the anticipated effects of a major development upon all the aspects of the environment that it may affect. As a procedure it is well known internationally. In the USA it is often a requirement for a developer to submit an EIA with his application for planning consent. Interestingly the US Armed Services prepare an EIA when proposing major defence facilities and one has recently appeared for the MX Missile system which was used by the Regional Council's Consultants, Cremer and Warner, London.

3.1.2 In 1980 there was a proposal by the Commission of the European Communities "for a Council Directive concerning the assessment of the environmental effects of certain public and private projects". The types of development proposals which were seen as candidates for assessment included storage facilities for chemical products, the construction of roads and harbours and plants for processing fissionable materials. It may thus become mandatory in the UK for EIA's to be prepared for major projects of the scale and nature of the MoD proposal for Coulport; in anticipation, a Manual for the Assessment of Major Development Proposals based on the EIA approach was commissioned from a team at Aberdeen University by SDD, the Department of the Environment and the Welsh Office (Ref 2).

3.2 Application of EIA to RNAD, Coulport extension.

3.2.1 There is thus to hand a convenient framework on which to build an assessment of a project of the scale and complexity of the proposed RNAD extension, involving the construction of a complex of buildings in which routine processes are planned which occasion explosive, chemically toxic and radioactive hazards. The Regional Physical Planning Department have structured their Part 1: General Report as an EIA and in this Report I have arranged the material provided by other parties in the same framework.

3.3 Basic Input Information for the Production of an EIA.

3.3.1 To enable an EIA to be prepared, the developer should supply with his planning application the following information:-

(a) a description of the proposed project and, where applicable, of the reasonable alternatives for the site and design of the project;

(b) a description of the environment likely to be significantly affected by the proposed project;

(c) an assessment of the likely significant effects on the environment;

(d) a description of the measures envisaged to eliminate, reduce or compensate adverse effects on the environment;

(e) a description of the relationship between the proposed project and existing environmental and land-use plans and standards for the area likely to be affected; and

(f) in the case of significant effects upon the environment, an explanation of the reasons for the choice of site and design of the proposed project, compared with reasonable alternative solutions which might have less adverse effects.

3.3.2 As no information was provided by the applicant, the Ministry of Defence, directly in this form, regard is now had to the NoPD as served on Dumbarton District Council on 2nd June 1981 as the "planning application" to see how adequately it provides the input information needed for the production of an EIA under the headings listed in 3.3.1.

(a) the description of the project is "to provide storage and handling facilities for the Trident Weapon System". An indication is given of alternative sites, viz."other coastal sites, including several on the west coast of Scotland".

(b) From the NoPD it is deducible that the environment aspects likely to be significantly affected by the project are visual impact (para 6), new road systems (para 7 and 9), employment (para 8 and 11), housing (para 6), sea access (para 9), rail access (para 9), water, sewerage and electrical supplies (para 10), the planning restrictions arising from a requirement for a "safeguarding area" (para 12) and the need for a series of security fences.

(c) and (d); taking the environmental aspects individually we note:-

1. visual impact: a start is made (para 6) on the actions to be taken to minimise this impact; considerably more infomation was supplied later to Dumbarton District Council on the planning of the buildings envisaged in the first NoPD. By the time the resubmission is served perhaps the geotechnical survey will have been completed and the disposition of the buildings will have more finality.

2. new road systems: basic details are included (para 9).

3. employment: numbers during construction period are estimated (para 8). There is no indication given of the number of jobs involved when the operational period is reached.

4. housing: apart from the question of a work camp during the construction period, accommodation for increased civil and naval staff will be necessary when for a limited period Polaris and Trident are operating in parallel.

5. sea and rail access: no details are given.

6. water, sewerage and electricity: no details were given in the NoPD but were presumably available for the consultations said to have taken place with the authorities responsible for these services.

7. safeguarding area: this raises what, in my view, is the most difficult problem in connection with the proposed development. No response was made to the request made during the consultations with Dumbarton District Council in 1981 for more information on the basis of the positioning of the yellow and purple lines; unless there has been a policy change, it is unlikely that the Ministry will be more forthcoming in the case of resubmission. The question of the reconciliation of the public's need for confidence in regard to peacetime hazards and the requirements of the Official Secrets Acts is discussed in Chapter 8.

8. security fences: these were detailed in material provided to the District Council during the first consultation.

(e) The ownership of the land involved , viz. MoD, Forestry Commission and a single private owner (para 4) is stated. No indication is given of relation to present land-use. Standards receive comment in paragraph 6.

(f) Apart from the alternative sites mentioned in paragraph 3, this does not apply. The question of a fundamental change of design because of adverse environmental effects is not likely to arise in this case.

3.3.3 It is to be noted that there is no mention of possible toxic or radioactive effluents, of overloading of telephone lines to the peninsula during the construction period nor of the interference with the present recreational use of part of the site.

3.4 Actions required to Produce the EIA.

3.4.1 The input information having been established, the EIA Manual then requires the following actions:-

(a) Discussions with the developer

Initial Site Inspection

Consideration of existing planning policies.

(b) Identification of Likely Impacts

Production of Impact Matrices.

(c) Appraisal of Likely Impacts

Preparation of Technical Reports

Analysis of the scale and significance of potential impacts.

(d) Presentation of Results

Production of an Impact Statement.

3.4.2 In constructing their EIA as instructed by the Regional Council, the Regional Physical Planning Department encountered an immediate difficulty due to the non-cooperation of the Ministry of Defence. The Ministry maintained that it was not appropriate that anything be done until the implications of the transfer of certain activities to America had been worked out.

3.4.3 It would be surprising, in view of the US EIA on the MX missiles if, as was suggested in the verbal presentation by the Regional Physical Planning Department, there is a misunderstanding in the MoD about the nature of an Environmental Impact Assessment.

3.4.4 On the other hand, if the Ministry officials are familiar with the concept, it is difficult to see why consideration of the time that would be saved later did not persuade them to assist the Regional Planners in advance of the completion of MoD studies on the changes consequent on the decision to have missile re-furbishing carried out in America. In particular the exploration of peace-time hazards suffered from the non-cooperation of the Ministry of Defence with the Consultants commissioned by the Region. Passage of time will not simplify the difficult questions of Risk Evaluation on which public concern will eventually have to have an answer from an objective body of acknowledged competence, privy to all the facts, some of which are not at present in the public domain.

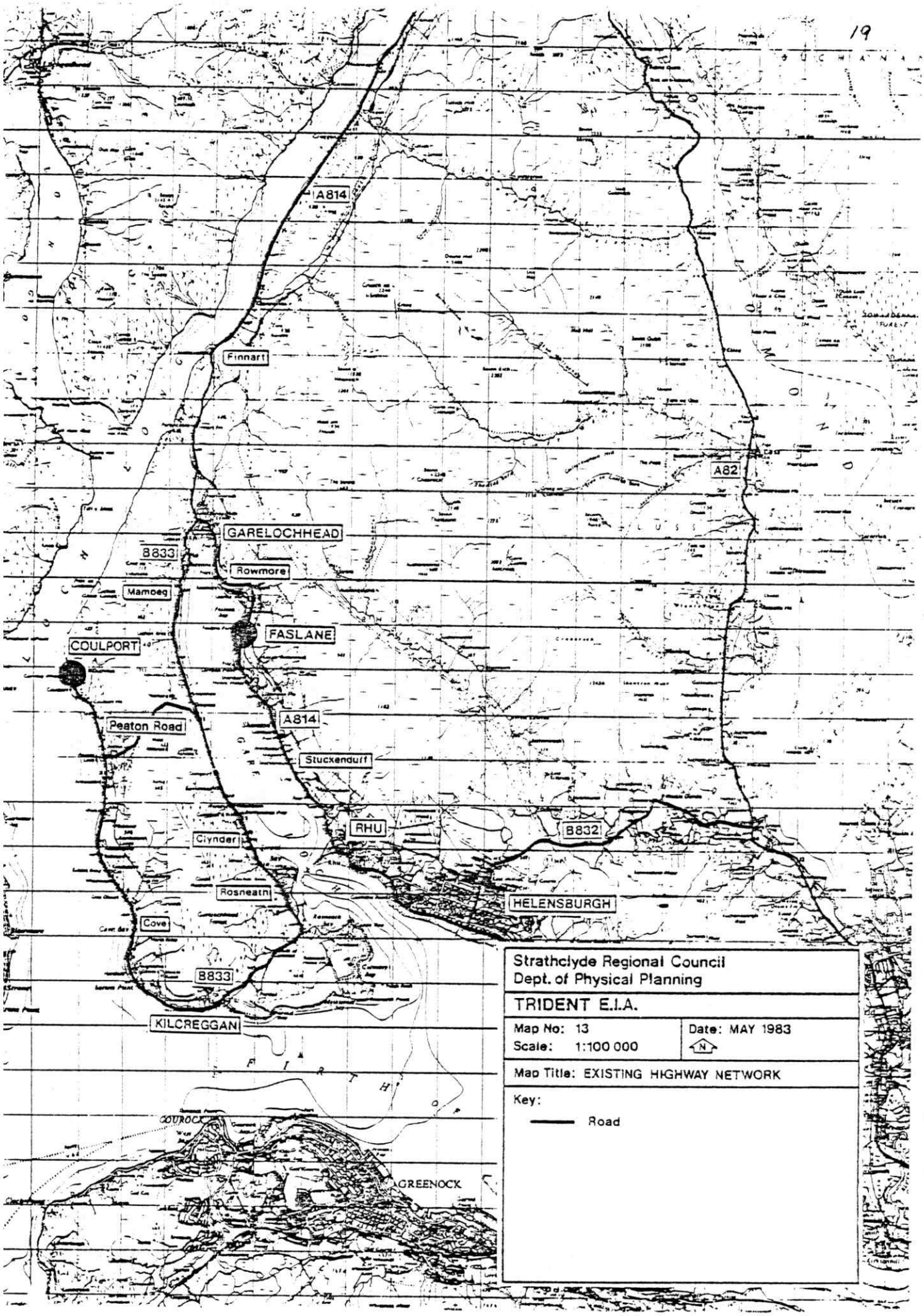
3.4.5 Under 3.4.1(a) above, a site visit was carried out. Again this was without the cooperation of the MoD.

3.4.6 The Generalised Impact Matrix referred to in 3.4.1(c) above is a device for identifying particular impacts so that the overall complex situation can be treated as a collection of manageable topics. Horizontally is listed the aspects of the environment on which there will be an impact at different stages in the development. Vertically is listed the existing activities, services and environmental aspects likely to be affected, beneficially or adversely, by that impact. For example, from the Matrix reproduced as Annex E, it can be seen that pollution, if there be any in the operational phase, will affect the life of the population, the Landscape Quality, Ecology and Recreation and Tourism, but not the electricity services or employment.

3.4.7 The production of the technical reports required for the production of the EIA was largely within the competence of the Regional Department or the other special bodies normally consulted by them on planning matters. However the question of Hazard Assessment, clearly so central and so unusual in respect to the NoPD, required the services of an external specialist firm of Scientists and Consultants, Cremer and Warner, London.

3.5 Results of EIA.

3.5.1 In conformity with 3.4.1(d), the results were presented by the Regional Physical Planning Department in relation to the squares in the Impact Matrix (Ref 10,para 3.3).



Strathclyde Regional Council
Dept. of Physical Planning

TRIDENT E.I.A.

Map No: 13
Scale: 1:100 000

Date: MAY 1983

Map Title: EXISTING HIGHWAY NETWORK

Key:

Road

Chapter 4. Particular Environmental Impacts.

4.1 Roads.

4.1.1 From the EIA Matrix, it is noted that the road system will be affected

(a) during the Construction Period by

(i) Mineral Extraction;

(ii) Increased Traffic;

(iii) Disruption of Services;

(iv) Visual Detraction,

and

(b) during the Operational Period by

(v) Infrastructure demands;

(vi) Restrictions on Access.

4.1.2 Present Road Situation.

(a) Access Roads on Rosneath Peninsula.

At the present time, apart from some workers travelling from Gourock to Kilcreggan by ferry, all road traffic to RNAD Coulport comes through the junction of the B833 and A814 at Garelochhead. The route branches halfway down the west side of the Gare Loch where the unclassified Peaton Road allows access directly across the peninsula. However, although Peaton Road was upgraded in 1977 and at present has an excellent surface, nevertheless, because of two factors, firstly long steep gradients and secondly awkward junctions with the B833, a considerable fraction of the heavier traffic, including all the regular buses, takes the longer route round the southern tip of the peninsula. This results in a peak hour traffic flow through the communities at Clynder, Rosneath, Kilcreggan and Cove which was the subject of general complaint in the evidence of local residents to the Inquiry.

From the extensive information on Roads provided in Appendix D(Ref 10), I constructed Table 1, Annex F of this assessment. From it one sees that in 1981 the stretch of road from Garelochhead to the junction with Peaton Road was carrying at peak times 67.5% of the traffic flow regarded as the Maximum Working Flow, presumably with regard to congestion and accident risk. In the absence of any new development and taking a mean

estimate of the expected growth in car ownership and usage, the Maximum Working Flow will be reached in this section of road in the late 1980's, regardless of new operations at RNAD, Coulport.

The flows on the sections of road through the local communities were, on this calculation, not so close to the maximum flow. It should be noted, however, that the 1981 measurement was made in the month of April. There is an acknowledged important seasonal variation due to holiday traffic for which no allowance has here been made.

(b) Access Roads to Garelochhead.

Travel from the north is by the A82 along Loch Lomond to Tarbet then via the A814 from Arrochar through Whistlefield to Garelochhead. There are gradients as steep as 15% to the summit at Whistlefield.

All other traffic must necessarily come through Helensburgh, either coming off the A82 at Arden via the B832, or via the north bank of the Clyde through Cardross. The route by the B832 has the attraction of being mostly dual carriageway right from Glasgow. However, the road works along the A82 between Balloch and Tarbet, foreshadowed in Reference 10(para 3.2.22), have very recently been announced and they will continue over several years. This will produce changes during that period in the present traffic flows on the A814 from Helensburgh to Arrochar. It must also be noted that the tourist traffic is considerable on the A82 and will lead to large seasonal fluctuations in the diverted traffic flow.

The MoD traffic accounts for more than half the traffic movements on the roads into Coulport from Garelochhead. However, there are many major operators using the roads leading to Garelochhead and in a time of road works on a considerable scale there could be interactive complications outwith the control of the Ministry and its agents.

4.1.3(a) Impact of Development on Roads.

(a) Traffic During Construction Period.

The question of the source of the construction material is discussed in 4.2. It will certainly lie almost entirely outside the peninsula and therefore the immediate access roads will be involved if this material has to be transported by road.

