ENVIRONMENT CANADA

SUBMISSION TO THE SABLE ISLAND

ENVIRONMENTAL ASSESSMENT PANEL

VOLUME II OF II

(Revised)

VOLUME II OF II

APPENDIX II

DETAILED TECHNICAL REVIEW COMMENTS

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PREFACE

This volume contains detailed comments by Environment Canada on both the Venture Development Project Environmental Impact Statement of February, 1983, and on the Venture Development Project Environmental Impact Statement Supplement of August, 1983.

Comments contained in the June, 1983 version of this volume have been revised to reflect the acceptance by Environment Canada of the conceptual nature of the EIS and supplement. Most comments of a site or project specific nature have been withdrawn until a detailed Development Plan has been submitted for review by the proponents. The Supplement has satisfied some of the earlier concerns and comments of this Department. Where appropriate, such concerns have been deleted or modified. Comments have been re-numbered and arranged in the order of the documents reviewed.

ENVIRONMENT CANADA

DETAILED TECHNICAL

REVIEW COMMENTS

on the

Venture Development
Project Environmental Impact
Statement

VOLUME I, SUMMARY

General Comment

- The EIS summary is not a good representation of the rest of the Environmental Impact Statement (EIS). Those reading only the Summary do not gain a proper appreciation of the project or the potential environmental and socio-economic impact of the project. 1 (1)

I: 3, S1.0*

- The EIS does not fulfill several of the requirements of the guidelines developed by the joint federal-provincial panel. As is stated in the Panel guidelines, guideline requirements not met should be listed along with justification of why they were not addressed. 2 (3)

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* The reference convention is as follows:

IIIb: 115, S3.2.5.7, C1, P2, L5 35 (41): means EIS Volume Number IIIb, Page 115, Section 3.2.5.7, Column 1, Paragraph 2, Line 5, Revised comment number 35, Initial Comment Number (41), T designates Tables, F designates Figures.

I: 8, S2.0, C1, L7

- The project description was based on gross assumptions of reserves, production schedules and development plans. As a result, the impacts discussed in the document are qualitative. Once firm development plans are prepared, a number of additional and possibly significant impacts could surface which are not presently identified in the EIS. 3 (4)

I: 8, S2.0, C1, P1, L14

- "... sufficient project information is provided to adequately assess the socio-economic and environmental aspects of the proposal."

  The proponents have not, as suggested here, provided sufficient project information for the Panel or technical reviewers to assess several environmental aspects of the proposal. 4 (6)

- The proponents must make a firm committment to undertake sufficient additional and on-going environmental and socio-economic studies to ensure environmental and socio-economic protection during development and subsequent production of the field. 5 (7)

I: 8, S2.1

- What is the design life and physical life expectancy of the pipeline and other production hardware? Will this facility be designed to handle "piggy-back" fields once Venture is depleted? See Comment Number 40. 6 (8)

I: 13, S2.2.3

- There is frequent reference to regulations which have yet to be promulgated (i.e. structures regs., production regs., pipeline regs.,

etc.). Therefore, Mobil's commitment to comply with these regulations may not necessarily meet environmental criteria yet to be established.

I: 17, S2.4.2

- This list of Contingency Plans does not show the "Oil Spill" contingency plan which is listed on Page 3 of the EIS Addendum report as a current plan. 8 (15)

- The sequence of priorities is well stated, in that environmental protection is "secondary only to the safety and protection of human life" in DOE's view as well. 9 (16)

- Many of the contingency plans mentioned are for the Grand Banks area and are not particularly relevant to the Scotian Shelf. Detailed contingency plans for the Scotian Shelf near Sable Island are obviously required. 10 (18)
  See Comment Numbers 88, and 89.

I: 17, S2.4.3

- This section is entirely devoted to concerns for the structures as affected by the environment and no reference is made to possible impacts of the structures on the environments. 11 (20)

I: 17, S2.4.3.3, P4

- This section considers only the possible impact of sand waves on the production facilities; mention should also have been made in the summary to their potential effect on the subsea pipeline. 12 (21)

I: 18, S2.4.3.4, P3, L7

- The implication here is that new technology will be required to deal with corrosive conditions existing in the well flow lines. If so, what are these conditions? What additional risk of failure 13 (22)

is involved? Can these problems be expected to be overcome? Will well work-over schedules be effected?

I: 18, S2.4.4, P 3, L1

- Definition of "Monitoring the effects of the project on the environment ... disturbances on the physical environment..." 14 (23)

  There is little further detail provided on this topic, in later segments of this document (IIIb: 84, S7.0, P.1 and Addendum S3, 2.6, Pg. 69). Far more information on the proponent's intent, concerning the monitoring program, is required.

I: 18, S2.4.4, P.3, L5

- "Mobil intends to carry out several field studies to assess the fate and effects of effluents from the Venture Project on the Environment." 15 (24)

  This is inadequate. More detailed concerns are provided later under comments on III b, S7.0.
  See other Comment Numbers 354-356.

I: 48, S3.5.2.5

- Restriction of tree re-growth along the right-of-way for the pipeline will be necessary. Mobil has made a verbal committment that the right of way will be maintained mechanically. This should be verified in a more tangible form. 16 (25)

I: 49, S3.5.2.5, C, P 4, L1

- The proponent indicates it will try to avoid private lands. May this be done at some environmental expense? Where doing so involves an environmental cost, what would the priorities be? 17 (26)

I: 50, S3.5.2.6, C1, P 3

- Has the cost of these facilities been included in the benefits/ cost analysis in Volume IV? 18 (27)

I: 67, S4.1.1.2, F36

- This section Omits mention of harbour seals, one of two resident marine mammals of Sable Island. 19 (30)

I: 71, S4.1.2

- This is an excellent section; it recognizes the historical, geological and biological uniqueness of the Island. 20 (31)

I: 71, S4.1.2, P 1, L3

- Environment Canada wishes to re-state concerns earlier identified during the delineation drilling phases. The most modest use of Sable Island may have immediate impacts and perhaps longer term impacts on the water resources. The capacity of the Island in light of potential future developments is unknown. 21 (33)

I: 71, S4.1.2.2, C2, P 2, L6

- "... the endangered Roseate tern." To clarify, the specie is not classified as endangered in Canada, but it is "blue-listed" in the U.S. "Blue-listing" is an unofficial designation of concern for decreased population sizes. 22 (34)

I: 74, S4.1.3.2, Inland Birds, P 3, L1

- Based on our knowledge of the distribution of the avian population of Nova Scotia, we question that either pheasant or grey partridge are in the terrestrial corridor. 23 (35)

I: 77, S4.2.1, Point iii

- It must be emphasized here that it is critical for determination of potential impact, that there is sufficient knowledge of the resources at risk. Species interactions, ecosystem functioning and valued ecosystem components must be identified before a full evaluation can be made. 24 (36)

I: 79, S4.2, C2, L3

- Environment Canada does not agree that "In all cases, the most severe impact ratings were selected for inclusion." As an example, the proponent has underestimated the potential impacts associated with a blowout or spill at the offshore production facilities; especially in terms of the effects on Sable Island. 25 (37)

I: 79, S4.2.1, T14

- These definitions are quantifiable. The proponent should be expected to make quantitative estimates of impact and then, in co-operation with regulatory agencies, to test the accuracy of their predictions. Even though the EIS is at the conceptual stage, the point remains that impact quantifications should be required prior to site disturbance if not provided with this EIS. 26 (38)

I: 80, S4.2.2.1, P 1, L7-14

- Normal industry practice for control of biofouling is scraping and chipping the organisms from a structure. This does not remove the organism from the system. The issue of biofouling and "weed" species is considerably over-stated and may serve to mask more important concerns and impacts. 27 (39)

I: 80, S4.2.2.1, C1, P 1, L10

- Use of oil-based drilling fluids will be regulated by COGLA. 28

Release rates will be set based on analysis of lethal and sublethal concentrations affecting marine organisms and sea birds. (40)

I: 81-90, S4.2, T 15-18

- The suggestion in Tables 15-18 that residual impacts from most accidental events including blowouts and pipeline ruptures are negligible, and that potential impacts are "minor" is too subjective and dependent on optimistic conclusions of the report on behavior and fate of such spills. In several places, it states that such impacts will be mitigated by implementation of the spill contingency plan. It remains to be demonstrated how effective the industry and spill response plan will be, especially for condensate, but the tone of such reassurances is overly optimistic. 29 (41)

I: 83, S4.2.3.1, C1 P 2, L1

- "Minor impact on microbiota." This term 'microbiota' includes too many categories of organism to be of meaning to the general public. The guidelines require the Summary to be written in terms understandable to the general public. Environment Canada suggests that use of this term in this context will obscure the meaning of the statement. A preferred approach would be to list the microbiota effected in more common language such as fish eggs and young, lobster and crab young, plankton, etc. 30 (42)

I: 89, S4.2.4, T18

- Discharge of toxic hydrostatic testing fluid into a stream is unacceptable under the Fisheries Act. Dilution is not an acceptable solution. 31 (47)

  See also Comment Number 75.

- Forest fires in the project area may have moderate to major impacts considering the present poor forest quality, and underlying soils, etc. Reforestation may not occur for several generations. No reference is made to other large or minor fires in this area, their impact, and how the burned areas have recovered. 32 (48)

- The impact from chemical or fuel spills could be moderate to severe in certain areas, depending on the chemical, the quantity and the time of year. 33 (49)

I: 91, S4.2.4.1, C1, P 2, L4

- Environment Canada suggests the loss of a rare or endangered species in Nova Scotia is a major impact as these species may not recolonize here for many generations, if at all. 34 (51)

I: 91, S4.2.4.2, P 2

- How long will it take to detect a leak? To isolate the leak? Should a rupture occur, how much gas or condensate would be released before the rupture was localized? 35 (52)

I: 91, S4.2.4.2

- The proponent provides insufficient information on control of access to the pipeline right of way. The whole issue of human access via the pipeline corridor is extremely important in terms of protection to wildlife, fish and generally to the wilderness areas across which the pipeline passes. Human access to the corridor by 4-wheel drive, all-terrain vehicles, snowmobiles, etc., can significantly alter the environment by increasing stress on the biota. 36 (53)

I: 95, S4.3.1, P 1

- Because of the nature of the biofouling community and the artificial reef effect and the possibility of thermal plumes 37 (54)

from cooling water and formation water, there is a distinct possibility of food chain transfer of toxins from the biofouling community to other trophic levels. Granted this would be difficult to measure but note that because it is difficult to measure this does not mean it does not exist nor that it might be a significant effect. It simply means that sampling may be very difficult.

- The statement that "Residual impacts of the Venture Project are expected to be concentrated in the nearshore and on land, despite initial popular perceptions of impacts associated with offshore hydrocarbon production" may also be a 'popular' perception. The worst-case scenarios and attendant major risks may still lie in the Venture field area. An adequate monitoring program should provide evidence to test both conclusions. 38 (58)

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VOLUME II, PROJECT DESCRIPTION

- It is not accurate to state that conditions at the Venture site are similar to those of areas of the southern North Sea. It is our understanding that the Venture area is subject to much higher geopressures than elsewhere, super-structure icing is more of a problem on the Scotian Shelf, the substrate is sand which is subject to erosion and migration, etc. 39 (60)

II: 10, S2.3

- This description of associated developments is inadequate given the terms of reference for the EIS. Passing reference is made to the possible use of the subsea pipeline to tap additional wells. Is there, in fact, excess capacity in the line to bring such projects on-line within the same 18 year life of the Venture field or are there projects that would have to await the depletion of Venture extending the life of the development considerably or alternatively require twinning of the line? What are the cumulative impacts of 30, 40 or 50 years of gas production in the Sable Island area?
  See Comment Number 6. 40 (61)

- The Intrepid wells are not shown on Figure 3, pp 5 as suggested in the text. 41 (62)

II: 10, S2.4

- Page 3 of the EIS addendum (2nd para) makes reference to Section 2.4 as covering contingency plans. Section 2.4 does not exist. 42 (63)

II: 13, S3.1

- Except in one or two instances no attempt has been made to assess, in section 3.2, the environmental criteria used in selection of the preferred alternatives. 43 (64)

II: 14, S3.2.2

- It is conceivable that liquids (condensates) released due to a blowout at one complex could drift into the area of the other complex some 5 km distant and endanger that facility (i.e. fire hazards), or that a blowout at one complex could produce a multi-blowout scenario as a result of associated fire from the first. 44 (65)

II: 15, S3.2.3, F7

- The development schedule does not indicate any environmental monitoring for the construction and operation of these facilities. See also Comment Number 26. 45 (66)

II: 19, S4.3, C2, P5

- The extreme overpressures at Venture can not be viewed as typical! 46 (71)

II: 21, S4.4.3, C2, P2, L10

"More tests to verify the toxicity (of low toxicity oil based muds) on local species ... Venture Project."

- The impact assessment assumes the use of such products; the results must be made available before the use of such products is approved. 47 (72)

- Environment Canada is currently conducting bioassay tests on several oil-based muds. Several questions are yet to be answered, for example, the amount of oil which will be released from cuttings discharges. What is the effect of released oil on marine birds through ingestion and surface contact? These questions should be answered before the proponent is allowed to used oil-based muds. 48 (73)

II: 21, S4.4.3, F10

- The diagram and the short descriptive paragraph in the text imply that cuttings are routinely washed before discharge. This is not the case and it is questionable whether this is in fact, common practice on board the two Mobil jack-ups. This diagram, in fact, is intended to show an oil recovery system designed to remove oil from cuttings when oil-based drilling fluids are used. 49 (74)

II: 22, S4.4, P1 & 2

- Insufficient information is provided on work-over fluids, formation clean-up fluids and drilling muds to allow evaluation of the claims made. Are bactericides contemplated for use in drilling muds? What types of rig wash compounds will be used? Toxicity data on any substance which will be released to the environment will have to be supplied to regulatory agencies prior to release of the substance. 50 (75)

II: 22, S4.5

- It should be borne in mind that the discharge values given on Page 22 are for a single well. Elsewhere it states that 4 rigs will be 51 (77)

operating on Venture and that up to 20 wells will be drilled. At least 8 wells are likely to be drilled from the same platform so that all discharges will be made over a very localized area.

- The proponents make claims that the effluent discharge will meet the standards of the Canada Oil and Gas Production Regulations, however, these have yet to be finalized and may not specify discharge limits. 52 (78)

II: 23, S4.5, C1, P3, Point (2)

- Details of the incinerator design should be presented to allow for estimation of combustion efficiency, ash production and emissions. 53 (79)

II: 32, S5.1.2, C1, P2

- A project of this size will inevitably require phased construction of gathering pipelines as the resource area is developed and more production wells are brought on stream. The cumulative impacts of such successive construction activities, in which the marine environment is repeatedly disturbed, may be much more severe than the impact predicted from a single construction event. The proponent should address such potential cumulative impacts and appropriate additional mitigating measures that may have to be implemented. 54 (84)

II: 33, S5.3.1, F17

- Figure 17 assumes that all contaminants are water insoluble and also not securely bound to the sand and thus that they can be readily recovered. 55 (85)

- How and where is the glycol eventually disposed of? 56 (86)

- How small are the 'small' quantities of sand that are produced? 57 (87)

II: 35, S5.3.2.6

- Reference is made on Page 35 to the fact that the discharged effluent will normally contain 20-25 ppm of total hydrocarbons. This perception is based on a single study to which reviewers do not have access. 58 (88)

II: 35, S5.3.2.6, T6

- Are these the only components of the produced water that was analyzed or does this represent the only some of the components? If not, what are the other materials present and in what concentrations? It is our understanding that there are problems with analysis of hypersaline solutions. Have assays been completed? Are the metals present bio-active? 59 (89)

II: 37, S5.3.2.6, P2, L7

- It is not clear whether the hydrocarbon levels of 15 to 25 ppm are the discharged concentrations or those within the caisson. 60 (91)

II: 37, S5.3.2.7

- Will liquid from all platform drains be collected? If so, this should be clarified as in most operating rigs (as opposed to platforms) many drains are open to the ocean. 61 (92)

II: 37, S5.3.2.11, Point (2)

- What is the chemical composition and toxicity of the foam used to fight fires? Some foams are more bio-degradable and less toxic than others. 62 (93)

II: 37, S5.3.2.11, Point (3), P2

- It is the understanding of Environment Canada that halon systems presently installed on rigs are not completely safe for personnel facilities that will be required at the end of 10 years. 63 (94) (104)

within the discharge compartment. Is this halon system different from those presently in use?

