PROFORMA FOR DETERMINING ENERGY EFFICIENCY USING R1

Site name North Wales Deeside Site | **Permit reference**

What data has been used in the application? → Design data

Details of who to contact if we have any queries regarding this form

Environment Agency

		Quantity in reporting year	Units	U_c	Properties (Average over reporting year)	Units	Note which parameters that have been estimated	Reference to Supporting information
Indicative R1 factor (subject to confirmation)	0.76							
1. Gross electricity meter (Electricity produced at turbine)		131472	MWh					Water-Steam cycle
2. Electricity exported - Net input/output meter		115695	MWh				12% Parasitic Load	Assumed
3. Electricity imported - Net input/output meter		75	MWh				0.5MW for 150hr/year	Assumed
4. Other fuel inputs								
	4.1 Light fuel oil	217620	litres		0.93	kg/l		3 cold start ups @
					42800	kJ/kg	Fuel consumption for st	25000kg
	4.2 Natural gas		Nm^3		34200	kJ/Nm^3		
	4.3 LPG		Nm^3			kg/Nm^3		
						kJ/kg		
	4.4 Other fuels similar to light fuel oil		litres			kg/l		
						kJ/kg		
5. Primary combustion air (as supplied to furnace)		577728000	Nm^3		100	°C		
					1.287	kg/Nm^3		
					75.75	kJ/kg		Water-Steam cycle
6. Secondary combustion air (as supplied to furnace)		510624000	Nm^3		100	°C		
					1.287	kg/Nm^3		
					75.75	kJ/kg		Water-Steam cycle
7. Recycled flue gas (as supplied to furnace)			Nm^3			°C		
						kg/Nm^3		
					0	kJ/kg		
8. Heat exported outside R1 boundary								
	8.1 steam exported		tonnes			°C		
						kPa		
						kJ/kg		
	condensate returned		tonnes			°C		
						kPa		
						kJ/kg		
	8.2 hot water exported		tonnes			°C		
						kPa		
						kJ/kg		
	hot water returned		tonnes			°C		
						kPa		
						kJ/kg		
9. Internal steam use								
	9.1 for soot blowing (no backflow)	0	tonnes			°C		Mechanical rapping
						kPa		and shot cleaning used
						kJ/kg		instead.
	9.2 for steam driven devices	2864	tonnes		418.7	°C		Steam for evacuation of
					5800	kPa		ACC. Water-Steam
					3230	kJ/kg		cycle.
	backflow as steam	2864	tonnes		40.5	°C		Steam for evacuation of
					100	kPa		ACC. Water-Steam
					169	kJ/kg		cycle.
	9.3 for trace heating	0	tonnes			°C		
						kPa		Electrical trace heating
						kJ/kg		used.
	backflow as condensate	0	tonnes			°C		
						kPa		Electrical trace heating
						kJ/kg		used.
	9.4 for re-heating flue gas	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
	9.5 for concentration processes	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
	9.6 for building, equipment, tank heating	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
	9.7 for deaeration and demineralisation	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
	9.8 other internal applications, in line with commission guidance, to be specified	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
	9.9 other internal applications, in line with commission guidance, to be specified	0	tonnes			°C		
						kPa		
						kJ/kg		
	backflow as condensate	0	tonnes			°C		
						kPa		
						kJ/kg		
10. Use of condensing energy from steam in flue gas		0	GJ					
11. Superheated steam at boiler outlet		576856	tonnes		420	°C		
					6000	kPa		
					3230	kJ/kg		Water-Steam cycle
12. Boiler feedwater		583024	tonnes		130	°C		
					8150	kPa		
					552	kJ/kg		Water-Steam cycle
13. Boiler efficiency		87%	±	1.5%				Water-Steam cycle

Instructions for completing this spreadsheet

1. Ensure that you have completed the first three rows of the application form
2. This form should be accompanied by supporting information for the figures quoted. Where this information is in the permit application, reference to the relevant sections of the application can be made.
   A Sankey diagram (or equivalent) reflecting the boundaries of the installation used as well as any references to physical properties is the absolute minimum that should be provided for an application based on design information
3. We have colour coded the cells in this spreadsheet to assist you in completing this form, an explanation of the colour codes is provided below. The colour will disappear when data has been entered.
   Blue cells require data that is essential for the R1 calculation, where information on uncertainty of the data is available it would be useful (but not mandatory) for this to be included for these parameters.
   Beige Cells indicate that any data entered will be used in the R1 calculation. They have been used where there is a choice of inputs but not all plants will have data for all the input options.
   Where you are entering data into beige cells you need to make sure that you enter data into all the beige cells associated with the input as they are all needed for carrying out the calculation.
   Yellow cells have been used to provide flexibility to include fuels or energy uses not identified elsewhere. Supporting information to explain why the standard fields were not appropriate or adequate will need to be provided where these cells are used
   Data entered in uncoloured cells are not used when calculating the R1 energy efficiency factor but can be completed to provide a more complete data set.
4. If you believe that any of the information that you have submitted in this application form is commercially confidential please identify the confidential information and the grounds on which you believe it to be confidential in your covering letter