The 1981 NoPD anticipated that during the five year construction period there would be 350 lorry arrivals per day and a labour force of 1700 construction workers. Assuming that the resubmission is reduced to about 60% of the 1981 proposal and that 200 lorry arrivals per day and 970 construction workers are required, the Regional Engineers carried through a study of the impact on the local roads. It was assumed that the construction workers generated traffic, in addition to the daily lorries, in the same proportion as the permanent workers on the site. The results

of the study are incorporated in Table 1, Annex F. At the evening peak hour it is calculated that there would be 196 additional vehicle trips, including 57 lorries, and the section of the B833 between Garelochhead and the Peaton Road turn-off would be loaded well beyond its safe limit. The private cars could filter over Peaton Road; the extra traffic through Clynder, Rosneath, Kilcreggan and Cove would be entirely buses and lorries. It was stated at the Inquiry, and confirmed by the Regional Roads Division, that should any of the culverts, of which there are several, on the section of the B833 through these communities subside and require repair, complete closure of the road could be necessary as its width prevents temporary single lane working. This would have very serious implications for both the contractors and the local residents.

(b) Traffic beyond Construction Period.

There is to be a period when the Polaris and Trident systems are operating in parallel. If the build-up of Trident personnel overlaps the run down of construction effort, the peak in traffic flows on the roads on the peninsula before the fall to the steady condition reached in 1995 should be as in Table 1 in the Annex.

4.2 Mineral Extraction.

The District Council Planning Department referred to the possibility of bulk delivery of mineral raw material by sea from "the potential super quarry sites on the west and northern coasts of Scotland". These quarries are not yet operative and in any event may produce only hard rock. The organisation of the very large quantities of sand and gravel, and possibly also all the hard rock, required in the construction period will probably have to come from more local sources and have a very great impact on the road system over a very considerable area if road transport has to be involved. The possible sites for mineral extraction have been considered by Region and Dumbarton District Planning Departments.

In Reference 20, page 46, it is indicated that there is a very large reserve of sand, gravel and crushed rock in Argyll sub-Region and Clyde Valley.

There are , in particular, 6 existing sites, five in Dumbarton and one in Argyll and Bute Districts to be noted. These are:-

1.	Rigangower Quarry, Milton	Whinstone
2.	Dumbucknill Quarry, Dumbarton	Whinstone and Agglomerate
3.	Sheephill Quarry, Bowling	Whinstone

The District Council are of the view that the opening up of Sheephill, on which there is a valid planning consent, would have a "disastrous effect on the amenity of the area". The intensification of operations at Dumbuck or Riganower is preferred.

4. Camsail Wood Quarry, Rosneath — Igneous Rock

The consent for this small quarry has expired but renewal is being sought. I understand that the application for renewal has been refused. In any case the reserves are not thought to be large enough for the requirements of the Coulport extension.

5. Mid Ross, Arden — Sand and Gravel

A recent report by the Institute of Geological Sciences identified the principal resources of sand and gravel in the area as lying in "lower Glen Fruin and south-west of Loch Lomond". At present Mid Ross is the only site in this area being currently worked; its consent expires in 1986. The District Council Planners pointed out that, while "meaningful restoration at the end of operations" is here a possibility, extensive working would interfere with a large hotel/chalet/marina complex recently approved and result in the loss of some 200 permanent jobs.

6. Cairndow Quarry, Loch Fyne — Sand and Gravel

Two additional quarry sites have been brought forward as a result of the Coulport development.

7. Succoth, Arrochar was the subject of a planning application to Argyll and Bute District Council for mineral working. Permission was refused in November 1982 on the grounds that it was contrary to the Regional Structure Plan and to the Cowal Local Plan and would have an adverse effect on nearby residential property.

8. Dumfin Quarry, Arden was the second new site suggested. It has not been the subject of a planning application but was advertised for let shortly after publication of the original proposals for Coulport.

It may be seen from the map that sources 6 and 7 would load the A814 over Whistlefield, sources 5 and 8 would lead, via the B832, to complications in Sinclair Street, Helensburgh which at present cannot be by-passed and sources 1,2 and 3 would load the A814 through Helensburgh and Rhu to Garelochhead.

4.3 Water Supplies.

4.3.1 The MoD have indicated that the Lochan Ghlas Laoigh reservoir, which supplies potable water to Cove and Kilcreggan, would be required for firefighting purposes. There would therefore be a need for an alternative water supply for Cove and Kilcreggan.

4.3.2 The Region suggest (Ref 10, para 4.3.2) that this could be arranged by tapping the main water from Loch Sloy above Arrochar to Garelochnead. This main is already tapped to supply RNAD Coulport. A new branch main would be required from the Loch Sloy main at Whistlefield to run down the peninsula. This has been costed (Ref 10, para 4.3.3) at £1.75M (1981 prices), assuming that the proposed spine road can be used as a route; otherwise the cost would exceed £2M.

4.3.3 The suggestion has been made (Ref 10, para 4.3.6) that, although it is the Regional Council's statutory duty to maintain a water supply to Cove and Kilcreggan, as the new system would be a consequence of the MoD change of use of the Lochan, the cost of the new works should be met by the Ministry of Defence.

4.4 Sewerage.

4.4.1 In connection both with the disturbance during the construction phase and in the extra demands in the operational phase, the present admitted inadequacies of the sewage arrangements at Garelochnead have to be noted. The Regional submission (Ref 10, para 3.2.28) states that "the population of the town has increased beyond that with which the existing septic tank can cope". A letter of 29th June 1981 from the Clyde River Purification Board to Dumbarton District Council states that "if it is proposed to connect the sewage from the development into the existing sewerage system serving Garelochnead prior to treatment and discharge to Loch Long, both the sewerage system and sewage treatment plant serving the village require to be extensively modified prior to the development proceeding. If it is decided to treat the sewage on site and discharge to Loch Long or presumably to Gare Loch, then it is essential that discussions are held with the Board's staff in order to negotiate a suitable effluent quality and satisfactory location for the outfall."

4.4.2 At present the MoD operates a site sewage treatment plant (Ref 10, para 3.2.28). Assuming this to be extended to cover the demands of the extended site, there would remain, "off site", the impact of "work camps" during the construction phase and possibly permanent houses, additional to the existing housing stock, during the operational phase. The complications which would ensue unless a new work programme has been undertaken, are foreshadowed by the recommendation by the Clyde River Purification Board to Dumbarton District Council to refuse planning permission for housing alteration involving only three additional bedrooms on the grounds of the inadequacy of the present sewage arrangements at

Garelochhead. (Ref 14, page 21)

4.4.3 The Garelochhead Community Council conveyed grave concern about the present state of sewage contamination in the Gare Loch.

4.5 Electricity.

The North of Scotland Hydro Electricity Board's 132kV overhead crossing of Loch Long passes through the northern part of the original proposed development area at Coulport to join the National Grid transmission line running through Glen Fruin. (Ref 10, para 4.4.4) In the original proposal there was no indication that the existence of the cable created any problems. It is, therefore, unlikely that in the modified proposal, anticipated as requiring fewer buildings, any question of relocation of this cable will be called for.

4.6 Telephones.

Local parties drew attention to the dislocation of the local telephone system that occurred during a previous construction phase at Coulport. This is a social inconvenience with all sorts of complications in a community at a distance from social and welfare centres and with so many commuters dependent on trains and ferries for transport. An insertion of this heading was made into the Region's General Impact Matrix.

4.7 Employment.

4.7.1 The major employment impact would lie in the need for a large temporary labour force during the construction period of say 5 years covering not only the new works at Coulport but also the associated infrastructure work on roads, sewage and water projects. The 1981 MoD proposal envisaged up to 1700 people working on the site during the construction period from 1984 to the end of the decade. It is possible that this figure could still be 1000 in the reduced proposal; this excludes the labour force required if there were to be associated major infrastructure works on the peninsula. The extension to RNAD is not seen by MoD or any party at the Inquiry as leading to an increase in permanent jobs in the area beyond the time when Polaris is phased out.

4.7.2 If Polaris is phased out before the Trident system is installed at Coulport, or if Trident is installed elsewhere, the extent of the job loss to the area is estimated to amount to 2,200 (Ref 10, para 4.1.2, based on information from PSA, 29/4/81) This figure should be treated with caution in view of the transfer of work in recent years from civil to Service personnel.

4.7.3 Dumbarton District Council (Ref 14,section E) estimates the numbers during construction as 1,000 to 1,700 on the site with a reduction to around 400 after the construction period and finally going to zero as Polaris is phased out. They see about 750 jobs available for District residents, which would be greatly welcome having regard to the present unemployment in the District.

4.7.4 The Dumbarton District Council and local parties pointed out that the permanent work force was predominantly male and that there was little prospect for trainees. The District also disputed the Ministry's suggestion that there might be a multiplier effect as high as one extra job in the District for each MoD job. The District Council see the increased spending power boosting local demand and helping transport sectors but believe this will be met by adjustments not necessarily leading to an increase in employment.

4.7.5 In requested Supporting Information (30/Jun/1983), the Regional Department of Physical Planning estimated that, on the construction of roads which could arise from the development, the employment might be 16,000 man years over a period of 2.5 years. Investigation of a comparable project at Port Glasgow showed 60% of the work force came from the District, 40% from the Glasgow area.

4.8 Housing.

4.8.1 Dumbarton District Council foresaw no planning problem if the MoD wished to build permanent staff accommodation in the area, provided the Regional Service departments could cope with the increase in population.(Ref 14, page 24) Attention was drawn in particular to the sewerage requirement in Garelochhead.(4.4 above)

4.8.2 The need for a site for a temporary work camp raised considerable concern locally and its location will be a difficult decision. If it is designed to be converted in the long term into general needs housing the District Council would welcome the addition to its housing stock, though it recognised it would mean persuading applicants to accept houses in areas which were not their first choice.

4.9 Pollution.

4.9.1 As far as non-radioactive pollution is concerned, the Regional Council (Ref 10,para 4.5.9) were of the view that the site, as one of low biological productivity, would be expected to have no significant adverse effect on the ecology of the area. However a possible danger to potable water provided to farms from streams on the slopes facing the Gare Loch, if the development disturbed the existing drainage system, would have to be considered.

4.9.2 The Defence Radiological Protection Service and the Ministry of Agriculture and Fisheries carry out routine marine radiological monitoring. The present dose rates over intertidal sediments remain indistinguishable from the natural background and the public radiation exposure is found to be very low (0.1% of the International Commission of Radiological Protection recommended dose limit).(Ref 10, para 3.2.38) This monitoring information was apparently not known to the Consultants. (Ref 11, para 4.7.1)

4.9.3 There is no indication of atmospheric pollution at the Rosneath Peninsula. Incidentally, the Region point out that the area is at the edge of the West Central Highlands of Scotland which has possibly the highest level of acid deposition in the U.K. and as high as the worst areas in Scandinavia and North America.(Ref 10, para 3.2.37)

4.10 Education.

There was a complaint from a party that there was an adverse effect on the educational system in the area due to the constant change around of Servicemen's children affecting the conesion of class groups. This must be a feature of all schools which have Service establishments in their catchment areas and, if it exists, must have been a feature of the local schools for a very long time. It was also argued that a new Secondary School in Helensburgh might be necessary if there was any increase in enrolments.

The Region Department of Physical Planning (Supporting Information to the Inquiry Reporter, 30/Jun/1983) stated that the school rolls did not show any unusual fluctations. Also, in view of the present trend of falling rolls in line with most schools in the Strathclyde area, no problem was envisaged as far as the physical provisions were concerned unless the number of families moving into the area as a result of the Depot being extended greatly exceeded present estimates. However, any increase in school rolls would raise the requirement for the employment of more teachers with a consequent increase in revenue costs.

4.11 Leisure and Recreation.

There were mixed feelings on the impact the existence of the present base had on local recreational facilities. Where there was a need for greater participation, as in the local Highland Games, the extra numbers were welcome. Where there was pressure on accommodation, the view was expressed that, not only should the Ministry provide for its own staff but that the Service facilities should be available to all local residents. A letter from the MoD(23 July 1981)(Ref 14) made it clear that, as of that date, there were no plans to provide additional recreational facilities, such as a swimming pool in connection with the Trident project. An aspect of a work camp development that the District Council stressed was the strain it would place, at least temporarily, on the leisure and recreational facilities in the area unless additional were provided or arrangements made to transport the construction workers to larger

centres .(Ref 14,page 26)

Chapter 5. Peace-time Safety Aspects.

5.1 Statutory Major Hazards.

5.1.1 By U.K. planning statute (Ref 3) a Major Hazard is defined as:-

(a) Development where the industrial process, and storage facilities of specified types (e.g. petrochemical manufacture) involve storage of specified materials (e.g. liquefied petroleum gas, chlorine, liquid oxygen) at specified quantities: or

(b) Commercial pipelines for transporting crude oil, ethylene, natural gas or natural gas liquids: or

(c) Explosives factories or magazines.

The extension at RNAD Coulport would under (c) be classified as a Major Hazard if it were being proposed by a commercial company.

5.1.2 Internationally in recent years, two disasters and one "near miss" have brought Major Hazards into the forefront of land use planning.

1. Flixborough.

On 1st June 1974 there was an accident at a nylon factory in England which resulted in the death of 29 workers, seriously injured people outside the plant and damaged property out to a distance of 5 km. The explosion, which resulted from the ignition of a vapour cloud, was estimated to be the equivalent of 15 to 20 tons of TNT.

2. Seveso.

On 10th July 1976 at Seveso in Italy there was an explosion in a chemical reaction vessel which resulted in a large scale release of dioxin. An area of about 7 sq.km was seriously contaminated. A large number of domestic animals died and humans, particularly children, were in the short term affected by acne-like symptoms. In the longer term, liver complaints have developed. It is estimated that some 200,000 people in 11 municipalities may have been at risk. Controversy continues, seven years after the event, as to the adequacy of decontamination and of the policy for the safe disposal of the material from the wrecked factory.

3. Three Mile Island.

On 29th March 1979 a loss of coolant on the Pressurised Water Reactor at Harrisburg, Pennsylvania, USA, followed by inadequate operator response, led to fears of a serious radiation leak. In

excess of 200,000 people moved out of the area and for a period there was fear of a "melt down" of the reactor core. This catastrophe was, however, averted. The reactor was sealed off and it was reckoned it would be four years before it could be decontaminated, overhauled and reactivated. In the event there was no serious radiation leak. However the occurrence of this accident, in the face of the safety precautions, led to a full scale, high level inquiry in the USA into the adequacy of nuclear reactor safety regulations.

