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FOUR BRITISH EIA's

A preliminary study of the general characteristics of EIA's in the UK

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ABSTRACT

This paper is concerned with the characteristics of four EIA's undertaken within the UK during the 1970's. The basic characteristics, method and content of the EIA's are investigated. The role and terms of reference of the EIA's are found to exert a considerable influence on the above aspects. Although there is a great deal of variation among the EIA's a number of common areas of importance do seem to exist and these are identified in the conclusions.

CONTENTS

Tables:

1. INTRODUCTION

It is not the intention of this paper to argue for the need for Environmental Impact Analysis (EIA) in the UK, nor is it important here, to investigate its history of development on either side of the Atlantic.

EIA is already being used in this country. It is being undertaken primarily within the existing planning framework, and its use is increasing.

This paper is the first stage in an investigation of the use and potential of EIA in the UK.

2. AIMS

The aim of this paper is to present and test the methods adopted for assessing the characteristics of EIA's in an objective fashion.

N.B. It is hoped that these methods will then be used to determine the characteristics of a large proportion of the United Kingdom EIA's. This in turn will form the first part of an assessment of the usefulness of EIA in the context of the existing planning system.

3. METHOD

The purpose of the method is to identify, objectively, the characteristics of the EIA's under investigation.

3.1 The methodological approach of the EIA is to be classified according to technique rather than function. Classification by technique orders method by the way in which impacts are identified. The accepted allocation is to the following categories: ad hoc, checklists, overlays, matrices and networks (Jain, Urban and Stacey, 1977; Clarke *et al*, 1978)

3.2 Once the method has been classified according to the above system it is necessary to determine some of its more detailed characteristics. The most obvious of these is 'content'. The CEQ Guidelines (1973) identified the following areas that were to be covered within an Environmental Impact Statement (EIS) in the USA:

1. A description of the proposed action.
2. The relationship between present and projected land uses.
3. A description of the potential impacts.
4. The alternatives to the proposed action.
5. Consideration of the adverse impacts of the proposed action.
6. The relationship between local short term uses of man's environment and the maintenance and enhancement of long term productivity.
7. Any irreversible or irretrievable commitments of resources.
8. Any likely interactions with other proposals.

A British equivalent of the above cannot be included in the study because there is no generally accepted format for an EIA within the United Kingdom. However most of the suggestions in the literature for content of EIA's contain most or all of the above sections.

3.3 The depth of analysis that each identified impact receives if a further consideration. The following qualities of impacts were identified in Research Report 13 (Clarke *et al*, 1976):

Beneficial	and/or	Adverse
Short term	and/or	Long term
Reversible	and/or	Irreversible
Direct	and/or	Indirect
Local	and/or	Strategic

3.4 One further system (Warner and Preston, 1974) for describing methodological approach is included. This contains various elements from the above sections but has been included in full because it provides a comprehensive analysis of methods

A. IMPACT IDENTIFICATION:

(1) Comprehensiveness - are a full range of impacts covered?
- including ecological, physical-chemical pollution, socio-economic, cultural and aesthetic.

(2) Specificity - have specific parameters (sub-categories of impacts) been identified?
- e.g. effects on rare birds.

(3) Isolation of project impacts - have methods been suggested to identify project impacts as distinct from future environmental changes produced by other causes?

(4) Timing and duration - have impacts been related to:
(a) their timing (construction/operation), and
(b) their duration (time period over which the impact will occur)?

(5) Data sources - have the sources of information used to identify measure and interpret impacts been identified?
- (a) generally and
(b) specifically.

B. IMPACT MEASUREMENT:

(6) Explicit indicators - have specific measurable indicators been used to quantify impacts on specic parameters?
- e.g. extra houses, noise levels.

(7) Magnitude - has impact magnitude been incorporated as distinct from impact significance?

(8) Objectivity - have objective rather than subjective impact measurements been employed?

C. IMPACT INTERPRETATION:

(9) Significance - has the significance of the measured impacts been assessed?

(10) Explicit Criteria - have the criteria and assumptions employed in determining impact significance been stated explicitly?

(11) Uncertainty - has the uncertainty or degree of confidence in impact predictions been assessed?