II: 39, S5.4, C2, P5

- Smoke density may be of consequence. 64 (95)

- Will added particulates affect fog generation locally and in turn affect logistics? 65 (96)

- The conclusion that "pollutants will blow away from the platform ... air pollution will be negligible" may not be substantiated. Before applying the results of a North Sea Study (Johnston, 1981) to the Sable area, it should be established that the conditions are similar. The analysis of air quality information is weak and does not justify the conclusions. 66 (97)

- Emissions from the flare and dispersion characteristics should be quantified in the final development plan. 67 (98)

II: 41, S5.6.7

- If its capacity is not increased, the treatment package will be operating at design capacity all the times. This may lead to more frequent breakdown. Will the holding tank be adequately sized to handle the wastes of the 25 extra people referred to in Section 5.6? 68 (100)

II: 45, S6.1

- The general conditions and areas where offshore trenching may be necessary should be described. If blasting is anticipated, it should be indicated, and probable impacts identified later in the report. 69 (102)
  See also Comment Number 412.

- The report should indicate potential impacts due to the compressor facilities that will be required at the end of 10 years. 70 (104)

- How long will it take the operators to detect a significant pipeline leak and isolate the line? We understand in the event of a leak the entire line contents will be released. The probable time for a leak of 1-2% to remain undetected should be mentioned here, with potential impacts addressed elsewhere in the report. 71 (106)

II: 49, S6.3

- How applicable are the valving arrangements in the NEB oil pipeline regulations to gas and condensate lines? 72 (108)

II: 54, S7.2.6

- Effluents from onshore facilities will be subject to regulations other than draft COGLA Production Regulations (i.e. NSDOE and DOE). 73 (112)

II: 59, S9.2, P6, L7

- Treatment of effluents from the temporary accomodation facilities is reportedly "similar" to that specified for production platforms. Will aerobic treatment be provided for sewage and COGLA discharge requirements met? 74 (113)

II: 60, S9.3, C2, P6

- Discharges of hydrostatic testing fluids will also have to meet the project-specific requirements of the Federal Fisheries Act. Prior to use of particular biocides and corrosion inhibitors, Environment Canada and Department of Fisheries and Oceans should be consulted. Chemical characterization of hydrostatic testing fluid will be required as will details of the discharge flow, location, timing, etc. 75 (114)

- Although an anti-corrosion chemical may be necessary for onshore hydrostatic testing, the use of a biocide should be justified, as 76 (115)

little growth could occur in the short time required to test the line. The chemicals referenced in Section 9.3 and 9.5 have not been evaulated for their toxicity, or persistence in the environment.

II: 61, S9.5

- It is not possible to fully assess construction and other impacts along the pipeline corridor without a more specific pipeline routing scheme. 77 (116)

- There is concern not solely for the slope of the terrain, but also for potential erosion of soils on the steeper slopes. Similar slopes may have widely varying erosion potential. 78 (117)

II: 62, S9.6

- Sweet gas plants of this capacity normally require less than 5-10 hectares of land. The reason that this plant needs 145 hectares should be discussed. 79 (121)

II: 62, S9.10

- The tabulated values rate noise levels from individual source types, but do not attempt to combine sources likely to be operating simultaneously for evaluation of overall noise levels. Discussions have not referenced the pitch, daily or seasonal variations, nor the range above background levels. This range would be important underwater, and to sensitive terrestrial fauna. 80 (122)

II: 64-65, S10.0, F26-27

- Figures 26 and 27 refer strictly to international trade vessels according to the original reference. These figures suggest that the Venture field lies extremely close to shipping lanes; however, no assessment of collision risks appear to have been undertaken 81 (124)

(eg. the "Euro Princess" incident). As local and fishing traffic are particularly important, this information should be incorporated in this assessement.

II: 70, S11.0 P1

- Information regarding the temporary supply base is inadequate to judge impacts should the site ever be selected. 82 (125)

II: 74, S13.2, P3

- If grooming of the right-of-way is to be a mechanical activity with no chemical applications, it should be so stated. Otherwise, the impacts of herbicide use should be addressed. 83 (127)
See Comment Number 16.

II: 82, S15.1, P1

- During this same 1955 to 1980 period, there were 151 major accidents in the US-OSC including 45 complete rig losses (see table below). 84 (128)

Major Accidents 1955-1980
(from Ocean Industry - October 1982)

Cause	Total Rig Losses	Major Accident (over $1 million)	Accidents (less than $1 million)
Blowout/fire	12	8	9
Storm induced	12	8	19
Jacking mode	1	3	2
Moving	9	14	3
Preparing to move	3	--	1
Drilling	3	5	--
Collision	--	2	26
Undesignated	5	1	5
TOTALS	45	41	65

- According to "Safety Offshore Oil" (1981), a publication of the U.S. National Research Council - "The rates of blowout for the 10 85 (129)

year period [of the last ten years of the 1956-1979 period considered] are 1 per 264 wells drilled, 1 per 485 major workovers, 1 per 1,484 completions and 1 blowout for each 3,100 producing wells". These statistics do not paint quite as rosy a picture as does the EIS. The principal causes of the 88 lost well control events during this period were shallow gas, equipment, personnel, unknown and storms.

- The same report suggests that in the Gulf of Mexico - OSC between 1970-78 there were 301 pipeline failures, 85.4 percent involving spills. The leak statistics given by Mobil appear to be for onshore pipelines only, since that is essentially the only pipeline construction done in Canada to date. Accident records in the Gulf of Mexico and North Sea reveal the following causes: 86 (130)

	Gulf of Mexico	North Sea
Impacts below water	46%	14%
Corrosion	18%	36%
Pipe movement	14%	14%
Expansion/contraction	--	28%

Underwater impacts (anchor-dragging, etc.) are responsible for the bulk of hydrocarbons spilled from pipelines (Safety and Offshore Oil Report - 1981).

In view of these problems, what measures are proposed to minimize such accidents?

- A recently received Norwegian study (Dahn E., Bern, T-I, M. Golan, G. Engen, 1983. Risk of oil and gas blowout on the Norwegian Continental Shelf, OTTER Group Rpt. No. STF 88A82062) shows that blowouts are always preceeded by a kick, 50% are caused by unexpected pressure zones, 28% by swabbing effects and 9% by lost circulation. On this basis, six blowouts are expected to occur between the years 1981 and 2000 in the Norwegian, North Sea, three from fixed platforms and at least one resulting in a fire. 87

II: 83, S15.2

- Volume III of the contingency plan does not address the containment and clean-up of condensate spills and in fact condensates are not even mentioned in the title or text! 88 (132)

- Volumes II and III have not been updated since 1980 where as the Action Manual (Vol. I) has been annually updated. These contingency plans have been developed for exploratory drilling operations. They will require significant revision, to incorporate physical environmental information gathered (from the literature) during the preparation of the EIS, as well as to address production operations at Venture. 89 (133)

II: 84, S15.2, P3

- Condensate spill response and clean-up drills should be held more often than once a year since crew changes will mean only half the crew is exposed to this type of excercise. These should be 'hands on' type exercises. Communication exercises should also be held frequently. 90 (135)

- What clean-up/containment type equipment will be available on the platforms or at Sable Island? 91 (136)

II: 86, S16.1

- The Canada Oil and Gas Structures Regulations have not yet been promulgated and requirements could change before they are finalized. 92 (137)

II: 86, S16.1.1.2

- The proponent should provide information on the magnitude of the problem (i.e. amount of helicopter downtime, overwintering contingencies during construction, etc.). 93 (138)

II: 87, S16.1.3, P3

- The list of concerns does not include shallow gas lenses. 94 (139)

II: 87, S16.1.3.5

- Having no detailed site-specific measures, can the proponents be positive about the stability of the piles and the integrity of the pipeline? 95 (140)

II: 88, S16.1.3.7

- It is noted that an earthquake registering 5.7 on the Richter Scale was recorded north east of Sable Island in 1974, and several others have been recorded greater than magnitude 6.0 in recent times. 96 (141)

- It should be pointed out that recorded earthquakes in this region are not correlated with known faults. Although the proponent may know where some of the faults are, this does not give a better picture of where an earthquake may occur. Seismic disturbances may be associated with slumping or other slope stability phenomena which are incompatible with pipelines. 97 (142)

II: 90, S16.2.1

- At what stage will 'storm recorders' be installed. It would be valuable for design purposes to begin collecting this type of data immediately. 98 (143)

II: 92, S16.3

- How will it be ensured that the monitoring program will go forward even after the completion of the EAR process, in any meaningful way? 99 (144)

  See also Comment Number 38.

- The "baseline assumptions" are the result of a review of the literature and little site-specific (pre-development) baseline information has been gathered. Without an adequate baseline, monitoring data will be all but meaningless. 100 (145)

- Why did the proponent compile baseline data at Hibernia but not at the Venture site? 101 (146)

- Decisions should be made beforehand as to what the biological and chemical monitoring program should include. The weather observing program (16.2.1) is well established and the weather elements which are recorded are dictated by COGLA drilling regulations. No such mechanism exists on the biological and chemical side and there is concern that a poorly designed monitoring program will be set up which will not yield satisfactory information to government, the proponents, or other concerned groups. The monitoring program should contain two main elements; 'end of pipe' compliance measurements to audit the efficiency of effluent treatment equipment and an environmental monitoring program which tests the accuracy and adequacy of mitigative measures, monitors for environmental change, and acts as an environmental early warning system. 102 (147)

II: 92, S16.3, T14

- The level of detail on monitoring is inadequate. It is not just the quantity but also the quality of the effluents that is important. The outlined monitoring program appears to be restricted to the operational phase of the project; considerable thought needs to be given to construction phase monitoring of impacts also. 103 (148)

- Monthly monitoring of produced water, drilling fluids and drill cuttings is not adequate (especially when one is talking about the first of a number of such development projects off the east coast; each has to benefit from knowledge gained during the construction and operation of its predecessor). 104 (149)

II: 98, Appendix A1.1

- There may be certain situations where the Ocean Dumping Control Act would apply to Venture Development activities. 105 (152)

- This appendix should not be considered to fullfill the guideline requirement to indicate the regulatory framework for the project. 106 (153)

- No reference has been made to Customs legislation, the Transportation of Dangerous Goods Act, the Criminal Code, or the Energy Supplies Emergency Act, all of which may have some bearing on the project. 107 (154)

II: 102, Appendix 2.2

- No references are given as to the source and veracity of this information. 108 (155)

- No information is given on the fate of the monitoring data collected. How, and by whom, is it to be analyzed, stored and acted upon? 109 (156)

- The extremes given as 73 year records are actually 83 year records. 110 (157)

II: 103, Appendix 2.3, P1, L3

- The intent of this paragraph, namely to clarify the meaning of "return period", is commendable. However, the second sentence is, unfortunately, incorrectly worded. This results in confusing the entire issue. This sentence should read: "for example, if the 100 year return period wave height is 30 m, the 30 m wave height is interpreted as that value which will be exceeded, on the average, once every 100 years". 111 (158)

ENVIRONMENT CANADA

DETAILED TECHNICAL

REVIEW COMMENTS

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VOLUME IIIa, BIOPHYSICAL ASSESSMENT

GENERAL

There is little or no information for many parameters in the study area. Information provided is often preceeded by a qualifier limiting its applicability. Concerns regarding this lack of detail of baseline information are discussed in the summary statement. 112 (159)

IIIa: 6, S2.0

- This section appears to provide additional details not included in Volume II, which is supposed to detail the project design. Only hydrostatic testing fluids are mentioned in Volume II even though equally large volumes of deoxygenated overwintering water will also be released into the environment. Similarly, effluents from the gas plant are discussed here but only noted as being insignificant in "The Project Description." 113 (161)

IIIa: 7, S2.3.1, P 3

- Liquid and solid emissions should be quantified, at least in a general sense, i.e., small amounts of hydrocarbons will adhere to the drill cuttings as a result of use of oil based drilling fluids. 114 (162)

What is a small amount? 100 ppm is a small amount but not an environmentally acceptable one.

IIIa: 10, S2.4

- Have the proponents chosen least possible toxic alternatives? (i.e., pH adjustment, aeration, etc.). Why is the biocide necessary? What concentrations will be used? If used to control biofouling of the in-side of the pipeline, are mechanical means available to produce the same end? Such questions will require answers before any release to the environment. 115 (163)

IIIa: 12, S2.5.3

- The air pollution potential of emissions from the plant, especially under emergency conditions, are not discussed. 116 (164)

IIIa: 14, S.2.8

"Mobil has contingency plans ... including a comprehensive condensate spill plan."

- This is incorrect; the present plans do not mention condensates They list equipment which has not been tested to see if it is suitable for containing or cleaning up condensates. 117 (167)
See Comment Numbers 88 and 89.

IIIa: 18, S3.2.1, C1, P3, L 13

- This appears to be contradicted by later statements on page 31 to the effect that Sable Island wind speed measurements may be between 10 and up to 30% lower than offshore sites. 118 (168)

IIIa: 23, S.3.2.1.4, C1, P 1, L8

- The study of extratropical storms (Richards 1982) focussed on storms which affected Hibernia area of the Grand Banks only. Although some of these storms traversed the Scotian Shelf it is not correct to say that the paper dealt with storms on the Scotian Shelf and Grand Banks. 119 (169)

IIIa: 30, S3.2.1.5, T5 - 8

- Climate data in tables 3,4,5,6,7 and 8 purports to come from AES Climate Normal publications. Approximately 75% of the data for Sable Island has been misquoted. 120 (170)

IIIa: 31, S3.2.1.5, C2, Point (3)

- The statement that "a fair weather bias ... is not applicable to the Scotian Shelf" is not justifiable. It may be partially true that large ocean-going vessels are bound by schedules and therefore travel whatever the weather (subject to Harbourmaster and Pilotage Authority approval). But these large vessels comprise only a part of the marine meteorological data base. Smaller vessels (i.e., fishing trawlers, coastguard and navy ships) certainally have the freedom to alter schedules in response to weather conditions (actual or forecast) and they frequently exercise it. Several AES metorologists (pers. comm.) have been aboard CCG ships on the Scotian Shelf which put to port to avoid bad weather. The fact that these ships are operating relatively close to shore allows them to move to port to wait out a storm. It is also not hard to imagine a responsible master delaying departure in the face of an intense storm. The only "ship reports" which do not have fair weather bias are those of "fixed" platforms such as drilling rigs. Comparison of this data to conventional SSMO data on the Continental Shelf reveals that a bias does exist in the SSMO data. 121 (171)

- The proponent tries to rationalize a reduction factor of 10-15% at Sable Island. We consider the reduction to be closer to 25%. It is stated that ships winds are accepted as adequate above 15 knots yet Environment Canada studies show ships winds to be, on average, 35% greater than Sable Island winds. Rig observations have averaged 59% higher than Sable, of which less than half can be attributed to anemometer height. Also, applying their factor to the return period table on p. 35 yields a 100 year return wind of 79 knots. A value of at least 110 knots is more likely. 122 (172)

IIIa: 35, S3.2.1.5, T12-14

- The extreme wind velocities listed in Tables 12 and 13 suffer from uncertainties referred to in the EIS. It should be emphasized that the design values listed in Table 14 are deemed most representative of Sable area offshore conditions. 123 (173)

IIIa: 34-35, S3.2.1.5, T9 - T10

- The maximum hourly wind speeds and gusts are the maximum values observed during the entire period of record, not the range indicated in Tables 10 and 11. 124 (174)

- It should be noted that the wind speeds at Canso in Table 10 are "one hour average" or "wind run" measurements recorded using a Type 45B anemometer. Since 1969 Sable Island has been equipped with U2A wind equipment and the measurements since that time have been one minute averages. 125 (175)

IIIa: 37, S3.2.1.5, T15

- Either the example is incorrect or the table entries under Wind Direction = N, Month = Jan and Duration = 12-24 hrs. (a) and (b) are reversed. 126 (176)

IIIa: 38, S3.2.1.6, Fog and Ice Fog

- No mention is made here or elsewhere of the potential of effluents from the production facility to increase the incidence of fog and ice fog (i.e., heated water effluents and smoke emissions into the air). 127 (177)

- "Advection of moist air over patches of warmer water causing low level instability, lifting and condensation" - one wonders how the formation of fog is related to the destabilizing effect quoted. Instability is usually considered a deterrent to fog formation. 128 (178)

- Radiation cooling is quoted as a fog forming mechanism. However, it is suggested that this sentence would make better sense if changed to read something similar to: 129 (179)

  "nocturnal radiational cooling of low level moist air which may have moved inland from the sea during the day."