5.1.3 Widespread public concern on the reliability of safety planning in these and other hazardous projects has given rise to an interest in many quarters in the risk posed to society by technological innovation. The Royal Society of London in 1978, responding to public concern, set up a Study Group on Risk Assessment which issued a Report in 1983.(Ref 7)

5.1.4 There is now a European Council Directive (Ref 4) which makes it mandatory on Member States, including the U.K., to introduce by 1989 a requirement for hazard assessment into their planning legislation. Reflecting this development, the Manual for the Assessment of Major Developoment Proposals (see 3.1.2 above) includes hazard as a major consideration in the appraisal of likely environmental impacts.

5.1.5 Since the Flixborough accident, the U.K. has extended the Health and Safety at Work etc Act 1974 to place a responsibility on employers to notify the Health and Safety Executive if they intend to handle certain specified hazardous substances (Ref 5). The Regional Planning Department informed me that the Health and Safety Executive anticipate that the next step will be to make the employer undertake a hazard survey with the following main objectives:-

1. To provide information and data on the nature and scale of the hazard;

2. To identify the more critical features of the hazardous undertakings and of the systems used to control the hazards; and

3. To cause the operating organisation to review the events which could lead to loss of containment of the most hazardous inventories and the consequences of such loss.

5.2 The Hazard Survey for the Trident Development.

The assurance has been given that "the new facilities will be built to the Government's very stringent safety standards" (Ref 6,para 12).

However there was no evidence from any parties participating in the Inquiry indicating that any Hazard Survey, in line with that to be required from a private Applicant, is in prospect from the Ministry of Defence. Cremer and Warner (Ref 11) have tried, within the limits set by public knowledge of the Government's intention vis-a-vis the acquisition of the Trident system, to set out the nature of the complex hazard involved. While this qualitatively will be valuable as background information to the Local Authorities, the risk cannot be quantified without a detailed knowledge of the operations envisaged and, having regard to national security, it is very unlikely that the details necessary will be publicly divulged. The resolution of this dilemma is likely to be the most important and most difficult matter arising in the consultations between the MoD and the Local Authorities.

5.3 Principles of Hazard Assessment.

5.3.1 It is important to have an agreed set of definitions in discussing risk evaluation; in this Report the meaning to be assigned to the commonly used terms are as follows (Ref 7,page 22):-

"Risk" is the probability that a particular adverse event occurs during a stated period of time;

"Adverse Event", (shortened to "event" if unambiguous) is an occurrence that produces harm where "Harm" is the loss to a human being (or to a human population) consequent on damage and "Damage" is the loss of inherent quality suffered by an entity (physical or biological);

"Hazard" is the situation that in particular circumstances could lead to harm;

"Detriment" is a numerical measure of the expected harm or loss associated with an adverse event;

"Benefit" is the gain to a human population.

5.3.2 Measure of a Hazard.

In simple cases where the risk can be readily assessed and where the detriment is straightforward, a measure of the hazard can be achieved by multiplying risk by detriment. Thus a very unlikely event potentially causing a lot of damage can be a greater hazard than a relatively likely event which causes little damage. The Planner, on behalf of the public, has then to weigh the hazard, thus quantified, against the benefit and decide if the hazard is acceptable. Should he decide the hazard is unacceptable, he may ask that the risk be reduced. This will usually lead to additional expense, resulting in a reduction in the attractiveness of the project as well as a reduction in the hazard. The developer must then decide whether or not to proceed. If he decides to proceed and comes forward with an amended proposal, the procedure is repeated. In this way,

by successive steps, the hazard may be finally made acceptable.

5.3.3 Public Perception of Hazard.

In many cases the public perception of the detriment, and hence of the hazard, may be very different from the objective assessment of the detriment. (Ref 7, page 94) This is particularly so in any circumstances involving radioactivity. A good example of this is the hazard associated with the transport of nuclear fuel elements between sites in the U.K.. From accident statistics the probability of a collision of a given severity per mile of travel can be estimated with fair accuracy. Experimental tests can establish the probability of the container being damaged in the impact to the extent that leakage occurs. Up to this point there would probably be agreement between the "popular" and the "expert" view. In the case of a cargo of non-irradiated solid fissile material, the objective view would be that there would be practically no hazard. Had the fissile material been irradiated, then, as explained in Annex G, a slight emission of radioactive gas, quickly dispersing would result. The public view, however, is likely to run on the lines of "nuclear accident", "mushroom clouds" and "plumes of contamination". While the Inquiry was in progress, correspondence on the subject of the transport of radioactive material was received from the Regional Chief Executive and, in view of that development, a further discussion is given in Annex G. In the particular case of the Coulport operations it is not surprising, in view of the lack of public knowledge of the nature of the operations taking place on the site, to find a very wide gap between the "objective" and the "publicly perceived" hazard. To close this gap will require a major exercise in public relations by the MoD.

5.3.4 More Complicated Hazard Considerations.

It is not always adequate to consider hazard as a simple product of risk and detriment. The public has much greater concern over accidents involving multiple deaths; one accident causing 100 deaths is regarded as more serious than 100 separate accidents each causing one death. Workers in the field of hazard evaluation try to allow for this public view by demanding a much reduced risk in the case of multiple death accidents than the simple consideration of 5.3.2 would yield. This is very relevant to the case of safety estimates in the RNAD Coulport extension and is taken into account in 5.4.6.

5.4 <u>The Nature of the Hazard at Coulport.</u>

5.4.1 Piecing together information mainly from American sources (Ref 8), it would appear that the Trident missile, weighing some 50 tons (Ref 33), is designed to take off from rest at tens of seconds notice, travel 6000 miles and deposit its "payload" of nuclear weaponry, weighing perhaps a ton and a half in total, on up to 14 separate centres of population, creating up to 14 circles, each some ten miles across of utter devastation. The chemical energy in the propellant necessary to drive the massive pay-load across Europe and the nuclear energy necessary to devastate 1100 square miles of territory when it arrives are (Ref 8) compactly stored in a

cylinder 42 feet long by about 7 feet in diameter and are situated within the same hull as 15 other such energy stores; in the hull there is also a nuclear reactor, itself storing enough energy to drive the submarine on its long operational voyages. This represents a frightening concentration of stored energy, a good fraction designed to explode on request. It has to be noted that the stated intention of the present Government is to use not necessarily all 16 missile tubes on each submarine (Ref 23, Q15,page 3) and to limit the number of warheads per missile to less than the possible 14. (Ref 23,para 8,page 24),(Ref 27, Q1568,page 261) Nevertheless, having provision on four submarines for carrying a total of 64 missiles, the Government, at the time when it was planned to base the system on C4 missiles, was reported as planning, to allow for spares, the purchase of 100 missiles. (Ref 27, Q326,page 86) After the substitution of the D5 for C4, the Defence Minister (Mr Nott) was able to state that the figure of 60 suggested as the number of D5's to be purchased was "wildly wrong".(Ref 23,para 5) A figure of 60-100 missiles was estimated by a Consultant to the Defence Committee. (Ref 23,page 24/25) Whatever the number eventually purchased by the Government, the number of missiles likely to be on the Coulport site at any one time is, of course, unknown.(see 5.6.2) Even if it were only the 16 necessary to furnish one submarine, the scale of potential peace-time disaster must be unprecedented for these islands. Similarly, the number of warheads in the stockpile and the number at Coulport at any one time is likely to continue as highly classified information. Were it not that a similar but smaller hazard has existed these last decades in regard to the Polaris system, one would be inclined to believe that responsibility for such a hazard represents an intolerable burden for the authorities. In terms of the definitions of 5.3.1, the detriment is so huge that the hazard can only be acceptable if the risk is minutely small. It is a very difficult question, but one that has to be faced, to decide how small this risk must be.

5.4.2 The Consultants (Ref 11,para 4.4) considered that the greatest peace-time hazards on the site lay with the missile propellant and a lesser hazard, because there probably would be a smaller quantity involved, with conventional H.E. in the weapon trigger. The quantities of these hazardous materials on site is not likely to be revealed. However, to get an impression of the scale of the safety problem, let us assume 16 missiles and 100 warheads to be involved. The propellant per missile is about 28 tons(Ref 11,para 4.4). The H.E. per warhead is another piece of information likely to be highly classified. As the Consultants remark (Ref 11, para 4.4), the quantities of H.E. are likely to be much smaller than those of propellant; so, for the sake of developing the argument, assume that there is 1 ton in small batches on site. Now make the "worst case" assumption that the "housekeeping" is so bad that these batches are so close together that one going off will detonate the others. The nature of the hazard is that either the propellant or the trigger H.E. be accidentally set off by mechanical shock or excessive temperature and then ignite the other as a secondary accident. Apart from the thermal and blast waves caused by the primary and secondary explosions, there is the risk of toxic contamination from the unconsumed explosive material and radioactive contamination should the containment of the warhead or the containment of

the reactor be breached. This is summarised in a hazard matrix in Annex H. The safety distances corresponding to the above quantities of propellant and H.E. are estimated in Annex I.

5.4.3 Having identified the potential accident areas, the system planners should next have regard to the safeguards, which may be provided by equipment or by operator response, designed to prevent accident occurrence and should proceed to construct a logic diagram called a "fault or event tree". The production of such a tree is mandatory in comparable US contexts. (Ref 11, para 4.2) A "fault", or "event", tree is a diagram in which the consequences of a failure in equipment or a mistake made by personnel which could result in an accident are followed through all the subsequent events in the safety chain. At each branch, the probability of a further fault occurring or a further mistake being made should be estimated. Then the risk of a particular accident can be arrived at by the rules for combining probabilities. For a system as complicated as the Trident system the production of a fault tree must be a daunting task. Nevertheless it ought to be attempted in however rough a form. As far as equipment is concerned, the absolute failure rate will come to be known with increasing accuracy in the course of operations. The probability of personnel making mistakes does not however lend itself to simple measurement and will always be an area of great uncertainty. An error frequency of about 0.003 per operation(i.e. 3 mistakes in every 1000 operations on average) in going through a check list (not under stress) is quoted by the Consultants.(Ref 11,para 4.6.1) There will be large variations in such an estimate. However, it is mostly relative risks that are of interest and as we shall see, even rough estimates can be useful.

5.4.4 There is obvious merit in a "fault tree" as a means of providing a permanent record of the overall safety situation; this is particularly valuable, indeed essential, where there are frequent staff changes. The tree has the additional advantage of highlighting the areas of greatest risk and indicating modifications to equipment or changes in procedures that would significantly reduce the accident risk. One assumes that the production of fault trees, a present day procedure in all hazardous projects, is routine within the Ministry of Defence. Again it is a question of the assurance the public may have of the existence and reliability of these fault trees consistent with security requirements.

5.4.5 The size of risk that would be acceptable must relate to the detriment associated with the accident (see 5.3.1). Provided the yellow and purple lines of the safeguarding procedure(5.5 below) have been correctly positioned, and provided the purple area between is delimited for toxic and radioactive contamination as well as for blast (which is far from certain), limited detriment to the general public will arise from anything short of the "ultimate catastrophe", i.e. a nuclear explosion of a warhead. The risk of this eventuality, while not the only risk to be considered, is by far the most important.

5.4.6 To arrive at an upper limit to the acceptable risk we might compare it to the "acceptable" risk of, say, one air crash per year in the U.K. involving 50 casualties. While demanding full investigation and improvement in safety precautions to prevent reoccurrence, society "accepts" this scale and frequency of accident as the price to be paid for travel convenience. If we accept the "Groningen criterion" (Ref 11,page 1-3) that "an increase in the consequences of an accident by a factor of 10 should be accompanied by a reduction in the frequency of the accident by a factor of 100" (Ref 11, para 1.2) then the comparable "acceptable" risk of the inadvertent explosion of a nuclear weapon causing say 500,000 casualties, would, on the basis of a comparison of casualties alone, be of the order of 1 in 100 million years. This is very much an upper limit as no account has been taken of the long term effects, psychological as well as physical, on survivors, the longlasting contamination of territory and the enormous loss of physical resources that would be involved. The US estimate of 1 in 10,000 million per weapon over the service life of the system (Ref 11, para 4.2), on the assumption of say 100 weapons on the site and a service life of 25 years leads to a figure of 1 in 2,500 million years to be compared with the 100 million years arrived at above. Whether that leaves enough in hand to cover the detrimental effects ignored above is a matter for subjective judgement. On the basis of a comparison of the damaged area for a nuclear explosion with the area for a boiling liquid expanding vapour explosion the Consultants (4.6.1) arrive at an estimate of one in 10,000,000 million. It may be unprecedented to ask a developer to meet such low risk reqirements; this could be said to be a direct and necessary consequence of the unprecedented harm that could follow from an accident of this kind.

5.5 Safeguarding.

5.5.1 In connection with MoD hazardous sites there is currently a procedure for defining yellow and purple lines around the site. Once these are laid down in a "Direction" by the Secretary of State certain Planning consequences follow.

(a) Any application for planning permission to the Local Authority for a development within the yellow line ("Inhabited Building Distance") (Ref 10, para 2.4.19) has to be notified to the Ministry of Defence. If the Ministry objects, as is likely on safety grounds, the application may well be called in and refused by the Secretary of State (Ref 14,page 12).

(b) In the Purple zone, the area between the yellow and purple lines, proposed developments involving curtain walls and/or large glass areas have to be notified to the Ministry of Defence and are dealt with as in (a) above.

(c) Outside the purple line normal planning regulations apply.

5.5.2 The concept of safeguarding has been introduced to avoid the need to leave undeveloped around every such hazardous site an unduly large margin of land, in which there would be a relatively small risk of

relatively minor damage to property and people. It is important to realise that in practice it is seldom possible to define a line such that it is safe on one side and hazardous on the other. A paper (Ref 9), which originated in the Ministry of Defence, is on occasions used as a basis of calculation of these lines by Local Planners and, in the case of this Inquiry, was used by the Consultants. The paper begins by warning that "the term Safety Distance is somewhat of a misnomer in that the layman assumes that once outside the safety distance there is no danger to persons or property. Since all the variables that determine safety are continuous with distance, this is rarely, if ever, true".

5.5.3 In Reference 9 the Public Building Distance, which I assume synonymous with the yellow line, is said to have been defined by the Explosives Storage and Transport Committee as the distance beyond which there is "no more than a 5% chance of getting serious structural damage". In the same paragraph in the paper, the author implies that there should be the "expectation of no serious direct injury" to persons. An indirect injury due to flying debris, e.g. broken glass, from lightly damaged buildings would remain a possibility. The question of acceptable heat radiation to humans is also discussed and it is suggested that "doses of 3,6,9 cal/sq.cm will produce first,second and third degree burns, respectively" for a cordite fire. Other explosions involving a different spectral emission or a different duration of heat flash would require separate consideration. Figure 3 (Ref 9) graphs the "relationship of thermal dose level to weight and distance of burning propellant" for "bare, compact charge" in the case of cordite.

