

Engineering Report Rev. 1 – Secondary Containment Version V1.1

| **CLIENT:** 2C Enviro Inc. | **PROJECT:** Secondary Containment Assessment

| **DATE:** September 27th, 2019 | **BAR FILE No:** 2CE-19EN-3671

| **ADDRESS:** PO Box 2425 Lloydminster, SK S9V 1W5

| **SCOPE** – BAR Engineering was requested by 2C Enviro Inc. to perform a structural engineering review of their secondary containment system version V1.1 for aboveground storage tanks.

| **BACKGROUND** – The secondary containment system consists of overlapping High Density Polyethylene (HDPE) panels. The panels are free-standing and come in two shapes; straight panels that measure 1.0m x1.0m x1.0m and 45° rounded corner panels that measure 0.96m x 1.0m x 1.0m (gross dimensions). This allows users to assemble the panels in unique configurations appropriate for their containment area. 2C Enviro Inc. has a patent for the system (application no.3,033,434 and reference 75605-1) with a configuration shown in Figure 1. During the event of a spill from the above ground storage tanks, the system must effectively contain fluids to prevent seepage to underground water sources and damage to the environment.

| **ASSESSMENT BASIS** – The system was reviewed with respect to the following regulations:

- Alberta ERCB Directive 55 “Storage Requirements for the Upstream Petroleum Industry”.
- Saskatchewan Directive S-01 “Upstream Petroleum Industry Storage Standards”.
- British Columbia “Oil and Gas Activity Application Manual”.

| **LIMITATIONS** – This assessment is limited to evaluating the structural stability of the containment system under hydrostatic loads and does not imply a review of the following:

- Permeability of the geomembrane liner or the HDPE panel when exposed to flammable or combustible liquids.
- Combustibility of the geomembrane liner, HDPE panel, or any other accessories forming part of the secondary containment system.
- Degradation of the geomembrane liner or the HDPE panels when exposed to UV radiation.

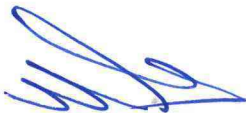
- Facility registration or conformance to PTMAA or the National Fire Code.
- Arrangement capacities, clearances, drainage control, and site preparation; each of which should be evaluated on a site specific basis.

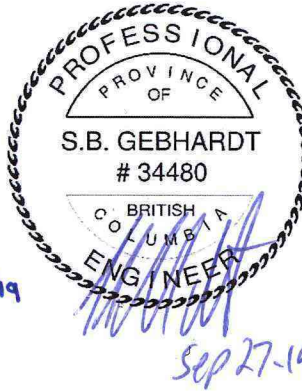
| SUMMARY – The secondary containment panels have been analyzed to resist global overturning and localized bending failure under hydrostatic fluid loads. The panel deformation was calculated and measured to be within acceptable limits to prevent spillage and maintain performance over several days of fluid containment.

The panels are manufactured by Allied Plastics Inc. using HDPE material (Marlex® HHM 5502-01ST Polyethylene) with acceptable physical properties and environmental resistance for the intended use.

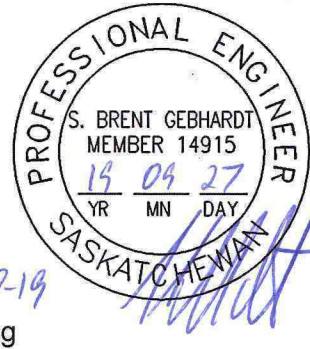
CLOSURE – 2C Enviro Inc.'s secondary containment system version V1.1 meets the structural requirements to withstand hydrostatic head at full capacity. We trust that this report has provided an adequate assessment of the containment system. We have prepared this report in accordance with good engineering practice and the previously mentioned regulations. Should further information be made available, we would appreciate the opportunity to review it to determine whether it affects the conclusions drawn in this report. If you have any questions or comments, please contact the undersigned.

Prepared by:



27 sept. '19
Mark Goossens, EIT



Approved by:



Reviewed by:

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