(12) Risk - have impacts of low probability but high potential effect been identified?

(13) Alternative comparison - have alternatives been considered?
- including (a) alternative sites/designs, and
(b) the no go alternative.

(14) Aggregation - has the weighting system been identified if aggregation is part of the method?

(15) Public involvement - have the public been involved in the interpretation of impact significance?
- as (a) interest groups/societies, etc. and
(b) individuals.

D. IMPACT COMMUNICATION:

(16) Affected parties - have affected parties been identified?

(17) Setting description - has the project setting been identified?

(18) Summary format - have the results of the analysis been presented in the summary form?

(19) Key issues - have the key issues and impacts been identified?

(Note: a few minor changes have been made to this method).

3.5 As has been stated a method has been adopted in an attempt to reduce subjectivity. The degree to which this is possible varies from characteristic to characteristic under investigation. For example it is possible to identify precisely the method which has been employed in each EIA but for characteristics such as assessment of the significance of impacts there is a continuum of possibilities for the depth and scope of analysis. For this reason a binary classification system has been rejected as having insufficient detail and a system which has three options has been adopted. This tripartite system is composed as follows:

1. Substantial compliance - the subject has been adequately explored in terms of scope and substance.
2. Partial compliance - the subject has been explored but the depth and scope of the analysis were insufficient to place it in the first category.
3. Omission or insubstantial compliance - the subject has been omitted or given only cursory coverage.

This tripartite system has been adopted for all characteristics except the classification of method.

3.6 The methodology adopted concentrates on assessing the performance of EIA's in comparison to the theoretical aims of EIA . However it is also important to look at the performance of each individual EIA in comparison to its own terms of reference. A discussion of this aspect has therefore been included in the findings of this study (Section 5.7).

3.7 Finally it is considered important that the background of the EIA is known. The author, status of the author and source of finance for the study must be made explicit to indicate possible influences on the reports. It is also important to ascertain the availability of the EIA to the general public in order to determine whether the EIA is being produced to provide a better, more publicly accountable planning decision or just to placate the planners, councillors and public inquiry inspectors. Also, in this general area the stage of development at which the report was commissioned is relevant.

4. THE FOUR EIA's

The four EIA's that have been used in this study are:

1. Flotta Orkney Oil Handling Terminal : An Environmental Appraisal (W.J. Cairns and Associates, 1973).
2. An Examination of Sites for Gravity Platform Construction on the Clyde Estuary (Jack Holmes Planning Group, 1974).
3. Oil Terminal at Sullom Voe : Environmental Impact Assessment (Sullom Voe Environmental Advisory Group, 1976).
4. Environmental Appraisal : Haweswater, Borrow Beck, Morecambe Bay and Hellifield (Land Use Consultants, 1978).

The aim in choosing the four EIA's for this study was to cover a range of types of development and a range of times of development through the 1970's. At the same time it was of interest to investigate the effects of different approaches. Therefore both Sullom Voe and Flotta were included. Pragmatism also played a part in the selection, the four reports being selected on the above criteria from a number of the more readily available reports.

5. RESULTS

5.1 Table 1 : The Background of the four EIA's

	Flotta (1973)	Clyde Estuary (1974)	Sullom Voe (1976)	N.W. Water Resources (1978)
SUBJECT	Oil terminal	Concrete Platform Construction	Oil Terminal	Water Supply Schemes
AUTHOR	W.J.Cairns + Associates	Jack Holmes Planning Gp.	SVEAG	Land Use Consultants
STATUS	Consultants	Consultants	Developer/ Council and others	Consultants
FINANCE	Oil industry	SDD and Dept. of Energy	Shetland Island Council and the Oil industry	NWWA
STAGE AT WHICH REPORT WAS COMMISSIONED	Post-Decision	Predominantly Pre-Decision	Post-Decision	Pre-Decision
PRICE	-	-	£1.00	£3.00
LENGTH	101 pp.	402 pp.	132 pp.	188 pp.