5.5.4 The Jarrett paper (Ref 9), which is the subject of a technical Annex I, merits the attention given as it represents a basis on which planning of sites containing propellants can proceed on something better than guess work. The statistics on which formula (8) (Ref 9,page 32) is founded amount to 24 well-documented explosions "combined with records of explosions dating from 1871, together with experience of enemy bombing in the United Kingdom". The formula can be checked, and, one assumes, in the last 17 years has been, on a laboratory scale. Hopefully there will be no further accidental explosions against which it may be judged. There is nothing in Reference 9 to help in estimating the effect on the positioning of the yellow line arising from possible contamination with toxic or radioactive debris.

5.5.5 No evidence was provided to the Inquiry on the relationship of the purple line to the yellow line. In Jarrett(Ref 9, page 35), dealing with the quantity of explosive that may be used in Deliberate Firings, it is stated that "as a guide when deliberately detonating explosives, a distance equivalent to seven and a half times the public safety distance is required. At this distance windows should not normally be broken. If there are sizable centres of population just outside the establishment or if a history of complaints exists, it may be necessary to reduce the quantity further or to check meteorological conditions to avoid blast focussing".

5.6 Major Accidents on or associated with the Site.

5.6.1 In reviewing the possible accidents to be included in a risk assessment, and in the absence of any guidance from the Ministry of Defence, the Consultants chose to take a "worst case" view and assumed that, at some time all hazardous operations associated with the Trident weapon system might take place on the Coulport site. This view resulted in the following assumptions:-

1. that components of nuclear warheads would be transported to the site;

2. that nuclear warhead components would be stored and assembled on site;

3. that missile propellant would be transported to the site;

4. that missile propellant would be stored and handled on site;

5. that missile propellant would be in both solid and liquid form;

6. that non-irradiated reactor fuel elements would be transported to the site;

7. that reactor maintenance involving the handling of non-irradiated and irradiated fuel elements would take place on site;

8. that irradiated reactor fuel elements would be transported from the site;

5.6.2 There has been an indication from the Ministry of Defence, although not to this Inquiry, that:-

(a) there will be no provision at Coulport, or anywhere in the U.K., for the removal of missiles from Trident submarines. Missiles will be stored and loaded at Kings Bay, Georgia, USA. Consequently there will be no propellant ashore at Coulport. (Ref 34, QQ01-64, page 13)

(b) the maintenance of submarine reactors will continue, as at present, to be confined to Naval Dockyards; Operational Bases like Coulport will not be involved in handling reactor fuel elements. Consequently there will be no transporting of reactor fuel elements to and from RNAD Coulport. (Ref 27, Q715, page 139)

(c) only solid propellant will be involved in the Trident missile. (Ref 27, Q1012, page 187) It should be noted in this connection that, whereas in missile technology there has been a move away from liquid fuels, nevertheless, in the MX missile, which is larger than Trident but has a somewhat similar "pay-load" specification, "the post-boost vehicle, which manoeuvres to guide the individual warheads after the three main stages

burn out, is liquid fuelled" .(Ref 15, page 87) It is, as far as I am aware, not publicly known whether the present Trident specification can be met without recourse, to some extent, to liquid propellant. However, if it is assumed that no handling is involved at Coulport, this is not a relevant safety issue on that site.

5.6.3 Accidental Explosion of Propellant.

On this new assumption on the location of propellant on the site, the accident contingency, replacing that considered by the Consultants(Ref 11,para 4.4 and 4.6.3) to set the scale of yellow line distances, becomes the possibility of an explosion of the propellant in one missile alone, or, if there is a "domino" effect, the explosion escalating to involve the propellant in all 16 missiles on one submarine. As far as blast is concerned, Jarrett's formula, assuming it is applicable with K=56 and taking the weight of propellant in one missile as 28 tons (Ref 11, page 4-11), leads to distances of 0.7 km for one missile exploding and 1.7 km for all 16. As far as heat flash is concerned, the prediction is (Ref 9, fig 3) that at these distances the thermal dose would be less than 0.3 cal/sq cm, an order of magnitude below that for first degree burns. On both the score of blast and that of heat flash, 1.75 km distance seems a reasonable estimate, assuming that the propellant explosive properties are similar to those of cordite on which Jarrett's experiments were performed. Before concluding that the hazard is containable within the site, however, consideration has to be given to possible toxic and radioactive contamination demanding greater safety distances.

5.6.4 Intermediate between the situation postulated by the Consultants and the alternative of the last paragraph is the possibility suggested by the Regional Planners(Ref 10, para 2.2.14) that on abnormal occasions it may be necessary to remove one or more missiles from the tubes on the submarine. If this option is to be designed into the extension, then the centre to which the yellow line is to be related in the context of a propellant explosion is no longer uniquely the docked submarine. The yellow line would have to be appropriately adjusted.

5.6.5 The Consultants drew attention to the possibility of toxicity of propellant material. (Ref 11, page 4-4) If the propellant has this property, the question has to be asked, and could presumably only be answered by controlled tests, whether areas at a distance from an exploding plug of solid propellant could be contaminated with unburned propellant.

5.6.6 The question of possible radioactive contamination will depend on the extent to which the warhead and reactor containment is affected by a propellant explosion. If there were to be fragmentation of the solid fissile material in the warhead or the reactor, then, as in the case of the weapon which accidentally fell from an aircraft over Spain, there might be an extensive decontamination exercise required to clean up scattered fissile material. If there was only a fracture of the container, there would be a relatively mild hazard due to possible gas leak of built-up products, comparable to the hazard of an accident damaging a fuel casket in

transport. (Ref 24)

5.6.7 It is possible for warheads to survive very severe explosions without loss of containment. On 19th September 1980, a Titan missile exploded in its silo in America due to leaking rocket fuel. The warhead was hurled out of the silo with hundred of tons of concrete and steel and landed at a distance of 200 yards. Although its exterior suffered extensive damage, the weapon was mainly intact and there was no leakage of radioactive material. The weapon was one of the oldest in the stockpile, having been produced in the late 1960's. Assuming the British weapons to be comparable in design to and as robust as the 1970 generation of American warheads and assuming the same state of arming at the time of an accident, the risk of radioactive contamination on this score should be low and it could be argued that the value of 1.75 km for the yellow line distance set by blast should be adequate.

5.6.8 Accidental Explosion of Trigger.

Compared to the tons of propellant in a missile, the mass of the explosive in the trigger, which drives the device beyond critical size (Ref 11, page 4-11), is very small. Should it accidentally explode, then, assuming that an interlock or set of interlocks, to prevent it fulfilling completely its designed purpose does not fail, the consequences depend on whether or not the containment is breached and the considerations are as in 5.6.6.

5.6.9 Transport of Warheads.

The hazard associated with the transport of warheads, be it by road, by rail or by sea, is as for non-irradiated reactor fuel elements and is dealt with in Annex G.

5.7 Reactor Accidents; Clyde Area Public Safety Scheme.

5.7.1 There is a requirement in the case of every civil power reactor for there to be an Emergency Contingency Plan and periodically for there to be exercises held to test the plan and familiarise participants with the details and implications. (Ref 19) To parallel this the Royal Navy have the Clyde Area Public Safety Scheme and, in collaboration with the Regional and District Authorities, exercises are regularly held. At the Inquiry officials of the Regional and District Councils described their participation in these local exercises.

5.7.2 The Scheme was drawn up specifically with respect to unlikely accidents in reactors aboard a nuclear propelled warship leading to a possible release of radioactivity. It is important to note, however, that the opening paragraph states that the purpose of the Scheme is "to safeguard the public not only in the unlikely event of a submarine reactor accident, but also in the event of any other accident in the Clyde area which might lead to a spread of radioactive contamination to an extent that may interfere with the normal activities of the public".

5.7.3 In the exercises possible areas of contamination are estimated, having regard to the location of the warship aboard which the accident is assumed to have occurred, and actions are put in hand to warn the public, to have measurements made of the radioactivity deposited on the ground and to take precautions to limit the spread of contamination to food and water.

5.7.4 The Scheme is a model in public relations, in which an accident, however unlikely, in which the public as well as Service personnel might conceivably become involved, is thoroughly analysed and an adequate plan of action worked out in detail. The Local Authorities are participants in the pre-Planning and would control the execution of the plan if it should ever require to be implemented.

5.7.5 Responsibility for the Scheme rests with a Local Liaison Committee chaired by the Commodore Clyde and having on it representatives of the Regional Council, six District Councils and various interested public bodies. The present Scheme drawn up by the Local Liaison Committee envisages local headquarters provided by the local authorities from which Local Action Committees will control the implementation of the emergency plans. The composition of these Local Action Committees will be decided by the District Authorities and will contain representatives of the Regional Council and the Naval Authorities. The Local Action Committee will be run by the District Chief Executive, since the protection of the public is the responsibility of the civil authorities; he will implement the agreed procedures detailed in the Safety Scheme. The Navy will provide specialised resources and organise the radioactive monitoring. Arrangements have been made to support the Naval Emergency Monitoring Service, if necessary, by calling in personnel from the UKAEA and CEGB (Ref 13, 1.18) as well as SSEB and such Regional and District resources as are required. (Ref 13, 2.19) The latter might include the Scientific Advisers trained centrally to assist the Local Authorities in War-time Emergencies, though this is not explicitly stated in the Scheme.

5.7.6 One witness denigrated the Scheme by suggesting that it existed to broadcast a prepared message to deceive the public. This seems to me an unjustified slur on a collaborative prudent provision between the Services and local authorities against a possible serious accident.

Chapter 6. War-induced Hazards.

6.1 The Attack Scenario.

The Risk Evaluation of the Peace-time hazard was noted to be a daunting task. The evaluation of the War-time hazard is even more complex but of an entirely different nature. Whereas in the peace-time case one is dealing with the somewhat unpredictable behaviour of explosive materials, the unexpected failure of mechanical supports and, perhaps, the forgetful nature of the human operator, in the war-time situation one is dealing with even greater uncertainties, namely the machinations in the foreign policies of sovereign states. There are very many possible attack scenarios. The Consultants have chosen to use that favoured by the BMA Report (Ref 16). This represents an "all-out" attack limited in size only by

(i) the total number of weapons in the enemy stock-pile and

(ii) the adversary's need to attack other high priority targets in Europe and possibly North America.

The same attack scenario was assumed by the CND, SANA and SCAT representatives at the Inquiry. All parties resisted strongly the idea that a nuclear attack of lesser intensity required consideration, preferring to agree with the opinion of the Consultants(Ref 11, para 5.5) that "use of the smallest 'battlefield' nuclear weapons would quickly spread to 'interdiction attacks' on airfields and ports, then to an all-out nuclear exchange". I think it should be noted, however, that it depends on the timescale implied by "quickly". If there is a pause even of hours at each rung in the escalation ladder, then the option of "desisting" envisaged in Reference 18 would be open to both sides and the process might stop short of an all-out nuclear exchange.

6.2 Propensity to Nuclear Attack.

There are two important differences between the Polaris and Trident weapon systems to be considered in discussing the effect the substitution of Trident for Polaris might have on the propensity to nuclear attack.

(a) Each Trident missile may have as many as 14 independently targetted warheads compared with the "Chevalined" Polaris cluster of 3 warheads per missile falling around a single target. (Ref 23,para 8,page 24) However, the retaliatory power of Polaris is likely to have it so high on a priority target list, that there would be no higher position available when the Trident replacement came into operation. The likelihood of an attack on the Clyde estuary would therefore not be affected.

(b) The Trident system specification calls for an accuracy much greater than that achievable by Polaris. (Ref 27,Q317,page 85, Q497,page 107) Several witnesses maintained that this would create a Britisn "first strike" potential and change the strategic status of the Depot in enemy

eyes. While it is true that the accuracy would permit Trident to be used as a "counter-force" weapon (i.e. to attack specific targets, perhaps even enemy missile silos) (Ref 27, Q317,page 85), nevertheless a "first strike" would have to be made on all enemy silos and submarine launchers simultaneously. Even if all the missiles on all 4 Trident submarines were furnished with the maximum number of warheads and all 4 submarines were on station at the one time, a British attack on the requisite scale could not be mounted.(Ref 23,Appendix 2,para 10) The role of Trident in British policy is to be the same as the role of Polaris, namely to be used as a "counter-value" weapon (the euphemism for the production of megadeaths in enemy cities); the British Government has decided that the Trident system, although more accurate than necessary for the British purpose, is the only one available to meet its purpose in this regard. Treated therefore as an independent British weapon system, Trident would appear on its introduction likely to introduce no increase in attack propensity.

6.3 Consequences of a Nuclear Attack.

6.3.1 With the choice of "all-out" scenario made by the Consultants, which is at the "worst case" end of the scenario spectrum, it would make no difference whether Polaris had been replaced by Trident at Coulport or not. In either event, the possibility of catching in the Clyde estuary, a submarine capable of launching a devastating nuclear strike would result in an attack with the horrendous consequences for the populated belt of central Scotland analysed by the Consultants(Ref 11, para 5.7). In fact, in the face of an enemy not wishing to subdue with a view to occupying and taking over surviving resources, but wishing to devastate massively all resources essential for the continuation of hostilities, it would make little difference whether there were any bases in the Region or not. The direction in which the wind was blowing immediately after the attack would be more important than the existence in the area of the highest priority targets. The Consultants conclusions on this point were not challenged by SANA, who claimed to have carried out independent computer aided calculations on similar assumptions.

6.3.2 If however one or other side desisted, as discussed in 6.1 and the crisis ended after a strike on retaliatory bases but before interdiction attacks on airfields, ports, etc., the situation would be very different. If there were no nuclear bases or associated facilities, such as communication stations, then there would, at the stage in the escalation reached, be no attack. If there was an attack much more limited than the all-out attack, then the overwhelming of the Civil Defence resources envisaged by the Consultants (Ref 11, page 5-20) would not take place and the consequences would turn on the quality of the peace-time Emergency Planning carried out by the Regional and District Councils.

Chapter 7. Wider Consultations.

7.1 Representations from other than Local Authorities.

7.1.1 In the 1977 Circular (Ref 1), the Local Authorities are enjoined, presumably in so far as is possible in whatever time is allowed, to "have regard to any comments received by them in response to the publicity given". An important feature of this Inquiry has been the opportunity it provided to receive, examine and, in some instances, interrogate parties on their views for and against the proposed development, subject to no unreasonable time constraint.

