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ENERGY

MEMO

Job	**TNG Energy from Waste Facility, Eastern Creek, Differences Design fuel mix between UTDI (Nov 15) and Concept of Design (March 15) reports**
Date	**2016-10-24**
From	**Martin Brunner, Ahmet Erol**

Differences of the Design fuel mix between UTDI (Nov 15) and Concept of Design (March 15) reports

Introduction

EPA requested an explanation why there are such differences in the design fuel mix between Updated Technical Design Information (UTDI Nov 15) report and the Concept of Design (March 15) report and why it has not had an impact on the percentage make-up of the design fuel mix.

Explanation

Ramboll was asked to review the basis design fuel in the Fichtner Concept Design Report. As a basis for this review Ramboll was provided a comprehensive report with description and pictures of the waste streams treated at the Genesis plant and the products produced by the screening and sorting process. Based on Ramboll's experience the composition of every product and every waste stream to the future TNG facility was evaluated and redefined.

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Ver. 2

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Composition of waste streams by products

The following table shows the composition of the design fuel based on products (paper, plastic, etc.) in the different waste streams (CRW, C&D, etc.) according to the Concept Design Report (CDR).

Table 1: Proposed design fuel analysis, as received basis											
	Units	CRW	C&D	C&I	Flock waste	Paper Pulp	Glass Recovery	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Fuel Mix	%	23.37%	28.69%	16.84%	14.43%	4.81%	1.72%	2.06%	6.87%	1.20%	100
Compositional Analysis											
Paper/Card	%	4.30	14.05	22.44	3.93	78.40	62.00	30.00	21.05	38.54	16.75
Plastic Film	%	10.20	6.37	10.90	10.90	21.60	3.80	2.50	20.00	26.94	10.47
Dense Plastic	%	0.00	6.37	10.90	10.90	0.00	34.20	2.50	21.05	0.00	7.32
Textiles	%	5.30	0.00	12.89	0.18	0.00	0.00	0.00	10.53	0.00	4.16
Glass	%	0.00	0.00	1.81	0.00	0.00	0.00	4.00	0.00	8.50	0.49
Vegetation	%	8.30	0.00	1.70	0.00	0.00	0.00	35.00	3.16	0.00	3.16
Other putrescibles	%	0.00	0.00	0.00	70.41	0.00	0.00	0.00	0.00	0.00	10.16
Metal	%	1.80	1.12	0.37	0.00	0.00	0.00	5.00	0.00	7.59	1.00
Fines	%	0.00	0.94	0.18	0.00	0.00	0.00	0.00	11.58	0.00	1.10
Wood	%	58.20	43.91	21.53	0.85	0.00	0.00	0.00	4.21	0.00	30.24
Combustibles	%	0.00	0.00	2.84	2.84	0.00	0.00	0.00	2.11	0.00	1.03
Non-Combustibles	%	6.90	6.50	0.00	0.00	0.00	0.00	21.00	1.05	0.03	3.98
Hazardous	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	%	5.00	20.75	14.44	0.00	0.00	0.00	0.00	5.26	18.40	10.14
Total	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 1 Fichtner Concept Design Report (March 2015), Design fuel analysis

Based on the description and pictures of the waste streams it was obvious, that one important product in the CRW and C&D waste (so called Gyprock, waste from gypsum building material) had not been considered. As gypsum contains sulphur ($CaSO_4$), which contributes to the SO_2 content of the flue gas, this waste stream was added to the list of products. To compensate for this change the fraction of non-combustible was reduced. The updated composition (changes shown in green) is shown in Table 2 below.