IIIa: 38, S3.2.1.6, F15

- It is claimed in the text that Figure 15 shows the percent occurance of visibilities less than several threshold values. The figures suggest that the restrictions to visibility are due to fog. According to the original references, the visibility restrictions in Fig. 15(a) can be due to any cause (i.e., snow, rain, mist, fog). On the other hand, Figs 15(b) and 15(c) are frequencies of occurence of fog only. Besides fog there are numerous other weather elements (particularly snow in winter) which can reduce visibility. To be meaningful and to agree with the accompanying text the figures should be corrected. 130 (180)

- The data sources on which Figures 15(b) and 15(c) are based are not properly referenced. 131 (181)

IIIa: 39, S3.2.1.6, F16

- The figures showing persistence of low visibilities at Sable Island do not make sense. The example says that "fog during July will last 7 hours, 70% of the time." Selecting another point on the same graph leads one to the conclusion that "fog during July will last 10 hours, 80% of the time." These two statements are conceptually incompatible since one would expect longer durations of fog to occur less frequently. 132 (182)

IIIa: 42, S3.2.1.6, F18

- The reference (Byers 1959) does not appear in the bibliography. 133 (183)

IIIa: 43, S3.2.1.6, Icing on Ship Superstructures...

- Discussion of the freezing spray hazard is general and not all of it is specific to the Venture site. It is known that freezing spray can persist on the Scotian Shelf for up to 2 weeks, with only brief and infrequent lulls. It is not clear from information in the report that ice accreting for long durations on one side of a structure will present no problem to a bottom-founded structure. It seems possible that if, during high seas, spray exceeds wave heights by 16 m, the spray can reach the deck and superstructure for significant intervals of time. 134 (184)

IIIa: 45, S3.2.1.6, Wind Chill ..., C2, L6

- Table 18 should be referenced rather than Table 19. 135 (185)

- Mean wind chill is not a particularly useful concept. It would be much more appropriate to list, in addition to the percent above threshold table, the maximum values. 136 (186)

IIIa: 52, S3.2.2

- Time does not permit us to examine the reference "S.L. Ross Environmental Research Limited, 1982" which apparently contains an analysis of the impact on air quality resulting from accidental or planned Venture hydrocarbon releases. Furthermore, there are not enough data describing the onshore facilities to allow air quality modelling. Preliminary calculations do seem to indicate that the impact on air quality from a blowout is negligible. The EIS should contain documentation to firmly establish the environment impacts resulting from flaring, blowouts and other accidental releases, etc. It is not sufficient to merely state that these are negligible. 137 (187)

IIIa: 52, S3.2.2.2

- Mixing height is usually defined as the height above ground (or sea surface) at which dry adiabatic extension of the surface temperature intersects the vertical temperature profile. In the absence of precipitation or fog it delineates the thickness of the layer next to the ground (or sea surface) in which vertical mixing (on a short time scale) may proceed. Its existence is not dependent upon the presence of an inversion as is implied in this document. 138 (188)

IIIa: 52, S3.2.2.2, T21

- Table 21 has been derived from output of the so-called "STAR" program - a routine which <u>does not</u> apply to locations over the open water such as Sable Island and which gives rather doubtful results for coastal sites influenced by large bodies of water such as the open ocean. The "STAR" program relates stability class to insolation and wind speed and strictly speaking, applies only to level homogeneous terrain. It is quite obvious that insolation has little impact upon sea surface temperatures in the short term, and therefore <u>does not</u> have nearly as great an impact upon stability over a sea surface as it does over a land surface. 139 (189)

Furthermore, unlike inland locations, one would expect the greatest frequency of Class A stability to occur over the water south of Nova Scotia during the winter when cold air is carried in a southerly to southwesterly direction over the warmer water surfaces. However, Table 21 shows the greatest frequency of Class A stability in July at Sable Island. It is recommended that SABLE ISLAND be deleted from this table and that the deficiencies in the remainder of the table be mentioned.

- The occurence of highest ventilation coefficients at Sable during the winter does not relate well to the data for Sable Island shown in Table 21. 140 (190)

IIIa: 58, S3.2.3.2, Main Bathymetric Features, C2, P1, L5

- "East-northwest" should read "east-northeast. 141 (191)

IIIa: 60, S3.2.3.2, Effect of Bathymetry ..., C2, P1, L11

- Waves from the east and northeast have long fetches and only encounter water depths less than 60 metres relatively close to the Venture site so that attenuation of wave heights may not be as great as suggested by the proponents (i.e. design wave of 17.8 m). 142 (192)

IIIa: 66, S3.2.3.3, Mixing and Residence Time ...

- Residence time in the Sable area would be extended due in part to the clockwise gyre around the Island. 143 (193)

IIIa: 68, S3.2.3.4, Ocean Currents, F30, F31

- A comparison of Figure 30 and 31 reveals quite dramatically that no data has been collected to the north and northwest of Venture or along any of the subsea pipeline route. This may be a significant deficiency in terms of project design and in understanding the oceanography/biology of the entire project area. 144 (194)

IIIa: 82, S3.2.3.7, Upwelling

- The Gully is noted as an area of upwelling, however its importance to the biology of the area has not been addressed adequately. 145 (195)

IIIa: 83, S3.2.3.8, Wave Climate

- Throughout the discussion of extreme conditions (Page 99) and unusual conditions (Page 101), one is left with the impression that the severity of the wave climate was understated, and that the effects of shoaling were overestimated. Figure 45 gives a maximum crest elevation of 16.0 metres for the Rowan Juneau site and elsewhere it states (Page 99) that wave conditions on the Scotian Shelf are extremely variable, changing within only a few kilometres. 146 (196)

- It is stated that extreme wave values from WES data may be overestimated in some cases. This statement needs to be rationalized with the generally accepted view that WES winds are underestimates of the true values. 147 (197)

- The tabulated differences between significant and maximum wave heights for 50 and 100 year recurrence intervals is very small, especially at Site F (Table 44 in Vol. III(a) and Table 7 in Addendum). The small differences may result from difficulties in applying the Gumbel technique with precision and need to be resolved with generally observed differences between significant and maximum wave heights. 148 (198)

IIIa: 86-87, S3.2.3.8, T32-T33

- A column outlining the maximum wave heights determined by each study should have been incorporated into Table 32 and 33 to allow a meaningful comparison. 149 (199)

- No information is given on the relative size of the icebergs that have come close to Sable Island and Venture (i.e. exceptional observations #3, 10, 11, 12, 13 and 15). Would they have posed any threat if they intruded into the area of the Venture production facilities? 150 (200)

- This section appears to dismiss out-of-hand the importance of ice and icebergs to the operation of the production facility. 151 (201)

- There is bathymetric evidence of iceberg furrowing along the inner shelf. How old are these? Do they pose a threat to the pipeline? 152 (202)

IIIa: 104, S3.2.4.2

- The chemical marine environment is clearly an area where baseline information is required and should be collected by the proponents prior to construction or development drilling. The proponents will not be in a position to monitor impacts without this type of data. 153 (203)

IIIa: 105, S3.2.4.2, Dissolved Oxygen

- Dissolved oxygen concentrations at the Venture Development Site and along the offshore pipeline corridor, particularly near the landfall, should be characterized by obtaining a valid time series of data. Without this data set it will not be possible to determine if a dissolved oxygen depletion which might occur during the development is a natural aberration or related to the development. 154 (204)

  See Comment Numbers 38.

IIIa: 105, S3.2.4.2, Suspended Particulate Matter

- Ambient SPM concentrations at the Venture Development Site and along the offshore pipeline corridor, particularly near the landfall, should be characterized by obtaining a valid time series of 155 (205)

data. Without this data set it will not be possible to determine whether a rise in SPM is a natural aberration or the result of activities related to development. These activities could include mud discharges and, dredging related to pipeline trenching and burial, and wharf construction.

- "The sources and distribution of SPM in the near-bottom zone are not well understood, nor do the limited data for this particular site permit speculation". The understanding of near bottom SPM processes is essential to determination and quantitafication of impacts and as such, investigations should be undertaken before development commences, both at the Venture Site and in the vicinity of the pipeline landfall and onshore developments. 156 (206)

IIIa: 109, S3.2.4.2, Trace Metals

- Knowledge of baseline heavy metals is essential for the Venture site if a meaningful monitoring programs is to be designed. Metal contamination from at least 3 potential sources; drilling fluids, formation water and formation sand, is possible. 157 (207)

IIIa: 111, S3.2.4.2, Hydrocarbons, T48

- In the original study (Table 48) oil production sources were segregated from transportation type sources. This data is dated. Since 1975 there have been a number of significant oil well and tanker accidents which would, Environment Canada believes, alter both the estimates and the proportions attributable to land and sea pollution sources (eg. Ekofisk, Ixtoc, ongoing discharges in Persian Gulf, Kurdistan, Amoco Cadiz and Argo Merchant to mention but a few). 158 (208)

IIIa: 112, S3.2.4.2, Hydrocarbons, P1, L9

- "No data [polycyclic aromatic compounds] are available for the study area but it is reasonable to assume that ... industrialized centres." 159 (209)

It is conceivable that over the 15 years that Mobil and others have been drilling in the shallow waters around Sable Island that their operations have contributed PAH and other hydrocarbons to this semi-closed circulation system.
See Comment Numbers 165 and 166.

IIIa: 112, S3.2.4.2

- Absolute statements are out of place, given the lack of site-specific data, and the conceptual nature of this EIS. 160 (210)

IIIa: 113, S3.2.4.3

- It is relevant to note that sediments will have to be characterized in detail in those areas where project activities come under the jurisdiction of the Ocean Dumping Control Act. This should be done in the very near future so that any problems which might arise as a result of sediment contamination can be dealt with in a time frame which will not interfere with the development project schedule. 161 (211)

IIIa: 113, S3.2.4.3, Trace Metals

- The proponent is known to have data on trace metals for the Venture field. These should be reported. 162 (213)
See also Comment Number 173.

- Sediment trace metal concentrations should be determined across a grid at the Venture development site encompassing delineation and production wells. Sediment trace metal determinations should be carried out on sediments at the pipeline landfall and in the vicinity of any shoreline developments. Without a statistically significant data base, there will be not means of measuring impact. 163 (214)

IIIa: 114, S3.2.4.3, Trace Metals, T52

- This table is misquoted from data provided by Environment Canada. Corrected values are as follows: 164 (215)

	Table 52	Environment Canada Corrected Information
Cadmium	0.01 ppm	0.1 ppm
Copper	5-10 ppm	5-14 ppm
Mercury	0.04-0.07 ppm	0.035-0.07 ppm

IIIa: 115, S3.2.4.3, Hydrocarbons, C1, P3

- This is one of the few times that there are data reported for the Sable Island area, however, there is no further mention of the results of the samples from around Sable Island. 165 (216)

- Although the conclusions of the Keizer et al. (1978a) study are justifiably conservative in interpretation of their results they do state: 166 (217)

"There is an apparent difference in the hydrocarbon composition of the sediment at abandoned exploratory drilling sites [around Sable Island] and from adjacent areas presumably unaffected by drilling. This cannot be accounted for by differences in sediment type or in situ production of biogenic hydrocarbons."

- The range of concentrations of between 0.5 $ug.g^{-1}$ to 405 $ug.g^{-1}$ is reported without sufficient explanation or comment. Treatment of the availability to benthos and discussion and explanation of the sediment hydrocarbons is inadequate, especially considering that this is an EIS for a hydrocarbon development. 167 (218)

IIIa: 115, S3.2.4.3, C1, P3, L10

- Although this is an obvious suggestion that the Keizer et al. (1978a) data is faulty, there is no attempt to justify this statement with fact or reasoning. 168 (219)

- Given the nature of the development, one would have anticipated collection of at least this type of site-specific data, especially since exploration has continued in the Sable Island area since the late 1960's. 169 (220)

IIIa: 115, S3.2.4.3, Other Contaminants

- This section is deficient in that no data are presented or anticipated for areas to be impacted by development. 170 (221)

IIIa: 116, S3.2.4.4

- Trace metal and hydrocarbon levels in tissues of marine animals in the Venture project area should be determined. 171 (222)
  They may have to be provided before the project reaches the operational phase if monitoring efforts are going to have any meaning.

- Hydrocarbon levels in organisms from the Nova Scotia coast are not representative of the study area, especially since many of those values reported are in connection with marine disasters. 172 (223)

- It is the understanding of Environment Canada that Mobil has attempted to collect, or is in possession of data on trace metal content and hydrocarbon content of benthos in the Venture area. This should be reported. As well, the proponent should discuss the adequacy of the data for monitoring purposes. 173 (224)

IIIa: 141, S3.2.5.5, T58

- Clam River is the only river in the table to be affected by this project. The three rivers on Cape Breton Island have significantly different characteristics than either the Clam or the St. Mary's. Are no data available for the Salmon or Guysborough Rivers, Country Harbour, Issaac's Harbour, or New Harbour Rivers? 174 (227)

IIIa: 154, S3.2.5.7, T62 and F70

- Severe limitations to forestry growth are indicated (Class 5 and 6) along approximately one-half the pipeline corridor. Loss of this resource through a large forest fire would be a moderate to severe (not minor) impact, and would significantly affect local ecosystems for decades to come. This is more realistic than measuring the impact in terms of generations. 175 (228)

IIIa: 159-163, S3.3.1

- Data presented in Section 3.3.1.2, Seasonal Distribution is somewhat useful, and quantitive. However, it is unlikely that there will be any impacts of this development on nutrient concentration or any discernable impacts on annual production at the level of resolution reported or known. 176 (229)

- As it is known (see for example Dunstan et al. 1975 and the recent review by Snow 1981) that change in phytoplankton community species composition is a common impact of the petroleum hydrocarbon contamination, it is important to know the dynamics of species composition in the phytoplankton of the study area. Thus, there is a notable deficiency in Section 3.3.1.4, Dynamics. The species composition is not known. Since, without this information, it is unlikely that any impact of the development would be discernable, the information is critical. 177 (230)

IIIa: 176, S3.3.2

- As stated for phytoplantkon, above, it is known and has been stated in the EIS, that community changes can be expected with the presence of petroleum hydrocarbons. However, there is insufficient site-specific data to identify such a change. Since microbiota have been identified as potential monitoring agents (McIntyre and Pearce, 1980), the data presented here is deficient for the purpose for which it is required. 178 (231)

IIIa: 180, S3.3.2.4

- As above, for example, when discussing protozoa, there is no mention of the levels of hydrocarbons at which ciliates and amoebae increase dramatically nor an interpretation of general effects on the ecosystem should it become contaminated. For example, are all these organisms nutritively important and are they acceptable food items to predators? 179 (232)

IIIa: 181, S3.3.3

- This section is probably about as good as one can expect, considering the data available. If the other biological data were as good, it would be better for impact prediction requirements. 180 (233)

IIIa: 183 and 185, S3.3.3

- The photograph captions for nauplius Calanus sp. and adult Calanus sp. are reversed. 181 (234)

IIIa: 195, S3.3.4

- Considering the probability that the benthic community will be disrupted while the field production platforms are set in place and while the submarine pipeline is constructed, quantitative sampling of these areas is essential to identify resources of ecological or commercial importance. This information is not 182 (235)

presented and the proponents should be required to collect it before they are allowed to go ahead with construction.

IIIa: 195, C1, P5

- Mention of "high replacement potential" suggests minimal problems in recovery of populations. This is not necessarily so. The nature (chronic or acute) of this disruption, extent, timing, and the availability and suitability of the substrate will affect the type and extent of recolonization. 183 (237)

- Because a species may produce a large quantity of potential replacements does not suggest that species will replace itself rapidly upon disruption. A recent survey for commercial quantities of shellfish such as ocean quahogs (Arctica islandica) showed that the average age of individuals in the Scotian Shelf survey area was several decades. This is indicative of a slow rate of recruitment to the stock. A similar situation may exist on the South-east shoals of the Grand Banks for an extremely numerous bivalve, Mesodesma deauratium. 184 (238)

- This blanket statement concerning replacement potential suggests an incomplete knowledge of the population biology of benthic species, which could very well result in incorrect conclusions concerning vulnerability and potential impact. 185 (238)

IIIa: 195, S3.3.4.1

- The biases and limitations of the sampling conducted by others have not been discussed, and therefore uncertainty still exists regarding actual conditions in the study area. 186 (239)

IIIa: 197, S3.3.4, F92

- Although this figure is based on sediment type and total distributions are based on extrapolation of sediment types (see 187 (240)

Volume IIIa, Page 198, Column 1, Para. 1, Line 7), this map bears only general similarity to Figure 59, Volume IIIa, Page 135. The data presented in Figure 59 should be used to increase the accuracy of the estimates of benthic distribution.