5.2 Table 2 : The methods used in the four EIA's

	Flotta	Clyde Estuary	Sullom Voe	N.W. Water Resources
Ad Hoc Check lists	X	X	X	X
Overlays				
Matrices				
Networks				

Note: All of the EIA's in the sample used an ad hoc approach to the identification of impacts, however it is necessary to point out that there were important differences within this broad category. These differences have been included in the discussion of the EIA's which follows.

5.3 Table 3 : The Content of the four EIA's

	Flotta	Clyde Estuary	Sullom Voe	N.W. Water Resources
Description of proposed action	o	⊠	⊠	⊠
Relationship between present and projected land uses	⊠	⊠	⊠	⊠
Description of potential impacts	⊠	⊠	⊠	⊠
Alternatives to the proposed action	o	⊠	o	⊠
Consideration of adverse impacts	⊠	⊠	⊠	⊠
Relationship between long term and short term uses of the environment	o	ϕ	ϕ	ϕ
Irreversible and irretrievable commitment of resources	o	ϕ	o	ϕ
Likely interactions with other proposals	o	⊠	o	⊠

Key: ⊠ Substantial compliance
ϕ Partial compliance
o Omission

5.4 Table 4 : The analysis of impacts within the four EIA's

	Flotta	Clyde Estuary	Sullom Voe	N.W. Water Resources
Beneficial and/or Adverse	⊠	⊠	⊠	⊠
Short term and/or Long term	ϕ	ϕ	ϕ	⊠
Reversible and/or Irreversible	ϕ	o	o	⊠
Direct and/or Indirect	o	o	o	ϕ
Local and/or Strategic	o	ϕ	ϕ	⊠

Key: Degree of consideration of impact qualities

⊠ Substantial compliance
ϕ Partial compliance
o Omission

5.5 Table 5 : Method characteristics of the four EIA's (Warner and Preston)

		Flotta	Clyde Estuary	Sullom Voe	N.W. Water Resources
Impact Identification	(Comprehensiveness	⊠	⊠	∅	⊠
	(Specificity	⊠	○	⊠	⊠
	(Isolation of project impacts	⊠	○	⊠	○
	(Timing	⊠	⊠	⊠	⊠
	(Duration	∅	○	∅	⊠
	(Identification of) General	⊠	⊠	⊠	⊠
	(data sources) Specific	⊠	∅	∅	⊠
Impact Measurement	(Explicit indicators	○	○	⊠	⊠
	(Magnitude	⊠	○	⊠	⊠
	(Objectivity	⊠	∅	∅	⊠
	(Significance	⊠	∅	∅	⊠
	(Explicit Criteria	○	⊠	○	○
	(Uncertainty	○	○	○	⊠
Impact Interpretation	(Risk	○	○	○	⊠
	(Alternative Comparison	○	⊠	○	⊠
	(No-project Alternative	○	○	○	⊠
	(Aggregation	-	⊠	-	-
	(Public) Interest Groups	⊠	⊠	⊠	⊠
	(Involvement) Individuals	○	○	○	○
Impact Communication	(Affected parties	⊠	∅	⊠	⊠
	(Setting description	⊠	⊠	⊠	⊠
	(Summary format	⊠	⊠	○	⊠
	(Key issues	⊠	⊠	⊠	⊠

Key: Degree of consideration of or compliance with method characteristics

⊠ Substantial compliance
∅ Partial compliance
○ Omission

5.6 The preceeding classification covers the substantive areas of an EIA, what follows is a generalized description covering relevant areas outside the classification as well as picking out important aspects within the classification. This is necessary both to set the background and to highlight the important issues.

The policy input to each EIA is one area which is explored. This is included not just to show the actual policy framework within which impacts were assessed but also, and perhaps even more importantly, the degree to which policy was explicitly involved in the analysis. The relationship of the EIA to the development and also to other relevant reports is explained. Finally the major strengths and weaknesses of each report are highlighted, along with

more detailed explanations of various aspects of the EIA where necessary.

Flotta Orkney Oil Handling Terminal

The decision to locate the Oil Terminal at Flotta had been taken before the study was commissioned. Flotta, along with Hoy and Fara,had been identified as an area suitable for oil related development by the County Council's consultants Moira and Moira. This recommendation was embodied in the 'Interim Strategy Review of the County Development Plan' (1973).