7.1.2 In the case of many of the representations, the party expressed opposition to the Trident acquisition in principle, on moral grounds, on financial grounds or on combinations of these. To be effective, these views have to be conveyed to and to carry persuasion in other quarters. Prior to the Inquiry there had been the very recent opportunity provided by the General Election to put views on Trident to Parliamentary candidates and to raise them at public meetings. Interestingly two parties giving evidence had been candidates and both said they had not had Trident, or deterrence for that matter, forced on them as a major issue in their campaigns.

7.1.3 Some organisations, particularly CND and SCAT, while maintaining their total opposition in principle to the acquisition of Trident, nevertheless, helped the Inquiry by giving their views on what might best be done if their total opposition continued to be overruled. It was a pity that more organisations and individuals supporting the acquisition by Britain of the Trident Weapon System did not chose to appear at the Inquiry to assist the local Community Councils in their presentation of the case for the development.

7.2 Psychological Effects.

7.2.1 The Inquiry was addressed by two representatives of the Churches, one appearing on behalf of Dumbarton Presbytery, the other on behalf of various Church sponsored organisations. They contended that "health" in the remit of the Inquiry should be taken to mean more than the physical health of people in the locality and that consideration be given to the mental health and spiritual well-being of the local communities. In that connection they drew attention to the piece of investigative journalism, as they called it, carried out between June and October 1981 (Ref 22) when, on a wide scale, opinions were sought from local residents on various matters concerning the Nuclear Bases in the area as they presently existed and as they might become.

7.2.2 There are doubtless many MoD employees who agree with the Government view on the need to possess nuclear weapons and have no qualms about their involvement in the servicing of these means of mass destruction. However several interviewees admitted that the need for the

job and the lack of alternative employment had placed them in a situation where they had to shut their minds to the possible consequences of their daily occupation. It was maintained by the witnesses that Society had a duty to see that its members were not put in the position of having to live with this painful dilemma. It was admitted that this situation was of long standing. The difference Trident would make would be one of increase in size and prolongation in time.

7.2.3 Another reaction to the dilemma was exemplified by the response "I have signed the Official Secrets Act and am not allowed to have opinions". Close to this is a feeling of general apathy and the belief that nothing can be done about it. The witnesses feared the effect this would have on the attitude of individuals to their democratic duties towards national and local authorities.

7.2.4 An attitude of interviewees towards propensity to nuclear attack that seemed quite general was the acceptance that the centre of the holocaust, if it came, would be in their locality but as the whole country would be devastated they would prefer to be at the centre rather than being on the fringe.

7.2.5 As far as peacetime hazard was concerned, possibly as a result of the excellent record of Polaris since its installation, there was an acceptance of the stated impossibility of an accidental nuclear explosion. Strangely there was no concern discovered about the possibility of accidents involving other hazardous materials on the site, considerations that have received a great deal of attention at the Inquiry. This finding is at variance with the keen interest shown in certain local quarters on the safeguarding issue.

7.2.6 The study (Ref 22) raises some interesting questions that have to be asked and answered about the psychological implications of the Bases; it has to be remembered, however, that it is a piece of admittedly investigative journalism and not a sociological study. No other party at the Inquiry raised the question of mental health abnormalities in the locality and it is presumed that there is no evidence of such.

7.3 Employment.

7.3.1 Lengthy and well prepared presentations by the Parents for Survival and Inverclyde CND on the employment prospects stressed that the local employment opportunities could be substantially less than in the local authorities' representations. There were some experiences quoted of contractors taking, as staff members, ordinary tradesmen, as well as specialists, from one large contract to another, to the detriment of local employment. In addition the "opportunity costs" of the extension to RNAD Coulport, which it was claimed had not been presented with the customary detail to the Parliamentary Committee on Defence by the Ministry (Ref 32, page xvi), were exemplified within Strathclyde Region by the loss, through competition for funds, of conventional armament contracts on the

Clyde.

7.3.2 It should be noted that there is no suggestion that an increase in direct employment would result from the extension at RNAD Coulport either in the NoPD or in the papers issued at the Helensburgh Presentation apart from the temporary jobs during the construction period and during the Polaris/Trident overlap phase.

7.4 Security

7.4.1 Several parties, particularly the Scottish Council for Civil Liberties and SCAT, maintained that there was no need for as much, or even for any, secrecy in respect of the Proposal. A comparison was drawn with the situation in the USA which had a Freedom of Information Act. There the military had to establish a need for secrecy before facts could be withheld, whereas in the U.K. the onus fell on the public to show that it was not against the national interest that the facts be generally known. However, there was no indication from witnesses how complete openness, for example about transport of war heads, could be combined with the need to prevent subversive elements interfering with the operations.

7.4.2 A resident of Cove complained of the adverse effects the security arrangements had on life in the area and spoke of the uncomfortable feeling of being constantly watched and recorded.

7.5 Navigation in the Estuary.

7.5.1 Parents for Survival expressed concern at the increased probability of an accident in the estuary arising from the larger size of the Trident compared to the Polaris submarines. It has, however, to be noted that the number of voyages in a given time also enters into this risk; this number will not necessarily be for Trident what it has been for Polaris.

7.5.2 There was no indication from any of the organisations involved in sailing in the area of their reaction to the restrictions now applying, despite the large number of restricted areas in the Estuary shown on the Admiralty Charts. One private party did however claim that the local regattas were affected and she personally resented the loss of freedom of sailing on the loch that the regulations now entail.

7.6 Noise Pollution.

Rosneath Amenity Society complained of low flying helicopters passing over local houses. It was allowed that on occasions there were Service requirements making this unavoidable but there was local feeling that, on other occasions, "joy-riding" was involved. Apart from this, and, of course, the road traffic noise on which practically all the local witnesses had strong views, there was no evidence of noise nuisance associated with

the present operations and no anticipation that this would alter if the extension took place. The question of noise during the construction period was not raised.

7.7 Present Land Use.

The Local Plan for the area has not yet appeared. Several private parties mantained that considerable use was at present made for recreational purposes of ground that would be lost if the extension proceeded. There is evidence of the use of the Locnan for angling and "nature trails" by school parties were mentioned in this area and in the areas planted by the Forestry Commission.

Chapter 8. Future Consultations.

8.1 Issues for Future Consultations.

8.1.1 This chapter looks forward to the submission of a second NoPD and the reopening of consultations with the Local Authorities. It collects the issues that the Local Authorities might reasonably raise with the Ministry of Defence in the light of the representations made to the Inquiry. The substantial list of such issues is headed by two of outstanding importance, namely the necessary preliminary infrastructure capital works and the peacetime risk evaluation. In connection with the latter, a matter of national policy arises, namely, how to provide public assurance on matters covered by the Official Secrets Acts.

8.2 Preliminary Infrastructure Capital Works.

8.2.1 Spine Road.

There was agreement by all parties that the road proposed in the NoPD(Ref 6,para 9), from Whistlefield directly into the north end of the site, should proceed as a matter of the highest priority. It would provide for the first time a second route into the Depot and relieve the present load on the B833 from the Peaton Road junction to Coulport. Gradients would require very careful treatment.(Ref 10,para 3.2.14)

8.2.2 Garelochhead Bypass.

To access the Spine Road, traffic from the south will still mainly use the A814 and pass through Garelochhead. The construction of the Spine Road would therefore, not eliminate the requirement, recognised by the Regional Roads Division, to bypass Garelochhead village. Consideration has been given to the line of the bypass. There appears to be general agreement that it should be behind the village as viewed from the Loch, through ground believed to be owned by the MoD.

8.2.3 Improvements to B833.

Improvements to sections of the B833 are already in hand. Careful consideration should be given to any further improvements that can be carried out without loss of amenity, in view of additional traffic that might take this route through Clynder, Rosneath and Cove even if there was an alternative route via Whistlefield.

8.2.4 Bypassing of Helensburgh.

Depending on the source of minerals during the construction period, there might be a significant increase in traffic through Helensburgh. The question of bypassing might merit consideration. It was noted, however, that one resident affirmed at the Inquiry that during the Polaris construction period there was, in his opinion, no associated traffic

problem inflicted on Helensburgh.

8.2.5 Rail and Sea Transport.

The possibility of Rail and Sea transport of construction equipment and materials raised in the NoPD should be energetically pursued. Not only would a spur into the site from the West Highland Railway take a strain off the roads during the construction period, but it could perhaps have advantages thereafter. As far as sea transport is concerned, the Local Authorities referred to previous cases where other applicants' assurances that sea transport of minerals would be adopted were not, in the event, honoured. The local Amenity Society raised as one of their main representations that a promise of just such a kind made prior to the Polaris extension did not prevent large scale earth moving equipment coming in by road.

8.2.6 Sewerage.

The provision of new works to cope with a situation at Garelochhead which at present is inhibiting developments at a trivial level would seem to rank second in priority only to the Spine Road requirement.

8.2.7 Water Supply.

The need to run a branch from Whistlefield of a water main to replace Lochan Ghlas Laoigh if that is to be taken over by MoD seems a straightforward requirement.

8.2.8 Visual Impact.

Paragraph 6 of the 1981 NoPd indicates that the Ministry is concerned to minimise the environmental impact of the development. This will be made easier if there is no requirement to land the missiles and handle them ashore, which will presumably remove the need for the highest buildings appearing in the 1981 NoPD. The Countryside Commission and others were particularly concerned that any spoil from the excavations not required for functional earth banking be removed from the site.

8.2.9 Apportioning of Costs.

The Regional Report(Ref 10,page 88) makes strongly the point that if the road works were to go forward and if the cost had to be borne in the usual way, it could only happen at the expense of other projects to which the Region is committed by its Strategic Plan. There is a precedent, namely the Peaton Road improvement, for the capital costs being shared with the MoD. As regards the expense of the Water Main, since it is being occasioned solely by the takeover of Lochan Ghlas Laoigh by the MoD, there would seem to be a case for the Ministry meeting the total cost. Sewerage would seem a less straightforward case in view of the benefit accruing locally. It was noted that the assessed rateable value in respect of

Faslane and Coulport is just over 1.75M£ (Supporting Information requested from Strathclyde Regional Council Department of Physical Planning,30/Jun/1983), based on which the MoD makes an ex gratia payment towards the Local Rates. This fact, which did not seem to be widely known by the local residents, would no doubt be relevant in negotiations about apportioning the costs.

8.3 Peace-time Hazards.

8.3.1 The Local Authorities are, in my view, reflecting genuine public anxiety concerning the risk of serious accident on the site. It is recognised that a technical Risk Evaluation of the depth that would be required, for example, in the case of a petro-chemical complex would in the case of the operations at Coulport, be in itself a very large project. It is to be hoped that it has been done. However it is unlikely that all the ramifications can be brought into the public domain. Be that as it may, in the post-Flixborough, post-Seveso and post-Three Mile Island Age, something more than an unsubstantiated statement that high standards are being met will be needed to reassure the public. Whether something, deep enough but not unnecessarily complicated, and still convincing enough to reassure the public can be produced in the face of the secrecy that the national interest may be deemed to demand, I see to be the most important and perhaps the most difficult issue to be raised in consultations.

8.3.2 Propellant and Trigger.

An accidental explosion of propellant or trigger may turn out to have the highest, while hopefully, still an acceptably small associated risk. The safety problems involved must be very familiar to the MoD as they are similar to those arising in any store of conventional high explosives. The procedures publicly described in Reference 9, which may have been up-dated in the last 16 years though no later version was brought to the attention of the Inquiry, appear to provide a satisfactory basis for arriving at separation distances generous enough to prevent a "domino" triggering of materials in areas surrounding the primary explosion, and in defining the position of the yellow line as defined in Reference 9, subject to the following considerations:-

1. An appropriate K-value has to be determined by experiment both for propellant and for trigger material for insertion into the Jarrett formula(Ref 11,page 4-12) This value will depend both on the nature of the explosive material and on its containment.

2. If the propellant material has significant toxicity, then by calculation based, if possible, on scaled experiment, estimates should be made of the possible distances out to which toxic contamination may occur; this would then be taken into account in defining the yellow and purple lines.

3. While the mechanical strength of the containment of all fissile and radioactive material would obviously be a consideration in arriving at safe "building distances" and therefore there would be a good assurance of no release of radioactivity in the neighbourhood of a "conventional" explosion, nevertheless confirmation that there had been no release of radioactivity would be sought by implementing the monitoring arrangements of the Clyde Area Public Safety Scheme. If it were to be accepted that, together with the Naval, UKAEA and Electricity Board personnel, the Scientific Advisers, trained for service with the Local Authorities in a war-time capacity, take part in the monitoring, the assurance to the public would, perhaps, be significantly increased.

The Consultants (Ref 11, para 4.4) spoke of the risks associated with moving the propellant, including possibly liquid propellant, within the site. The plans now being considered, and it must await the new NoPD to see if they are final, to have only solid propellant and to keep the missiles on board the submarine, alter but do not eliminate the risk. On 27th November 1982 in a missile test silo at a development plant in America, a second stage MX engine weighing 27 tons and presumably with solid propellant, erupted during remedial operations following an explosion in the silo 10 days before. The causes of both incidents are said to be unknown. Fumes (the report does not say whether toxic or not) from the fire prevented access for several days.

8.3.3 Reactor.

The Clyde Area Public Safety Scheme, which would come into play in the event of a reactor accident on site as well as in the Estuary, represents the model response, the like of which should be sought for all the other "accident scenarios" that could be written for conceivable "event sequences" in the Depot.

8.3.4 It should be noted that, in one of the very few references to safety precautions in the long Defence Committee investigation of the Trident development (Ref 27, Question 1116), it is stated in connection with Submarine Reactors by the representative of the manufacturers, that "we have not got a safety problem with the existing plants but the safety criteria have changed over the 20 years and therefore we need to demonstrate safety to a different level". It is this attitude to safety that should extend into the other areas of hazard. If it already does, then the Ministry has a need to make it known publicly.

8.3.5 War-head.

The prevention of the horrifying possibility of an accident involving the warhead on the scale outlined by the Consultants (Ref 11, 4.6.1) has no doubt been the subject of exhaustive study by all possessors of Nuclear weapons. That this has been well done, (whether adequately done is another

matter; only time will tell), may be judged by the fact that despite the long list of "nuclear accidents" (Ref 11, Appendix III), now common knowledge, none in the west has culminated in a nuclear explosion. The stages that must be completed before a war-head is armed have been listed in Reference 11(4.5.2.1). If the Ministry confirms that the missiles will never be ashore at Coulport, then all of this activity must be assumed to take place at the Lochside berth. The guarantee, in general terms, that a chain reaction cannot be accidentally initiated will lie in separation of components, deliberately introduced mechanical blockages and control of chemical detonation. The worth of any such guarantee and the assurance that the planned precautions are observed in practice, will be difficult for the parties to the consultations to establish in the face of the Official Secrets Acts.

