Evergreen Environmental Technologies

P.O. Box 947, Minnedosa, MB (204) 867-7161

April 10, 2015

Siobhan Burland-Ross, M. Eng P.Eng
Municipal and Industrial
Environmental Approvals Branch
Conservation and Water Stewardship
123 Main Street
Winnipeg, MB R3C 1A5

RE: Notice of Alteration to Evergreen Environmental Technologies License 2612RR

Dear Ms. Burland-Ross:

Most recently, Evergreen Environmental Technologies approved a partnership with Southwest Regional Development Corporation of Hamiota, Manitoba and Celtic Power & Machining of Rapid City, Manitoba to hold on site demonstrations of household waste and other landfill waste materials in a gasification process.

Please find attached to this letter an Addendum outlining the required information concerning the demonstration gasification process.

We anticipate this demonstration project to run from late spring 2015 to March 31, 2016

Once approved – please invoice us the $500 alteration fee for license.

If you require any further information, please contact Dave MacDonald or Wendy MacLennan – Evergreen Environmental Technologies at evergreen@xplorent.ca or phone 204.867.7161.

Yours truly,

M. Peckover, P.ENG.

Monty Peckover
Vice-Chairman of Board
Evergreen Environmental Technologies

**ADDENDUM**

## Notice of Alteration to License – Description of Changes

Partners with Evergreen Environmental Technologies Demonstration Gasification Project

**Celtic Power & Machining:**
Principals: Brian Reynolds, Gavin Reynolds and Eileen Reynolds. Celtic Power & Machining is a Manitoba registered company.

**Sigma Professional Engineering**:
Principals: Gene M (Mike) Pope and Jerry Green. Sigma Professional Engineering is an American corporation registered in Florida. Mike Pope was instrumental in the installation and operation of a solid municipal waste gasifier in the town of Barrow, Alaska. He was also involved in the construction of gasifier systems in England and Switzerland.

**Southwest Regional Development Corporation (SRDC) -** was formed and incorporated in 2003 as a non-profit Economic Development Corporation to promote regional economic development through funding from the Provincial Government.

**Background:**

Celtic Power & Machining have been involved with wood gasification projects in the past and were successful in running an industrial slow-speed generator on the gas produced. They developed an operating system which allowed the generator to supplement gas with biodiesel seamlessly adjust feed quantities to compensate for fluctuations in the calorific value of the gas.

Mike Pope of Sigma Professional Engineering LLC was instrumental in the installation and operation of a solid municipal waste gasifier in the town of Barrow, Alaska. He was also involved in the construction of gasifier systems in England and Switzerland. (Please see Air History on pages 4 and 5 of this document.)

The technical skills of both companies will be used to develop the demonstration gasifier/generator system which will primarily be used to dispose of municipal solid waste in a 100% efficient manner. The system could be located anywhere there is a need to eliminate waste and produce power.

**Description of proposed development, including construction, operation, and decommissioning if applicable:**

The Evergreen Environmental Technologies site will not require any preparation other than to identify a need for a more level surface in order to situate the demonstration gasification project.

The gasification chamber will basically be constructed from a 40 foot shipping container with added elements. A hopper will be constructed on top of the container for loading purposes. The whole system would be very low impact visually and environmentally.

The household waste used to test the system will be loaded directly into the gasification chamber from Evergreen Environmental Technologies. Emissions testing of household waste will be conducted.

The facility contains a landfill area, recyclables collection area, a pesticide container collection depot, and an area for tires, Household Hazardous Waste, Wood, scrap metals and a Soil Farm. This segregation of materials will allow for easy access of particular products to place in the chamber and gasify – thereby running individual and accurate emissions tests on various waste products.

**Description of existing environment in the project area:**

The gasifier will be partially built at Celtic Power & Machining and then moved to the Evergreen Environmental Technologies (EET) site. The EET site has met acceptable standards per its current emissions license requirements.

The unit will be completely mobile and can be moved and/or taken apart at the end of the expected demonstration time.

**Description of environmental effects of the proposed development:**

We believe that there would be no environmental effects due to the operation of the gasifier. Any emissions would be negligible and while we do not have data specific to the proposed unit, we do have data collected from the gasifier constructed in Barrow, Alaska. The gas produced was not used to fuel a generator but flared to atmosphere. A copy of this data is attached on pages 4 and 5.

**Description of the human health effects of the proposed development:**

There would be no reason to expect any detrimental effects to human health resulting from the operation of this gasifier. If the demonstration project is built and proved it will eliminate the

need for odorous, unsightly landfill sites and by eliminating these it would also remove the vermin population that always proliferates at landfill sites.

**Mitigation measures to protect the environment and human health and residual environmental effects:**

The only measures required for protection of the environment would be the containment of any waste used for gasification. Since this is already in place at Evergreen Environmental Technologies site – there is no concern to this containment.

**Follow-up plans, including monitoring and reporting:**

Once the gasifier is built and tested, there are potential plans in place to involve University of Manitoba – Faculty of Engineering Staff (Professor studying gasification) and a student interested in gasification. It is planned to involve this student and possibly Brandon University Science staff and students in the data processing to determine emissions, calorific values of various types of feedstock, and electrical power generated, etc.

Evergreen Environmental Technologies, SRDC, Celtic Power & Machining expect when the gasification unit is operating smoothly, plans will be made to host a demonstration day to promote, educate and communicate the use of the gasification system to other waste management landfill sites, RMs, government, industry and business personnel in rural Manitoba.