A number of statements of policy are made within the Flotta document, they are:

1. to provide opportunities which will enable young people to stay in Orkney and render the area attractive to immigrants;
2. that Flotta, Hoy and Fara are suitable for oil related developments;
3. that North Sea Oil is the biggest single factor in both immediate and long term planning; and
4. to reduce impacts resulting from oil related developments that will have a damaging effect on the community.

The Flotta study consisted of a description of the context of the development, the study's terms of reference, the planning and development objectives and a summary of the findings as well as the report of survey itself. The survey covered the areas of ecology, climate, physiography, the people of Flotta, infrastructure and landscape.

The approach was ad hoc both in the identification of impacts and their assessment. The analysis has not addressed the questions of whether impacts are direct of indirect or whether they are local and/or strategic. There was a summary section in the study which provided a very useful and comprehensive abstract of the report findings.

There were two major omissions to the study. The first was a failure to describe the project, all that is known about it from the document is that it is an oil terminal. The second omission was a failure to indicate the degree of risk or probability of there being any major incident. The report does discuss the effects of a major oil spill but it does not put this into the context of probability. The report also failed to discuss possible alternatives to the proposed site on Flotta.

It is stated that the reports aim was to 'establish an effective planning framework for the development and for the further more detailed impact/integration assessments and monitoring studies which were proposed'. Two detailed studies were undertaken as a result of the EIA. These were concerned with landscaping and the marine environment which had been identified as the key issues.

It can be seen that the Flotta EIA is a study of the environmental impacts of an oil terminal located on the Golta peninsular of Flotta. It does not address the problems of location or design. Social aspects are not thoroughly dealt with but it is stated that Orkney County Council were to deal with these in more detail (Cairns, 1978). Neither is risk dealt with. The areas that are covered in the report are covered reasonably well and it is certainly useful as an information document (except by the omission of a description of the terminal). The summary especially is very useful. A further dimension to the problem was that at that time Orkney County Council were applying to Parliament for special powers relating to development.

An examination of sites for gravity platform construction on the Clyde Estuary

An examination of sites for gravity platform construction on the Clyde Estuary does not explicitly identify itself as an EIA. The document states that it is a 'social and environmental' investigation of the sites available for gravity platform construction. However this form of 'social and environmental location analysis' is close enough in aim and methodology to be included in this survey of British EIA documents. The only question remaining over its inclusion is whether or not the impact of a gravity platform construction site is 'significant'. My opinion is that there are sections of the Clyde coast on which a platform construction site would have created a significant environmental impact. This is also the point to be made that this document provides an environmentally based 'subject plan' for site location within the Clyde Estuary. There are definite advantages to this kind of forward planning and this report could have been included in the survey on these grounds alone.

The Clyde Estuary study relies on two basic policy statements to provide its framework of analysis and assessment. These policies are to reduce unemployment and to conserve the recreational value of the Clyde coast. One further policy of influence was the central government decision to exploit North Sea Oil resources as soon as possible.

The Clyde Estuary study consisted of a statement of policies and the terms of reference of the study; a description of the development's characteristics; a summary of the conclusions; general, social, economic, landscape and environmental effects; an assessment of the individual sites; a description of the method and the resulting order of preference matrices. There was also a separate summary document for the study.

The method employed was ad hoc in its identification of impacts. However an order of preference matrix was used in the assessment of those impacts. This is a method of summarizing the findings of the report and also for testing various schemes of weighting for the impacts. However there are well known disadvantages associated with this method linked to the false assumption that it is based on an interval scale rather than an ordinal scale (see McCall, Skutch and Flowerdew, 1976). There are also problems associated with the weighting of impacts as this can be extremely subjective. In defence of the method it is a lot easier to rank alternatives than it is to provide interval scale information on impacts and in this case both the ranking and weighting were made explicit and were used in a 'sensible' manner. There was also a summary document of the study. Although this was extremely useful it did not make clear how the final rankings were arrived at - it does however refer the reader to the main document for an explanation. For the impacts themselves little was said about their nature, i.e. long term/short term, reversible/irreversible, direct/indirect or even about their magnitude and significance.