Ramboll revised	Material Sources and Compositions									
	136000	167000	98000	84000	28000	10000	12000	40000	7000	582000
Fuel Mix	23.37%	28.69%	16.84%	14.43%	4.81%	1.72%	2.06%	6.87%	1.20%	100%
	CRW	C&D	C&I	Flock Waste	Paper Pulp	Glass Residual	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Paper/card	4.30%	14.05%	22.44%	3.93%	78.40%	62.00%	30.00%	21.05%	38.54%	16.75%
Plastic film	10.20%	6.37%	10.90%	10.90%	21.60%	3.80%	2.50%	20.00%	26.94%	10.47%
Dense plastic	0.00%	6.37%	10.90%	10.90%	0.00%	34.20%	2.50%	21.05%	0.00%	7.32%
Textiles	5.30%	0.00%	12.89%	0.18%	0.00%	0.00%	0.00%	10.53%	0.00%	4.16%
Glass	0.00%	0.00%	1.81%	0.00%	0.00%	0.00%	4.00%	0.00%	8.50%	0.49%
Vegetation	8.30%	0.00%	1.70%	0.00%	0.00%	0.00%	35.00%	3.16%	0.00%	3.16%
Other combustibles	0.00%	0.00%	0.00%	70.41%	0.00%	0.00%	0.00%	0.00%	0.00%	10.16%
Metal	1.80%	1.12%	0.37%	0.00%	0.00%	0.00%	5.00%	0.00%	7.59%	1.00%
Fines	0.00%	0.94%	0.18%	0.00%	0.00%	0.00%	0.00%	11.58%	0.00%	1.10%
Wood	58.20%	43.91%	21.53%	0.85%	0.00%	0.00%	0.00%	4.21%	0.00%	30.24%
Combustibles	0.00%	0.00%	2.84%	2.84%	0.00%	0.00%	0.00%	2.11%	0.00%	1.03%
Non-combustibles	4.50%	0.00%	0.00%	0.00%	0.00%	0.00%	21.00%	1.05%	0.03%	1.56%
Hazardous	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Gyprock	2.40%	6.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.43%
Other	5.00%	20.75%	14.44%	0.00%	0.00%	0.00%	0.00%	5.26%	18.40%	10.14%
Total	100.00%	100.00%	100.00%	100.01%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 2 Ramboll Updated Technical Design Information (UTDI Nov 15), Design fuel mix revised

Composition of waste streams chemical analysis

The following table shows the initial composition of the design fuel according to the CDR.

	Units	CRW	C&D	C&I	Floc waste	Paper Pulp	Glass Recovery	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Chemical Analysis											
Carbon (C)	%	37.37	38.90	40.05	23.44	35.31	40.32	18.53	38.81	30.87	35.83
Hydrogen (H)	%	4.78	5.02	5.40	3.30	5.11	5.61	2.50	5.37	4.53	4.76
Nitrogen (N)	%	0.90	0.71	0.95	0.90	0.37	0.42	0.50	0.85	0.34	0.80
Sulphur(S)	%	0.12	0.12	0.12	0.12	0.12	0.11	0.18	0.17	0.12	0.12
Chloride (Cl)	%	0.17	0.66	1.09	1.03	0.39	2.35	0.39	1.73	0.41	0.75
Oxygen (O)	%	28.21	28.28	24.86	11.84	24.57	22.87	14.30	16.68	15.78	23.81
Water (H2O)	%	17.12	13.81	18.57	50.00	25.00	19.57	31.65	23.77	21.96	22.39
Ash	%	11.33	12.50	8.97	9.36	9.14	8.75	31.95	12.63	25.97	11.53
Total	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
NCV	**MJ/kg**	13.68	12.08	13.46	8.46	13.22	16.13	6.31	14.86	10.09	**12.34**

Table 3: Fichtner Concept Design Report (March 2015), Chemical Analysis

In order to reassess the design fuel, every single product was analysed and its chemical composition redefined based on a database of comparable products. The chemical composition of each product as used for the assessment is shown in the appendix of this memo. The chemical composition of each waste stream was then calculated based on the chemical composition of its products. The results of the redefinition are shown in the table below.

