REVIEW OF MELFORD INTERNATIONAL TERMINAL'S ENVIRONMENTAL IMPACT STATEMENT

Context

DFO Maritimes Science was asked by DFO's Environmental Assessment and Major Projects (EAMP) section to review the Melford International Terminal Incorporated's draft "Environmental Impact Statement (EIS) for the Proposed Melford International Terminal", prepared by AMEC Earth and Environmental, on 28 May 2008. A response was requested by 12 June 2008. A final version of the EIS was received in August 2008, and DFO Maritimes Science was asked to compare this draft to the earlier one to determine if the issues identified previously had been addressed. A response was requested before 23 October 2008. Given the short timelines to prepare a response in each case, DFO Maritimes Science determined that a Special Science Response Process would be used. These responses have been combined into a single Science Response report.

Background

The proposed Melford International container terminal in the Strait of Canso is a large scale development which, if approved, will require a marine infill of approximately 20 hectares plus onshore stream impacts. EAMP is tasked with reviewing this project under the Canadian Environmental Assessment Act. The draft EIS was provided to allow for identification of information requirements and allow for a complete review of the project, with all pertinent information available. The effects of the project on the immediate marine environment are of interest to DFO, as there is a local fishery is in the area and two deep water eelgrass beds have been identified within the project foot print. This Science Response includes a review of the proponent's evaluation of oceanographic conditions, the marine environment, and fishing industry interactions. The review of the draft EIS is provided first, followed by the review of the final EIS.

Analysis and Responses

Review of Draft EIS

The following comments were made on the draft EIS for the Proposed Melford International Terminal that was provided to DFO Science for review on 28 May 2008.

Oceanographic Conditions

Much of the information presented on the hydrography of the area is based on older observations (Lawrence et al. 1973, Cranston et al. 1974). The proponent also mentions that a synoptic picture or detailed analysis is not possible with this information. Under these circumstances, new observations should be made in support of the project.

A model of seasonal oceanographic circulation and currents, as well as seasonal stratification, is required for the entire Chedabucto Bay. This is needed to better understand the potential implications of the effects of oceanographic conditions on the biological diversity of the area and

for a comprehensive assessment of the impact of sediment transport and potential contaminant spills on the habitat and distribution of biota. Unfortunately, no modelling of the circulation patterns, residence time, or seasonal stratification was attempted.

DFO's 'WebTide' was used by the proponent to model tidal currents, but more sophisticated forecast models are available that could provide real-time boundary conditions on a finer scale.

In the 'Summary of Significant Environment Effects' section of the draft EIS, only short term effects in relation to an increase in sediment loading were considered. A long term monitoring of the immediate area and adjacent areas is needed, as sediment could cover areas normally occupied by juvenile stages of crustaceans and other species. Juvenile stages of crustaceans and other species were not identified during the surveys as these were not quantitative, and no examination of organisms living within small space was conducted during the surveys.

On an editorial note, no references are provided for the literature cited in Section 5.5 of the draft EIS.

Marine Environment

General

The term "footprint" is used in several cases related to the proposed development, but the extent of this term is not clear. Does it refer to the 20 ha area that would be filled, or the much larger area of the marine environment that the development may influence? Without details on mean current patterns, how can the area potentially affected by a spill of heavy runoff be determined?

The level of detail within the section is quite variable. For example the bottom survey by divers provides good detail on the flora and fauna within the vicinity of the project area. However, the remainder of the section discusses very general distributional information on a range of species, without any particular linking to the remainder of the strait and Chedabucto Bay. Although recent information is relatively limited for this area, a more thorough search of the literature might provide important background information to review a project of this size.

The proponent describes the massive oil spill in 1970 that polluted half the coastline in Chedabucto Bay, citing a study that concluded there was little evidence of this oil spill after 20 years. This may be true, but the extent of the immediate damage in this incident should be described in more detail, as well as the recovery process by the bay over the 20 year period.

In the summary of significant Environment Effects, only short term effects in relation to an increase in sediment loadings are considered. Long term monitoring of the immediate area and adjacent areas is required to evaluate the impact of sediment covering areas normally occupied by juvenile stages of crustaceans and other species.

At various points in the documentation, the area of infill is described as 20 ha, 22 ha, and 23 ha. The true value should be verified and the document corrected so as to be consistent.

Sediment Quality

It is unclear what the nature of the fill on the construction site might be, which makes it difficult to assess potential impacts. Will the fill be limited to just what is removed during the early construction stages, or will additional material be transported? Short term effects of infilling and

dredging are described, but no long-term evaluation is presented. Leaching of the fill site during rain storms will likely occur over a period of years and needs to be addressed.

Elevated levels of PCBs were detected in a significant proportion of sediment samples collected near the study site. The distribution of this contaminant needs to be investigated further with additional sampling to delineate the area affected and better determine concentrations. Redistribution of PCBs during dredging operations is a concern and must be addressed. This may be of particular concern for the aquaculture site located 6 miles from the proposed terminal.