8.4 Safety and Security.

8.4.1 It is now customary practice in the case of a large project to have the plans scrutinised by a party independent of the applicant with a view to an assessment of hazard. For example, an Electricity Board proposing to build a Reactor has to submit its plans to the Nuclear Installations Inspectorate(NII) of the Health and Safety Executive for this purpose. When the project is in operation, the Health and Safety Executive, operating in the case of a reactor through the NII, is responsible for confirming that the agreed safety procedures are being observed.

8.4.2 For security reasons it is not possible for these customary requirements to be satisfied in the case of the Coulport extension. However, it transpired at the Inquiry that, at least in the following areas, an equivalent procedure is being followed.

1. Dumbarton District mentioned a Nuclear Weapons Safety Committee(Ref 14,page 15) which is also referred to in the MoD Paper prepared for the Helensburgh Presentation.

2. In Reference 9(page 18), there is mention of the Explosives Storage and Transport Committee, "which prescribes safety distances applicable for both civil and military interests", which, if still in existence, is no doubt in close touch with the Ministry.

3. The same paper also refers to the Armed Services Explosives Safety Board.

4. Further, since the Inquiry, I have noted a reference in the Atomic Energy Annual Report(Ref 28) to a safety service provided for the MoD by the Safety and Reliability Directorate of the UKAEA with regard to "design, operation and maintenance of nuclear-powered submarines".

5. In the recent Annual Report of the Radioactive Waste Management Advisory Committee(Ref 25) it is claimed that "the Committee will review the management of defence wastes".

It is noteworthy that in one area there seems to be, even on the civil side, a lack of independent monitoring highlighted by the concern of the Radioactive Waste Management Advisory Committee "that there is no standing independent advisory committee like itself to act as a watchdog on the transport of radioactive materials".(Ref 25)

8.4.3 The Regional Council might like to consider, independently of the last or the next NoPD, representing to the Ministry the desirability of codifying all these "watchdog" activities as they at present exist, perhaps in a Government Open Discussion Document. Alternatively it might be an appropriate matter for the House of Commons Defence Committee. In the event of the production of this information in whatever form, it would be of the highest importance that there be clarification of the extent to which the advisory bodies are, in a position to provide, as the Waste Management Advisory Committee claims it can, an "informed, independent and public critique".

8.4.4 In this connection I draw attention to the importance attached in the Royal Commission Report(Ref 12,para 291) to the need to separate the regulation of a project in regard to safety from the promotion of the project. In each of the hazard areas cited above, viz. propellant, trigger, reactor and especially weapon, it is important that it be established that these functions are adequately separated. The Royal Commission stressed that they should lie with separate organisations "since the conflicts of interest are then likely to be more fully and openly resolved".

8.4.5 The assurance given by the MoD that the Nuclear Weapons Safety Committee "includes distinguished independent experts" (Helensburgh Presentation Fact Sheet, 20/May/1981) may or may not equate to a guarantee that the committee is responsible to a body which in turn has no responsibility for the planning or operation of the Depot.

8.4.6 I draw the Regional Council's attention to a suggestion apparently contained in the Report of the Independent Review of the Radio Spectrum(30-960 MHz).(Ref 26) In the face of the Official Secrets Acts preventing the Reporter of that review saying why he believed the MoD frequency band requirements were justified, he suggested that "a committee of privy councillors should review the defence situation every 5-10 years", the committee to have access to the MoD's information. It might be considered, if this suggestion were to be adopted for Frequency Band Allocation, extending the remit to include Safety on Nuclear Operational Bases.

References.

1. (a) Scottish Development Department Circular 49/1977.

   (b) Scottish Development Department Circular 18/1983.

2. A Manual for the Assessment of Major Development Proposals. (HMSO 1981)

3. The Town and Country Planning (Notification of Applications) (Scotland) Direction 1981, Appendix to Schedule, pp. 1,2.

4. European Council Directive on the major accident hazards of certain industrial activities: 1982. (82/501/EEC)

5. Notification of Installations Handling Hazardous Substances Regulations 1982. (No 1357)

6. Notice of Proposed Development (D/Lands/501/14F). (2nd June 1981)

7. Risk Evaluation; A Study Group Report (The Royal Society 1983).

8. Robert C. Aldridge, The Nation, 4th February 1978.

9. "Derivation of the British Explosives Safety Distances" by D.E.Jarrett, Annals of the New York Academy of Sciences 1966.

10. EIA of the Proposed Extension of the RNAD at Coulport; Part 1- General Report by Strathclyde Regional Council, Department of Physical Planning.

11. EIA of the Proposed Extension of the RNAD at Coulport; Part 2- Specific Report on Hazards by Cremer and Warner.

12. Royal Commission on Environmental Pollution; 6th Report (September 1976).

13. Clyde Area Public Safety Scheme. (Revised 1982)

14. Submission of Dumbarton District Council to this Inquiry.

15. "The Arms Race and Arms Control" (SIPRI, Taylor and Francis, 1982).

16. BMA, "The Medical Effects of Nuclear War", the Report of the BMA Board of Science and Education, John Wiley 1983.

17. "Nuclear Power Hazard Control Policy", by J.C.Chicken (Pergamon Press 1982)

18. MoD Open Government Discussion Document.80/23

19. Emergency Plans for Civil Nuclear Installations.(Health and Safety Executive)1982.

20. Strathclyde Structure Plan; Written Statement 1981

21. Emergency Plans for Civil Nuclear Installations (HMSO 1982)

22. "Faslane: Facts and Feelings" by Ian O. Macdonald. (SRT Project, Church of Scotland, Nov. 1981)

23. House of Commons Defence Committee, First Special Report (HC 266-I, 17th March 1982)

24. "Atom", March 1983, June 1983 (page 124)

25. "New Scientist", 30th June 1983, page 924.

26. "New Scientist", 11th August 1983, page 391.

27. House of Commons; 4th Report from the Defence Committee, Session 1980-81(HC674(1979-80).

28. UK Atomic Energy Authority Annual Report 1981-82, paragraph 106.

29. "Facts on File", 1982, page 903.

30. Regulations for the Safe Transport of Radioactive Materials; 1973 Revised Edition.(IAEA,Vienna,1973)

31. "Transport Packaging for Radioactive Materials", Proceedings of a Seminar 23-27 August 1976(IAEA,Vienna,1976)

32. "Nuclear War: The Aftermath", Pergamon Press, 1983 (page 5)

33. Flight International, Worldwide Missile Directory, 5th February, 1983.

34. House of Commons; 4th Report from the Defence Committee, Session 1982-83 (12th May 1983)

ANNEX A.

Intended Procedure.

INQUIRY INTO PROPOSED DEVELOPMENT BY M.O.D. AT COULPORT

NOTE OF INTENDED PROCEDURE

The Ministry of Defence submitted to Dumbarton District Council on 2nd June 1981 a "Notice of Proposed Development" for the establishment of a Trident Weapons base at Coulport, Dunbartonshire. Such a proposal is not subject to the Town and Country Planning Acts and hence does not require approval by the Local Planning Authority nor is it subject to the usual objection and Inquiry procedure. The Secretary of State has indicated that he is not willing to hold a Public Inquiry to consider this proposal and Strathclyde Regional Council have therefore set up this independent inquiry into it.

The Reporter, Prof. J.M. Reid, has been appointed by Strathclyde Regional Council "to receive and consider with regard to the Government's proposed siting of Trident Missiles at Coulport, (Dunbartonshire), all the evidence, whether written or verbal, before him on the impact of Trident on employment, services, health, safety, pollution, propensity to nuclear attack and any other matters which he considers relevant and thereafter to assess that evidence and report his findings on it to the Regional Council".

This Inquiry is accordingly concerned only with the impact of the siting of this system at Coulport and not whether or not Trident Missiles should be sited at this or any other place. Any evidence not bearing on the impact of the siting at Coulport will be disregarded as irrelevant.

In an effort to reduce the time and expense of the Inquiry while at the same time allowing a full investigation of the proposal and the views of interested parties it has been decided to require written submissions to be lodged with the Reporter. He thereafter at his discretion has the power to hear oral submissions and evidence to the Inquiry from those who have made written submissions.

The /

The Inquiry hearing will commence in Strathclyde Region's Council Chambers, Holland Street, Glasgow, at 9.30 a.m. on Monday 20th June 1983 and may be adjourned at such time or times and continued to such time and place as the Reporter may intimate to the parties invited to address him.

The Reporter's conclusions will be submitted to the Regional Council for their consideration. Further, the Inquiry is set up by the Regional Council and is not arranged under the Town and Country Planning Acts, and any conclusions of the Reporter or the Council will not be binding on the Ministry of Defence.

This Inquiry not being held under the Town and Country Planning Acts, statutory Inquiry rules do not apply. The procedure at the Inquiry hearing is within the discretion of the Reporter who shall have power to regulate the hearing but subject to that it is intended to adopt the following:-

(1) The Inquiry hearing will be open to the public but subject to the Reporter's discretion only those invited to do so will be permitted to address the Reporter. The Reporter will have the duty of preserving order at the Inquiry hearing and of securing that those persons addressing him obtain a fair hearing. He will be entitled to require any person (including members of the public, parties invited to address him and their witnesses) he considers responsible for disorder to leave the hearing and in the event of disorder arising may adjourn the hearing or in his option clear and close the public gallery for such period as he sees fit.

(2) Parties may appear in person or be represented by Counsel or Solicitor or, with the leave of the Reporter by any other person.

(3) /

(3) Parties will not be afforded the opportunity at the commencement or end of the hearing to make opening or closing statements; all submissions should accordingly be made and evidence led together.

(4) Where there are two or more persons having interests which do not conflict, the Reporter may allow one or more persons to appear for the benefit of some or all persons so interested.

(5) The Reporter intends first to hear submissions (if any) from parties in the following order (1) Ministry of Defence, (2) Strathclyde Regional Council, (3) Dumbarton District Council and (4) other parties in accordance with the circulated provisional time-table.

(6) Where a party intends to refer to or to put in evidence at the hearing documents (including maps and Plans) and/or to have any other person make a statement on behalf of that party, that party shall require to have lodged two copies of all such documents and of precognitions covering at least in summary the statement of all such other persons with three copies of a list of such documents and of the names and designations (including professional qualifications) of such other persons with the Clerk to the Inquiry by 4 p.m. on Monday 6th June 1983. As soon as may be after that date the Clerk will send one copy of every such list to each of the parties who have been invited to address the Reporter at the hearing. All documents, precognitions and lists thereof will be available by prior arrangement with the Clerk for inspection within the offices of the Clerk at 129 St. Vincent Street, Glasgow, by other parties who have been invited to address the Reporter at the hearing, during normal business hours from 10 a.m. on Friday 10th June 1983 until 4 p.m. on Friday 17th June 1983. Evidence other than that lodged in terms of the foregoing requirements will be admitted /

admitted only at the discretion of the Reporter and subject to such directions or conditions (as to availability for inspection by other parties or otherwise) as he may see fit to impose.

(7) The submissions and evidence, whether oral or written, received and admitted will be in the discretion of the Reporter but production of evidence which is not relevant to the subject of the Inquiry, which would be contrary to the public interest, which is in breach of the law (and in particular of the Official Secrets Acts or other Acts relating to the armed forces) or which has been wrongfully obtained will not be permitted.

(8) Evidence from witnesses will not normally be required to be given on oath or after affirmation. Unless exceptionally on special motion to the Reporter and on cause shown, on conclusion of a witness's evidence the opportunity to cross-examine will not be afforded. The Reporter may direct questions to parties or witnesses.

(9) If any party invited to address the Reporter at the hearing fails to do so, the Reporter may proceed with the hearing at his discretion but shall be entitled to take into account any written submissions made by that party prior to the hearing.

(10) In addition to any notes of the proceedings which the Reporter may see fit to make an audio tape recording will be made of statements made and evidence led before the Reporter within the Council Chambers. It is not intended that this be made available to parties during or after the hearing.

(11) The Reporter intends to carry out an inspection of the site. The Reporter in his discretion may permit such of the parties as he sees fit to accompany him. Any persons wishing to accompany him should so intimate to the Clerk before the commencement of the hearing.

(12) /

(12) The Reporter may from time to time adjourn the meeting and, if the date, time and place of the adjourned hearing are announced before the adjournment, no further notice shall be required.

(13) If, after the close of the hearing, the Reporter sees fit so to do, he may solicit from any party who has made written or oral submissions to him, any witness at the hearing or any other body or person such further information or response as he feels may assist him.

(14) After the close of the Inquiry the Reporter shall, as mentioned above, report his findings in confidence to Strathclyde Regional Council.

PROPOSED DEVELOPMENT BY MINISTRY OF DEFENCE OF A SITE AT COULPORT, DUNBARTON FOR THE TRIDENT WEAPON SYSTEM

I have been appointed by Strathclyde Regional Council, Strathclyde House, 20 India Street, Glasgow, to preside at a Public Inquiry arranged by the Council into the proposals by the Ministry of Defence for development of a site at Coulport, Dunbarton for the Trident Weapon System. The Inquiry will commence on Monday, 20th June, 1983 in the Council Chambers, Holland Street, Glasgow, and further advertisement will be given of the Inquiry and the arrangements for it.

My terms of reference are to receive and consider, with regard to the Government's proposed siting of Trident Missiles at Coulport, Dunbarton, all the evidence, whether written or verbal, before me on the impact of Trident on employment, services, health, safety, pollution, propensity to nuclear attack and any other matter which I consider relevant and thereafter to assess that evidence and report my findings on it to the Regional Council. Anyone who wishes to do so, may make representations on this matter and must do so in writing by Monday, 16th May, 1983. Submissions should be sent to the Clerk to the Inquiry, Mr Iain S. Talman, Solicitor, 129 St Vincent Street, Glasgow, to reach him by Monday, 16th May, 1983.

Thereafter I may, at my discretion, invite parties to speak to their written submissions at the Public Inquiry before reporting my findings to the Regional Council. Only those persons who have made submissions in writing as prescribed may be invited to speak to them at the Inquiry. My report to the Council will, however, take account of all the evidence before me whether written or verbal.

J M Reid

ANNEX C.

Representations Received.

