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March 8, 2011

**Dr. Brian Gray**
**Assistant Deputy Minister**
Natural Resources Canada
Earth Sciences Sector

**Dr. Siddika Mithani,**
**Assistant Deputy Minister**
Oceans and Science Sector
Fisheries & Oceans, Canada

Dear Drs. Gray and Mithani,

**Re: Canada's Offshore Oceanographic Science Vessel (aka. Hudson Replacement)**

"*…if you cannot measure it, your knowledge is meagre and unsatisfactory*"
- Lord Kelvin

The oceanographic community has grave concerns that the design for the new Offshore Oceanographic Science Vessel (OOSV), meant as a replacement for the *CCGS Hudson*, will not meet present or future needs of Canadian offshore oceanographic research. Construction of an inadequate vessel at this time will inhibit construction of an appropriate one into the foreseeable future and thereby limit Canada's ability to know and to manage its' offshore lands and seas.

It was with great excitement that the scientific community learned of the Federal Government's 2008 announcement of the Canadian Coast Guard "Fleet Replacement" program and the inclusion of a replacement for the aging *CCGS Hudson*. The *Hudson* was brought into service in 1963 and has been the sole Canadian vessel capable of deep water multidisciplinary research in remote waters that experience challenging weather conditions. Unfortunately, she is well beyond her intended life expectancy, lacks modern oceanographic capability and has at least twice now been taken out of service due to rust issues and to her failure to meet Transport Canada safety regulations. Her replacement is well past-due. To replace her, however, requires a vessel of at least similar capability, but with modern oceanographic facilities. $120M was allotted for her replacement. In recent design specifications, fitting a vessel to that budget required substantial compromises on the size and capabilities of the vessel. We sea-going scientists, with the mandate of providing the Government of Canada with knowledge of Canada's offshore lands and seas, have grave concerns that this new design cannot possibly provide the capabilities required of modern oceanographic practices, nor provide a safe and productive platform for working in North Atlantic and sub-Arctic waters. Canada has the longest coastline of any nation in the World; much of it remote and isolated. With a successful Extended Continental Shelf submission to the UN Commission on the Law of the Sea, Canada will have the second largest offshore territory of any nation in the World. As a signatory to the convention, Canada has an obligation for "*the protection and preservation of the marine environment*" (UNCLOS, Article 56). Canada must demonstrate the capacity for scientific stewardship in the management of these offshore

lands now and into the future, and in the eyes of the international community. Without a suitable vessel and a suitably equipped vessel, this mandate is unachievable.

Of greatest concern is the size of the proposed replacement vessel. The present proposed design is for a 76 m vessel with 3400 tonnes displacement. The Hudson is 91 m in length with 4800 tonnes displacement. This reduced size greatly shortens the operational weather window for offshore research – particularly in the North Atlantic and Labrador Sea, meaning shorter field seasons and reduced number of operational days. It also limits the size and quantity of oceanographic/survey equipment that can be deployed on any particular mission. The consequence of such limitations is that multi-dimensional and multi-disciplinary missions will not be possible, restricting interdepartmental and inter-agency collaborative programs and restricting seagoing scientific training opportunities. Even without multi-disciplinary missions, the remoteness of the Canadian seascape requires a vessel to carry equipment enough for multiple missions during a single deployment. It is not possible to make equipment transfers north of Goose Bay or Churchill, for example. Missions to remote areas commonly involve many days of unproductive transit to and from suitable ports, making the multidisciplinary and effective use of the ship all the more important. In addition, the proposed vessel will not be large enough to host large pieces of oceanographic equipment that are necessary for deep water sampling and surveying. Its shorter hull length will prevent installation of modern depth sensors required to survey the full extent of Canada's Extended Continental Shelf.

There is also concern over the degree of ice strengthening of the proposed design. Research in Canada's north is a priority with the Government of Canada, thus a dedicated science vessel capable of operating in seasonally ice covered seas is necessary. The Hudson was constructed with a comparable rating of Polar Class 2 to 4; our understanding at the time of this writing is that the new vessel is proposed to be Class 6 (Class 1 is full ice strengthened capability). Operation in only light ice will restrict its operational arena and its operational season.