While sedimentation will likely not be a serious problem so long as proposed measures to limit release of sediment during and after construction are implemented, in the absence of information on circulation patterns and currents it is not possible to say where suspended material or contaminants might travel.

Water Quality

Information provided in Appendix 5.8-B is restricted to a single sampling period and does not represent seasonal averages or variability, which is what would be needed to characterize water quality on the area.

Marine Fauna

The 'Fish and Shellfish' section does not adequately describe the invertebrate fauna of the study area. Lobsters are mentioned briefly; all others are identified by presence alone. More details on common invertebrates found in the area with frequency of occurrence is required. The study mentions a benthic habitat survey which identified 79 unique taxa. A table with this information, including the average number of taxa per square meter sampled would be useful.

The report provides lists of fish and invertebrate species as described by Jacques Whitford (2004) 'Environmental Assessment for the Proposed Bear Head LNG Terminal', with the implication that similar assemblages occur in the Straits of Canso and Chedabucto Bay. More detail is required to support this conclusion. No other literature is cited to support the list of species that occur in the project area.

While the DFO summer survey does not sample in Chedabucto Bay, examination of catches nearby shows a number of species that are likely resident in the study area but are not mentioned in the report. These include thorny skate, Vahl's eelpout, daubed shanny, turbot, mailed sculpin, and four-beard rockling. Similarly, from survey data, shortfin squid, starfish, *Pandalus montagui*, greater toad crab, lesser toad crab, sea urchins, sand dollars and sea cucumbers are likely in the study area but not mentioned in the text.

Important information may be available from additional sources. An inshore survey was conducted along the Nova Scotia coastline in 2006, with some sampling sites quite close to the proposed site. The information from this survey and other data sources was summarized in the DFO and Fishermen & Scientists Research Society Inshore Ecosystem Project Data Synthesis Workshop (DFO 2007). Beach seine catches at St. Peters Bay included alewife, amphipods, Atlantic silversides, cod, *Crangon* species, green crabs, hake, herring, jellyfish, mummichog, northern sand lance, perwinkles, unidentified pipefish, rock gunnels, shorthorn sculpins, shrimp, winter flounder, unidentified eels, and sticklebacks.

Table 5.8-1 contains a number of errors. *Zoarces vivparus* is not mentioned in Atlantic Fishes of Canada by Scott and Scott (1994) or Fishes of the Gulf of Maine by Collette and Klein-MacPhee

(2002) and is likely a misidentification. Atlantic cod, cunner and radiate shanny are listed as pelagic species, when they are demersal.

The information presented on phytoplankton and zooplankton (Table 5.8-4) was gathered prior to 1995, 13 years ago, and needs to be updated to be relevant to the present status of the Melford area within Chedabucto Bay.

There is considerable discussion on sea turtles, but there is no evidence that any of these species are resident to Chedabucto Bay. The description of sea turtles as land nesting habits and the problems inherent therein is interesting but irrelevant, as sea turtles do not nest here and do not make landfall.

Marine Flora

Phytoplankton is the main starting point of the food chain, but there is no mention of any baseline sampling at this level of the food chain. Assumptions that the phytoplankton community will be similar to adjacent areas of the Atlantic Ocean may not be valid. Changes in nutrient loading associated with leaching of the fill, changes in circulation patterns or turbulence by ship traffic could affect this biological component. There is no mention of red tide in the document – could potential changes be important to aquaculture sites?

A table summarizing the marine algae species information from the underwater benthic survey would be useful.

Marine Species at Risk

Based on DFO survey data, Atlantic striped wolfish (special concern) and winter skate (threatened) are commonly caught in nearby strata 459 and, therefore, both could be in the general area of the project. In addition to these species, there has been a single record of a northern wolfish (endangered) caught in strata 459 as well as a couple of records of cusk (threatened) in that strata. No spotted wolfish (endangered) were caught in strata 459 but they have been caught in adjacent strata.

Fisheries

Landings from Statistical Districts 9 and 14 are not necessarily caught in those districts. For example, all reported landings of clams in 2006 came from Banquereau Bank. The report does mention that the project area is extremely small in comparison to the area of the adjacent districts, but there is the inference that the landings are within these two statistical districts and this needs to be corrected. Actual landings within the bay and in the area affected by the ship traffic should be reported. Inshore fisheries like lobsters may represent actual landings within each statistical district, but positional data is limited for these fisheries.

Impact of the project on commercial fisheries may extend beyond Statistical Districts 9 and 14. Landings for Lobster Fishing Areas 29, 30 and 31A have been increasing in recent years and should be included in the summary. Shrimp, lobster, sea urchins and snow crab are additional species that support (or have supported) economic activities in the area, and landings of these species in adjacent statistical districts should be included.

Table 5.8.7 refers to licenses in District 14 only. It would be relevant to this report to also have information from adjacent areas to the proposed development site. An outline of all licenses

issued for LFA 29, 30, 31A would better provide the scope of the fishery in areas within Chedabucto Bay and immediate areas.

