

**Canadian Nuclear Safety Commission**  
**Bid Solicitation # 5000074343**  
**Questions and Answers #1**  
**March 24, 2024**

Number	Question	Answer
1	pH test (to be determined by the contractor) – conducted on fresh or hardened concrete?	Ideally, the test should be conducted on hardened concrete. An age of at least 56 days (or more) should be appropriate.
2	Leaching test is referred to as short term. We recommend minimum 3 months, but ideally 6 months since we want to focus be on durability aspects. Should the focus include toxicity? Should post-testing assessment be included evaluating the microstructural, elemental and phase analysis?	While the first focus of leaching tests should indeed be the durability aspects, the toxicity aspect of leaching should also be considered.  CNSC staff trust that post testing assessment are an important part of the overall leaching evaluation and therefore, should be included as part of the assessment related to leaching effects.
3	Could the grouting of a 1.00x1.00x1.00 m <sup>3</sup> block be replaced by a 0.75x0.75x0.75 m <sup>3</sup> block, enabling execution in a single cast preparation?	One of the objectives of pouring the large block is actually to evaluate how the grouting of the ISD projects may be affected by logistics and operational needs (e.g. delamination due to cold joints). Therefore, preparing the whole block in a single cast operation is not desirable.
4	Are the specific suppliers of the referenced binders known (e.g. the chemical composition of OPC GU/fly ash can vary depending on the different sources)?	The specific suppliers are not known and are also subject to change. The raw materials will be selected by the contractor based on their compliance with the appropriate standards as referred to in Table 1 of Annex A of the RFP (e.g. CSA A3000 for GU cement, etc.).
5	Are specific details of the aggregates to be used known? Is the same aggregate source to be used in all three mixes?	The aggregates to be used in all three mixes should be the same, for easiness of comparison purposes. Specific details are unknown and the aggregates (fine only, no coarse aggregates in the mixes) will be selected by the contractor based on their compliance with the appropriate standards as referred to in Table 1 of Annex A of the RFP (e.g. CSA A23.1 for the aggregates).

6	Shipping of materials from Canada to Finland can take between 2-3 months. This impacts the timeline. What is the expectation for when this project should start?	<p>Some elements of the schedule are provided in Section 6 of Annex A of the RFP. While the project should be started as soon as practically possible, CNSC staff acknowledge difficulties related to logistics and may provide flexibility in that matter, as long as the deliverable schedule is abided by. Note that the schedule of deliverables will be revised according to respond to comment #13 below, through an amendment.</p> <p>Nevertheless, note that the contractor may consider using raw materials from non-Canadian sources provided they are compliant with all the requirements from the appropriate standards as referred to in Table 1 of Annex A.</p>
7	Does the requested testing need to be performed in an SCC accredited laboratory or can the tests simply be performed to the CSA standard without any formal accreditation?	The tests can be performed to the appropriate standard without formal accreditation.
8	If accreditation is necessary, is it possible to use comparable procedures based on alternative standards such as EN or BS standards?	See response to question #7 above.
9	For the preparation of the 1 m <sup>3</sup> block, is it acceptable to prepare the grouting mixture in individual batches with a smaller overall volume (perhaps on the order of 200 - 500 litres) which would then be delivered consecutively? And if so, what would the smallest acceptable volume be for each individual batch?	Yes, it is acceptable, and actually desirable, that the 1 m <sup>3</sup> block be cast in individual batches of smaller volume for the reasons detailed in response to Question #3 above. CNSC staff trust that a total number of 2 to 5 batches of an approximately similar volume should be appropriate.

10	<p>Are there any specifications for both the nature and size of the various inserts to be used in the preparation and casting of the 1 m<sup>3</sup> block? And are the materials comprising the inserts expected to be compatible with the proposed NPD and WR-1 formulations?</p>	<p>There are no particular specifications for the inserts within the 1 m<sup>3</sup> block. The contractor should consider including hollowed horizontal and vertical pipes of various dimensions (e.g. between 2 cm to 20 cm diameter), old utility pumps with or without trash screens, beam pocket, construction debris, etc.</p> <p>This part of the project aims to simulate and assess the ability of the grout to fill the whole volume, including around and inside inserts. Potential compatibility issues between the inserts and the grout itself don't seem to be a concern given the objective mentioned above.</p>
11	<p>Which elements would be the preferred choice for determining leachability? Would stable isotopes of caesium and/or strontium and/or cobalt be desirable?</p>	<p>The main objective of the leaching aspect of this project is to evaluate how the grout itself may be affected by leaching (i.e. leaching rate increasing the porosity and permeability, etc.) and how this may impact the toxicity of the released groundwater in terms of content of dissolved grout compounds.</p> <p>Nevertheless, the grout is credited with the function to contain and isolate the waste inventory from the environment in order to reduce the migration of radionuclides from the facility to the environment. The radionuclide inventory of the ISD projects mainly consists of (excluding 3H, and in descending order of significance): 59Ni, 63Ni, 14C, 60Co, 135Cs, 137Cs, 90Sr, 36Cl, 94Nb, and 55Fe. In that context, studying leachability of some of the elements mentioned before (also considering their half-life) would constitute an asset to the proposal.</p>
12	<p>To confirm the homogeneity of the grout formulations, would a longitudinal cross-section of a solid body be accepted, showing the overall homogeneity and the absence of sedimented solid parts of the grout mixture?</p>	<p>The homogeneity of the grout cast within the 1 m<sup>3</sup> block, along with the ability of the grout to fill the whole volume, including around and inside inserts, should be evaluated by cross-section cuts (longitudinal and transversal) of the 1 m<sup>3</sup> block. In addition, the homogeneity of the grout mix-designs per say will be primarily evaluated by the static segregation test, the bleeding test, the VSI assessment and, to a lesser extent, by the J-Ring test. Additional methods to evaluate the homogeneity of the grout (such as the one suggested in the question) may be proposed by the contractor.</p>

13	The timeframe of the project duration of 10 months is quite short to support a graduate student or a one-year post-doctoral fellow.	The schedule of deliverable will be revised accordingly, through an amendment.
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