



Natural Resources Wales
Chester Road
Buckley
Flintshire
CH7 3AJ

Attention of: Alison Soper – Regulatory Officer PPC/RSR

26th February 2016

Dear Mrs Soper

Re: Improvement Programme Item Reference IC34 - Permit Number: EPR/BR9383ID/V007

Please find enclosed a report to satisfy the requirements of Improvement Programme Item Reference 34 as referenced in Table S1.3 of the Environmental Permit.

As identified in the report, the logic that has been applied to define normal operating conditions cannot retrospectively be applied to the Plant's OSi Pi Monitoring System, as the system monitors real time data. Therefore, I request a three month trial period (March, April, May) to verify that the process conditions give a correct and reliable 'Plant Status' output in OSi Pi and that the sample interval used gives a clear operating/not-operating signal.

I trust this information is satisfactory, however, please do not hesitate to contact me should you require any further information.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Keouski'.

Claire Keouski
HSE Manager

Enc.

Introduction

This document is submitted to meet the requirement of Improvement Programme Item Number 34 of Table S1.3 of the EPR Permit, which stipulates that *'the operator shall submit a written report defining the parameters of normal operating conditions'*.

Parameters of Normal Operating Conditions

Three process conditions have been identified, which define the beginning and end of normal operating conditions:

1. Flue Gas Top Temperature >60°C
2. After burner CO Measurement <15%
3. Flue Gas Abatement System K324 damper set point <36%

Flue Gas Top Temperature:

In normal operation, the flue gas top temperature is greater than 60°C degrees, which is indicative of melting stone. A top temperature of less than 60 degrees equates to abnormal operation, which is encountered during start-ups, shutdowns and prolonged hold periods.

After burner CO Level:

In normal operation, CO measurement is less than 15%. During start-ups, Co levels can increase up to 23% as a result of the increased coke level required to initially light the furnace. Once the coke bed is fully lit, CO levels decrease as the standard coke amount feeds into the cupola.

Flue Gas Abatement System K324 Damper Control:

The flue gas abatement system K324 damper allows additional preheated combustion air from W40, which is the blast air heat exchanger and is utilised during start-ups to aid combustion. On start-ups, the K324 valve automatically opens from its normal set point of 35% to 60% to facilitate additional oxygen in the combustion zone when CO is above 'normal' levels. This additional combustion air is no longer required when CO levels return to normal and thus, the K324 damper returns to its normal set point of 35%, which is indicative of normal operation. The transducer within K324 is scaled in such a manner that a set point of 35% may be slightly over or under due to the hysteresis of the mechanical device and therefore, the set point of less than 36% is acceptable given the tolerances of the feedback system.

Application of the Parameters of Normal Operating Conditions

Logic has been created based on the three process conditions, which are considered to define normal operating conditions as agreed by HSE, Technical, Production Hot End and Engineering Department Leaders. The logic has been tested on historical start-up and shutdown data in Excel.

Start-up Data: 10/02/16

Normal Operating Status: 1 = Operating / 0 = Not Operating

QF_Env_ML1_AfterBurner_Filter_CO_Prc_MV				
QF_Aft_ML1_Abatement_Cupola_FlueGas_Tmp_MV				
QF_Aft_ML1_Abatement_BurnerChamber_CoolingValve_Pos_MV				
Date	CO %	Top Temp °C	K324 Valve %	Operating Condition (Normal =1)
10/Feb/16 14:40:00	17.80	174.77	59.92	0
10/Feb/16 14:41:00	17.80	177.08	59.92	0
10/Feb/16 14:42:00	17.32	165.51	59.92	0
10/Feb/16 14:43:00	16.72	164.06	59.92	0
10/Feb/16 14:44:00	16.23	164.93	59.92	0
10/Feb/16 14:45:00	15.55	166.96	59.92	0
10/Feb/16 14:46:00	15.59	159.43	59.92	0
10/Feb/16 14:47:00	14.87	156.83	59.92	0
10/Feb/16 14:48:00	14.87	147.57	59.92	0
10/Feb/16 14:49:00	14.19	148.15	59.92	0
10/Feb/16 14:50:00	14.19	147.86	59.92	0
10/Feb/16 14:51:00	13.87	153.07	59.92	0
10/Feb/16 14:52:00	13.27	150.17	59.92	0
10/Feb/16 14:53:00	12.96	144.68	59.92	0
10/Feb/16 14:54:00	12.83	132.81	59.92	0
10/Feb/16 14:55:00	12.93	124.71	59.92	0
10/Feb/16 14:56:00	12.99	127.60	59.92	0
10/Feb/16 14:57:00	12.52	131.66	59.92	0
10/Feb/16 14:58:00	12.74	121.53	59.92	0
10/Feb/16 14:59:00	12.49	119.79	59.92	0
10/Feb/16 15:00:00	12.24	120.37	59.92	0
10/Feb/16 15:01:00	11.83	111.40	59.92	0
10/Feb/16 15:02:00	11.57	109.09	59.92	0
10/Feb/16 15:03:00	11.28	111.40	59.92	0
10/Feb/16 15:04:00	10.93	114.00	59.92	0
10/Feb/16 15:05:00	9.62	116.32	59.92	0
10/Feb/16 15:06:00	9.40	114.00	59.92	0
10/Feb/16 15:07:00	8.97	116.32	59.92	0
10/Feb/16 15:08:00	8.62	116.32	59.92	0
10/Feb/16 15:09:00	7.97	117.48	34.87	1
10/Feb/16 15:10:00	7.68	117.48	34.87	1
10/Feb/16 15:11:00	7.68	114.87	34.87	1
10/Feb/16 15:12:00	7.38	111.40	34.87	1
10/Feb/16 15:13:00	7.38	108.22	34.87	1