Residual Effects

Much of this section refers to the fact that significant adverse effects will result in a decline in species diversity, a decline in abundance and changes to the distribution of species. For this to be monitored it would be necessary to conduct a more extensive study to cover a broader area and obtain quantitative information on macrofauna and macroflora that would allow an ecological baseline for long term monitoring to be set.

Accidents and Malfunctions

All small accidents add up into the soil and the cumulative effect of these small spills and their leakage into the groundwater table and into the marine environment needs to be considered.

Table 8.1.1 raised several concerns. For the 'Offsite Incidents' scenario, it was not clear where or how contaminated soil and water would be disposed of. In regard to the 'Spill' scenario, the statement that petroleum products would be "prone to dispersion by wave action" is incorrect. Wave action will not resolve the problem, but rather will simply spread it. Regarding ballast water, although the responsibility for adhering to the regulations is the responsibility of the vessel operator, sampling equipment should be in place locally and the situation monitored to ensure compliance.

Several of the concluding statements were seen as invalid. "Quantities of released contaminants are small" does not consider cumulative effects. "Adverse effects remain localized" is not provable without more information on currents.

Underwater Benthic Habitat Survey

The information on the biota surveys is interesting but the manner in which the information is presented makes it difficult to visualize the spatial distribution of animals and marine plant species and seagrass, in relation to the bottom type. Further assemblage of collected information on each transect would be useful to better visualize characteristics of benthic habitat in relation to actual distribution of type of substrate, algal coverage, and observed abundance of macrofauna.

The evaluation of habitat, macroflora, and macrofauna is useful; however, more quantitative information is required to do an adequate assessment of the biological productivity of benthic macrofauna. This lack of actual quantitative information (density, abundance, biomass, size, maturity stage of observed species) precludes a characterization of the habitat as suitable for nursery area of invertebrates or fish or not. Under these circumstances, it is difficult to assess the ecological significance of the proposed habitat changes and later on proposed mitigation.

The inclusion of estimates of biological diversity would be relevant to this report and to monitoring of changes over time, although it requires a more standard sampling method and accounting for all species, not just those than are large enough that they can be seen on video.

The abundance categories used (Abundant/Common/Occasional/Uncommon) may not be applicable in all cases. What might seem rare for one species might not hold for others. For example, lobsters might have been characterized as abundant at 1-5 per observation on a

number of stations on both near parallel to shore transects; however, this can not be easily discerned as presented.

It seems curious that lobsters were found on both parallel transects but not on the perpendicular transects.

There are also a couple of editorial issues to be resolved. The distance of the T1 transect is stated to be 600m in the text, but is 900m in the figure. In Attachment A, there are two tables labeled A4 with the same headings; the second one is Table A5 and it is Transect 2.

Review of Final EIS

The final version of the Melford International Terminal EIS was received in August 2008 and compared to the earlier draft to determine if the issues identified by DFO Science had been addressed.

In some cases, revisions incorporated into the final version addressed these concerns:

- More detail on the 1970 'Arrow' oil spill in Chedabucto Bay was provided.
- Information from DFO research vessel survey sampling in areas adjacent to the study area was incorporated, including reports on a number of finfish and invertebrate species (e.g., species at risk) that are likely present.
- Various editorial issues were corrected.

However, in most cases the final version failed to address the concerns of DFO Science. Most importantly:

- Most reviewers noted that information which formed the basis of the EIS was a decade or more old. This included hydrographic observations, as well as information on some of the fauna and flora of the study area. More current observations are required.
- Additional, more sophisticated modelling of circulation patterns, residence time, and seasonal stratification is required to understand the potential impacts of sediment transport and potential contaminant spills on the habitat and distribution of biota.
- Only short term effects were considered in many cases – long term effects need to be addressed also.
- Commercial landings data need to be expanded to include adjacent areas, and the accuracy verified. For example, the table for Statistical Districts 9 and 14 landings contains a number of species which are not caught anywhere near the study area.

While the above is a summary of the most notable concerns, several other gaps identified previously in the DFO Science review of the draft EIS were not addressed.

Conclusions

The draft Environmental Impact Statement (EIS) for the proposed Melford International Terminal Melford Container Pier addressed many issues in the immediate vicinity of the construction site using available information. However, a number of important information gaps were noted. For example, it was recommended that the potential impact of the terminal be evaluated over a much larger area. In the case of oceanographic conditions, this would require much more extensive analysis of currents and circulation patterns, as well as collection of information that reflect current environmental conditions. More comprehensive consideration of biological

information, including more recent sampling, over a broader spatial and temporal scale was also recommended.

The final version of the EIS addressed some but not all of these recommendations. More detail on the 1970 'Arrow' oil spill in Chedabucto Bay was provided, information from DFO's research vessel survey sampling in areas adjacent to the study area was incorporated, and various editorial issues were corrected. However, much of the final information basis of the EIS was still a decade or more old. This included hydrographic observations, as well as information on some of the fauna and flora of the study area. In addition, potential impacts of sediment transport and contaminant spills on the habitat and distribution of biota were not fully explored, i.e., through modelling of circulation patterns, residence time, and seasonal stratification. Finally, long term effects were not felt to have been given adequate consideration.

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