Although the Clyde Estuary study provides a very useful guide to which specific sites are acceptable for platform construction, the general principle of the development of oil related industries on these stretches of coastline had already been endorsed in the Scottish Development Department's 'Interim Coastal Planning Framework' (1973).

The Clyde Estuary study is an example of an environmental impact approach being used to select locations and indicate the most appropriate form for the development to take. It also points up the possible use of EIA in forward planning. The report is reasonably comprehensive and the analysis is well explained and designed but it does lack precision.

Oil Terminal at Sullom Voe : Environmental Impact Assessment (SVEIA)

SVEIA describes a similar type of development to the Flotta study. The decision to locate the Terminal at Sullom Voe had been made prior to the commissioning of the study, as had the decision on the location of support infrastructure.

The policy statements within SVEIA fall into two categories, general statements and specific statements embodied in the local plan. The general policies adopted in assessing the impact of the terminal were:-

1. to safeguard the people, environment and traditional way of life and industries of Shetland.
2. the national importance of exploiting oil resources in the surrounding seas.

The Sullom Voe District Plan (ZCC, 1974) contained the following proposals which have been adopted by the Council:-

1. zoning of land for the terminal and possible future developments;
2. acquisition of the designated land;
3. establishment of the principle of joint use of the terminal's basic facilities by different companies;
4. establishment of a port and harbour authority for the whole of Sullom Voe;
5. establishment of control out to the three mile limit;
6. establishment of a 'reserve fund' for the benefit of Shetland;
7. creation of the Sullom Voe Associated Ltd., a non-profit making organization inforporating members of the Council and oil industry to design, construct and operate the terminal facility.

The local plan also designated Brae, Voe and Mossbank as villages for expansion and Firth as the site for the construction village.

SVEIA consisted of a description of the existing environment, the proposed project, the impacts which were likely to occur as a result of that project being undertaken and the conclusions of working groups on oil spillage, monitoring and safety.

The method employed in the EIA was ad hoc, although it did include a list of topics for consideration (Appendix 3). This list broke down the development into its component parts, e.g. pipeline landfalls, the harbour area etc. Under each of these headings aspects of concern were noted. This list cannot be regarded as a checklist as it is not comprehensive or detailed enough to warrant the title. Within the report very little attention has been paid to analyzing impacts or assessing their significance. No

alternatives to the proposed development were considered. Risk assessment and socio-economic factors were not adequately covered. Finally, no summary was included.

SVEIA was not concerned with the siting of the terminal, this was the responsibility of Shetland Islands Council who chose the site following the advise of their consultants. One of SVEIA's aims was to keep the public informed of the manner in which environmental aspects were being dealt with. The report is part of an ongoing process and environmental information continued to be gathered after the report was published. It can be viewed as a descriptin of the stage that had been reached in the development process in 1976.

SVEIA is primarily an information document. It described the situation that existed, the plans that had been laid and the possible impacts arising from those plans. The report also indicated that an environmental impact approach was applied to design. The situation at Sullom Voe is further complicated by the existance of the Zetland County Council Act.

Environmental Appraisal : Haveswater, Borrow Beck, Morecambe Bay and Hellifield

The 'Environmental Appraisal' is an examination of four potential sites for reservoir development : Haweswater, Borrow Beck, Morecambe Bay and Hellifield. It covers the sites, various schemes for the utilisation of each site and the associated works that would be required. It is obviously an EIA.- the title, terms of reference and method demonstrate this fact. It draws on previous studies relating to the four sites and is itself only part of the long term planning process adopted by the North West Water Authority (NWWA), the commissioning agency.

The Environmental Appraisal has regard to the policies of the Structure Planning Authorities in whose area the proposed development is to take place. It also has to consider the powers and responsibilities of the water industry itself (The Water Act, 1973 and earlier legislation) and the policies laid down by the Secretary of State for Environment and the Minister of Agriculture, Fisheries and Food, who are jointly responsible for promoting a national water policy. Two DoE circulars provide particularly relevant guidance, the first is concerned with reservoir development within National Parks and the other with non-agricultural use of agricultural land (Section 2.5 of the report provides a fuller statement of these policies).

