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WWF New Zealand
PO Box 6237
Marion Square
WELLINGTON 6141

Attention: Peter Hardstaff

Dear Sir

OFFICIAL INFORMATION ACT REQUEST

We refer to our letter of 25 November 2010 responding to your request for information set out in your undated letter received by Solid Energy on 1 November. We have now received notice of your complaint to the Office of the Ombudsmen regarding our refusal to release our lifecycle assessments of the greenhouse gas emissions arising from a CTL conversion plant in Southland and our life cycle analysis of mineral oil.

As you will be aware, following our response to you, the Parliamentary Commissioner for the Environment released her report on Lignite and Climate Change. The information contained in the report regarding greenhouse gas emissions is similar to the assessments we have made. As this information is now in the public arena we have decided to release our life cycle assessments of greenhouse gas emissions.

We set out in the attached document our life cycle assessments of the greenhouse gas emissions arising from various coals to liquids plants and for conventional oil to diesel.

If you have any questions regarding this matter please contact the writer.

Yours faithfully

Rob Page
CORPORATE SOLICITOR

(Encl: Life Cycle Assessments)

**COAL TO LIQUIDS
LIFE CYCLE ASSESSMENTS OF GREENHOUSE GAS EMISSIONS**

Coal to Liquids (CTL) plants have a wide range of emissions per unit of production. This is related to quality of the feedstock, the technology selected, the age of that technology, the level of thermal integration, the source of electricity to power the plant (i.e. is it drawn from the grid (with some proportion of renewables) or is it generated through coal or syngas) and the level of carbon capture and sequestration (CCS) used.

We set out below our lifecycle assessments of GHG emissions for mineral diesel and for a number of CTL plant scenarios.

Well to Tank (WTT) and Well to Wheels (WTW) Emissions (kg CO₂-e/litre)

Description	Diesel from Crude	'Old' CTL	'Current' CTL	'Current' CTL with CCS	'New' CTL	'New' CTL with CCS
Extraction	0.1					
Transport	0.1		0.1	0.1	0.1	0.1
Conversion	0.3	6.0	3.5	1.9	3.0	1.7
Transport to Market	0.1					
Well to Tank	0.6	6.0	3.6	2.0	3.1	1.8
Use	2.6	2.5	2.5	2.5	2.5	2.5
Well to Wheels	3.2	8.5	6.1	4.6	5.6	4.3

The "Diesel from Crude" column sets out our assessment of GHG emissions in relation to diesel from conventional crude oil.

The "Old CTL" column sets out our assessment of emissions based on data from a 1970's plant which is poorly integrated. In addition to integration, the technologies in the unit operations themselves have also advanced significantly and become more energy efficient in the last 40 years. This plant processes coal with a high ash content which significantly increases oxygen demand in the gasification process which further impacts energy use negatively.

The "Current CTL" column sets out our assessment of emissions that reflect current, well proven technologies (1990/2000's) for a plant based in a first world country. This is our base life cycle assessment we are using for our investigations into a CTL plant in Southland. We do not, as yet, have an emissions figure for the extraction stage of a CTL plant. However we believe it will be a very small part of the WTW total.

The "Current CTL with CCS" column sets out emissions based on the Current CTL figures above and assume that 50% of the CO₂ generated as part of the process is sequestered.

The "New CTL" column sets out emissions based on a current plant using high efficiency, well integrated technologies currently deployed and being operated in China at large scale demonstration level.

The "New CTL with CCS" column set out our assessment of emissions based upon the New CTL figures and assumes 50% of the CO₂ generated as part of the process is sequestered.

All the cases presented relate to indirect CTL which is the conventional pathway to convert coal to liquids. However, there are three technology pathways:

1. Indirect CTL with gasification and Fischer-Tropsch
2. Direct CTL (DCL)
3. Pyrolysis e.g. supercritical pyrolysis

Solid Energy is exploring the technology pathways at concept level to understand the suitability of the processes to New Zealand lignites, the viability of the process, the maturity of the technologies and the environmental impacts of each pathway. Although Solid Energy does not as yet have data to substantiate any claims, we think that DCL and pyrolysis routes may have lower carbon footprints than future CTL plants.