	Units	CRW	C&D	C&I	Floc waste	Paper Pulp	Glass Recovery	GO Residual	AWT Residual	MRF Residual	Design Fuel Mix
Chemical Analysis											
Carbon (C)	%	31.34	27.02	35	29.65	42.9	41.01	16.98	38.96	32.63	31.44
Hydrogen (H)	%	4.21	3.51	4.29	3.8	5.84	4.63	2.12	4.98	4.84	4.07
Nitrogen (N)	%	0.34	0.06	0.59	0.18	0	0	0.12	0.47	0	0.26
Sulphur(S)	%	**0.42**	**1.04**	0.05	0.11	0.12	0.09	0.06	0.04	0.06	0.43
Chloride (Cl)	%	0.09	0.66	1.15	1.78	0.19	3.27	0.26	2.18	0.23	0.88
Oxygen (O)	%	21.11	21.5	17.5	7.04	24.64	26.69	12.58	13.77	12.11	18.06
Water (H2O)	%	28.47	21.51	21.68	22.62	22.58	20.81	36.2	18.4	15.2	23.38
Ash	%	14.03	**24.7**	**19.74**	**34.82**	3.73	3.5	31.68	21.2	34.93	21.49
Total	%	100	100	100	100	100	100	100	100	100	100
NCV	**MJ/kg**	11.95	9.97	13.84	12.59	17.22	15.24	5.67	16.33	14.23	**12.3**

Table 4: Ramboll Updated Technical Design Information (UTDI Nov 15), Chemical Analysis revised

The following tables summarize the overall chemical analysis in the Fichtner CDR (March 2015) and the Ramboll UTDI (Nov 2015).

		C	H	O	N	S	Cl	Ash	H_2O	NCV
Concept of Design (March 15) report		35.83%	4.76%	23.81%	0.80%	0.12%	0.75%	11.53%	22.39%	**12.34** MJ/kg
UTDI (Nov 15) report	100.0%	31.4%	4.1%	18.1%	0.3%	0.4%	0.9%	21.5%	23.4%	**12.30** MJ/kg

Table 5: Comparison of Fichtner CDR and Ramboll UTDI

The major change is the increased ash content. This is mainly a result of increased inert content in C&D, C&I and floc waste. In C&D the inert is mainly coming from adherent mineral substances like gypsum or mortar. The ash in floc waste is made up from paints, dirt, fine metals and rust.

As a result of the higher ash content the percentage of combustible (mainly C, H, O) is reduced accordingly. There further is an increase of the sulphur and chloride content. Both are important parameters for the design of the air pollution control equipment and need to be chosen carefully.

The decrease of oxygen is more than proportional and a result of the chemical reassessment of the different products. As oxygen has a negative impact on the calorific value, the reduction of oxygen results in a constant overall CV – irrespective of the decrease of combustible.

Appendix

Chemical analysis and CV calculation of each waste stream.

CRW		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	4.30%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	10.20%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	0.00%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	5.30%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	8.30%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	1.80%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	58.20%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	4.50%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	2.40%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	5.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	31.3%	4.2%	21.1%	0.3%	0.4%	0.1%	14.0%	28.5%	**11.95 MJ/kg**
Concept of Design (March 15) report	100.0%	37.4%	4.8%	28.2%	0.9%	0.1%	0.2%	11.3%	17.1%	**13.68 MJ/kg**

C&D		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	14.05%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	6.37%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	6.37%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.00%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	0.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	1.12%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.94%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	43.91%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	6.50%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	20.75%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	27.0%	3.5%	21.5%	0.1%	1.0%	0.7%	24.7%	21.5%	**9.97 MJ/kg**
Concept of Design (March 15) report	100.0%	38.9%	5.0%	28.3%	0.7%	0.1%	0.7%	12.5%	13.8%	**12.08 MJ/kg**

C&I		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	22.44%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	10.90%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	10.90%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	12.89%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	1.81%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	1.70%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	0.37%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.18%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	21.53%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	2.84%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	14.44%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	35.0%	4.3%	17.5%	0.6%	0.1%	1.2%	19.7%	21.7%	**13.84 MJ/kg**
Concept of Design (March 15) report	100.0%	40.1%	5.4%	24.9%	1.0%	0.1%	1.1%	9.0%	18.6%	**13.46 MJ/kg**

