APPENDICES

Appendix 1

R1 Calculation

CONSTRUCTIONS INDUSTRIELLES DE LA MÉDITERRANÉE CNIM

E	Update with LHV 9,5MJ/kg	15/06/17	
D	Update for final offer	09/01/17	
C	Update with LHV 9,2MJ/kg	12/07/16	
B	Update	30/03/15	
A	First issue	12/03/15	
REV.	OBJET	DATES	ENR

Un trait dans la marge signale une évolution du texte depuis l'indice précédent.

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DESIGNATION DE L'AFFAIRE :

KEIGHLEY

TITRE :

Energy Efficiency - R1

Ce document dans son statut BPE reste applicable pendant toute la phase de réalisation

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Preliminary values

		Reporting year (8000h)			
	Type of energy	Unit	amount [tonne]	NCV [kJ/kg]	Energy Ex [MWh]
1.1	amount of incinerated waste (without 1.2 and 1.3)		148 544	9 500	391 972
1.2	e.g. amount of incinerated sewage sludge		0		
1.3	e.g. amount used activated carbon incinerated		0		
1	**E_w: energy input to the system by waste**	**MWh**			**391 972**
2.1	$E_{f\,1}$: amount of light fuel oil for start up (after connection with the steam grid)	litre	18 856	42 705	206
2.2	$E_{f\,2}$: amount of light fuel oil for keeping the incineration temperature	litre	0		
2.3	$E_{f\,3}$: amount of natural gas for start up and keeping incineration temperature	Nm3	0		
2	**S E_f: energy input by imported energy with steam production**	**MWh**			**206**
3.1	$E_{i\,1}$: amount of light fuel oil for start up/shut down (no connection with the steam grid)	litre	18 856	42 705	206
3.2	$E_{i\,2}$: e.g. natural gas for heating up of flue gas temperature for SCR	Nm3	0		
3.3	$E_{i\,3}$: imported electricity (multiplied with the equivalence factor 2.6)				869
3.4	$E_{i\,4}$: imported heat (multiplied with the equivalence factor 1.1)		0		
3	**S E_i: energy input by imported energy without steam production**	**MWh**			**1 075**
4.1	Ep_{el} internal used: electricity produced and internally used for the incineration process	MWh			101 837
4.2	Ep_{el} exported: electricity delivered to a third party	MWh			0
4	**S $Ep_{el\ produced}$ = $E_{pel\ internal\ used}$ + $E_{pel\ exported}$**	**MWh**			**101 837**
5.1	$Ep_{heat\ exp.1}$: steam delivered to a third party without backflow as condensate				0
5.2	$Ep_{heat\ exp.2}$: district heat delivered to a third party with backflow as condensate (hot water)				0
5	**$Ep_{heat\ exported}$ = $Ep_{heat\ exp.1}$ + $Ep_{heat\ exp.2}$**	**MWh**			**0**
6.1	$Ep_{heat\ int.used1}$: for steam driven turbo pumps for boiler water, backflow as steam				0
6.2	$Ep_{heat\ int.used2}$: for heating up of flue gas with steam, backflow as condensate				2 909
6.3	$Ep_{heat\ int.used4}$: for concentration of liquid APC residues with steam, backflow as condensate				0
6.4	$Ep_{heat\ int.used5}$: for soot blowing without backflow as steam or condensate				3 694
6.5	$Ep_{heat\ int.used7}$: for heating purposes of buildings/instruments/silos, backflow as condensate				0
6.6	$Ep_{heat\ int.used8}$: for deaeration-demineralization with condensate as boiler water input				
6.7	$Ep_{heat\ int.used9}$: for NH4OH (water) injection without backflow as steam or condensate				0
6	**S $Ep_{heat\ int.used}$ = S $Ep_{heat\ int.used1-9}$**	**MWh**			**6 603**

R1 = [(Ep - (Ef + Ei)) / (0.97 * (Ew + Ef))] * Climatic factor	**[-]**	**Climatic factor = 1,05**
Ep = 2.6*(S $Ep_{el\ int.used}$+S $Ep_{el\ exported}$) + 1.1*(S $Ep_{heat\ int.used}$+S $Ep_{heat\ exported}$)	**MWh**	**272 039**
R1 = [((2.6*(101 683) + 1.1*(5 935+0)) - (206+1 066))/(0.97*(391 983+206)] * 1,05	**[-]**	**74,4%**