RPS Health, Safety and Environment
Steadings Barn
Pury Hill Business Park
Nr Alderton
Towcester
Northants NN12 7LS

Report Date: 24th July 2006
Report Ref: FTA 5629

Hydrogen Sulphide Monitoring
07/07/06

COVENTRY CASTINGS LTD

Report on Air Emission Monitoring at

COVENTRY CASTINGS LTD

ALDERMANS GREEN, COVENTRY, CV2 2LD

JULY 2006

Stack Emission Monitoring Report – Executive Summary
Ref. FTA 5629

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Investigation in to the Emissions of Hydrogen Sulphide to Atmosphere

Part 1:	**Executive Summary**
Permit Number:	**PPC/093, variation 001**
Operator:	**Coventry Castings Ltd**
Installation:	**Barlow Road, Coventry**
Emission Point:	**Furnace Extraction Stack - H**
Monitoring Date(s):	**7th July 2006**

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Contract Reference:	FTA 5629
Operator:	Coventry Castings Ltd
Address:	Barlow Road Aldermans Green Industrial Estate Aldermans Green Coventry CV2 2LD
Monitoring Organisation:	RPS Health, Safety & Environment
Address:	Steadings Barn, Pury Hill Business Park, Alderton Road, Towcester, Northamptonshire, NN12 7LS
Report Date:	24th July 2006
Report Approved By:	Richard Harvey
Position:	Team Manager
MCERTS Registration No.:	MM02 020
Signature:	[redacted]

RPS Health, Safety and Environment has produced this report within the term of the contract with the client and taking account of the resources devoted to it by agreement with the client.

We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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Part 1: Executive Summary

Monitoring Objectives

At the request of Mr Ian Reid of Coventry Castings Ltd, RPS Health, Safety and Environment conducted air emission monitoring at the Coventry site in July 2006.

The monitoring programme at this installation was carried out to provide data on the emissions to atmosphere from the Furnace Extraction Stack - H

The parameters requested for monitoring and the actual monitoring conducted are detailed below.

Table 1

Parameters Requested to be Monitored	**Emission Point**
	Furnace Extraction Stack - H
Gas Velocity and Temperature Traverse	✓
Hydrogen Sulphide	✓
Specific Requirements	See table 3

Notes:
✓ *Represents the actual parameters monitored.*
✗ *Parameters requested but not monitored.*

Monitoring Results

Table 2 – Monitoring Results from the Furnace Extraction Stack - H at Coventry Castings, Coventry in July 2006

Substance Monitored	Emission Limit Value ✣	Periodic Monitoring Result	Units	Uncertainty (mg/m^3) #	Reference Conditions 273K, 101.3kPa....	Sampling Date	Sampling Times	Monitoring Reference Method	Accreditation Status	Operating Status
Hydrogen Sulphide	5ppm ($3.8mg/m^3$)	<0.25	mg/m^3	± 0.040	wet gas, without correction for oxygen	7-July-06	10:47 – 13:38	USEPA Method 11	UKAS	See table 3

Notes:
 # The uncertainty associated with the quoted result is at the 95% confidence interval
✣ As stated in the Coventry City Council Permit PPC 093, variation notice 001

Operating Information

Table 3 – Operating Information Relating to the Monitoring of the Furnace Extraction at Coventry Castings Ltd, Coventry in July 2006

Parameter	Result
Sample Date	7th July-06
Process Type	Batch – Grade 17 waste steel wheel hubs were melted in the electric induction furnace to >1420°C. After drossing, a portion of the melt was transferred to a 600kg ladle. This was covered with an exothermic flux. The remaining melt was transferred to a large sand cast.
Process Duration	2 hours and 50 minutes
If 'Batch', was monitoring carried out over the whole batch?	Yes – covered melting (from cold), drossing and transfer stages
If 'No', give details	N/A
Abatement/Operational?	None
Fuel Type	N/A (electric coreless induction furnace)
Feedstock	Grade 17 steel wheel hubs
Load	Approx. 1.5 tonnes
Throughput	N/A
Continuous Rating	N/A

Monitoring Deviations

Table 4 – Monitoring Deviations During Monitoring of the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in July 2006

Substance Deviations	Monitoring Deviations	Other Relevant Issues
Furnace Extraction Stack - H: None	**Furnace Extraction Stack - H**: None	**Furnace Extraction Stack - H**: Please refer to the Site Specific Protocol

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JULY 2006

Supplementary Information to the Stack Emission Monitoring Report – Executive Summary

Ref. FTA 5629

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Investigation in to the Emissions of Hydrogen Sulphide to Atmosphere