## Air Emission Testing History

| Lab | System | Waste | Dust | HCl | $SO_2$ | NOx | CO | Diox/ Furan | Hg | Pb | Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | mg/ dscm | PPM | PPM | PPM | PPM | ng/ dscm | ug/ dscm | ug/ dscm | ug/ dscm |
| **USEPA** | **STANDARD** | **=** | **24** | **25** | **30** | **150** | **50** | **13** | **80** | **200** | **20** |
| | Barrow,AK | MSW | 9 | NT | 47 | 132 | 0.6 | NT | NT | NT | NT |
| | Barrow,AK | MSW | 13 | NT | 18 | 146 | 3 | 0.1 | NT | NT | NT |
| | Allen,KY | MSW | 18 | 49.4 | 1.77 | 56 | 0.2 | 196.7 | 30 | 14 | 2 |
| CORE Labs | Malaysia | MSW | 4 | 20.2 | 1.88 | 41 | 0.4 | 11.6 | 46 | 66 | 15 |
| CORE Labs | Malaysia | Bio-M | 9 | 24.6 | 0.76 | 30 | 1.11 | 12.8 | 36 | 49 | 2 |
| CORE Labs | Malaysia | Indust | 10 | 6.4 | 11 | 88 | 1.4 | NT | 19 | 76 | 4 |
| CORE Labs | Malaysia | MSW | 5 | 17.6 | 9.4 | 57 | 1.8 | 1.272 | 21 | 53 | 8 |
| CORE Labs | Malaysia | MSW | 6 | 12 | 17 | 53 | 3 | 1.99 | 24 | 7.7 | 4.7 |
| CORE Labs | Malaysia | Bio-M | 7 | 11 | NT | 21 | 61 | 0.9 | 45 | 5.5 | 9 |
| CORE Labs | Malaysia | MSW | 3 | 32 | 9 | 56 | 3 | 2 | 61 | 94 | 7 |
| AmTest | Anchorage | Auto Fluff | 24 | 5 | 27 | 101 | 3 | 6 | 21 | 16 | 8 |
| AmTest | Anchorage | Rail Ties | 7 | 10 | 11 | 81 | 2 | 7 | 29 | 62 | 2 |
| AmTest | Anchorage | Auto Fluff | 20 | 18 | 21 | 47 | 4 | 6 | 24 | 82 | 3 |
| AmTest | Anchorage | MSW | 4 | 13 | 18 | 55 | 2 | 3 | 37 | 15 | 2 |
| WRI | Anchorage | Oily Wste | 6 | 6 | 7 | 70 | 6 | 3.5 | 3 | 18 | 29 |
| WRI | Anchorage | MSW | 5 | 17 | 1 | 21 | 3 | 9.7 | 1 | 37 | 2 |
| | | | | | | | | | | | |

| Date | Lab | System | Waste | Dust | HCl | $SO_2$ | NOx | CO | Diox/ Furan | Hg | Pb | Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | mg/ dscm | PPM | PPM | PPM | PPM | ng/ dscm | ug/ dscm | ug/ dscm | ug/ dscm |
| | USEPA | STANDARD | = | 24 | 25 | 30 | 150 | 50 | 13 | 80 | 200 | 20 |
| 4/93 | WRI | Anchorage | Bio-M | 13 | 30 | 16 | 68 | 2 | 2 | 12 | 15 | 4 |
| 4/93 | WRI | Anchorage | Tires | 16 | 24 | 12 | 71 | 5 | 1.5 | 61 | 10 | 3 |
| 4/93 | WRI | Anchorage | MSW | 5 | 13 | 7 | 58 | 2 | 7 | 70 | 25 | 2 |
| 12/90 | WRI | Anchorage | Bio-M | 4 | 17 | 12 | 70 | 6 | 3 | ND | 18 | 2 |
| 12/90 | WRI | Anchorage | Tires | 7 | 10 | 11 | 77 | 18 | NT | ND | 8 | 4 |
| 12/90 | WRI | Anchorage | Tires | 2 | 3 | 1 | 75 | 15 | NT | ND | 3 | 2 |
| 12/90 | WRI | Anchorage | MSW | 1 | 22 | 2 | 33 | 7 | 6 | 8 | 4 | 2 |
| 9/90 | WRI\YORK | Laramie | Tires | 5 | 24 | 70 | 84 | 75 | 3 | ND | 17 | 4 |
| 8/90 | WRI\YORK | Laramie | Tires | 6 | 16 | 14 | 99 | 4 | 1 | 2 | 17 | 4 |
| 5/90 | WRI | Laramie | MSW | 17 | 21 | 45 | 115 | 7 | NT | 1 | 5 | 9 |
| 10/89 | WRI | Laramie | Bio-M | 5 | 10 | ND | 46 | 1 | 9 | 4 | 3 | 8 |
| 9/89 | WRI | Laramie | Polym | 2 | 4 | 22 | 54 | 2 | 27 | 3 | 2 | 1 |
| 8/89 | WRI | Laramie | PVC | 6 | 15 | 2 | 76 | 2 | NT | NT | NT | NT |
| 8/89 | WRI | Laramie | PVC | 4 | 2 | 1 | 76 | 1 | 39 | 4 | 7 | 2 |
| 10/88 | WRI | Laramie | PVC | 1 | 23 | 2 | 85 | 4 | 18 | NT | NT | NT |
| 10/88 | York | Laramie | MSW | 1 | 17 | ND | 48 | 26 | ND | 1 | 3 | 8 |
| 10/88 | York | Laramie | MSW | 1 | 11 | ND | 31 | 23 | ND | 1 | 2 | 8 |