IIIa: 198, S3.3.4.2

- Much of the mapping over the Scotian Shelf which is presented in Figure 92, is derived from extrapolation of dominant species information based on sediment type. Figure 92 gives the impression that benthic community distributions over the Scotian Shelf in the pipeline corridor are well understood. Based on the paucity and distribution of sampling sites presented in Figure 91, and our information it seems clear that this is not the case. 188 (241)

IIIa: 202, S3.3.4.4, Species Composition and Distribution

"The sampling effort in the offshore portion of the study area is very limited and most of the distributions of benthic fauna are based on a knowledge of the bottom type."

"Similar to the area east of Sable Island, sand dollars probably dominant the sandy areas north of Sable Island and on most of Middle Bank. Nothing is known of the infauna occuring in the sand dollar community north of Sable Island. The epifauna probably includes echinoderms such as starfish and sea cucumbers, and a number of crustaceans such as crabs (Cancer sp. and Pagurus sp.)."

- Clearly the above description is not sufficient information upon which to base an impact assessment. 189 (242)

IIIa: 203, S3.3.4.4

- The sections entitled "Seasonal Cycles"; "Feeding Types and Trophic Relations"; and "Production" are too simplistic. It may have been overly ambitious to expect that these topics could be addressed in any meaningful way. A more appropriate treatment 190 (243)

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would have included only those factors judged important to establishing the potential impacts of a hydrocarbon development as was suggested in the Guidelines.

IIIa: 215, S3.3.5

- Considering the vast range of information on marine fish and fisheries, this section, on the whole, is relatively well done. However, much is irrelevant. The approach fails to address specific points of importance to the potential impacts of a hydrocarbon development on fish as is required by the guidelines. A functional habitat oriented approach would have been more valid. Topics such as stock delineation and local stock affinity, for example in herring, bottom preference and territoriality in flatfish and lobster, the substrate conditions required for settling in lobster and scallop, the phenomenon of patchiness as it applies to ichthyoplankton distributions or the potential for critical feeding relationships and timing in the early life history of fish should be related to possible impacts. 191 (248)

IIIa: 241, S3.3.5.6

- This section leaves the impression that the biomass estimates presented in T77 and T78 are derived from multispecies models or stock-recruitment models. This is not the case. Fisheries and Oceans' stock estimates are based, for the most part, on numerical single-species models, such as Virtual Population Analysis (VPA). The basis of the production estimates should be more thoroughly explained and referenced. 192 (249)

IIIa: 242, S3.3.5.7

- Production versus biomass ratios are an extremely crude method of estimating productivity. (Note that productivity is a rate, as in grams per year.) Data available for most commercial fish species should allow a far more accurate measure of productivity. 193 (250)

- Any impact on fish populations from this development will not be visible from changes in fish production. There is far too much give and take in the natural course of recruitment. Rather, the proponent should be required to study the sensitive stages of fish life; the eggs and larvae and in fact the reproductive products before they are released by the parent. This, if anywhere, is where impact could be detected. 194 (251)

IIIa: 290, S3.3.9

"There are no facilities associated with the Venture ... therefore justified."

- Regardless of whether there are facilities on the Island, it is probable that any significant accident at the production platform will result in impact to the Island. 195 (254)

IIIa: 307, S3.3.10.1-S3.3.10.2, Rare Species

- These sections should have discussed the vulnerability of these rare and endangered species, particularly to activities associated with this project. The text here is drawn from the reference by Isnor (1981) but the information on vulnerability in that reference has not been interpreted. 196 (258)

IIIa: 320, S3.3.10.3, Fish, C2, P2

"Little specific information on fish communities has been published for lakes and rivers of the study area, but occurence can be predicted on the basis of experience elsewhere in Nova Scotia."

- This statement is only partially true.. It is not possible to predict the fishery resource (extent and composition) of a given stream based on data from other streams in a region. Each watershed has its own physical/chemical characteristics which dictate its fishery productivity. Clearly, before an environmental 197 (263)

impact designation related to pipeline construction can be made, the fishery resources, spawning areas and fish movements must be well understood for the streams to be crossed. Fairly extensive field work on these streams must be undertaken soon.

IIIa: 321, S3.3.10.3, Life History...

- The East, Moser and St. Mary's Rivers are discussed in the text; however, it is unlikely that any of the rivers will be crossed by a pipeline. The detailed discussion of these rivers seems, therefore, somewhat irrelevant. A cursory glance at Figure 128 indicates that the Country Harbour, Guysborough, Issac Harbour, New Harbour, and Salmon Rivers may warrant detailed study. 198 (264)

IIIa: 324, S3.3.11

- There is danger in making the impossible seem possible. There can be no claim to understanding any of the ecosystems impacted. Any statements or analysis based on the ecosystem discussions should be strongly qualifed to indicate the limitations of the methods and the data. 199 (266)

- Although it is agreed that a major problem with describing an ecosystem is defining the boundaries, it is artificial and misleading in this context to separate the inshore and offshore marine ecosystems. 200 (267)

- The decision implies that a functional approach was taken to impact prediction. This is not so. A single order interaction matrix was used, an extremely simplistic approach. 201 (268)

- Production estimates were not used in the impact prediction exercise. They could have been used as a primary indicator of major interactions or important components but, considering the quality and resolution of the data, it is well that no further use is made of them. 202 (269)

ENVIRONMENT CANADA

DETAILED TECHNICAL

REVIEW COMMENTS

on the

Venture Development
Project Environmental Impact
Statement

Volume IIIb - Biophysical Assessment

IIIb: 2, S4.0, P2

- "The preferred route may lie either to the north or the south of the Island, but no facilities are presently planned for Sable Island itself." It is not possible to assess potential impacts on Sable Island with this kind of project description. 203 (273)

IIIb: 8, S4.1.2.3

- While marine ice problems may be minor, pipeline design at the production and the shoreline ends should incorporate appropriate safety features. Details should be provided in the proposed Development Plan. 204 (276)

IIIb: 8, S4.1.2.3, P3

- Since icebergs have occasionally been sighted in the project area, the proponents should attempt to indicate what size bergs could be encountered, whether they could damage the fixed platforms, subsea pipeline and what measures could be taken to mitigate the threat in a heavy iceberg year (i.e. reconnaissance, iceberg towing, etc.). 205 (277)

- As noted in comments on IIIa, iceberg furrows are a known feature of the bathymetry of the Scotian Shelf. 206 (278)

IIIb: 11, S4.1.3.3, P3

- "Intensity of dynamic activity in the nearshore zone is often site-specific and will be studied during final selection of a landfall site." It will be necessary to ensure that environmental concerns are adequately addressed when a final site is chosen. 207 (280)

IIIb: 17, S4.2.2, F11

- It is questionable whether or not there is adequate information to create Figure 11 the "Distribution of Marine Benthos in the Proposed Offshore Pipeline Corridor." This figure should contain station locations and be properly referenced. On the basis of Figure 91 in Volume IIIa, we do not believe the information base supports the creation of Figure 11 and in consequence, there is little basis for any claim to knowledge of the benthic resources of the study area. 208 (283)

IIIb: 17, S4.2.2

- Section 4.2.2 does not supply sufficient information upon which to base an assessment of the impacts of offshore pipeline construction on benthic communities. 209 (284)

IIIb: 17, S4.2.2.2

- The proponents should be expected to collect baseline data within the intertidal and nearshore subtidal zones over the short stretch of coastline within the pipeline corridor. This is the area in the marine environment most likely to be impacted by the laying of pipeline, associated trenching and blasting and the release of testing and overwintering fluids. 210 (285)

IIIb: 18, S4.2.3.1

- Data on fishing activity and gear use is given for 1981 only. The values given should be compared to those of previous years since in all likelihood, a single year is not representative. 211 (286)

- Detail of the nearshore fishery resources should be of similar resolution to that which Mobil would require to determine compensation claims. Is the proponent to use its current data base for this purpose? 212 (287)

IIIb: 19, S4.2.3.2, F17 and IIIb: 31, S4.4.5

- The major rivers may be neither the most important nor the most sensitive habitat for salmonids. Small rivers, streams and lakes provide critical spawning and nursery habitat and may be severely impacted by improper route location or construction activity because of the lesser capacity of these smaller habitats to accept impact. 213 (288)

IIIb: 26, S4.4.1

- This section provides a map and description of nine "ecosections" delinieated in the pipeline corridor. No description of the methods used or rationale followed for defining the ecosections is provided. Have the terms and definitions laid out by the Canada Committee on Ecological Land Classification been followed here or not? If not, a description of the methodology is required. 214 (291)

- Aside from providing a general description of the study area, what was the purpose of presenting this kind of information? Is it to be used in aligning the pipeline route? - If so, how? 215 (292)

IIIb: 31, S4.4.5

- Details as to population densities, and locations of spawning beds, rearing areas and overwintering pools in relation to stream crossing will be required.

IIIb: 34, S5.0

- The proponent is to be complimented on attempting to rationalize the establishment of development impacts. This is a quantum step ahead of other similar impact statements. However, the method used, the "Leopold" or inter-active matrix, suffers from at least two major limitations. First, the single interaction format is unrealistic and cumbersome. Secondary multi-order and cumulative impacts are not explicately identified. Only the prior knowledge of the assessor will identify these using this method. Defined matrix relationships are not immediately obvious to a reviewer and require explanation. The second major limitation is that catagories are mutually exclusive wherein reality, all are interconnected. In attempting through simplificatiion, to understand the system, there is a danger of missing important interactions through oversimplification. 216 (295)

IIIb: 37, S5.1

- In a strictly biological sense, the definitions of environmental impact are valid; however, such broad definitions will tend to mask localized impacts which may well be unacceptable to local residents of, for example, Seal Cove, or unacceptable to citizens of Nova Scotia as a whole. It would be better to recognize this dichotomy of acceptable impact by modifying impact ratings to recognize the difference between what might be labelled biologically-scoped environmental impact and socially-scoped environmental impact. Alternatively, in order to allow a more detailed interpretation of impact, catagories such as "minor" impact should be subdivided to provide non-technical reviewers with an appreciation for the level of impact anticipated. 217 (297)

- A definition of a MAJOR IMPACT being tied to "several generations" is ambiguous. How may generations are "several"? What plant or organism is to be used as a definition of generation? Clearly trees and polychaetes have greatly differing generation 218 (298)

time spans. Also the definition cannot be applied to physical effects, such as effects on fishing gear. The difficulty becomes apparent in Section 5.2.1.2. It is possible that impacts in terms of years (such as MODERATE on the order of 5 years to recovery; and MAJOR being on the order of 10 years) would be a more appropriate delimiter.

- How would one define the impact of an increase in heavy metal contamination in marine sediments? According to the scheme presented, one has to assess the impact of the increased contamination on a biological component of the environment. 219 (299)

- Sublethal early warning signs (biochemical, cellular, physiological, etc.) should be investigated as an alternative to population effects. By the time observable population changes occur the impact at sublethal levels may be very extensive and possible irreversible. 220 (300)

IIIb: 38, S5.2, C1, P1, L10 and S5.2.1.3, C2, P3, L1

- Where do these fish come from? Does this attraction not remove these fish from potential fishing by attracting them within the exclusion zone? The positive impact in areas such as the Gulf of Mexico is due to the sport fishery around rigs; no such fishery is possible in this case. Another factor not considered is the impact of effluent discharges on locally concentrated fishes (i.e. tainting and possible metals accumulation). 221 (301)

- Attracted fish should be analyzed for metals (formation water, cuttings) and hydrocarbons. Tissues with potential accumulation capacity such as the liver, nervous system, and gonads are of particular interest. 222 (302)

IIIb: 39, S5.2, F22

- Environment Canada questions the "negligible" rating for water quality given to liquid/solid releases during drilling/ 223 (303)

construction, and "minor" rating during an accidental event.

224

- Nowhere in Figure 22 are safety implications assessed. (304)

- Environment Canada question the "negligible" and "minor" ratings given vegetation (Sable Island) and birds, respectively, in the case of accidental events. 225 (305)

- Potable water quality (Sable Island) does not appear to have been considered in reaching ratings for accidental events. 226 (306)

- This table (Figure 22) is not what it purports to be. It clearly does not represent worst-case impacts. 227 (307)

IIIb: 40, S5.2.2

- While dust from drilling muds and dry cement are unlikely to have an effect on biota, Environment Canada believes they are an area of concern for the rig workers, based on knowledge of present poor handling practices. The panel should consult appropriate experts to discern whether there is a health hazard. 228 (308)

IIIb: 40, S5.2.2, C1, P4

Will the flare contact Sable Island for example, during the frequent summer fogs? What will be the long term effects of regular gas flare fallout on vegetation and animals on Sable Island? 229 (309)

- Do migratory bird routes involve the proposed platform areas, and if so, are passerines identified among the migratory birds? Passerines have been found to be attracted to bright lights and flares. Relevant data from other operations should have been provided. Will nights be worse than days for bird incinerations, and if so, can schedued flare releases be made in the daytime? 230 (310)

IIIb: 40, S5.2.3

- Throughout this and other sections, each effluent or impact is considered in isolation and synergistic/antagonistic interactions are not discussed. 231 (312)
  See also Comment Number 216.

- The fact that heavy metals are associated with some barite sources is not fully acknowledged. 232 (313)

- No mention is made of biocides often included in drilling muds to prevent fermentation. 233 (314)

- The toxicity of many rig wash compounds is not mentioned nor is the fact that radioactive substances are stored on the rig for logging and testings purposes. 234 (315)

IIIb: 40, S5.2.3, T7

- Table 7 does not provide the complete picture for liquid/solid releases during drilling. For example, oil-based muds are often required in production well drilling and are not mentioned here. 235 (316)

- In addition to regular discharges, the possible spills from the platform include: well kill mud, contaminated sand, condensate, glycol, caustic, thinners, diesel fuel ($300m^3$ tank), aviation fuel, sand, hypochlorite ($8m^3$ tank) and cooling water.

IIb: 40, S5.2.3

- What quantities of hydrochloric and hydrofluoric acid are used in formation clean-up? Is any netralization planned or necessary prior to disposal? 237 (319)

IIIb: 41, S5.2.3.1, Water-Based Drilling Muds

- EPS has examined the toxicity of drilling muds used off the east coast. The results of these analyses should be compared to those given in the test since the EPS data shows higher toxicity readings in some cases. 238 (320)

  Considerable work has been done in Canada by a Government Industry Task Force on the toxicity of whole muds and mud additives. This data should have been referenced and used. The results are more applicable in Canada than those quoted.

  The proponents have not given an unbiased assessment of the problems of fluid disposal and hence tend to underestimate the impact. The proponents have relied on only two papers on drilling muds for their entire discussion. There are equally persuasive counter-arguments available in the literature.

IIIb: 41, S5.2.3.1, Water-Based Drilling Muds

- It is relevant to note that the MacLaren Plansearch 1982 report entitled, "Physical Fate of Drilling and Production Discharges in the Venture Field" was prepared using a computer modelling technique with no field testing. The current data used are not site-specific. The following statement in the report, relating to current data should be taken into account when the results are applied to impact assessment. "... however, care must be taken in generalizing data for one site to another as conditions around the Island are quite variable." 239 (321)

- A program to monitor the types of discharges and their effects will be required. To make this monitoring meaningful, a good baseline of water and sediment quality information will be required. 240 (322)

- Bulk dumping and disposal of drill pipe, etc., should be controlled by DOE through implementation of the Ocean Dumping 241 (323)

Control Act. These activities are strictly DISPOSAL related and are not really INCIDENTAL to the drilling operation. A case in point is the recent Panarctic conviction.