Part 2:	**Supporting Information**
Permit Number:	**PPC/093, variation 001**
Operator:	**Coventry Castings Ltd**
Installation:	**Barlow Road, Coventry**
Emission Point(s):	**Furnace Extraction Stack - H**
Monitoring Date(s):	**7th July 2006**

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THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
1709

Contract Reference:	FTA 5629
Operator:	Coventry Castings Ltd
Address:	Barlow Road Aldermans Green Industrial Estate Aldermans Green Coventry CV2 2LD
Monitoring Organisation:	RPS Health, Safety & Environment
Address:	Steadings Barn, Pury Hill Business Park, Alderton Road, Towcester, Northamptonshire, NN12 7LS
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Part 2: Supporting Information

APPENDIX 1: General Information

Monitoring Organisation Staff Details

Table 5

Site Team	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Martin Johnson	Team Leader	2	1, 2 & 3	MM 03 168
Matt Sumner	Technician	1	1	MM 05 622

Report Author	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Martin Johnson	Team Leader	2	1, & 3	MM 03 168

Report Reviewer	Position	MCERTS Level	Technical Endorsements	MCERTS Registration Number
Richard Harvey	Team Manager	2	1,2,3 & 4	MM02 020

Monitoring Organisation Method Details

Table 6

Emission Parameter	Standard Method	Monitoring Procedure No.	Monitoring Accreditation Status	Analysis Technique	Analysis Procedure No.	Analytical Laboratory	Analysis Accreditaton Status
Practical Considerations Prior to Monitoring	N/A	RPSCE/1/1	MCERTS	N/A	N/A	N/A	N/A
Gas Flows	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Gas Temperatures	BS-EN 13284-1:2001	RPSCE/1/2	MCERTS	N/A	N/A	N/A	N/A
Hydrogen Sulphide	USEPA Method 11	RPSCE/1/17	UKAS	Colourimetry	BLM 256	Butterworth Laboratories Ltd	UKAS

APPENDIX 2: Emission Point(s): Furnace Extraction Stack - H

Stack Gas Measurements

Table 7 - Temperature and Velocity Profile

Results of Gas Flows and Gas Temperatures Measured from the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry on the 7th July 2006

Traverse Point (m)	Sample Line A				Sample Line B			
	T (°C)	ΔP (Pa)	Neg. Flow?	Spin <15°	T (°C)	ΔP (Pa)	Neg. Flow?	Spin <15°
0.10	40	7.5	No	< 15	40	8	No	< 15
0.56	40	7.5	No	< 15	40	9	No	< 15

Barometric pressure (kPa)	100.6
Static Pressure (Pa)	-ve 30
Stack Dimension Ø (m)	0.66

Table 8 - Gas Measurements (continued)

Results of Hydrogen Sulphide and General Emission Parameters Measured from the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in July 2006

Emission Parameter	Units	Mean Result
Sample Date	-	07-Jul-06
Sample Period	-	10:47 – 13:38
Internal Area Of Duct	m^2	0.34
Stack Moisture Content	%	1.1
Stack Temperature	°C	40
Gas Velocity (as measured at sampling plane)	m/sec	3.8
Volumetric Flowrate (as measured)	m^3/sec	1.3
Volumetric Flowrate (at reference conditions)	m^3/sec*	1.1
Hydrogen Sulphide Mass Emission	kg/hr	<0.0010
Hydrogen Sulphide Concentration	mg/m^3*	<0.25

Notes:
* *Reference conditions expressed as 273 K, 101.3 kPa, wet gas, without correction for oxygen.*

Photograph(s)

Photograph of Furnace Extraction Stack – H and Platform at Coventry Castings Ltd in Coventry

Reportable Blank Results

Table 9 - Results of the Reportable Blank Concentrations for Hydrogen Sulphide taken for the Furnace Extraction Stack - H at Coventry Castings Ltd, Coventry in July 2006

Emission Parameter	Sample Date	Units	Mean Blank Concentration
Hydrogen Sulphide	7th July 2006	mg/m^3	<0.25

Notes:
Reference conditions expressed as 273 K, 101.3 kPa, without correction for moisture content.

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Certificate(s) of Analyses

BUTTERWORTH LABORATORIES — Contract Analytical Chemistry

Our Ref: **BL 7/0412 (06)** paw

24 July 2006

CERTIFICATE OF ANALYSIS

RPS Health, Safety and Environment
Steadings Barn
Pury Hill Business Park
Nr Alderton
Towcester
Northamptonshire NN12 7LS

For the attention of Mr M Sumner

Sample(s) of: Impingers

Date Received: 11 July 2006

Date Analysed: 24 July 2006

BLL Reference	Sample Reference	Sulphide expressed as H_2S	Volume in ml
BL 7/0412 (06)	T106677	0.5	59
BL 7/0413 (06)	T106678	0.7 0.7	57

Results in mg/l relate to samples as received.