The Environmental Appraisal consisted of a description of the purpose and organisation of the study, its background and then a description of the schemes and their variants. Each of the four schemes was discussed in relation to its engineering characteristics, the existing character of the site, and the environmental impacts of the schemes variants. A final section was devoted to the additional works that would be required to the existing supply aquaduct and treatment works and their environmental impact. The findings of the report were also presented in a summary form.

The Environmental Appraisal used an ad hoc approach both to the identification of impacts and their assessment. However the following section headings were used in impact identification : landscape, agriculture, ecology, recreation and tourism, and the local community and economy. The method of assessment of environmental impacts consisted of:

1. examining existing planning policies relevant to the proposal;
2. surveying the environmental characteristics of the areas potentially affected by each scheme variant;
3. analysing the characteristics of the engineering proposals;
4. defining the probable interactions between the engineering proposals and the environmental character of the affected area, and assessing the relative significance of particular impacts;
5. examining the scope for reducing or modifying the effects of adverse environmental impacts by altering the engineering proposals;
6. making a final assessment of those environmental impacts which were inherent and unavoidable.

Four basic characteristics were used to help determine the relative significance of environmental impacts. These were: local or strategic, adverse or beneficial, long term or short term and reversible or irreversible. The document also included a summary which consisted of a summary table of the environmental issues affecting each scheme variant and a written summary of the variants. This written summary was particularly useful because it differentiated (by type face) statements of fact from the conclusion drawn.

The Environmental Appraisal did not assess the need for additional water supplies though two alternative 'demands' for the year 2001 were used in the report. Neither did the report relate the alternative schemes to one another and present a 'best option from the analysis'. However, both of these aspects were outside the terms of reference of the study.

The Environmental Appraisal used an EIA approach to determine both the best design and the best location. The report included

conclusions on the best design for each option but it leaves the decision on location open. The report is reasonably comprehensive and specific. It provides a great deal of quantified information on the various impacts. It would prove a very useful document if and when the need for additional water supplies was demonstrated. The role of the document lies within the long term planning process.

5.7 As stated before the relationship of each EIA to its own terms of reference is also important in assessing its characteristics. These relationships are discussed here.

Flotta Orkney Oil Handling Terminal

The terms of reference of the Flotta study are:-

1. to establish the nature of existing environmental conditions;
2. to assess the impact of the proposal.

The scope of the report was described in the following extract:-

'The intention of this report is to provide both a general perspective and detailed analysis where these are applicable, of the prevailing environmental conditions of the Terminal site, its relationship with Flotta, the role of Flotta within Scapa Flow and finally to establish the context of the proposals within the Orkney Islands as a whole.

This report seeks to establish an effective planning framework for the development and for further more detailed impact/integration assessments and monitoring studies which are proposed'.

The Flotta study has fulfilled its terms of reference reasonably well. The scope of the report contains more detailed statements than the terms of reference and as such allows for a more precise assessment of the degree of compliance with the stated aims. In this area it can be concluded that on the whole the report gives a far better 'general perspective' than 'detailed analysis'. Whether this was the most applicable approach to all areas can only be guessed at without further study. However as a first impression it appears that one area, that of risk assessment, would have been appropriate for detailed study rather than the scant treatment which it received. On further investigation other areas may also reveal this need. As far as the geographical scope of the report is concerned, i.e. from the site to the Orkneys as a whole, the report has fulfilled its stated aims.

In conclusion the Flotta study has met its stated aims in almost all areas, though there is some doubt about the depth of analysis that certain subjects have received.

An examination of sites for gravity platform construction on the Clyde Estuary

The terms of reference for the Clyde Estuary study state that the aim of the study is 'to examine in social and environmental terms sites for platform building in the Clyde Estuary which have been identified for the Department of Energy ... on grounds of their potential suitability to the contractor'. The study was also to consider sites with outstanding planning applications. The geographical extent of the study was defined so as to allow for 'the formulation of an overall policy for gravity platform construction in the whole of the Clyde Estuary'.

The terms of reference for this study are rather vague, as a result few conclusions can be drawn about the degree of compliance that the report achieves. The report does indeed consider both social and encironmental aspects of the potential development, and in some depth. The geographical extent of the search for suitable sites has also been fulfilled. The general impression is therefore that the report does comply with its terms of reference.