- With two "distinct" production areas about 5 km apart, there will be probably be some overlap of plumes. This possibility should be addressed in the EIS. 242 (324)

- Regular mud dumping will create slightly toxic sediment over 22.1 km^2. Is this acceptable? Why are low-toxicity muds and biodegradable chemicals only being "considered"? Based on current information, Environment Canada will recommend low toxicity muds be required if oil based muds are used offshore. 243 (326)

- The whole discussion of drilling muds and oil-based muds is too simplistic. The available literature on plume dispersion does not appear to have been adequately accessed. 244 (327)

IIIb: 43, S5.2.3.1, C2, P1, Oil-Based Drilling Muds

- The reference quoted (Wells et al. 1982) cites the product as an oil dispersant rather than a component of oil-based drilling fluid. There is an incomplete discussion of the significance of any oil coming in contact with seabirds and the quantity of oil required to result in death through hypothermia, be it mineral oil or diesel oil. 245 (328)

IIIb: 43, S5.2.3.1, C2, P2, L5, Oil-Based Drilling Muds

- There is no proof provided for the statement that diesel oil released from cuttings will have a neglible impact. To our knowledge, conclusive studies have not been conducted although there has been some field work conducted in the North Sea to indicate build-up of petroleum around rigs using oil-based muds. This work should have been referenced and reported. Has there been any work on accumulation of hydrocarbons from the water column into fatty 246 (329)

tissues and organs such as the liver and gonads? What is the effect of any accumulation on the reproductive potential of effected fish, for example? Long term release of diesel oil, even at low levels, should not be allowed without an adequate program to monitor the potential impacts and regulations which will allow enforcement of mitigation of impact, if noted.

IIIb: 43, S5.2.3.1, C2, P2, L12, Oil-Based Drilling Fluids

- Concerning oil degradation by oleoclasts, the proponent has given no evidence to show that bacterial degradation will have any perceptible role in removal of petroleum hydrocarbons from the ecosystem. In fact, if bacterial degradation occurs, some of the intermediate products of this degradation (for example polycyclic aromatics have been suggested to be more potentially dangerous than the original compounds. There is evidence from North Sea research into the use of diesel-based drilling fluids that suggests that benthos is affected by this discharge. The proponent should be expected to undertake tests to measure the oleoclastic activity, define the component compounds of any degradation products and also impacts of diesel release on water column organisms and bentho in the event it wishes to use diesel oil-based drilling fluids. See Comment Number 297. 247 (330)

IIIb: 43, S5.2.3.1, Oil-Based Drilling Fluids

- Impacts on seabirds of even the "non-toxic" oil-based muds can be damaging if any kind of slick is formed. Oil could interfere with the birds' insulation. 248 (331)

IIIb: 45, S5.2.3.3

- The proponents should undertake to only use low toxicity deck washing compounds. 249 (332)

- If emulsifiers (detergents, dispersants) are used in deck washing, discharging this waste through the drilling mud caisson could emulsify the oil in the caisson and affect the oil recovery rate. 250 (333)

IIIb: 45, S5.2.3.4

- Does the proponent anticipate any thermal entrainment due to release of cooling water or produced water to occur? Has a thermal plume model been developed? Are there any anticipated interactions between thermal entrainment and hydrocarbon discharge? Will the platforms be designed so as to reduce the potential synergism of thermal, liquid, solids and sewage discharges? 251 (334)

- If overflights are only needed to check bearings, why not place the required beacon on one of the production platforms, thereby eliminating any need to approach or fly over the Island? 252 (336)

IIIb: 46, S5.2.6

- The offshore platform will be in the travelled shipping lanes and Sable Island is infamous as a graveyard for ships, therefore we perceive a danger from a ship collision with the platforms. 253 (337)

- Environment Canada questions the conclusion (Ross 1982) that condensate deposition on Sable "would be negligible" (Vol. IIIb; Page 47). There is no indication as to the quantity of condensate impacting the Island that would result in a biological or geological impact. Potentially a "negligible" amount of condensate could result in a "major" biological impact depending on what one considered a "negligible" amount. 254 (338)

IIIb: 47, S5.2.6.1, P3

- 60 ug. m^{-2} .s^{-1} is approximately equal to 5184 mg.m^{-2} d^{-1}. This would equal a concentration of 5.184 mg/l in the top 1 meter of 255 (339)

the water per day. For a 200 day blowout, a large water volume could be affected by this 5 mg/l of condensate. This concentration is in the range for lethality for water soluble fractions to rainbow trout, stickleback and Daphnia and for oil-water dispersions to Daphnia.
See also comment number 259.

IIIb: 47, S5.2.6.2

- The risk and dangers of collision has not been evaluated. 256 (342)

IIIb: 48, S5.2.6.3, Behaviour of Gas...

- Will the release of gas in a blowout threaten the integrity of the system by undermining the production facility? 257 (344)
There have been several jack-up rig losses traced to this phenomenon.

- Throughout this section there is no mention of sublethal effects other than impairment of chemoreception. Narcotization is a common sublethal effect of low (ppb) concentrations of petroleum hydro-carbon. As well, the potential for accumulation in gonads and subsequent impairment of reproductive success has also been suggested as a potential sublethal effect. Taking this potential for sublethal but equally as fatal impacts (a narcotized copepod is as subject to predation as a dead one and disruption of timing of copeopod reproduction could have severe effect on growth rates of haddock larvae) as reasonable results of several studies, the proponent should reconsider the impact evaluation and also should be expected to participate in testing the predictions. 258 (345)

- It is disputed that spilling 34 million litres of condensate into the ocean over a 200 day period will have a negligible effect on the biota of the area. We can accept that the possibility of a blowout is remote, but if it does occur, the environmental effects 259 (346)

would be more extensive than the proponent is predicting. Sub-lethal or chronic effects of the gas condensate have not been described. A blowout that lasts for 200 days would certainly expose marine organisms in the area to low levels of condensate over a long period of time. This aspect has not been adequately addressed.

See also comment number 255.

- Another omission in the document was the environmental impact of a condensate spill on shore (pipe line rupture, tank car or truck upset, storage tank leakage). The EIS should adequately address the environment impact of a spill on land once the condensate is separated from the natural gas. 260 (347)

IIIb: Background Study "S.L. Ross Environmental Research Ltd., The Behaviour and Fate of Gas and Condensate Spills"

Section 2.3:4, Point 4

- "The material quickly dilutes in the water column" is a over-simplification of what happens to condensates in water and gives the impression that there is no problem. 261 (349)

- How would the slick be dispersed? 262 (350)

Point 5

- "They would probably be carried into the atmosphere with the gas to form a mist-like fog." Unfortunately, the report relies on a lot of guesses as to the behaviour of the condensates. This is disturbing since the implications of this are that we really do not know how they will behave and thus what the effects are. This criticism is born out in the body of the report as well. 263 (351)

Point 6

- This conclusion is again based on estimates; however, as this is a worst-case assumption, condensates may not appear to be a topic of major concern. 264 (352)

Page V

- The conclusion here is that 10,000 barrels of condensates does not pose a problem. This paragraph does not put the problem into perspective. 265 (353)

Section 2.2:3

- Worst-case assumption appears to be valid. 266 (354)

Section 3.1:10

- Absence or existence of polycyclic aromatics should be confirmed. Not knowing this information casts some uncertainty on conceptual impacts identified. 267

Section 3.3: 27 and T5

- The condensate is very soluble and this we think should be highlighted as a problem. This probably also explains the higher toxicity as noted in the toxicity study. 268 (355)

Section 4.4.1: 47

- Weather condition D is a typical condition weather stability. This represents a typical case and not a worst-case condition. The worst-case condition is "Class F" and does occur on occasion in Canada. Under most circumstances this is much more severe than Class D. 269 (356)

Overall Assessment of the Document

- The background study was well done with the exception of the above points. 270 (359)

IIIb: 48, S5.2.6.3, C1, P2, L13

- Mobil should be required to make a formal committment to provide such information from on-going or contemplated studies available for full public review. Alternatively they should provide the information before the Panel completes its decision. 271 (360)

IIIb: 48, S5.2.6.3, C2, P1

- 2 $l.s^{-1}$ of condensate approximately equals 172,000 litres/day or 3.4×10^7 litres/200 days. This is a significantly large volume of condensate and should not be hidden in rates of litres per second. 272 (361)

IIIb: 48, S5.2.6.3, C2, P2

- Mobil does not discuss the possible toxic effects of dissolved methane, ethane, propane and butane. A concentration of 14 parts per thousand seems high and there would be toxic effects. 273 (362)

IIIb: 49, S5.2.6.3, C1, P2

- Any discussion of bioassay tests should include the limitations of this methodology as well as a statement that bioassay testing, is at best, a conventional indicator of lethality but not necessarily related to real conditions. 274 (363)

- Do these bioassay procedures reflect the actual offshore blowout condition where soluble fractions would be vigorously agitated into the water column over a 22 meter depth and constantly renewed until the well is controlled? 275 (364)

IIIb: 49, S5.2.6.3, C1, P3

- Change "48 hour LC50" to read "96 hour LC50." 276 (365)

IIIb: 49, S5.2.6.3, C2, P1

- In the Daphnia test, the condensate became much more toxic as it weathered (48 hour LC50 = 9 ppm for fresh condensate as compared to a 48 hour LC50 = 0.03 ppm for condensate weathered to 29% of its original concentration). On Page 48, there is some emphasis on the evaporation of the condensates as a means of reducing the environmental effects. Obviously, that argument is invalid because the condensate becomes more toxic as it weathers. 277 (366)

IIIB: Background Study "Atlantic Oceanics Company Ltd., Chemistry and Toxicity of the Venture Field Condensate"

Abstract, pg. iii

- Statement that the acute lethal toxicity of 5.6 ul l^{-1} is "similar to the toxicities of crude and refined oils to salmonids and is relatively less toxic than a range of other organic and inorganic toxicants". This translates to 4.5 mg/l approximately (given the density of the oil) and represents a fairly toxic oil. Most oils are between 10 to 100 ppm. This appears to be a major conclusion of the report and our interpretation of the data would be that condensates are more toxic than most oils; however, not significantly so and are not as toxic as many other contaminants. It should be noted that this toxicity evaluation is very much dependent on preparatory and experimental methods and thus the comparison is somewhat difficult. 278 (368)

pg. iii, P2, L6

- This is a good qualifying statement about the report. 279 (369)

Section 2.1:2, P3

- When interpreting this report, it is important to note that they chose a condensate sample which was theoretically the most toxic. 280 (370)

Section 2.4: 5, L3-6

- Normally, one would expect a higher solubility of hydrocarbons in freshwater than in seawater (Sutton and Calder, 1974; Sutton and Calder, 1975). The "accomodation" of fine droplets may or may not be more in salt water than in freshwater. 281 (372)

Section 2.5: 6, Last Line

- Is there any basis in fact for this statement? 282 (373)

Section 3.2: 12

- The 10%, 11.5% and 18% concentrations show measured concentrations different from the expected values. Using the equation indicated, the 100% dispersion would be expected to have a concentration of 93 $ul l^{-1}$. That is quite different from the 41.8 ± 18.6 $ul l^{-1}$ reported for the 100% dispersions. 283 (375)

Section 4.0: 23 and T3.7

- After explaining in the first two paragraphs on Page 23, how the toxicity of oil-water dispersions (OWD) and water soluable fractions (WSF) may differ and some possible explanations for this, the author refers to Table 3.7 which compares the acute lethality of OWD of Venture gas condensate to the WSF of several other petroleum hydrocarbons. This comparision is not valid. 284 (379)

Section 4.0: 24, P2

- One could just as easily chose 9 or 10 other inorganic and organic compounds which are less acutely lethal to rainbow trout than the Venture gas condensate. Comparisons of this sort are of little use or validity. 285 (380)

Overall Assessment of the Atlantic Oceanics Background Document

- Aside from the points of detail raised above, the study is good in that the authors attempted to answer a number of questions. The study does not; however, provide data to show that condensate dispersions are harmless or less toxic than other oils. It only provides a snapshot of what the toxicity might be under certain conditions. 286 (381)

- Comparisons between the toxicity of Venture gas condensate and other petroleum hydrocarbons, organic compounds and inorganic compounds are made. These comparisons are meaningless and without basis and should be omitted from the report. See Comment Numbers 284 and 285. 287 (382)

- The following is a summary of a Natural Gas Condensate Toxicity Tests conducted by Environment Canada, January - March, 1983 288 (383)

Methods:

Condensate was exposed to organisms in three ways:

a) As an Oil-Water Dispersion (OWD) prepared as similarly as possible to the method of Atlantic Oceanics in their condensate toxicity study. Energy supplied by shaking 100 times by hand.

b) As an OWD prepared by blending appropriate amounts of the condensate with test water at hi-speed for 1 minute on a Waring Commercial Blender.

c) As a Water Soluble Fraction (WSF) prepared similar to the method of Anderson et al. (1974). The oil was layered onto water in a carboy and stirred gently for about 20 hours and allowed to settle for 4 hours. The clear water extract was then siphoned off from under the oil layer.

Results:

Table 1 summarizes the results of the toxicity tests performed on the gas condensate.

Table 1

RESULTS OF ACUTE LETHAL TOXICITY TESTS ON NATURAL GAS CONDENSATE FROM THE VENTURE FIELD. All values are expressed as measured concentrations (mg/l) corrected for control values. Daphnia values are 48-hour LC50's, and values for other test organisims are 96-hour LC50's.

SPECIES	OIL-WATER DISPERSIONS (ATLANTIC OCEANIC METHOD)	OIL-WATER DISPERSIONS	WATER SOLUABLE FRACTIONS
	*		**
Rainbow trout Salmo gairdneri	11.5 (Range: 7-19)	21 (Range:16.5-27)	0.9(CL:0.35-1.5
Stickleback Gasterosteus aculeatus	--------	26 (CL: 23-29)	1.9(Range:0.32-3.4)
Water flea Daphnia magna	--------	2.2 (CL: 0.4-3.8)	1.2(Range0.48-2.7)
Mussel Mytilus edulis	--------	94 ***	----------

* Range = Closest range to LC50 value of 0 and 100% mortality of test organisms.

** CL = 95% Confidence Limits calculated by BMD 03S computer program.

*** Mussels showed delayed mortality upon transfer to clean water. 96h EC50 (inhibition of re-attachment by byssal threads) = 14 (95% CL 5-22).

IIIb: 50, S5.2.6.3, Zone of Influence, C2, P2

- Since no research has been carried out on larval fish to determine toxic effects, they cannot state that "concentrations of condensate lethal to larval and adult fish would be found only at the 'boil' of the blowout plume". 289 (384)

- The document also states that the loss of 1% of the ichthioplankon on the Scotian Shelf would have little effect on the fish stock without providing supporting evidence. 290 (385)

IIIb: 51, S5.2.6.3, Zone of Influence, T11

- All but the Atlantic Oceanics data in Table 11 are results for tests using 'crude' oils and not for condensates which the proponents suggest elsewhere in the EIS behave very differently and have different properties. 291 (386)
  See also comment number 278.

- In Table 11, the proponent cites Jenkins (1979) that 1 ppb of hydrocarbon concentration is the threshold for chemoreception impairment. In the section following the table, they simply state "Crustacean and other chemoreception systems might be at risk over a large area". The proponent should elaborate on the effects to chemoreception systems and define the areas where these effects might occur. 292 (387)

IIIb: 51, S5.2.6.3, C1, P1

- Why have the proponents used a current speed of 0.26 $m.s^{-1}$ in this discussion of the effects of a condensate spill while using a current of 0.05 $m.s^{-1}$ in drilling mud dispersion studies? (i.e., Vol. IIIb: 42). 293 (388)

- Elsewhere in this section it is assumed that condensates would become mixed into the water column as it exits turbulently from the site of the blowout and therefore surface slicks are unlikely. Conversely here they state that the hydrocarbons would remain in the upper layer of water and thus not taint benthic organisms. The water depth of 22 m suggests that the condensate would become fairly well dispersed throughout the water column especially in an area, such as this, of heavy wave action. 294 (389)

IIIb: 51, S5.2.6.3, C2, P1

- Processors may be reluctant to accept tainted fish and may not accept any fish from the area following an incident. 295 (390)

IIIb: 51, S5.2.6.3, C2, P1, L4

- There is no proof that fish avoid oil in the water column. 296 (391)

IIIb: 51, S5.2.6.3, C2, P2, L4

- The proponent has presented no evidence of oleoclast activity to the extent required to discernably reduce the amount of hydrocarbon which would reach the sediments. 297 (392)
  See also Comment Number 247.

