

PENTAGON ENGINEERING LTD.

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Date: March 6, 2017

City of Penticton AWWTP
459 Waterloo Ave
Penticton, BC

Via email: randy.craig@penticton.ca

Attention: **Randy Craig**

RE: Penticton AWWTP – Alternate Measures of Control (AMC), Bio-Reactors (2)

Dear Mr. Craig,

The Armtec gate is of adequate engineering, construction and maintenance to hold back the head applied to it for the time required to be in the confined space. The analysis of the gate as a control measure assumes that all gates leak. However, there is no expectation that a properly installed and maintained gate will fail catastrophically if no work is being performed on it which this gate is. It is recognized that systems will often permit some leakage; a means of pumping out the fluid should be undertaken. The upstream water should be continuously monitored and if the level rises too high that space should be evacuated.

The outlet gravity feed channel after being pumped out is also considered as adequate Alternate Measure of Control as the design of the system does not allow for water to flow back into the channel. The downstream water should be continuously monitored and if the level rises too high that space should be evacuated. As an added safety precaution, the Fontaine gates are of adequate engineering, construction and maintenance to hold back the head if it was to be applied to it for the time required to exit the confined space.

The Victaulic valve for the RAS line and the Clow valve for the Fermentor return line are of adequate engineering, construction and maintenance to hold back the head applied to it for the time required to be in the confined space

Given these facts it is our opinion that the proposed AMC for entering the Bio-Reactors (2) confined space is adequate. This AMC is adequate for two years and after that time it should be revisited to ensure its adequacy.

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Per:



Rob Linder, P.Eng.
Director