Oil Terminal at Sullom Voe : Environmental Impact Assessment

The Sullom Voe study does not include its terms of reference as such, however it does include the terms of reference of the Sullom Voe Environmental Advisory Group (SVEAG) who are the authors. These state that 'SVEAG will advise on the environmental aspects of the developments associated with the Oil Terminal ... The aim is to ensure that environmental considerations are taken into account in the planning, development and operation stages of the project'. It is also stated that SVEIA is a general descriptive summary of the work of SVEAG. It is offered as a contribution to public information on what is happening in Shetland. SVEIA was not intended to be a pre-decision study; it was intended as 'a description of the stage reached in a continuing process'.

SVEIA is primarily a descriptive document, thereby fulfilling part of its designated role. The extent to which it has helped ensure that environmental aspects are taken into account in the planning development and operation stages of the project is more difficult to assess without further study.

Environmental Appraisal

The Environmental Appraisal is only one stage in the NWWA's program for developing a long term strategy for meeting future water needs. One of the functions of the report is 'to provide a statement of facts against which statutory bodies and other

interested parties can respond to the Water Authority with their views on the relative importance that should be attached to particular environmental issues'. It is not the purpose of the study to investigate whether any additional water supplies will be needed in the future, nor is it part of the study to choose a preferred scheme. The terms of reference of the study embrace two basic aims:-

1. to inform the authority of those relevant environmental factors necessary for it to reach the best balanced decision on the four schemes;
2. to enable the authority to comply with its statutory obligations concerning conservation, amenity and recreation.

In achieving these aims the objectives of the study can be summarised as follows:-

1. to demonstrate the implications of the engineering proposals relating to ecology, land use and environmental quality, in clear and unambiguous terms to the authorities statutorily concerned with these matters;
2. to assess the degree of significant environmental impact which would be produced by the developed forms of the four schemes under investigation, both during construction and operation;
3. to assess the extent of potential objection to, or support for, the schemes that such impacts generate among organisations consulted during the study;
4. to interpret existing or proposed policies of structure planning and other statutory authorities for the guidance of the authority and their Consulting Engineers in the formulation of the four schemes;
5. to ensure, wherever possible, compatability between the schemes and the policies of the Structure Planning Authorities affected by them;
6. to lay the groundwork for subsequent development of one, or any, of the water resource schemes, should the authority decide to proceed.

However, the report was only intended to meet in part these aims and objectives, as the publication of the report was to be followed by a period of consultation with statutory authorities and other interested parties.

These are the most specific terms of reference among the four studies. Of the objectives only number three is not fully covered in the study.

6. CONCLUSIONS

6.1 The method used in all of the EIA's was fundamentally ad hoc (see Table 2). However, there were variations in the degree to which impacts were systematically analysed, assessed and presented. The other characteristics considered in the methodology bring out these differences.

6.2 The content of the EIA's was investigated by comparison with the CEQ Guideline (1973) on the content of American EIS's. From the results of this comparison various aspects can be seen as being important to the British EIA authors, these were:-

1. a description of the proposed action (except Flotta);
2. the relationship between present and projected land uses;
3. a description of the potential impacts; and
4. consideration of adverse impacts.

Other aspects were more dependent on the role of the EIA. Only the pre-decision EIA's included a discussion of alternatives and interactions with other proposals. The pre-decision EIA's apparently have more comprehensive contents than the post-decision EIA's, though this could well be due to the EIA's chosen for this preliminary study (see Table 3).

6.3 The depth of analysis that impacts received in each EIA did not appear to show any pattern. The only factor that was consistantly considered was whether the impacts identified were beneficial or adverse. The Environmental Appraisal involved the most comprehensive assessment of impact characteristics. Whether impacts were direct or indirect was the characteristic which received the least attention throughout the four EIA's (Table 4).

6.4 From the analysis of method characteristics (Table 5) various other factors can be picked out as being considered important by all authors:-

1. the timing of impacts, i.e. whether occurring during construction or during the operation phase of development;
2. the identification of data sources - though half the studies identified sources as a bibliography or appendix rather than identifying the source for each specific piece of data quoted;
3. consultation with various interest groups, e.g. the Nature Conservancy Council - though in no instance was the general public consulted;
4. a description of the setting, i.e. the existing environmental characteristics;
5. identification of the key issues.