1.	Loch Construction,Kirkintilloch.	14.3.83
2.	,East Lothian.	14.3.83
3.	Macnaught,Newton Mearns.	16.3.83
4.	Cummings,Houston.	17.3.83
5.	Taggart,Cove.	23.3.83
6.	Watt,Arrochar.	21.4.83
7.	Clark,Hyndland.	13.4.83
8.	Lumsden,Arrochar.	14.4.83
9.	SNP,Cove and Kilcreggan.	19.4.83
0.	Sauchie Church,Alloa.	20.4.83
1.	Dingwall and District CND.	19.4.83
2.	Sutherland,Cove.	21.4.83
3.	Murdoch,Alexandria.	29.4.83
4.	Young,Helensburgh.	29.4.83
5.	Dingwall and District SNP	21.4.83
6.	Reid,Cove	28.4.83
7.	Ross,Cromarty and Skye SNP	27.4.83
8.	Rintoul,Helensburgh	4.5.83
9.	Ayr CND	4.5.83
0.	Murphy,Paisley	1.5.83
	Supplement	8.5.83

21.	Helensburgh and District CND	27.4.83
22.	Gordon,Dumbarton.	9.5.83
23.	Whyte,Glasgow.	9.5.83
24.	Plunkett,Alexandria.	9.5.83
25.	Millington,Oxford.	9.5.83
26.	Hitching,Loch Eck.	10.5.83
27.	Murton,Loch Eck.	10.5.83
28.	McLaren,Glasgow.	10.5.83
29.	Cupar CND.	10.5.83
30.	Epton,Loch Eck.	10.5.83
31.	Govan Community Council.	11.5.83
32.	CEND,Edinburgh.	12.5.83
33.	Gardner,Glasgow.	11.5.83
34.	Coote,Bearsden.	11.5.83
35.	Dumbarton SNP.	11.5.83
36.	Inverness CND.	11.5.83
37.	Hamilton CND.	12.5.83
38.	"Arran Against the Bomb",CND.	12.5.83
39.	Scottish Group,SANA.	13.5.83
40.	S.C.Civil Liberties.	12.5.83
41.	MacDonald,Glasgow.	13.5.83
42.	K.Wadsworth,Glasgow.	13.5.83
43.	Kene,Glasgow.	13.5.83
44.	M.Wadsworth,Glasgow.	13.5.83
45.	Marshall,Glasgow.	13.5.83

46.	Inverclyde "Parents for Survival".	13.5.83
47.	Inverclyde CND.	12.5.83
48.	Scottisn CND.	13.5.83
49.	Bayne,SNP Candidate,Dumbarton.	13.5.83
50.	Lenzie Peace Group	13.5.83
51.	Garelochhead Community Council.	13.5.83
52.	Anti-Trident Campaign.	16.5.83
53.	Mrs Caldwell,Ayr	16.5.83
54.	South Yorkshire County Council	16.5.83
55.	Govan Peace Committee-CND	16.5.83
56.	J and A Grant,by Ayr.	16.5.83
57.	Manley,Helensburgh.	16.5.83
58.	McKenzie,Milton of Campsie.	16.5.83
59.	McGavigan,Lenzie.	16.5.83
60.	Smith,Hotspur St.,Glasgow	16.5.83
61.	Ovis,Gipson St.,Glasgow.	16.5.83
62.	Houston,Central Av.,Glasgow.	16.5.83
63.	Rae,Dumbarton.	16.5.83
64.	Helensburgh Community Council.	16.5.83
65.	Paisley C.N.D.	16.5.83
66.	Glen,District Councillor,Dum'ton.	16.5.83
67.	Prentice,Helensburgh.	16.5.83
68.	Kilgr'n and Rosneath Amenity Soc.	16.5.83
69.	Dunoon C.N.D.	16.5.83
70.	D.T.Reid,West Kirk,H'burgh.	16.5.83

71.	Macdonald,Rhu.	16.5.83
72.	Bo'ness and District CND.	16.5.83
73.	?,1 Glendarvel Av.,Bearsden	16.5.83
74.	Lenagn,Helensburgh.	16.5.83
75.	Irvine Youth CND.	16.5.83
76.	Clark,Ayr.	16.5.83
77.	Donaldson,Fairlie.	16.5.83
78.	Donaldson,Hillhead St.,Glasgow.	16.5.83
79.	Donaldson,Hillhead St.,Glasgow.	16.5.83
80.	Vale of Leven SNP.	16.5.83
81.	Dumbarton District Council.	16.5.83
82.	Strathclyde Reg.Counc.(Part1 and 2)	16.5.83
83.	Liberal/SDP Alliance Group,SRC.	16.5.83
84.	C and C Comm.,Dumbarton Presbytery.	16.5.83
85.	Riley,Barrhead.	16.5.83
86.	Clydebank CND.	16.5.83
87.	Scottish National Party.	16.5.83
88.	McKay,Neilston.	16.5.83
89.	Glasgow CND.	16.5.83
90.	Scottisn Churches' Peace Team.	16.5.83
91.	Cumnock and District CND.	16.5.83
92.	Glasgow South CND.	16.5.83
93.	Montgomery,Bellshill.	16.5.83
94.	SCRAM.,Edinburgh.	16.5.83
95.	"Parents for Survival",Glasgow.	16.5.83

96. C.of S.Society and Technology Committee. 16.5.83
97. West Calder CND. 16.5.83
98. McGavigan,Bridge of Weir. 16.5.83
99. McGavigan,Bridge of Weir. 16.5.83
100. Mack,Garelochhead. 16.5.83
101. Chadwin,Rosneath. 16.5.83
102. Gray,Garelochhead. 16.5.83
103. Gray,Garelochhead. 16.5.83
104. Chadwin,Rosneath. 16.5.83

Late Submissions:-

1. Gallacher,Neilston.
2. Westlake,Ardentinny.
3. Guthrie,Alexandria.
4. Dumfries CND.
5. Brown,Rosneath.
6. Dumbarton District CND.
7. Ratley,Ayr.
8. Lumsden,Arrochar.

Annex D.

Timetable of Verbal Presentations.

	Party Represented	Person Speaking.
Monday 20th June 1983.		
a.m.	Strathclyde Regional Council	Mr Roe, Physical Planning Dept.
		Mr Lawson, Roads Dept.
	Dumbarton District Council	Cllr.Leitch, Planning Convener
		Mr I.Fernie, Ass.Dir.of Planning
p.m.	Helensburgh Community Council	Mr W.Bryden,Chairman
	Garelochhead Community Council	Mrs Weir,Chairwoman
	Regional Council,Alliance Group	Cllr.Mason
	Cllr. N. Glen	
	Kilcreggan and Rosneath Amenity Society	Mr Craig,Chairman
	Mr I.Bayne	
	Vale of Leven SNP	Mr I.Bayne
	Scottish Council for Civil Liberties	Mr D.Goodwin
	Scottish CND	Mr K.Bovey,Chairman.
		Dr J.Walker(witness)
	Scottish National Party	Mr Taggart
	Cove and Kilcreggan SNP	Miss C.Reid
	Mrs Sutherland,Cove	

Tuesday 21st June 1983.

a.m.	Strathclyde Regional Council	Mr G.Blackburn
		Mr P.Waite
		(Cremer and Warner, Consultants)
	Parents for Survival	Mr M.Caldwell
	Dumbarton District Council	Cllr.Leitch
		Mr Fernie
p.m.	Scottish CND	Mrs Morton
		Dr S.Galbraith (Witness)
	Inverclyde CND	Mr J.Ferguson, Chairman
	Dumbarton District Council	Mr Storie
		Dir of Planning

Wednesday 22nd June 1983. Site Visit.

Thursday 23rd June 1983,.

a.m.	Mr J.L.Gray	
	Church and Community Committee	Rev Ralph Smith
	Dumbarton Presbytery.	
	Scottish Churches Peace Team	Mr Danus Skene, Secretary.
	(Scottish Churches Action for World Development)	
	Society Religion and Technology Project	
	Inverclyde CND	Mr J.Ferguson,Chairman
	Helensburgh and District CND	Miss J.Vassie
	Parents for Survival	Mr M.Caldwell
p.m.	Helensburgh and District CND	Dr J.Taggart
	Dr J.Taggart	
	Dumbarton District CND	Dr J.Taggart
	Paisley CND	Mrs P.Truss
	Dumbarton District Council	Cllr.Leitch
		Mr I.Fernie
	Strathclyde Regional Council	Mr Roe
		Mr J.Irvine
		Mr J.McVicar
		Emergency Planning Officer
	Mrs M.Gray	

Friday 24th July 1983.

a.m.	Strathclyde Regional Council.	Mr G.Blackburn
		Mr P.Waite
		(Cremer and Warner,Consultants)
	Scottisn Group SANA	Dr A.Longman
	Scottish CND	Mrs Morton
		Dr S.Galbraitn
		(Witness)
	Parents for Survival	Mr M.Caldwell
	Inverclyde CND	Mr J.Ferguson,Chairman
p.m.	Dumbarton District Council	Cllr.Leitch
		Mr Webster
		Depute Dir. of Planning
	Church and Community Committee of Dumbarton Presbytery	Rev R.Smith
	Scottish Churches Peace Team/ Society Religion and Technology Project	Mr D.Skene
	Mrs Chacwin	
	Mr R.Rae	Mr I.Campbell MP.
	Scottish Council for Civil Liberties	Miss Garry-Dawn
	Anti-Trident Campaign	Mr I.Leitch,Chairman
	Garelochhead Community Council	Mrs Weir,Chairwoman
	Dumbarton District Council	Councillor Leitch

ANNEX E

Generalised Impact Matrix

Characteristics of the Development / Characteristics of the Existing Situation		Construction Phase							Operational Phase							
		Mineral Extraction	Employment	Increased Traffic	Distruption of Services	Visual Detraction	Land Loss	Noise	Nuclear Hazard	Non-Nuclear Hazard	Employment	Infrastructure Demand	Land Loss	Visual Detraction	Restrictions on Access	Pollution
Human Activity	Employment Structure	X	X		X						X	X				
	Population		X		X				X	X	X					X
Infrastructure	Roads	X		X	X	X						X			X	
	Education											X				
	Water				X							X				
	Sewerage				X							X				
	Electricity				X											
	Telecommunications				X											
	Emergency Services				X							X				
Natural Environment	Land Use	X			X		X	X					X		X	
	Landscape Quality	X		X		X		X						X		X
	Ecology	X		X		X	X	X					X	X		X
	Recreation and Tourism	X		X		X		X						X	X	X

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ANNEX F.

Road Capacities and Utilisation.

The Regional Roads Department in the submission to the Inquiry gave detailed measured figures of

(i) 1981 road usage, measured April 1981;

(ii) projected usage through to 1995, in absence of extension to RNAD;

(iii) projected usage to 1995, assuming the extension proceeds.

Projection (ii) was made on the conventional assumptions on increased traffic due to increase in car ownership and car usage. To cover the uncertainty in the growth figures arising from their dependence on the levels of employment and changes in social habits over the next decade and beyond, low and high growth estimates were assumed and lower and upper bounds on traffic flows were produced.

Projection (iii) was made taking into account the additional traffic flows arising during the Construction Period of the Trident extension (1984-1990) and of the flows in the period following the phasing out of Polaris. There would no doubt be a transitional period when the fall in construction effort would coincide with a build up in numbers of permanent Trident workers followed by a diminution of Polaris staff giving a peak in 1990. A scale of expansion of the Depot corresponding to 57% of that in the NoPD of 1981 was taken, viz. 200 instead of 350 lorry arrivals per day and a labour force of 970 in place of 1700 over the five year construction period.

In the Table below, usage is the "peak hour flow" expressed as a percentage of "the maximum working flow". This latter number is obtained by taking the accepted figure for a newly constructed road of 7.3 metres width, with good overtaking visibility and no obstructions, and modifying it, using the figures given in Table 1(Ref 10 Appendix D), to allow for narrower roads, for poor visibility and an element of obstruction in the case of sections of particular roads. The Roads Department drew attention to the unavoidable subjective element in the calculation which they claim to have carried through in conformity with the recommendations of Scottish Development Department Technical Memorandum SH5/75.

Table 1.

			(i)	(ii)			(iii)			
Route	Section of Road	Typical Road Width	Usage 1981 (Measured)	Traffic Growth Alone			Construction Traffic (ven/hour)	Usage if Construct Proceeds		
				1984	1990	1995		1984	1990	1995
B833	* CD	6m	87.5%	92%	103%	110%	190	131%	142%	110%
	DE	5.5m	41.3%	43%	49%	52%	60	55%	61%	52.%
	EF	5.2m	38.2%	40%	45%	48%	67	61%	67%	48%
Peaton Road		6m	35.4%	37%	42%	45%	130	56%	60%	45%

*CD= Garelochhead to Peaton Road junction;

DE= Peaton Road junction to Kilcreggan;

EF= Kilcreggan to Coulport.

ANNEX G.

Transportation of Fissile Material.

1.1 Nature of Materials.

The fissile material incorporated in reactor fuel rods and in nuclear war-heads is assumed to consist of isotopes of uranium or plutonium and will have the chemical behaviour of these elements. Physically the material will be expected be in the form of a solid, consisting of either the pure metal or of the oxide scintered into a ceramic.

1.1.2 Uranium is a silvery white metal a little softer than steel and nearly 19 times denser than water. It is found in natural ores and is by no means a rare element. On exposure to air at room temperature it tarnishes by forming a layer or oxide. In the form of solid metal the material may be handled with caution. However, when finely divided the metal is attacked by water and also, being pyrophoric, represents a fire hazard. Like other heavy elements, e.g. lead and mercury, uranium is poisonous. All the isotopes are radioactive with half-lives long on a geological scale; those isotopes involved in reactors and weapons decay predominantly by emitting alpha-particles and gamma-rays.

1.1.3 Plutonium is a silvery white reactive metal almost 20 times as dense as water; on contact with air, it oxidises and takes on a yellowish tarnish. Because its half-life is short on a geological time-scale, it is found only in trace amounts in uranium bearing ores. However it can be produced in quantity in reactors by the transformation of uranium to the element neptunium which radioactively decays relatively quickly to form plutonium. It is exceedingly poisonous and, in any form, it cannot be handled without special equipment and precautions. As with uranium, the material decays predominantly by alpha and gamma emission.

1.2 The Fission Process.

1.2.1 The fissile nucleus, uranium or plutonium, on being hit by a neutron divides into two fragments which fly apart with great velocity. It is the energy of motion of the fission fragments which is the main energy source tapped in a slow controlled manner in a reactor and in a rapid explosive manner in a weapon. The fissioning nucleus on occasions splits symmetrically; in this case, if we start with a uranium nucleus, for example, we are left with two nuclei of the element palladium. It turns out, however, that it is more likely that the division occurs asymmetrically and the resulting fission fragments may lie in the periodic table, anywhere between zinc(Z=30) and dysprosium(Z=66). The fission fragments formed are radioactively very unstable and decay, each with its own characteristic half-life, through several stages. Each decay involves

the emission of beta-particles and gamma-rays. It is not surprising that the complex mixture of fission products contains over 300 isotopes of 36 different chemical elements.