IIIb: 51, S5.2.6.3, C2, P3, L3

"Nonetheless, it is remotely possible that condensates from a blowout would persist as a slick long enough to strand on Sable Island."

298

- This was supposed to represent a worst-case scenario. (394)

- If a Venture blowout were to last 200 days, it is unlikely that contamination of Sable salt marsh vegetation would be a single event as suggested here. Repeated contacts are likely, especially in view of the current patterns surrounding the Island. 299 (395)

IIIb: 51, S5.2.6.3, C2, P4

- It is not appropriate to apply the results of Baker (1971) to the brackish ponds on Sable Island because the flora of the ponds is not saltmarsh vegetation. It should also be noted that there is a possibility of spilled condensate entering and fouling the fresh water lens of Sable Island. 300 (397)

IIIb: 51, S5.2.6.3, C2, P4 and S5.6.1.3 (Page 62)

- As a result of questions raised during an earlier review (i.e. IEE for Deliniation Drilling off Sable Island) condensate 301 (399)

toxicity studies on the dune and inland vegetation were undertaken. These data are not reported. The addendum to the EIS states only that studies examining the possibility of condensates reaching Sable are underway. It is very likely that given the nature of the situation, the probability of condensates as aerosols or slicks damaging Island vegetation cover is low. However, the importance of the sparse vegetation cover to the stability of the Island makes it imperative that such worst-case scenarios be examined as closely as possible. Two major forms of evidence are needed. One dealing with the probability of a blowout depositing toxic levels of condensate on the Island. The second addressing the sensitivity and response of the vegetation to expected concentrations of condensate.

IIIb: 52, S5.3.2

- The parts of Guidelines 5.3 (m), (t) and (u) specifically referring to the quality and quantity of atmospheric emissions have not been addressed. This is viewed as a deficiency in the EIS. 302 (400)

- The long-term effects of routine emissions vented at the offshore and onshore facilities are of particular concern. The impact of these emissions on the terrestrial environment (i.e., Sable Island and the Canso area) should be addressed. 303 (401)

- The proponent contends that it is not possible to estimate the impact on the environment of atmospheric effluents if one does not know the quantities involved. The predicted impact of routine atmospheric emissions should therefore be viewed with skepticism. 304 (402)

IIIb: 52, S5.3.3

- It will be necessary to monitor the effects of on-going discharges and to make this monitoring meaningful, a good 305 (404)

baseline of water and sediment quality information will be required.

- What steps, if any, will be taken to treat produced waters to improve pH conditions and compensate for high BOD, COD and low oxygen? 306 (405)

- The discharge characteristics and impacts of produced water should be addressed in the monitoring programs. 307 (406)

IIIb: 54, S5.3.3.1, C1, P4, L15

- In a thermal plume, with metals in ionic forms, it is not reasonable to expect that metals will contact sediments before being in the water column for a significant amount of time. The statement "Metals normally become bound to sediments" is difficult to believe. 308 (408)

IIIb: 52, S5.3.3.1, P2

- Mobil is committed to discharging produced water brine discharge with no greater than 25 ppm hydrocarbon. The modelling data uses 40 ppm and still shows minimal impact. Such results can only be confirmed with installation of suitable treatment technology currently available and monitoring of operations. 309 (409)

IIIb: 52, S5.3.3.1, T12

- Produced water ion levels (Table 12) differ from those listed in the background documentation as 'typical' of the Venture Field. pH levels also differ. 310 (410)

- Is this a complete analysis of potential metals? Page 54, Column 1, Paragraph 2, Line 6 lists phenols as well as mercury, zinc and vanadium as examples of trace metals present in formation water. 311

Why were these excluded from Table 12? Are there other metals such as Cadmium and Arsenic present also? A thorough assessment of produced water components should be prepared and submitted for review by the Panel.

IIIb: 54, S5.3.3.3, P1

- Since it can be expected that primary production will be higher in the thermal plume of both cooling water and formation water; 312 (411)

i) Will design steps be taken to reduce the chance of combining contaminated produced water discharge with discharge from the warm, cooling water?

ii) The statement about impact on planktonic forms is not valid but nektonic forms could well be attracted by warmer water and higher productivity.

IIIb: 56, S5.5

- Nowhere have Mobil estimated the amount of trenching likely to be required or the extent of blasting. It is our understanding that blasting may be required in bedrock areas nearshore. Only the impacts associated with sedimentation are discussed however. See also Comment 69. 313 (412)

IIIb: 56, S5.5, F27

- Figures 26 and 27 do not contain impact ratings for the dredging and dumping required for pipeline installation. These may range from "negligible" to "moderate" for water quality, benthos and fish in inshore areas, depending on the pipeline landfall location. 314 (413)

IIb: 58, S5.5.1.2, P1

- It is not necessarily valid to assume that all of the suspended sediment load will settle out of the watercolumn "within a period of minutes to hours". In areas where fine silts and clays are moved, settling of the fine fraction can require on the order of 12 hours. A reference should have accompanied this sort of statement. 315 (417)

- In inshore areas, the sediment physical/chemical characteristics should be determined before sediment is moved in pipeline trenching and burial operations. Contaminated sediments will have to be disposed of in an environmentally acceptable manner under conditions set by the Ocean Dumping Control Act. 316 (418)

IIIb: 59, S5.5.1.2, C1, P2, L7

- Herring eggs adhere to the bottom and are susceptable to oxygen depletion and smothering resulting from sediment disturbance. Since it is possible that some herring stocks are quite localized, any spawning bed disturbed, either directly through pipelaying activities or indirectly through increase in suspended sediments, could result a complete loss of a year class to the stock in question. Since such stocks may depend on periodic good year classes, such an impact could effect replacement recruitment into the stock and thus local herring catches. 317 (420)

IIIb: 60, S5.5.3

- The physical/chemical characteristics of liquid released need to be more clearly defined. 318 (421)

- How will these releases be monitored? 319 (422)

- How will impacts of these releases be monitored? 320 (423)

- What baseline data will be used to assess the impacts of these releases? 321 (424)

- How will the dumping of solid wastes and debris be controlled and/or monitored by Regulatory Agencies? 322 (425)

IIIb: 60, S5.5.3.1

- Will this over-wintering fluid be treated with an antifreeze? This would affect definition of discharge limitations. 323 (426)

- Mobil should indicate its proposed source for the 134,000m^3 of fresh water. 324 (427)

- Will the fluid be chemically de-oxygenated? If so, will the oxygen scavenger be added in excess, thereby resulting in a high COD to any receiving waters? 325 (428)

IIIb: 60, S5.5.3.1 and S5.5.3.2

- The proponent may have under-estimated the biologicial impacts of releasing 134,000 m3 of deoxygenated water and an equal amount of testing fluid. 326 (429)

IIIb: 62, S5.6.1.3, C1, P2

- Results of rough calculation indicate that a deposition of 0.05 mm on a duck egg would contain more than the 1-5 ul said to be harmful (in the previous paragraph). Has Mobil recognized this potential impact? 327 (431)

- At what concentration is bird plumage wetted by condensate? (432)

IIIb: 62, S5.6.1.4

- There is a potential conflict between the site of the proposed gas plant and that proposed for the Artic Pilot Project Terminal. The exclusion zones for these two projects overlap. 328 (433)

IIIb: 62, S5.6.1.4, C2, P2, L8

- Perhaps a more useful statistic is that the aerial extent of the plume would be 10.6 km^2. 329 (434)

IIIb: 62, S5.6.1.4, C2, P4, L9

- Neither Blumer et al., 1971 nor Teal et al., 1978, deal with a condensate spill; in fact, very few of the references used in supporting claims made in the EIS involve condensates. 330 (435)

IIIb: 64, S5.8

- Although this section provides a reasonable summary of the generic concerns related to pipeline construction within the corridor, no route or alternative routes are proposed. The route(s) selected should be referred for review before construction begins. Only in this way can adequate evaluation be made. 331 (436)

- It is not possible to assess the impacts of onshore pipeline construction on aquatic habitat prior to route selection. Detailed engineering of stream crossing, scheduling and design of mitigative measures must await an adequate evaluation of the resources at risk. 332 (437)

IIIb: 64, S5.8.1

- Activities recommended and described in the Environmental Protection Plan may determine to a large extent the impact of this project on the environment. 333 (441)

- In contrast to Tsui and McCart (1981) streams in Nova Scotia have shown a highly variable ability to recover from sediment inputs. 334 (446)

- Effects on fish are dependent upon proximity of spawning beds, nursery areas, overwintering areas and the time of activities in 335 (449)

these areas, as well as the timing of spawning runs. Information on all of these points will be required for each river and stream before environmental and engineering design can be done.

IIIb: 67, S5.8.3.1

- Acidic runoff from Meguma Formation pyrite bearing slates and their overlying tills is not addressed in sufficient detail to provide assurances to environmental agencies that significant pH and heavy metal problems will not occur. This concern is based on a history of environmental damage in the Halifax Airport area associated with pyritic formations. Although some protective measures were taken, the proponent has had to install and operate costly treatment facilities, or face possible prosecution under the federal Fisheries Act. The EIS indicates that the contractor will follow "Guidelines for Excavation of Slate Bedrock" issued by the Nova Scotia Department of Environment, but runoff water quality into a stream may still be unacceptable under the Fisheries Act. No evaluation of the efficacy of the Guidelines has been done to date, and Environment Canada believes that these Guidelines may not be adequate to control the quality of runoff. Early consultation with Department of Fisheries and Oceans and Environment Canada is encouraged, as pipeline construction techniques, and possibly route location may have to be modified to avoid severe and chronic impacts to fresh water ecosystems. 336 (451)

IIIb: 67, S5.8.3.2, P1, L16

- This statement is not well founded and is contrary to the fundamental feature of riverine biology; that community structure often changes along the length of a stream. 337 (452)

IIIb: 68, S5.8.5.1, P3, L3

- The regeneration of forests in this area may well be accomplished in 'a number of years' as suggested, however, some idea of the 338 (453)

time should be provided.
See Comment Number 298.

- It is questionable to suggest that in the event of a major fire, the residual impacts would be "minor". 339 (454)

IIIb: 70, S5.9.1

- The whole issue of human access via the pipeline corridor is extremely important in terms of protection to wildlife, fish and generally to the wilderness areas across which the pipeline passes. Environment Canada does not agree that this area has "numerous existing access roads". 340 (456)

- Human access to the corridor by 4-wheel drive, all-terrain vehicles, snowmobiles, etc. can significantly alter the environment by increasing stress on the biota. 341 (457)

- There is potential for long term residual effects if the pipeline corridor provides even marginal access to the public. 342 (458)

- The effects of worker accommodation and access to the pipeline route during construction have not been addressed. 343 (459)

IIIb: 70, S5.9.2

- The time frame for restoration of vegetation due to a leak or a rupture is not indicated. These aspects of a terrestrial spill need to be addressed in greater detail, at an appropriate stage of the assessment process. 344 (460)

- We question whether the rating of a rupture of the condensate pipeline at a stream crossing is "minor" to "negligible". 345 (462)

IIIb: 71, S5.11

- The question of additional highway construction arises here. Are additional roads contemplated to service the land fall site, pipeline route, gas plant, etc.? If so, who will be responsible for their design, alignment, and construction? 346 (463)

IIIb: 74, S5.12.3

- It is not possible to assess the impacts of effluents from various onshore facilities without knowlege of outfall locations, receiving environment characteristics and effluent characteristics. Effluent standard compliance and receiving environment monitoring will be required as well as appropriate receiving environment baseline data. 347 (468)

IIIb: 75, S5.12.3.1, P2

- What is the reference for statements made in the second paragraph of this section? 348 (469)

- It is unacceptable for the proponent to state that the dumping of oil contaminated ballast and bilgewater in Halifax Harbour and the Strait of Canso will have negligible effect because these waters are already polluted. 349 (470)

IIIb: 75, S5.12.3.2

- Mitigative measures described will be satisfactory for the storm-water runoff from yards and plants. These must comply with the conditions of Section 33 of the Fisheries Act. 350 (471)

IIIb: 78, S6.0

- Prediction of residual impact is of little use and easily said unless there is a method in place to test the accuracy of 351 (472)

prediction. This should be a major requirement of the monitoring program.

IIIb: 80, S6.2.2 and S6.2.3

- The proponent should have indicated here or in earlier sections what restorative actions they may take should an accident occur. This applies particulary to the intertidal environment, an impacted stream, and extensive acidic runoff. 352 (473)

IIIb: 81, S6.3, L1

- This is fair comment by the proponent but it is the opinion of Environment Canada that this is a premature conclusion based on insufficient data. A properly designed monitoring program should test the proponent's conclusion. 353 (474)

IIIb: 84, S7.0

- End of pipe monitoring will also be necessary for example: 354 (476)

1. Periodic sampling and analysis of sewage effluent is necessary to check efficiency of treatment and demonstrate compliance with discharge limits.

2. Drilling effluents, produced water, etc., will have to be monitored periodically to confirm flow estimates and define chemical, physical characteristics.

3. Pipe coating/fabrication yard effluents will have to be monitored to check compliance with site-specific discharge limits.

4. Hydrostatic testing fluid and over-wintering fluids will have to be monitored during batch discharge periods.

- Impacted environments must be monitored, not only during production but also, and in many cases most importantly, during construction. 355 (477)

- A comparable project that has generated much useful information was undertaken along a pipeline route in southern Ontario. Impacts on agricultural land were documented and recommendations for mitigation were developed (Culley et al., 1981). 356 (478)

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VOLUME IV, SOCIO-ECONOMIC ASSESSMENT

NOTE: Environment Canada has confined its review to the environmental aspects of the socio-economic Assessment. We make no claim to have completely reviewed this volume and strongly encourage the panel to solicite appropriate expertise to fully evaluate the environmental aspects of the social and economic facets of this project.

- In general, reviewers felt that the requirement to assess the cumulative impacts of Venture and associated developments has not been met. More consideration should be given to indirect land use impacts related to land development and speculation which gives rise to increased real estate activity and often inflated land values. Consideration should be given to the effect acquisition of private land for pipeline construction has on the owner's disposition of other properties or the portion of the land parcel not acquired for the pipeline. 357 (479)

- The process for co-ordinating land use planning efforts by residents, municipal and provincial agencies and Mobil, must be 358 (480)

designed to meet the needs of local people. As noted in the background documents the many unsuccessful development initiatives undertaken in the Strait area have engendered skepticism. The conclusions and recommendations of the "Community Fabric and Social Issues" background report should be heeded.

- The effects of the substitution of gas and oil, coal and wood were not examined adequately, for example, an evaluation of the extent to which a reduction in fuel wood demand would affect rural residents who sell fuel wood as a second source of income, would be appropriate. 359 (481)

- While there is no doubt that quantitive estimates of environmental benefits and costs are extremely difficult, discussion of environmental benefits and cost is essential in the main body of the EIS. 360 (482)

- The message conveyed by the socio-economic volume in the sections on the Strait of Canso under "Land Use, Renewable Revenues and Physical Infrastructure," is that the existing social and environmental structures of the area will not be abnormally affected by this project. Yet there is an absence of well thought out statements for mitigating adverse environmental circumstances as a socio-economic concern in such areas as the fisheries, forestry, wildlife, water supply, sanitary sewerage and solid waste. 361 (483)

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ADDENDUM

Addendum: 32-33, S3.1.3.2, Wind Data Variability

- The WES winds are marginally comparable to the Sable Island data. 362
  However, they are significantly higher (23%) and the mean speeds (485)
  are two knots higher. The WES winds are also two knots too low
  based on buoy comparisons carried out by the Atmospheric Environment
  Service (AES). Monthly mean speeds of WES and SSMO data do not
  compare well. There is a three knot underestimation by the WES data
  in the winter months. The Geostrophic Wind Climatology data is in
  better agreement. The smooth (relatively) form of the WES data is
  partially due to the fact that it is based on 6-hourly values inter-
  polated to three hours compared to the hourly or 3-hourly measurements
  from Sable and ship/rig data. The higher persistence values are partly
  due to the higher wind speeds as well as the smoothed data. The lower
  percent occurence of high wind speeds at Sable is due as much to the
  too-low values as the smoothness of the WES data. In any case, both
  data sets will yield too-low values. The WES data does not show the
  effects of short term variability such as gusting. However, the ship
  data, and much of the rig data, do not show gusting either and the
  Sable Island record shows only gusts which occur near the hour of
  observation and not a continuous record.