Flock Waste		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	3.93%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	10.90%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	10.90%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.18%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	0.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	70.41%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	0.85%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	2.84%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	29.7%	3.8%	7.0%	0.2%	0.1%	1.8%	34.8%	22.6%	**12.59 MJ/kg**
Concept of Design (March 15) report	100.0%	23.4%	3.3%	11.8%	0.9%	0.1%	1.0%	9.4%	50.0%	**8.46 MJ/kg**

Paper Pulp		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	78.40%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	21.60%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	0.00%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.00%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	0.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	0.00%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	42.9%	5.8%	24.6%	0.0%	0.1%	0.2%	3.7%	22.6%	**17.21 MJ/kg**
Concept of Design (March 15) report	100.0%	35.3%	5.1%	24.6%	0.4%	0.1%	0.4%	9.1%	25.0%	**13.22 MJ/kg**

Glass Residual		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	62.00%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	3.80%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	34.20%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.00%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	0.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	0.00%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	41.0%	4.6%	26.7%	0.0%	0.1%	3.3%	3.5%	20.8%	**15.24 MJ/kg**
Concept of Design (March 15) report	100.0%	40.3%	5.6%	22.9%	0.4%	0.1%	2.4%	8.8%	19.6%	**16.13 MJ/kg**

GO Residual		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	30.00%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	2.50%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	2.50%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.00%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	4.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	35.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	5.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	0.00%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	21.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	17.0%	2.1%	12.6%	0.1%	0.1%	0.3%	31.7%	36.2%	**5.67 MJ/kg**
Concept of Design (March 15) report	100.0%	18.5%	2.5%	14.3%	0.5%	0.2%	0.4%	32.0%	31.7%	**6.31 MJ/kg**

AWT Residual		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	21.05%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	20.00%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	21.05%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	10.53%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	3.16%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	11.58%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	4.21%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	2.11%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	1.05%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	5.26%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	39.0%	5.0%	13.8%	0.5%	0.0%	2.2%	21.2%	18.4%	**16.33 MJ/kg**
Concept of Design (March 15) report	100.0%	38.8%	5.4%	16.7%	0.9%	0.2%	1.7%	12.6%	23.8%	**14.86 MJ/kg**

MRF Residual		C	H	O	N	S	Cl	Ash	H_2O	NCV
Paper/card	38.54%	35.3%	4.1%	31.4%	0.0%	0.2%	0.0%	4.1%	25.0%	12.15 MJ/kg
Plastic film	26.94%	70.7%	12.1%	0.0%	0.0%	0.0%	0.9%	2.6%	13.8%	35.59 MJ/kg
Dense plastic	0.00%	48.2%	4.7%	21.1%	0.0%	0.0%	9.5%	2.6%	14.0%	18.58 MJ/kg
Textiles	0.00%	48.8%	4.1%	10.5%	4.3%	0.0%	0.0%	7.5%	25.0%	19.36 MJ/kg
Glass	8.50%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Vegetation	0.00%	9.8%	1.3%	7.5%	0.3%	0.0%	0.0%	1.0%	80.0%	1.92 MJ/kg
Other combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Metal	7.59%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Fines	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Wood	0.00%	33.0%	4.2%	30.4%	0.1%	0.1%	0.0%	2.8%	29.3%	11.50 MJ/kg
Combustibles	0.00%	20.4%	2.4%	4.4%	0.2%	0.2%	0.9%	46.5%	25.0%	8.30 MJ/kg
Non-combustibles	0.03%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Hazardous	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.00 MJ/kg
Gyprock	0.00%	0.0%	0.0%	36.8%	0.0%	15.2%	0.0%	28.0%	20.0%	-2.87 MJ/kg
Other	18.40%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	90.0%	10.0%	-0.24 MJ/kg
UTDI (Nov 15) report	100.0%	32.6%	4.8%	12.1%	0.0%	0.1%	0.2%	34.9%	15.2%	**14.23 MJ/kg**
Concept of Design (March 15) report	100.0%	30.9%	4.5%	15.8%	0.3%	0.1%	0.4%	26.0%	22.0%	**10.09 MJ/kg**