Appendix 5 Emissions and Contaminant Standards for Plasma Gasification

Table 5-1. Emissions from PGP Gas Power Generation in comparison to MoEE Standards – Plasco Energy Group

Air Emissions (Monitored after combustion engine in Plasco system)	Tightened Incinerator Requirements Issued in 2004 by Ontario MOE (A-7)	European Standard	Jenbacher Engines Using Natural Gas	Jenbacher Engines Using Landfill Gas (Trail Road)	Conventional Coal-base electrical generation (world bank standards)	Standard Automobile Engine (Drive Clean)	Jenbacher Engines Using gas from Plasco Energy PGP Process for Ottawa
HCl	18 ppmv	7 ppmv* (10 mg/Rm3)	nil	10 ppmv	nil	nil	3.3 ppmv
SO2	21 ppmv	19 ppmv* (50 mg/Rm3)	1 ppmv	12 ppmv	750 ppmv	7.5 ppmv (low S gas)	3 ppmv
NOx	110 ppmv	159 ppmv* (200 mg/Rm3)	200 ppmv* (250 mg/Rm3)	200 ppmv* (250 mg/Rm3)	365 ppmv	600 ppmv	<110 ppmv
Organic Matter	100 ppmv	10 mg/Rm3	10 ppmv	100 ppmv	200 ppmv	200 ppmv	10 ppmv
Particulate Matter	17 mg/Rm3	10 mg/Rm3	10mg/Rm3	10 mg/Rm3	50 mg/Rm3		10mg/Rm3
Dioxins and Furans	80 pg/Rm3	100 pg/Nm3	nil	nil (See **note 1**)	low	(diesels can emit high levels of dioxins)	nil (See **note 2**)

* Converted from the format originally quoted by the specification or as applied to the engine used. The original format is found in parentheses.

Rm^3 refers to reference cubic meter. Ppmv refers to parts per million by volume.

Note 1 – In normal operation, levels of dioxins and furans are non-detectable. During equipment or process malfunctions, dioxins may be formed. During these brief and infrequent periods, combustion of landfill gas has been shown to produce up to 100 picograms/Nm3 of dioxins.

Note 2– In normal operation, the Plasco process dissociates waste to the atomic level – dioxins and furans are absent at the exit from the converter. During equipment or process malfunctions, dioxins may be formed (mainly in the gas quality control section) until the equipment is shutdown, or until the process is re-stabilized. During these short and infrequent transition periods, the facility may produce 0-30 picogram/Nm3 of dioxins and furans.

Table 5-2 Plasma Gasification Slag Leachate Toxicity Comparisons (mg/L-fully crushed sample) (1994)

Element	Biomedical Slag Leachate	Soda Bottle Leachate	Ontario Regulations
Arsenic	0.026	0.002	2.5
Barium	0.0037	0.12	100.0
Boron	0.011	0.43	500.0
Cadmium	<0.002	0.47	0.5
Chromium	<0.004	<0.01	5.0
Lead	<0.02	12.2	5.0
Mercury	0.000085	<0.0001	0.1
Selenium	0.003	0.002	1.0
Silver	<0.01	<0.02	5.0
Zinc	0.042	0.16	