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From: Cochrane, Norman A
Sent: Wednesday, November 27, 2002 2:22 PM
To: Ross, Jim
Subject: Whites Point Quarry Blasting Plan - Comments N. Cochrane

Jim

Attached are some comments about the Whites Point Quarry Blasting Plan. Do not hesitate to contact me if you feel there are further issues to be discussed.



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I have read the "Whites Point Quarry Blasting Plan" by Nova Stone Exporters Inc. dated Nov. 18, 2002. I have also read "Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters" by D. G. Wright and G. E. Hopky.

One presumes DFO is primarily interested in blasting effects on fish/marine mammals and their habitat rather than the projected effects on nearby "structures" reported in the blasting plan. I have no major problems with the blasting plan as submitted. However there are some areas of concern, which you may or may not have already considered:

- 1) Is the current blasting plan relevant only to the initial blast, the plan for which is described in some detail, or a blanket document covering all subsequent blasting operations at the quarry? Some portions seem to read like the former and some the latter.
- 2) The "guidelines" document (p. 5 section 4) states that ammonium nitrate-fuel oil (ANFO) explosives are not to be used in or **near** water. The submitted blasting plan (p. 3) states the explosives will be primarily ANFO. The question is whether the site is sufficiently close to fish habitat that pollution might occur. It is not clear from DWG. 2 of the blasting plan exactly where the surface runoff goes (the land slopes toward Whites Cove) and how quickly.
- 3) The time delay of multiple explosive charges should be greater than 25 ms (Guidelines p. 9). The blasting plan delay specifies exactly 25 ms between adjacent shot holes (blasting plan Fig. 2) but more than one line of shot holes are detonated simultaneously. This amounts to a total of 57 shots over 660 ms or an average time delay of only 11.8 ms. One pair of shots are only, in theory, 1 ms apart (367 and 368 ms delays respectively). This is sufficiently close to cause addition (approximate doubling) or "beaming" of excess acoustic pressures in particular directions. For a spherically spreading pressure wave this would approximately double the range for a given pressure effect compared to a single isolated detonation.
- 4) While the 35.6 m set back criterion (ignoring "beaming" effects above) for the approximate shot weight appears to be met for both the initial detonation site and for the projected region of the quarry. The setback distance for the 13 mm/s maximum ground velocity criterion for spawning habitat, is about 101 m (using a 45 kg charge and interpolating using a square root dependence on charge size and the data from Guidelines Table 2) and appears **not** to be met by the proposed initial blast site using the high water mark located 80 – 85 m distant. However, it is quite possible that the local inter-tidal zone is not considered a spawning area in which case this consideration is inapplicable.
- 5) Will fly-rock, potentially hazardous to local birds and other wild life, be generated by the blasting?
- 6) P. 5 of the Blasting Plan mentions a seal colony observed at Crowells Cove north of the quarry site. Is this colony permanent? I don't see Crowells Cove marked on any of the associated maps. Is it sufficiently close to be an issue of concern and, if so, should not visual and instrumental monitoring be conducted at this site during the initial blast?

Additional comments:

One should note that the 35.6 m set back criterion is computed for a 100 kPa pressure pulse. Such a pulse has a high probability of lethal effects on swim bladdered fish, especially at shallow water depths. Sub-lethal effects are not considered. This is a very severe criterion!

The mathematical formulations in the Guidelines are probably a bit too simplistic to give an extremely high precision to calculated criteria. For instance, the exact location of the shot site in relation to the water column is not considered.

No mention is made of the projected frequency of future blasting (one per day – once per week – sporadic, on demand?). Some quarry operations are both noisy and of a more or less continuous nature such as

drilling shot holes, rock crushers, & heavy truck traffic. Have these aspects been assessed? They could have a bearing on the effects to nearby colonies of seabirds or marine mammals – if such exist.

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