Other factors such as the magnitude and significance of

of impacts, the objectivity of statements and the identification of affected parties were also considered important but the degree of compliance with these varied from study to study.

6.4 The role that each EIA was expected to fulfil was very different. This helped determine the stage of development at which the EIA was undertaken.

The Sullom Voe EIA was carried out after the decision on location of the Terminal and its supporting infrastructure had been taken. Its tole was 'to inform the public on what (was) happening in Shetland and to (help develop) a method of analysis of the impact of industrial development on the environment and the measures that may be taken to control it'. The EIA was seen as part of an ongoing process of management of all the oil related developments within Shetland.

The Flotta EIA was also carried out after the decision on location had been made by the local council. Its aim was to establish the nature of the existing environment and to assess the environmental impact of the proposal. The document was therefore primarily descriptive and fulfilled the role of informing the public of the impacts of the development. Other studies were carried out which were published after the EIA dealing with aspects of marine ecology and landscaping. These reports were more design orientated.

The Clyde Estuary EIA was primarily a pre-decision document. Its role was that of formulating a location policy for gravity platform construction sites on the Clyde Estuary. However at the time that the study was undertaken one site was already in existence and planning applications relating to a number of other sites had been submitted. Although the study did deal with existing planning applications its role lay primarily within the sphere of forward planning.

The EIA dealing with water resources within the NWWA's boundaries was a pre-decision study. It was also a pre-application study. In fact its role lay within the long term planning sphere. It involved both the location and the design of the water resource schemes. Engineering studies were carried out concurrently with the EIA.

The role of the EIA is inextricably bound up with its terms of reference, together these determine its structure. (Structure is used to describe the content/method synthesis that constitutes the EIA itself). As the role and terms of reference of the study vary so does its structure, e.g. the informative EIA's - Flotta

and Sullom Voe - do not contain the depth of analysis that the pre-decision Environmental Appraisal carried out for the NWWA does.

6.5 Also of importance is the availability of the EIA to the public. If an EIA is to fulfil a useful role within the planning system it must be freely available to the general public, elected representatives and other organisations for their information and comments. Availability will be affected by both the size and the price of the report. Price, if high, will deter, or even prohibit, many individuals from taking part in informed discussion. Size, again if excessive, will deter almost everyone from making themselves fully informed. It can also be argued that excessive size negates one of the other functions of the EIA, that of being a summary document which identifies and concentrates upon the key issues.

6.6 The most obvious conclusion to be drawn from this preliminary study is that there is a great deal of variation among British EIA's in both their role and their structure. This differs from the American situation where these factors are controlled by laws and their supporting guidelines. Whether this degree of individuality among British EIA's is a disadvantage is questioned by Catlow and Thirlwall (1976) who state that it should be left to the good sense of those responsible for the study to make their own decisions on the relevant issues and content according to the needs of any particular case.

The above can be considered as a rough guide to the kind of EIA which is being produced in the UK. However not a lot of strength can be placed on these findings as the sample was so small. When the full study is complete, including almost all of the British EIA's, the findings should be more significant.

6.7 The methodology adopted has allowed conclusions to be drawn about the EIA's being produced within the UK. Its main advantage lies in the systematic assessment of characteristics which it forces. This helps to focus attention on the important methodological issues and helps provide a realistic means of comparing the EIA's and drawing conclusions. One of the aims of the method was to reduce subjectivity. This has been achieved in comparison to an ad hoc approach. However the method is certainly not entirely objective. It still remains a basically subjective judgement as to the degree of compliance with the requirements of an EIA that is achieved for each characteristic. This is

particularly true for 'borderline' cases. However without spending inordinate amounts of time and energy fastidiously analysing each statement within an EIA it would be hard to produce more objective results.

6.8 This method will now be applied to the EIA's that have been produced in the UK. It is hoped that the survey will be comprehensive though problems in obtaining copies of some of the EIA's may determine its limits.

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