1.2.2 The activity of a given amount of radioactive material depends on the half-life of the isotope since this controls the number of decays, and hence the number of gamma-rays emitted, in a given time; thus a given amount of the fission product 131I, which has a half-life of 8 days will be more active than a specimen containing the same number of nuclei of 235U which has a half-life of 704 million years, by 10 orders of magnitude.

1.2.3 When formed in solid fissile material the fission fragments may stay fixed but on occasions they or the isotopes into which they decay are noble gases and will diffuse out . Thus, a fuel element, consisting say of metallic uranium clad in a light container, will go into the reactor with the hazard limited to the relatively slightly active uranium in solid form. After a spell in the reactor, the element will contain fission fragments decaying much more rapidly than the uranium and hence more radioactive; also some of these fission fragments will be in the form of a gas, diffusing into the space between the rod and the cladding and capable of leaking through any porosity in the cladding.

1.3 Transportation of Fissile Material.

1.3.1 The questions to be asked in connection with a consignment of fissile material are these;

1. Is it uranium or plutonium?

2. Is it in the form of a solid, metal or ceramic?

3. What is its radiation history?

4. What is its present activity?

5. Does it require continuous cooling on account of the self-absorption of its radioactive emissions?

Given the answers to these questions, recourse can be had to regulations laid down in a Code of Practice sponsored by the International Atomic Energy Agency and the World Health Organisation(Ref 30), to decide whether the proposed transport arrangements are acceptable.

1.3.2 These regulations, which cover the transportation of all radioactive materials in both large and small quantities, first appeared in 1961 and have been periodically revised. Their aim is to ensure that a package is devised for each consignment that guarantees that

1. there is enough internal screening to reduce the dose rate external to the package to an acceptable level, having regard to the internationally accepted tolerance levels;

2. that there is a physical barrier to prevent the escape of any radioactive material, gaseous, liquid or solid;

3. that this barrier will stand up to the vicissitudes encountered in a journey by land sea or air.

1.3.3 Among the most hazardous loads envisaged are consignments of fuel rods consisting of fissile material clad in a light metal container with cooling fins, the rods having been for some time in a reactor. The activity of the fission fragments they contain will be proportional to the energy that has been extracted from them, allowance having been made for the decay of the activity during the cooling off period following their removal from the reactor. If the activity is still high it may be necessary to allow for water cooling in transit. Extremely elaborate flasks have been designed to contain such loads and according to the regulations they have to pass the following tests:-

1. water spray test in which water is sprayed for at least an hour at an angle of 45 degrees to the horizontal, of an amount equivalent to a rainfall of 5 cm/hour;

2. free drop test in which the specimen falls from a height onto a concrete slab;

3. a penetration test in which 6 kg bars are dropped onto the flask;

4. compression tests in which external pressures are applied for periods of 24 hours;

5. thermal tests in which there has to be a simulation of the container being in a fire at a temperature of 800 degrees C for 30 minutes.

To simulate accident conditions the flask is to be subjected to a drop test to produce maximum damage and then subjected to the thermal test.

1.3.4 Flasks designed to pass such tests have now been in use for long enough to have been involved in accidents. At a Seminar held in 1976, transport experience was reviewed. One accident reported(Ref 31, page 237) occurred in December 1970 in the USA and involved an irradiated spent fuel flask. The truck driver lost control and the truck overturned. As a result the flask was thrown into a ditch and travelled more than 100 feet before coming to rest. There was minor damage to the outer thermal insulation but there was no release of contents or increase in radiation.

1.4 Computer Accident Simulation.

In parallel with the development of suitable flasks, it is desirable to explore theoretically the consequences of an accident in which the flask might be damaged. A computer simulation, commissioned by the Greater London Council, has now been published. (Ref 24) It modelled an accident in which a flask containing irradiated fuel elements experienced severe impact followed by a 2-hour fire at a temperature of 1,000 degrees C. (Presumably the flask contents were taken to be about a ton of fuel rods cooled to a total activity of about 1 MCi and the flask designed in conformity with IAEA Regulations (Ref 24).) The accident was postulated to have happened in a marshalling yard at Willesden Junction with the flask stationary in the yard in a siding. It was assumed that noble gases and the more volatile fission products were released uniformly at a height of 2 metres and during a period of 1.5 hours. No counter measures were invoked. The predicted doses are far below the threshold for early radiation injury. The program allowed for the inhalation of released material and followed it into the food chain. Wind conditions were allowed for and the deposition was followed out to 40 km. The author finds that "the health impact of the release is .... limited to late effects, of which cancer in the exposed population and hereditary effects in their descendants are the most important. The predicted incidence of these effects, should a release occur, is extremely small, the average predicted number of cases being about 2". It is concluded that the "risk factors close to the release point are... about one thousandth of the natural risk of cancer." It should be noted that the fire is responsible for the release of radioactive material additional to the noble gases and greatly aggravates the consequences. Also, there are proposed countermeasures that would minimise the uptake through the food chain and reduce risk; these were, in the computation, assumed not to have been implemented.

1.5 Subversive Activities.

1.5.1 The public perception of the risks involved in the transportation of fissile materials results in a possible attraction of attention from subversive elements who might seek to interfere with the transport operation in order to cause public alarm. In fact the objective hazard that could easily be caused, having regard to the strength of the container, the mass of the screening and the difficulty of achieving fragmentation of the solid contents, could be much less than the hazard arising from a similar action against a road tanker carrying octane fuel. In any case, the justification for secrecy must be a question of judgement by the responsible authorities.

1.6 Accident Procedures.

In the event of a serious accident, particularly if fire were to be involved, it would seem desirable to follow the procedures of the Clyde Area Public Safety Scheme. This is another circumstance in which the monitoring, which doubtlessly would be quickly provided by the consigning authority, could profitably be backed up by the Local Authority Scientific

Advisers with great gain to local morale.

1.7 Independent Monitoring.

A study of Reference 31 suggests that this area of transportation of radioactive material has received the attention it deserves. The Regulations (Ref 30) laid down have been in operation long enough to give confidence in their adequacy. It remains, however, to point out the need to consider the requirement for an independent monitoring (Ref 25) of the extent to which the Regulations are being observed in practice.

ANNEX H.

Accident Matrix.

1. The consequences of an accidental nuclear explosion are excluded from this matrix.

2. It assumed that a Propellant explosion might set off the Trigger or vice-versa and that the rest of the warhead and reactor might be damaged.

3. A separate accident assumed is the kind of reactor incident described in the Clyde Area Public Safety Scheme scenario, with nothing else affected by this accident.

4. The toxicity of the various materials in the components is not information in the public domain.

5. The Consultants (Ref 11, page 4-10) reported the possibility of radioactive isotopes, particularly tritium, in the light components in a thermonuclear weapon. Even if present this is likely to disperse quickly and is not expected to be a major factor in an accident.

	Propellant	Warhead				Reactor
		Heavy	Light	Trigger	Initiator	
Blast	B	-	-	B	-	-
Heat Flash	B	-	-	B	-	-
Toxic Contamination	?(B)	?(S)	?(S)	?(B)	?(S)	B
Radioactive contamination	-	S	?(S)	-	S	B

Note:- S = Secondary : B = Both Primary and Secondary.

ANNEX I.

Summary of "Derivation of British Explosives Safety Distances" (Ref 9)

Jarrett defines three distances with respect to a point source of hazardous material, as follows:-

(i) the "storage distance". The distance at which it ceases to be a risk that an explosion will propagate by detonating stored material. Personnel could be at serious risk at this distance.

(ii) the "intraline distance". The distance at which there could be inhabited buildings in which, say, processing of hazardous material could be taking place. The personnel could be at risk of less than severe injury and are assumed to be trained in emergency procedures. Since the intraline distance is greater than the storage distance, there is no danger of stored material being detonated in these processing buildings.

(iii) the "public building distance". The distance to the nearest point at which there would be no "severe structural damage to property" and "a reasonable degree of immunity from injury to members of the public in dwellings or in the open".

Hazardous materials are classified in four categories as follows:-

(i) X, producing slight blast and giving rise to projectiles, e.g. boxes of ammunition;

(ii) Y, producing mainly radiant heat, e.g. cordite and many rocket propellants.

(iii) Z, producing major blast, cratering, earth shock and projectiles, e.g. aircraft bombs and depth charges.

(iv) ZZ, having mass explosion risk, like Z, but with little projectile hazard, e.g. high explosives in wooden boxes.

The empirical formulae given by Jarrett for Y and Z type explosives are collected in Table 1.

The distance estimates given by these formulae have been entered in Table 2 for three different weights (i) 1 ton (appropriate to trigger), (ii) 28 tons (appropriate to single missile) and (iii) ,16x28 tons (appropriate to full complement of missiles on one submarine).

The category into which the material falls depends not only on its explosive properties but also on how it is contained. That it is not unreasonable, in the case of a modern missile, to plan on the propellant being in category Z with K=56 may be seen by noting that the Jarrett Formula for a

Public Building Distance of 900 m, the distance for an MX missile (Ref 11, page 4-4), gives 64 tonnes as the stored weight of explosive. This is not inconsistent with a "take-off" weight of 86.4 tons (Figure supplied by Cremer and Warner)) and a "second stage" weight of 28 tons (Ref 29) for the MX missile.

The Jarrett formula quoted by the Consultants (Ref 11, page 4-12) should have 1/6 as the exponent in the denominator, not 1/2. In the range of W used in the Report there is negligible error introduced.

Category	Storage Distance	Intraline Distance	Public Building Distance
Y	$1.05W^{0.44}$	$1.6W^{1/2}$ * $8.0W^{1/3}$ **	$3.2W^{1/2}$ * $16.0W^{1/3}$ **
Z	$12W^{1/3}$	$\frac{24W^{1/3}}{[1+(7000/W)^2]^{1/6}}$	$\frac{56W^{1/3}}{[1+(7000/W)^2]^{1/6}}$

* for quantities less than 10,000 lb. (Projectiles main hazard)

** for 10,000 lb and above. (Thermal flash main hazard)

TABLE 1.

Category	Storage Distance	Intraline Distance	Public Building Distance	Weight
Y	31' (9.4 m)	76' (23.2 m)	152' (46.3 m)	1 Ton.
	136' (41.5 m)	318' (96.9 m)	636' (193.9 m)	28 Ton.
	459' (139.9 m)	801' (244.1 m)	1602' (488.3 m)	16x28 Ton.
Z	157' (47.9 m)	211' (64.3 m)	492' (150.0 m)	1 Ton.
	477' (145.4 m)	952' (290.1 m)	2220' (676.7 m)	28 Ton.
	1201' (366.1 m)	2403' (732.4 m)	5607' (1709.0 m)	16x28 Ton.

TABLE 2.

Chapter 1. History of the Proposal.

1.1 Government Departments and Planning Procedures.

1.1.1 "Development by the Crown does not require planning permission" (Ref 1(a), para 5). The unrestricted exercise by Government Departments of this right to be exempt from planning regulations would make a nonsense of Local Authority Strategic Planning. To meet this difficulty Scottish Development Department Circular 49/1977 "sets out a guide to the planning procedures agreed in relation to Government Departments when a Department proposes development which, if undertaken by a private person, would require planning permission" (Ref 1(a), para 2).

1.1.2 In place of the Application for Planning Permission that a private person is required to make to the Planning Authority, the Government Department serves a Notice of Proposed Development (NoPD) on the Planning Authority, usually the District Council. The Planning Authority elicits views on the proposal from appropriate bodies. Consultations then take place between the developing Department and the Planning Authority. These consultations enable the Authority to discover whether the Proposed Development is compatible with the Structure Plan of the Region and the Local Plans of the Districts. Should there be any difference of view on the accommodation of the NoPD within the Planning Strategy of the Authority and should the developing Department be unable to resolve the issue to the satisfaction of both sides, "the developing Department, if they wish to proceed, will bring the matter to the attention of the Scottish Development Department" (Ref 1(a), para 17).

1.1.3 The Circular then goes on to say that "the method of dealing with such cases will depend upon the circumstances. Sometimes written representations or an informal meeting may suffice; but in other cases it may be desirable to take more formal steps and to hold a non-statutory public local inquiry. In all cases, the planning authority, the developing Department and other interested parties will be given an opportunity to express their views; and the decision will be announced by the Scottish Development Department in a letter to the planning authority." (Ref 1(a), para 18).

1.1.4 By this procedure, notwithstanding the rights of the Crown in the matter, the provisions of the usual planning procedures can, to a large extent, be applied in practice to Crown developments but with this important difference. In the case of a private Application, in certain circumstances, the Secretary of State is required by statute to hold a Public Inquiry and to have regard to its recommendations in determining the Application. In the case of a Crown development, the holding of an inquiry is entirely at the discretion of the Secretary of State.

1.1.5 It is important to note the timetable envisaged by the Circular for the events following the serving of a NoPD. "Any representations about the proposed development should be made to the Developing Department within

Chapter 3. Environmental Impact Assessment.

3.1 The Concept and Status of Environmental Impact Assessment.

3.1.1 Environmental Impact Assessment (EIA) is a standardised approach designed to provide an unbiased and balanced assessment of the anticipated effects of a major development upon all the aspects of the environment that it may affect. As a procedure it is well known internationally. In the USA it is often a requirement for a developer to submit an EIA with his application for planning consent. Interestingly the US Armed Services prepare an EIA when proposing major defence facilities and one has recently appeared for the MX Missile system which was used by the Regional Council's Consultants, Cremer and Warner, London.

3.1.2 In 1980 there was a proposal by the Commission of the European Communities "for a Council Directive concerning the assessment of the environmental effects of certain public and private projects". The types of development proposals which were seen as candidates for assessment included storage facilities for chemical products, the construction of roads and harbours and plants for processing fissionable materials. It may thus become mandatory in the UK for EIA's to be prepared for major projects of the scale and nature of the MoD proposal for Coulport; in anticipation, a Manual for the Assessment of Major Development Proposals based on the EIA approach was commissioned from a team at Aberdeen University by SDD, the Department of the Environment and the Welsh Office (Ref 2).

3.2 Application of EIA to RNAD, Coulport extension.

3.2.1 There is thus to hand a convenient framework on which to build an assessment of a project of the scale and complexity of the proposed RNAD extension, involving the construction of a complex of buildings in which routine processes are planned which occasion explosive, chemically toxic and radioactive hazards. The Regional Physical Planning Department have structured their Part 1: General Report as an EIA and in this Report I have arranged the material provided by other parties in the same framework.

3.3 Basic Input Information for the Production of an EIA.

3.3.1 To enable an EIA to be prepared, the developer should supply with his planning application the following information:-

(a) a description of the proposed project and, where applicable, of the reasonable alternatives for the site and design of the project;

(b) a description of the environment likely to be significantly affected by the proposed project;

(c) an assessment of the likely significant effects on the environment;