The data shows that the logic changes when all three process parameters meet the criteria for normal operation.

Shutdown Data: 18/02/16

Normal Operating Status: 1 = Operating / 0 = Not Operating

QF_Env_ML1_AfterBurner_Filter_CO_Prc_MV				
QF_Aft_ML1_Abatement_Cupola_FlueGas_Tmp_MV				
QF_Aft_ML1_Abatement_BurnerChamber_CoolingValve_Pos_MV				
Date	CO %	Top Temp °C	K324 Valve %	Operating Condition (Normal =1)
18/Feb/16 14:34:00	10.28	121.53	34.90	1
18/Feb/16 14:35:00	7.88	103.88	34.90	1
18/Feb/16 14:36:00	8.28	94.62	34.90	1
18/Feb/16 14:37:00	7.38	88.83	34.90	1
18/Feb/16 14:38:00	6.88	84.49	34.90	1
18/Feb/16 14:39:00	6.88	81.31	34.90	1
18/Feb/16 14:40:00	6.58	74.94	34.90	1
18/Feb/16 14:41:00	7.48	72.05	34.90	1
18/Feb/16 14:42:00	5.58	71.18	34.90	1
18/Feb/16 14:43:00	5.58	70.60	34.90	1
18/Feb/16 14:44:00	5.58	69.73	34.90	1
18/Feb/16 14:45:00	5.58	68.58	34.90	1
18/Feb/16 14:46:00	5.58	68.29	34.90	1
18/Feb/16 14:47:00	5.58	96.06	34.90	1
18/Feb/16 14:48:00	4.59	85.07	34.90	1
18/Feb/16 14:49:00	3.18	72.34	34.90	1
18/Feb/16 14:50:00	2.87	62.21	34.90	1
18/Feb/16 14:51:00	3.08	56.71	34.90	0
18/Feb/16 14:52:00	3.08	54.69	34.90	0
18/Feb/16 14:53:00	3.08	54.98	34.90	0
18/Feb/16 14:54:00	3.28	54.11	34.90	0
18/Feb/16 14:55:00	3.28	52.37	34.90	0
18/Feb/16 14:56:00	3.28	51.22	34.90	0
18/Feb/16 14:57:00	3.28	47.45	34.90	0
18/Feb/16 14:58:00	3.28	47.74	34.90	0
18/Feb/16 14:59:00	3.28	41.09	34.90	0
18/Feb/16 15:00:00	3.58	39.64	34.90	0
18/Feb/16 15:01:00	3.58	39.06	34.90	0
18/Feb/16 15:02:00	3.38	38.77	34.90	0
18/Feb/16 15:03:00	3.38	39.06	34.90	0

The data shows that the logic changes when all three process parameters meet the criteria for normal operation.

Conclusion

The logic for normal operating conditions has been proven in Excel, however this logic cannot retrospectively be applied to the Plant's OSI Pi Monitoring System, as the system monitors real time data. Therefore, 'Plant Status' tags have subsequently been created in the OSI Pi Monitoring system and I request a three month trial period (March, April, May) to verify that the process conditions give a correct and reliable 'Plant Status' output in OSI Pi and that the sample interval used gives a clear operating/not-operating signal.

C. Keouski
HSE Manager