Analysed in accordance with Butterworth Laboratories Limited documented in-house method BLM 256 (issue 4).

[redacted]

MARTIN P BOYLE
Senior Analytical Chemist

[redacted]

DAVID A RICHES
Analytical Operations Manager
for **Butterworth Laboratories Limited**

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Impingers

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Company registration No. 1185121

Copy to Michelle Mumby. 31.10.2006

Received 2/11/06.

Monitoring of Hydrogen Sulphide Emissions from the Furnace Extraction Stack – H, Coventry Castings Ltd, Barlow Road, Coventry, 7th July 2006

At the request of Mr Ian Reid of Coventry Castings Ltd, RPS Health, Safety and Environment conducted air emission monitoring in order to quantify hydrogen sulphide emissions from the Furnace Extraction Stack at the Coventry site in July 2006.

The monitoring was carried out according to RPS in house method RPSCE/1/17 "Monitoring of H_2S Based on the requirements of USEPA Method 11". This is a UKAS accredited procedure. USEPA Method 11 is the method listed in Environment Agency Technical Guidance Note M2 for the monitoring of H_2S and as such is judged to be the best available method in the absence of an appropriate CEN standard.

The basis of the method is the non-isokinetic sampling (ie at a fixed sample rate regardless of stack gas velocity) of the stack gas, and impingement into cadmium sulphate solution.

Tabulated below are the main procedural requirements of USEPA M11 and the method employed by RPS.

USEPA M11	RPS Test Method
Equipment	
Sample Probe – Teflon tubing (unheated)	Sample probe - Borosilicate glass (heated to 120°C)[1]
Sample Train – 5 Midget Impingers 1 containing 3% H_2O_2 solution 1 empty 3 containing $CdSO_4$ solution Silica Gel moisture trap	Sample Train – 5 Midget Impingers 1 containing 3% H_2O_2 solution 3 containing zinc acetate solution[2] 1 containing silica gel
Sample valve (to adjust flow rate) Dry Gas Meter (to measure volume sampled) Thermocouple (to measure DGM temperature) Shut off valve Rotameter (to measure sample rate) Diaphragm pump (to extract sample)	Apex Instruments MC 623 Source Sampler consisting of: Needle valve Calibrated DGM Rotameter Shut off valve Diaphragm pump Vacuum gauge (to measure sample train vacuum) Differential pressure gauge (to measure DGM pressure) Calibrated stopwatch Temperature controller (to control probe temperature) Calibrated thermocouple to measure DGM temperature Performance tested thermocouples to measure sample train exit temperature and probe temperature.
Barometer – Mercury, aneroid or other	Barometer - Aneroid

USEPA M11	RPS Test Method
Sample Method Leak Check ; Seal sample train and pressurize to 25cm of water. Monitor pressure drop over time (must be <1cm water/minute).	Leak Check:[3] Start pump and set sample rate (1litre/minute) Seal sample train. Observe movement of Dry Gas Meter. If train is leak free, DGM will stop dead. Maximum allowable leak rate is 2% of sample rate (in this case 20ml/min) Observed leak rate – 9ml/min
Sampling: Sample for at least 10 minutes at approximately 1litre/minute.	Sampling: Sampled for 171 minutes. Total volume sampled 187.2 litres Sample rate 1.09 litres/minute.
Post Sampling: Leak check (see above). Disconnect sample train from sample line. Purge train for 15mins in fresh air to ensure all H_2S is removed from H_2O_2 impinger.	Post Sampling: Leak check – Leak rate 20ml/min (1.8% of actual sample rate) Sample train disconnected from sample probe and train purged for 15mins in fresh air (NB – fresh air purge is not included in total volume sampled.)
Sample Recovery: Contents of H_2O_2 impinger discarded Rinse contents of $CdSO_4$ impingers into sample flask using water.	Sample Recovery: Contents of H_2O_2 impinger discarded. Contents of zinc acetate impingers rinsed into sample bottle using de-ionized water.
Sample Analysis: Iodemetry Overall limit of detection (sampling +analysis) : 8mg/m^3	Sample analysis: Colourimetry Analysis Lab: Butterworths Method: BLM 256 (UKAS accredited) Analytical limit of detection : 0.1ppm Overall limit of detection : 0.25mg/m^3

Notes:

1 H_2S is not known to react with borosilicate glass. Heating the probe to 120°C prevents condensation/adsorption of the stack gas within the probe.

2 Environment Agency TGN M2 states that USEPA M11 "involves using hazardous materials and potentially hazardous operations. Zinc Acetate solution is commonly used in the UK in place of Cadmium Sulphate solution."

3 Leak checks are carried out according to BS EN1911.