Addendum: 62-65, S3.2.3, Example 1: Analysis of Impact of Effluents from Offshore Facilities on Fish Stocks

- The calculation of the proportion of a fish population effected is based on the extremely simplistic method of taking an estimate of the aerial extent of a population and dividing it into the simulated aerial extent of zone of influence of a particular contaminant. Such a method does not consider the extremely patchy nature of plankton and nekton distribution, or any sublethal toxicity effects. Regardless of whether larvae are killed outright, if contact with a toxicant leaves them susceptable to predation or deformed so it is unable to successfully procure food or grow to be reproductive, it is dead to the population. In addition, the method does not consider the potential impact for reduction of recruitment to an otherwise good year class. Many fisheries are often dependent for a number of consecutive years on a single successful year class. If such a year class is impacted, economic as well as biological consequences would follow. 363 (486)

Addendum: 65, S3.2, P1, L2

- Food chain contamination was predicted to have the greatest possible impact. This suggests three questions. First, what proof or evidence can be provided to support the claim that contaminated prey will be unavailable due to sinkage? We find this a questionable conclusion at best. Second, what is the impact? It is not "quantified" in Table 11. Third, what is the impact of the contamination affects the lifelong reproductive ability of impacted larvae? 364 (487)

Addendum: 65, S3.2, P1, L7

- There is considerable evidence to refute this statement. Fish, including larvae, readily take up petroleum hydrocarbons regardless the source. It is probable that larvae would uptake contaminents 365 (488)

more readily than fish since their digestive tracts and integuments are less well formed.

Addendum: 69, S3.2.5, P2, L5

- The key words are "have been observed." It is entirely possible that the lack of detection is a function of the study design rather than there being no effect. For example, a major confounding factor in the Buccaneer Field Study (Middledutch 1981 (edit) Environmental Effects of Offshore Oil Production Plenum Press, New York is the correct citation rather than that provided by Mobil) was outflow from the Mississippi River with its heavy burden of contaminants. Similar criticism can be made of the other studies noted. 366 (489)

- No mention is made of the potential bioaccumulation or food chain magnification of toxicants, although the probability of "dilution" is regularly stated. 367 (490)

Addendum: 70, S3.2.6

- The reports cited here were not made available for review. 368 (493)

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General Comments:

- The "Venture Supplement" fails to address the majority of the criticisms raised by the reviewers, even those not of a site or project specific nature. For example, points raised concerning the atmospheric environment have been completely ignored. The proponent has been selective in reply to comments and in some cases, for example, in discussing the need for and relevance of baseline data, has apparently misunderstood the meaning and intent of review comments. By accepting the conceptual nature of this EIS, many of the initial Environment Canada technical comments may now be considered to require the provision of a level of detail unnecessary at this time. (Such comments have, therefore, been withdrawn for the moment by Environment Canada.) However, there remain many valid criticisms which must yet be addressed by the proponent before the requirements of this assessment process can be considered to have been adequately fulfilled. 369* (x1)

- The proponent has made no commitment to either the public or government to provide agencies with more detailed documentation at a later date unless such agencies have a 370 (x2)

* 369 - Continues the sequential numbering of revised comment.
(x1) - Comments relating to the supplement (Sp) are numbered sequentially prefixed by an 'x'.

regulatory function. Many of the Environment Canada concerns are not related to regulation per se but rather to the evaluation of alternatives aimed at minimizing environmental impacts. Intervention before the NEB appears to be the only route remaining to Environment Canada to ensure that site-specific concerns, construction procedures and verification of impact predictions will be addressed. However, S3(2) of the NEB Rules of Practise and Procedures allow the Board to waive any or all requirements of the regulations. This is of concern to all reviewers.

- The Venture EIS and Panel review should stand on their own, instead of depending on the subsequent NEB process. 371 (x3)

The Revised Guide to the Federal Environmental Assessment Review Process states:

> "The EIS also describes the area's existing environment and current patterns of resource use." (p. 6)
>
> "It (the EIS) provides a detailed description of the potential effect of the proposal on the area's environment and identifies the measures the proponent intends to take to reduce those impacts. Any impacts that might remain after these mitigating measures have been taken must be identified." (p. 6)

- A major concern is that for the level of information provided, the Panel will be able to advise the Minister only on the overall acceptability of the concept, but not on satisfactory mitigation measures or specific residual impacts. 372

The Panel should defer a recommendation on the acceptability of mitigation measures until a commitment to provide more information and opportunity to Environment Canada to review each significant development phase is given by the Initiator.

Environment Canada notes that the proponent continues to argue against the preparation of an adequate data base upon which to found its future environmental studies. This major deficiency was noted in the earlier submission of Environment Canada's position and remains a significant issue. The following commentary is offered as a consolidation of the Environment Canada technical comment on this subject. 372 (x4)

There are two basic types of baseline data: regional surveys and site-specific information. Regional surveys need be conducted only when there is little or no information available on an area. These are a broad reflection of the natural resources of an area. Site-specific baseline data are collected once a particular resource or area has been identified as being at risk. The second must follow the first to be of any significance since the regional knowledge is required along with an understanding of how the ecosystem operates in order to identify the resources at risk. With a few notable exceptions (for e.g. the Venture production field and the subsea pipeline corridor), Mobil has provided adequate regional baseline data, however, the EIS is notably lacking in site or resource specific baseline data.

The proponent has attempted to utilize published data for much of its perceived baseline data requirement. This reliance on published data is acceptable, provided the data are available in sufficient quantity and quality and are known to apply to the site under consideration for development. This is not the case for much of the biological information in the Mobil EIS where extrapolation was extensively employed. It may, of course, be more cost-effective for Mobil to use this

approach, but they themselves occasionally warn against this practice (for e.g., when discussing the wide variability in discharge records among basins of different sizes and location in the Hydrology Section).

Natural variation exists over time and space. Some environmental components (for e.g. extent and quantity of spawning gravels, suspended sediment loading, contaminant levels in sediments, pH of water and other stream water quality criteria) require several years of data collection in order to adequately estimate the magnitude of temporal and spatial variation. Since many of the major project related impacts have been identified, it is feasible to begin to collect the required baseline data now. Spatial variation can, conceivably, be characterized as construction takes place.

Such quantitative information is required in order to judge the veracity of the proponent's prediction of impact, to gauge the usefulness of proposed mitigation measures and to allow identification of unexpected impacts so they can be mitigated. Simply put, if one does not know what was there in the beginning, it is not possible to measure the change which has resulted.

Several recent reviews of environmental assessment and monitoring studies (for e.g. Beanlands and Duinker 1983, Hiborn and Walters 1981) have concluded that post-impact monitoring in the absence of a quantitative baseline was a waste of time. The proponent should be required to address this question.

- There is an obvious difference of opinion between Environment Canada and Mobil over the necessity to collect baseline data, 373 (x5)

the possible cumulative effects of hydrocarbon discharge and responsibilities for post-EIS environmental monitoring. These conflicts may eventually be resolved with the continuation of the cooperative attitude projected by Mobil in the Supplement and if there is a committment to continue the resolution of these issues beyond the current Review Process. Without some formal mechanism for input and fairly intensive monitoring of Mobil's activities by DOE, COGLA and other government agencies, however, it is possible that the intentions expressed in the EIS and the supplement will not be realized.

- Although worst-case scenarios have been considered for most situations, the document generalizes many of the results and creates a false sense of security vis-a-vis environmental impact. The adverse environmental impacts, whether large or small, appear to have been eliminated in two categories: (a) impacts which occur but are so small or localized that they do not warrant concern; or (b) impacts that occur but because sufficient background data is lacking, the adverse effects are either not perceived or downplayed. 374 (x6)

- It remains the view of Environment Canada that worst case scenarios and attendant risks still lie in the Sable Island area. This does not appear to be the shared opinion of the proponent. 375 (x7)

- The distinction between detectable and actual impact has not been made nor has it been noted that detection is critically dependent on technology and adequate fore-knowledge of the resource at risk. 376 (x8)

Detailed Comments:

Sp:2, S2.1.1

- The proponent makes no mention of the environmental damage resulting from the earlier Mobil drilling operations on Sable Island or the fact that dune restoration work was initiated in large part because of damage caused by Mobil's activities. 377 (x9)

Sp:8, S2.2

- No information is provided on the possibility or probability of rail shipment of condensate and other refining products. 378 (x10)

Sp:13, S2.3.2.1

- Although "spanning" is noted as dangerous from the single perspective of pipeline integrity, consideration should also be given to the danger of commercial fishing gear becoming snagged on exposed pipe compounding the problem posed to pipeline integrity by spanning alone. 379 (x11)

Sp:14, S2.3.2.4 380 (x12)

- US NRC (1981) states:

> "Analysis of accident records reveal that the leading causes of pipeline discharges are impacts below the water (46%) and corrosion (18%). Underwater impacts are responsible for the bulk of hydrocarbon spilled from pipelines. These are often anchor-dragging incidents involving small vessels, such as OCS (Offshore Continental Shelf) workboats". (p. 109)

The proponent makes note of this but then ignores lay barges and workboats and considers only merchant ships. The proponent should be expected to completely address this question.

Sp:15, S2.3.2.5, Point 2

- "Only local scratches . . ." 381 (x13)

  NRC (1981) cites such trauma as the source of focii for corrosion which can evantually lead to rupture if not detected in time.

Sp:19, S2.3.4

- Although the proponent should be able to predict, even using only BPT (Best Present Technology) estimates, the accuracy of leak detection technology, they have not provided this. Our information is that accuracy of leak detection technology is in the order of 3% of the volume which translates to the possibility that up to 12 million cubic feet/day (3% of 400 mmcfd) could be released without detection. 382 (x14)

Sp:19, S2.3.5

- Even at the conceptual stage of the project, Mobil must have some idea of the range or generic nature of the components of the hydrostatic test fluid (as well as the over-wintering fluid). This information is required to predict the theoretical impact of release of these substances, as well as to advise the proponent on the probable regulatory requirements for disposal. 383 (x15)

Sp:21, S2.4

- Many of the considerations and precautionary measures outlined in S2.4 and a number of subsequent sections are stated as "may" or "should". Obviously, procedures used will depend on 384 (x16)

circumstances encountered, however, statements should be statements should be definitive as to what will actually be undertaken, given a knowledge of proposed COGLA and NEB regulatory requirements. It would have been appropriate for the proponents of the EIS to have edited the text and replace many of the non-committal statements with commitments. The proponent should also undertake to state what measures it would consider beyond its capability or requirement to undertake.

Sp:23, S2.4.3

- Concern for compaction of non-agricultural subsoils has not been addressed. 385 (x17)

Sp:25, S2.4.4.2, P2

- Maps 2S and 3S show numerous outcroppings and the shallowness of Halifax formation bedrock between the landfall and Salmon River. Mobil's estimation of impact potential from disturbed acid shales and development of successful mitigation measures is not apparent. Mobil has not defined the extent and level of mineralization and thus the potential for impact. There are no proven means of addressing the problem of formation of acid leachate from disturbed acidic shales. Trial and error approaches to the problem have shown to be extremely costly in the past in both environmental and financial terms. Fish kills are the most obvious impact from affected waters. 386 (x18)

Sp:29-31, S2.4.7.1, P2, L1
and S2.4.8.2

- Scheduling of construction activities is recognized as very important by the proponent but no attempt has been made to resolve apparent conflicting schedule requirements. What 387 (x19)

criteria will the proponent use to examine such trade-off situations between optimum mitigation, habitat types (e.g. stream crossings and wetlands) and increased construction costs?

Sp:52, S3.2.1

- DOE knows of at least two experiments which are proposed to study the sediment transport of the Sable Island area (AGC/ Universite de Quebec study using Iridium 192 isotope and York University study using moored buoys). What other studies are currently underway or planned? 388 (x20)

Sp:65, S3.2.5, P3, L4

- It has been previously stated (Environment Canada Vol. II, Comment No. 142) that past earthquakes in this region have not been related to the known faults. Reference to inactivity of faults is not relevant, as the ability to predict the location of earthquakes in this region is inadequate. 389 (x21)

Sp:75, S3.2.10

- Geophysical sampling should be paired with benthic sampling to gain the required information on biotic resources at risk. Such features as extensive or long-lived shellbeds should be noted, if for nothing else, for their commercial harvest prospects. Benthic sampling would represent a small additional expense to that already planned. 390 (x22)

Sp:83, S3.3, P1, L6; Sp:242, S8.2, L4
and Sp:248, S8.3.3

- In both the case of the onshore pipeline and the pipeline 391

landfall, the phrase "could be selected" is used. The corollary of this is that these selections may not be used. (x23)

Sp:154, S5.2.3, L12-16

- Mobil has overlooked Environment Canada's comment (Vol. 1, p. 20) that based on studies reported by Mobil in the EIS (Vol. IIIb, p. 49), the condensate becomes more toxic as it evaporates. The residues remaining after evaporation probably contain the more toxic fractions. Instead, Mobil states on several occasions that because of the rapid evaporation of the condensate, it should be relatively non-toxic to icthyoplankton on the Scotian Shelf. Mobil has itself presented data to contradict this contention and should be expected to clarify the discrepancy. 419 (x51)

Sp:155, S5.2.3, P2

- Scott (1982) caught several other species of fish. Current data are inadequate to predict the seasonal and spatial use made of the Venture field area by juvenile or other age groups of fish. Studies are required immediately to determine the resource at risk, let alone quantify it. 420 (x52)

Sp:155, S5.2.3 - Penultimate 3 Lines

- Presently accepted "safe levels" for prolonged exposure to a toxicant are in the order of one-tenth to one one-hundredth of the 96-hour LC50. Mobil states that levels of condensate would be one-quarter of the acutely lethal threshold in the top ten metres of water, ten kilometers from the blowout site within twelve hours of a blowout. Prolonged exposure to this level of condensate would be expected to have sub-lethal and chronic effects on organisms in that area. 421 (x53)

i) The 'myths' presented in the book are admitted "strawmen" (Holling 1978:2) which are set up, in turn, to be swept aside by the proposed methodology "Adaptive Environmental Assessment and Management". It is not clear whether Mobil supports the strawmen or the Holling philosophy. It is clear from Holling's book that Holling and his other co-authors definitely do not support the myth.

ii) The Holling approach is an iterative process of which the Beanlands (Beanlands and Duinker 1983) approach is an adaptation. As the title of his book "Adaptive Environmental Assessment and Management" (1978) implies, the Holling method is adaptive and highly flexible, using a core group of experts to guide a project through a series of workshops to attempt to predict the impacts of the development.

iii) The methodology described in Fig. 4.1 (Sp125) is a classic engineering "feasibility to final project" approach but <u>does not</u> reflect the philosophy or the practice described in Holling (1978).

- Regardless of the approach Mobil proposes, Mobil is expected to fulfill the requirements of both the FEAR and N.S. provincial environmental EIA&R processes. This it has obviously not done. However, Environment Canada has stated that the Mobil approach is acceptable <u>provided that there are adequate environmental safeguards in place</u>. The only way that this can be ensured is for Environment Canada to play an active and meaningful role at each regulatory stage. 397 (x29)

Sp:126, S4.2, P1, L10

- The interaction matrix method employed by Mobil is not the state-of-the-art. It is ten years old (Leopold et al. 1971 as cited in Holling 1978:301) and has several limitations which were stated in the initial DOE submission (comment numbers 216 (295) and 217 (296). 398 (x30)

- State-of-the-art is reflected by the methodology presented in Holling's (1978) book. It is reflected by such attempts as: 399 (x31)

  i) Auble, G. T. 1982. Results of an Adaptive Environmental Assessment Modelling Workshop Concerning Potential Impacts of Drilling Muds and Cuttings on the Marine Environment, EPA-60019-82-019.

  ii) The experiment using adaptive environmental assessment and management techniques on the Beaufort Sea, an Unsolicited Proposal awarded to ESSA Ltd., Vancouver, B.C., The Department of Supply and Services. This study is ongoing.

  iii) Numerous studies cited by Beanlands and Duinker 1983 as good examples of EIA&R.