We, the community of oceanographic researchers, wish to express our concern over the present proposed OOSV design and express the need for construction of a research vessel that will serve the Canadian public for the next 40 years. It must be at least as capable as the present vessel. It must be able to operate within all of the Canadian offshore territory (including the proposed Extended Continental Shelf under Canada's UNCLOS submission), short of areas of perennial sea ice cover, with modern and future oceanographic equipment. Specific examples of the potential inadequacies of the proposed vessel are included in the appendix.

Sincerely,

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Dr. Ellen Kenchington, PhD, DFO

*continued*

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**Appendix**

**Limited deck space/storage space**

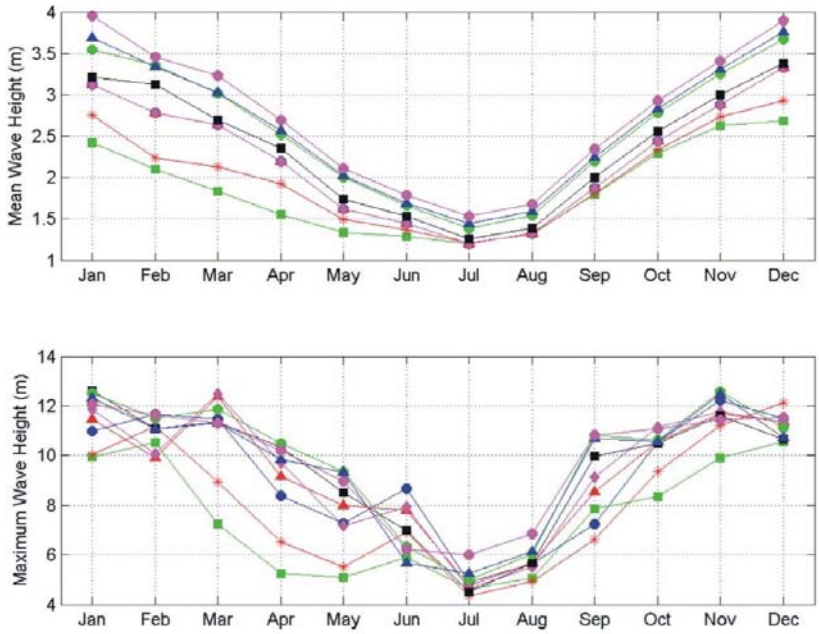
Limited deck space leads to greater safety hazard and fewer opportunities for multidisciplinary or multi-component expeditions. For examples, long cores would be limited to less than 25 m and cores greater than 20 m would no longer be possible if all the geophysical tools were on the deck as well. Multidisciplinary programs are not possible or greatly restricted (e.g. coring and seismic operations during the same mission not feasible). Operation of newly developed Canadian Autonomous Underwater Vehicles are likely not feasible because of limited deck space for equipment handling. As for coring, it would be the only system that would likely be able to be accommodated on the vessel on a single mission. Equipment development, such as the Canadian-developed SeaBed II system could not be tested on a vessel of limited deck space. International collaborative programs utilizing such equipment as the German MeBo rock drill or the French geotechnical PenFeld tool are not possible as they require 4 containers and there is not the deck space to accommodate this support equipment. Fundamental seismic reflection programs using several km-long hydrophone arrays are not possible due to lack of deck space to hold the large winches required. Similarly, there is no deck space for additional air compressors to drive the necessary pneumatic sound sources for seismic surveying.

Limited capacity to carry personnel and equipment necessitates more port calls and longer transit times, reducing actual working days at sea. Most port calls are required to occur in St. John's or Halifax, incurring many days of steaming from remote North Atlantic or Labrador Sea locations.