- Beanlands and Duinker 1983 also stated that in many past assessment exercises, there was little ecological content or scientific basis for the studies performed. Without scientific content supported by credible baseline and monitoring studies, environmental assessment becomes a guessing game in which impact predictions cannot be verified. 400 (x32)

Sp:127, S4.2, P2

- "The realities . . ." are that techniques do exist to predict how particular segments of an ecosystem will respond to a stimulus. The extrapolation to a whole ecosystem is, admittedly, beyond our capability at this time but that does not preclude concentration on particular components (e.g. stream crossings, wetlands crossings, quahog beds). As well, the information collected from a scientifically-based impact assessment and followup monitoring program will considerably further ongoing research to understand natural systems. While it may be reasonable to expect the proponent to bear the full cost of such a program, such matters are suitable candidates for funding under programs such as the Environmental Studies Revolving Fund and should not be overlooked because of the difficulty of the task. 401 (x33)

Sp:127, S4.2, P2, L21

- It is unacceptable not to endeavor to probe beyond this level because the understanding of the factors and forces lies at the limits of our technology and knowledge. 402 (x34)

Sp:128, S4.2, T4.1

- No data is provided on the populations or even species considered at risk to reflect the use of any of these parameters in assessment or assigning of degree of impact. The proponent should describe the actual method used, rather than a "rationalization" of the method. 403 (x35)

Sp: 129, S4.2, L3

- Although a "skilled eye" assessment is valuable, without adequate baseline information on certain selected parameters, 404 (x36)

verification of impact predictions cannot occur and accuracy of future prediction cannot improve. Mobil is committed to ecological effects monitoring and followup (p. 254) as per NEB requirements, Part VI, but without quantative baseline data, what comparison is possible?

- The comment attributed to Holling (1978) is taken out of context. Holling (1978:11-16) argues that all components of the study "team" must have a mutual respect and understanding of the role of the others. Modellers without an understanding of the underlying processes may make mistakes without adequate direction from biologists, sociologists and policy makers or any other group which has major control of the fate of the system in question. 405 (x37)

- "Data are not a substitute for understanding", but understanding is accomplished by the assessment of data. 406 (x38)

Sp:129, S4.2, P3, L14

- ". . . an acceptable socio-economic and biological cost." A knowledgeable society should define what is acceptable guided by agents with no self-interest in the final decision. 407 (39)

Sp:130, S4.2, P3

- Where there is insufficient data or understanding of resources to predict impacts, the most acceptable approach is to identify the information gap and err on the side of conservatism in predicting impact. Mobil has not convinced the reviewers that a conservative approach has been taken. 408 (x40)

Sp:131, S4.2, P1

- Displacement of the impact designation was but one of the criticisms of the methodology used. The proponent has failed to address the other DOE criticisms which still stand. 409 (x41)

Sp:132, S4.4 - Cumulative Impacts

- By applying the same reasoning used by Mobil in S4.2, the conclusions of the studies on cumulative impact cited here (S4.4) cannot be expected to be scientifically conclusive. Both prediction of environmental impact from the Venture Project and prediction of the cumulative impact from production or development discharges suffer the same limitations of approach. We have inadequate knowledge at present to predict or judge whole system impacts for natural ecosystems. However, this does not mean we stop working towards that goal nor does it mean that we cannot solve some of the parts before we gain the solution for the whole. 410 (x42)

- There is a significant difference between a detectable effect and an actual effect. The former is dependent on the limitation of technology or the methodology employed. The later is what happens whether we can detect it or not. 411 (x43)

Sp:133, S4.4, Point 2 - "Small Progressive . . . "

- Adaptive population characteristics only hamper interpretation if there is inadequate knowledge of the parameters. Given adequate knowledge of parameters such as recruitment or recolonization, these characteristics can become sensitive indicators of the "health" of the population. In the same way, adequate knowledge of the range of tolerance of individuals of a given species is comparable to being able to "ask it whether it feels well". General stress indicators, for example, induction of the Mixed Function Oxidaze System in teleosts or the change in bile acid composition, fecundity, or stored fat, 412 (x44)

all can provide some indication of whether an individual is "healthy".

Sp:133, S4.4, Point 2 "Assessment of Petroleum-related . . ."

- Many of the studies subsequently cited as examples of this argument are either single or isolated well programs, which were started in areas already stressed by other pollution sources or were commenced with an inadequate pre-development data base. We are concerned that this could also prove to be the case off Eastern Canada. 413 (x45)

- Perhaps the following quotation from the summing up of the recent Royal Society Discussion Meeting on the Impact of Oil Pollution on Marine Populations, Communities and Ecosystems (Clarke 1982, Phil. Trans., R. Soc. Lond., B297:433-443) can provide a view of the current scientific perspective on this matter: 414 (x46)

> "The Discussion Meeting revealed a considerable divergence of views. Present evidence suggests that oil pollution may have serious local and temporary consequences, but they are no greater, and generally less than natural fluctuations. There are a number of areas of ignorance or uncertainty, which accounts for the different attitudes taken at the meeting. The principal need is to gain a better understanding of the functional performance of ecosystems and their response to disturbance, whether caused by natural events or pollution." (p. 249)

Sp:135, S5.1

- There is no airstrip on Sable Island. Fixed-wing aircraft use the flat sand beach for landing (when conditions are suitable). 415 (x47)

Sp:148, S5.1, P3

- Once the production platforms are installed, why not use these facilities for bearing checks, rather than the Island thus reducing the need for overflights? 416 (x48)

Sp:152, S5.2.2

- Although the amount of fuel oil spilled by a support vessel is unlikely to have a severe or long lasting effect on an open ocean population, the distinction between a discernible effect and an actual effect should be re-stated. Just because there is a technological limitation to our ability to discern an effect does not mean that it does not occur. 417 (x49)

Sp:153, S5.2.2, Point 3, Last Line

- While the statement may be true, it requires further qualification: 418 (x50)

  (a) The area may have the ability to assimilate what it now receives in the way of contaminants. It may not have the ability to assimilate oil related products.

  (b) Its load-handling capability may be affected by the introduction of large amounts of hydrocarbon pollution to the point where the mechanisms already functioning shutdown completely and the adverse effects are compounded.

  (c) Pollutants are pollutants whether they are already in place or are newly introduced and as such warrant some

degree of consideration.

Sp:154, S5.2.3, L12-16

- Mobil has overlooked Environment Canada's comment (Vol. 1, p. 20) that based on studies reported by Mobil in the EIS (Vol. IIIb, p. 49), the condensate becomes more toxic as it evaporates. The residues remaining after evaporation probably contain the more toxic fractions. Instead, Mobil states on several occasions that because of the rapid evaporation of the condensate, it should be relatively non-toxic to icthyoplankton on the Scotian Shelf. Mobil has itself presented data to contradict this contention and should be expected to clarify the discrepancy. 419 (x51)

Sp:155, S5.2.3, P2

- Scott (1982) caught several other species of fish. Current data is inadequate to predict the seasonal and spatial use made of the Venture field area by juvenile or other age groups of fish. Studies are required immediately to determine the resource at risk, let alone quantify it. 420 (x52)

Sp:155, S5.2.3 - Penultimate 3 Lines

- Presently accepted "safe levels" for prolonged exposure to a toxicant are in the order of one-tenth to one one-hundredth of the 96-hour LC50. Mobil states that levels of condensate would be one-quarter of the acutely lethal threshold in the top ten metres of water, ten kilometers from the blowout site within twelve hours of a blowout. Prolonged exposure to this level of condensate would be expected to have sub-lethal and chronic effects on organisms in that area. 421 (x53)

Sp:156, S5.3

- Because the scientific community exhibits a divergence of views on this subject, it would be reasonable to convene an appropriate forum to review the current knowledge and develop a scientifically valid approach to the problem. Environment Canada is prepared to participate fully in the sponsorship of such a forum. 422 (x54)

Sp:159, S5.3.1, P3, L4

- Cold water environments may enhance the lethal effects of hydrocarbons and other volatile toxicants by reducing the rate of evaporation and allowing the organism to remain in contact with the toxicant longer than would be the case in warmer aquatic environments. Similarly, high energy environments allow for more mixing energy and thus a greater amount of hydrocarbon to be incorporated in the water column. 423 (x55)

Sp:163, S5.4, P2, L4

- Spent drilling fluids do not have the same characteristics as dredge spoils. The proponent does not provide any reference to the "voluminous literature" consulted. 424 (x56)

Sp:164, S5.4, P2, (334)

- The original Environment Canada comment was ambiguously worded. The thermal plume of interest is that of the production water which is considerably more noxious than cooling water. 425 (x57)

Sp:167, S5.5

- The lack of very preliminary and basic information about the coastal environment near the landfall site is a significant data gap, even at this conceptual state. 426 (x58)

Sp:171, S5.5, L3

- Although it may be possible to select a route that avoids salt marshes, etc., depending on site conditions and alternatives, such a crossing may be the lesser of two evils. 427 (x59)

Sp:181, S6.0

- Regarding the non-committal nature of the statements in this section, the Panel is referred to Environment Canada comment number 384(x16). 428 (x60)

- The proponent suggests an inappropriate method of obtaining adequate information on resources from technical agencies. Although knowledgeable, local officials may possess only anecdotal or incomplete information on resources in, for e.g., a stream or river. The proponent or its agents should approach the appropriate contact point in government. These contacts will then ensure that appropriate information is supplied. 429 (x61)

Sp:183, S6.1, P3

Many private woodlot owners have signed agreements with the Canadian Forestry Service and the N.S. Dept. of Lands and Forests with respect to forestry operations on private lands to manage their woodlot in a specific way. These agreements may require the woodlot owners to cross the proposed pipeline with heavy equipment such as forwarders and tree harvesters. Special 430 (x62)

measures will have to be taken when crossing these lands to ensure that this right of access can be maintained. It may be necessary to provide frequent ramps or increase the pipeline burial depth. Has the proponent held discussions with woodlot owners along the pipeline route?

Sp:184, S6.1.1.3, P2

- Aside from the mitigation measures mentioned, it will also be necessary to ensure that water cannot migrate off the mine site within the pipeline trench. 431 (x63)

Sp:185, S6.1.1.4, L9-11

- "Obstruction of this river . . . " This statement is unacceptably vague and lacking in commitment although undoubtedly well intentioned. 432 (64)

Sp:188, S6.1 and Sp:21, S2.4

- Mobil has identified concerns within the 1 km pipeline corridor (p. 83) but osprey and eagles may live in areas just outside the corridor but close enough to be affected by pipeline construction (less than 2-3 km; p. 21). Similarly, for sensitive downstream spawning habitat, a 1-2 km band either side of the most probable corridor should be characterized for sensitive habitats such as those discussed. 433 (x65)

Sp:193, S6.1.2.7

- The geotechnical investigations mentioned for stream crossings in the Guysborough Harbour to the plant site section may also be necessary for the landfall to Guysborough Harbour section. 434 (x66)

Sp:199, S6.2

- Mobil has circumvented analysis of risk in several places. Of particular concern is the possible interaction between the gas processing plant and other industries such as the Arctic Pilot Project LNG plant should both be built. 435 (x67)

Sp:235, S7.4, Point "Spanning . . . "

- Although the proponent notes in S2.3.4 (p. 18) that "Free spans occur on almost all pipelines," the interaction between trawl gear and a free span of pipeline does not appear to be addressed. (See also Environment Canada comment #379(x11)). 436 (x68)

Sp:238, S8.0

- Mobil's monitoring and surveillance programs encompass from wellhead to plant but what about support facilities on the mainland, Sable Island, etc., will the impact of their operations be similarly monitored? 437 (x69)

- No mention is made of monitoring efficiency or of mitigation measures related to acid rock disturbance nor of long term residual impacts. 438 (x70)

Sp:239, S8.0

- Elaboration of the monitoring and surveillance program is incomplete at this time. Environment Canada can only agree with the principle of the plan but must await final approval until more concrete plans are provided. 439 (x71)

Sp:239, S8.1.2

- The International Convention for the Prevention of Pollution from Ships (MARPOL 73-78) will take effect for ships, including offshore oil rigs in October 1983. Although Canada is not yet bound by this convention, enabling legislation is currently being drafted under the Canada Shipping Act. This convention applies only partly to offshore petroleum structures but it is the position of Environment Canada that all structures should observe the spirit as well as the letter of this convention. It is expected that both the U.S.A. and the U.K. will act likewise. Under this Convention, the regulated level of oil effluent is 15 ppm under this Convention. 440 (x72)

Sp:239, S8.1.2, P3

- Mobil should be expected to use the BPT (Best Practical Technology) principle in the choice of technology. COGLA will be the regulatory agency in this regard, as well as for determining the frequency of sampling required. 441 (x73)

Sp:240, S8.1.2, P1

- By implication, one would reason that the gravimetric method is more accurate. This is not the case. Gravimetric methods are limited by the accuracy of the weighing methods. Both methods have distinct but relatively well-known limitations. The final decision as to the method used will be a compromise and taken by the regulatory agency, COGLA. 442 (x74)

Sp:240, S8.1.3

- There is a definite confusion of terms apparent. There is a need for clarification and agreement by all concerned (including Environment Canada) to specifically define such terms as: 443 (x75)

i) Effects Monitoring;
ii) Baseline Effects Monitoring;
iii) Environmental Effects Monitoring;
(iv) Biological Effects Monitoring

Otherwise, discussions will be unproductive.

Sp:241, S8.1.3, P3, Point 2 - "Water chemistry . . . "

- It may be more appropriate to key in on trace metal contamination or both. 444 (x76)

Sp:242, S8.2, Penultimate Line

- Without site-specific data, a valid conclusion is not possible. Impacts associated with construction and operation could only be monitored meaningfully if pre-development conditions were known and understood. 445 (x77)

Sp:246, S8.2.5

- P. 13 indicates that corrosion is one of the more common hazards affecting offshore pipelines. What potential fishing problems may arise 10-20 years after the line has been abandoned and anti-corrosive measures stopped? 446 (x78)

Sp:249, S8.3.3, L10

- The definition of terms such as "major" must be explicit. A 'minor' stream in the hydrologic sense may be a 'major' stream in the ecological sense. 447 (x79)

Sp:252, S8.3.5 - "Pesticide Usage"

- It was stated by Mobil that they do not intend to use herbicides on the right-of-way. Will pesticides be used elsewhere? 448 (x80)

Sp:274, S9.5.1

- Three different rates of evaporation of the condensate are given. On p. 274, it is stated that 50% of the condensate will evaporate in the first ten minutes. On p. 154, two different figures are given; 35% of the original hydrocarbons will remain after two and one-half days at a wellhead blowout and 20% will remain after one day from a pipeline blowout. These predictions seem vastly different. An explanation of how these figures were arrived at would be useful. 449 (x81)

Sp:276, S9.5.4

- If condensate has a low viscosity, it will penetrate soil rapidly at which point evaporation will be reduced. How effective is soil restoration by "aeration and fertilization"? What experience or studies have been conducted in the past? 450 (x82)

Sp:277, S10.0

- As noted in Volume I and II of the original Environment Canada presentation to the Panel, Mobil has completed more than one study of the trace metal content of benthos from the Sable Island area. Why was this information not provided here? 451 (x83)

Sp:298, S(B)1.0

- Environment Canada accepts the proponent's limited control of post-Panel review processes and requests that the Panel identify the need for an appropriate mechanism in its recommendations. 452 (x84)

Sp:32 and 33

- Short and long term re-claimation goals are outlined. The long term goals include restoration to former land use. In agricultural areas, the former land use could be maintained, however, in forestry areas, restoration to a forestry land use may not be practical or desirable. Qualification of this long term goal would be appropriate. 453 (x84)

Sp: The Pipeline Route Atlas

- In general, the atlas provides a reasonable overview of selected environmental data in the proposed pipeline route. It should be noted, however, that the data sources and methods used to synthesize that data are not discussed in the atlas at all and receive limited treatment in the accompanying text. The recently completed Lands Systems mapping done at 1:50,000 scale by N. S. Lands and Forests would seem to be relevant. There appears to be no reference to it. In addition, slope contraints are not addressed. Although not appropriate to map at 1:50,000, slope assessments might well have been made on the 1:10,000 scale maps which focus on river crossings. 454 (x85)

- The proposed location of the gas plant indicates at least a 2 km. setback from the coast which lies outside the presently cleared area and impinges on a local reservoir. Further clarification and justification of the proposed site selection is required. 455 (x86)