**Operational weather window**

With a reduced vessel size, the operational weather window is greatly reduced, restricting work in most North Atlantic environments to one season of the year and reducing the number of productive days at sea. The figure below demonstrates the severe sea states expected in the Labrador Sea outside of July and August, for example. Increased weather damage to the ship and scientific equipment can be expected with a smaller vessel.

Figure 3.23 Mean and Maximum Monthly Significant Wave Height by Grid Point




**Lack of deep water survey capability**

The vessel will be outfitted with multibeam sounding tools for shelf and upper slope water depths but not for greater water depths. Under UNCLOS, Canada will be responsible for managing the seafloor and sub-seafloor in water depths down to 4500 m, but Canada does not presently have, nor will have the capability of surveying these environments with this proposed vessel. A 76 m vessel will not accommodate the transducers necessary for a deep water multibeam system.

**Ice reinforcement**

The vessel will not be capable of operating in ice, except very light ice conditions (Class 6); compared with the Hudson (Class 2). This limitation greatly restricts the operational arena of the vessel. It is highly unlikely that the proposed new Polar Icebreaker will be affordable by most science programs and operations in sub-Arctic environments won't require that capability, so it is critical that this science vessel has the capability of operating in ice of some thickness. Only with this capability will Government researcher be able to carry out mandated northern objectives.

**Dynamic positioning (DP) and stability**

Dynamic positioning is utilized by much of the offshore oil industry and there are operational safety standards set by industry for near-field work around offshore oil and gas platforms. DFO currently performs environmental monitoring in these areas. The industry standard for dynamic positioning in such situations is DP2. The DP2 system can supply enough redundancy that if a single point failure occurs (such as the loss of a bow thruster), the vessel can still keep station. The OOSV is to have DP1 installed which does not conform to the industry standards and could become a safety issue.

The stability of the vessel at speeds less than 2 knots is an issue. STX did not model this condition because the model did not perform well with speeds less than 2 knots. Many science operations require low tow speeds and ship stability at these low speeds is a necessity.

**Limited Science Berths**

There are 11 science cabins and one spare (shared to CG or Science) with the intent of double occupancy in all cabins - making for accommodation of 22 or 24 science staff at maximum capacity (compared with 31 on Hudson). Collaboration with other agencies and university partners and educational/training opportunities will be restricted as a result of reduced berthing. The cabins are 2.5 x 4 m in size with lockers and a shared washroom between every two cabins. There is no space to accommodate desks, and no work or leisure space is provided in the cabins. No other computer/desk space is provided on board other than in the general purpose lab. These tight quarters will result in less efficient science activities (i.e. no scientific writing) and will lead to higher stress levels and more personnel conflicts. Space and limited berth problems will be amplified by projects using ROPOS or similar personnel-intense programs where berths for numerous technicians are needed for cost-effective 24 hour operation. Berth space is further eroded in order to use the planned EM710 multibeam system that requires at least 2 operators for that activity alone.

By comparison, the vessel accommodates 24 Coast Guard personnel that includes 18 single cabins, yet in the Coast Guard lay-day system (30 days on – 30 days off), science technical staff often spend more consecutive days at sea than Coast Guard personnel.

**Comparison with other Countries**

By comparison, the newest UK oceanographic vessel, delivered in 2006 is the *RRS James Cook*. It is 90 m in length with 5800 tonnes displacement and full ocean depth multibeam sonar capability. The newest research vessel in the German fleet, launched in 2005 is the *RV Maria S. Merian*; a 94.8 m long vessel with 5200 tonnes displacement. Their research vessel built in 1986 is the *RV Meteor III*, which is 97.5 m in length and 4780 tonnes displacement. The newest French vessel, *Pourquoi Pas?,* was delivered in 2006 and is 107 m in length with 6600 tonnes displacement. In general, these vessels are at least 17% longer and 32% larger (displacement) than the proposed Canadian OOSV. These vessels perform the type of oceanographic work that Canada needs to conduct, but in Canada's case, weather and sea state conditions encountered are likely to be more challenging.

**Signatures of Emeritus Scientists and technical staff**
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